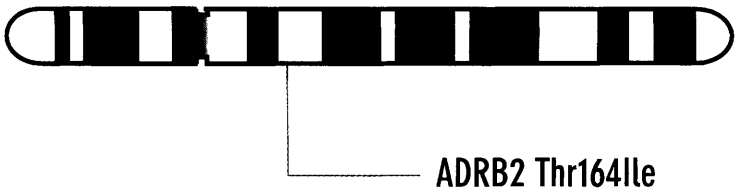


Five million Americans are living with congestive heart failure.[1] For 175,000 of them, current therapies may not be effective. This SNP could mark the difference.

SNPstream™

Automated Genotyping Systems

Another application for SNPstream™ Automated Genotyping Systems using SNP-IT™ Technology.

SNP-IT Technology from Orchid is the genotyping solution with documented accuracy >99.9%, surpassing direct DNA sequence analysis. Using Orchid's patented SNP-IT Technology, SNPstream systems provide cost-effective, high-performance automated screening for any SNP at any scale.

Any SNP—name the SNP, Orchid delivers the fully validated assay.

Any Scale—from 500–25,000 genotypes per day.

For information on SNPstream Automated Genotyping Systems call (609) 750-2200, or visit us at www.orchid.com.

The way people who do SNPs do SNPs.

ORCHID™

1. Living with Heart Failure. American Heart Association, 1999. http://www.americanheart.org

Orchid BioSciences, Inc. • 303 College Road East • Princeton, NJ 08540 • 609-750-2200 • 888-398-9352

NEW PRODUCTS

REVERSE TRANSCRIPTION WITHOUT RNA ISOLATION

The Cells-to-cDNA Kit produces cDNA from cultured mammalian cells in less than 2 hours. No RNA isolation is required. This kit is suitable for those who want to perform reverse transcriptase reactions on small numbers of cells or numerous cell samples or for users who are unfamiliar with RNA isolation.

Ambion
For more information call 800-888-8804 or **circle 147** on the Reader Service Card

PRECAST AGAROSE GELS

The AGILE (Agarose Gel In-Line Electrophoresis) Precast Agarose Gels combine resolution and reproducibility with the convenience of an ultraviolet-transparent cassette. The results can be seen without removing the gel from the cassette, and the cassette has a handle for easy transport through the electrophoresis process. The gels fit most commonly used electrophoresis units and are available in a variety of forms.

J.T. Baker
For more information call 800-582-2537 or **circle 148** on the Reader Service Card

SOLID-PHASE SYNTHESIS SUPPORTS

The StratoSpheres range of solid-phase synthesis supports is produced using novel copolymerization procedures to generate quality resins with exceptional reproducibility in loading and swell characteristics. The proprietary copolymerization procedures ensure that the level of loading and homogeneity is tightly controlled directly from the base chloromethyl styrene resin copolymer. These resins are designed to eliminate the side reactions that introduce anomalous functional groups or additional crosslinking, which would interfere with solid-supported reactions.

Polymer Laboratories
For more information call +44 01694 723581 or **circle 149** on the Reader Service Card

LITERATURE

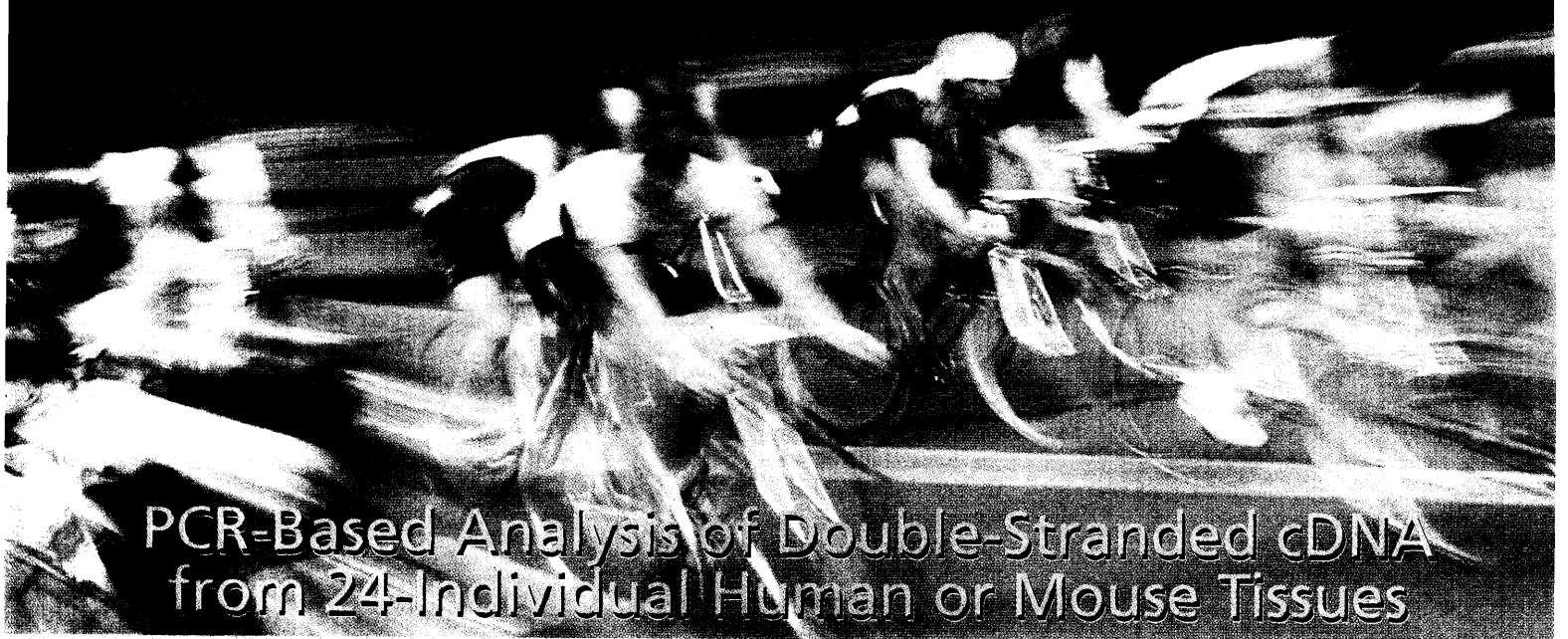
Mini-Catalog: Multidrug Resistance (MDR) Monoclonal Antibodies to MDR-Related Proteins reviews the latest developments for P-glycoprotein, multidrug resistance–associated protein, and lung-resistance–related protein. It also contains a section on substrates and inhibitors. The catalog is organized by product group to allow the researcher to easily find products and technical information on specific areas of interest. More than 120 literature references are cited.

Alexis Biochemicals
For more information call 800-900-0065 or **circle 150** on the Reader Service Card

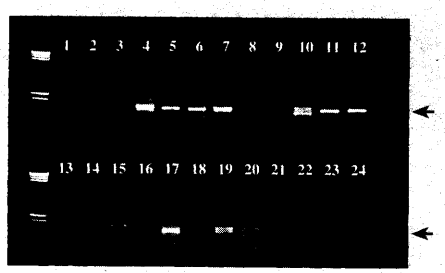
Newly offered instrumentation, apparatus, and laboratory materials of interest to researchers in all disciplines in academic, industrial, and government organizations are featured in this space. Emphasis is given to purpose, chief characteristics, and availability of products and materials. Endorsement by *Science* or AAAS of any products or materials mentioned is not implied. Additional information may be obtained from the manufacturers or suppliers named by circling the appropriate number on the Reader Service Card and placing it in a mailbox. U.S. postage is free.

OriGene Sure-RACE™

Multi-Tissue RACE Panel

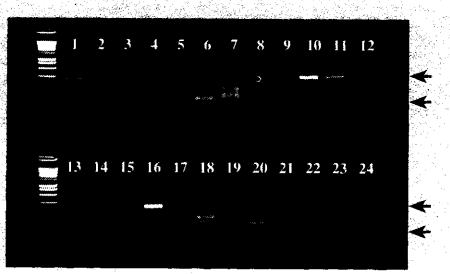


PCR-Based Analysis of Double-Stranded cDNA from 24-Individual Human or Mouse Tissues



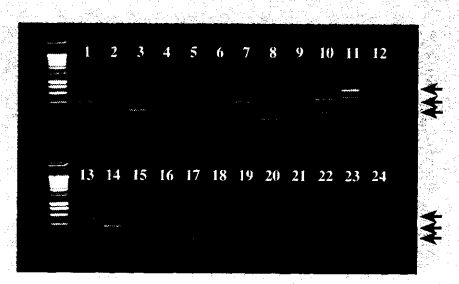
(1) To complete the 5'-end sequences of long and rare transcripts with extensive secondary structures.

The ataxia telangiectasia (ATM) gene encodes an ubiquitous ~12 kb transcript with extensive conformations and heterogeneous 5' ends.



(2) To discover alternate RNA start-sites derived from different tissue-specific transcriptional promoters.

The intercellular adhesion molecule-1 (ICAM-1) gene uses different promoters to initiate transcription



(3) To identify differentially-spliced transcripts that contain alternate 5' exons that are utilized in different tissues.

The fibroblast growth factor 1 (FGF-1) gene makes use of different 5' exons to regulate its expression.

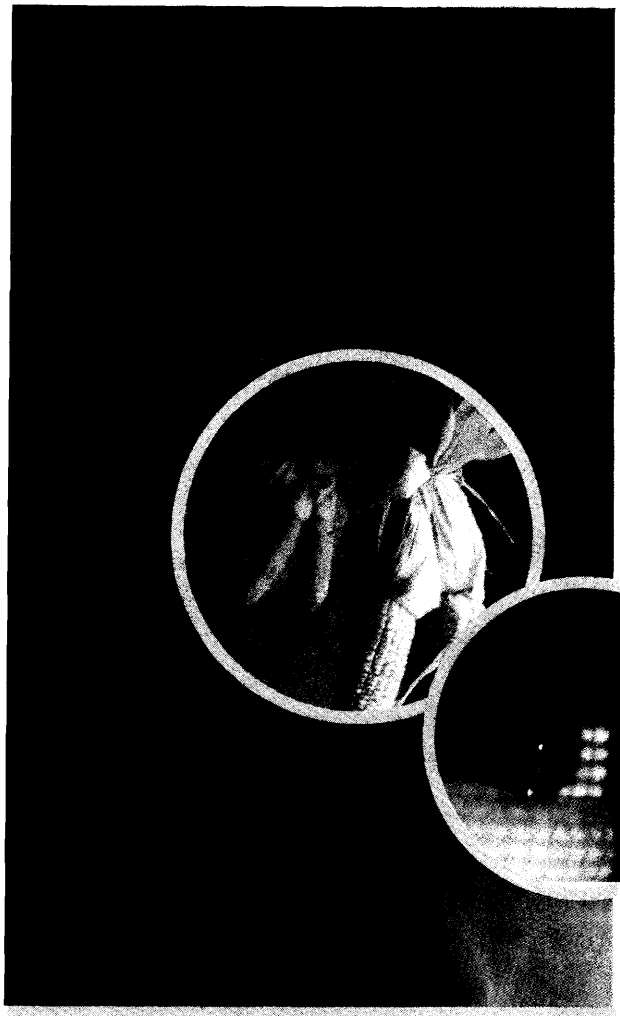
Contact Us At: **OriGene Technologies Inc.,**
6 Taft Court, Suite 300, Rockville, Maryland 20850
E-mail: custsupport@origene.com • Fax: 301-340-9254
Phone: 301-340-3188 • U.S. Toll Free: 1-888-267-4436
Visit our website at www.origene.com

ORIGENE TECHNOLOGIES, INC.

OUR INTERNATIONAL DISTRIBUTORS

Austria and Eastern Europe - RuP Margaritella GmbH (tel) +43 1 889 18 19 (fax) +43 1 889 18 19 20; **France** - Clinisciences (tel) +33-1 42 53 14 53 (fax) +33-1 46 56 97 33; **Germany and Benelux Countries** - Eurogentec (tel) +32 4 366 0150 (fax) +32 4 365 5103; **Germany** - AMS Biotechnologie GmbH (tel) +49 (0)69 288 082 (fax) +49 (0)69 133 76 880; **Italy** - (tel) +39 02-5801 34 50 (fax) +39 02-5801 34 38; **Sweden** - (tel) +46-8-3060 10; **Switzerland** - (tel) +41 061-795 9610; **United Kingdom** - Cambridge Bioscience (tel) +44 (01223) 316855 (fax) +44 (01223) 360732 • For all other countries, visit the OriGene website or call 301 340 3188

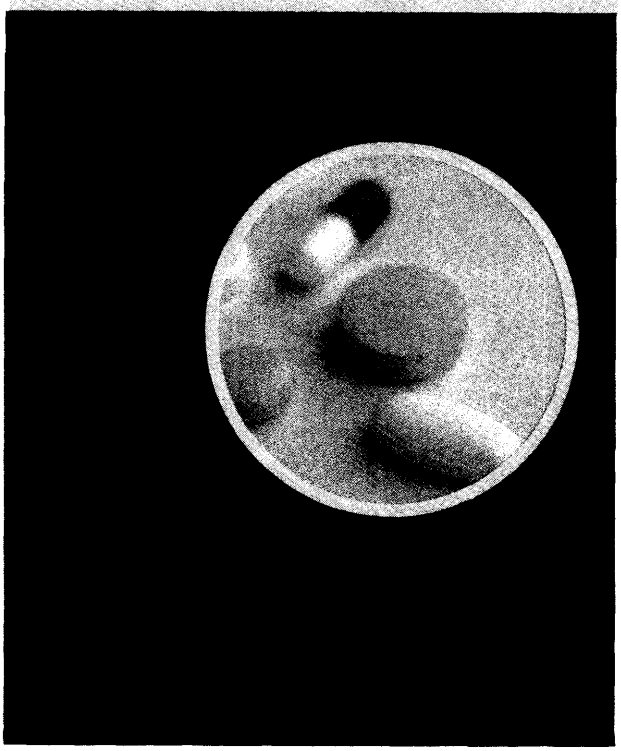
Circle No. 38 on Readers' Service Card



Technologies in Genomic Research: The Sequel

Within the next few years, technologies developed for the Human Genome Project and similar sequencing efforts will revolutionize medicine, agriculture, crimefighting, and other fields. They will also stimulate debate on social issues, notably those involving privacy and identity. by Peter Gwynne and Guy Page

▮ New Forms of Therapy ▮ Social Concerns ▮ Seeing the Light in Drug Discovery ▮ Fresh Pathways ▮ Dealing with Databases ▮ ▮ A SNP Off the Old Block ▮ Dawn of Personalized Medicine ▮ Attack on the Killer Pathogens ▮ Food Fight ▮ Identity Crisis? ▮



Just as the second half of the 20th century was the age of the computer, the first half of the 21st century promises to be the era of biology. Our grip on the fundamentals of biological processes tightens almost daily, and we become ever more able to manage, manipulate, and control the very essence of who we are. Much of this control has stemmed directly from the rapid and impressive successes of the Human Genome Project (HGP), the privately funded Celera effort, and other sequencing efforts.

The stunning successes of those recent projects owe much to pioneering work in what now appears to be the prehistorical period of biology. After all, great science resembles great wine in requiring plenty of time to reach its prime. Computers provide a valuable example. The seminal, catalytic event that led almost irrevocably to the creation of today's computers occurred in the 1920s with the development of the vacuum tube. Yet it took almost 50 more years of research and development before computers emerged as truly useful and practical tools. And another 20 years passed before they became household items.

In molecular genetics, the comparable catalytic event was the discovery of the structure of DNA by Watson and Crick. In retrospect, the path leading from that find to today's near-completion of the entire sequence of the human genome appears almost inevitable. But it has taken time. Only now, after almost 50 years of struggle and discovery, is life science really beginning to hit its stride as an authentically powerful technical force.

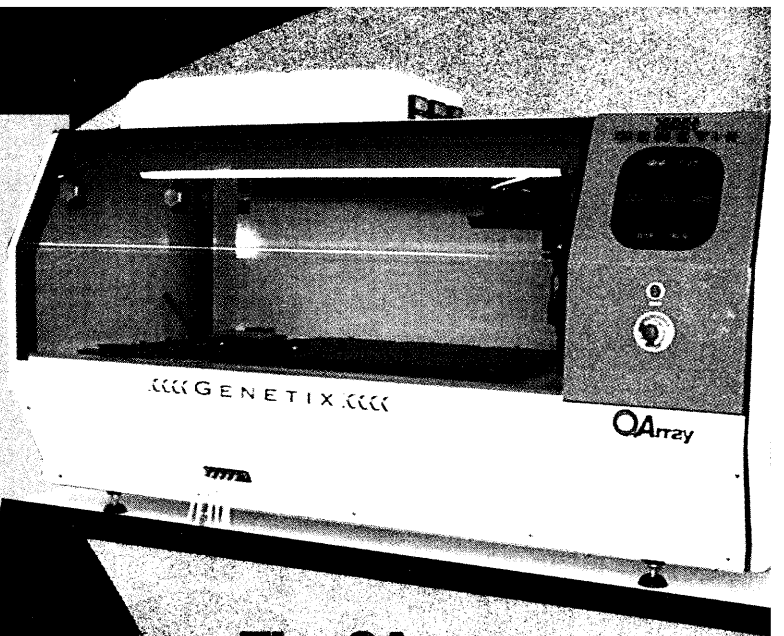
Now the discipline has reached the point at which it can become the kind of revolutionary, transforming technology that computing has become over the past couple of decades. That transformation will take place via the vehicle of genomics. It will affect virtually every aspect of biology and medicine.

continued ➢

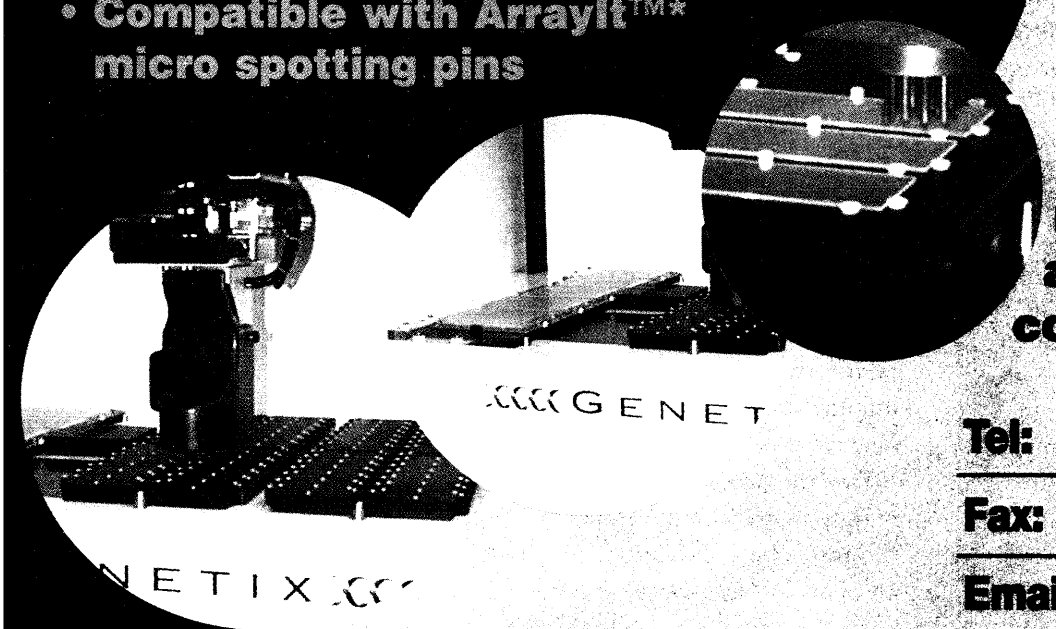
The companies in this article were selected at random. Their inclusion in this article does not indicate endorsement by either AAAS or *Science*, nor is it meant to imply that their products or services are superior to those of other companies.

QArray

Microarrayer



- Compatible with 384 well plates
- 84 Slide capacity
- User friendly, networkable software
- High pressure wash station
- 1µm resolution encoders
- HEPA Air Filtration and humidity control
- Compatible with ArrayIt™* micro spotting pins



The QArray from Genetix is a novel, automated microarrayer from the makers of the QBot and QPix. The QArray offers high speed and high accuracy microarraying at an affordable cost.

Tel: +44 (0) 1202 483900

Fax: +44 (0) 1202 480289

Email: sales@genetix.co.uk

Web: http://www.genetix.co.uk

63-69 Somerford Road, Christchurch, Dorset, BH23 3QA, UK.

Circle No. 7 on Readers' Service Card

GENETIX

When it comes to high-throughput, there are custom oligos, and there are customized custom oligos.

Your lab is unique. Shouldn't your high-throughput service be?

We think so. That's why our competitive pricing and synthesis capacity allow you to order any number of custom oligos for your genome project. Choose from 96-well plates, 384-well plates, and cluster tubes customized to your specifications and delivered in 3-5 days.

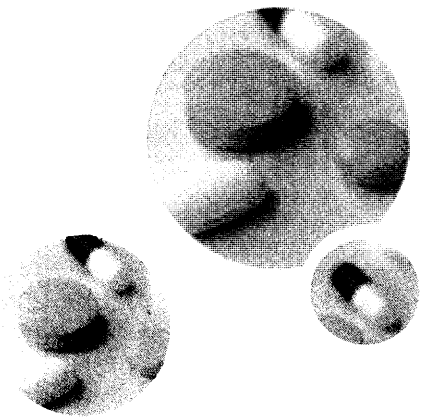
What's more, no one's quality control surpasses ours. Every oligo is verified by PAGE analysis, and every batch is performance-tested by PCR and mass spec. You'll also enjoy our personal, friendly service and easy ordering. All at surprisingly affordable prices!

So call today for details on our revolutionary custom high-throughput oligo synthesis. You'll find that at Sigma-Genosys, we focus on you, so you can focus on your research.

SIGMA GENOSYS

Toll Free: 877-260-0764 • www.genosys.com • Email: info@genosys.com

Circle No. 34 on Readers' Service Card



...genomic technologies will revolutionize medicine by increasing the proportion of medicines aimed at the causes of disease rather than the symptoms.

New Forms of Therapy

Effectively applied, genomics will change the nature of drug discovery. "Functional genomics is all the science you need to do once you've found a correlation between a genetic property and a disease — that is, what you need to do to find a practical target," explains Paul Herrling, head of global research for pharmaceutical company Novartis. "To do that we need a platform that combines dozens of methods. And because of the data being accumulated you need high throughput. We're moving to an industrialized process with a lot of automation. You can't do it any more with a pencil and paper."

Beyond drug discovery, genomics will impact the entire practice of medicine. "Genomics technology changes the fundamental understanding of disease," explains Lev Leytes, CEO of LJL Biosystems, a company that supplies infrastructure tools to companies involved in the search for new medicines. "The Human Genome Project is revealing for the first time the nature of disease," adds Eric Lander, director of the Whitehead/MIT Center for Genome Research. "This opens the way to targeting against specific disease mechanisms."

Indeed, genomic technologies will revolutionize medicine by increasing the proportion of medicines aimed at the causes of disease rather than the symptoms. "We're looking at what the medication is doing to a particular part of the body at a genetic level," says Mark Gessler, president and CEO of Gene Logic, Inc., a provider of genomic information. "As we get more samples, we'll be able to select an individual drug and patient and get genetic insights from real human samples." That approach will eventually open the way to personalized medicine, with the drug and the dose tailored to the individual patient and his or her condition.

Genetic engineering has already made an impact in a field that has the potential for affecting every human being rather than just those individuals afflicted by disease. Efforts at improving foods have ranged from more productive cattle and chickens to healthier, more resistant crop plants. Crime control is another area that genomics and related technologies will change forever. "As forensics labs increase their capabilities, they will be able to apply DNA technology to all forms of crime, and not just the most violent acts," says Paul Ferrara, director of the Virginia Division of Forensic Science. "Application of the technology to real-world samples will continually increase, to assist in the investigation and solution of crime."

Social Concerns

Those advances have inevitably raised social issues far more difficult to solve than the technical barriers that arise in any rapidly advancing scientific development. For example, genetically modified organisms (GMOs) have already attracted significant opposition from the Green movement and others in Europe. Within the past year that opposition has moved over to the United States, and has forced farmers and food companies to retreat from the most ambitious portions of their plans for development.

Other social concerns are ready to gel. "The genome community has realized that issues of informed consent will be critical ones," says Ferrara. Policing organizations are already building up databanks that contain the DNA of convicted criminals. But should they add DNA samples for every individual arrested once the technology allows databanks of sufficient size? "Forensic databanks may be among the first lightning rods for issues of privacy," predicts Ferrara. That debate will rapidly expand to cover the privacy of genetic material and information taken from patients in the course of medical diagnosis and treatment.

Similarly, industrialists, ethicists, and others must tackle the impact that genomics research has on our understanding of who we really are. "We require a reconceptualization of personal identity," says Steve Holtzman, chief business officer of Millennium Pharmaceuticals, Inc. "Against the background of genomics, all our ideas of genes versus environment and nature versus nurture all become anachronisms. We have the complex web of gene-gene interactions, producing a spectrum in which our individuality lies rather than the either/or picture we now have."

That spectrum will emerge as human genome sequencers expand their work beyond the current individual subject to examine the genomes of a variety of humans. At that point, they will begin to discover the genetic alterations that make one person different from another, while confirming the vast swathe of genetic detail shared by all people. "At some level we are all created equal," says Lander. "And at another there are 3 billion differences among us."

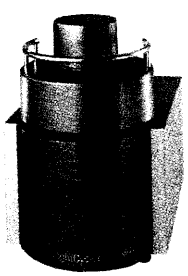
Seeing the Light in Drug Discovery

Genomic technologies will have the most immediate impact on drug discovery. They will change the process radically. A classic joke recounts the story of a man searching for a lost wallet one night. He wanders round and round under a street light, becoming ever more despondent. A passerby helps him for several frustrating minutes before asking the man if he is sure he lost the wallet near the light. "No. I lost it a couple of blocks down the street," he replies. "Then why are we looking here?" asks the helper. Comes the reply: "Because this is where the light is."

To read part one of this series, go to **scienceoonline.org** Click on **E-marketplace**, then click on **Science Benchtop.**

CONTINUED ➢

You'll Never Lose in the Mutation Detection Game with the LightCycler System



For a new spin on mutation detection,
visit the Roche Molecular Biochemicals website at
http://biochem.roche.com/lightcycler
or contact your local representative at
(800) 428-5433.

Roche

Circle No. 27 on Readers' Service Card

Roche Diagnostics Corporation
Roche Molecular Biochemicals
Indianapolis, IN

Take it E@sy!
Let E@sy Oligo™ simplify your life.

Simple, fast and available online!

www.gensetoligos.com

E@sy to Buy
Single price per oligo regardless of length.

E@sy to Order
Enter the sequence, and send.

E@sy to Use
Delivered in solution at a convenient concentration.

ONLY $15 per oligo

Fast and reliable delivery.
Orders shipped within 24 hours.

GENSET OLIGOS

GENSET OLIGOS SYNTHESIS FACILITIES

USA, CANADA, AMERICA
marketing@gensetlj.com

EUROPE, MIDDLE EAST, AFRICA
marketing@gensetoligos.com

JAPAN
marketing@genset.co.jp

ASIA
marketing@genset.com.sg

AUSTRALIA
marketing@genset.com.au

Circle No. 20 on Readers' Service Card

THIS IS THE TECHNOLOGY THAT WILL PUT YOU ON THE MAP.

HIGH-THROUGHPUT RESEARCH™ FROM INFORMAX.

Optimize your targets. Accelerate your discoveries. Send your genomic research into overdrive with GenoMax™ – the most powerful bioinformatics tool available today.

GenoMax software is the only software that includes all the parameters of a High Throughput Research™ (HTR™) environment: Genomic Integration of multiple target analyses. Research Automation that mines data 24/7. Results Filtering, giving you the most meaningful findings. Collaboration between scientists who can access, manage and visualize data. Extensibility that allows new tools to be quickly integrated. And Distributed Processing of massive amounts of data with dedicated servers.

If you're going to remain profitable in the race for discovery, it's time for a quantum leap toward success. Create your own HTR environment with GenoMax. And find yourself miles ahead on the genetic map.

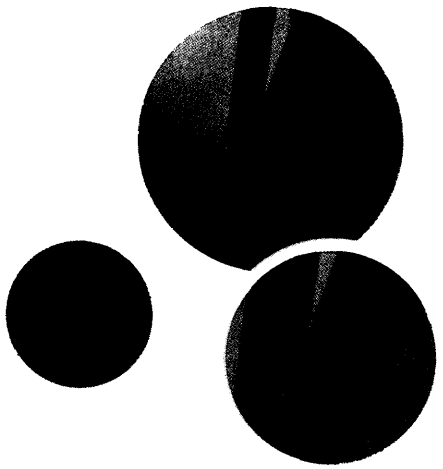
Gene Expression Analysis • EST Clustering • Genome Viewing • 3-D Structure Prediction • SNP Analysis • Protein-Protein Interaction Analysis

Circle No. 71 on Readers' Service Card

InforMax®

High-Throughput Research

United States: *Phone: 800.357.3114 Fax: 301.216.0087* • **United Kingdom:** *Phone: 44 (0) 186.578.4580 Fax: 44 (0) 186.578.4585* • **www.informaxinc.com**



...scientists are finding a vast panoply of new drug targets, including transcription factors, enzymes, and certain structural proteins.

For decades "the light" in drug discovery was the cell surface receptor. This group of proteins, located conveniently on cell membranes, mediates many cellular responses and communication channels. Significantly, they are easy to screen. In the classic "grind and bind" strategy of drug discovery, scientists would homogenize a target tissue and test it for its capacity to bind some of the many thousands of chemical compounds that made up a pharmaceutical company's inventory of potential drugs. In most cases the scientists performed the tests without any foreknowledge of the target cell receptor. Any compound that showed the potential to bind to the tissue became a candidate for more detailed examination, until it became a drug or revealed a problem that consigned it to the wastebin.

Is it any surprise, then, that the vast majority of drugs exert their effects through G-protein coupled receptors (GPCRs)? Not at all. Does that fact mean that GPCRs are the best and most likely drug targets? Again not at all. As the output of the Human Genome Project has increased and the scientific community has catalogued more and more of the protein building blocks from which we are assembled, scientists are finding a vast panoply of new drug targets, including transcription factors, enzymes, and certain structural proteins. Furthermore, we will still be in a position to evaluate drug targets not only as individual entities but as components of biological networks.

A frustrating aspect of rational drug development is biological redundancy. When a researcher discovers that a specific protein participates in a critical way in the etiology of a certain disease, one might naturally assume that affecting the protein with a drug may prevent the disease. The truth is disappointingly different. Nature often engineers redundant systems so that the loss of one function through a drug interaction is compensated by another.

For the first time, genomics offers a way around that infuriating dilemma. We can envision a time in the near future when scientists will have characterized every human genetic function along with its interactions. Then we will have, in effect, a working model of the human genetic system that shows us all the pathways by which biology is accomplished. Then, rather than trying to find the single pressure point in a disease, a drug researcher can design multiple points of entry that block not only the main pathway but also the collateral paths. Ideally, this could all be done *in silico* on the computer before any animal or human has become the subject of an experiment.

An approach of this type is already under way in the case of Alzheimer's disease. Researchers know that at least four genes are involved in the condition. However, says Herrling, there is accumulating evidence that all four come to a point at which they contribute somehow to accelerated formation of plaques that are deposited in the patient's brain and have been shown to cause neuronal death. So the strategy is to attack the disease at that point and to try to reduce the speed at which the plaque builds up.

Fresh Pathways

Genomics alone won't solve the problem, however. "Several years ago we realized, as others probably did, that the genome in and of itself would clearly not be enough to say: 'Here are the drug targets,'" says Bob Tepper, chief scientific officer of Millennium. "Clearly a biology infrastructure was going to be critical, involving the collection of tissue samples and especially DNA. In addition, the chemical world was going to be critical."

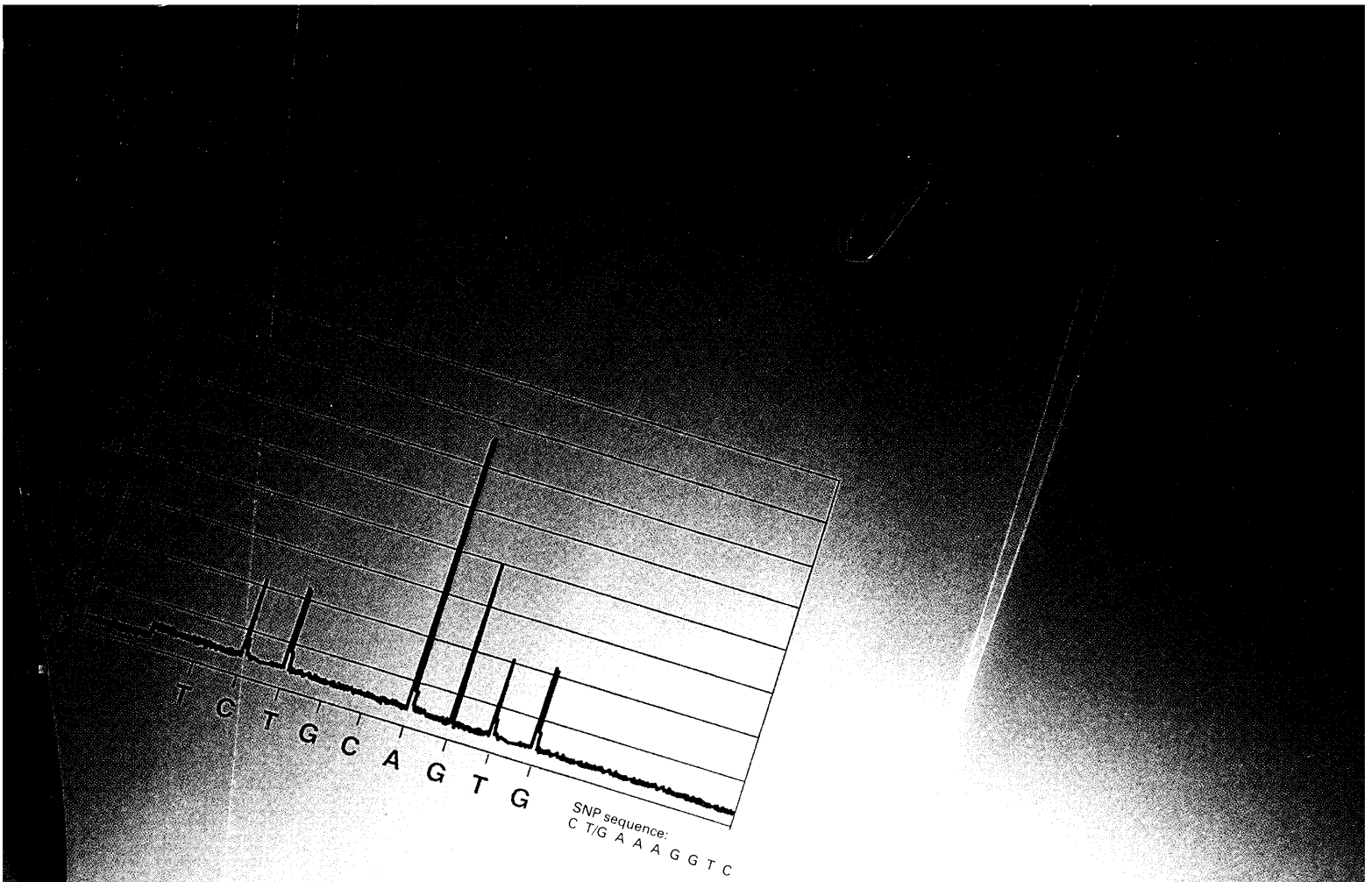
Millennium's philosophy, continues Tepper, " is to identify the 50, 75, or 100 most important pathways related to diseases from knowing the genes and having the biological resources. Then we can trigger a pathway, find chemical material that can alter the pathway, and identify clinical patients so that we can subset that disease. That, to me, is going to get us to the next generation of targets."

Leptin, a major hormone that controls body weight, provides an example. "We identified the receptor for leptin in 1995," says Tepper. However, that find didn't point directly to a drug because obese patients are leptin resistant, and the receptor is difficult to make in a drug form. "We asked: 'Can we identify all the genes in the relevant cell and tissue type that are triggered when leptin engages its receptor? Then, armed with that knowledge, can we choose the best target to stimulate that pathway?' We've come up with an enzyme downstream of the receptor that can make that pathway much more sensitive in animals. That's a better drug target than leptin itself."

Millennium has, in effect, designed its own platform of fundamental technologies for drug discovery. Novartis decided to take a similar approach. "Our focus is in therapeutics," explains Herrling. "We have to figure out the biological cascade that causes the disease, and we need to understand where we have to modify that cascade to prevent disease. So functional genomics is where we decided to allocate our resources. Instead of choosing a partner we decided to form two groups, at La Jolla, California, and Basel, Switzerland. They are building up very fast to select appropriate therapeutic targets in collaboration with the rest of Novartis."

Novartis identified one area in which it could easily work with partners: databases. "We use the public human genome database, which gives you data of variable quality, an Incyte database, and Celera's database," says Herrling. "My senior man-

CONTINUED ➢

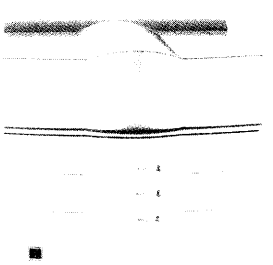


THE FIRST TRULY BRIGHT IDEA FOR SNP ANALYSIS.

Introducing Pyrosequencing™ for automatic SNP analysis: You'll get 96 SNPs in 10 minutes, greater than 99% test accuracy, and sequence data to confirm your results.

Pyrosequencing is simple to use, complete with reagent kits and intuitive SNP software. No gels, labels or dyes, and no high investment. You can even watch sequencing events in real time on your computer screen. Each peak in your pyrogram™ reflects the generation of light as a nucleotide is incorporated into a growing DNA strand.

But best of all, Pyrosequencing for SNP analysis is available now. Get in touch with us today to shed new light on your SNPs.



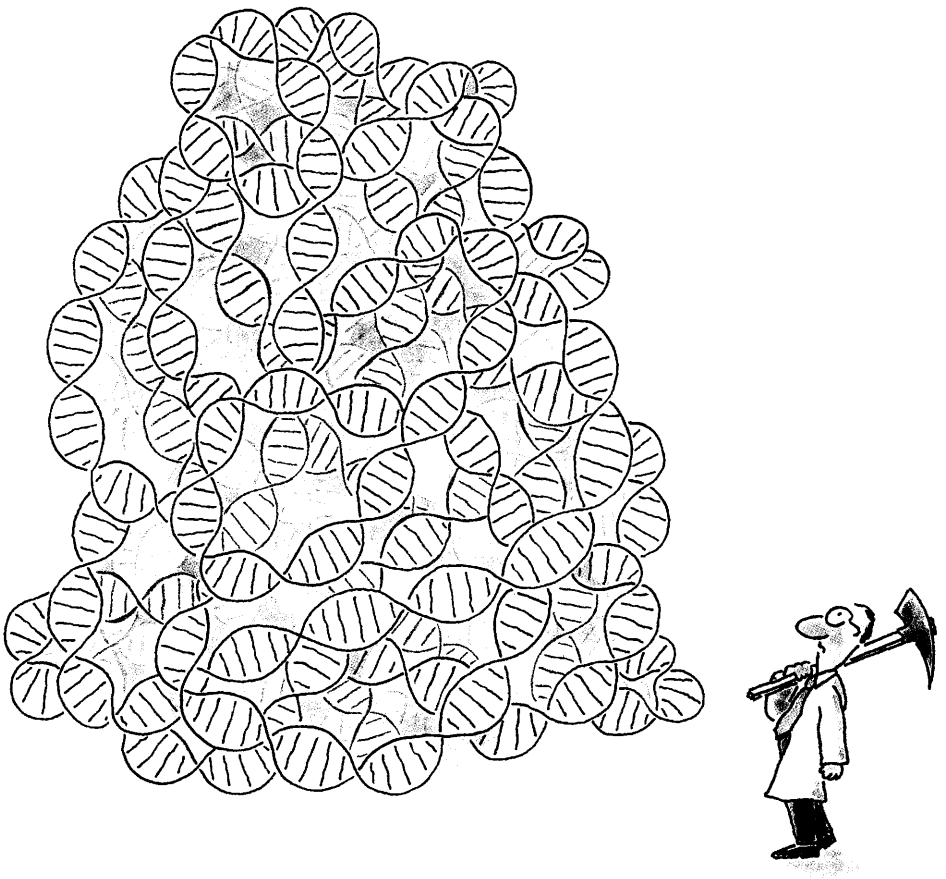
A new light on DNA.

PYROSEQUENCING

www.pyrosequencing.com
US Office Toll Free No: (877) 797 6767
Tel: +46 18 516000

Pyrosequencing and pyrogram are trademarks of Pyrosequencing AB, Sweden.

Circle No. 14 on Readers' Service Card



Need a hand with gene discovery?

Enlist our help and you'll get just what you're looking for: novel, full-length genes.

Now you can access our innovative, proprietary technologies for targeted gene discovery through our custom services:

- construction of full-length cDNA libraries with 50-80% full-length genes
- normalization of cDNA libraries enriched for novel genes
- high-throughput gene isolation
- isolation of novel members of gene families
- advanced two-hybrid screening with greatly enhanced specificity

We know that the only genes that matter are the ones you want. And those are the kind we deliver—full length and ready to analyze.

Accelerate your research with expert assistance. To arrange a consultation with our scientists, call (800) 874-4226, extension 8300.

LIFE TECHNOLOGIES.

Essential Technologies for the Science of Life™

Gene Discovery Services: (800) 874-4226, ext. 8300
Internet: www.lifetech.com

Circle No. 42 on Readers' Service Card

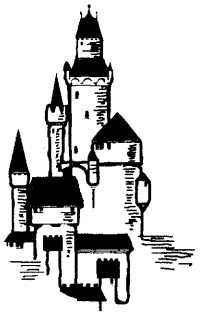
TaKaRa

The Taming The Shrew

First Quiet, Then Command

Takara's Novel Adenovirus Cre/loxP Kit

Provides a Convenient Cre-mediated ON/OFF Switching System*1 to Control Cytotoxic Gene Expression in Cultured Mammalian Cells and Animals

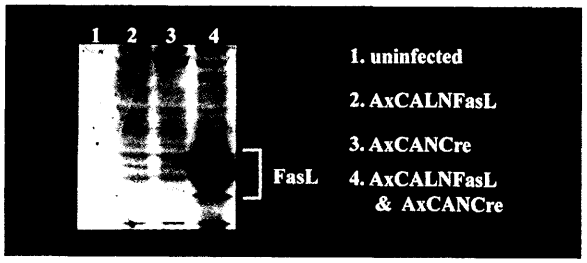


An example of the Utility of This System

Generation of Recombinant Adenovirus Expressing rat Fas-ligand successfully achieved using a Cre-*lox*P recombination system in the 293 cells which are susceptible to Fas-mediated apoptosis.

Fas Ligand Expression in COS-7 Cells detected by Western Blotting with an anti-human Fas-ligand antibody. The cells co-infected with AxCALNFasL and AxCANCre ("ON" expression) expressed Fas-ligand, while the cells infected with AxCALNFasL ("OFF" expression) alone did not express detectable levels of rat Fas-ligand.

Courtesy of Dr. T. Okuyama, Department of Genetics, National Children's Medical Research Center, Tokyo



Adenovirus Cre/loxP Kit

(Code # 6151; for 5 recombinants)

Convenient system of the recombinase-mediated switching for gene expression in mammalian cells: In the cassette cosmid, pAxCALNFLw, a stuffer DNA is placed between the potent CAG promoter and the insert cDNA at a unique *Swa*I site. Its excisional deletion with Cre recombinase triggers a many fold increase in expression of the gene encoded by the downstream sequence under the control of CAG promoter ("ON" expression).

Adenovirus Expression Vector Kit

(Code # 6150; for 5 recombinants)

High titer recombinant adenoviruses can be easily and efficiently obtained using the COS-TPC method*2: A recombinant adenovirus is generated through homologous recombination of cassette cosmid with digested DNA-terminal protein complex of Adenovirus in the producer cell, 293.

References 1. *1 Kanegae, Y. et al. (1995) *Nucl. Acids Res.* 23, 3816
2. *2 Miyake, S. et al. (1996) *Proc. Natl. Acad. Sci. USA* 93, 1320
3. Okuyama, T. et al. (1998) *Gene Therapy* 5, 1047
4. Sudo, M. et al. (1999) *Mol. Brain Res.* 65, 176

Research Use Only. Not for use in diagnostic or therapeutic procedures. The kit is covered by patents. Any commercial use, including discovery or development of commercial products, requires licensing arrangements.

TaKaRa
TAKARA SHUZO CO.,LTD.
BIOMEDICAL GROUP
Otsu, Shiga, Japan
Phone:+81 77-543-7247 Fax:+81 77-543-9254

Korea
BOHAN (TaKaRa-Korea) Biomedical Inc.
Phone: (02) 577-2002 Fax: (02) 577-3691
China
TaKaRa Biotechnology (Dalian) Co., Ltd.
Phone: (0411) 763-2792 Fax (0411) 761-9946
Europe
TaKaRa Biomedical Europe S.A.
Phone: +33 1 41 47 01 14 Fax: +33 1 47 92 18 80

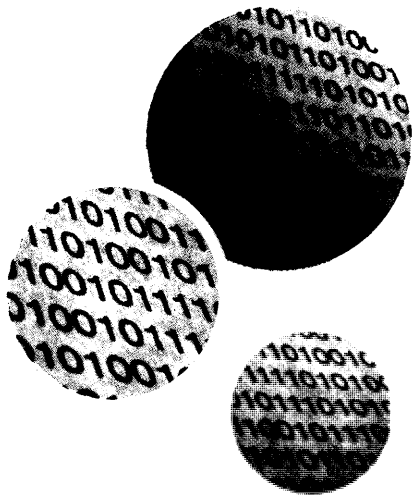
DISTRIBUTORS
USA and the Americas
PanVera Corporation
Phone: 800 791 1400 Fax: 608 233 3007
E-mail: info@panvera.com
USA
Fisher Scientific
Phone: 800 766 7000 Fax: 800 926 1166

Europe
BioWhittaker Europe
Austria: 0800 201 538 Belgium: +32 87 321 611
France: 0800 911 981 Germany: 0800 182 5287
Netherlands: 0800 022 4525 Switzerland: 0800 838 620
UK: +44 118 979 5234

Taiwan
Cheng Chin Trading Co., Ltd.
Phone: +886 2 2331 3111 Fax: +886 2 2382 2197
Cold Spring Biotechnology Co., Ltd.
Phone: +886 2 2695 9990 Fax: +886 2 2695 9963

Homepage: http://www.takara.co.jp/english/bio_e/ E-mail: bio-sm@takara.co.jp

Circle No. 12 on Readers' Service Card



Increasingly, database compilers are concentrating on ways to mix and match genetic and clinical parameters, in order to get at the roots of diseases.

agement asked why we need two private databases. I explained that they are extremely complementary. Having two gives you huge leverage. In our inside one we have tissue-specific and disease-specific expression. The Celera database has *Drosophila*, mouse, and human data collected in a standard, consistent way. If you find one type of interesting target in one database, you can go to the other and fish for all other homologies in the genome, even if they are expressed at very low levels." Speed is also significant. "When anybody publishes a relevant gene in a human that's of interest to us we can ask whether it exists in *Drosophila*," Herrling continues.

Dealing with Databases

Assembling and manipulating genetic databases have become key technologies in the new biology. Increasingly, database compilers are concentrating on ways to mix and match genetic and clinical parameters, in order to get at the roots of diseases. Following the Human Genome Project, "we need to determine the role of genes in normal development and disease," says Gene Logic's Gessler. "We're taking up to 30,000 tissue samples from humans, diseased and normal. We'll survey all the genes to understand at what levels they're being used in these tissues. Right now we can tell you that certain pathways are not active in certain types of cancer."

Gene sequence data form the foundation of much of this work. Two firms are taking somewhat different approaches to add value to such data. In May, DoubleTwist, Inc. announced that it had completed an extensive analysis of public data from the Human Genome Project using supercomputers from Sun Microsystems, Inc. and its own proprietary software. "What we have done is raise a platform that empowers life scientists to do genomics," explains John Couch, DoubleTwist's chairman and CEO. "We've added value to the public data by running it through our DoubleTwist processor." The company plans to license its database and associated data mining software directly to pharmaceutical and biotechnology companies as an aid to their efforts in drug discovery.

Hyseq, Inc., meanwhile, works largely with its own sequencing data. "We've been operating in the direction of doing a lot of sequencing ourselves," says president and CEO George Rathmann. "We'll use data from wherever we can validate conclusions we've reached. But the public data is not as pivotal to us as maintaining the pace of our own sequencing."

The company plans to do a lot of screening and to compare new genes to those it has already discovered. "We want to identify the rarest genes because, for them, therapy is likely to be practical," Rathmann continues. "We have to probe deeply to find those rare genes and figure out what to do with them. We'll start with informatics programs, then make the material and get some function, and then get patents and start on human clinical testing. We figure the payoff will be in human therapeutics. We intend to have two drugs in human clinical testing in 2001 and two in 2002."

Sequencing software provides just one of the technological underpinnings of genomic approaches. Hyseq, like other companies, is working on a single chip approach. British company BioRobotics focuses on automated systems for gene sequencing. Early this year it introduced the second generation of its MicroGrid microarraying robot. This device is designed to overcome challenges that emerged as scientists moved from 96 microplates to 384. "Samples remaining in the microplates evaporate," says marketing communications manager Brian Pumphrey. "We cool the area where the samples are on the robot, and we have relocated the motors."

A SNP Off the Old Block

At the DNA level, perhaps the most important tools to emerge in recent years are single nucleotide polymorphisms (SNPs, pronounced snips). Each SNP is a base pair located at a specific point on a single chromosome that represents a distinct point of genetic variation between individuals. Most DNA base pairs in our genomes show no variation from one person to another. When variations occur, they are detectable and measurable and provide points of reference.

SNPs play a significant role as direct markers of disease. When a particular SNP variation correlates strongly with the presence of disease, it is possible that the base pair in question is located in a key disease gene itself. Even if it's not, it may be located close by. In each case the measurable variation can help scientists to pinpoint the location of the disease gene, allowing drug developers to proceed much faster through the early stages of discovery. "Imagine that we suspect a SNP is associated with schizophrenia," explains Leytes. "Our customers would take a population of patients with families who have schizophrenia and would check whether that particular SNP is present."

Pharmaceutical companies regard SNP technology as so important that two

CONTINUED ➢

It's here

Introducing GenePix™ *Pro 3.0* microarray analysis software.

If you're looking for more flexibility and automation in your microarray analysis software, look at what GenePix Pro 3.0 has to offer:

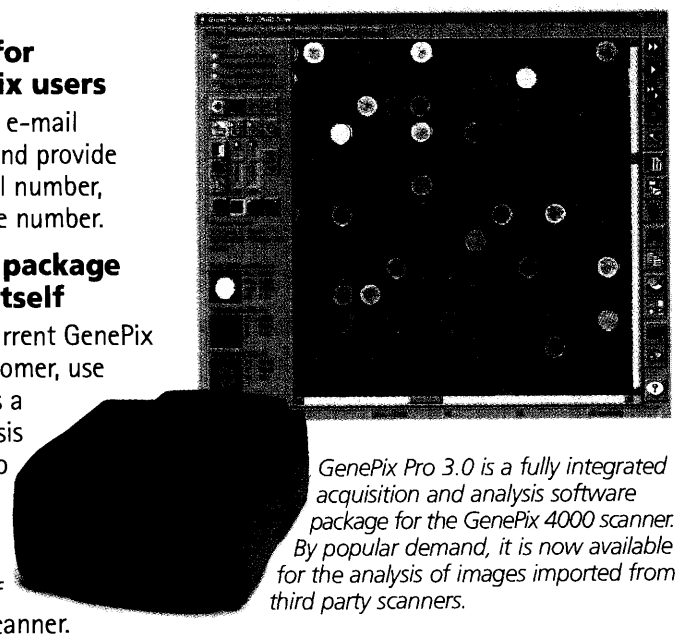
- HTML and Visual Basic scripting for custom control over data acquisition, analysis and display.
- Customizable URL links to web-based data.
- Automatic barcode reading from images as they are acquired—no more hand-held readers!
- Automatic spot finder aligns feature indicators with image features—even images from third-party scanners.
- Scatter plot display of any extracted analysis quantity against any other quantity.
- Automated workflow control—run scans and save images with the push of a button.
- Integrated array list generator makes it easy to map clones from multi-well plates to microarrays.

Free upgrade for current GenePix users

For your free copy, e-mail sales@axon.com and provide your GenePix serial number, address, and phone number.

A stand-alone package that pays for itself

If you are not a current GenePix 4000 scanner customer, use GenePix Pro 3.0 as a stand-alone analysis package. Buy up to three copies and apply the cost directly to the future purchase of a GenePix 4000 scanner.



GenePix Pro 3.0 is a fully integrated acquisition and analysis software package for the GenePix 4000 scanner. By popular demand, it is now available for the analysis of images imported from third party scanners.

Find out more

To get more details and a list of International Distributors, call +1-650-571-9400 or visit our web site at **www.axon.com.**

Axon Instruments, Inc.

REGISTERED ISO 9001 QUALITY SYSTEM

Circle No. 80 on Readers' Service Card

Investigate our proteomic solutions — *available now!*

New! Protein Warehouse™

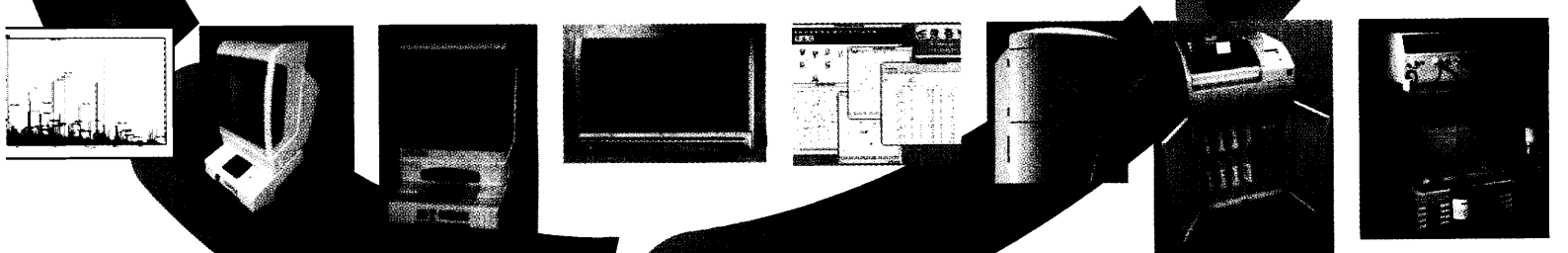
The only bioinformatics solution.

Yes, Genomic Solutions does have your complete proteomic solution. Our Investigator™ Proteomic System automates current manual methods to save time and increase throughput. ProteinWAREHOUSE™ provides bioinformatics that pulls your data together. The result is the ability to seamlessly integrate and easily track your data along the protein characterization pathway.

Within the Investigator proteomics circle, you'll find:

- Bioinformatics
- 2-D electrophoresis
- Automated gel staining
- 2-D image analysis, quantification and matching
- Gel plug (spot) excision
- Automated protein digestion
- Automated spotting
- Proteomic-grade reagents & pre-cast gels
- 2-D contract lab services

Electrophoresis to Mass Spec, join our inner circle of solutions. It's the new shape of productivity in proteomics research.



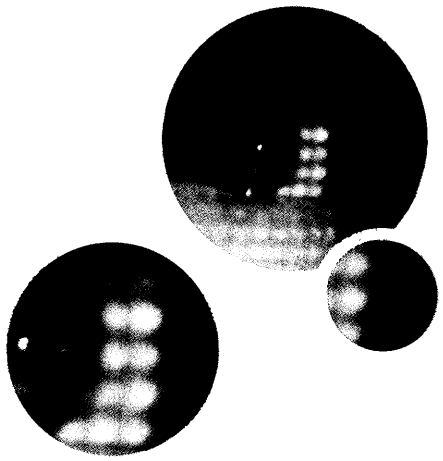
GENOMIC SOLUTIONS™

FUELING INNOVATION.
DRIVING DISCOVERY.™

Why wait?

www.genomicsolutions.com

Circle No. 77 on Readers' Service Card



...the industry stands at the gateway to personalized medicine, in which every aspect of a person's medical care will be tailored to his or her precise biological type.

years ago a group of them created and funded the SNP Consortium. During the next few years the consortium, coordinated by the Wellcome Trust and working in conjunction with the Cold Spring Harbor Laboratories, plans to identify, catalogue, and publish over 300,000 SNPs.

The consortium has the obvious advantage of spreading the expense of research on SNPs among several participants. Novartis, for example, seriously considered going it alone in mapping the variations. "We found that it would cost $50 million a shot," recalls Herrling. "That was too much for basic research. Then we thought about waiting for academia to do the research. But that raises the issue of standards, and persuading a lot of academic laboratories to contribute to the project spontaneously." So Novartis and other members of the consortium agreed to carry out the work in a precompetitive fashion, at a cost of about $3 million per company. The use of the data, of course, will be competitive.

They also agreed to make the results publicly available for academic researchers. "You have to share the results, but we're really convinced that we will profit by having all of academia able to use the data," says Herrling.

Dawn of Personalized Medicine

The variations among people that reveal themselves through SNPs confirm that we are really individuals at the biochemical level as well as the psychological. They also provide the reason for a key finding of traditional medicine. Not all patients suffering from a particular ailment will react in the same way to a specific therapy. Individuals with the same cholesterol level will not necessarily reduce and control that level by taking the same dose of the same medication. And people with the same cancer will respond in different ways to chemotherapy, radiation, and other treatments.

Those differences in response almost certainly correlate with variations in genetic composition among individuals. As scientists obtain more sophisticated measurements of genetic variation, they will be able to correlate genetic patterns with particular responses or nonresponses to medical treatments. For example, a patient in the genetic category #298577 may receive a higher dose of a certain drug than a patient in category #432168, or perhaps a different drug entirely. Or the first individual might be put on a strictly fat-free diet to treat a heart condition while the second may need no dietary restrictions despite having the same condition. Plainly the industry stands at the gateway to personalized medicine in which every aspect of a person's medical care will be tailored to his or her precise biological type.

The pharmaceutical and biotechnology industries are rushing toward that goal at a breathtaking speed. "What we've seen in early research is now starting to move into the development and clinical settings," says Gessler. "We are now learning how to use genetic technologies to select the best patients to test new kinds of medicine."

Gene Logic's database, for example, contains tissues from hundreds of clinical parameters, such as cholesterol levels for patients of different ages and clinical histories that can be tested against 100,000 genes. "We're actually looking at what the medication is doing to a particular part of the body at a genetic level," continues Gessler. "As we get more samples into the database, we'll be able to select an individual drug and patient and get genetic insights from real samples."

Personalized medicine will do more than provide physicians with a more precise course of treatment for each patient. It will change the physician's role in the healing process. "Our vision is to change the practice of medicine," says Ken Conway, president of Millennium Predictive Medicine, a part of Millennium Pharmaceuticals. "Any service we provide must change the relationship between doctor and patient. Health care will change from a payer-provider business to a consumer business, with patients as consumers and partners in the medical decision process."

The role of the medical professionals in personalized medicine has already emerged as an area of concern in medical schools. "They are very concerned about how they educate physicians on this issue to ensure that their learning curve continues to go up after they have qualified," says Conway.

Attack on the Killer Pathogens

Personalized medicine relies on the emerging capability to understand the unique biochemistry of each individual. Researchers can also turn this ability to distinguish individual types into a powerful weapon against microbial pathogens. The more they understand about an organism's unique biology, the more precisely they can intervene to stop that organism from causing or advancing an infection. Research teams are now developing new diagnostic tools and new antimicrobials.

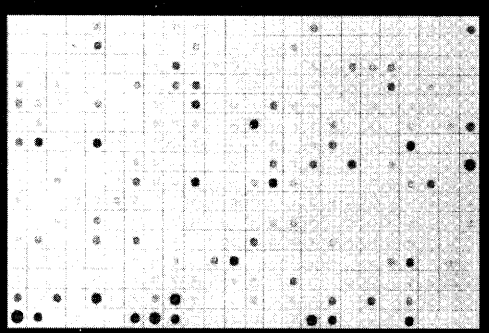
Antimicrobials prescribed today are typically broad spectrum, designed to attack a wide range of microorganisms. In part this stems from simple economic efficiency. But it also reflects the limited number of points of intervention available to current medicine.

That number will increase spectacularly as sequencers continue to gather detailed genetic information about pathogenic microorganisms. The relatively small genome size of most microbes, combined with dramatic advances in rapid sequenc-

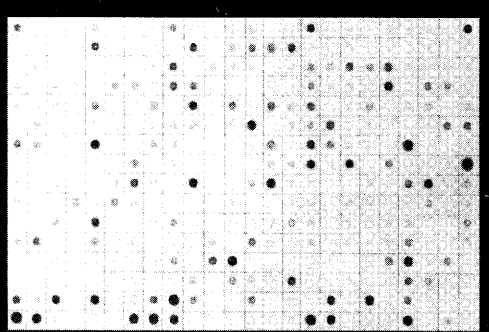
CONTINUED ➢

Gene expression profiling just got easier.

A



B



Images of Star Profiler Arrays hybridized with DIG-labeled cDNA from human MSTO (A) and NCI-H82 (B) lung cancer cell lines. Following hybridization, array membranes were incubated with anti-DIG AP antibody and then subsequently with a chemiluminescent substrate. Membranes were exposed for 5 min to x-ray film.

Introducing... Star Profiler Arrays.

★nonradioactive detection

★373 well-studied genes

★fast! results in 2 days

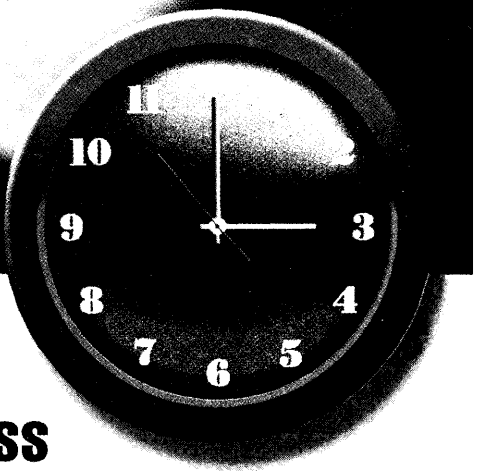
To order or inquire about Star Profiler Arrays, call us toll free at 1-888-411-4363(GENE) or email us at info@genemed.com.

Oncogene Profiler Arrays coming soon! Custom array orders are also available... call for more information.

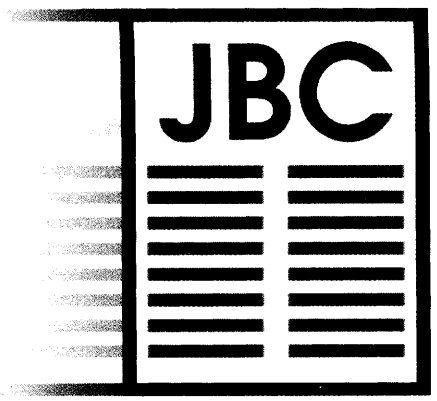
Genemed Molecular Biochemicals
South San Francisco, CA 94080 USA
Tel: 888-411-4363 or 650-876-7193
Fax: 650-872-0318
Email: info@genemed.com

GMB
Simplifying Science.

A Revolutionary Concept in Scientific Publishing



From The Journal of Biological Chemistry and HighWire Press



JBC PAPERS IN PRESS

www.jbc.org

Publication of JBC Papers in Press (JBC PIPs) offers many advantages:

For authors:

- JBC PIPs reduce time to publication by about 8 weeks.
- JBC PIPs establish publication priority.
- JBC PIPs bring your papers to the entire world—free.

For readers:

- JBC PIPs provide rigorous peer reviewed research fast.
- JBC PIPs are free to everyone with Internet access.*

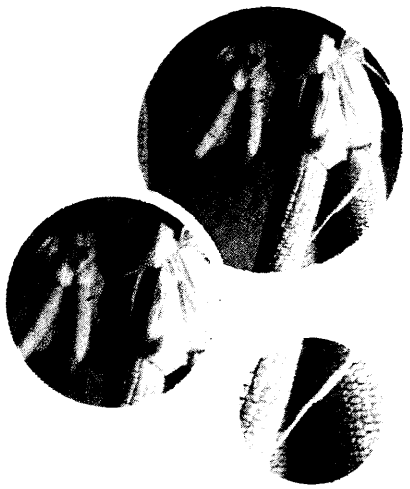
The development of the JBC On-line manuscript Submission/Review System (OSRS) results in the conversion of all submitted papers into PDF format suitable for Internet publication. We will publish the PDF versions of accepted papers the day they are accepted. Since it currently takes about 8 weeks from the time of acceptance to publication in JBC On-line and JBC Print, JBC PIPs publication will reduce the overall publication time by about 8 weeks.

JBC PIPs will be dated and this date will be cited as the publication date. Once a JBC PIP is published, the manuscript will proceed through the current redaction process for publication on both the JBC On-line and JBC Print versions. Both versions will have a notation of the JBC PIP publication date so that publication priority is unambiguous.

It is our hope that this very rapid publication format will encourage authors to send their most important work to the JBC.

---

*The American Society for Biochemistry and Molecular Biology, publisher of the Journal of Biological Chemistry, feels that it is important for the world scientific community to have barrier free access to the important research results published in the JBC. JBC PIPs are free to everyone with Internet access, www.jbc.org.



Social resistance to genetically modified organisms has become a problem of near-monumental proportions that threatens even to repudiate all the technical gains...

ing technology, has made it possible to determine the entire genetic structure of a pathogenic microorganism in a relatively short time. In principle, many of the genes uncovered in these efforts to sequence entire genomes will offer new and valuable targets for antimicrobial development.

At the same time, whole genomic sequencing of several different strains of a pathogenic microorganism may reveal the same kind of genetic variation that occurs in people. It is highly likely that those variations will correspond to some degree with variations in response to antimicrobial remedies. So in a manner analogous to the development of personalized medicine, it may be possible to create strain-specific antimicrobials that target not just a class or even a species, but a particular subspecies. Just as they do for humans, scientists will identify the particular genetic type of a microorganism by a SNP analysis. Microbial SNPs will almost certainly become key diagnostic tools in the future.

"We think there's a lot of sequencing and basic biological discovery to be done," says Rob Fleischman, an investigator who specializes in tuberculosis at The Institute for Genomic Research (TIGR). "We have two complete genomes of tuberculosis, a lab strain and a clinical isolate. We may not sequence other strains or isolates to completion, but we want to survey additional isolates. By exploring these strains we can understand the variations that exist. That means understanding the evolution of the strains and of genes that may relate to how the disease progresses in different patients."

Instrumentation plays a key role in those efforts. "We've become interested in the more high-throughput technologies," explains Fleischman. "We are investing in microarrays, which have very broad application and are relatively easy to grasp. We're in the process of producing a tuberculosis array with private funding."

Food Fight

So far, the potential applications of genomics to medicine have caused little controversy. That has not been the case for other areas in which genomic technology has started to produce applications. The most strident protests have involved food.

The idea of modifying and improving foods appeared in the earliest discussions of the applications of genetic engineering. The expectations ranged from more productive cattle and chickens to healthier, more pest-resistant crops. At the time, few scientists and executives in the genetic engineering industry could have foreseen that they would have to cope with problems greater than the considerable technical difficulties involved in reaching their goals. It seemed enough of a challenge to understand the complex genomics and biologics of commercially important species and to develop technologies that would make useful modifications of them.

Now the key technologies have been developed and the genomes understood. Scientists have made several valuable improvements to critical crop plants entirely as a result of genetic engineering. But as the technical barriers have fallen, new and probably more daunting hurdles have arisen. Social resistance to genetically modified organisms has become a problem of near-monumental proportions that threatens to repudiate all the technical gains achieved in the past decade.

For several years, the protests came almost exclusively from "green" interests — both the official Green parties and their sympathizers — in Europe. They adamantly opposed the use of genetic engineering in any way, particularly to create new species of commercially valuable plants or animals. Then two years ago, after agricultural genomics had become concentrated in the hands of Monsanto, Novartis, and a few other large companies, the protests spread politically and geographically. Consumers in Europe have become aware of the use of GMOs and frequently avoid them. In response, the industry has slowed down its introduction of new breeds.

The controversy may simply reflect a poor choice of starting material. Bovine somatrophin was one of the first genetically engineered products offered for sale. "You have to realize that messing around with milk hits people at a very deep level," asserts Steve Holtzman. "If improved pork chops had been the first product available, people would have worried much less."

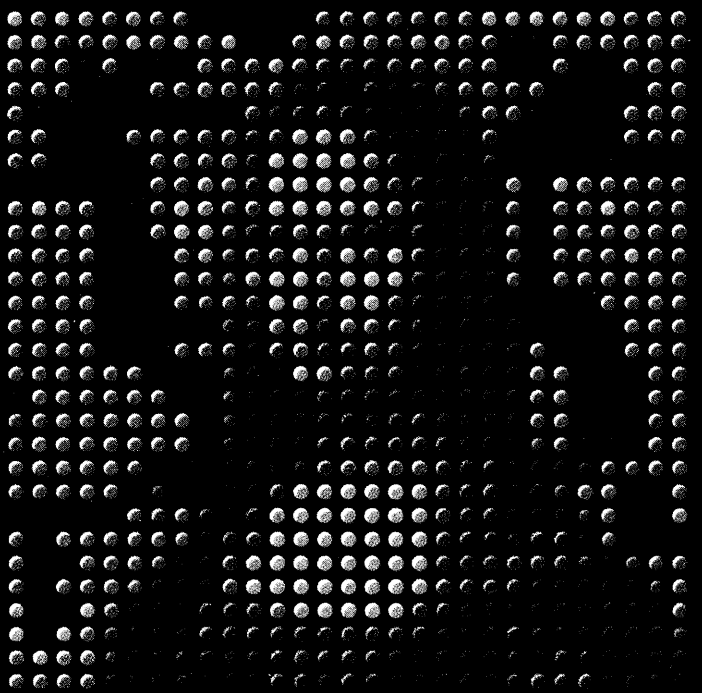
Early this year a study by a team at Cornell University added to the doubts. The study indicated that monarch butterflies survived less well in a field of GMO crops than among unmodified crops. While several scientists have suggested that the study had several drawbacks, its message is clear. "To make these technologies available to the world, you have to deal with the political context," says Holtzman.

While genetically modified foods have formed the main target for criticism of genetic technology, genomics-based medicine has not escaped criticism entirely. The death of a volunteer patient during an apparently simple gene therapy procedure by researchers at the University of Pennsylvania sparked calls for tighter controls on human experimentation.

Identity Crisis?

The field with the greatest potential for controversy in the near future involves the use of DNA profiles for identification. The idea that an individual's DNA identifies her or him uniquely and that the DNA can be analyzed accurately is no longer surprising or incredible. Even court systems that are

CONTINUED ➢



The best thing since glass slides | OpArrays®

OpArrays™ are Operon's highly optimized, made-to-order arrays that offer researchers unsurpassed performance every time. Our T_m-normalized microarrays are carefully designed to maximize specificity yet yield excellent sensitivity. Operon is also pleased to introduce a series of stock microarrays that target major functional areas within the human genome.

Currently Available

- Complete Yeast Genome
- Human Cancer
- Human Stress
- Human Apoptosis

Coming Soon

- Drosophila
- C. elegans
- Human Collage (version 2)

Prices start at $100.00 per slide

Restrictions apply

the *art* of Genomics™

OPERON

OPERON TECHNOLOGIES, INC.

(800) 688-2248 dna@operon.com www.operon.com

Circle No. 31 on Readers' Service Card

Need microarray results faster?

Kick start your experiments — Genomic Solutions has tools to accelerate your research. Don't have a library? Our GeneMap™ arrays are available for hybridization, imaging and analysis. Or choose the complete GeneTAC™ biochip system — we'll train you on incorporating the system into your experiments. These specialized instruments work together, assuring the productivity today's challenging research climate demands.

New! GeneMap™

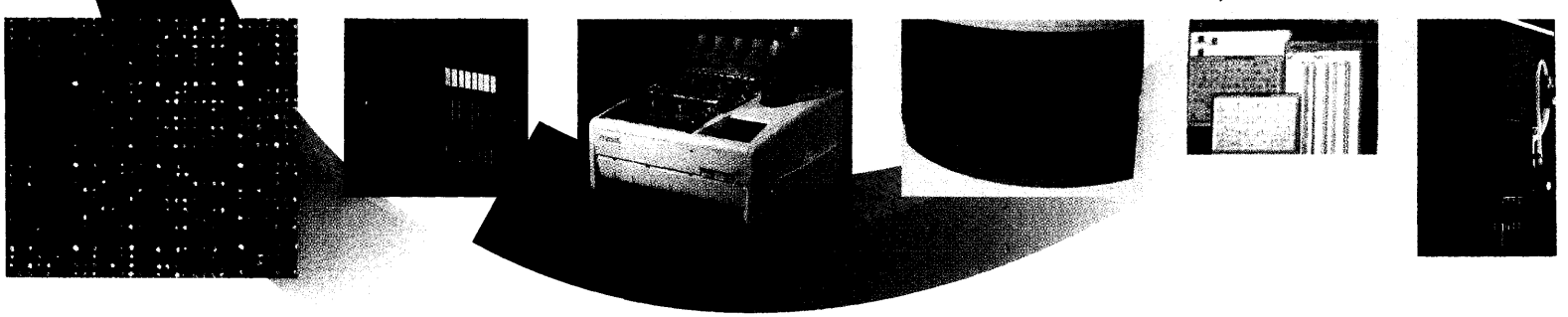
Gene expression analysis out of a box.

Within our GeneTAC circle you'll find:

- Gene expression analysis
- DNA library management
- Microarray production
- Hybridization
- Microarray imaging
- Microarray analysis
- Results reporting

We can also fill any part of your research regimen with our in-house contract lab services.

Genomic Solutions: a full circle of research solutions to fit your exacting needs in gene expression analysis.



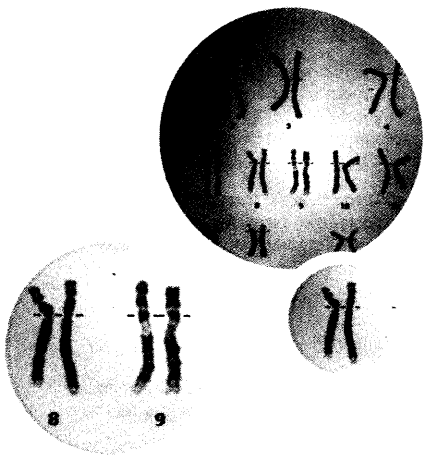
GENOMIC SOLUTIONS™

FUELING INNOVATION.
DRIVING DISCOVERY.™

See our new GeneTAC™ G3 at the Beyond the Genome meeting

www.genomicsolutions.com

Circle No. 44 on Readers' Service Card



Increasingly DNA begins to look like the ultimate identity card. And as the technology advances, gaining more precision with less sample, the prospect of using it in that way becomes less daunting.

notoriously slow to accept new technology treat DNA identifications as routine.

"The technology has had a tremendous impact on the legal system and paternity testing. It has led to both convictions and findings of innocence," says Michael Baird, vice president of laboratory operations at Lifecodes Corporation, which owns six DNA testing laboratories. "If DNA evidence isn't presented the judge, prosecutors, or defense attorneys want to know where it is," says Ferrara. "There's now an expectation of DNA in investigations and prosecutions and even an application to postconviction cases and cold cases. There's been a great demand for us to go back to look at unsolved cases of 20 and 30 years ago."

The technology continues to advance. While DNA databanks such as the FBI's CODIS have been largely standardized on samples with 13 loci, research teams are developing more sensitive methods of collecting and analyzing those samples. "Mitochondrial DNA can be useful in shed hairs, when you can't get enough regular DNA," explains Baird. "Y-chromosome DNAs can help investigators to sort out mixtures of DNA from several individuals. And further down the line chip technology may make it possible to do DNA analysis at a crime scene."

Databanks have already proven their value in crime fighting. "When properly used and protected, they have been a tremendous tool in reducing crime," says Ferrara. "We're identifying serial rapists, murderers, and violent criminals before they can do more damage. The technology will increase public safety by preventing victimizations. It will also prevent investigators from spending huge amounts of time going down blind alleys pursuing innocent suspects."

Increasingly DNA begins to look like the ultimate identity card. And as the technology advances, gaining more precision with less sample, the prospect of using it in that way becomes less daunting. The U.S. Military has explored the prospect of universal DNA typing of soldiers for many years. It now seems likely that this kind of program will be introduced, probably using SNP analysis. DNA typing of criminals has already become routine, with the debate focusing on whether every individual arrested should contribute DNA to a databank whatever the outcome of the arrest.

What next? Hospital patients may be typed. Parents may be required to have their newborns typed. We might even reach the point at which a DNA type confirmation would replace a passport as the form of identification required to cross international borders.

That use of DNA, which seems entirely possible within the next two decades, will undoubtedly change our view of ourselves. On the way, the process will give rise to significant social debate over the possibility of abuse by employers, insurers, and medical institutions. If the current controversy over GMOs provides any indication, the technical problems of DNA typing will be resolved long before settlement of the highly charged medical, political, and social concerns.

Peter Gwynne is a freelance science writer based on Cape Cod, Massachusetts. Guy Page is managing director of Ferguson Forth Page, a consulting firm in Madison, Wisconsin.

Genomics Research: List of Resources

BioRobotics	www.biorobotics.com
Celera	www.celera.com
Cold Spring Harbor Laboratories	www.cshl.org
Cornell University	www.cornell.edu/
DoubleTwist, Inc.	www.doubletwist.com
Federal Bureau of Investigation	www.fbi.gov/
Gene Logic	www.genelogic.com
Hyseq, Inc.	www.hyseq.com
Institute for Genomic Research	www.tigr.com
Lifecodes Corporation	www.lifecodes.com
LJL Biosystems	ljlbio.com
Millennium Pharmaceuticals	www.mlnm.com
Millennium Predictive Medicine	www.mlnm.com/subsid/
Monsanto	www.monsanto.com
Novartis	www.novartis.com
SNP Consortium	www.ornl.gov/hgmis/faq/snps.html
Sun Microsystems, Inc.	www.sun.com
University of Pennsylvania	www.upenn.edu/
Virginia Division of Forensic Science	www.dcjs.state.va.us/forensic/
Wellcome Trust	www.wellcome.ac.uk
Whitehead/MIT Center for Genome Research	www.genome.wi.mit.edu

LIST OF ADVERTISERS

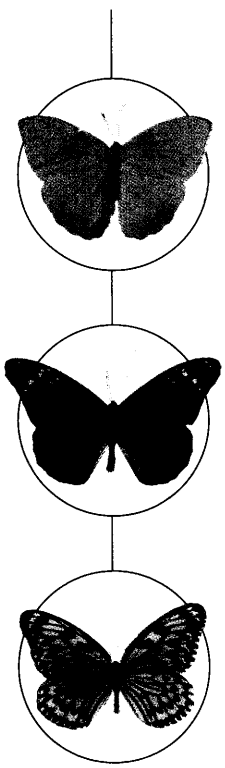
American Society for Biochemistry	www.faseb.org/asbmb
Axon Instruments	www.axon.com
Biochemie GmbH	www.biochemie.com
Biosearch Technologies	www.biosearchtech.com
EPICENTRE™	www.epicentre.com
Genemed Biotechnology	www.genemed.com
Genetics Computer Group (GCG)	www.gcg.com
Genetix	www.genetix.co.uk
Genomic Solutions	www.genomicsolutions.com
Genset	www.gensetoligos.com
Graffinity	www.graffinity.com
Incyte Genomics, Inc.	www.incyte.com
InforMax, Inc.	www.informaxinc.com
Life Technologies	www.lifetech.com
Operon Technologies	www.operon.com
Origene Technologies, Inc.	www.origene.com
Pyrosequencing	www.pyrosequencing.com
Roche Molecular Biochemicals/ Roche Diagnostics Corporation	biochem.roche.com/lightcycler
Sigma Genosys	www.genosys.com
Takara Shuzo Co., Ltd	www.takara.co.jp/english/bio_e/
The Institute for Genomic Research	www.tigr.org, www.asmusa.org

EUROPEAN COUNTRY REPORT: **AUSTRIA**

Birth of a Boom in Bioscience

by Peter Gwynne

Austria has recently started to apply its skills in basic life sciences to commercial ends. Increased funding from national and international organizations is encouraging young life scientists to become entrepreneurs.



Austrian Nordic Research Institute A/S
Boehringer Ingelheim
HÄMOSAN GmbH
IGENEON
Impulse Program in Biotechnology
Intercell Biomedizinsche
University of Vienna

Austria has a long tradition of excellence in academic life science. Now, the central European nation has started to convert that excellence into commercial enterprises. National sources that traditionally funded basic life sciences have recently diverted funds into institutions that encourage academic-industrial collaborations. Several academics have expressed concern at the diversion. However, it has stimulated the emergence of new life science companies at a remarkable rate in Austria.

That spurt of activity has several causes. In particular, the national and local governments have begun to provide financial and moral support for a life science industry. The Innovation Agency, run by the Federal Ministry of Economy and Labor, has played a major role in the change. The city of Vienna has matched that enthusiasm, notably by providing financial and logistical support for the Vienna Bio Center.

The Bio Center consists of the Research Institute of Molecular Pathology (IMP) — itself an institution that has formed a bridge between the commercial and academic worlds of life science since its birth in the early 1990s — and seven university institutes with 700 scientists and students from over 35 nations. It is now building an incubator for small biotechnology companies. The Vienna Business Agency is pursuing the formation of a cluster of life science companies around the Vienna Bio Center similar to those in the United States, the United Kingdom, and Germany. It hopes to build up the cluster more quickly than those rivals did because it can learn from the pioneers' mistakes and provide the appropriate support for new companies.

Academic institutions have joined the move toward commercialization. Austrian universities are providing courses for would-be scientific entrepreneurs in such fields as patent law and economic fundamentals.

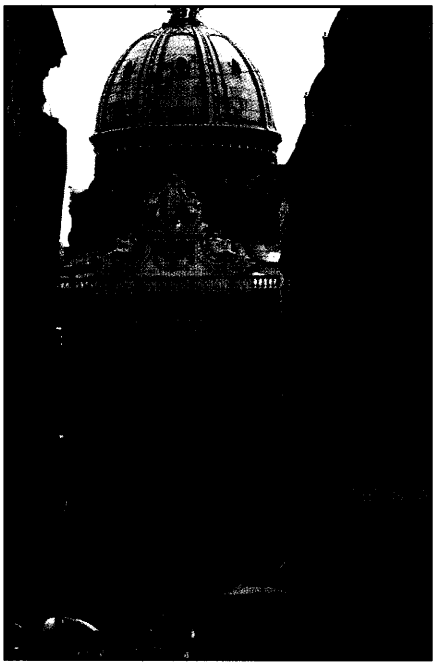
In response, an enthusiastic young generation of life scientists, many of whom have been exposed to the increasingly commercial culture of the European Union, is rushing to take advantage of the new

A former science editor of Newsweek, *Peter Gwynne writes about science and technology from his base on Cape Cod, Massachusetts, U.S.A.*

CONTINUED ➢

opportunities. Several life scientists who have completed postdoctoral fellowships in the United States are moving back to Austria to join them.

Alone among EU members, Austria has an extra source of potential strength: Eastern European life scientists and companies. Scientists in those nations receive solid training. But because of a paucity of funding in their native lands, they lack exposure to sophisticated instrumentation and opportunities for advancement in the academic or commercial worlds. Austria provides those individuals with a gateway to modern capitalism and to Western Europe.



The surge of interest in commercial life science has already begun to ring up successes. The European Molecular Biology Organization and the Fraunhofer Institutes have ranked Viennese universities among the top 10 in central Europe for genetics and molecular biology. This year's World Competitiveness Yearbook, published by Swiss company IMD, places Austria in 18th place out of 45 countries surveyed. That puts it ahead of France and Belgium. Austria has also climbed from 22nd to 12th in the yearbook's ranking of efforts to attract foreign companies.

Commercial life science has some way to go in Austria. As in other European countries, fear of failure still discourages risk-taking by entrepreneurs of the type common in the United States. Nevertheless, Vienna has a high concentration of life science companies and research institutions, and Innsbruck, Salzburg, and Graz boast some good research laboratories. Indeed, the industry has made remarkable progress over the past two years. Here, we discuss that progress with representatives from commercial, academic, and government institutions.

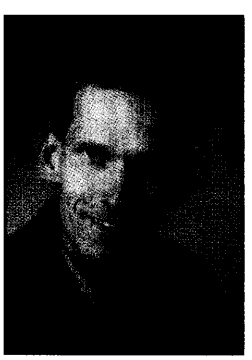
[In Austria] the surge of interest in commercial life science has already begun to ring up successes.

Brian Salmons ▮ Austrian Nordic Research Institute ➤

• • • VIENNA: As manager of corporate planning and scientific administration at the Austrian branch of the Bavarian Nordic Research Institute A/S, located in the Institute of Virology at the University of Veterinary Sciences, Till Jelitto has a unique view of the governmental-industrial-academic collaboration that has produced the renaissance in Austrian life science. "We have a very enthusiastic young generation of life scientists who have been exposed to the European Union," he says. "They would really like to see Austria successfully involved in international competition in life science."

Bavarian Nordic certainly brings an international touch to Austrian life science. A biopharmaceutical company based in Denmark, it operates in several countries and has development laboratories in Martinsried near Munich, Germany. "The international nature of the company is very important to us," says Brian Salmons, scientific director of Bavarian Nordic and CEO of the new company Austrian Nordic. "I see us as a kind of model for biotechnology firms in Europe," adds Jelitto. "It makes a great deal of sense for a small biotechnology company to have operations throughout Europe. It requires a lot of mobility in your work force and flexibility in management."

Till Jelitto ▮ Austrian Nordic Research Institute ➤



Bavarian Nordic develops delivery technologies for treating cancer and infectious diseases and has three ongoing clinical trials. The Austrian branch, now being registered as an independent company, will focus on recombinant viruses as gene delivery systems for gene therapy. "Our aim is to develop our preexisting know-how in targeted and regulatable retrovirus vectors for treatment of serious diseases, especially pancreatic and breast cancer," explains Jelitto.

The company chose that niche because of existing Viennese expertise. "Our mother company comes from the Medicon Valley [in Denmark and Sweden]; our sister company is near Munich; but we realized that Vienna has at least as much to offer as those two regions. So we took a role in promoting biotechnology in Vienna," says Jelitto. "The technology and expertise for retroviral therapy is here at the Institute of Virology. We decided to set up the company for gene therapy in close

CONTINUED ➤

Bio Tech in Vienna

BENEFIT FROM OUR EXPERTISE ON BUSINESS IN BIOTECH IN AUSTRIA.

The InnovationAgency is your competent partner for establishing your biotech company. It supports you by providing seedfinancing, venture capital and patenting know-how. The InnovationAgency has established a network of relevant contacts to national funding agencies and international venture capital.

Contact: Taborstrasse 10, A-1020 Vienna, Austria, Phone: +43-1-216-52 93 345, Fax: +43-1-216 52 93 99, E-mail: biotech@innovation.co.at

THE VIENNA BUSINESS AGENCY (VBA)

is a professional partner for all questions concerning business developments, real estate management, and cooperation with entrepreneurs in Vienna. The VBA has recently installed a cluster manager for biotechnology and molecular medicine. A major goal is to plan, coordinate and stimulate future developments in biotechnology in the Vienna area, and to create a European biotechnology cluster with both national and international start-ups as well as university research institutions.

Contact: Rathausplatz 2, A-1010 Vienna, Austria, Phone: +43-1-4000-86192, Fax: +43-1-4000-7092, E-mail: biotechvienna@wwff.gv.at

INNOVATIONSAGENTUR

we support ideas

Vienna BUSINESS AGENCY

Wien · Vienne · Viena · ウィーン

Sonja Hammerschmid ▮ Impulse Program Biotechnology ➤

association with the Institute. It was a straightforward decision to establish a collaboration to accelerate basic research, as well as development and clinical programs."

While Bavarian Nordic will own 60 percent of Austrian Nordic, the new company will have plenty of independence. "All relevant patents and technologies will be owned by the Austrian company, and all rights arising from existing collaborations in retroviral gene transfer will be assigned to the new company," says Salmons. "We have had a lot of support from Bavarian Nordic and the Innovation Agency. However, we are looking for the kind of biotech investment culture that already exists in other European countries — solid investors with a long-term horizon."

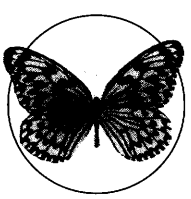
Austrian Nordic has already started to use a resource specific to Austria, in the form of scientists from Eastern European countries. "From a company point of view it's very promising: an ambitious work force that's been educated to a very high standard," says Jelitto.

• • • VIENNA: "We try to stimulate life scientists to think in terms of commercializing their results." So says Sonja Hammerschmid, head of the Impulse Program Biotechnology, a project set up a year ago by Austria's Innovation Agency. "The program aims to help researchers with patenting and financing," she continues. "It provides all the tools for writing a business plan and understanding cash flow, balance sheets, and profit and loss calculations."

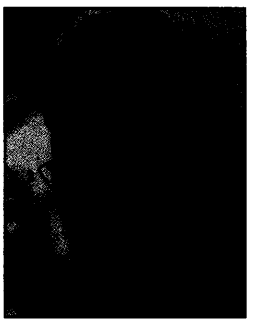
The Innovation Agency, set up a decade ago by the Federal Ministry of Economy and Labor, uses seed money to encourage start-up companies, especially those involved in high-technology ventures. "The program is really organized for researchers," Hammerschmid continues. "They can get a maximum of 10 million schillings [$700,000] in seed capital that they have to pay back only in case of profit. We take neither collateral nor equity. We evaluate the projects for marketing, managing, competition, and technology. Our main criterion is the strength of the management team."

In addition to seed money, biotech entrepreneurs can apply for support from the UniVenture Fund, a venture capital fund managed by the Innovation Agency to support university spinoffs. And the Biotech Funding and Financing Network facilitates access to national funding institutions and national and international venture capital funds.

The agency's offerings include two other key forms of assistance. A technology licensing office helps Austrian researchers to finance their patent applications and to find licensing partners once the patents have been granted. Another part of the organization helps to find business "angels" who will finance the earliest stages of start-ups.



"The biotechnology program is a combination of all," says Hammerschmid. "And the city's spirit for promoting the life sciences is reflected in efforts between the Vienna Business Agency and the Impulse program to build a classic incubator for start-up biotechnology companies."



The success of Germany's Bioregios played a role in sparking the biotechnology stimulation program. "Before we started the program here the Austrian projects all went to Munich," Hammerschmid explains. "So we have tried to hold them here and support them as much as possible, in Graz, Salzburg, and Innsbruck as well as Vienna. Our program is very similar to the Bioregios' projects in terms of financing and exploitation."

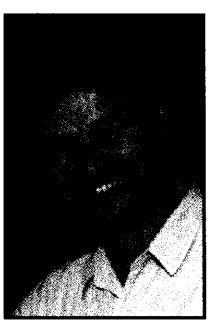
The Innovation Agency had some foundations on which to build its biotechnology program. "Collaborations between our universities and outside groups have always been very intensive," says Hammerschmid. "And many of our life scientists have been to the United States for postdoctoral fellowships. In addition, she says, "The European Union's Framework program has been important for helping Austrian startups in terms of acquiring financial support and scientific partners."

Does the country produce enough life scientists to staff the new companies? "I think so," says Hammerschmid. "We have many students in this field, but the market is open for all good researchers in life science."

Karl Kuchler ▮ University of Vienna ➤

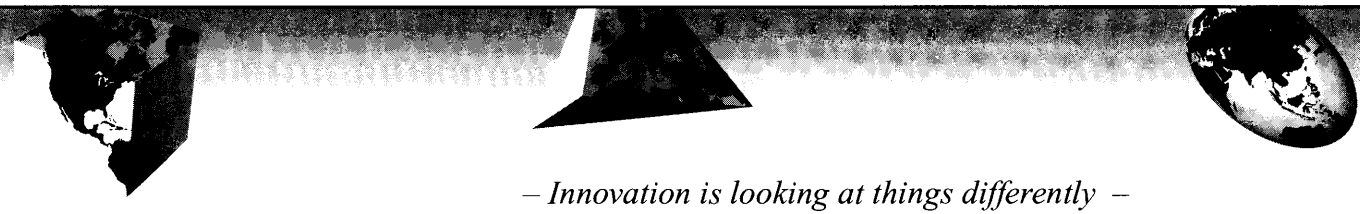
• • • VIENNA: "Austria has always been very strong in life science," says Karl Kuchler, professor of molecular genetics at the University of Vienna who was recently appointed cluster manager for biotechnology and molecular medicine by the Vienna Business Agency. "But once Austrians leave the country for training at the doctoral and postdoctoral levels, we have had trouble getting them back, as opportunities have been limited. Now, though, that's changing as a result of actions by the federal government, funding agencies such as the Austrian Science Foundation, and universities. Young scientists can now come back to temporary positions in laboratories with top-notch equipment and good salaries. If they perform in this competitive environment, they might have the opportunity to get tenure-track positions." Returning life scientists also have the chance to enter the rapidly expanding private sector.

"The city of Vienna is building new lab space at the Vienna Bio Center, including incubators for spin-offs and junior group leaders. As cluster manager, one of my tasks is to focus on attracting national and international life science companies," Kuchler says. "A main goal is to create a biotechnology cluster like those elsewhere in Europe and the United States."



Kuchler and other executives of the Bio Center realize that Vienna is starting back in the pack. "Even compared with the rest of Europe we have a long way to go," he concedes. "We don't have a very large number of life science companies in Austria. But the

CONTINUED ➤



– Innovation is looking at things differently –

Join our worldwide team to shape the future.

Research and Development and modern technology are the basis for our worldwide growth.

Communication is our key.

Our core business: Human Pharmaceuticals, Animal Health.

Our shared ambition: Value through innovation.

PH.D. CHEMIST

Boehringer Ingelheim (BI) is a global pharmaceutical company, employing more than 4000 employees in R&D worldwide. We are seeking Ph.D. scientists in organic chemistry to head laboratories in our newly established Department of Chemical Research at **Boehringer Ingelheim Austria GmbH** in Vienna.

The responsibilities include:

- Teamwork in research groups dedicated to oncology-related research targets
- Planning and synthesis of novel molecules with clinically useful activity
- Cooperation with specialists in the field of structural research, cheminformatics, HTS and combinatorial chemistry to optimize drug candidates

For this position you need a strong background in organic chemistry and experience in multi-step organic synthesis. You should be familiar with the planning of synthetic routes, the execution of reactions, and current methods of isolation and characterization of products. You should be able to identify chances offered by new methods and techniques to increase the efficiency of your laboratory.

For the work in multidisciplinary research teams in the area of oncology you need to thrive on interdisciplinary thinking and open communication. You should know how to integrate your scientific skills in target-orientated teamwork to discover innovative human therapeutic agents.

For more information, please contact
Dr. Eric Haaksma,
Head Dept. of Medicinal Chemistry,
e-mail: Eric.Haaksma@bc.boehringer-ingelheim.com

If you feel that you are qualified for this position, please send your resume to:

Boehringer Ingelheim Austria GmbH
Mrs. Susanne Fröhlich
Dr. Boehringer-Gasse 5-11
A-1121 Vienna, Austria
www.boehringer-ingelheim.com

Boehringer Ingelheim

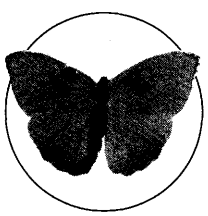
Michael Buschle ▮ Intercell Biomedizinsche ➤

government and the city of Vienna are committed to pumping more money into life science. They are going the extra mile to help with lab space, fellowships, and funding for basic research in areas with an applied possibility. Anybody looking for opportunities can get them."

One immediate task is to publicize those opportunities. "We will be starting very aggressive marketing and public relations in summer and fall," says Kuchler. "We'll look to attract spin-off companies locally and from abroad. We particularly want to spark interest in the United States. We also want to attract companies from Eastern Europe."

To stimulate a supply of freshly trained scientists for those companies, the Federal government has agreed to start three university institutions. "New departments of bioinformatics, structural biology, and X-ray crystallography will give us a critical mass of new scientists involved in functional genomics," Kuchler continues.

Meanwhile, he has started to increase links between the Bio Center and the Research Institute of Molecular Pathology (IMP), the institution that was originally instrumental in stimulating Vienna's boom in life science. "A contract between IMP and the university in which we share equipment and expertise, through seminars and joint programs in R&D, has been expanded to include Intercell," he says.



• • • **VIENNA:** Intercell Biomedizinsche Forschungs- und Entwicklungs- GmbH has the distinction of being the first Austrian start-up company specializing in biotechnology. Created in September 1997 by scientists from the Research Institute of Molecular Pathology and working out of the Vienna Bio Center, it focuses on an integrated system for developing chemically defined vaccines to treat cancers and chronic infections caused by pathogens of various types. The company has a proprietary technique, CISTEM, to identify cancer antigens and pathogen-derived antigens, and TRANSVAX, a proprietary vaccine technology that induces strong humoral and cellular immunity against the diseases.

The company owes its existence to the infrastructure set up to support commercial bioscience in Austria. "There would be no Intercell were it not for the Vienna Bio Center," says Michael Buschle, the firm's vice president and chief scientific officer.

Intercell has lined up enough funding to keep it going for its first five years from venture capital companies as well as local, national, and European Union funds. "We got a lot of financial aid and moral support," says Buschle. "All political parties are supporting us."

Despite that support, the company could not continue in business without collaborative projects. "A small company can survive only with

partnerships," Buschle explains. "We have collaborations with Seqella, Sunol, and The Institute for Genomics Research [TIGR] in the United States — collaborations that we're very eager to expand. We are building a partnership with the Institute of Cancer Research in London. We also work with the Clinical Institute at the University of Vienna and with clinicians in Germany and other parts of Europe."

Those projects have stimulated fast growth. "We hired our first six employees in September 1998, a year after we founded the firm," remembers Buschle. "Then we closed a deal with venture capitalists, and in January 1999 we had 17 people. A year later we had 40. Now we are 55."

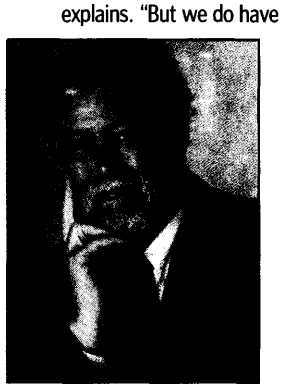
Buschle and his colleagues plan to continue to expand staffing, although at a slower rate. "We are hiring at all academic levels, up to Ph.D.s," he says. "We want specialists in immunology and molecular biology. We are also thinking of hiring some pharmacologists."

Peter Swetly ▮ Boehringer Ingelheim ➤

• • • **VIENNA:** Top executives at international pharmaceutical firm Boehringer Ingelheim made a serendipitous decision 35 years ago. "They wanted to hire an Austrian professor as its research head," recalls Peter Swetly, current director of research and development at the company's Austrian branch. "He wouldn't move to Germany. So they built a small research lab in Vienna."

That lab now finds itself at the center of a growth spurt in life science. Since its early beginnings the lab has grown to an organization that employs 160 individuals and will continue to grow by 30 to 50 more. "We have been very lucky that Boehringer Ingelheim made the decision to invest here, which not every company would have done," says Swetly.

The company also helped to found the Research Institute of Molecular Pathology (IMP) in collaboration with American biotechnology firm Genentech. Boehringer Ingelheim took over exclusive ownership of IMP when Swiss pharmaceutical company Roche brought Genentech under its wing. However, the company controls the institute with a light touch. "We have no influence on the science at IMP. Its charter is: Make good science, and do not go into programs that involve drug development," Swetly explains. "But we do have a link. If they discover an interesting target, the scientists at IMP will inform us."



Boehringer Ingelheim's Austrian branch has a well-defined goal of its own. "We have a very clear research focus on oncology with the charter of developing drugs," says Swetly. To pursue that aim, the company is hiring life scientists with qualifications in genetics, bioinformatics, and combinatorial chemistry. Swetly welcomes scientists at all levels of training, from Bachelor's degrees to postdoc-

CONTINUED ➤

toral fellowships. In addition to academic credentials, the major necessity is the ability to speak English. "English is the language of the laboratory. We hold our meetings in English and write our publications in the language," he says. "Otherwise there are no language restrictions."

Beyond that, Swetly expects employees to possess two less tangible skills. "The most important thing is the readiness to be flexible and to work in teams," he explains. "You should also be ready to move on to new areas as necessary."

● ● ● **VIENNA:** "I'm constantly visiting the U.S. and I know the environment very well," says pharmaceutical industry veteran Hans Loibner. "Austrian entrepreneurship is underdeveloped compared with the United States. But there is strong interest in all political groups in changing that by setting up small companies for life science and biotechnology. It is now possible for young colleagues to get involved in start-ups. We are starting to see one-stop shops that help scientists to start up their own companies."

Loibner himself has joined the start-up movement. He is co-founder and co-CEO of IGENEON, a firm started in June 1999. It has a product portfolio based on unique cancer vaccines that actively induce specific antibodies and other components of patients' immune systems to combat cancer. "We had discussions with local government institutions before starting up and received heavy encouragement from all sides," he says. "You can now get financial support, which is useful in the absence of venture capital. There are open doors if you have a good business plan."

Hans Loibner ■ IGENEON ▲

Nongovernmental contacts also help. "We have very modern equipment because we were able to establish our company on a campus belonging to the Novartis Research Foundation, where I used to work," Loibner notes. "The foundation rents lab and office space to us, which has enabled us to start at a very high level." The company also has very good contacts with the University of Agriculture and Forestry in Vienna. "One of my colleagues studies there and we have three postdocs from there," says Loibner. "We also plan to have collaborations with the medical university and hospital."

Partly as a result of those partnerships, IGENEON now has 14 staff members. "We will hire again," Loibner continues. "We will be in the range of 20 co-workers by the end of the year."

What scientific backgrounds does the company prefer? "We are looking for Ph.D.s in biology, molecular biology, and, especially, human immunology," says Loibner. "We are a very applied company and we are focusing on projects that we can bring to clinical research as soon as possible. So we are also looking for M.D.s with an interest in doing applied medical research. And we need somebody who bridges science and business: a person with an MBA and knowledge of life science."

Loibner's main nonscientific criterion for recruits is collegiality. "The company functions on a high motivational base, which is easy with 14 co-workers," he says. "When I'm looking for somebody new, it's important that the person should fit into the group."

● ● ● **GRAZ:** Austria's commercial bioscience does not rest entirely within the bounds of Vienna. The city of Graz, 125 miles south of the capital, has its own small life science sector. That sector includes HÄMOSAN GmbH, a small, privately owned company founded in 1988 that has reinvented itself in the light of changing scientific and political circumstances.

"We started as a company producing bovine serum albumen," recalls CEO Herwig Reichl. "But from 1992 on, a European Union directive telling people not to use bovine material because of the threat of BSE [bovine spongiform encephalopathy, otherwise known as mad cow disease] nearly killed us. So we went to life science services."

Ironically, the company now coordinates three research projects funded by the EU on TSE (transmissible spongiform encephalopathy). It also seeks research projects with commercial partners. "We're aiming at a certain critical mass for service," explains Reichl. "We offer protein purification and other services that stem from our competence in TSE. The services are quite extensive for a small company."

HÄMOSAN has not forgotten the product sector. "We have well-developed product ideas, but we can't finance the clinical trials and the marketing," Reichl concedes. "We are trying to find a way to get financing or strategic partnerships that will allow us to continue these project ideas and split them off from our life science service area. If we get venture capital or a strategic partnership, the product area could grow faster." Reichl is also looking for partnerships with universities that will give his company access to specialized equipment, such as mass spectrometers, that would be too expensive for a small company that doesn't need to use them every day.

Reichl expects the number of employees in the company's service sector to double from five to 10 in the next few years. "I really invite postdocs or even Ph.D.s to work with us," he continues. "We want biochemists, virologists, and protein chemists. Specialists in prion research are even better. We often have to turn down projects because we don't have the people. And I'll be looking for project managers with industry experience as venture capital comes in."

Growth will present Reichl with a new challenge: deciding whether or not to move the operation to Vienna, where it will be able to tap into the strength of an established life science industry. "We may need to keep a small lab in Graz, but I'm not sure yet," he says.

With new funding, new companies, and new academic departments, Austrian life science is well on the move. In years to come, it could start to overhaul its European rivals who were faster out of the starting blocks. ■

● ● ● ● ● For further valuable career features, go to **sciencecareers.org**, then click on **Advice and Perspectives.** ● ● ● ● ●

Universität Heidelberg

Effective immediately a

Foundation Professorship for Toxicology (Bes.Gr. C 4 BBesO)

is to be filled at the **Ruprecht-Karls-University Heidelberg, Faculty of Clinical Medicine Mannheim.**

It is expected that current topics of the fields of genetic and genomic toxicology shall be addressed in active research programmes. At the same time the influence of predispositions on the toxicity of environmental noxa, on the effects and side effects of drugs and/or specific influences of drugs on expression patterns of genes should be investigated. Topics of genediagnostics and gene-toxicology - also under the aspect of the assessment of risk in genetherapeutical measures - are also considered as relevant topics. A close cooperation with the existing research facilities of the Faculty of Clinical Medicine Mannheim is indispensable.

The successful candidate should set up scientific priorities. Applicants should have experience in pharmacogenetics and/or toxicogenetics, in pharmacogenomics and/or toxicogenomics and/or in epidemiology. Applicants should have an excellent university degree, habilitation or equivalent scientific expertise as well as pedagogical skills and experience in teaching. She/he should be internationally renowned in one of the above fields.

The chair shall help to establish and strengthen the emerging disciplines of pharmacogenomics/toxicogenomics within the German scientific and international community.

Furthermore, it is expected that the successful candidate will utilize the superb biotechnology environment of the Heidelberg-Mannheim (Bio-Regio) area via scientific collaborations. Possibly, the chair may act as focal point of additional biotech start ups in the area of molecular medicine.

The chair will be an "endowed chair" funded by Aventis. Besides the funding of the chair, the foundation allows for the basic equipment of the laboratories.

It is planned to integrate the foundation chair into the main emphasis of genomic research institutes in clinical medicine, currently being built. At the faculty, chairs for pharmacology and toxicology and for clinical pharmacology exist.

It is expected that the successful candidate will participate appropriately in the teaching of pharmacology and toxicology.

According to Section 1 Paragraph 67 of the Universitätsgesetz (Regulations for Universities), the contractual relationship of a University professor, on the occasion of his/her first appointment, must be, in principle, on a fixed-term basis. Exceptions can be made if candidates from abroad or from outside the university system otherwise would not accept such positions. A renewed application procedure is not required if the contractual relationship is to be extended after the fixed term has expired.

Applications should include a curriculum vitae, a list of publications, copies of 5 relevant publications and a personal statement of future research projects and should be forwarded within 6 weeks after announcement to: **The Dean of the Faculty of Clinical Medicine Mannheim: Prof. Dr. R. Hehlmann, D-68135 Mannheim.**

Imperial College

OF SCIENCE, TECHNOLOGY AND MEDICINE

NERC Centre for Population Biology

Postdoctoral Researchers

The Centre for Population Biology (CPB) and its collaborators seek up to 3 people to join a large, multidisciplinary group of theoretical and experimental ecologists, based at Imperial College's Silwood Park campus near Ascot.

1. Ecological Modeller

A theoretical ecologist (either a mathematician with a strong interest in biology or vice versa) for a joint position with CABI Bioscience, one of the world's premier biological control organisations. To work on an ongoing EU project to develop models to help understand the population dynamic interactions and non-target effects involved in the biological control of insect pests; also to develop other projects of interest to CPB and CABI Bioscience, such as studies of invasive plants or microbial interactions.

2. Evolutionary Ecologist

A population biologist to join a team working on the evolution of resistance and virulence in host-parasitoid interactions. We are currently working with *Drosophila*-parasitoid and aphid-parasitoid systems (see CPB web page).

3. Plant Ecologist

A population biologist interested in experimental plant ecology, and in particular testing and parameterising models of plant population dynamics. CPB and its collaborators are currently investigating mechanisms of plant coexistence, the dynamics of invasive species and the role of plant biodiversity in maintaining ecosystem processes (see CPB web page).

For all positions, you should have a PhD with a relevant background, plus ideas for developing your own projects to address important questions in relevant areas, within CPB's broad research programme.

Initial contracts are for 3 years (position 1) or 2 years (positions 2 and 3) with possibilities for renewal. Salary within the RA1A scale: £16,286 - £24,479 (under review).

Details: c.challis@ic.ac.uk, +44 (0)20 7594 2474; http://www.sw.ic.ac.uk/cpb/cpb/vacancy.html

Applications to be received by 31 July 2000

The College is striving towards Equal Opportunities

Future is our Mission

Forschungszentrum Jülich

We are an interdisciplinary research center funded by the federal and state government. The 4 200 members of our staff are developing innovative solutions to problems of public interest in the research areas of „Matter", „Energy", „Information Technology", „Life Sciences" and „Environmental Sciences". As a member of the Hermann von Helmholtz Association of German Research Centers (HGF) we are committed to issues of concern to our society.

We plan to merge the Institute of Thin Film and Ion Technology (ISI) and the Institute of Surface Research and Vacuum Physics (IGV) to establish the new Institute of Thin-Film and Interface Research (ISG) which will be headed jointly by 4 directors. The present areas of competence, represented by two directors, cover the entire spectrum from basic research to industrial applications in the fields of surface/interface physics, thin-film physics, electrochemistry, and development of advanced semiconductor and superconductor devices. Future fields of research will include biologic/inorganic interfaces as well as chemical and biophysical sensors.

For the new ISG 2 covering the field of

CHEMICAL AND BIOPHYSICAL SENSORS BASED ON THIN FILM TECHNOLOGY

we are looking for an experienced scientist as a

DIRECTOR (C 4).

He/she is expected to provide leadership in the development of the research program. We offer excellent support facilities in semiconductor and microstructure technology as well as an interdisciplinary environment in solid state physics, biophysics and cell biology.

For the new ISG 4 covering the field of

BIOLOGIC/INORGANIC INTERFACES

we are looking for an experienced scientist as a

DIRECTOR (C 4).

He/she is expected to provide leadership in the development of the research program. We offer an excellent environment with competence in biophysics and cell biology, as well as in surface/interface and solid state physics.

The successful candidates will be appointed jointly to chairs at a university within North Rhine-Westphalia („Jülich Model"). The salary will conform to the C 4-scale of the German Civil Service. Applicants are required to possess the „Habilitation" or an equivalent scientific qualification as well as the ability to direct a research institute and to teach on an academic level. The Research Center Jülich is committed to increase the number of women in leading positions and encourages especially qualified women to apply. Applications comprising a curriculum vitae, list of publications and a short summary of scientific achievements should be send by September 30, 2000 to

Vorstand der Forschungszentrum Jülich GmbH
D-52425 Jülich
Germany
Internet: www.fz-juelich.de

Research positions available at the Karolinska Institutet Center for Alzheimer's Research.

The Centre for Alzheimer's Research is a new venture arising from a recently signed collaboration between the Karolinska Institutet and Sumitomo Pharmaceuticals Co. Ltd. The centre under the directorship of Prof. Bengt Winblad is based at the Novum Research Park, South Stockholm, Sweden, and is seeking to employ research scientists at the post-doctorate, Ph.D. student and laboratory technician levels.

Applicants will be employed on a fixed term basis (2 - 5 years) for projects designed to identify novel targets for Alzheimer's disease therapeutics. Expertise is sought in the following project areas:

Functional genomics, proteomics

The applicant should have a strong background in protein biochemistry and purification. The work will make use of a variety of biochemical techniques, such as liquid chromatography, 2-D gel electrophoresis and mass spectrometry. Prior experience with HTS methods, in particular 2-D gel electrophoresis, is a merit.

For information contact: Dr Jan Näslund (Jan.Naslund@neurotec.ki.se).

Molecular genetics, transgenic animal modelling

Applicants should have a background in molecular genetics (gene mapping and linkage analysis) and / or transgenic animal modelling.

For information contact: Dr Lars Lannfelt (Lars.Lannfelt@kfcmail.hs.sll.se)

Cellular signalling and apoptosis

We are seeking cell and molecular biologists with a strong background in either cellular signalling or cell death mechanisms.

For information contact: Dr Richard F. Cowburn (Richard.Cowburn@neurotec.ki.se)

Applications should be made in writing to **Dr Richard F. Cowburn, Karolinska Institutet, NEUROTEC, NOVUM, KFC, plan 4, S-141 86 Huddinge, Sweden** and should include curriculum vitae, publication list, plus two letters of reference.

The application deadline is July 31st for employment starting Autumn, 2000.

UNIVERSITY OF BRISTOL

Veterinary Science

Three Professors

The University is making a major strategic investment in Veterinary Science by appointing three new Professors to strengthen research in each of the following areas:

- **Veterinary Microbiology (reference 6565)**
- **Veterinary Molecular Genetics (reference 6566)**
- **Veterinary Epidemiology (reference 6567)**

The University is seeking to appoint individuals with a strong scientific background, able to lead internationally excellent collaborative interdisciplinary research.

Informal enquiries are welcomed to either Professor Avril Waterman-Pearson (Head of Department, E-Mail A.E.Waterman@bristol.ac.uk - telephone (0117) 928 9400 or Professor Chris Stokes (Director of Research, E-Mail Chris.Stokes@bristol.ac.uk - telephone (0117) 928 9243.

For further details telephone (0117) 954 6947, minicom (0117) 928 8894 or E-Mail Recruitment@bris.ac.uk (stating postal address ONLY) quoting the appropriate reference number.

The closing date for applications is 18th August 2000.

www.bristol.ac.uk

AN EQUAL OPPORTUNITIES EMPLOYER

dkfz

Deutsches Krebsforschungszentrum
Stiftung des öffentlichen Rechts

The Institute of Applied Tumor Virology at the German Cancer Research Centre in Heidelberg is looking for a

Postdoctoral Researcher (No.: 101/2000)

with a keen interest in viral gene therapy using AAV vectors. Requirements include either a Ph.D. or (preferably) an M.D. and a sound knowledge of molecular biology/ biochemistry. Experience in virology would be advantageous.

The candidate will be involved in viral vector design and production as well as planning for subsequent clinical trials. Funding for the position is available until April 2003.

For further information: Dr. Jürgen Kleinschmidt, Tel. +49-6221-424978.

Applications should be sent to: The Personnel Department, German Cancer Research Centre

Im Neuenheimer Feld 280 • D-69120 Heidelberg
Postfach 10 19 49 • D-69009 Heidelberg
Tel. +49/6221/42-0

Roche

diagnostics

Laboratory Director in Drug Metabolism

Who we are

F. Hoffmann-La Roche Ltd, a world leader in pharmaceuticals, has a reputation for successful, innovative drug development. The mission of the Drug Metabolism group at F. Hoffmann-La Roche Ltd, Basel, Switzerland, is to provide information on the fate of potential newdrugs in the body. As part of the Preclinical Development group, our responsibilities cover a wide range: from supporting the drug discovery groups in their efforts to find new drug candidates to ensuring optimal support for the development of the compounds in our portfolio.

The position

You will plan, conduct and report animal and human metabolic studies relevant to the registration of new drugs, and support the selection of drug substances for further development in close collaboration with the various research departments. Your responsibilities will include giving your fellow research scientists the «drug metabolism perspective», leading a team of several technicians and supervising their training, keeping the Drug Metabolism group informed about the latest developments in the field and developing new methods to address upcoming metabolic issues as part of non-clinical drug safety. Publication and presentation of research findings is strongly encouraged.

Who you are

You have a Ph.D. in chemistry, basic knowledge of biochemistry and analytics, and you have gained experience with relevant drug-metabolizing enzymes during post-doctoral training. You are fluent in English and ideally have a good command of a second language, preferably German or French.

Who to contact

Interested in this challenging position? If so, please forward your application, with full supporting documentation to: F. Hoffmann-La Roche Ltd, Mr Raph Gysin, PSPB, 52/210, P.O. Box, CH-4070 Basel, quoting reference: Gr3346. For further information, please call Dr Silvio Albertini, Tel. 0041-61-688 52 95.

UNIVERSIDADE DO PORTO
(PORTUGAL)
FACULDADE DE CIÊNCIAS
DEPARTAMENTO DE QUÍMICA

TENURE-TRACK APPOINTMENT ASSISTANT PROFESSOR IN CHEMICAL EDUCATION

Departamento de Química, Faculdade de Ciências, Universidade do Porto, invites applications for a tenure-track position at the rank of **ASSISTANT PROFESSOR (PROFESSOR AUXILIAR/ PROFESSOR AUXILIAR CONVIDADO)** in the field of Chemical Education. Applicants should possess a Ph.D. in Chemical Education and a strong academic background and a good research record. Fluency in the Portuguese language, at least at the oral level, is required. The successful candidate will be expected to conduct an active and innovative research program, to supervise research students in the field of Chemical Education and engage in active collaboration with other educational institutes linked to the University. The position is primarily intended to serve the Educational Branch of the Department and the candidate will have teaching responsibilities at the undergraduate level (courses on Chemical Didactics and Educational Technology, and supervision of final year projects and Pre-service Training) and at the graduate level on the M.Sc in Chemical Education. Collaboration in the programs of Continuous Education offered by the Department is to be expected.

Applications will also be accepted until August 15th 2000. Applicants should provide a curriculum vitae, a list of publications, a statement of teaching interests, an outline of their proposed research, and should arrange to have two confidential letters of recommendation, sent on their behalf to:

PRESIDENTE DO DEPARTAMENTO
DE QUÍMICA
FACULDADE DE CIÊNCIAS DA
UNIVERSIDADE DO PORTO
RUA DO CAMPO ALEGRE
4169-007 PORTO
PORTUGAL

THE ROYAL SOCIETY

GlaxoWellcome

Royal Society Research Professorships

The Royal Society invites applications from internationally respected scientists of outstanding achievement and promise for research professorships. About seven professorships will be available including the three named below. Applications would be particularly welcome from scientists who are currently resident outside the UK and who wish to return.

Research Professorships funded by the Society's Parliamentary Grant-in-aid are for research into any of the natural and applied sciences including medical and engineering science (but not social sciences). They are open to EU nationals who are either currently employed in the UK or have, at some time, been ordinarily resident in the UK for at least three consecutive years other than for the purpose of full-time education.

There is no restriction as to citizenship of candidates for the three privately funded professorships:

- The **Foulerton Research Professorship** is for original research in medicine or other such sciences as are connected with the discovery of the causes of disease and the relief of human suffering
- The **Napier Research Professorship** is for research 'with the object of ascertaining the cause of cancer, including any corresponding allied disease and the means of prevention, cure and alleviation' (extract from the will of Mr MS Napier)
- The **Royal Society/GlaxoWellcome Research Professorship** is for research into molecular aspects of medicine. The research professor would be encouraged to maintain close links with the Royal Society and the R & D departments of GlaxoWellcome throughout the duration of the appointment.

All these research professorships will be tenable only at an appropriate UK university or other higher educational or research institution from 1 October 2001.

Successful candidates will normally be employed until retiring age but responsibility for the funding of this post will be shared between the Society and the host institution as follows: professors under 40 years of age on appointment will receive up to 15 years' support from the Society while those over 40 will receive 10 years' support (or until they reach 55 years of age, whichever is the longer). After this period, all responsibility for the post, financial and otherwise, will pass to the host institution alone. Applicants should obtain agreement in principle from the prospective host institution that it would be prepared to make this commitment, prior to submitting an application to the Society.

The salary offered by the Society is the national professorial minimum plus 40% (£50,961 as of April 2000), but it is open to the host university/institute to supplement the salary if it so wishes. Professors will receive a start-up grant on taking up their appointment and they may also apply for research expenses up to £16,000 *per annum*. They can bid for a technical or research assistant in competition with the Society's other research professors. Successful applicants from overseas will receive some assistance with removal expenses.

Application details are available from the Society's web site. Queries should be addressed to the Head of Research Support, The Royal Society, 6 Carlton House Terrace, London SW1Y 5AG (by email to helen.pask@royalsoc.ac.uk). The closing date is **1 September 2000** and no applications arriving after 4pm on that date will be considered.

WWW:http://www.royalsoc.ac.uk The Royal Society is a registered charity

promoting excellence in science

European Opportunities

the GENETICS company

The human genome will soon be available...
Meet the challenge of functional genomics.

The Genetic Company, Inc. (TGC) is a young, highly innovative functional genomics company dedicated to the discovery of new drug targets, and the development of novel therapeutics in the fields of cancer and diabetes.
The scientific founders of TGC are:
Michel Aguet, Konrad Basler and Ernst Hafen.

Two positions are now available at our research facility in the Biotech pole of Epalinges/Lausanne, Switzerland.

Scientist – Mouse tumor models / Gene expression (Ref.: A)
You are a highly qualified molecular biologist holding a Ph.D. in Oncology or Developmental Biology. You must also have experience with DNA microarrays. You will work with determining gene expression patterns in inducible mouse tumor systems.

Scientist – Virology / Expression cloning (Ref.: B)
You have experience in virology and the use of viral libraries. Your work will include the development of innovative expression cloning strategies. Practical experiences with various cell culture models, transfection assays and reporter gene assays are desired.

The selected candidates will work as part of a multi-disciplinary team. Good communication skills are required. We offer demanding and challenging work, attractive salary, entrepreneurial spirit and the perspectives of a fast growing biotech company.

To be part of our team please apply with your CV including the names and addresses of three referees and a covering letter to:
Dr. Maximilien Murone, ISREC, ch. des Boveresses 155, 1066 Epalinges/Lausanne, Switzerland.
E-mail inquires to: maximilien.murone@isrec.unil.ch

For further information please visit our website at www.the-genetics.com

The genetics company, inc. phone +41-1-635 6625
winterthurerstrasse 190 fax +41-1-635 6877
8057 zurich, switzerland www.the-genetics.com

European Opportunities

Deutsches Primatenzentrum

DPZ

Deutsches Primatenzentrum GmbH, Kellnerweg 4, D-37077 Göttingen
Mitglied der Wissenschaftsgemeinschaft Gottfried Wilhelm Leibniz e.V.
Telefon: (0551) 3851-0, Telefax: (0551) 3851-183

Position of

Scientific Manager and Director

from 1st March 2001 at the German Primate Centre (DPZ) in Goettingen

DPZ is one of the institutes of the Gottfried Wilhelm Leibniz Scientific Association. The institute currently comprises departments or working groups of Neurobiology, Primate Genetics, Reproductive Biology, Veterinary Medicine/Primate Breeding, Ethology/Ecology, as well as Virology and Immunology. The activities of DPZ include primate related research as well as, as a service, keeping and breeding of primates to supply other research facilities. Applications are invited from individuals who have documented a high degree of original scientific production in primate related research. The field of research should support or complement ongoing projects at DPZ.

We are looking for a personality of outstanding professional and social competence who will be concerned with the organization of the activities at DPZ and who will convincingly represent DPZ in the face of the general public and governing bodies. In addition, scientific qualifications, experience in leadership in research, management abilities, powers of assertion, negotiation talents and integration ability are of particular importance.

Applicants should be prepared to work closely with the Georg-August-University in Goettingen or any other University in Lower Saxony as well as to devote time to teaching duties.

Salary is based on C4 (BBesO).

The Federal Government and The Land of Lower Saxony are striving for an even balance in the genders in leading positions. Applications from women are therefore especially encouraged.

Handicapped applicants with equivalent suitability, qualifications and professional achievements will be given priority.

Applications should be made within six weeks of appearance of this announcement and should be addressed to **Dr. Axel Kollatschny, - Vositzender des Aufsichtsrats des Deutschen Primatenzentrums -, Niedersächsisches Ministerium für Wissenschaft und Kultur, Post Box 261, D-30002 Hannover, Germany.**

Global Opportunities

Department of Physiology and Biophysics
Bruce Rappaport Faculty of Medicine
Technion, Haifa, Israel
System Physiologist

The Department of Physiology and Biophysics invites applicants for a tenure track position at the level of Assistant Professor, Associate Professor or Professor. The applicants must have a Ph.D. (or equivalent) or an M.D. degree, with research experience and expertise in system physiology (cardiovascular, pulmonary, renal). The new faculty member will be expected to participate in the teaching of undergraduate, graduate and medical students, and to develop an independent research program. Applicants are requested to send their curriculum vitae, a cover letter describing their research accomplishments and future interests, and names of six referees (with e-mail) who can provide letters of recommendation to:

Moshe Gavish, Ph.D.
Rappaport Institute
P.O. Box 9697,
Haifa 31096, Israel

E-mail: mgavish@techunix.technion.ac.il

Deadline: October 1, 2000

NOVARTIS

The spirit of discovery.

Functional Genomics at Novartis

The Functional Genomics Department is establishing a transgenic mouse group that will be responsible for the design and creation of new mouse models of human disease and gene function for Novartis world-wide research. This group will be an integral part of our Functional Genomics effort, developing and using transgenic mouse technologies for the identification of new drug targets and therapeutic proteins. We are interested in those individuals with ideas and the drive needed to develop new technologies for large-scale use of transgenic and gene targeted mice. We are seeking the following enthusiastic, creative individuals to join the Summit, New Jersey division of our Functional Genomics Department.

SENIOR SCIENTISTS

We are seeking individuals to participate in an lead team efforts in the creation, characterization and utilization of transgenic and gene targeted mice. You will have the opportunity to collaborate with discovery programs throughout Novartis and within Functional Genomics. Candidates should have a Ph.D. in a biological science, at least 2+ years postdoctoral experience and demonstrated success in mouse molecular genetics. Please refer to position **HB #7713.**

RESEARCH SCIENTISTS

We are seeking individuals with extensive experience in transgenic mouse technologies and molecular biology. Candidates should have hands-on experience using pronuclear microinjection or gene targeting in embryonic stem cells. Additionally, we are interested in those individuals with significant molecular biology experience, including recombination vector construction, gene expression analysis, mammalian tissue culture and in situ hybridization. Individuals should have a B.S. or Masters and 2+ years experience in industrial or academic research. Please refer to position **HB #7714.**

POST DOCTORAL RESEARCH PROGRAM

We are also offering a number of postdoctoral positions in different areas of the functional genomics department.

TRANSGENIC MICE

We are seeking individuals to utilize mouse molecular genetics for the study of human disease. The successful candidates will also have the opportunity to develop and apply new technologies that can take advantage of the opportunities provided by the completed human genome sequence. Please refer to position **HB #7710.**

MOLECULAR BIOLOGY

The successful candidate will be involved in the discovery and functional validation of candidate disease genes with emphasis on cell cycle regulation and chromatin modification. Please refer to position **HB #7711.**

DROSOPHILA GENETICS

The successful candidate will use Drosophila melanogaster to define pathways and networks related to human disease. Experience in molecular biology or model organism genetics is preferred. Please refer to position **HB #7712.**

The innovative, dedicated individuals we seek will have a Ph.D. in a biological science, experience in molecular or cellular biology and model organism genetics as appropriate. Our postdoctoral assignments encourage creative thinking and offer ample opportunities for publication and research presentations.

We offer competitive salaries, comprehensive benefits and the excitement of having a significant impact on the programs of an international pharmaceutical leader. Please refer to position number (HB#) on resume AND envelope, or as the subject of the e-mail. Send your resume/curriculum vitae and letter of interest to: R&D Staffing, Novartis Pharmaceuticals Corporation, 556 Morris Avenue, Building SEF 1029, Summit, NJ 07901; e-mail: novartisr&d@recruitmentsolutions.com. We are an equal opportunity employer M/F/D/V. We appreciate your interest in our Company. Unfortunately, we will only be able to respond to those candidates chosen for interviews or additional follow-up.

Aventis Cambridge Genomics Center

ONE to watch.

The **Aventis Cambridge Genomics Center** is developing leading edge genomic technologies designed to elucidate the molecular basis of human disease.

Our state-of-the art facilities in Cambridge Massachusetts are some of the most sophisticated in the world. We are continuing to expand our Cambridge site and have multiple, exciting career opportunities available for B.S., M.S., and Ph.D. level scientists in a variety of genomic disciplines. Join our growing team in one of the following areas.

Visit our website for further information:

www.aventispharma-us.com

Aventis Pharmaceuticals is proud to be an equal opportunity employer committed to a diverse workforce.

MOLECULAR GENOMICS

SENIOR SCIENTISTS: Candidates for the following senior scientific positions should have a Ph.D. in a related field with at least 3-4 years of postdoctoral research. Expertise in genomics, mammalian genetics and diseases is highly desirable.

Molecular Biologist: Gene Expression — Job Code: MBGE1

Candidate to lead a gene expression profiling group to compare expression patterns in normal and disease states using high density microarray technologies and DNA sequence analysis. Involves implementing and improving state-of-the-art technologies in high throughput formats. Prior experience with gene expression technologies and/or genomics is highly desirable. The position requires leadership abilities in managing a group, analyzing complex data in collaboration with bioinformatic researchers and affecting improvements with bio-automation scientists.

Molecular Biologist: — Job Code: MBGE2

Candidate to lead a group responsible for molecular biology technologies related to gene discovery and characterization. Prior experience in molecular biology, particularly related to cDNA and genomic libraries, vector development, expression and/or functional analysis is required. This position involves developing, implementing and improving state-of-the-art technologies in high-throughput formats. The position also involves analyzing genomics data in collaboration with bioinformatic researchers and affecting improvements with bio-automation scientists.

RESEARCH ASSOCIATES:

Molecular Biologist: Gene Expression — Job Code: MBGEX

Seeking highly motivated person capable of working independently and as team player in the Gene Expression Group on disease and technology related projects. Candidates will perform research and data analysis on state-of-the-art oligo and cDNA microarray gene chip technologies. Candidate will perform molecular biology research such as RNA isolation and analysis, microbial culture, DNA/RNA labeling and hybridization, PCR and gel electrophoresis. Position requires B.S./M.S. degree in biology or related field. Computer skills and/or molecular biology/genomics laboratory experience are desirable.

Molecular Biologists: Gene Discovery — Job Code: MBGD

Successful candidates will perform molecular biology techniques applied to technology development and disease gene discovery research. Applicants should have direct experience with DNA cloning, cDNA/genomic library construction, PCR, RNA isolation, library screening, Northern/Southern blots and/or other molecular biology techniques. Experience with cDNA libraries, tissue culture, and handling RNA is a plus. We are looking for hardworking, self-motivated, and very well organized individuals with strong communication skills, who can work independently and effectively as part of a team. Laboratory research, computer experience and/or genomics experience highly desirable. Positions require B.S./M.S. degree in the biological sciences or related field.

LABORATORY INFORMATION MANAGEMENT:

Lead Software Engineer — Job Code: LLSE

Experienced LIMS Specialist for supporting the research efforts of a large genomics research laboratory that includes high throughput automated sequencing, finishing, full-length cDNA cloning, microarray construction and data transfer.

Our challenge is life.

Duties require providing Laboratory Information Management Systems (LIMS) support to Aventis by working with scientists to develop, implement and maintain customized LIMS packages. LIMS implementation includes assisting in the initial configuration of databases, configuring commercial LIMS to meet Aventis requirements, customizations of LIMS, setting up automatic data collection from instruments, writing specific LIMS generated reports, and establishing interfaces with other applications. Requires experience with the implementation and support of commercial LIMS applications. Project planning/management skills and the ability to prioritize and handle multiple tasks are essential. Programming experience in PERL, JAVA, or C++, and PC programming languages (ex: Visual Basic) is highly desirable. In order to provide technical documentation and user guides, good oral and written communication skills are very important. Familiarity with NCBI programs, GenBank a plus. Requires a B.S./M.S. degree in computer science with 3-5 years experience in LIMS. Experience in a molecular biology or genomics laboratory environment or related fields a plus.

Associate Software Engineer — Job Code: LASE

LIMS Specialist for supporting the research efforts of a large genomics research laboratory that includes high throughput automated sequencing, finishing, full-length cDNA cloning, microarray construction and data transfer. Duties require providing Laboratory Information Management Systems (LIMS) support to Aventis by developing, implementing and maintaining customized LIMS packages. LIMS implementation includes assisting in the initial configuration databases, configuring commercial LIMS to meet Aventis requirements, customizations of LIMS, setting up automatic data collection from instruments, writing specific reports, and establishing interfaces with other applications. Programming experience in PERL, JAVA, or C++, and PC programming languages (ex: Visual Basic) is essential. Good oral and written communication skills are very important. Requires a B.S. degree in computer science or related field with 1-2 years programming experience.

BIOINFORMATICS

SENIOR SCIENTISTS:

Scientist, Gene Expression Informatics — Job Code: BOSGEI

Responsible for scientific analysis of large data sets derived from chip based gene expression experiments. Activities include technology evaluation of expression platforms using experimental design methods and statistical models; development of informatics tools and procedures to ensure high data quality; and the application of multivariate statistical methods in the analysis of large data sets for identification of disease-relevant pharmaceutical targets. Evaluate third party tools and, with the informatics group, integrate tools and methods into an expression analysis system for scientific investigators. Ph.D. in Biophysics, Biomedical Engineering, Statistics, or related field with hands-on experience in scientific computing. Ideally you can demonstrate expertise in the analysis of expression data. Good programming skills (JAVA, PERL, MATLAB and SQL) are highly desirable. Self-motivation, excellent communication skills and ability to work in team environment.

Scientist, Genome Informatics — Job Code: BOSGI

Responsible for developing, evaluating and integrating tools and systems allowing for high throughput analysis and annotation of EST and genomic sequences arising from human, mouse, and rat sequencing projects. Activities include application of advanced clustering and assembly algorithms to large EST data sets; informatics analysis of resulting data space to assess quality and refine methods; and evaluation, improvement and deployment of genome analysis and annotation pipelines. Provide scientific leadership in the development, evaluation and deployment of automated pathway analysis systems and participate in team initiatives in the formation of gene centric information systems. Ph.D. in Bioinformatics, Biophysics, Molecular Biology, or Computer Science with 3+ years relevant professional experience and proven record of developing tools for computational sequence analysis. Must have in-depth understanding of the algorithms and tools for sequence analysis and homology searches, DNA clustering and alignment tools, HMMs, and gene structure prediction approaches. Programming experience should include server-side JAVA, PERL, C, CGI, & JavaScript; familiarity with CORBA and XML technologies is useful. Practical experience with database design & implementation in Oracle or Sybase is required.

RESEARCH ASSOCIATE:

Analyst, Genome Informatics — Job Code: BOAGI

Responsible for evaluation, use, integration, and training of advanced sequence analysis tools and data sets. Work closely with investigators in the identification of disease-relevant pharmaceutical targets using assembled EST, annotated genomic, and proprietary sequences. Act as scientific liaison between the bioinformatics development group and the investigators defining new scientific requirements and identifying & implementing tools that integrate data enabling target selection. Evaluate, disseminate and test new systems created or proposed to meet these requirements. Background in Bioinformatics, Biophysics, or Molecular Biology with 1-3 years full time bioinformatics experience in academia or industry. Must have basic knowledge of sequence analysis tools and public DNA/protein databases. Must also be familiar with UNIX operating system and relational database technology. Considerable programming experience in PERL and one of the following languages: C, C++, JAVA.

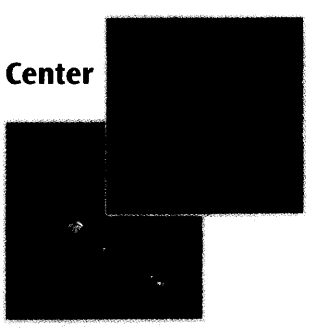
CELL BIOLOGY

Research Scientist — Job Code: CB02

Work in a team environment to develop technology for gene validation efforts. Strong molecular and cellular biology skills and computer experience required. The position involves cell culture, protein expression, RNA isolation/analysis, DNA cloning and genetic screens. Must be able to interact effectively with team members and contribute to team goals. Strong communication skills and ability to present results required. B.S. or equivalent required; M.S. and 3-5 years experience is desirable.

Become part of the most exciting growth company in the pharmaceutical industry. Please send a resume and cover letter indicating your full career details, job code for position of interest and reference Ad Code 2000BW0049 to:

Aventis Cambridge Genomics Center
Attn: Human Resources
26 Landsdowne Street
Cambridge, MA USA 02139



Therapeutic Genomics, Inc.

Therapeutic Genomics, Inc. is an exciting new biopharmaceutical company focused on the discovery and implementation of novel drugs, better targets and revolutionary screening paradigms. In particular, we recognize the need to bring anticancer therapy into the 21st century.

As a candidate for one of the positions listed below, you will be a highly motivated scientist and well qualified within your area of specialty. Beyond that, we are looking for individuals who welcome the challenging, dynamic, and exciting nature of a start-up environment, in which your input will play a pivotal role in the success and future of our company.

Therapeutic Genomics, Inc. offers an excellent and competitive compensation package. For confidential consideration, please send a letter with a copy of your resume to the address listed below, specifying within your application the appropriate job code that follows the position description.

BS/MS Senior Research Associates

You will work in a collaborative environment as an important member of a multidisciplinary team, focused on target discovery and the implementation of novel screening strategies. Qualified scientists will have a BS/MS degree in biology or a related field and 5+ years of laboratory experience. Expertise in molecular biology is required, and experience with tissue culture and/or the development of cell-based assays is also essential. Proficiency in RT-PCR, subcloning, library screening, transfections, DNA/RNA isolation, hybridization, and genomics/sequence analysis is expected. Experience with protein expression and purification is also desirable. Candidates must demonstrate the ability to work independently, think creatively, and be self-motivated in their research endeavors. **Code: PYSRA600.**

Director, Medicinal Chemistry

You will develop and implement the strategy and direction of our in-house chemistry program and will actively participate in building our preclinical pipeline of effective pharmaceutical compounds. Candidates must possess a Ph.D. in organic or medicinal chemistry or a related discipline and have 8+ years of relevant biopharmaceutical industry experience. Successful management of Ph.D. level synthetic/medicinal chemists engaged in drug discovery, research and demonstrated leadership in moving small molecule targets from initial lead status to preclinical development are required. The successful applicant will have the confidence and desire to apply their skill-set to the creation of a premier chemistry program and will be excited by the possibility of drug discovery achieved through novel screening technologies. **Code: PYDMC600**

Database Specialist/Bioinformatics Developer

You will drive the design and development of our proprietary in-house database information systems and will implement database platforms and create web-based applications. Candidates must possess a BS degree in computer science or a related field and have 3+ years of relevant development and programming experience. Demonstrated skills with Perl, Java, SQL in a WinNT/UNIX environment are required. Proficiency with Oracle and/or Sybase systems is a necessity. Knowledge of relational database technologies and computational genomics is desirable. The ideal applicant will have the ability to understand the language and requirements of our biologists, and can utilize their combined skills to develop appropriate solutions to address our complex scientific needs. **Code: PYDSBD600**

Therapeutic Genomics, Inc.
9700 Great Seneca Highway
Rockville, MD 20850
or send an email to jobs@theragenomics.com

We are an Equal Opportunity Employer.

Biotechnology

Have you considered a genomics institute?

Novartis Agricultural Discovery Institute Inc. (NADII), is one of the largest single fully funded research endeavors dedicated to agricultural genomics. We apply cutting-edge biotechnology to match genes with traits and provide advanced technologies that can be used widely in agribusiness research for the development of gene-based products. We currently seek the following exceptional individual to join NADII's growing team:

Postdoctoral Associate

NADII has an opening at the post-doctoral associate level for an ambitious individual to lead the development of high throughput screening technology for gene discovery. The candidate will work with our Engineering, Chemistry, and Cell Biology groups to develop tools, and then apply them to the discovery of genes that control intriguing phenotypes. This is an excellent opportunity to blend technology and science, a hallmark of research at NADII. The candidate must have a Ph.D. in Molecular-oriented Biology or Bioengineering and extensive experience in molecular biology. In addition, we are considering two alternative requirements for this position: (1) strong plant tissue culture experience and an excellent physics/engineering-oriented mind; or (2) strong experience in FACS or other cell-based high throughput technology and strong interest in working on plant systems. Responsibilities include coordination of highly diverse collaborators, such as Plant Viralogists, Engineers and Chemists, as well as technology development in plant cell culture and molecular biology aspects of the project. **Job Code: PDA/FK-SCI**

NADII offers excellent compensation and a great benefits package. For immediate and confidential consideration, please send resume including salary history and expectations to: **Novartis Agricultural Discovery Institute, Inc., HR Dept./Job Code, 3115 Merryfield Row, Suite 100, San Diego, CA 92121-1102. Fax: (858) 812-1096.** EOE

NOVARTIS

www.nadii.com

Molecular Virologist

As a leading research driven pharmaceutical products and services company recently ranked by Fortune among "America's Most Admired Companies," **Merck & Co., Inc.** discovers, develops, manufactures and markets a broad range of innovative products. We currently have an exceptional career opportunity available for Molecular Virologists at our modern **West Point, PA** facility 25 miles NW of Philadelphia.

The successful candidate should have a working knowledge of standard biochemical, immunological, molecular biological, and virological methods, as well as experience with assay development and validation. The candidate will be expected to solve problems independently, possess excellent communication skills, and work effectively in a team environment.

A BS/MS or equivalent in biochemistry, molecular biology, virology, or a related field is required. GMP/GLP experience is preferred.

We offer a comprehensive salary and benefits package, including tuition reimbursement and one of the best 401(k) plans in the nation, as well as opportunities for professional growth. To be considered, please submit your resume and cover letter, indicating salary requirements and PAF Code, to: **Merck Positions, PAF Code: XHXMRSMKH07070, PO Box 92164, Los Angeles, CA 90009-2164. E-mail: merck@resume.isearch.com. Fax: (310) 337-3393.** Candidates selected for interviews will be contacted. We are an Equal Opportunity Employer, M/F/D/V.

FORTUNE America's Most Admired Companies

www.merck.com

MERCK

DIVERSA

Innovation from Biodiversity and Gene Evolution

Diversa is a global leader utilizing proprietary genomic technologies to discover and optimize novel genes and gene pathways from diverse environmental sources. Unlike other genomics companies, Diversa's fully integrated approach extends from discovery to production of novel enzymes and drugs. Our powerful patented evolution technologies allow us to optimize the best genes found in nature to produce ideal product solutions across multiple markets, including: agricultural, chemical processing, industrial and pharmaceutical. We are currently in a phase of expansion and are seeking talented science professionals with various levels of experience.

Group Leaders for:

- Pathway Expression
- Gene Expression
- Enzymology
- Industrial Enzymes
- Computational Biology
- RNA Dynamics
- Proteomics
- Genetic Systems
- Molecular Biology
- Microbial Diversity
- DNA Sequencing
- Whole Cell Engineering

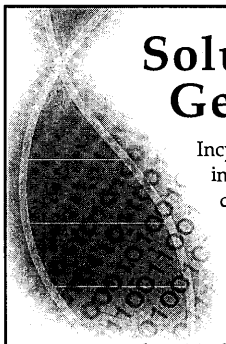
Scientists for:

- Enzymology
- Analytical Biochemistry
- Molecular Biology
- Microbiology
- Bioinformatics
- Gene Expression
- Genomics
- Fermentation
- Evolution
- Whole Cell Engineering
- FACS
- LC-MS

- Laboratory Automation Engineer

Diversa is located in San Diego, California, known for year round mild temperatures, beautiful beach communities and a high quality of life. San Diego offers a casual, active lifestyle with easy access to the mountains and minutes from the ocean. Diversa is part of a dynamic academic and scientific community that offers cultural and intellectual diversity within the biotechnology industry.

For more details regarding these positions refer to www.diversa.com
or fax your resume to Human Resources at 858-626-3789



Solutions for Genomic Research

Incyte Genomics is a leading provider of an integrated platform of genomic technologies designed to aid in the understanding of the molecular basis of disease. Our platform includes database products, genomic data management software, microarray-based gene expression services, and related reagents and services—information management tools critical to the pharmaceutical and biotechnology industries for drug discovery and development. The employees of Incyte provide the tremendous energy, talent and expertise that will help us revolutionize the world of healthcare. We're looking for individuals who share our vision and want to play a role in defining a new industry as we build our global organization.

Scientific Programmer

Responsible for scientific programming and software development to support DNA sequence dataflow. This individual will interact with dataflow and product science groups and others in bioinformatics to identify dataflow steps that can be streamlined through automation or otherwise optimized; design and implement software to accomplish these improvements; and maintain and improve existing software. Requires a BS or equivalent in Computer Science or Biological Sciences; strong programming background, Perl, C++ and excellent communication skills. At least 2 years work or graduate-level experience utilizing the above skills, knowledge of molecular biology and bioinformatics, database experience (Oracle, SQL, Perl, DBI/DBD), and web HTML/CGI/Java development are required. REF: TY4189SP

Scientist/Sr. Scientist

Perform scientific validation of user interface functionality of new dataflow processes. Requires an MS plus 4 years experience in biology or related field; or PhD in Biology or related field. Must be familiar with bioinformatic tools, proficient in UNIX and have good written and oral communication skills. Perl or SQL experience is desirable. REF: TY4118MB, TY4117MB

Scientific Programmer

Work to automate and optimize complex programs in a production environment. Requires a BS/MS or equivalent in Computer Science, with excellent knowledge of UNIX, Perl/C/C++ and Oracle Pro*C programming. Excellent organizational and communication skills are a plus. Experience with sequence analysis programs, including gene finding and bioinformatic analysis tools, is desired. REF: TY3880AJ

Bioinformatics Assistant/Associate

Perform all bioinformatics functions necessary for sequencing projects, working with various processes and platforms depending on project type. Requires a BS or equivalent in biological or related science, with a strong biology/genetics background. Experience in a UNIX environment and good organizational and communication skills also required. SQL and Perl programming desired. REF: PS4239MM0

You'll find we offer competitive salaries, an outstanding benefits package and significant opportunities for professional growth. Please reply with your resume to: Incyte Genomics, Inc., 3174 Porter Dr., REF: _____, Palo Alto, CA 94304, fax 650/845-4176, email employ@incyte.com. Incyte Genomics is proud to be an equal opportunity employer, and recognizes the talent of its diverse workforce.

www.incyte.com

IncyteGenomics

Join the Ambion Team.

Production, Technical Support, Research Associates, and R&D Positions

Ambion is a 10 year old and rapidly growing biotechnology company with over 100 employees. As "The RNA Company", Ambion markets products and kits for isolation, detection, quantification and synthesis of RNA. Many of Ambion's products are based on novel, patented technologies developed at Ambion. Our departments are comprised of diverse individuals, working together as a team to produce cutting edge, innovative products for molecular biologists.

Ambion offers a stimulating work environment, competitive salary, company-paid insurance, 401(K) plan, employee stock option plan and bonus program.

Submit your resume via mail, web or fax.
See our website for position descriptions:
www.ambion.com/jobs

EOE

Ambion, Inc.
2130 Woodward St.
Austin, TX 78744-1832
fax: (512)651-0201
www.ambion.com/jobs

Ambion®
THE RNA COMPANY™

UNIVERSITY AT ALBANY
STATE UNIVERSITY OF NEW YORK

Research Associate
Center for Comparative Functional Genomics
University at Albany, SUNY

We seek a postdoctoral fellow to assist in directing a new facility for characterization of global gene expression patterns in genetically altered mice. The position is funded by a five-year NIH grant to the University at Albany and Taconic Farms, Inc. for the establishment of one of four national Mutant Mouse Resource Centers. The successful applicant would interact with scientists at the Center for Comparative Functional Genomics and the other Mutant Mouse Centers to implement new methodology to maximize the value of rodents as animal models for human disease. Ph.D. in Molecular Biology essential; expertise with microarray analysis and/or mouse genetics preferred.

Please direct response to:
Dr. Paulette McCormick
Center for Comparative Functional Genomics
Department of Biological Sciences
University at Albany, SUNY
1400 Washington Avenue
Albany, NY 12222

Please include a CV and three letters of reference or the names and e-mail addresses of three references.

The University at Albany is an Equal Opportunity/Affirmative Action employer.

THE POST-GENOMICS REVOLUTION IS HERE.

Are you ready to change the future of healthcare?

The human genome effort is at the finish line. Orchid is a leader in what's next—the post-genomics era. We are developing low-cost, high-throughput tools to analyze single nucleotide polymorphisms (SNPs) in order to determine the most effective therapeutic applications of tomorrow.

Associate Director, Chemical Development

Translate research developments into robust and professional processes that will facilitate the manufacture of world-class products. Requirements: B.S./M.S., Ph.D. preferred in Molecular Biology or Biochemistry with at least 7 years experience in the R&D or Production side of reagents and associated assays used in Life Sciences or diagnostics. Knowledge regarding professional documentation systems for chemical/biochemical and kit products is strongly desired; solid understanding of MRP, indented bill of materials, vendor qualification, bottling packaging, GLP, GMP, JIT and TQM is necessary.

Associate Director, Research Technical Services

Supervise and direct development, planning and implementation of instrumentation for genomic applications. In addition, position calls for the evaluation and management of development of external/internal solution for automation needs on projects as necessary. Requirements: Ph.D. and/or 8-10 years experience in analytical chemistry, instrumentation, biochemistry or engineering with background in high-throughout automation in the pharmaceutical or biotechnology industry. Expertise in fluid delivery systems including valving and pressure/time regulation is required; instrumentation knowledge of DNA synthesis, HPLC and CE systems desired.

Sr. Bioautomation Scientist/Engineer

Develop automation strategies for biological assays including protocol automation, equipment evaluation and validation and documentation creation for automation platforms. Requirements: M.S./Ph.D. in Molecular Biology, Chemistry, Biomedical Engineering or other related field with 6+ years industrial experience with emphasis on process automation/applications.

Development Scientists

Design, execute and analyze experiments in support of the development of new products for genotyping. In addition, individual will perform R&D directed toward improvements in genotyping assays, protocols and platforms and validate methods for manufacturing and quality control. Requirements: M.S./Ph.D. in Biochemistry, Molecular Biology or related field with 1-3 years experience in an industrial environment. Broad knowledge of molecular biology methods including one or more of DNA Sequencing, Mutation Analysis and DNA Enzymology is required; computer proficiency and facility with MS Office are essential. Scientific graphing, statistical design of experiments and DNA sequence analysis experience preferred.

Research Associate Development

Execute experiments in support of the development of new products for genotyping and improving assays, protocols and platforms. Requirements: B.S./M.S. in Biochemistry, Molecular Biology or related field with 1-3 years experience in an industrial environment. Knowledge of Molecular Biology methods including DNA Sequencing, Mutation Analysis and DNA Enzymology is desired; MS Office familiarity required. Scientific graphing, statistical design of experiments and DNA sequence analysis experience preferred.

Optical Instrument Development Engineer

Participate in instrumentation development for Orchid's exclusive technology including optics design, optical fluorescence component selection, instrument testing, instrument control software, electrical design, and electro-mechanical component specification for laboratory instruments. Requirements: M.S./Ph.D. in Optics, Physics, or other Engineering-related field with expertise in optical components, fluorescence, CCD devices and detection apparatus. Experience with mid-sized software development projects necessary; working knowledge of precision instrumentation design, calibration, validation and manufacturing testing helpful. Design for manufacturing experience preferred.

Sr. Scientist Arraying Specialist

Assist in the development, implementation, and maintenance of a state-of-the-art array manufacturing operation. Provide support in production, assembly, and quality control of microarray products for Orchid genotyping laboratory and other internal and external business efforts. Requirements: M.S./Ph.D. with 3+ years of experience in arraying DNA on diverse surfaces, as well as in-depth knowledge of relevant instrumentation. Familiarity with genotyping applications in a rapidly expanding product and services company a real plus.

Sr. Research Engineer

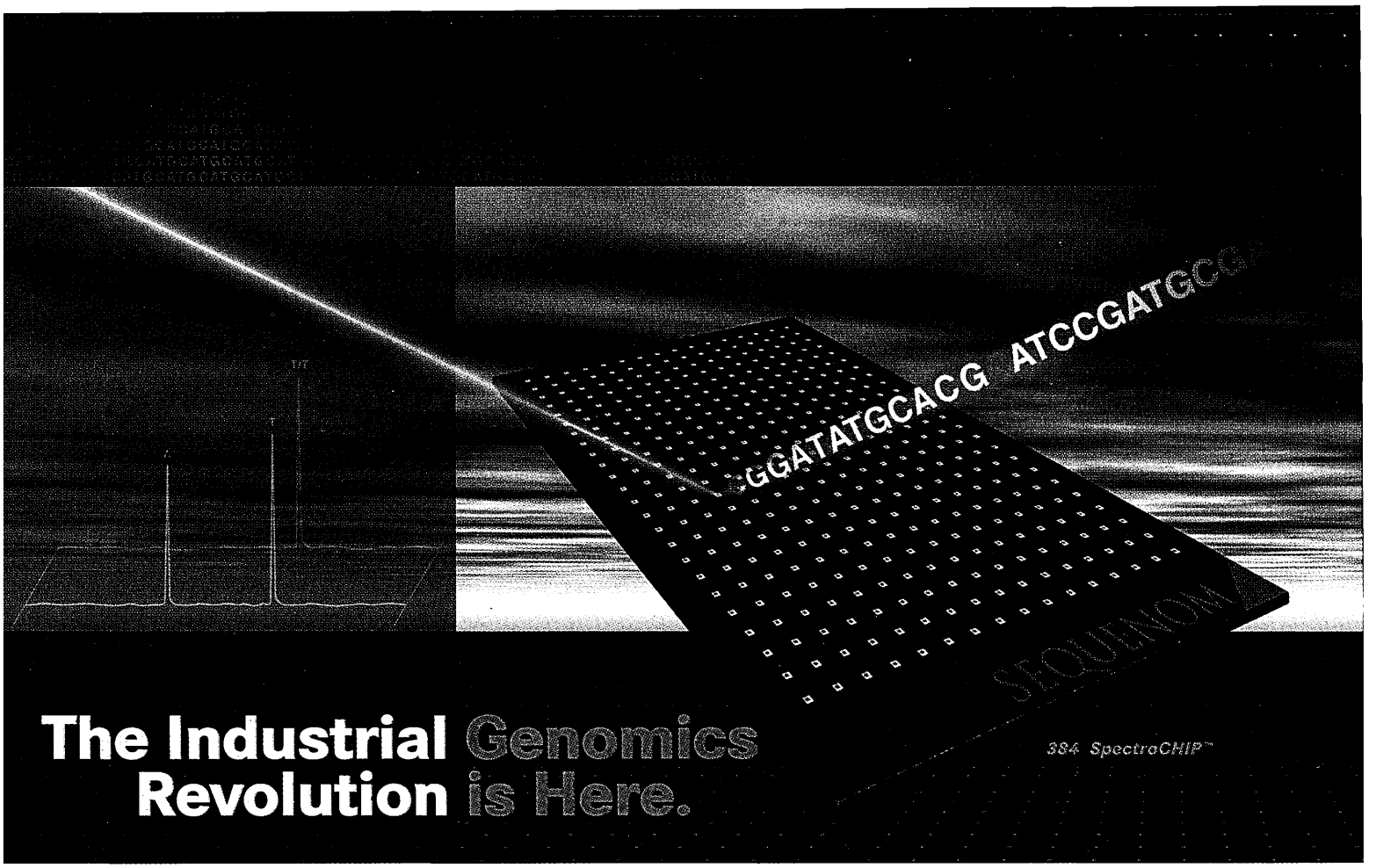
Develop DNA microarrays, design, fabrication and testing of microfluidic devices and assay integration and automation on microfluidic platforms. Requirements: M.S./Ph.D. in Engineering or Physics with 3+ years industry experience. Strong experimental skills, including design of experiments, execution and statistical analysis, are required. Knowledge of and experience in microfabrication, microfluidics and surface science are essential; optical measurements, analytical procedures and assay development a plus.

Orchid offers a competitive compensation package for all employees including a base salary, bonus potential and stock options and a comprehensive benefits plan. Send your resume with salary requirements to: **Human Resources, Orchid BioSciences, Inc., 303 College Road East, Princeton, NJ 08540; Fax: (609) 750-2250; E-mail: hr@orchid.com.**
An equal opportunity employer. Visit our Web site to view our other job openings.

www.orchid.com

ORCHID

The way people who do SNPs do SNPs.



The Industrial Genomics Revolution is Here.

SEQUENOM's revolutionary MassARRAY™ technology provides the performance you need to take high-throughput genotyping to an industrial level.

By combining proprietary chemistries with the speed and analytical power of MALDI-TOF mass spectrometry, the MassARRAY system offers unparalleled accuracy and throughput in SNPs analysis. This flexible system also easily adapts to meet your changing research needs, assuring success in even the most demanding genotyping projects. To join the Industrial Genomics Revolution, contact us at 1.877.4GENOME or visit our website today and get all the FACTS

FLEXIBILITY ACCURACY COST-EFFECTIVENESS THROUGHPUT SIMPLICITY

SEQUENOM
INDUSTRIAL GENOMICS™

Join the revolution @ www.sequenom.com

HUMAN GENOME SCIENCES

The Art and Science of Discovery

The mission of Human Genome Sciences is to treat and cure disease by bringing new gene-based medicines to patients around the world. We are dedicated to discovery for health. We believe that our genomics-based drugs will usher in a new generation of healthcare products. Our medicines will use the human body's natural substances – genes, proteins and antibodies – to repair, rebuild and restore to normal health damaged, diseased and aged tissues. Join a leader in the field of combining genomics and human antibody product development.

Scientist Positions in Antibody Development

There's never been a more exciting time to join Human Genome Sciences. With our recent partnerships with Abgenix, Inc., Cambridge Antibody Technology plc, and Dyax Corp., we have combined our proprietary database of human genes with state-of-the-art human antibody technologies. HGS is now poised to become a leader in the development of antibody therapeutics. Now, more than ever, we seek highly motivated scientists to join our dynamic Antibody Development Department. Qualified candidates will hold a Ph.D./M.D. in Molecular Biology, Biochemistry, Cell Biology, Immunology or related discipline and 2+ years of related experience in a research and/or development environment.

Molecular Biologist

Scientists will use bioinformatics tools and molecular biological techniques to identify and characterize potential novel therapeutic targets. A working knowledge of protein and DNA sequence analysis tools and expertise in molecular biological techniques including cloning, expression analysis, as well as cell culture, transfection and stable cell line generation is required. Industry experience in drug discovery or development is preferred. **Job Code: MBVA7/7**

Membrane Protein Expression and Purification

Candidates will be responsible for the development and use of novel techniques for expression, isolation and reconstruction of membrane proteins. Candidates must have knowledge of membrane biochemistry and biophysical techniques to purify, stabilize and characterize membrane proteins, and to develop assays using this technology. Experience with expression and purification of various types of membrane proteins including single and multiple transmembrane domain proteins, G-protein coupled receptors, channels and transporters is required. **Job Code: MPEPVA7/7**

Protein Expression and Purification

Candidates will be responsible for purification of recombinantly expressed proteins for antibody generation and characterization, and large-scale purification of antibodies and antibody fragments. Individuals will also handle development and optimization of expression and purification techniques. Experience with protein purification techniques and a variety of expression systems including bacterial, yeast, viral and mammalian cells required. **Job Code: PEPVA7/7**

Cell Biologists

Scientists will characterize and validate novel proteins as therapeutic drug targets, and develop high and low throughput assays for characterization of potential therapeutics. Experience with a broad variety of cellular and biochemical techniques including preparation and maintenance of primary and immortalized cell lines, receptor binding techniques, enzymatic assays, and cellular functional assays is required. Candidates should have scientific background in at least one of the following: immunology, oncology, inflammation, vascular biology/angiogenesis, and enzymology. **Job Code: CBVA7/7**

Antibody Generation and Characterization

Candidates will be responsible for the generation, characterization and development of antibodies as therapeutics. Experience in production, characterization and purification of monoclonal antibodies, and proven skills in immunoassay and bioassay development are required. Industry experience with development of therapeutic antibodies is preferred. **Job Code: AGCVA7/7**

HGS encourages the pursuit of excellence and offers a competitive benefits package, including educational reimbursement, subsidized health club membership, and a 401(k) with employer match. Look for us on the Internet at www.hgsi.com for additional information. For immediate consideration, please send/fax your resume to **Human Resources Department, Human Genome Sciences, Inc., Job Code #, 9410 Key West Avenue, Rockville, MD 20850; fax: (301) 309-1845.** Our preferred method for receiving resumes is via our Web page or via e-mail. EOE, M/F/D/V.

"HIGH TECHNOLOGY FIRM OF THE YEAR"
- High Technology Council of Maryland (April 13, 2000)

Visit our Web site to learn more about us: **http://www.hgsi.com**

THE UNIVERSITY OF TEXAS MD ANDERSON CANCER CENTER

POSTDOCTORAL FELLOW/ RESEARCH ASSOCIATE

Multiple positions funded by the NIH and DOD are available immediately in The Department of Molecular and Cellular Oncology at The University of Texas MD Anderson Cancer Center to conduct experiments related to molecular and cellular aspects of oncogenesis. Incumbent will be responsible for conducting experiments related to gene therapy (e.g., *Nat. Med.*, Vol. 6, No. 2, pp. 189-195, 2000) and signal transduction (e.g., *Proc. Natl. Acad. Sci. USA*, Vol. 97, No. 8, pp. 4262-4266, 2000 and *J. Biol. Chem.*, Vol. 275, No. 11, pp. 8027-8031, 2000).

Interested applicants should send a letter and curriculum vitae to: Mien-Chie Hung, Ph.D., Chairman, Department of Molecular and Cellular Oncology, Box 108, The University of Texas M. D. Anderson Cancer Center, 1515 Holcombe Blvd., Houston, Texas 77030 or email: ***mcopd@mdanderson.org***

UTMDACC is an equal opportunity employer and has a smoke-free environment. Women and minority candidates are encouraged to apply.

Molecular Biology Core

Genetic Therapy, Inc. (GTI), a Novartis company, is a leader in the research and development of human gene therapy products and technologies for the treatment of genetic and acquired diseases. The Molecular Biology Core laboratory provides a broad range of high quality services that support Research and Development efforts.

SENIOR SCIENTIST I

This individual will be responsible for development and validation of assays used to support pre-clinical safety studies in compliance with GLPs. Duties will include preparation and maintenance of documentation, such as validation protocols and reports, sample analysis, training and guidance of junior scientists, and coordination of assay transfer to Quality Control when appropriate. Skills required for this position include advanced molecular biology techniques such as reverse transcriptase-PCR, in vitro translation, and RNAse protection, as well as basic molecular biology skills, excellent communication skills and experience with molecular biology software tools. A strong background in statistical methods is preferred. Minimum qualifications include a Ph.D. in a scientific discipline and up to 2 years of relevant experience or equivalent.

All of our positions encourage creative thinking! GTI offers a stimulating and innovative environment with competitive salaries and benefits. **Please specify job code GB002032 when applying.** Fax or send curriculum vitae to:

Genetic Therapy, Inc.
9 West Watkins Mill Rd, Gaithersburg, MD 20878
Fax: (301) 258-4605
Email: gti.jobs@pharma.novartis.com

GENETIC THERAPY, INC.
A NOVARTIS COMPANY

Genetic Therapy is an Equal Opportunity Employer.

***Cephalon** is a leader in the discovery and development of products used to treat neurological diseases and disorders. The following opportunity is available in West Chester, PA:*

FORMULATION DEVELOPMENT SCIENTIST (III)

Selected candidate will develop clinically acceptable formulations and high concentration toxicology formulations for poorly soluble compounds, including experience with oil/wax/surfactant formulations, and scale-up the formulating process from laboratory scale to early clinical scale through commercial scale for non-standard, non-tablet manufacturing process. Must have manufacturing experience with hot melt capsule filing, soft gel, liposomes, blow-fill-seal, solid dispersion, patch and implantable gels.

This position requires a Ph.D. in Pharmaceutics or a related science, plus minimum 10 years demonstrated experience in the pharmaceutical industry, including management experience. Must have technical expertise in formulation development, especially formulation of poorly soluble/poorly permeable compounds. Familiarity, not necessarily expertise, with analytical chemistry and stability programs is needed. Strong management experience in strategic planning, budgets, resource allocation, plus regulatory experience in preparing the drug product sections of INDs, NDAs and foreign marketing applications essential.

Please send your resume, indicating POSITION CODE CH and salary requirements, to **Recruitment Manager, CEPHALON, INC., 145 Brandywine Parkway, West Chester, PA 19380-4245.** EEO, M/F/D/V.

Cephalon, Inc.

NATIONAL® CANCER INSTITUTE

Postdoctoral Fellowships are available through the National Cancer Institute's Division of Basic Sciences Intramural Research Award (IRA) and Collaborative Project Award (CPA) programs. Principal Investigators at both the Bethesda, MD, and Frederick, MD, campuses who have won competitive IRA or CPA fellowship positions are seeking outstanding Postdoctoral Fellows with either Ph.D.'s or M.D.'s to pursue the following research projects:

- Dysregulation of the CD8+ T Cell Subtype Response as a Mechanism of Tumor Escape

  Scott Abrams, Ph.D., *Laboratory of Tumor Immunology and Biology*
  The project involves the identification and characterization of novel tumor immune escape mechanisms and their impact on metastasis. Candidates should possess research interests and expertise in T lymphocyte biology, particularly in the areas of immune regulation and effector functions of CD4+and CD8+T cell subtypes.

- Rational Design of HGF Agonists and Antagonists

  Donald Bottaro, Ph.D., *Laboratory of Cellular and Molecular Biology*
  The project will focus on protein-protein and protein-proteoglycan interactions of Hepatocyte Growth Factor (HGF), with the overall goal of designing artificial HGF agonists and antagonists with therapeutic potential. Candidates should possess research interests and expertise in molecular biology and signal transduction.

- Mechanisms of Tumor Suppression by TGF-β

  Adam Glick, Ph.D., *Laboratory of Cellular Carcinogenesis and Tumor Promotion*
  The project focuses on signaling pathways and molecular mechanisms involved in suppression of tumor progression by TGF-β, using newly generated tet-on and tet-off transgenics for conditional expression of TGF-β in the mouse epidermis. A second project involves changes in CpG island methylation in the multistage skin carcinogenesis model. Candidates should have experience and background in molecular biology of cancer.

- Elucidation of the role of polo kinases during the G2/M phases of the cell cycle

  Kyung S. Lee, Ph.D., *Laboratory of Metabolism*
  Our research focuses on elucidating the function of the polo-box domain, which is essential for the function of polo kinases. Novel genetic and classical biochemical methods will be used to identify polo-box binding proteins. Both budding yeast and mammalian systems will be used to study the multiple roles of polo kinases during mitotic progression. Candidates should have an interest and experience in the fields of the cell cycle and signal transduction.

- Yeast Gene Microarrays for the Study of Gene Regulation, Gene Function and Chromosome Structure

  Michael Lichten, Ph.D., *Laboratory of Biochemistry*
  Project focuses on high-density DNA microarray analysis of gene expression and chromosome structure in the yeast *Saccharomyces cerevisiae*. Candidates should be prepared to lead a team which will prepare PCR products, fabricate microarrays, use microarrays to study DNA damage repair, recombination, and chromosome structure/function in yeast, and implement informatics systems for data analysis.

- Disruption of Transporter Protein Function

  Christopher Michejda, Ph.D., *Structural Biophysics Laboratory*
  Focus of the project is to design structural analogs of P-glycoprotein (P-gp) transmemebrane domains and test their ability to inhibit drug export by P-gp. Candidates should have a strong background in peptide and peptidomimitic syntheses, excellent credentials in general organic methods, and interest in parallel synthesis, combinatorial chemistry, molecular and structural biology.

- Signal Transducers of Unique Autocrine TGF-β Effects in Hematopoiesis

  Francis Ruscetti, Ph.D., *Laboratory of Leukocyte Biology*
  Project focus is on molecular dissection of signal tranducers responsible for the pleiotropic actions of TGF-β on hematopoietic growth and differentiation. Ideal candidate will have experience in either molecular biology or cellular hematology.

- Imprinted Gene Expression and Chromatin in an Androgenetic and Parthenogenetic Fibroblast Cell Line

  Colin L. Stewart, D. Phi., *Cancer and Developmental Biology Laboratory*
  Project will focus on the regulation of imprinted genes and epigenetic modifications of imprinted alleles leading to transcriptional silencing. Candidates should have experience in epigenetics, transcriptional regulation, chromatin structure, and/or gene targeting.

Applicants must have a Ph.D. and/or an M.D. and less than five years of postdoctoral experience. Please indicate the Fellowship of interest and submit CV and names of three professional references to:

Ave Cline
National Cancer Institute
Division of Basic Sciences
P.O. Box B
Building 428 Room 43B
Frederick, MD 21701-1201
301 842-1584
acline@mail.ncifcrf.gov

To learn more about other DBS employment opportunities, see our Web page at:

http://dino.nci.nih.gov/public/dbs/jobs/openings.html

The NCI is an Equal Opportunity Employer

BURROUGHS WELLCOME FUND

P.O. Box 13901
21 T.W. Alexander Dr.
Research Triangle Park, NC 27709-3901
Telephone (919) 991-5100 Fax (919) 991-5160
E-mail: info@bwfund.org
Web site: www.bwfund.org

BIOMEDICAL RESEARCH FUNDING

CAREER AWARDS IN THE BIOMEDICAL SCIENCES

These competitive awards are intended to foster the development and productivity of biomedical researchers who are early in their careers and to help them make the critical transition to becoming independent investigators. The awards provide up to $574,000 in support to bridge advanced postdoctoral training and the first three years of faculty service. Recipients may spend part of the a ward period at institutions in the United Kingdom or the Republic of Ireland. It is anticipated that at least 23 a wards will be made, with some awards targeted specifically at researchers in reproductive science. BWF encourages nominations on behalf of graduates of M.D. and M.D.-Ph.D. programs, women, and underrepresented minority groups.

More information about the Career Awards Program and the work of career awardees is available in a new report Investing in the Future of Science: The First Five Years of the Career Awards Program on our web site at (www.bwfund.org).

BWF made the following Career Awards in the Biomedical Sciences in 2000. Congratulations to BWF's newest Career Award Recipients!

Matthew P. Anderson, M.D., Ph.D. Massachusetts Institute of Technology. *Discipline: Molecular, cellular, and developmental neuroscience*

Jody L. Baron, M.D., Ph.D. University of California-San Francisco School of Medicine. *Discipline: Immunology*

Greg J. Bashaw, Ph.D. University of California-Berkeley. *Discipline: Molecular, cellular, and developmental neuroscience*

Leonardo Belluscio, Ph.D. Duke University Medical Center. *Discipline: Molecular, cellular, and developmental neuroscience*

Guoqiang Bi, Ph.D. University of California-San Diego. *Discipline: Molecular, cellular, and developmental neuroscience*

Chester W. Brown, M.D., Ph.D. Baylor College of Medicine. *Discipline: Endocrinology, metabolism, and reproductive science*

Michael D. Bulger, Ph.D. University of Washington School of Medicine. *Discipline: Biological chemistry and macromolecular biophysics*

Walter R. Burack, M.D., Ph.D. Washington University School of Medicine. *Discipline: Cell function and interaction*

John D. Crispino, Ph.D. Harvard Medical School. *Discipline: Biology of development and aging*

Abby F. Dernburg, Ph.D. Stanford University School of Medicine. *Discilpline: Endocrinology, metabolism, and reproductive science*

Kelly S. Doran, Ph.D. University of California-San Diego. *Discipline: Infectious diseases and microbiology*

Jay T. Groves, Ph.D. University of California-Berkeley. *Discipline: Biological chemistry and macromolecular biophysics*

Michael D. Hogarty, M.D. University of Pennsylvania School of Medicine. *Discipline: Oncological sciences*

Lora V. Hooper, Ph.D. Washington University School of Medicine. *Discipline: Infectious diseases and microbiology*

Akiko Iwasaki, Ph.D. National Institutes of Health. *Discipline: Immunology*

Ursula H. Jakob, Ph.D. University of Michigan. *Discipline: Biological chemistry and macromolecular biophysics*

Benhur Lee, M.D. University of Pennsylvania School of Medicine. *Discipline: AIDS and AIDS-related research*

Karen L. Mohlke, Ph.D. National Institutes of Health. *Discipline: Molecular approaches to gene function*

Samuel J. Pleasure, M.D., Ph.D. University of California-San Francisco School of Medicine. *Discipline: Molecular, cellular, and developmental neuroscience*

Douglas N. Robinson, Ph.D. Stanford University School of Medicine. *Discipline: Cell function and interaction*

Julia A. Segre, Ph.D. University of Chicago. *Discipline: Biology of development and aging*

Nirao M. Shah, Ph.D. Columbia University College of Physicians and Surgeons. *Discipline: Molecular, cellular, and developmental neuroscience*

Roger B. Sutton, Ph.D. Yale University School of Medicine. *Discipline: Biological chemistry and macromolecular biophysics*

Suzanne J. Szabo, Ph.D. Harvard School of Public Health. *Discipline: Immunology*

Michael M. Wang, M.D., Ph.D. Johns Hopkins University School of Medicine. *Discipline: Molecular, cellular, and developmental neuroscience*

Yangping Zhang, Ph.D. University of North Carolina-Chapel Hill School of Medicine. *Discipline: Oncological sciences*

ADDITIONAL CAREER-DEVELOPMENT FUNDING FOR BIOMEDICAL SCIENTISTS

- Clinical Scientist Awards in Translational Research offer $750,000 to established independent physician-scientists whose work links the laboratory bench and clinical medicine. *Deadline: September 1, 2000.*
- New Investigators Awards in the Pharmacological or Toxicological sciences. *Deadline: November 1, 2000.*
- Awards in molecular parasitology, malaria, and molecular pathogenic mycology. *Deadline: January 15, 2001.*

Please visit our Web site at www.bwfund.org for complete program information.

Career awards provide up to $574,000 to support advanced postdoctoral training and initial faculty appointment.

Open to U.S. and Canadian biomedical scientists.

The application deadline for career awards that begin in the year 2001 is October 2, 2000.

The Burroughs Wellcome Fund is an independent private foundation dedicated to advancing the medical sciences by supporting research and other scientific and educational activities.

Abgenix

FOCUSED on the development of novel antibody-based therapeutics

Abgenix is a biopharmaceutical company that develops and intends to commercialize antibody therapies for the prevention & treatment of a variety of disease conditions. We currently have excellent opportunities for experienced and dedicated scientific professionals to provide leadership and direction to our R&D team.

Scientist, Target Identification

You will use public and private sequence databases to identify novel targets to develop therapeutic monoclonal antibodies; analyze nucleic acid databases to identify novel targets for antibody development; perform in silico manipulation of nucleic acid and protein sequences to identify homologues of known genes; and work with researchers to develop a plan for antibody generation and validation. Candidates must possess a Ph.D. or equivalent in Immunology, Cell Biology, Molecular Biology, or a related scientific discipline, with a minimum of 2 years' relevant experience in a biotech/pharmaceutical or academic environment (including post-doc work). Experience searching sequence databases and expertise with the analysis of sequences are required. The position requires research experience encompassing the areas of expression profiling, or bioinformatics. Superior written/verbal communication, planning, and organizational skills are essential. Some travel may be required. (Job Code: 00AB50-N)

Group Leader/Senior Scientist, Formulation/Delivery

You will establish a protein formulation and delivery lab within the Process Sciences Group, including designing liquid and lyophilized formulations and developing methods for controlled and efficient delivery of recombinant antibodies. You will initiate and obtain approval for new projects and represent the company's work via publications and presentations. Candidates must possess a Ph.D. or equivalent in protein biochemistry or related scientific discipline a minimum of 8 years' experience including management responsibilities in a biotech/pharmaceutical or academic environment. Extensive experience in pharmaceutical research and development of recombinant glycoproteins is required. (Job Code: 00AB54-N)

We offer a competitive compensation/benefits package & stock options. Please forward resume to: Abgenix, Inc., Attn: (Job Code), 7601 Dumbarton Circle, Fremont, CA 94555; Fax: (510) 608-6511; E-Mail: jobs@abgenix.com. EOE

Abgenix www.abgenix.com

Symposiums

International Symposium

Evaluation of Butadiene, Isoprene and Chloroprene Health Risks

12-14 September 2000
Nelson Dock Holiday Inn
London, England

A Satellite Symposium to Eurotox 2000 (XXXVIII European Congress of Toxicology)

Metabolism and Pharmacokinetics • Biological Effects • Epidemiology • Assessment Perspectives and Methods

Jointly Organized By:
API, EPA, ECETOC, HEI, IARC, IISRP, NIEHS, SOT, SEG, EUDG-XI, ECIC

Inquiries: Larry Turner, Symposium Coordinator

International Institute of Synthetic Rubber Producers, Inc.
2077 South Gessner, Suite 133
Houston, Texas 77063 USA
www.iisrp.com
Tel:+713.783.7511 Fax:+713.783.7253
Email: turner@iisrp.com

A POSTDOCTORAL position is available to study structure-function relationships of integral membrane proteins using electron spin resonance spin labeling and other biophysical techniques. Experience in protein chemistry, reconstitution methods, and electron spin resonance or fluorescence spectroscopy is desired. Please send a letter describing interest and qualifications, curriculum vitae, and the names and addresses (e-mail, postal, and phone) of three references to: **Dr. Jimmy B. Feix, National Biomedical ESR Center, Medical College of Wisconsin, Milwaukee, WI 53226. E-mail: jfeix@mcw.edu**

MEDICAL COLLEGE OF WISCONSIN
www.mcw.edu
EEO/AA Employer/M/F/D/V

EMORY

DIRECTOR YERKES REGIONAL PRIMATE RESEARCH CENTER EMORY UNIVERSITY Atlanta, Georgia

Emory University seeks a new Director of the Yerkes Regional Primate Research Center who will provide dynamic, scientific leadership to and administrative oversight of the Center's ongoing research resources and scientific programs. The Director reports to the Executive Vice President for Health Affairs.

Emory University, a private university, has an enrollment of over 11,000. The University encompasses nine divisions, a number of centers for advanced study, and a host of prestigious affiliated institutes. The Woodruff Health Sciences Center (WHSC) encompasses four academic divisions: the School of Medicine, the Nell Hodgson Woodruff School of Nursing, the Rollins School of Public Health, and the Yerkes Center. Emory Healthcare is the clinical arm of the WHSC.

The Yerkes Center, one of eight regional primate research centers sponsored by the National Center for Research Resources of NIH, is dedicated to basic and applied biomedical and behavioral research with non-human primates and other animal models when appropriate. The four major research areas include microbiology and immunology, neuroscience, psychobiology, and visual science. The Yerkes Center, located on the Emory University campus, has 29 full-time core scientists, an additional 80 collaborative and adjunct faculty, 160 support staff, and a total operating budget of $24 million.

The ideal candidate will possess the following: a doctoral degree in a health sciences discipline; tenurable at the rank of full professor; significant scientific accomplishments including a minimum of ten years of academic scholarship/leadership; a national reputation as a scientist, preferably involving the study of non-human primates; a collegial and collaborative management style.

James L. Madara, M.D., Chair of the Search Committee, requests that nominations, applications, and requests for additional information be directed to the University's consultant:

Paula Carabelli
EMN/Witt/Kieffer
1920 Main Street, Suite 310
Irvine, CA 92614
949/797-3536
Fax: 949/851-2412
e-mail: paulac@wittkieffer.com

Each candidate is asked to submit a letter of interest; a current curriculum vitae and bibliography; and the names, positions, and phone numbers of five references who will be contacted only with the candidate's approval. Screening will begin immediately and continue until an appointment is made. Emory University is an EEO/AA employer and strongly encourages all to apply.

Educational Management Network/Witt/Kieffer

CuraGen Corporation

Engineering Cures Through Genes

CuraGen's rapid growth has created new career opportunities. We currently have openings for individuals with backgrounds in molecular biology, biochemistry, biology engineering, bioinformatics, medicine and other related fields. Successful CuraGen employees are exceptionally organized, have an entrepreneurial spirit, a passion for their work, and thrive in a challenging, team oriented environment. We are currently seeking highly driven individuals for the following positions:

Director of Proteomics

Responsible for our proteomics platform, and the characterization of pathways for entire genomes (Yeast, *Drosophila*, Human). Applicant must be a leader in the identification, characterization and elucidation of signal transduction and biochemical pathways. Mastery working with yeast two-hybrid and genomic-scale datasets required, as is the ability to drive software, and automation efforts. Exceptional presentation and management skills required. PhD. or M.D. and 5+ years of experience required. Job Code: 096-00

Research Scientists/Pharmacogenomics

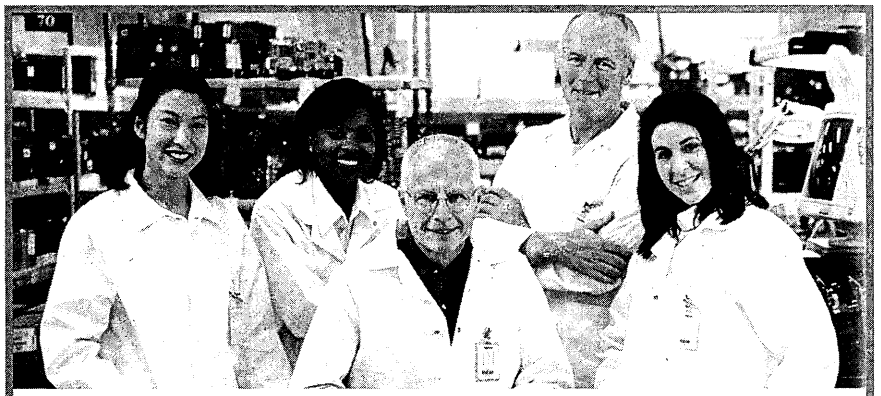
Successful candidates will engage in high-throughput differential gene expression analysis to identify molecular correlates of drug efficacy and toxicity. Experience with differential gene expression analyses/DNA chip microarrays is preferred. Positions are available in the following: Molecular Toxicology, Molecular Endocrinology and Molecular Neuro/Psychopharmacology. A solid publication record is required as are strong communication skills and the ability to work in a highly interactive environment. M.D. or Ph.D. with training in molecular pharmacology/toxicology.
Job Code: 080-00

Research Scientists/Pharmacogenetics

Catch the wave of the newest discipline, Population Genomics. We are seeking talented population geneticists interested in discovering the genes and their respective sequence variants that determine individual variability in drug response. Solid communication skills and the ability to work in a highly interactive environment are essential. Specific training in population-based genetics, genotype analyses and statistics as evidenced by a strong publication record is essential. M.D. or Ph.D. degree. Job Code: 082-00

Please send cover letter, resume / CV and 3 letters of recommendation. EOE

555 Long Wharf Drive
New Haven, CT 06511 USA
www.curagen.com
Email: jobs@curagen.com
Fax: (203) 401-3337



R&D PROFESSIONALS

NEW PRODUCTS ARE YOUR LIFEBLOOD. OURS TOO.

When we at Johnson & Johnson ask "what's new?", we're not speaking casually. We're reflecting a belief we all share – innovation is key. Because it's our ongoing innovation of products that help people, like Risperdal and Retin-A, that leads to the ongoing success of Johnson & Johnson, the world's leading health care and products and services company.

If you have an intense desire to make our next innovation your claim to fame, opportunities are now open at the following operating company.

THE R.W. JOHNSON
PHARMACEUTICAL RESEARCH INSTITUTE

The R.W. Johnson Pharmaceutical Research Institute, located in Raritan, New Jersey, conducts pharmaceutical research in therapeutic areas including anti-infectives, central nervous system, dermatology and oncology.

Scientist

You will design and conduct physical/chemical characterization research of active pharmaceutical ingredients and excipients. You'll provide guidance on formulation development; interact with Formulation Scientists and Analytical Chemists; conduct studies using powder, x-ray defractometry, thermal analysis and microscopy; write various reports; and provide components of regulatory filings.

The successful candidate will have a Ph.D. and 0-2 years experience in the pharmaceutical industry or an MS and 5+ years of experience in the pharmaceutical industry. Knowledge of material sciences, thermodynamics and HPLC is essential, as is strong familiarity with the unit operations of dosage form development. You must be able to identify potential problems and opportunities from limited data. Strong organizational, communication, teamwork and interpersonal skills are a must. **Req. Code 001518SCI**

Associate Scientist

Partnering with research scientists, clinicians and biostatisticians, you will provide input on pharmacokinetic-pharmacodynamic modeling, conduct simulation analysis of study design using computer assisted trial design softwares, and interpret PK:PD data from studies at various development phases.

To qualify, you must have an MS in science or engineering and 2 years of related experience, or a BS with 7 years of experience. Knowledge of material sciences, thermodynamics and HPLC is essential, as is strong familiarity with the unit operations of dosage form development. Strong organizational, communication, teamwork and interpersonal skills are a must. **Req. Code 001519SCI**

As a valued team member, you'll receive a competitive salary and great benefits including medical/dental, a 401(k), a pension plan and a comprehensive wellness program. Please apply directly on-line at our web site **www.jnj.com** or forward a scannable resume, noting operating company as **R.W. Johnson Pharmaceutical Research Institute** and **Req. Code**, to: **Johnson & Johnson Recruiting, P.O. Box 16597, New Brunswick, NJ 08906-6597.** Please note, resumes received electronically via jnj.com are reviewed within 24 hours. Mailed resumes are reviewed within 3 business days after receipt. We are an equal opportunity employer totally committed to diversity.

Johnson & Johnson

FOR FURTHER DETAILED INFORMATION REGARDING JOB RESPONSIBILITIES, WE HIGHLY RECOMMEND YOU VISIT OUR WEB SITE.

www.jnj.com

CALL FOR ABSTRACTS
AUSTRALIAN CONFERENCE
SIGNAL TRANSDUCTION

11th International Conference on Second Messengers and Phosphoproteins

22 – 27 April 2001
Melbourne, Australia

Abstract submissions are now invited.
Full details on the **CALL FOR PAPERS** are available on
www.secondmessengers.com

Conference Secretariat: The Meeting Planners Pty Ltd
email: secondmessengers@meetingplanners.com.au

Sponsored by **Science***'s Signal Transduction Knowledge Environment*

WAYNE STATE UNIVERSITY

Postdoctoral Positions in Cellular and Molecular Neuroscience

Four postdoctoral positions are available to study the cellular and molecular mechanisms regulating neural signaling. Successful applicants will play integral roles in these highly collaborative, multidisciplinary, NIH-funded research projects (visit our web site at http://psychiatry1.med.wayne.edu/cmnrd.htm):

- Electrophysiology of muscarinic receptors in prefrontal cortex. Whole cell recording techniques are used in combination with pharmacological and molecular biological approaches to address mechanisms by which muscarinic receptors regulate neuronal excitability. (Rodrigo Andrade)
- Regulation of the human dopamine transporter (hDAT). Analysis of hDAT gene expression in postmortem brain from cocaine abusers. In vitro analysis of hDAT promoter to elucidate underlying molecular mechanisms. RGS proteins. Confocal analysis of gene expression in slice cultures. (Michael Bannon)
- Collaborative project with Parke-Davis Pharmaceutical Research (Ann Arbor). Molecular and cellular analysis of GPCR signaling pathways. Function of regulators of G protein signaling (RGS) proteins in the CNS. Organization and regulation of adrenergic signaling in adipose tissue. (James Granneman)
- Mechanisms by which drugs of abuse and environmental toxins damage monoamine neurons. Monooxygenase enzyme and transporter protein response to reactive oxygen and nitrogen species. Microarray analysis of neurotoxic amphetamine-induced alterations in gene expression. (Donald Kuhn)

Interested candidates should send a brief letter describing their research interests, a curriculum vitae, and three letters of reference to the appropriate principal investigator at: **Wayne State University School of Medicine, Department of Psychiatry and Behavioral Neurosciences, 540 E. Canfield Ave., 2309 Scott Hall, Detroit, MI, 48201**.

Wayne State University is an equal opportunity/affirmative action employer.

The Science of Agricultural Genetics

Research Scientist (Job #RESP022/PSC)

This position, based at Woodland, CA, is part of the Trait Development and Integration Department. The candidate is required to identify traits, mechanisms and genetic variation leading to high stable maize grain yield and tolerance to drought, heat and high plant densities. Needed will be an understanding of the interaction of environment with conventional gene and transgene function, and the development of screens for key secondary traits, while collaborating with others sharing similar goals. A Ph.D. in crop physiology or physiological genetics is required, with practical field experience, and an ability to work in teams. Familiarity with molecular biology and current crop simulation models is desirable. For consideration, please send a scannable resume and cover letter to: Resume Processing Center - Job Code RESP022/PSC, Pioneer Hi-Bred International, Inc., 400 Locust Street, Suite 700, PO Box 14454, Des Moines, IA 50306-3454, or Email: apply@pioneerjobs.com. Visit our website at www.pioneer.com.

Pioneer Hi-Bred International, Inc., is the world leader in the discovery, development and delivery of elite crop genetics. We are committed to developing and incorporating both time-tested approaches and cutting edge technologies that will continue to make our products superior to any in the industry. Pioneer's research programs, research collaborations, extensive germplasm base and advanced work in genomics are unmatched by our competitors.

PIONEER HI-BRED INTERNATIONAL, INC.

An Equal Opportunity Employer

Distinguished Fellowship

Lawrence Livermore Postdoctoral Fellowship

The Lawrence Livermore National Laboratory Director has established a Lawrence Livermore Postdoctoral Fellowship. This is a highly desirable, prestigious position with ample resources and freedom to conduct cutting edge research in the fields of the candidate's choice. Duration for the Fellowship is up to three years. Typically two openings are available each year. Fellowships are awarded only to candidates with exceptional talent, credentials, and a track record of research accomplishments.

Candidates will do original research in one or more aspects of science relevant to the mission and goals of LLNL which include: Physics, Computational Mathematics, Computer Science, Chemistry, Material Science, Engineering, Environmental Research, Atmospheric Science, Geological Sciences, Energy, Laser Science, and Biological Science. Successful candidates may participate in experimental or theoretical work at LLNL, and will have access to LLNL's extensive computing facilities, specialized laboratory facilities, and field equipment. A senior scientist will serve as a mentor to each of the Fellows. The candidates will receive full management and administrative support. The salary is $6617/mo.

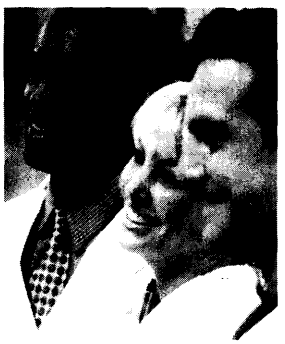
Please refer to our web page **http://www.llnl.gov/urp/LLNLPostDoc/LLNLPostDoc.htm** for eligibility requirements and application information. Please reference source code **AJSE770AD.** The deadline for application is September 15, 2000. No applications will be accepted after this date. Lawrence Livermore National Laboratory is operated by the University of California for the U.S. Department of Energy. We are an Equal Opportunity Employer with a commitment to workforce diversity.

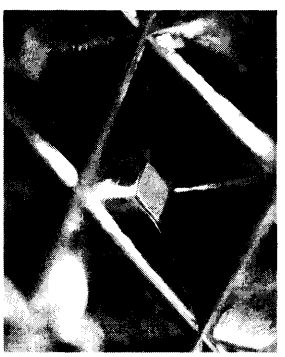
University of California
Lawrence Livermore National Laboratory

www.llnl.gov
For information about other employment opportunities, visit our website.

MULTI-FACETED.

Abbott Laboratories is guided by individuals with various backgrounds, experiences, perspectives and cultures.





Professionals from all over the world are drawn to Abbott Laboratories for different reasons. There are many aspects that make us a leader in the health care industry. From innovative solutions to an exciting work environment, there's something for everybody at Abbott Laboratories.

Help us improve lives - join Abbott in one of the following positions:

Senior Research Pharmacologist

Perform studies using *in vivo* animal models to assess integrated cardiovascular and cardio-renal profiles of lead therapeutic compounds in support of discovery research. Develop and implement state-of-the-art disease state models to advance discovery efforts in therapeutic areas including metabolic and urologic diseases and cancer. This position requires a Ph.D. in the Biological Sciences and at least 2 years of postdoctoral training in areas relevant to integrative cardiovascular pharmacology. Extensive experience with *in vivo* assessment of cardiovascular and circulatory function in animal models is essential. Experience in the areas of renal pharmacology and/or *in vitro* cellular or molecular biology techniques is a plus. Strong written and oral communication skills and the ability to work in a dynamic, fast-paced environment are key attributes. **Ad Code: 2K-KDA3236**

Senior Research Cellular/Molecular Biologist

Utilize genomic information and bioinformation to research and discover new targets in metabolic disease. Research will focus on diabetes, obesity, bone disorders and vascular disease. This position requires a Ph.D. in the Biological Sciences and at least 4 years of postdoctoral research in molecular metabolism and/or cardiovascular disease. Genomic biology, bioinformatics and molecular biology capabilities are essential. **Ad Code: 2K-KDA3137**

Research Cellular/Molecular Biologist

Participate in understanding the mechanism of action of novel anti-cancer drugs with our *in vivo* oncology team. Responsibilities include immunohistochemistry and cellular analysis of tumor sections using a variety of techniques. This position requires a Master's degree in Biology and 3-5 years experience in industrial or academic research. Individual must be familiar with tissue preparations, general histology, tumor cell markers and cell cycle analysis. **Ad Code: 2K-KDA3235**

Push the limits of your skills and talents with Abbott Laboratories - a company on the cutting-edge of tomorrow. In return for your commitment to innovation, we offer a competitive compensation and benefits package. To learn more, or to respond online, please visit us at www.abbott.com/ad and enter Ad Code: (insert from above). Or by mail to Abbott Laboratories, Ad Code: (insert from above), Dept. 583, Bldg. AP9A, 100 Abbott Park Road, Abbott Park, IL 60064-3537.

www.abbott.com

ABBOTT LABORATORIES
Quality Health Care Worldwide

An EOE, we are committed to employee diversity.

ASSOCIATE DEAN FOR RESEARCH
UNIVERSITY OF MISSOURI KANSAS CITY SCHOOL OF MEDICINE

University of Missouri Kansas City School of Medicine is recruiting an Associate Dean for Research to enhance research productivity at the school and to facilitate the development of collaborative research partnerships with our clinical affiliates. The Associate Dean for Research will develop and coordinate the Office for Research Administration, which will serve as a resource to medical school faculty in their pursuit of clinical and basic scientific research and extramural funding.

Minimum requirements include more than five years of administrative experience; experience working with public, philanthropic, and industrial funding sources; and an M.D. or Ph.D. degree in the biomedical sciences. The successful applicant should also have administrative experience with graduate biomedical education and will be qualified for a tenured faculty appointment at a senior academic rank. Preferred additional requirements include more than 15 years of experience as a successfully funded investigator in a biomedical science relevant to the fields of neuroscience, cardiovascular pathophysiology, or oncology.

Please submit curriculum vitae and names, addresses, and telephone numbers of four individuals who are highly familiar with your work and willing to serve as references to:

C. J. Papasian, Ph.D.
Chair, Search Committee
Associate Dean/Research
Department of Basic Medical Science
University of Missouri Kansas City
School of Medicine
2411 Holmes Street
Kansas City, MO 64108

University of Missouri Kansas City is an Affirmative Action/Equal Opportunity Employer Institution.

FACULTY POSITIONS
CANCER RESEARCH
Nebraska

The Department of Oral Biology of the University of Nebraska Medical Center (UNMC) College of Dentistry is expanding its research focus in cancer biology. Three full-time (12-month) **TENURE-TRACK FACULTY POSITIONS** are available beginning July 1, 2000. Selected candidates will be expected to build strong, externally funded research programs in the molecular mechanisms of cancer. Competitive salaries, start-up packages, and modern research laboratories are included. A Ph.D. or equivalent and postdoctoral experience are required with academic rank commensurate with qualifications. Collaboration with researchers at the UNMC Eppley Institute for Research in Cancer is anticipated. Review of applicants will continue until the position(s) are filled. Send curriculum vitae; selected reprints; a statement of research plans; and the names, addresses, and telephone numbers of three references to: **Office of the Dean, Position #0–0050, UNMC College of Dentistry, 40th and Holdrege, Lincoln, NE 68583-0740**. *UNMC is an Equal Opportunity/Affirmative Action Employer.*

BIOMEDICAL ENGINEER
(PRODUCT LINE MANAGER)

Candidate must have a Ph.D. in molecular or cell biology, biophysics, neuroscience, or zoology, plus a minimum of two years of employment or postdoctoral experience using cellular imaging instrumentation and data analysis software. Conduct research and development on biomedical research instrumentation and software, bioinformatics for research in genomics and neuroscience, liaise with external researchers. Involves use of advanced light-based microscopy, microarray technology, cellular imaging and electrophysiology equipment, programming in Visual Basic, C. Send/FAX résumé to: **Axon Instruments, 1101 Chess Drive, Foster City, CA 94404. FAX: 650-571-9500; e-mail: jobs@axon.com**. No calls, please.

POSITIONS OPEN

BIOINFORMATICS SPECIALIST

InforMax, Inc., worldwide leader in bioinformatics, has an opening for a Bioinformatics Specialist. Responsibilities include conducting presentations and opportunity discovery for the sales team. Additional duties would include support of the sales team for all products. This position requires molecular and/or cell biology laboratory experience, preferably at a Master's or Ph.D. level. Proficiency in using common operating systems such as UNIX and Windows as well as formal knowledge of the most known bioinformatics tools. Excellent communication and interpersonal skills a must. Willingness to travel 25% to 50%. We offer a dynamic and competitive environment allowing rapid professional growth in the bioinformatics field. Please send your cover letter and résumé, quoting Reference # SALES1, to:

InforMax, Inc.
Attention: Chris Wiggins
EC Sales Director
6010 Executive Boulevard, 10th Floor
North Bethesda, MD 20852
E-mail: chris@informaxinc.com
(e-mail preferred)

TWO FACULTY POSITIONS
CANCER GENETICS/GENOMICS

The Barbara Ann Karmanos Cancer Institute seeks outstanding basic science cancer researchers for faculty positions at Wayne State University. We seek outstanding candidates at the levels of **ASSISTANT, ASSOCIATE**, and **FULL PROFESSOR**, with an M.D. and/or Ph.D. degree and a strong record of academic achievement in basic cancer research employing hereditary cancer families or genomics to genetic models of human cancer. The candidates will join a research group utilizing a cancer genetics registry of high-risk families. The successful candidate will have a demonstrated record of accomplishment in human cancer genetics and genomics with the expectation of developing an independent, externally funded research program. Generous start-up packages are available.

Please send letters of application accompanied by curriculum vitae and names of three references to:

Ms. Caryn Volpe
Academic Affairs and Research Administration
Barbara Ann Karmanos Cancer Institute
4100 John R, Second Floor
Detroit, MI 48201
Website: www.karmanos.org

Wayne State University School of Medicine is an Equal Opportunity/Affirmative Action Employer.

Faculty position: The Department of Neurological Surgery, University of Washington, has an opening for a full-time basic scientist/faculty member at the **ASSISTANT** or **BEGINNING ASSOCIATE PROFESSOR** level. Applicants must have Ph.D. or comparable degree. Duties include research in the area of stem cell neurobiology, teaching of residents/postdoctorals/graduate students, and developing an independent research program. Excellent opportunities exist for collaboration and interaction with other investigators pursing a broad spectrum of neuroscience research issues. A three-year start-up package is to be negotiated with the Chairman; subsequent research support will be generated from research grants and contracts. Applicants should send curriculum vitae and names of at least three references by July 15, 2000, to: **P. A. Schwartzkroin, Chair, Search Committee, University of Washington, Department of Neurological Surgery, Box 356470, Seattle, WA 98195. E-mail: pas@u.washington.edu**. *Affirmative Action/Equal Opportunity Employer.*

POSITIONS OPEN

FISHERIES SCIENTIST

The Department of Zoology at North Carolina State University seeks applicants for a 12-month, tenure-track **ASSISTANT PROFESSOR** position in fisheries science. This position will address applied fisheries issues relating changes in habitat, water quality, harvest, and management to fisheries production and the dynamics of fish and shellfish populations. Strong candidates will use a combination of field, quantitative, and analytical approaches to conduct research that will result in more effective management. The position will be located at the Center for Marine Sciences and Technology (CMAST), North Carolina State University's new coastal research facility in Morehead City, North Carolina. In addition to advising graduate students, the selected candidate will be expected to establish an externally funded research program and an active extension/outreach program capitalizing on cooperative relationships with biologists at the North Carolina Division of Marine Fisheries, University of North Carolina Institute of Marine Science, NMFS/NOS Beaufort Laboratory, Duke Marine Laboratory, Carteret Community College, and the University of North Carolina Sea Grant program, as well as other North Carolina State faculty.

To apply, send a letter of application, three letters of recommendation, curriculum vitae, and statement of research interests to: **Dr. Jim Rice, Fisheries Scientist Search, Department of Zoology, North Carolina State University, Box 7617, Raleigh, NC 27695-7617**. Application review will begin September 1, 2000, and continue until a suitable candidate is identified. *North Carolina State University is an Equal Opportunity/Affirmative Action Employer. We encourage minorities, women, and the disabled to apply.*

SIX NEUROSCIENCE FACULTY POSITIONS
NEUROLOGICAL SCIENCES INSTITUTE
Oregon Health Sciences University

The Neurological Sciences Institute is recruiting additional faculty to staff its new research facility on Oregon Health Sciences University's west campus. We invite applications from neuroscientists at the level of **ASSISTANT, ASSOCIATE** or **SENIOR SCIENTIST** whose research complements that of the current faculty (**website: www.ohsu.edu/nsi/**). Preference will be given to those with extramurally funded programs. All levels of investigation will be considered including molecular, cellular, systems, and behavioral. Research related to hearing is one specific need to be filled.

Our institute is a multidisciplinary center dedicated to advancement of our understanding of the brain and neurological disorders and to application of that understanding to address problems in human health. We are part of a rapidly growing university that is strong in basic and clinical neurosciences. We are located adjacent to the Oregon Regional Primate Research Center and the new Vaccine and Gene Therapy Center.

Applicants should submit curriculum vitae, a statement of research interests, and three letters of recommendation to: **Search Committee, Neurological Sciences Institute, Oregon Health Sciences University, 1120 N.W. 20th Avenue, Portland, OR 97209**. Applications must be received before August 15, 2000; interviews will be conducted in the fall/winter of 2000 for appointments to begin in the fall of 2001. *Oregon Health Sciences University is an Equal Opportunity Employer.*

POSTDOCTORAL POSITION is available immediately to join an ongoing interdepartmental collaborative project characterizing gene expression differences in ovarian cancer and developing animal model for ovarian cancer. Previous experiences in molecular biology, tissue culture, and animal handling are highly desirable. Send a cover letter, curriculum vitae, and references to: **Dr. David Chang, Division of Hematology–Oncology, UCLA Department of Medicine, 10833 Le Conte Avenue, Los Angeles, CA 90095-1678. FAX: 310-825-6192; e-mail: ddchang@mednet.ucla.edu.**

NATIONAL® CANCER INSTITUTE

Be an NCI Cancer Prevention Fellow

THE NATIONAL CANCER INSTITUTE (NCI) sponsors the Cancer Prevention Fellowship Program (CPFP). Its purpose is to train individuals from a multiplicity of health and biomedical science disciplines in the field of cancer prevention and control.

What will I get out of the program?

- Master of Public Health degree
- NCI Summer Curriculum in Cancer Prevention
- Mentored research at the NCI
- Brief field assignments at other institutions

Research opportunities include chemoprevention, clinical epidemiology, diet, nutrition and other lifestyle-factor studies, evidence-based decisionmaking, intervention studies, outcomes research, special populations, screening and early detection (including genetic and other biomarkers), smoking cessation, social and behavioral research, statistical and epidemiological methodology, and translational research.

Am I eligible?

You must have a doctorate degree (M.D., D.D.S., D.O., Ph.D. or equivalent) from a U.S., territorial or Canadian institution. Foreign medical graduates must have current USMLE or ECFMG certification.

You must also be either a citizen or resident alien of the U.S. eligible for citizenship within 4 years.

How long is the program?

Fellows are accepted for up to 5 years of training beginning in July.

When are applications due?

Applications are due September 1, 2000 for entry into the program July 1, 2001.

How do I apply?

To receive a catalog, contact:*

Douglas L. Weed, M.D., M.P.H., Ph.D.
Director
Cancer Prevention Fellowship Program
National Cancer Institute
Executive Plaza South, Suite T-41
6130 Executive Blvd MSC 7105
Bethesda MD 20892-7105

*Please provide home address and where you heard about the program.

Further inquiries:
Mrs. Barbara Redding
☎ (301) 496-8640
Fax (301) 402-4863
E-mail br24v@nih.gov

Visit our Web site at:
http://dcp.nci.nih.gov/pob

THE NATIONAL CANCER INSTITUTE IS AN EQUAL OPPORTUNITY EMPLOYER.

Rapid Access to Intervention Development "RAID"

The NATIONAL CANCER INSTITUTE is requesting applications for the following initiative: Rapid Access to Intervention Development (RAID). RAID will make available to academic investigators, on a competitive basis, the preclinical development contract resources of NCI's Developmental Therapeutics Program. RAID is not a grant program to originating investigators. The goal of RAID is the rapid movement of novel molecules and concepts from the laboratory to the clinic for proof-of-principle clinical trials, using NCI's contract research mechanisms. RAID will assist investigators who submit successful applications by providing any (or all) of the preclinical development steps that may be obstacles to clinical translation. These may include, for example, production, bulk supply, GMP manufacturing, formulation, and toxicology. Suitable agents for RAID will include small molecules, biologics, or vaccines. *There are two receipt dates for proposals per year, February 1 and August 1. Current applications must be received by August 1, with all materials submitted directly to the office listed below.* For information on process and procedure, visit the web site, http://dtp.nci.nih.gov. Inquiries are encouraged, and the opportunity to clarify issues or questions is welcome. Academic investigators may have collaborations with small-business partners and still qualify for RAID funding. Non-profit organizations other than universities may also now submit RAID applications. Please note that a maximum of **two** distinct proposals per investigator can be submitted for each application review date. Please contact:

RAID, Office of Associate Director
Developmental Therapeutics Program, NCI
6116 Executive Blvd., Suite 500
Rockville, MD 20852
Tel: 301.496.8720; Fax: 301.402.0831
Email: sausville@nih.gov

ANNOUNCEMENTS

ANGIOGENESIS RESOURCE CENTER

The Developmental Therapeutics Program (DTP, DCTD, NCI) has recently put into operation its Angiogenesis Resource Center. This effort was recommended by the Advisory Committee to the Director, NCI to facilitate research into the mechanisms of tumor angiogenesis and the development of drugs that target the essential tumor vasculature.

The Center currently serves qualified investigators in the scientific community by providing human umbilical endothelial cells (HUVEC) and the reference agent TNP470. Additionally, anti-angiogenesis testing is available without charge for pure natural products or synthetic compounds submitted by suppliers in universities, research institutes, government agencies, and pharmaceutical or biotechnology companies.

For additional information on receiving any of these supplies and services, please visit our website at http://dtp.nci.nih.gov

or contact the following individuals:

Mr. Richard F. Camalier
Biological Testing Branch
DTP, DCTD, NCI
Fairview Center, Suite 205
1003 West 7th Street
Frederick, MD 21701-8527
Tel. (301) 846-5607
Fax. (301) 846-6183
email. camalier@mail.nih.gov

Dr. Ravi K. Varma
Drug Synthesis and Chemistry Branch
DTP, DCTD, NCI
EPN Room 831
6130 Executive Blvd.
Rockville, MD 20892
Tel. (301) 435-9159
Fax. (301) 480-4817
email. varmar@dtpepn.nci.nih.gov

NATIONAL® CANCER INSTITUTE

- Developmental Therapeutics Program -

The Cecil H. and Ida Green Center for Reproductive Biology Sciences comprises about 16,500 square feet of laboratory and office space at The University of Texas Southwestern Medical Center at Dallas. The Center will provide a link between research on embryonic and other stem cells, gamete development, fertilization, and nuclear transplantation/nuclear reprogramming. A novel blend of basic, applied, and clinical research in these focused areas will provide a unique training program for students and Postdoctorals not generally available elsewhere. Applications for positions at the **ASSISTANT PROFESSOR** level are invited within areas that concentrate on embryonic or general stem cell biology. A Ph.D. or M.D. with relevant postdoctoral experience is required. All applicants should provide curriculum vitae and three letters of reference at **website: http://greencenter.swmed.edu/**. Outstanding applicants will also become candidates for the prestigious Endowed Scholar position. Send written applications to: **Ms. Cherlyn Lacy, Cecil H. and Ida Green Center for Reproductive Biology Sciences, 5323 Harry Hines Boulevard, Dallas, TX 75390-9051**.

University of Texas Southwestern is an Equal Opportunity Employer.

POSITIONS IN FEMALE REPRODUCTIVE BIOLOGY

The University of Missouri–Columbia, will fill two tenure-track positions in female reprodutive biology: (1) **MOLECULAR BIOLOGIST** with interest in biochemical endocrinology that might include signal transduction; (2) **MOLECULAR BIOLOGIST, CELL BIOLOGIST**, or **DEVELOPMENTAL BIOLOGIST** with interests in some aspect of early embryonic development in mammals.

The successful applicants will join an interdepartmental group representing eight departments and four colleges. Candidates must have postdoctoral experience. Appointments will be 80% research and 20% teaching in the candidate's area of expertise. Appointees will contribute to the mission of the College of Agriculture, Food, and Natural Resources and Food for the 21st Century program. Applications are due September 1, 2000, or when suitable candidates are found. Applications should include a letter describing area of interest and future plans, curriculum vitae, and names of three to five persons who can be contacted for reference. Send applications to: **Dr. H. Allen Garverick, 163 Animal Sciences Center, 920 East Campus Drive, University of Missouri–Columbia, Columbia, MO 65211-5300**. *The University of Missouri is an Equal Opportunity/Affirmative Action Employer and specifically invites and encourages applications from qualified women and minorities.*

The Division of Nephrology at Mayo Clinic invites applications from an **ACADEMIC NEPHROLOGIST** to conduct laboratory-based research in the field of growth factors (IGF-I, HGF, and VEGF) and translational clinical research in renal disease. Applicants must have experience with clinical studies with the use of growth factors in renal failure. Responsibilities include teaching medical residents and students, supervision of Fellows in the laboratory, and development of extramurally funded research programs. Candidates must be Board-certified in internal medicine and Board-certified/eligible in nephrology, with a scientific degree (Ph.D./Master's) and a strong commitment to academic medicine. A substantial research track record and established grant funding are required. Interested applicants should submit their curriculum vitae, a statement of research interests and long-term goals, and names of three references by August 30, 2000, to: **Vicente E. Torres, M.D., Chair, Division of Nephrology, Mayo Clinic, Rochester, MN 55905**. *Mayo Foundation is an Affirmative Action/Equal Opportunity Employer and Educator.*

POSITIONS OPEN

FACULTY POSITION MICROBIAL GENOMICS

The Department of Veterinary Pathobiology at the University of Minnesota invites applications for a full-time tenure-track or tenured faculty position in microbial genomics at the level of **ASSISTANT** or **ASSOCIATE PROFESSOR**. We seek candidates who will pursue genetic and genomic approaches to microbial pathogenesis and/or host-pathogen interactions. We are particularly interested in outstanding candidates able to establish independent research programs and participate in ongoing training programs based in the Department. Rank (Assistant or Associate Professor) and term will depend on qualifications and experience consistent with collegiate and University policy. The selected candidates will become part of a major initiative in biomedical genomics at the University of Minnesota, receive a highly competitive salary and start-up package, and be eligible for interdisciplinary appointments in allied departments. Candidates must have a Ph.D. in the biological or biomedical sciences or an M.D./D.V.M. degree. A minimum of two years of postdoctoral research experience is also required. Experience with animal pathogens is desirable but not necessary. Review of applications will begin on August 15, 2000, or until the position is filled, but applicants are encouraged to apply at the earliest. To apply, please submit a letter of application, curriculum vitae, a statement on research and teaching goals; and the names and addresses (with e-mail and FAX numbers) of three references with knowledge of applicant's background and research abilities to: **Vivek Kapur, B.V.Sc., Ph.D., Search Committee Chair, Department of Veterinary Pathobiology, University of Minnesota, 1971 Commonwealth Avenue, St. Paul, MN 55108. E-mail: johns231@tc.umn.edu** (for inquiries only).

The University of Minnesota is an Equal Opportunity Educator and Employer.

WETLANDS PLANT ECOLOGY/ COMPUTER MODELING

The Department of Biological Sciences at California State University, Long Beach, invites applications for a full-time, tenure-track position at the **ASSISTANT PROFESSOR** level starting January 2001. Candidates must have a Ph.D. in the biological sciences with training, research, and postdoctoral research in areas of wetlands plant ecology and computer modeling. Candidates must have a strong commitment to teaching at the undergraduate and M.S. levels in an ethnically and culturally diverse campus community. Must have a record of published research and show potential for developing and sustaining an independent externally funded research program involving students. Submit letter of application, curriculum vitae, detailed research and teaching statements, and names of three references to: **Dr. Laura Kingsford, Chair, Wetlands Plant Ecology Search, Department of Biological Sciences, California State University, Long Beach, CA 90840-3702. Telephone: 562-985-4807; e-mail: ssuetsug@csulb.edu**. Screening will commence August 21, 2000. **Website: http://www.csulb.edu/**. *California State University, Long Beach, is an Equal Opportunity Employer committed to excellence through diversity and takes pride in its multicultural environment. An Equal Employment Opportunity/Affirmative Action/Title IX Employer.*

CANADIAN TECHNICAL SALES REPRESENTATIVE

Integrated DNA Technologies, Inc., a leading supplier of custom oligonucleotide synthesis and a developer of innovative new biotechnologies, is looking for a dynamic and self-motivated individual to add to its growing International Sales Department. Responsibilities include direct outside sales to academic, government, and industry accounts throughout the Toronto, Ottawa, and Montreal area. Must have more than three years of sales experience in the life science industry or strong academic credentials in molecular biology. Please send your résumé to: **ewalder@idtdna.com.**

POSITIONS OPEN

ASSISTANT, ASSOCIATE, OR FULL PROFESSOR BIOLOGICAL NMR
Department of Biochemistry
Duke University Medical Center

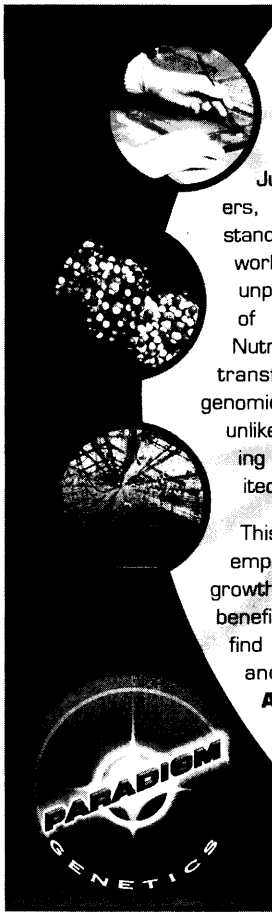
The Department of Biochemistry, Duke University Medical Center, invites applications for a faculty position at the level of Assistant, Associate, or Full Professor. We are seeking outstanding candidates with experience in the field of biological NMR as applied to fundamental problems of enzymology, protein structure, or nucleic acid biochemistry. Duke University has just purchased an 800 MHz spectrometer, which complements the existing 600 and 500 MHz instruments in the NMR Center. The candidate may also choose to be affiliated with the newly created Center for Chemical Biology in the Duke University School of Medicine. Send résumé, summary of research interests, and three letters of reference to: **Christian R. H. Raetz, Chairman, Department of Biochemistry, Duke University Medical Center, Durham, NC 27710**. Applications should be received by October 1, 2000. *Duke University is an Equal Opportunity/Affirmative Action Employer.*

FACULTY POSITION
Microbial Pathogenesis or Immunity in Host Defense

We seek a highly qualified individual with an M.D., Ph.D., or equivalent degree to fill a tenure-track **ASSISTANT** or **ASSOCIATE PROFESSOR** position in microbial pathogenesis or immunity and host defense. For the microbial pathogenesis position, research interests may encompass viral, bacterial, or fungal pathogenesis at the molecular, cellular, or organismal level. For the immunology position, research interests should encompass aspects of innate or adaptive immunity to microbial infection or disease. Applicants should have or should be able to attract significant competitive research funding. The Department of Microbiology and Immunology faculty are a dynamic, very well-funded group who are dedicated to graduate and medical education and to service to the University. It is expected that applicants will actively contribute to each of these areas. Research interests in the Department include molecular and cell biology of fungi and malaria parasites focusing on mechanisms of drug action, antimicrobial resistance, and energy metabolism; development and assessment of vaccines to malaria and influenza; Neisseria host-cell interactions and LPS sialylation; association of cell cycle with cellular metabolism; molecular and genetic characterization of autoimmune diseases; anti-HIV immunity; and the interrelationship between aging and the immune response to viral infections in humans and animals. Applicants' research interests are expected to integrate with, complement, and expand upon these areas. Please send your résumé, the names of at least three references, and a letter of intent including research interests to: **Richard F. Rest, Ph.D., Faculty Search Committee, Department of Microbiology and Immunology, MCP Hahnemann University School of Medicine, 2900 Queen Lane, Philadelphia, PA 19129**. Please visit our **website: http://www.mcphu.edu/medschool/bgs/descript/microbio.htm**.

HEALTH SCIENTIST (TOXICOLOGIST)

The Office of Occupational Medicine, Occupational Safety, and Health Administration (OSHA) is seeking a Toxicologist, GS-14, to serve as a senior-level expert providing guidance about health effects of hazardous substances. Call **Telephone: 202-693-1800** for Announcement Number OSH-00-58. Closing date is July 28, 2000.



Creating A Paradigm For World Innovation.

Just as a paradigm is an example followed by others, Paradigm Genetics is setting an entirely new standard in next-generation science. Every day, we're working to develop advanced technologies that add unprecedented speed and efficiency to the process of genetic analysis in Healthcare, Agricultural, Nutrition and Industrial fields. In doing so, we're transforming the very nature of functional genomics...and creating challenge and opportunity unlike anything you've ever seen. Join us on the leading edge of technology, where innovation-and unlimited possibilities-define the future you deserve.

This is what you should expect from a world-class employer; a dynamic team environment, excellent growth potential, generous compensation, superior benefits and stock options. And this is where you will find it. Please send resume referencing job code and salary history to: **Paradigm Genetics, Attn: Human Resources, E-mail: resumes@paragen.com or apply on-line at www.paragen.com** No phone calls please. Principals only. EOE

Manager Plant Molecular Biology and Genetics

This key position reports to the Director of Plant Research and represents an important component of the senior plant research management team. A Ph.D. in Molecular Biology, Genetics or Biotechnology and extensive experience in the plant research area is required. At least 5 years of experience in a group leader-like position is preferred, and leadership experience within an industrial setting is an advantage. Responsibilities include supervision of groups involved in high throughput gene discovery, gene cloning, plant transformation, and gene modification systems. In addition, the position is responsible for the development and implementation of novel technologies concerning gene modification and plant transformation systems. Responsible for all aspects of management of our Plant Molecular Biology & Genetics Group, including the development of research plans, monitoring of performance of the research operation, direct supervision of Ph.D. and Master-level personnel, and the establishment of third-party research collaborations. **Job # NOR/JUN/PRG/262P**

Sr. Staff/Staff Scientist: Biochemical Molecular Biologist

Paradigm Genetics' Microbial Research Department has a position available for a Biochemical Molecular Biologist. The Microbial Research Department investigates a variety of genomics based approaches for the determination of gene function. The successful candidate will have a Ph.D. and post-doctoral experience with microbial organisms in the investigation of metabolic pathways, biochemistry, enzymology, molecular biology, genetics, and related disciplines. Experience in metabolic pathways and the field of genomics is highly desired. The Sr. Staff Scientist would require a Ph.D. and 4-8 years of industry experience. **Job # NOR/JUN/MIC/208P**

This is where it begins:

www.paragen.com

PENNSTATE

University Park

1855

ASSISTANT PROFESSOR OF MOLECULAR PHYSIOLOGY

Department of Dairy and Animal Sciences
College of Agricultural Sciences

This tenure-track position has a 70% research and 30% teaching responsibility. RESEARCH responsibilities involve conducting fundamental research in the area of growth biology or nutrient metabolism with application to animal agriculture. The successful applicant will be expected to develop an externally-funded research program that is nationally and internationally recognized. The successful applicant will have the opportunity to work closely with colleagues whose research is in the fields of transgenic biology, genomics, reproduction, lactation or growth. The TEACHING component of the position will involve teaching an undergraduate course in animal growth and development, and a graduate course in the candidate's area of expertise.

Requires a Ph.D. in animal science, physiology, biochemistry or molecular biology and a minimum of two years of postdoctoral training in the appropriate field.

Starting date is negotiable and salary is competitive and commensurate with background and experience. An attractive benefits package is available.

Applicants should submit a letter of application, resume, academic transcripts, a statement of research and teaching interests, and have three professional reference letters sent to: **Dr. Ronald S. Kensinger, Chair, Search Committee, Department of Dairy and Animal Science, Pos #: S-7893, 324 W.L. Henning Building, The Pennsylvania State University, University Park, PA 16802.** CLOSING DATE: October 2, 2000 or until a qualified candidate is identified.

For more information about the Department see: **www.das.psu.edu/**

Penn State is committed to affirmative action, equal opportunity and the diversity of its work force.

Associate Director for Education and Training

The National Heart, Lung, and Blood Institute (NHLBI) is looking for an experienced person to serve as the Associate Director for Education and Training. The NHLBI is responsible for the major laboratory and clinical research programs of the National Institutes of Health leading to the prevention, management and cure of diseases, as well as the study of abnormalities in the heart, lungs, blood, and immune system. Included are all aspects of basic research in cell biology, microbiology, chemistry, physics, and genetics. This research involves clinics and laboratories located in several buildings on the Bethesda, Maryland campus, as well as off campus at 5 Research Court in Rockville, Maryland. This individual will be responsible for (1) serving as the Division's focal point for establishing and maintaining recruitment and training programs; (2) providing advice and guidance for effective mentoring of fellows and students; (3) providing a centralized location for the dissemination of information to research fellows regarding subjects such as standards of conduct, biomedical safety, training opportunities; availability of research at the NIH or through grants, and future career opportunities; (4) implementing a plan to increase the effectiveness of outreach and education programs (5) providing the Scientific Directors and scientific staff with advice and guidance on matters relating to minority and special emphasis programs; and (6) assisting the Scientific Directors in reviewing and analyzing these activities with respect to these programs. Applicants must possess a scientific or medical doctorate and have at least 5 years of experience in a biomedical research setting. The salary range is $84,638 to $110,028 per annum based on level of experience. Additional information can be obtained by calling the FAX-BACK system (301) 594-2953 and using FAX ID# 4028 or by calling Kim Westervelt or Rosa Snell on (301) 496-6477. Applicants should reference announcement number **HL-00-0084** and address the required KSA's; (1) ability to manage a large, multi-disciplinary research training program; (2) ability to communicate both orally and in writing; and (3) skills in conducting biomedical research. Submit your CV, Bibliography, list of references, and KSA's to:

Ms. Rosa Snell or Ms. Kim Westervelt
31 Center Drive, MSC 2484, Bldg. 31, Room 5A28
Bethesda, Maryland 20892-2484

Application packages must be received or postmarked by **September 1, 2000.** U.S. citizenship is required.

NIH IS AN EQUAL OPPORTUNITY EMPLOYER

POSITIONS OPEN

TENURE-TRACK INVESTIGATOR

The Intramural Research Program of the National Institute on Aging (NIA), Baltimore, Maryland, invites nominations and applications for an **INDEPENDENT INVESTIGATOR** position within the Laboratory of Genetics. Starting salary commensurate with qualifications and experience. The Investigator will be responsible for conducting and coordinating a research program in the genetic analysis of aging-related human conditions and diseases. In addition to directing independent research, the position offers participation in the analysis of genetic data with an interactive group studying selected aging-related phenotypes in the Baltimore Longitudinal Study of Aging; in other outbred populations; and in a major "founder population" (in conjunction with human geneticists from that population). Applicants must have a Doctoral degree with record of scientific accomplishment in modern quantitative statistical genetics. Additional preferred qualifications include demonstrated excellence in the organization and leadership of a laboratory team and productive efforts in international collaborations. How to apply: Applicants should send curriculum vitae, bibliography, and 1,000-word overview of plans and preferences for a future program along with three reference letters (and the addresses and telephone numbers of those references) to: **National Institute on Aging, NIA–Gerontology Research Center, Attention: Karen L. Maben, Box 26–VA#NIA00–25, 5600 Nathan Shock Boulevard, Baltimore, MD 21224**. The deadline for application is August 31, 2000. *NIA is an Equal Opportunity Employer.*

RESEARCH ENTOMOLOGIST/ MICROBIOLOGIST

The U.S. Department of Agriculture (USDA), Research, Education, and Extension (REE), Agricultural Research Service (ARS), NPA, Bee Biology and Systematics Laboratory accepting applications for a permanent full-time **RESEARCH ENTOMOLOGIST/MICROBIOLOGIST** to provide expertise that contributes directly to the USDA Alternatives to Methyl Bromide initiative and the USDA Small Farms initiative. Specific research objectives: (1) Develop novel approaches for management of chalkbrood (*Ascosphaera* spp.) in nesting materials of commercial-scale populations of the alfalfa leafcutting bee, blue orchard bee, and other bee pollinator species; (2) develop chemical and/or biological cultural (e.g., sanitation) control methods for commercial-scale bee pollinator species; (3) research the etiology of bee diseases using culture media and diagnostic kits for isolation, identification, and enumeration of specific microorganisms. *U.S. citizenship* and a Ph.D. or equivalent are desired. Salary ($50,139 to $91,589) commensurate with experience. Position information contact: **Dr. W. P. Kemp; Telephone: 435-797-2525; e-mail: wkemp@cc.usu.edu; website: www.ars.usda.gov/afm/hrd/resjobs**. Application procedures information contact: **John Watterson; Telephone: 435-797-3071**. Mark applications ARS–X0W–0342; mail to: **USDA, ARS, HRD, WOB, 5601 Sunnyside Avenue, Beltsville, MD 20705-5106**. Postmark applications by August 7, 2000. *USDA is an Equal Opportunity Provider and Employer.*

POSTDOCTORAL POSITION IN ANGIOGENESIS

A Postdoctoral position is available at the Buck Center for Research in Aging, a nonprofit research institute approximately 20 miles north of San Francisco, to study cellular and molecular mechanisms of angiogenesis in the central nervous system with a focus on adaptation to cerebral ischemia. Additional details regarding this NIH-supported project and a list of recent publications can be found at **website: www.buckcenter.org**. Please send curriculum vitae and names and e-mail addresses of three references to: **Dr. David A. Greenberg, Buck Center, P.O. Box 648, Novato, CA 94948. E-mail: dgreenberg@buckcenter.org.**

POSITIONS OPEN

USDA Agricultural Research Service

The USDA, Agricultural Research Service, Plant Sciences Institute, Horticultural Crops Quality Laboratory, Beltsville, Maryland, is seeking a permanent full-time **RESEARCH FOOD TECHNOLOGIST/PLANT PHYSIOLOGIST**, GS–12/13. Salary is commensurate with experience ($51,204 to $79,155 per year) plus benefits. *Must be U.S. citizen.* Conducts food technology research to improve methods for maintaining microbial safety and quality of fresh-cut fruits and vegetables that are cut, sliced, or diced and then packaged for commercial and retail use without further preparation. Develops packaging technology and postharvest handling systems and implements strategies discovered from research on the interactions among human pathogens, plant pathogens, and their fruit and vegetable hosts to maintain microbial safety during preparation and marketing. Basic research includes elucidation of the regulatory mechanisms involved in plant senescence processes, including chlorophyll degradation, membrane changes, water loss, content of various volatile compounds, susceptibility to decay, and texture/flavor changes as these processes relate to quality and microbial safety. Appropriate qualifying education in food technology/plant physiology and/or professional research experience is required. For research program information, contact: **Dr. Ken Gross; Telephone: 301-504-6128; e-mail: kgross@asrr.arsusda.gov**. To address specific qualification requirements and application instructions, applicants MUST call **Telephone: 301-504-1484** to request announcement ARS–DOE–0224 or via Internet at **website: http://www.ars.usda.gov/afm/hrd/resjobs.htm**. Applications must be postmarked by July 31, 2000. *USDA/ARS is an Equal Opportunity Employer and Provider.*

MICROBIOLOGIST. The U.S. Department of Agriculture (USDA), Agricultural Research Service (ARS), National Center for Agricultural Utilization Research (NCAUR), Peoria, Illinois, is seeking a permanent full-time Microbiologist, GS–12 (salary range $50,139 to $65,179 per annum) for the Microbial Properties research unit. The incumbent will conduct research on genetic diversity and population structure of *Listeria* with the goal of rapid detection and control of foodborne bacterial pathogens. The successful applicant will be responsible for all aspects of the research and joins an established group that specializes in molecular systematics/population biology of agriculturally important bacteria and fungi. Applicants must have a Ph.D. or equivalent and research experience in microbiology and in nucleic acid sequencing and data analysis. Comprehensive benefits package includes paid annual and sick leave, life insurance, health insurance, and a savings and an investment plan in addition to a federal retirement plan. *U.S. citizenship is required.* For full text of the vacancy announcement, which includes application information, **Telephone: Kathy John; 309-681-6478**; or visit the ARS vacancy **website: www.ars.usda.gov/afm/hrd/resjobs**, Announcement Number ARS–XOW–0217. For information on the research program and/or position, contact: **Dr. Cletus Kurtzman; Telephone: 309-681-6561**. Applications in response to this ad must be postmarked by September 3, 2000. *USDA/ARS is an Equal Opportunity Provider and Employer.*

POSTDOCTORAL POSITION available to study the molecular biology of the developing auditory system. Project involves cloning ion channel genes, examining expression, and testing growth factor regulation. Strong background in molecular techniques is required, including differential screening of cDNA libraries and yeast two-hybrid screening. Send curriculum vitae with names and e-mail of three references to: **Bernd Sokolowski, Ph.D., Department of Otolaryngology, MDC16, University of South Florida, 12901 Bruce B. Downs Boulevard, Tampa, FL 33612. E-mail: bsokolow@hsc.usf.edu**. *University of South Florida is an Equal Opportunity Employer.*

POSITIONS OPEN

FACULTY POSITION INFECTIOUS DISEASE

The Department of Diagnostic Medicine/Pathobiology invites applications for a tenure-track position at the **ASSISTANT** or **ASSOCIATE PROFESSOR** level in the College of Veterinary Medicine at Kansas State University beginning in January 2001. A Ph.D. or D.V.M./Ph.D. with postdoctoral experience is required. Salary and rank are commensurate with qualifications and experience. Applicants should have an extramural funding record or strong potential. We seek a faculty colleague who will pursue a vigorous independent and collaborative research program in an area of infectious disease and contribute to teaching in their respective areas of expertise. The research area is open, but applicants using molecular-based approaches to solve problems of veterinary importance in viral disease(s) are especially encouraged to apply. Interested individuals should submit an application letter containing a statement of research and teaching interests, curriculum vitae, reprints of recent significant publications, and three letters of recommendation to: **Dr. Shafiqul Chowdhury, Chair of the Search Committee, Department of Diagnostic Medicine/Pathobiology, College of Veterinary Medicine, Kansas State University, Manhattan, KS 66506. Telephone: 785-532-4616; FAX: 785-532-4039; e-mail: Chowdh@vet.ksu.edu**. Screening of applicants will begin August 15, 2000, and search will continue until a suitable candidate is found. *Kansas State University is an Equal Opportunity/Affirmative Action Employer.*

CRYOELECTRON MICROSCOPIST with expertise in image analysis/reconstruction, Department of Molecular Physiology and Biophysics, University of Vermont College of Medicine: A full-time, tenure-track position is available for a highly motivated and talented individual using high-resolution cryoelectron microscopy and image analysis/processing techniques to examine important problems in the area of structural biology of macromolecular complexes. Applicants at all levels (**ASSISTANT**, **ASSOCIATE**, or **FULL PROFESSOR**) will be considered. Successful candidates will be expected to sustain a vigorous extramurally funded research program and contribute to the overall goals and mission of the University of Vermont including scholarship, teaching, and service. Applicants should send curriculum vitae, copies of selected relevant research publications, brief descriptions of present and future research plans, and the names of at least three individuals from whom letters of recommendation can be obtained to: **Christopher L. Berger, Ph.D., Chair, Faculty Search Committee, Department of Molecular Physiology and Biophysics, University of Vermont College of Medicine, Burlington, VT 05405-0068**. Review of applications will begin immediately. The deadline for receipt of applications is December 1, 2000. *The University of Vermont is an Equal Opportunity/Affirmative Action Employer. Women and people from diverse racial, ethnic, and cultural backgrounds are encouraged to apply.*

George Mason University. The Center for Bioresource Development, College of Arts and Sciences, at George Mason University invites applications and nominations of candidates for the research faculty positions at the levels of **ASSISTANT/ASSOCIATE/ PROFESSOR**. These positions are open occasionally to support extramurally funded research in biomolecular engineering and related fields. Successful candidates should have a Ph.D. in a pertinent area and a strong research interest in a field related to biomolecular engineering, biomaterials, bioremediation, sensors, polymers, and novel materials. The Center is an interdisciplinary research unit of the College of Arts and Sciences. Applications will be accepted until all the positions are filled. Application review begins immediately. Please send curriculum vitae with names of three references to: **Director, Center for Bioresource Development, MSN 4D7, George Mason University, Fairfax, VA 22030-4444**. *Affirmative Action/Equal Employment Opportunity. Women and minority candidates are encouraged to apply for these positions.*

Scientific Recruitment/Training Administrator
Salary Range: $51,204 - $79,155
Vacancy Announcement Number: NCI-00-0305A
Application Receipt Deadline: 8/31/00

The Division of Basic Sciences, National Cancer Institute, NIH is recruiting for a Scientific Recruitment/Training Administrator. The successful candidate will direct the Division's recruitment and training activities to attract and retain quality scientific and other professional staff for its research programs. In addition to coordinating training and educational activities within the Division, the selected candidate will represent the Division and make formal presentations at national scientific meetings to explain research programs and to advise of employment and other career-development and training opportunities. The ideal candidate for this permanent, full-time position would be a U.S. Citizen with an extensive background in biomedical research acquired through formal training (Ph.D. Degree or equivalent) and work experience in a biomedical research setting.

How to apply: To view a copy of the vacancy announcement (#NCI-00-0305A) and submit an application on-line, please go to http://careerhere.nih.gov. A copy of the vacancy announcement may also be requested via our fax request line at 800-728-5627 (request fax ID # 1809). Or, to receive a copy of the vacancy announcement through the mail you may call (301) 402-2789. To be considered for this position, all MANDATORY application information listed in the vacancy announcement must be received or postmarked by 08/31/00. You may apply with a resume, the Optional Application for Federal Employment (OF-612), the Application for Federal Employment (SF-171) or any other written format which provides the required information. See vacancy announcement for complete details or contact Debbie Breedlove at (301) 496-5372 or breedlod@mail.nih.gov for further information.

NIH is an Equal Opportunity Employer

Director

Center for Environmental Resource Management
The University of Texas at El Paso

The University of Texas at El Paso (UTEP) invites applications and nominations for the position of Director of its Center for Environmental Resource Management (CERM). A major component of the University's research and education endeavors, CERM provides university-wide leadership and coordination for energy and environmentally related academic, policy, research, and service activities. Its mission is to address the environmental problems that threaten the health, safety, well-being, and economic development of the southwest border region of the United States and northern Mexico. CERM currently administers approximately $10 million in federal, state and private project funds. CERM focuses university resources to address hazardous waste, air quality, water availability and quality, ecosystem, alternate energy, and policy issues through an active program of research, outreach, policy and academic programs. An important part of CERM's mission is to provide support for a culturally diverse student population to develop the skills necessary to become environmental engineers and scientists. CERM administers the university's multidisciplinary Ph.D. in Environmental Science and Engineering and works with faculty throughout the university in the implementation of this program. The successful candidate should show evidence of outstanding leadership capability in administering complex research and academic programs; have progressively responsible experience with public sector agencies or institutions; have substantial knowledge of environmental issues and policies affecting the U.S.-Mexico border region; have demonstrated the ability to secure and direct major externally funded programs; possess a doctoral degree in a relevant science or engineering field; and be committed to UTEP's mission of providing a quality education to its diverse population. Situated in the largest metropolitan region on the U.S.-Mexico border, UTEP provides doctoral, master's and undergraduate programs to over 14,000 students.

Please send a letter summarizing your interest and capabilities, a detailed resume and list of three references to: **Dr. Paul C. Maxwell, Associate Vice President for Research and Sponsored Projects, The University of Texas at El Paso, Administration Building Room 209, El Paso, Texas 79968-0587.** Applications will be accepted until the position is filled. *UTEP does not discriminate on the basis of race, color, national origin, sex, religion, age, or disability in employment or the provision of services.*

HOSPITAL FOR **SPECIAL SURGERY**

Chief Scientific Officer

Hospital for Special Surgery (HSS), a major teaching affiliate of the Joan and Sanford I. Weill Medical College of Cornell University, is currently searching for a Chief Scientific Officer to head its newly established Research Institute. The Research Institute was created as the result of a commitment by the Board of Trustees to significantly increase research space, rebuild existing laboratories, recruit additional staff for basic and clinical research, and increase the endowment to support these activities. The goal is to establish a preeminent research facility for musculoskeletal disease within Hospital for Special Surgery.

The Chief Scientific Officer of the Research Institute will head the current basic and clinical research faculty while also being able to make new appointments in specific areas of interest. Currently, the research effort consists of 36 funded investigators working in seven thematic areas, which include Immunology and Inflammation, Mineralized Tissues, Soft Tissues and Tissue Engineering, Biomedical Mechanics and Biomolecular Design, Excitable Tissues (Anesthesiology), Clinical Rheumatology and Orthopedics, and Outcomes Research. The Chief Scientific Officer position will provide an excellent opportunity for an outstanding biomedical scientist to shape and initiate programs relevant to the mission of Hospital for Special Surgery.

The individual should have either a M.D. and/or Ph.D. degree and advanced training in his or her area of expertise. The position will require administrative experience and skills in leading the research program and interacting with the Board of Trustees. The individual should have the ability to develop a vision for the future of the Institute and should be able to inspire and recruit other outstanding researchers through personal leadership and a history and record of achievements. Moreover, he or she should be a team builder, mentor, and good evaluator of people. In addition to the role and responsibilities at HSS, the position includes a joint appointment at the Weill Medical College of Cornell University at an appropriate rank and salary commensurate with the candidate's background and expertise.

Hospital for Special Surgery, a 160-bed nonprofit specialty hospital, was founded in 1863 as the first orthopedic hospital in the country. A recognized leader in the fields of orthopedics and rheumatology, Special Surgery has been consistently ranked by U.S. News & World Report as one of the top hospitals in the nation for both of these specialties. An independent institution governed by its own board, HSS cooperates in patient care, undergraduate and graduate medical education, and research with the NewYork-Presbyterian Healthcare System. As a major teaching affiliate of the Joan and Sanford I. Weill Medical College of Cornell University, all Hospital for Special Surgery physicians and most research staff hold faculty appointments at both the Medical College and the Weill Graduate School of Medical Sciences of Cornell University.

HSS is an Equal Opportunity/Affirmative Action employer institution. Letters of Interest along with a curriculum vitae should be sent to:

Torsten Wiesel, M.D., F.R.S.
Chairman /CSO Search Committee
535 East 70th Street • Room 850 • New York, New York 10021

NewYork-Presbyterian Healthcare System
Weill Cornell Medical College

POSITIONS OPEN

ASSISTANT RESEARCHER. #84256T, Department of Microbiology, University of Hawaii at Manoa, temporary, full-time, beginning August 15, 2000, until June 30, 2002. Duties: Identify and develop commercially valuable enzymes and other bioproducts from marine and extremophilic microorganisms, particularly bacteria, and develop methods to screen existing and new cultures. Initiate, plan, and direct fieldwork in areas of interest and supervise graduate and undergraduate students in the field. The position will involve working with undergraduate and graduate students, overseas institutions, and industrial contacts. The appointee will assume sole responsibility for the maintenance and expansion of a collection of microorganisms. A record of independent laboratory and field research must be demonstrated. Minimum qualifications: Ph.D. degree with extensive fieldwork experience. Sound knowledge of microbial ecology and regulation of bacterial enzyme activities. Experience in 16S rRNA library construction and DNA sequencing. Desirable qualifications: Experience working with isolation of diverse bacterial groups from marine and terrestrial habitats. Determination of various enzyme activities in water and in pure cultures. Knowledge of protein purification methods is desirable, as is maintenance of culture collections. SCUBA certification will be an asset. The successful applicant will conduct fieldwork and should be prepared to travel at short notice. Pay range: R3–1, $3,377 per month. To apply: Send cover letter, résumé, and arrange three letters of recommendation to be sent to: **Dr. Maqsudul Alam, Department of Microbiology, 2538 The Mall, Snyder Hall, Room 207, Honolulu, HI 96822**. Closing date: July 31, 2000. Inquiries: **Dr. Maqsudul Alam; Telephone: 808-956-6945**. *An Equal Opportunity/Affirmative Action Institution.*

ASSOCIATE CHIEF OF STAFF FOR RESEARCH AND DEVELOPMENT VA Medical Center Jackson, Mississippi

The G. V. (Sonny) Montgomery VA Medical Center in Jackson, Mississippi, is seeking a Board-certified physician to direct its Research and Development program. Candidates must have credentials to receive a faculty appointment at the University of Mississippi School of Medicine and have sufficient administrative, clinical, and academic experience in order to teach medical students and residents. This medical center is a 163-bed acute care medical center with a 120-bed nursing home care unit, outpatient clinics, and a research and education facility. In addition to an attractive salary, we offer paid malpractice insurance, vacation/sick leave, health/life insurance coverage, and a retirement package including a tax-deferred savings plan. Applicants must be Board-certified, proficient in spoken and written English, and subject to drug testing and a preemployment physical. Interested candidates should send or FAX curriculum vitae, references, documentation of Board certification, and a copy of an active, current, full, and unrestricted license to: **Acting Chief of Staff (11), VA Medical Center, 1500 East Woodrow Wilson Drive, Jackson, MS 39216-5199; FAX: 601-364-1456; e-mail: KentKirchner@med.va.gov**. Closing date: August 31, 2000. *Equal Opportunity Employer.*

DIRECTOR LICENSING in Thousand Oaks, California. Require Bachelor's in a scientific field (biology, chemistry, zoology, or physics) and four years of experience in the job. Define strategy and negotiate terms for inward license of products and technologies to enhance pharmaceutical company portfolio. **FAX** your résumé to: **Yen Chong, Amgen, Job Code: 468; Telephone: 805-447-1985**.

POSTDOCTORAL/SABBATICAL CARNEGIE MELLON UNIVERSITY

Quantitatively oriented researcher to work on environmental, health, or safety regulation. Themes are environment, risk, engineering, and economics. See **website: http://www.epp.cmu.edu/csir**. Ph.D. required. Send résumé to: **Scott Farrow, EPP, Carnegie Mellon University, Pittsburgh, PA 15213-3890. Telephone: 412-268-1273.**

POSITIONS OPEN

DIRECTOR ESTUARINE RESEARCH CENTER THE ACADEMY OF NATURAL SCIENCES

The Academy of Natural Sciences seeks a dynamic leader to be Director of its Estuarine Research Center located on Chesapeake Bay in St. Leonard, Maryland. The Academy is an international museum of natural history established in 1812, which undertakes research and public education that focuses on the world's diverse species and their environment. The Estuarine Research Center is one part of the Academy's Scientific Research Division that also includes the Biodiversity Research Group and the Patrick Center for Environmental Research, both housed in the Academy's main facilities in Philadelphia. The Director of ERC is responsible for providing leadership and management of scientific research, fund raising, community relations, and the educational and outreach programs of the Center. The Academy has made a strong commitment to its scientific research programs, and the Director will implement this commitment through the advancement of scientific excellence at the Center and the building of its endowment. The Director reports to the Senior Vice President for Science and will be active in creating and implementing a collaborative and integrated institutional plan for research. We seek an energetic individual with a vision for new directions in environmental science and the skills to forge collaborative relationships, both internally and externally. The successful candidate will hold a Ph.D. and have a record of publication and grants that complements the Center's programs in biogeochemistry, estuarine food webs, and population and community ecology. Experience in fund raising and external relations is desirable. Ten years of research experience and five years of management experience are preferred. Review of applications will begin August 15, 2000, and will continue until a suitable candidate is identified. Send letter of application (refer to Vacancy Announcement Number 737), list of three references who may be contacted, and current curriculum vitae and/or résumé to: **Charles E. Smith, Jr., Director of Human Resources, Academy of Natural Sciences, 1900 Benjamin Franklin Parkway, Philadelphia, PA 19103**. Visit our **website: acnatsci.org**. *Equal Employment/Affirmative Action Employer.*

POSTDOCTORAL FELLOWSHIP IN PSYCHONEUROIMMUNOLOGY AT THE OHIO STATE UNIVERSITY

NIH-supported Postdoctoral training-grant position for scientists or clinicians (Ph.D. and/or M.D., D.D.S., D.V.M.) to conduct research on communication among the nervous, endocrine, and immune systems is currently available. *Applicants must be U.S. citizens or permanent residents of the United States.* Applicants should submit a letter stating their research interests along with curriculum vitae and the names of three references to: **Caroline C. Whitacre, Department of Molecular Virology, Immunology, and Medical Genetics, 333 West 10th Avenue, Room 2078, Columbus, OH 43210**. *The Ohio State University is an Equal Opportunity/Affirmative Action Employer. Qualified women, minorities, Vietnam-era veterans, disabled veterans, and individuals with disabilities are encouraged to apply.*

POSTDOCTORAL POSITION for new or recent Ph.D. who will use molecular and anatomical techniques to investigate the regulation of neurotransmitter phenotypic expression in stem cells of the olfactory system. Ph.D. in a biological science or related field required. Experience in molecular biology preferred. Please send or FAX résumé to: **Marlo Asencio, Human Resources, The Burke Medical Research Institute, 785 Mamaroneck Avenue, White Plains, NY 10605. FAX: 914-597-2788**.

Two **POSTDOCTORAL POSITIONS** available to investigate in the area of lung development, extracellular matrix, and smooth muscle myogenesis. Strong background in cell and/or molecular biology is essential. Contact: **Dr. Lucia Schuger, Wayne State University School of Medicine, 540 East Canfield Avenue, Detroit, MI 48201. E-mail: lschuger@med.wayne.edu; website: www.med.wayne.edu/Pathology/FACPROFILES/schuger.html**.

POSITIONS OPEN

POSTDOCTORAL FELLOWSHIP IN VIRAL PATHOGENESIS

Funded Postdoctoral position available in a laboratory focusing on the cellular and molecular mechanisms that regulate latent neuronal infection with herpes simplex virus. Successful candidate will conduct independent research in an intellectually stimulating yet pleasant environment. Experience in virology, molecular biology, and neurobiology is desirable. Please send curriculum vitae, description of previous research experience, and the names and addresses of three references to: **Todd Margolis, M.D., Ph.D., Francis I. Proctor Foundation, University of California San Francisco, Box 0944, San Francisco, CA 94143-0944 U.S.A. E-mail: tpms@itsa.ucsf.edu**. *University of California San Francisco is an Affirmative Action/Equal Opportunity Employer. The University undertakes Affirmative Action to assure Equal Employment Opportunity for underutilized minorities and women, for persons with disabilities, and for Vietnam-era veterans and special disabled persons.*

A **POSTDOCTORAL** or **RESEARCH ASSOCIATE/ASSISTANT** position is available immediately in the Boyer Center for Molecular Medicine to study the effects of steroid hormones on endothelial activation and function. Candidates with a strong background in molecular and cell biology, preferably with vascular biology experience, are encouraged to apply. *Applicants must be U.S. residents (permanent) or citizens.* Interested candidates should send curriculum vitae and direct inquiries to: **Jeffrey R. Bender, M.D., Boyer Center for Molecular Medicine, 454C, Yale University School of Medicine, P.O. Box 9812, 295 Congress Avenue, New Haven, CT 06536-0812. E-mail: jeffrey.bender@yale.edu.**

POSTDOCTORAL POSITIONS: signal transduction and membrane trafficking in insulin action. Our research program is aimed at elucidating (at the molecular level) pathways of signaling from the insulin receptor and the regulation of membrane trafficking, especially that of the glucose transporter GLUT4 by insulin. See **website: www.dartmouth.edu/~biochem/lienhard** for details. Send résumé and names of three references to: **Gus Lienhard, Department of Biochemistry, Dartmouth Medical School, Hanover, NH 03755. E-mail: gustav.e.lienhard@dartmouth.edu**.

POSTDOCTORAL POSITION in developmental and molecular neurobiology available for studies of stem cells in the adult mouse and human brain. Applicants must have a Doctoral degree and experience in tissue culture and/or molecular biology. Salary is based on current NIH guidelines commensurate with experience. Interested applicants should send a letter, curriculum vitae, and names and e-mail addresses of three references to: **D. A. Steindler, Department of Anatomy and Neurobiology, University of Tennessee Health Science Center, Memphis, TN 38163; e-mail: dstein@nb.utmem.edu**. *University of Tennessee is an Equal Employment Opportunity/Affirmative Action/Title VI/Title IX/Section 504/Americans With Disabilities Act/Age Discrimination in Employment Act Employer.*

POSTDOCTORAL POSITION OPEN AT CORNELL UNIVERSITY

Available immediately. You will investigate regulation, structure, and function of specific heparan sulfate proteoglycans (syndecans, glypicans). Molecular biology, conditional gene targeting in mice, immunological techniques, and surface plasmon resonance employed. Applicants should have training in biochemistry/molecular biology. Ph.D. required. Experience working with mouse models desirable. Send résumé and names of three references to: **Dr. Andre Bensadoun, Division of Nutritional Sciences, 321 Savage Hall, Cornell University, Ithaca, NY 14853**. *Affirmative Action/Equal Opportunity Employer.*

Ideas. Risks. Triumphs.

They're all Part of the Equation.

Medical Analysis Systems, Inc. is a leading manufacturer and supplier of Quality Control materials for the Clinical Laboratory. Our formula for success emphasizes innovation in a supportive team environment that encourages new ideas and the search for breakthroughs.

RESEARCH SCIENTIST

This key position requires a team player who is able to support and co-direct ongoing nucleic acid amplification/ detection technology development efforts.

Candidates must possess a Ph.D./MS in Molecular Biology, Biochemistry or Chemistry, 2 years of experience (4 with MS), and knowledge and experience with nucleic acid amplification methodologies, hybridization assays, assay development, DNA and RNA purification, DNA cloning, preparation of RNA transcripts, and sensitive non-isotopic detection technologies. Good verbal and written communication skills are essential. Nucleic acid diagnostic assay development experience is desirable.

We offer a competitive compensation and excellent benefits, unmatched growth potential, team support and the empowerment to make things happen. Please send your resume & salary history to: **Medical Analysis Systems, Inc., 5300 Adolfo Road, Camarillo, CA 93012, Attn: Human Resources. Fax: (805) 987-6498. E-mail: hr@mas-inc.com**

EOE

Visit us at www.mas-inc.com

MAS™ Medical Analysis Systems, Inc

NATIONAL INSTITUTES OF HEALTH
NATIONAL EYE INSTITUTE

Job Opportunities

The National Eye Institute Intramural Program at the NIH campus, Bethesda, MD., is seeking highly qualified Postdoctoral Fellows, Research Associates and Staff Scientists in the following areas:

- **Molecular Biology**
- **Cell Biology**
- **Immunology**
- **Psychophysics**
- **Biochemistry**

Salaries range from $27,500 to $118,400 per annum, based on experience and type of appointment.

NEI offers an extensive benefits package that you may be eligible for, depending on the appointment mechanisms: Health Benefits, Life Insurance, Retirement Benefits, Annual and Sick Leave, Formal Training Program, Recruitment Bonus, Retention Allowance, Relocation Allowance, Loan Repayment Program, and Travel Benefits.

Candidates interested in specific job opportunities at the NEI may visit the NEI web site at **http://www.nei.nih.gov/** listing the most current positions available.

NIH/NEI is an Equal Opportunity Employer

illumina™

Illumina, Inc. is developing next generation tools that will permit the large-scale analysis of genetic variation and function.

We are seeking outstanding individuals for challenging positions in a variety of areas. Some specific positions are listed below. Please see www.illumina.com for additional openings and information. Resumes should be sent to jobs@illumina.com or faxed to 858-587-4297. Please specify the position you wish to apply for at Illumina.

DIRECTOR, Bioinformatics, MC006
You will be responsible for leading a diverse bioinformatics program centered on microarray technology. You will develop microarray information systems, including databases, data collection, analysis, and visualization tools, as well as manage software product development. **Qualifications:** Ph.D. in Bioinformatics or related field with 8+ years experience in bioinformatics/ computational genomics, including algorithm and software development, and database design and implementation. Excellent analytical and organizational skills, with an exceptional track record of scientific and technical accomplishment. Expertise in microarray data analysis and data management is a strong plus, as is experience in commercial software development.

SCIENTIST, Bioinformatics, MC011
You will work closely with experimental scientists to identify, characterize, and prioritize large sets of sequences for assay development. You will also be involved in the design and development of interfaces for database query and data presentation, and data visualization and analysis tools. **Qualifications**: Ph.D. in Bioinformatics or related field with 3+ years experience in database design and implementation, or similar qualifications. Expertise with Oracle or Microsoft SQL Server and experience with web-based browser interface design and Java programming are desired. You should have excellent analytical and organizational skills, with proven experience in designing/managing complex databases of biological sequence information. Expertise in array-based data sets and analysis are strong pluses.

SCIENTIST, Expression Profiling, MC014
You will develop novel, highly parallel methods for functional analysis of biological systems, utilizing Illumina's bead-base array technology platform. **Qualifications:** Ph.D. in Biological or Physical Sciences with 2+ years postdoctoral experience in functional analysis of biological systems, with a proven track record of exceptional scientific accomplishment. Expertise in microarray technologies for mRNA and/or protein profiling is required. Proficiency with computational/software tools for data management and analysis, including Perl scripting and database administration and querying, is highly desirable. You must be innovative, analytical, quantitative, and have good problem-solving and communications skills, and enjoy working as part of a multidisciplinary team.

SCIENTIST, Molecular Biology, MC015
You will develop novel, highly parallel bead-base affinity binding and screening approaches for functional analysis of biological systems at the molecular level. **Qualifications:** Ph.D. in Biochemistry, Chemistry or related field with 3+ years postdoctoral experience in functional analysis of biological systems, with a proven track record of exceptional scientific accomplishment. A detailed knowledge of the chemistry of biological macromolecules is required, and expertise in the chemistry of nucleic acids is highly desirable. You must be innovative, analytical, quantitative, and have good problem-solving and communications skills, and enjoy working as part of a multidisciplinary team.

SCIENTIST, Analytical Chemist, DB001
You will be a member of an interdisciplinary team developing and optimizing Illumina's array technology. You will be responsible for developing and optimizing material requirements, immobilization procedures and conjugation chemistry used in biomolecule attachment to solid surfaces. **Qualifications:** PhD, Analytical Chemistry with two years industrial work or postdoctoral experience. A strong publication record in nucleic acid analysis is desirable. Strong background in nucleic acid analysis required. Expertise in MS, CE, HPLC and gel electrophoresis required.

SCIENTIST, Organic Chemist, DB004
You will be a member of an interdisciplinary team developing and optimizing Illumina's array technology. You will apply your broad-based synthetic experience to developing conjugation procedures for DNA and RNA attachment to solid phases. You will investigate novel bioconjugation methods, develop methods for assaying successful conjugation, and transfer these methods to a development team. **Qualifications:** PhD in organic chemistry with two years industrial work or postdoctoral experience. A strong publication record is desirable.

Illumina, Inc. offers a highly rewarding work environment with great potential for personal career growth. We offer competitive salaries, stock option packages, and great benefits.

Illumina is an Equal Opportunity Employer

THE UNIVERSITY OF OKLAHOMA

HEALTH SCIENCES CENTER

Chair, Department of Pharmaceutical Sciences

The College of Pharmacy of the University of Oklahoma Health Sciences Center invites applications and nominations for the position of **Chair, Department of Pharmaceutical Sciences**. The Department comprises the disciplines of Pharmacology, Toxicology, Pharmaceutics, Medicinal Chemistry and Nuclear Pharmacy. Applicants must have a Ph.D. or equivalent degree and recognized success in research, teaching, and faculty leadership in a basic science department. Candidates with a research background relevant to the areas listed above will be considered. The successful candidate is expected to be committed to a strong research program in the Department and to professional and graduate training. The position provides open faculty lines, an expanding graduate program, and outstanding laboratory space. Applications will be accepted and reviewed until the position is filled. The review of applications will begin August 1, 2000. Please submit a curriculum vitae, reprints of seminal manuscripts, and names and addresses of three references to:

Laurence D. Fechter, Ph.D./Chair, Search Committee
Professor and Director, Center for Toxicology
University of Oklahoma Health Sciences Center
P.O. Box 26901, Oklahoma City, OK 73190
http://www.cpb.uokhsc.edu

Women and minorities are strongly encouraged to apply. The University of Oklahoma Health Sciences Center is an Equal Opportunity/Affirmative Action Employer.

THE UNIVERSITY OF TEXAS MD ANDERSON CANCER CENTER

MOLECULAR AND CELLULAR BIOLOGIST Assistant Professor of Molecular and Cellular Oncology

The Department of Molecular and Cellular Oncology at The University of Texas MD Anderson Cancer Center is seeking two full-time, tenure-track assistant professors with demonstrated excellence in molecular and cellular approaches to understanding the causes of cancer. The incumbents will use state of the art science to elucidate the molecular mechanisms that cause cancer. An interest in breast cancer research and translational aspects of research to develop novel and effective strategies for cancer diagnosis and therapy (e.g., protein-chip array [proteomics] and gene therapy) is encouraged. Incumbents will be responsible for establishing their own independent research and expected to write grants and papers. Individuals will provide statistical expertise, design and analysis of laboratory research projects. Applicants must have a doctoral degree, postdoctoral experience and be eligible to apply for federal grants.

Interested applicants should send a letter and curriculum vitae to: **Mien-Chie Hung, Ph.D., Chairman, Department of Molecular and Cellular Oncology, Box 108, The University of Texas M. D. Anderson Cancer Center, 1515 Holcombe Blvd., Houston, Texas 77030** or email: **mcoap@mdanderson.org**

UTMDACC is an equal opportunity employer and has a smoke-free environment. Women and minority candidates are encouraged to apply.

POSITIONS OPEN

A **POSTDOCTORAL POSITION** is available to study the Type III protein secretion system in the bacterial plant pathogen *Pseudomonas syringae* using functional genomic and cell biological approaches. Candidates should be experienced with techniques utilized in molecular and cellular biology and bacterial genetics. Pleas send a statement of career goals, curriculum vitae, and contact information for three references to: **Dr. James R. Alfano, University of Nebraska Lincoln, The Beadle Center, 19th and Vine Streets, P.O. Box 880665, Lincoln, NE 68588-0665 U.S.A. E-mail: jalfano2@unl.edu.** *The University of Nebraska is an Affirmative Action/Equal Opportunity campus and is responsive to dual-career needs. For accommodations under Americans With Disabilities Act, please contact:* ***Dr. Ruben Donis, Telephone: 402-472-2635.***

POSTDOCTORAL FELLOW IN DEVELOPMENTAL NEUROSCIENCE

Seeking a Postdoctoral Fellow with training in molecular biology. We study the development of the brain and visual system in the embryonic mouse. Our techniques include molecular, biochemical, and morphological techniques, and our work focuses on retinoic acid–related processes. Qualified candidates should send curriculum vitae to:

Ursula Dräger
Eunice Kennedy Shriver Center
Waltham, MA 02452
E-mail: Udrager@shriver.org
Website: www.shriver.org

CARDIOVASCULAR PHYSIOLOGY POSTDOCTORAL POSITION

If you wish to investigate the myocardium and control of coronary blood flow during experimental heart failure and normal conditions, please write by post mail. Include curriculum vitae and a list of references that may be contacted. **Contact: Eric O. Feigl, M.D., Department of Physiology and Biophysics, Box 357290, University of Washington School of Medicine, Seattle, WA 98195-7290.**

POSITIONS OPEN

POSTDOCTORAL POSITIONS: Available for studies in various aspects of cancer research and toxicology in the Center in Molecular Toxicology through the Departments of Biochemistry, Cell Biology, Chemistry, Medicine, and Pathology. Areas of investigation relating to toxicology and carcinogenesis are (1) enzymatic oxidation and conjugation, (2) oxidative damage, (3) DNA damage and mutagenesis, (4) regulation of gene expression, and (5) environmental pathology. Center faculty include **Drs. Richard N. Armstrong, Raymond F. Burk, Richard M. Caprioli, Walter J. Chazin, Raymond N. DuBois, Doyle G. Graham, F. Peter Guengerich, Lawrence J. Marnett, Thomas J. Montine, Jennifer A. Pietenpol, Ned A. Porter, Michael P. Stone, William M. Valentine,** and **Michael R. Waterman**. Salaries are negotiable. Applicants should submit curriculum vitae and three letters of recommendation to: **Dr. F. Peter Guengerich, Director, Center in Molecular Toxicology, Vanderbilt University, School of Medicine, Nashville, TN 37232-0146.** *An Affirmative Action/Equal Opportunity Employer.*

Genomics-based plant drug discovery. A **POSTDOCTORAL POSITION** in plant pharmacogenetics is immediately available. The successful applicant will identify potentially novel sources of pharmacological activity in genetically manipulated plant cell cultures. Experience in GC/MS, HPLC/MS, natural product chemistry, and biochemistry is preferred. Send curriculum vitae and three letters of reference to: **Peter A. Crooks, Ph.D., Division of Pharmaceutical Sciences, College of Pharmacy, University of Kentucky, Lexington, KY 40536-0082.** *An Equal Opportunity University.*

MANAGER: CLINICAL AFFAIRS with biopharmaceutical company. Requires M.S., M.P.H., or Pharm.D. and five years of experience. Conduct all U.S. studies with improved second-generation drug for dialysis patients with anemia. Review and prepare results for filing with FDA. FAX résumé and copy of ad to: **Yen** at **Telephone: 805-447-1085.**

POSITIONS OPEN

Two NIH-funded **POSTDOCTORAL POSITIONS** at Brigham and Women's Hospital/Harvard Medical School to study the molecular mechanisms of Alzheimer's disease by using multiple systems (*E. coli*, mammalian cell lines, transgenic mice) to investigate presenilin-mediated amyloid generation and related inflammatory pathways. Qualified candidates will have a Ph.D. or M.D., strong background in biochemistry and molecular biology, and at least one first-authorship paper. Cover letter, résumé, and names of three references to: **Dr. Weiming Xia; FAX: 617-525-5252; E-mail: xia@cnd.bwh.harvard.edu; post: Center for Neurological Diseases, 77 Avenue Louis Pasteur, HIM 616, Boston, MA 02115.**

POSTDOCTORAL POSITION available immediately for studying p53 tumor suppressor gene in mouse mammary tumorigenesis. Current project aims to characterize functional properties of p53 mutants *in vitro* and *in vivo*. Candidates should have a Ph.D. and a background in molecular biology and tissue culture. Experience with retroviral vectors and handling mice a plus. Send curriculum vitae, summary of research experience, and names of three references to: **Dr. Janet S. Butel, Department of Molecular Virology and Microbiology, Baylor College of Medicine, MS: BCM–385, One Baylor Plaza, Houston, TX 77030-3498. E-mail: jbutel@bcm.tmc.edu.** *Equal Opportunity/Affirmative Action Employer.*

POSTDOCTORAL POSITION immediately available to study basic oncogenic mechanisms of tumor-associated chimeric transcription factors. Projects include mapping target gene networks by microarray analysis and development of advanced animal model systems. Previous advanced studies (Ph.D. or equivalent) in molecular sciences are a prerequisite. Send curriculum vitae and the names of three references to: **Christopher Denny, Department of Pediatrics, Room A2–312 MDCC, 10833 Le Conte Avenue, UCLA Medical Center, Los Angeles, CA 90095-1752. E-mail: cdenny@ucla.edu; FAX: 310-206-8089.** *UCLA is an Equal Opportunity Employer.*

Postdoctoral Fellowship at NIH HIV Research

A postdoctoral position is available for molecular studies on replication of HIV and development of new anti-HIV strategies. Research projects include the role of the viral nucleocapsid protein in HIV reverse transcription and investigation of virus assembly. Applicants should have a strong background in molecular biology and some experience working with viruses and handling RNA and enzymes. Less than five years of postdoctoral experience is required. Please send a curriculum vitae, bibliography, and the names and addresses of three references to:

Dr. Judith G. Levin, Chief
Section on Viral Gene Regulation
Laboratory of Molecular Genetics
NICHD, Building 6B, Room 216
NIH
Bethesda, MD 20892-2780
Fax: (301)-496-0243
Email: judith_levin@nih.gov
Website: http://dir.nichd.nih.gov/lmg/svgr/index.htm

NIH is an Equal Opportunity Employer.

THE ALLIANCE FOR CELLULAR SIGNALING

A MULTIDISCIPLINARY, MULTI-INSTITUTIONAL COLLABORATION TO UNDERSTAND FULLY HOW CELLS INTERPRET SIGNALS IN A CONTEXT-DEPENDENT MANNER

The Alliance for Cellular Signaling will be launched in September 2000. The organization of this Alliance has been catalyzed by an announcement by the National Institute of General Medical Sciences, NIH, of plans to fund large-scale collaborative projects to "enable the solution of major problems in biomedical research and to facilitate the next evolutionary stage of integrative biomedical science." The Alliance will identify proteins that comprise various signaling systems, quantify information flow through these systems *in vivo*, and reduce detailed data into a set of interacting theoretical models that describe cellular signaling.

Alfred G. Gilman will chair the Steering Committee that will oversee the Alliance. Experimental efforts will be focused on two mouse cells, the B lymphocyte and the cardiac myocyte, whose differentiated phenotypes are closely regulated by extracellular signals. Cell System Committees will direct the research of dedicated Alliance Laboratories.

Seven Alliance Laboratories will be located at UT Southwestern (Dallas), UC San Francisco, UC San Diego, Caltech (Pasadena), and Stanford (Palo Alto). The 50 Participating Alliance Investigators are located at 20 Universities and Research Institutes in the US, UK, and Canada.

The Alliance seeks members to act as scientific collaborators. Collaborators will act as consultants and create **molecule pages.** These pages, which will be published with attribution via the Internet, will summarize published data on individual signaling proteins; they will also form the core elements of a signaling database that will be disseminated via the Internet and linked to evolving maps of cellular signaling modules. **The Alliance also seeks Research Assistants and Ph.D. Research Scientists** as employees in its laboratories.

For information about Alliance plans and goals, membership, and employment: http://afcs.swmed.edu

GRANTS

AMERICAN HEALTH ASSISTANCE FOUNDATION

RESEARCH GRANTS

The American Health Assistance Foundation invites applications from researchers at non-profit institutions for the following programs:

Alzheimer's Disease Research: grant awards of up to $100,000 per year for up to two years for research into the causes and treatments of Alzheimer's Disease.
Deadline: October 16, 2000.

National Glaucoma Research: grant awards of up to $35,000 per year for up to two years for research into the causes and treatment of glaucoma.
Deadline: November 15, 2000.

National Heart Foundation: starter grants of up to $25,000 for one year for research into the cause and treatment of stroke or cardiovascular disease. To qualify for a starter grant, the investigator must be an assistant professor (or equivalent) beginning independent research.
Deadline: November 1, 2000.

For application forms please visit our website at http//:www.ahaf.org or call 301-948-3244.

DAAD

German Academic Exchange Service

GRANTS FOR RESEARCH IN GERMANY
Open to North American scholars in all fields

Research Grants for Recent Ph.D.s and Ph.D. Candidates
Seeking applicants with well-defined research projects who need to carry out research at libraries, archives, institutes or laboratories in Germany. In general, Ph.D.s (up to two years after degree) not older than 35 and Ph.D. candidates not older than 32 may apply.
Funding will be provided for **one to six months during Jan.-July, 2001**

Study Visit Research Grants for Faculty
Seeking applicants with well-defined research projects who need to carry out research at universities, laboratories and other institutions in Germany. At least two years of teaching and/or research experience after Ph.D. or equivalent, and a strong publication and research record in the proposed field are required.
Funding will be provided for **one to three months during Jan.-July, 2001**

Application deadline for both programs is August 1, 2000
daadny@daad.org http://www.daad.org
(212) 758-3223

POSITIONS OPEN

BIOINFORMATICS SCIENTIST

The American Type Culture Collection (ATCC), serving as one of the world's largest and diverse repositories of biological materials, offers an excellent opportunity for an entry-level Bioinformatics Scientist to become part of a progressive nonprofit organization. Ph.D. or equivalent in any field of natural sciences as well as a good knowledge of computer programming, database mining, and database creation required. Incumbent must be able to work independently and have a demonstrated ability to work proficiently with technical information and software tools. Strong interpersonal skills required to serve internal clients.

Competitive salary and excellent benefits package offered. Interested candidates should submit letter of interest and résumé, including salary requirement, to:

ATCC
Attention: HR/RSPD
10801 University Boulevard
Manassas, VA 20110
Fax: 703-365-2735
E-mail: employment@atcc.org
Website: www.atcc.org

Equal Opportunity Employer. Minorities/Females/Disabled/Veterans.

RESEARCH ASSOCIATE

Research Associate holding Ph.D. or M.D. degree is sought in Department of Medicine at Stanford University Medical Center in area of developmental biology of cardiovascular systems. Specific focus of laboratory is role of cellular signaling in vascular development. Models utilized include *in vitro* tissue culture and whole embryo culture models. Candidate should have in-depth knowledge of call and molecular techniques; experience in working with adenoviral expression vectors desirable. Responsibilities include carrying out their own research studies and guiding research assistants and postdoctorals on other research projects. Qualified applicants should submit curriculum vitae and names of three references to: **Judith L. Swain, M.D., Chair, Department of Medicine, Attention: Pat Schade, Stanford University Medical Center. FAX: 650-498-6741; e-mail: pschade@leland.stanford.edu**.

Two **POSTDOCTORAL POSITIONS** available immediately. Position One is to conduct structure/function studies on a recently identified tumor suppressor gene that is part of a chromatin remodeling complex. Position Two is to conduct studies to biochemically characterize a recently identified cellular factor that activates vaccinia virus late transcription. A recent Ph.D. with Western publications documenting experience in cellular and molecular biology is required. Experience in mammalian cell culture and transfection, expression of recombinant proteins, and site-directed mutagenesis is preferred. Please send curriculum vitae, a description of research experience and interests, and two letters of reference to: **Dr. Cynthia F. Wright, Department of Pathology and Laboratory Medicine, 165 Ashley Avenue, Suite 309, P.O. Box 250908, Charleston, SC 29425. E-mail: wrightcf@musc.edu**.

POSTDOCTORAL POSITION on NIH campus in Bethesda, Maryland, to develop and apply new molecular methods to discover viruses. Experience with virology and molecular techniques required. Send or **e-mail: krause@cber.fda.gov** curriculum vitae and names of three references to: **Philip Krause, M.D., FDA/CBER, HFM-457, 1401 Rockville Pike, Rockville, MD 20852.**

POSTDOCTORAL POSITION available to investigate the use of growth factors to generate CNS repair in demyelinating disease. Applicants must have experience in molecular biology and glial cell pathology. Send curriculum vitae and three references to: **Dr. Saud A. Sadiq, St. Luke's–Roosevelt Hospital Center, Columbia University, Antenucci Building, 432 West 58th Street, Room 117, New York, NY 10019. FAX: 212-523-8859**. *Equal Opportunity Employer.*

POSITIONS OPEN

Children's Hospital Oakland

The pediatric medical center for Northern California

POSTDOCTORAL POSITION IMMUNOLOGY OF POLYSACCHARIDES

Children's Hospital Oakland Research Institute has an immediate opening in **Dr. Alex Lucas'** laboratory to study mechanisms of immunity to encapsulated bacterial pathogens with emphasis upon polysaccharide-specific antibody responses. General areas of study include: V gene usage in antipolysaccharide antibody repertoires, repertoire oncogeny, the role of somatic mutation in responses to polysaccharide and polysaccharide-protein conjugates, and the structural determinates of antipolysaccharide antibody affinity and protective efficacy (*Immunol. Rev.* **171**:89–104, 1999). A Ph.D. in immunology is required. Applicants should send curriculum vitae and three letters of reference, including Job Reference #00–0433, to: **Children's Hospital Oakland, Human Resources Department, 747 52nd Street, Oakland, CA 94609. FAX: 510-428-3306; e-mail: choemployment@mail.cho.org**. *Equal Opportunity Employer.*

FACULTY POSITIONS BEHAVIORAL NEUROSCIENCE

The University of Massachusetts Medical School, Department of Psychiatry, has two Faculty positions available in the Behavioral Neuroscience Program and Brudnick Neuropsychiatric Research Institute. Successful candidates will be expected to conduct an active extramural funded research program. Selected candidates will join a team of researchers using functional magnetic resonance imaging as part of preclinical research projects studying psychiatric and neurological diseases. Background in MRI data acquisition, pulse sequence development, image processing, and analysis is essential. These are primary research positions with some teaching responsibilities. Faculty rank commensurate with experience. Applications should include curriculum vitae, a statement of research interests, documentation of grant support, and the names and addresses of three references. Send materials to:

Craig F. Ferris, Ph.D., Director
Behavioral Neuroscience Program
Department of Psychiatry
University of Massachusetts Medical School
55 Lake Avenue North
Worcester, MA 01655
E-mail: craig.ferris@umassmed.edu

The University of Massachusetts Medical School is an Equal Employment Opportunity/Affirmative Action Employer.

POSTDOCTORAL CLINICAL FELLOWSHIP NEUROIMMUNOLOGY

The Multiple Sclerosis Research and Treatment Center at St. Luke's–Roosevelt Hospital Center, a university hospital of Columbia University College of Physicians and Surgeons, is offering a two-year Clinical Fellowship in multiple sclerosis starting July 1, 2001. The Fellow will participate in the care of patients at the MS Center and on the inpatient MS unit. In addition, the Fellow will be required to participate in the subspecialty clinics involving spasticity, urology, urogynecology, and rehabilitation. Participation in ongoing clinical trials or development of an independent research interest is encouraged. Applicants should send curriculum vitae and letter of intent to: **Saud A. Sadiq, M.D., The Multiple Sclerosis Research and Treatment Center, 425 West 59th Street, Suite 7C, New York, NY 10019**. *St. Luke's–Roosevelt Hospital Center is an Equal Opportunity/Affirmative Action Employer.*

POSITIONS OPEN

FACULTY POSITIONS BIOMEDICAL ENGINEERING

The Georgia Institute of Technology (Georgia Tech) and the Emory University School of Medicine have established a joint Department of Biomedical Engineering. This new Department complements the existing bioengineering program at Georgia Tech and expands research and educational offerings at Emory University. The Department is housed at both campuses, which are located in Atlanta, Georgia.

Applications are invited for tenure-track faculty positions at all levels: **ASSISTANT, ASSOCIATE**, and **FULL PROFESSOR**. Of particular interest are individuals with research interests in biomedical modeling and computing, cardiovascular biology/biomechanics, biomedical imaging, neurosciences/engineering, and tissue engineering. Candidates must hold a Doctoral degree in an area that is in or is closely related to biomedical engineering or biomedical science.

The Department of Biomedical Engineering will offer a new joint Georgia Tech/Emory Ph.D. degree program beginning fall of the 2000 academic year. The Department also participates in the interdepartmental bioengineering M.S. and Ph.D. degree programs at Georgia Tech.

Applicants should submit a letter of application; curriculum vitae; and the names, addresses (including e-mail), and telephone numbers of three references to:

Don P. Giddens, Ph.D.
Lawrence L. Gellerstedt, Jr.
Chair in Bioengineering
Professor of Biomedical Engineering
Georgia Tech/Emory Department
of Biomedical Engineering
Atlanta, GA 30332-0535
E-mail: bme@bme.gatech.edu
Website: www.bme.gatech.edu

Tenure-track positions have been allocated at both Georgia Tech and Emory. If an accommodation due to disability is needed to apply for this/these position(s), please indicate accommodations needed in initial correspondence. TDD available upon written request. *An Equal Education/Employment Opportunity Institution.*

POSTDOCTORAL POSITION in glial neurobiology. Position available to study the cellular and molecular mechanisms of immune-neural interactions, signal transduction pathways in glial cells, and the role of ion channels in demyelinating diseases. Requirements include experience in cellular and molecular biology or cellular physiology plus some background in neuroscience. Please send curriculum vitae and names of three references to: **Dr. Betty Soliven, Department of Neurology and Committee on Neurology, University of Chicago, 5841 South Maryland Avenue, MC 2030, Chicago, IL 60637. E-mail: bsoliven@neurology.bsd.uchicago.edu.**

POSTDOCTORAL POSITIONS are available to study the regulation of gene expression, cell signaling, and apoptosis in cancer cells. Candidates should hold a Ph.D. or equivalent degree in molecular and cellular biology. Experience in molecular biology is essential. Send curriculum vitae and three letters of reference to: **Dr. Rakesh K. Srivastava, Department of Pharmaceutical Sciences, University of Maryland, 20 North Pine Street, Baltimore, MD 21201. E-mail: rsrivast@rx.umaryland.edu; FAX: 410-706-0346.**

MDS Panlabs, a division of MDS Pharmaceutical Services, is a leading contract research services organization located on Seattle's eastside, providing R&D services to the pharmaceutical and biotechnology communities. **We have an immediate employment opportunity in our Biotechnology Services Division for a:**

Scientist/Senior Scientist
Molecular Biology
(Position # 00-21)

The Molecular Biology group is seeking an experienced and ambitious individual to join a dynamic, growing team that is solving challenging problems in heterologous gene expression and metabolic pathway engineering. The candidate must have a Ph.D. in molecular biology or other relevant discipline, together with three or more years of postdoctoral experience. Industrial experience would be a definite plus. A strong record of scientific achievement in the development and use of industrially relevant gene expression and protein production systems is desirable, as are proven capabilities in the molecular analysis of gene expression and strain engineering. Experienced protein biochemists with considerable molecular biology experience are also encouraged to apply. The candidate will be expected to conduct experiments, prepare proposals and maintain contact with our clients. In addition, the candidate could have a role in guiding the efforts of the less senior staff. Consequently, an ability to work independently and as part of a team is critical, as are strong interpersonal skills.

MDS Panlabs is an equal opportunity employer. We offer competitive salary and benefit packages. Please submit your resume (be sure to include the position #) to:

MDS Panlabs
Attn: Human Resources #00-21
11804 North Creek Parkway South
Bothell, WA 98011
FAX: (425) 487-3787
Email: employment@panlabs.com (Microsoft WORD attachment)

ALBERT EINSTEIN COLLEGE OF MEDICINE

Advancing science, building careers

The Albert Einstein College of Medicine of Yeshiva University Jack and Pearl Resnick Campus

1300 Morris Park Avenue, Bronx, NY 10461

POST DOCTORAL POSITIONS IN AIDS RESEARCH

Post-doctoral research positions are available to work in one of our AIDS research groups. The Albert Einstein College of Medicine provides a stimulating environment and an ideal place for AIDS research with leading groups working on HIV and opportunistic infections of AIDS.

John S. Blanchard	Enzymology of Isoniazid Resistance
Joan Berman	HIV infection of the CNS; CNS inflammation and dementia
Jurgen Brojatsch	Signaling pathways induced by HIV Envelope protein-receptor interactions
Arturo Casadevall	Molecular Pathogenesis of *Cryptococcus neoformans*
John Chan	Latency, Granuloma and NO-mediated Defense in Tuberculosis
Tanya Dragic	Mechanisms of HIV-1 entry into target cells
Harris Goldstein	HIV Immunopathogenesis and Therapy Using SCID-Hu and Transgenic Mouse Models
William R. Jacobs, Jr.	Vaccines for AIDS and Tuberculosis
Ganjam V. Kalpana	Role of host factor INI1/hSNF5 in early and late events of HIV-1 replication
Kami Kim	Molecular basis of *Toxoplasma gondii* latency and host cell invasion
Robert Klein	Epidemiology and natural history of HIV-associated infections
Jack Lenz	Molecular genetics of human retroviruses; HIV-1 neutralizing antibodies
Liise-Anne Pirofski	Expression of Immunoglobulin Genes in AIDS Patients
Steve Porcelli	Cell Mediated Resistance to *M. tuberculosis* and *M. avium*
Vinayaka R. Prasad	HIV-1 Reverse Transcriptase: Determinants of Fidelity, Processivity and Drug Resistance
Matthew D. Scharff	Monoclonal Antibodies for Prevention and Treatment of Cryptococcal Infections
Ellie Schoenbaum	Epidemiology: HIV Disease Progression, Aging and HIV; Menopause and HIV
Louis Weiss	Developmental Biology of *Toxoplasma gondii* & Molecular Pathogenesis of Microsporidiosis

As per federal regulations for NRSA training grants, only U.S. permanent citizens and U.S. residents are eligible to apply. **Applicants should send cv and names of three references addressed to the faculty member of choice but to be emailed to Ms. Georgia Veroutis (email: veroutis@aecom.yu.edu).** Albert Einstein College of Medicine is an Equal Opportunity Employer.

GLOBAL OPPORTUNITIES

GRIFFITH UNIVERSITY

is an Equal Opportunity Employer and encourages diversity in its workplace.

QUEENSLAND - AUSTRALIA

Soil Microbiology/ Biochemistry

Research Fellow, Fixed-Term (Three Years), Nathan Campus, Brisbane

The Co-operative Research Centre for Sustainable Production Forestry, Australia, seeks a research scientist to work on the project - Management of Tropical Soils. A PhD in a relevant field and research experience in soil microbiology/biochemistry are essential, particularly in relation to soil C dynamics and N cycling.

Vacancy Reference Number: ENS11529/00

Remuneration: A$38,136 to A$44,860 per annum
(Plus 17% employer superannuation contribution: A$44,619 to A$52,486 per annum)

Further Enquiries: http://www.gu.edu.au/jobs/ or contact Ms Karen Lambrose, telephone + 61 7 3875 7359 or email k.lambrose@mailbox.gu.edu.au

Applications Close: 28 July 2000. AIS-UGRHRBB0109

IMPORTANT INFORMATION

Applicants must address the Selection Criteria contained in the Information Package. The website information represents the Information Package.

http://www.gu.edu.au/jobs/

The University is about to implement salary packaging arrangements for all staff.

UNITED ARAB EMIRATES UNIVERSITY
FACULTY OF MEDICINE AND HEALTH SCIENCES (FMHS)

The FMHS invites applications to fill the following position:

Senior Technician/Laboratory (Grade 3)

Applicants for this senior position should have an M.Sc. Degree in Biochemistry or in a related field (Ph.D. would be advantageous) with a minimum of eight years of research laboratory experience of which at least four years in protein chemistry and protein purification. Ability to use sophisticated analytical equipment, conduct experiments independently and work as part of a team of dedicated scientists on topics relevant to the UAE is essential. Good command of English language is required.

The successful candidate will be offered a tax-free salary, free accommodation, furniture allowance, annual air passage and an end of service bonus.

Interested applicants may forward their curriculum vitae together with the names and addresses of two professional referees and a covering letter with an indication of current salary to:

The Personnel Department
Faculty of Medicine and Health Sciences
United Arab Emirates University
P O Box 17666, Al Ain, United Arab Emirates
Fax No. 00971-3-7672001

Applications will be closed three weeks after the date of publication. Only short-listed candidates will be contacted.

RESEARCH ASSOCIATE: Construct plasmid DNA designed to achieve the high-level expression of appropriate protein in human cells. Design strategy for construction of expression plasmids. Use DNA sequencing to determine the exact nucleotide sequence of genetically engineered constructs. Discover unknown sequences in human genome to be used for maximizing expression of therapeutic proteins. Use PCR technology for amplification of known sequence from different sources of DNA, including the genomic DNA, and for introduction of desired modifications into the sequence. Design and use PCR primers for DNA amplification. Use restriction mapping for DNA analysis, confirming of constructed plasmids, and mapping of unknown DNA sequences. Minimum requirements include a Bachelor's degree or equivalent in chemistry or related field and at least two years of experience in the job offered or in the related field of molecular biology research. Thorough knowledge of standard recombinant DNA techniques, including plasmid construction, DNA sequencing, PCR technology, and DNA analysis. *Applicants must have unrestricted authorization to work in the United States.* Salary: $37,000 to $52,000 per year. Forty hours per week. Respond with two copies of résumé to: **Case Number 20000857, P.O. Box 8968, Boston, MA 02114**.

The Program in Molecular Cardiology at the University of North Carolina at Chapel Hill has positions open for **POSTDOCTORAL FELLOWS** to pursue innovative research in the molecular biology of cardiovascular diseases. Particular areas of interest are protein degradation via the ubiquitin-proteasome system, endothelial cell gene regulation, cardiovascular development (**Cam Patterson, M.D.**); thrombin-mediated signal transduction, oxidative stress and vascular disease, DNA damage and mitochondrial function (**Marschall S. Runge, M.D., Ph.D.**). Applicants should have experience in basic molecular and cell biology techniques and an interest in advanced molecular techniques and transgenic models of cardiovascular disease. Send curriculum vitae, a statement of research interests, and names of three references to: **Cam Patterson, M.D., Department of Medicine, 3031 Old Clinic Building, CB# 7005, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-7005**. *University of North Carolina at Chapel Hill is an Equal Opportunity/Americans With Disabilities Act Employer.*

An NIH-funded **POSTDOCTORAL POSITION** is available immediately in the Department of Anesthesia to study the interaction of inhaled anesthetics with small synthetic water-soluble and membrane-soluble α-helical bundle proteins. The research project involves protein design, protein synthesis, and the structural characterization of protein-anesthetic complexes. The applicant must have an M.D. and/or Ph.D. degree and be skilled in biochemistry or spectroscopy. Send curriculum vitae and names and e-mail addresses of three references to:

Jonas S. Johansson, M.D.
Department of Anesthesia
University of Pennsylvania Health System
Dulles 801
3400 Spruce Street
Philadelphia, PA 19104 U.S.A.
Telephone: 215-349-5472
FAX: 215-349-5078
E-mail: johansso@mail.med.upenn.edu

POSTDOCTORAL FELLOW/RESEARCH ASSOCIATE positions available to study hepatitis C virus and/or rotavirus immunity and pathogenesis. Applicants should be well trained in viral immunity and should have a broad interest in viral pathogenesis. Send curriculum vitae and three letters of reference to: **H. Greenberg, Dean's Office, M121, Stanford University School of Medicine, Stanford, CA 94305-5119. FAX: 650-852-3259; e-mail: hbgreen@leland.stanford.edu.**

POSITIONS OPEN

INTERESTED IN CLINICAL OR POSTDOCTORAL RESEARCH TRAINING?

The National Institutes of Health has both! For more information, visit our website which lists an array of clinical and postdoctoral opportunities, including tenure-track positions.

http://www.training.nih.gov

NIH is dedicated to building a diverse community in its training and employment programs.

POSTDOCTORAL POSITIONS
CELLULAR BIOPHYSICS
Department of Biological Chemistry and Molecular Pharmacology
Harvard Medical School

Become part of a research program focused on understanding the molecular interactions that control protein and lipid mobility and distribution in cell membranes, the roles these control mechanisms play in mediating intercellular adhesive interactions and intracellular signaling interactions, and the relationships between derangements in these control mechanisms and the pathophysiology of disease. Two Postdoctoral positions are available immediately to study membrane dynamics in red cells, white cells, endothelial cells, and other cell types. One position involves developing a nanometer scale video microscope in single particle tracking and laser optical tweezers experiments to identify and measure the molecular forces that regulate the lateral mobility and surface distribution of transmembrane receptors, channels, and adhesion molecules. The other position involves developing a novel method and analysis to quantify two-dimensional receptor-ligand binding interactions that mediate cell surface contacts between lymphocytes and target cells, between developing hematopoietic cells, and between host cells and pathogens.

A Ph.D. in cell biology, biochemistry, biophysics, physiology, or a related field is required. Experience in one or more of the following areas is preferred: laser and video microscopy, membrane protein biochemistry and biophysics, purification of transmembrane and membrane-associated proteins, cell culture, and molecular biology of wild-type and mutated cell membrane receptors. Please send curriculum vitae, statement of research interests, and contact information for three references to: **Dr. David E. Golan, Department of Biological Chemistry and Molecular Pharmacology, Harvard Medical School, 250 Longwood Avenue, Boston, MA 02115. E-mail: dgolan@hms.harvard.edu; FAX: 617-432-3833.**

POSTDOCTORAL ASSOCIATE
CHEMICAL CARCINOGENESIS

Outstanding opportunity for an individual with a Ph.D. in analytical chemistry or a related discipline and an interest in chemical carcinogenesis to develop assays for metabolites of polycyclic aromatic hydrocarbons in human urine. This information will be related to genotyping data, PAH-DNA adducts, and cancer susceptibility and will be applied in cancer chemoprevention studies. Contact: **Stephen S. Hecht, Ph.D., c/o Human Resources, University of Minnesota Cancer Center, Mayo Box 806, 420 Delaware Street S.E., Minneapolis, MN 55455.**

NIH-funded **POSTDOCTORAL POSITION** available to study cell surface proteoglycans in both *in vitro* and *in vivo* systems relevant to vascular biology and atherosclerosis. The successful candidate will have the opportunity to interact with members of the proteoglycan and vascular biology communities at Emory and at several collaborating institutions. Ph.D. degree with training in biochemistry and/or cell/molecular biology required. Experience with GACs desirable. Send curriculum vitae to: **Dr. Elliot L. Chaikof, M.D., Ph.D., Emory University, Department of Surgery, 1639 Pierce Drive, 5105 WMB, Atlanta, GA 30322. FAX: 404-727-3660. E-mail: echeiko@emory.edu.**

POSITIONS OPEN

SENIOR SCIENTIFIC POLICY ANALYST
FOOD AND DRUG ADMINISTRATION
Rockville, Maryland

The Office of Policy within the Office of Policy, Planning, and Legislation in the Office of the Commissioner, Food and Drug Administration (FDA), has an opening for an **INTERDISCIPLINARY SCIENTIST** (GS–0401, 0403, 0405, 0415, 1320) to serve as the principal advisor and consultant in matters relating to scientific issues that have an impact on science policy direction.

Salary: ranges from $71,954 to $93,000 per annum. Benefits include health and life insurance options, retirement, paid holidays, vacation, and sick leave.

U.S. citizenship is required. In order to validate your qualifications, it is necessary to describe your proficiency in the following knowledge, skills, and/or abilities (KSAs): (1) ability to communicate orally; (2) ability to communicate in writing; (3) ability to provide technical and scientific analysis; (4) knowledge of the federal Food, Drug, and Cosmetic Act and other pertinent laws related to agency enforcement and policy-making activities; (5) ability to serve as a spokesperson for a major program and negotiate with individuals at the highest levels inside and outside the government.

The position has a minimum education requirement; therefore, all candidates must submit either a college transcript or list of courses, including titles, credit hours, and grades, documenting relevant courses to be considered for the position. Candidates must have 52 weeks of specialized experience equivalent to the next lower grade level in federal service. Specialized experience is experience that is typically in or related to the work of the position, such as developing and implementing science policy and guidance.

For additional information regarding this position, please contact: **Fay Fink at 301-827-3360**. Résumés will be accepted until August 11, 2000. Please submit résumés to: **Office of Policy, HF–11, Room 14-101, 5600 Fishers Lane, Rockville, MD 20857, Attention: Fay Fink**.

The Food and Drug Administration is an Equal Opportunity Employer. FDA is smoke-free.

PHARMACOKINETIC MODELER

A challenging position combining laboratory research with physiologically based pharmacokinetic (PBPK) modeling is available in the Dayton, Ohio, area. Minimum requirements: Ph.D. in toxicology or related biomedical discipline plus two years of experience in PBPK modeling; expertise in kinetics and toxicology of xenobiotics; familiarity with personal computers and use of software that supports PBPK modeling; and excellent analytical, verbal, and written communication skills. *Applicant must be a U.S. citizen or have resident alien status.* Preferred candidates will have proven expertise and publication record in PBPK modeling and risk assessment, experience in development and application of PBPK models including laboratory experience in collecting data for model validation, and demonstrated project management skills. See job description on **website: www.mantech.com**. (See career opportunities; OH; project/research scientist: #4242-01.) Send résumé to: **HR/4242-01, ManTech Environmental Technology, Inc., P.O. Box 31009, Dayton, OH 45437**. *Equal Employment Opportunity; Minorities/Females/Disabled/Veterans urged to apply.*

POSTDOCTORAL POSITION available immediately to study regulation of retinoid-induced melanoma differentiation through the use of DNA arrays and proteomics. A second area of investigation is the role of PKC in the regulation of melanogenesis in normal (melanocytes and melanoma) cells. Experience in molecular biology and cell culture is preferred. Send curriculum vitae and names of three references to: **Dr. Richard M. Niles, Professor and Chair, Department of Biochemistry and Molecular Biology, Marshall University School of Medicine, 1542 Spring Valley Drive, Huntington, WV 25704. E-mail: niles@marshalledu**. Position open until filled.

GLOBAL OPPORTUNITIES

Senior position in schizophrenia research: The Mental Health Research Institute of Victoria seeks an outstanding **NEUROSCIENTIST** or **RESEARCH PSYCHIATRIST** who wishes to develop a major research program in schizophrenia to augment the Institute's current laboratory-based and clinical research programs. The appointee will be a successful, independent researcher with an excellent publication and competitive funding record. The initial appointment will be for five years and will be at a level corresponding to either **PROFESSOR** or **ASSOCIATE PROFESSOR**. The Mental Health Research Institute is Australia's preeminent psychiatric research institute. It is affiliated with Melbourne and Monash Universities and the Royal Melbourne and Alfred Hospitals. It is located in Parkville, Melbourne, and is housed in modern facilities with excellent laboratories. For further information, interested researchers should contact: **Professor David Copolov, Director; Telephone: +613-9389-2905; FAX: +613-9389-2998; e-mail: dlc@mhri.edu.au**. Further information about the Institute can also be found at **website: www.mhri.edu.au**.

LABORATORY HEAD
INSTITUTE OF NEUROSCIENCE
CHINESE ACADEMY OF SCIENCES

The recently inaugurated Institute of Neuroscience, Chinese Academy of Sciences, is inviting applications for Laboratory Head positions in all areas of neuroscience. Candidates must have a Ph.D. or equivalent training with significant postdoctoral research accomplishments. The successful candidates are required to develop an independent research program and to supervise graduate and postdoctoral students. Competitive start-up funds, annual operating funds, salary, and housing benefits will be provided. Inquiries and applications (curriculum vitae including a list of publications, a research plan, and names and e-mail addresses of three references) should be addressed to: **Dr. Shigang He, Institute of Neuroscience, 320 Yue-yang Road, Shanghai 200031 China. E-mail: s.he@ion.ac.cn**. Applications received before September 30, 2000, will be considered for appointment in 2001.

EUROPEAN OPPORTUNITIES

POSTDOCTORAL POSITION: Vienna BioCenter, fall 2000. Molecular characterization of genes that regulate development of avian ovarian follicles and oocytes. Transport and signalling receptors, endocytic machinery, extracellular matrix components and their assembly. While basic in nature, studies are also aimed at application in biotechnology and diagnostics. Contact with details: **Wolfgang J. Schneider, Vienna BioCenter. E-mail: wjs@mol.univie.ac.at.; FAX: ++43 1 4277 61804**.

POSTDOCTORAL POSITIONS
Antenna Theory and Signal Processing for Ground-Penetrating Radar Imaging

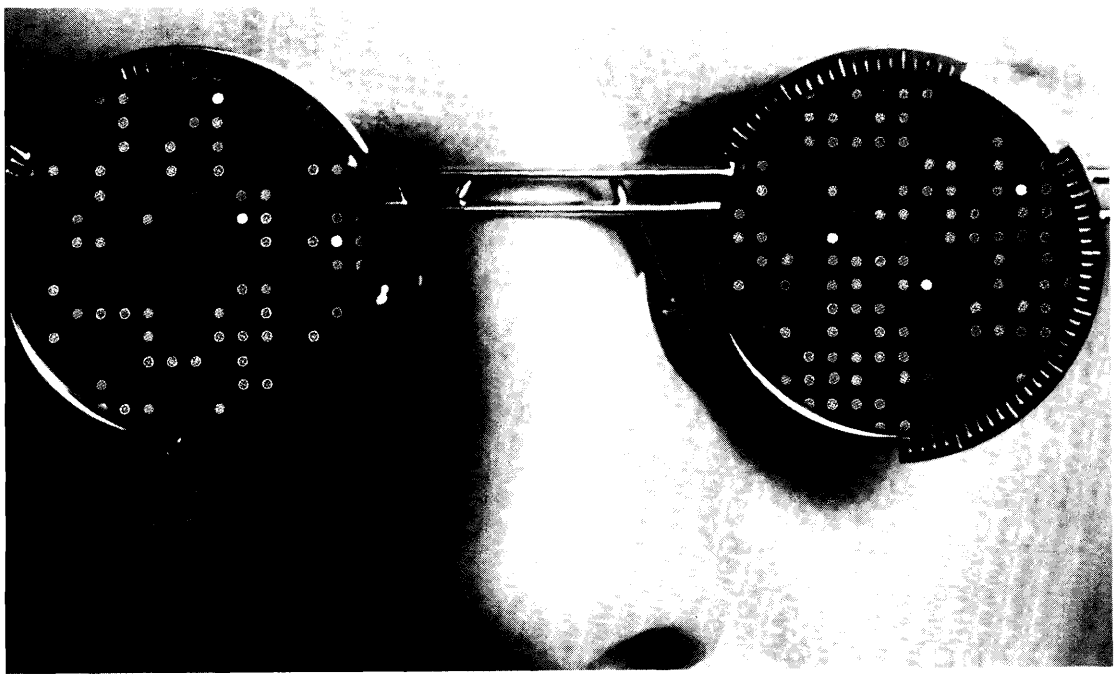
Two one-to-two-year **POSTDOCTORAL POSITIONS** are open for immediate appointment in the Department of Electromagnetic Systems, Technical University of Denmark. The candidates will join a research project on development of advanced, physics-based signal processing for ground-penetrating radar (GPRs). The main goal of the project is to obtain highly accurate three-dimensional images of objects buried in the soil from GPR data. We seek candidates with a Ph.D. degree, preferably in electrical engineering, and with research experience in at least two of the following areas: (1) antennas and electromagnetic theory, (2) antenna measurements, (3) inverse scattering, and (4) mathematical and numerical analysis. For more information, please see the project **website: http://www.emi.dru.dk/research/afg/gpr**. The application must include detailed curriculum vitae and a list of publications. Please forward applications before August 4, 2000, to:

Assistant Professor Peter Meincke
Department of Electromagnetic Systems
Technical University of Denmark
Ørsteds Plads, Building 348
DK–2800 Kgs. Lyngby, Denmark
Telephone: +45 45253813
FAX: +45 45931634; e-mail: pme@emi.dtu.dk

MARKETPLACE

MERGEN LTD.

Discover A Clear Array of Possibilities. ExpressChip™ DNA Microarrays from Mergen.



If you need to simultaneously analyze over one thousand gene expressions, there's no better choice than ExpressChip™ DNA Microarrays from Mergen. Each ExpressChip kit contains two duplicate glass slides pre-spotted with oligonucleotides, and reagents for probe hybridization and signal amplification.

ExpressChip

Simple, Flexible and Affordable.

- Choose among human, mouse, rat, or custom ExpressChip kits
- Use low amount of total RNA as starting material
- Process slides with your choice of laser scanners and image analysis software
- Customized services available

High Quality.

- Off-chip oligo synthesis for high coupling efficiency and optimized quality control
- Sequences individually tested for cross-homologies in GenBank database
- Superb spot geometry and uniform density
- Hybridization without cover slip for clear images across the array with minimal artifacts

Differential Expression Results You Can Trust.

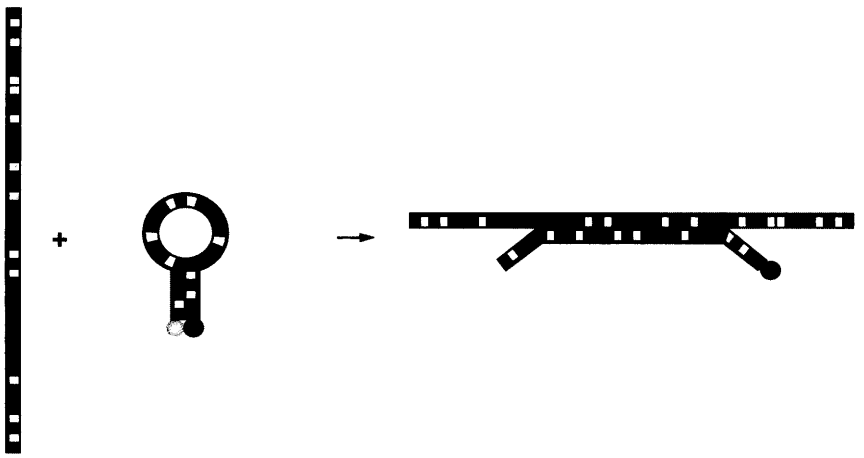
- High specificity and sensitivity
- Linearity over large dynamic range

Get started today with ExpressChip™ DNA Microarrays from Mergen and discover an endless array of possibilities. Visit us on the web at www.mergen-ltd.com, or call us toll-free at 1-877-4MERGEN (463-7436).

Circle No. 24 on Readers' Service Card

Molecular Beacons*

Real-time PCR† Quantitation, Allelic Discrimination, and *In Situ* Visualization

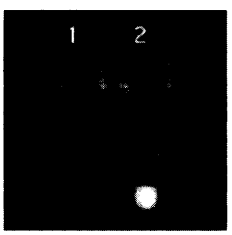


Research Genetics is proud to be a licensed distributor of molecular beacons. These single-stranded oligonucleotides contain a fluorescent dye and quencher dye on their 5' and 3' ends, respectively. Molecular beacons are designed to include a hairpin stem structure so that when they are not bound to the target, the fluorophore is quenched by the 3' DABCYL quencher and no fluorescence occurs. However, if target is present, the complementary loop of the molecular beacon forms a stronger bond with the target than the stem and a conformational change occurs forcing the stem apart and resulting in fluorescence.[1]

Molecular beacons have proven to be valuable tools for many different applications including real-time quantitation assays,[2] allelic discrimination,[3,4,5] and *in situ* visualization of mRNA in living cells.[6,7]

Research Genetics offers custom synthesis of molecular beacons. A 25:1 signal to background ratio is guaranteed, and all orders include a reverse complement and thermal denaturation profile. We offer custom synthesis in .2µmole scale for 5' FAM, TET and 1.0 µmole scale for 5' FAM, TET. For more details, including probe design suggestions, please e-mail sbates@resgen.com.

Research Genetics also offers Molecular Beacon Gene Expression Assays which provide a sensitive and rapid alternative to many traditional gene expression analyses, including Northern blotting, *in situ* hybridization, RNase protection and S1 nuclease assays. Molecular beacon assay reactions are performed in a single PCR run, thus providing a fast, specific and sensitive method for accurate quantitation. Additional assays are released every month. For more information, please visit our website at http://www.resgen.com.



Tube 1 contains molecular beacon only.
Tube 2 contains molecular beacon and 5-fold of its reverse complement.

Ref:
1. Tyagi, S. and Kramer, F.R. (1996) *Nature Biotech. 14*, 303-8.
2. Tyagi, S., Bratu, D. and Kramer, F.R. (1998) *Nature Biotech. 16*, 49-53.
3. Kostrikis, L.G. *et al.* (1998) *Science 279*, 1228-9.
4. Piatek, A. *et al.* (1998) *Nature Biotech. 16*, 359-63.
5. Marras, *et a.l* (1999) *Genetic Analysis 14*, 151-156.
6. Matsuo, T. (1998) *Biochimica et Biophysica Acta 1379*, 178-184.
7. Sokol, D. et al (September 1998) *Proc. Natl. Acad. Sci. USA Vol 95*, 11538-11543.

Headquarters:
Research Genetics
2130 Memorial Pkwy. SW
Huntsville, AL 35801
US or Canada
Tel: 800 533 4363
Fax: 256 536 9016
http://www.resgen.com

European Headquarters:
Invitrogen BV
P.O. Box 2312
9704 CH Groningen
The Netherlands
Tel: +31 (0) 50 5299 299
Fax: +31 (0) 50 5299 281

Toll free order line
00800 5456 5456
Toll free technical support
00800 5345 5345
Toll free fax number
00800 7890 7890
Email: tech_service@invitrogen.nl

Distributors:
Czech Republic 2 72764416
Finland 09 584 121
Hungary 01 280 3728
Israel 02 584 1111
Italy 02 38 1951
Poland 058 341 47 26
Portugal 021 453 7085
Spain 091 729 0333

Research Genetics.
Accelerating Discovery
an Invitrogen Company