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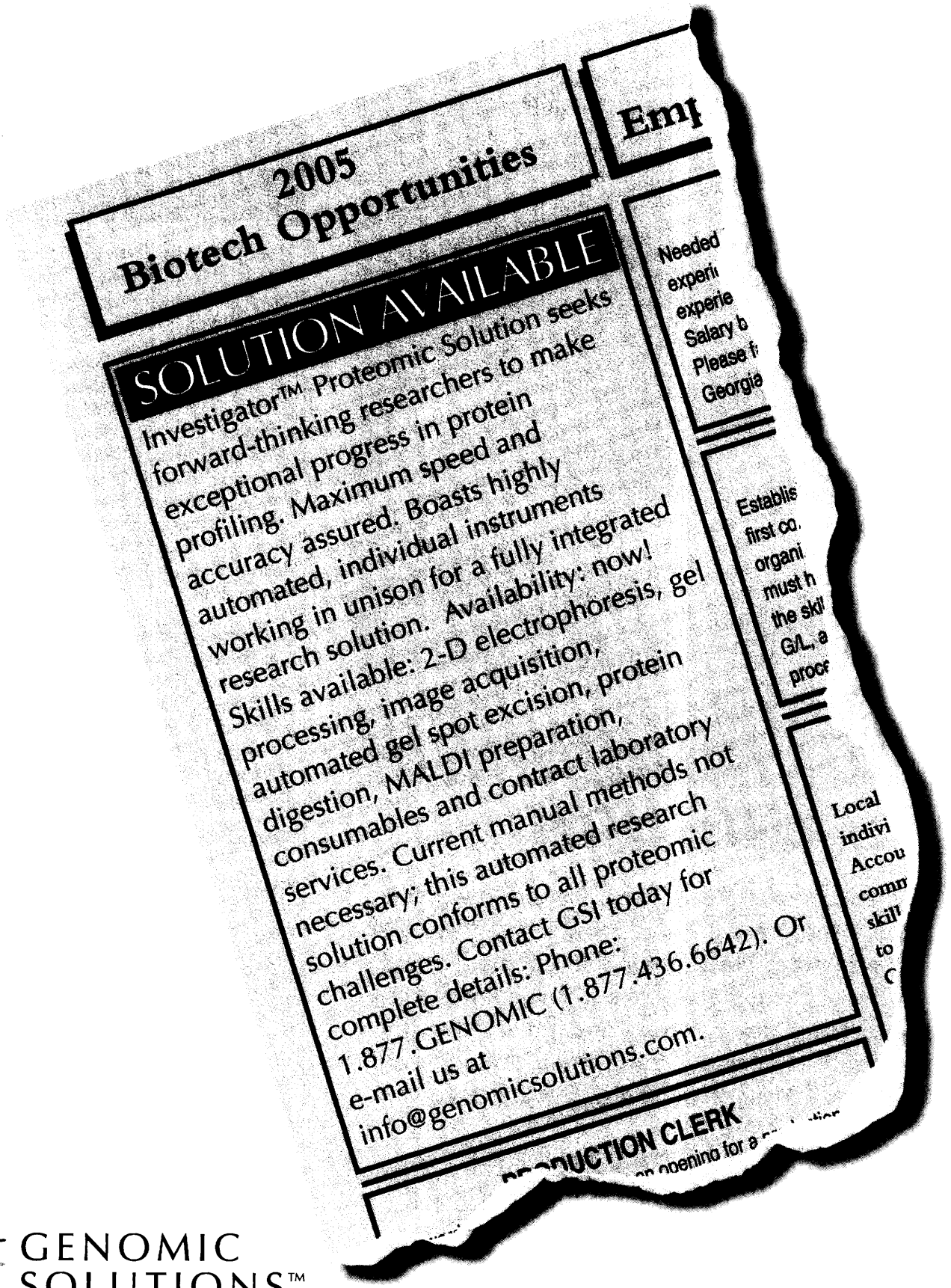

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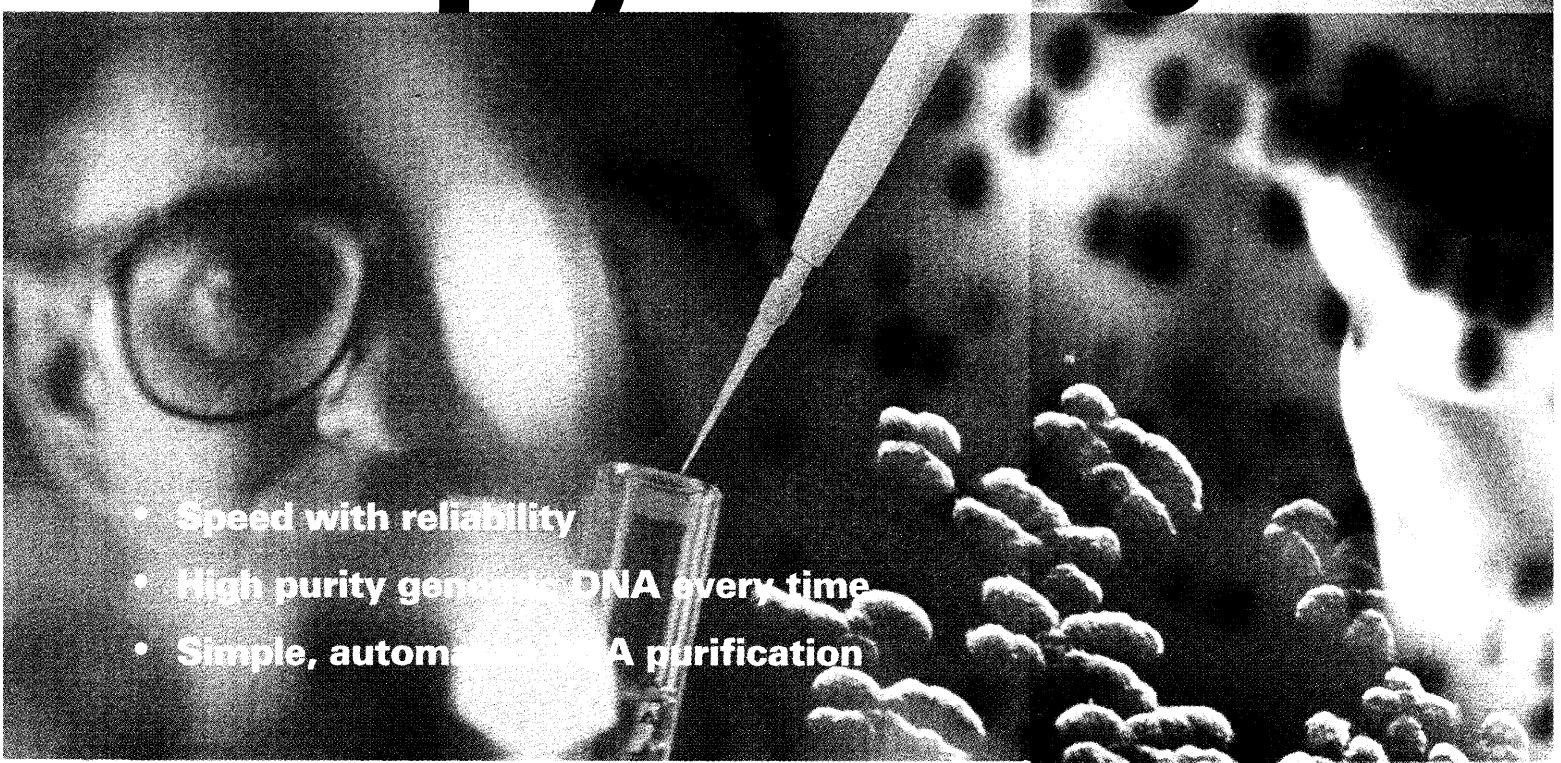

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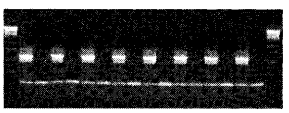

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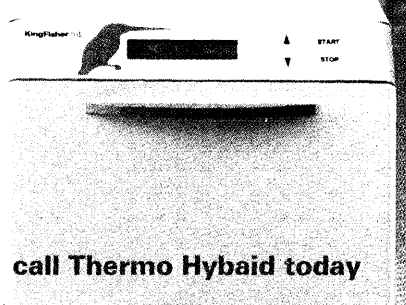

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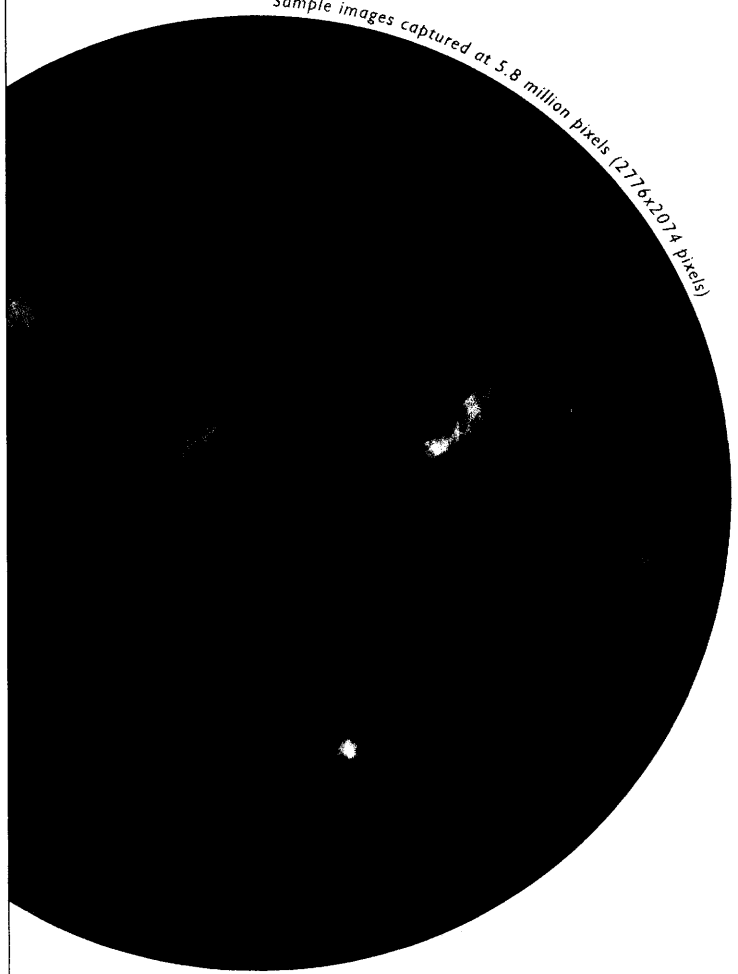

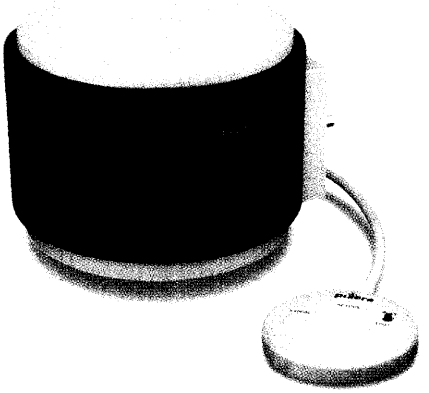

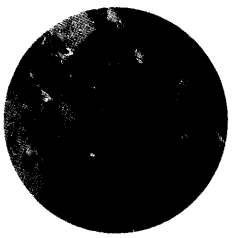

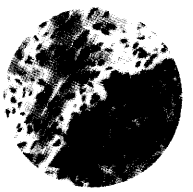

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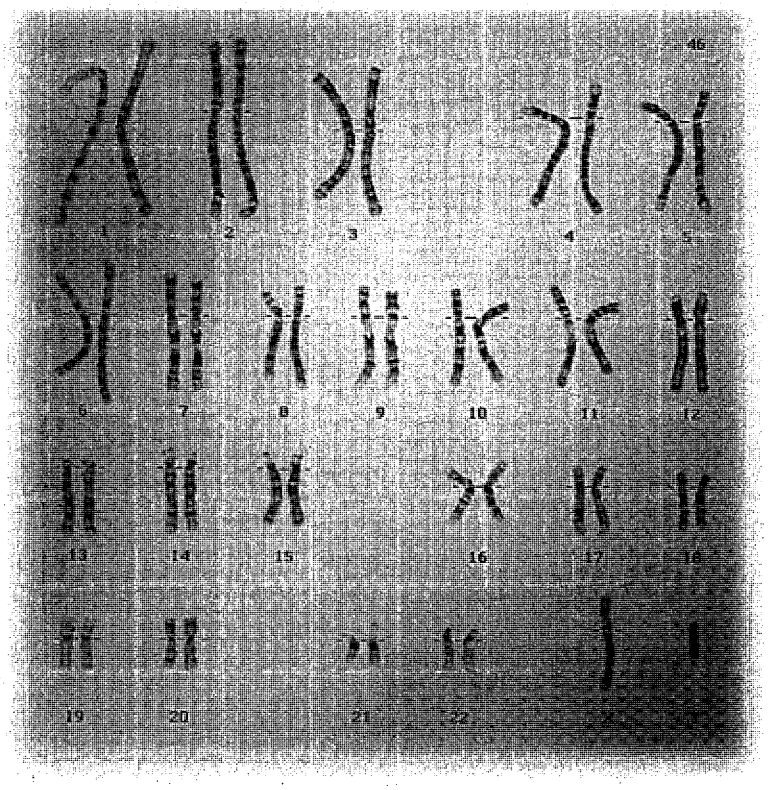

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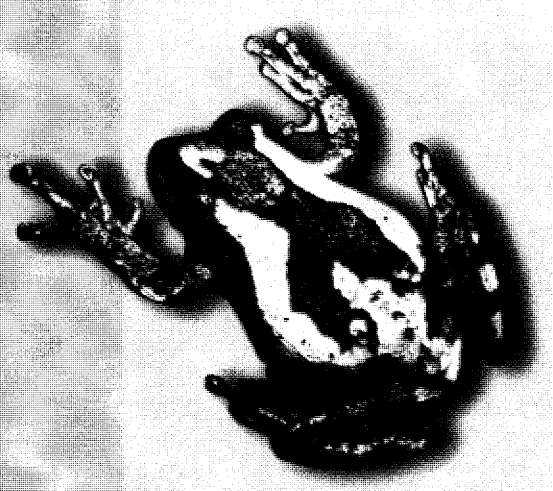

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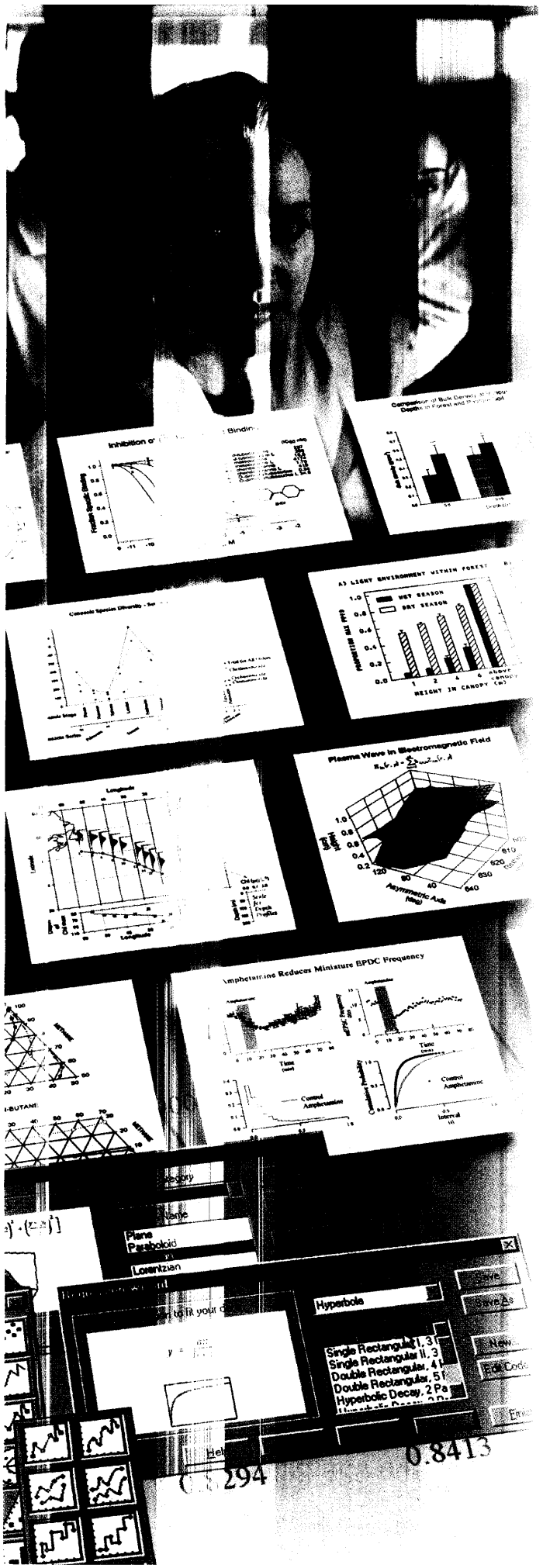

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—Brian R. Shmaefsky

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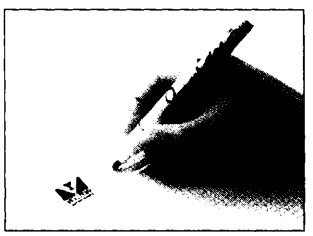

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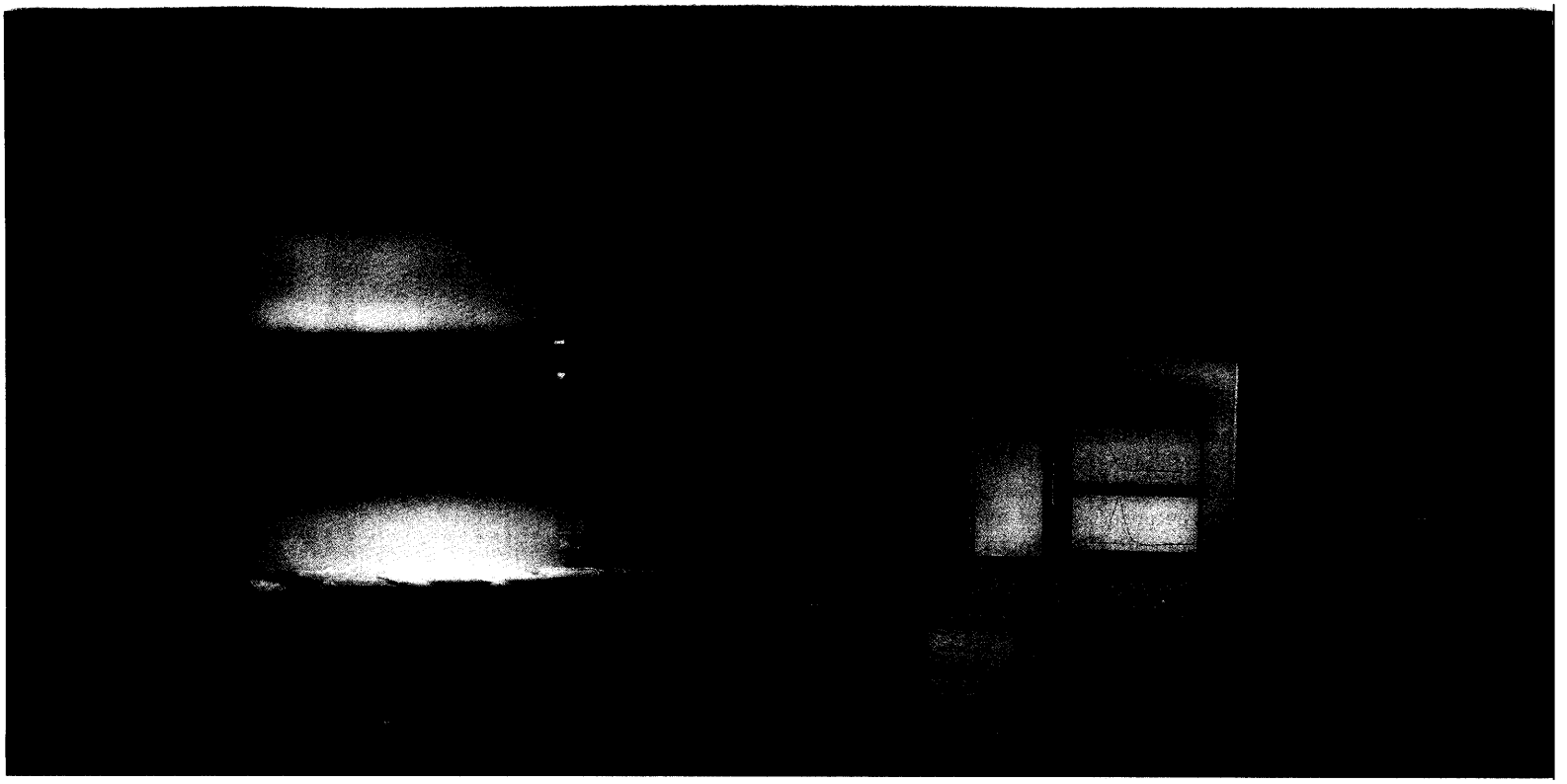

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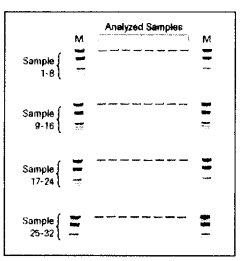

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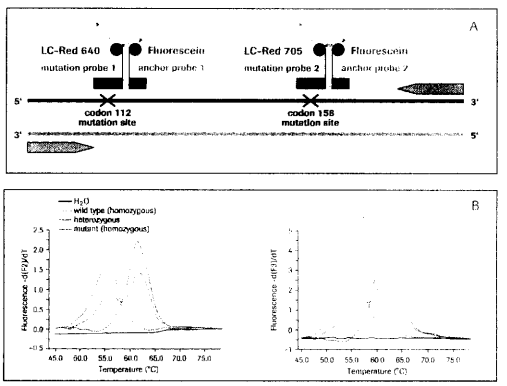

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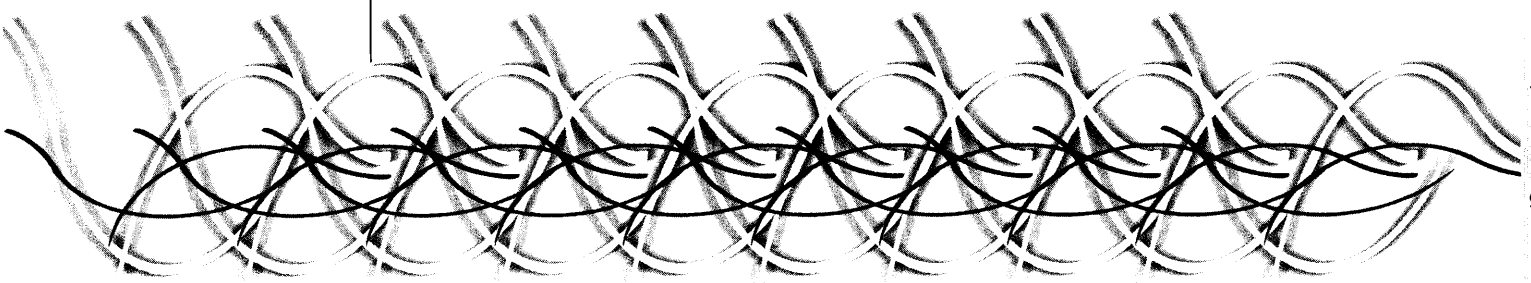

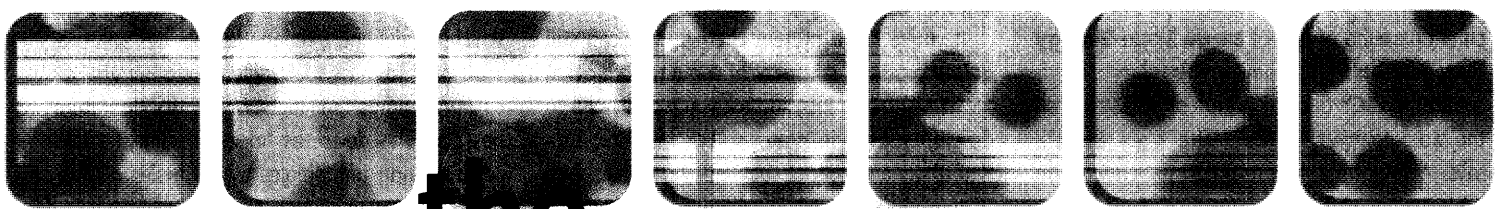

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New technologies identify, characterize, and follow the interactions of proteins in a variety of pathways. This knowledge will advance basic research and provide many clinical tools, including new approaches to drug discovery and disease diagnosis. BY MIKE MAY AND GARY HEEBNER

Throughout the 1990s, the **Human Genome Project** garnered considerable attention, but the early 2000s promise to focus on the next biological step: proteins. The field of proteomics involves the analysis and characterization of proteins expressed in cells, and a better understanding of proteins will answer many clinical and basic research questions. In so-called differential proteomics, for example, investigators will compare proteins expressed in normal and diseased cells in hopes of correlating a specific disease, and even a particular stage of a disease, with a distinct protein expression profile. With such knowledge, pharmaceutical companies should find a variety of new therapeutic targets.

Dave Walker, business unit manager in the Lab Devices Division of **Bio-Rad Laboratories**, calls this the decade of proteomics, but he adds, "Let's be fair to genomics. The buildup of sequencing databases has been essential. Genomics has driven forward and has reached a point where it is not able to answer the biological questions that are being asked." As a result, investigators are moving ahead to establish relations between the genes and proteins—the primary components of biochemical pathways in living cells. Nevertheless, proteomics generates very different challenges in comparison with genomics. According to Mats Johnson, vice president of proteomics at **Amersham Pharmacia Biotech**, "Genomics is a very static science, in a way, because the sample doesn't change over time. Proteomics is very dynamic. Basically, with each time unit, there's a change of the proteome of each cell." Despite the challenges arising from a dynamic target, Johnson adds, "The value of proteomics information, as such, is higher because it's closer to the function of cells."

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.

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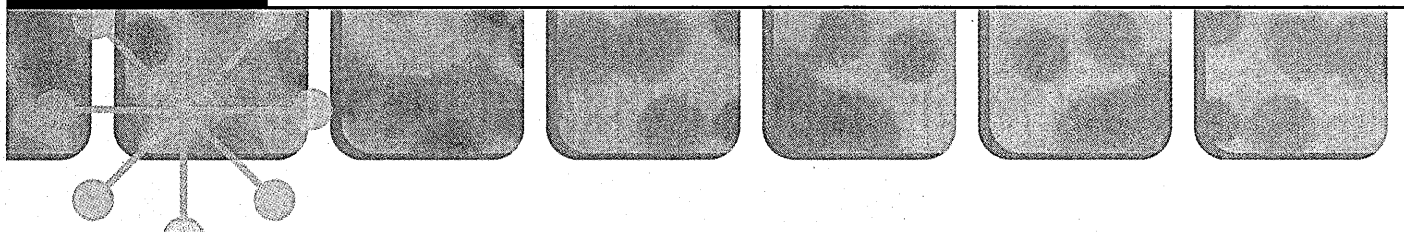

The dynamic features of proteins, though, create a host of interesting technical challenges. Although genes can be amplified with PCR, for example, proteins cannot. Consequently, investigators face serious obstacles to merely isolate and identify the proteins in a cell, some of them at very low levels. Leigh Anderson, president and chief operating officer of **Large Scale Biology Corporation's** proteomics subsidiary and a speaker at **IBC**'s upcoming Proteomics Event (see the accompanying article, "The Main Event"), says, "Proteomics is extremely dependent on advances in technology, because proteins are much more difficult molecules to deal with than DNA. Proteomics also takes a much broader range of technologies to put together into a platform to make proteomics really work, and that integration has been a major challenge in itself."

Consequently, getting at the changing spectrum of proteins inside an organism requires integrated, high throughput technologies for isolating, identifying, and characterizing many proteins. In many cases, proteomics depends heavily on two-dimensional gel electrophoresis for protein separation and mass spectrometry for protein characterization. Advances in these technologies, however, trigger floods of data to manage and analyze. Accordingly, bioinformatics helps investigators collect data and then compare the results to various databases, especially genomic ones. Significantly, many advances in proteomics follow advances in technology.

Attacking through Isolation

It's easy to imagine a physician's interest in a protein profile of a patient's blood, but no current technology provides a simple approach that spits out the types and quantities of proteins in any sample. Instead, investigators must start by isolating the proteins from other components.

For instance, scientists require techniques that disrupt cells and then make the proteins inside soluble and available for further analysis. Even this process can involve several steps: disrupting cells with a strong detergent and urea, which inactivates enzymes that would eat up the proteins before scientists look at them, and then creating a reducing environment that enhances protein solubility. Luckily, investigators can obtain these reagents from a number of suppliers, including Amersham Pharmacia Biotech, Bio-Rad Laboratories, **ICN Biomedicals**, **Pierce Chemical Company**, and **Sigma-Aldrich Corporation**.

If you're not a protein chemist, you can still isolate proteins. A variety of companies provide protein isolation kits, so that you won't need to develop your own protocol. For instance, Bio-Rad offers a variety of such kits. As Walker says, "One of the problems of proteomics and protein discovery is that proteins are expressed in an extremely large, dynamic range, and it is not possible to see everything at once. So we believe in the process of divide and conquer." In other words, Bio-Rad provides tools that start to separate a sample's proteins at the very beginning. Walker continues: "If you can split the whole-cell extract to manageable fractions, then it makes the whole thing simpler and easier. Our sequential extraction kit is an example of how we're probing the sample for hydrophobic proteins and, in particular, membrane proteins."

Separation and Purification

After isolation, you start separating proteins. A variety of techniques take on this challenge. In fact, it often requires several technologies to sort out a collection of proteins. For example, affinity chromatography separates a specific protein or family of proteins from a mixture. This method takes advantage of the fact that some proteins bind to specific substrates, which will pull out specific proteins from a mixture.

In some cases, manufacturers design a chromatographic device that goes after extremely small amounts of protein. For instance, **Millipore Corporation**'s ZipTip consists of a 10-microliter pipette tip that contains chromatographic media, which desalts and fractionates peptides and proteins prior to mass spectrometry or other analytical procedures. In fact, Millipore's literature describes this device as "ideal for purifying and concentrating femtomoles to picomoles of peptides, proteins, or oligonucleotides in seconds."

Many applications of chromatography, however, handle larger volumes. David Hicks, director of marketing for proteomics at **Applied Biosystems**, says, "We're especially focused on multidimensional liquid chromatography." An investigator can use this technique to break a sample into fractions, deplete high-abundance proteins, concentrate low-abundance fractions, or to do some separation before going on to another technique, such as two-dimensional gel electrophoresis. In cases where a protein of interest resists separation, such as membrane proteins often do, multidimensional liquid chromatography might be used instead of two-dimensional gel electrophoresis, Hicks says.

In the past, investigators often ignored chromatography for some proteomics work because of a lack of quantification. Today, Applied Biosystems offers isotope-coded affinity tags that label a protein with a heavy isotope. Steve Martin, director of the Proteomics Research Cen-

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ter at Applied Biosystems, says, "This becomes an isotope ratio, mass spectrometry measurement." So by combining liquid chromatography with mass spectrometry, Martin and his colleagues can compare, for example, normal and disease extracts by tagging them with isotopes of different mass and then testing the samples together with mass spectrometry. The results provide pairs of peaks for each protein of interest, offset by the difference in mass of the isotopes. Comparing the height of the peaks provides a measurement of relative abundance.

Some companies also pick out specific proteins by tagging them with a small sequence of peptides. A variety of companies, including **Clontech**, **Qiagen**, and Sigma-Aldrich, provide such systems, each based on a different tag. In addition, **IBA GmbH** produces a system called *Strep*-tag®. This system relies on a small tag–just eight amino acids long–that can be attached to a protein by modifying its gene during cloning. After gene expression, this tag lets an investigator pull out the recombinant protein of interest through binding it to immobilized *Strep*-Tactin–an engineered form of streptavidin–followed by washing and subsequent mild competitive elution by an analog of streptavidin's natural ligand biotin. Thomas Schmidt, IBA's chief operating officer, says, "This is a simple but most efficient affinity technology for the purification and analysis of recombinant proteins in general." Schmidt adds that this technology also works very well in high throughput assay formats. Customers may purchase all reagents to use *Strep*-tag by themselves or provide IBA with a sequence and the company will clone it, express the protein, purify the protein, and return a *Strep*-tagged protein for further use.

A proteome's dynamics involve signaling pathways that regulate the activation state of proteins by modifying them with specific chemical groups. Today, investigators can study these protein features with antibodies. As an example, **Cell Signaling Technology** provides antibodies that detect specific modifications of proteins, including phosphorylation, acetylation, nitrosylation, and cleavage. This company also provides antibodies that look for phosphorylation in a specific motif–for example, a phosphorylated serine that lies in a specific position between proline and arginine bases–that is a recognition site for specific kinases. As a result, these antibodies unveil hundreds of specifically phosphorylated proteins when a signaling cascade is activated. Roberto Polakiewicz, director of research at this company, says, "In general, we provide antibodies that will tell you whether a particular protein–be that a kinase, transcription factor, et cetera–is active or inactive. It will tell you more about, not just the protein being there, but about the function itself."

Two-Dimensional Gels

In the mid-1970s, scientists developed two-dimensional (2-D) gel electrophoresis, that soon emerged as a workhorse in the field of protein separation. In this system, investigators put a protein mixture through two gels, or dimensions. The first gel consists of a pH gradient that separates proteins based on their isoelectric points. This step proved particularly challenging in the past, and the first dimension often produced inconsistent results. Today, commercially available immobilized pH-gradient strips simplify this step and provide more consistent results for input into the second dimension. The second gel generally relies on so-called SDS-PAGE–or sodium dodecyl sulfate-polyacrylamide gel electrophoresis–an established tool in cell biology laboratories. The matrix of this gel creates a molecular sieve that separates proteins by molecular weight. Specifically, smaller molecules move faster than larger ones along this gel.

Today, scientists face fewer struggles with the world of 2-D gel electrophoresis. In fact, they can purchase complete systems to perform protein separations from a number of companies, including Amersham Pharmacia Biotech, Bio-Rad Laboratories, **C.B.S. Scientific**, and **Invitrogen**. In addition, many of these companies, as well as **FMC Corporation**, supply prepared gels, which provide more consistent results. In fact, when asked about improvements in the technology behind 2-D gels, Tom Berkelman, senior scientist at Amersham Pharmacia Biotech, says it consists of "incremental improvements in the convenience and reproducibility of the procedure."

As in some of the previous steps, dividing up a sample for 2-D gel electrophoresis leads to a better separation of proteins. Walker points out that breaking a sample into fractions gives 2-D gels more power. He adds: "We go even further, because we would divide that first dimension of 2-D into different components." In the past, the first dimension covered a broad pH range, say 3-10, but modern gels can cover much tighter ranges, like 4-5. As Walker explains: "It's not possible to see all proteins on a single gel. We say, if you divide your sample in the beginning through sample preparation and divide it up again in the first dimension, you increase the number of gels, but you also increase the amount of information."

Still, scientists search continually for even better techniques. Berkelman says, "There does seem to be a sort of underlying assumption that the days of 2-D electrophoresis are numbered and that there will be an improved technique–something more automated, something more reproducible, something not quite as manually intensive, something that's not quite so much an art." Having said that, he adds: "Everybody talks about this magical new technique, but I wouldn't have the first clue what it would be." Instead, Berkelman mentions that researchers and manufacturers continue to improve 2-D electrophoresis through better chemistry that improves both resolving power and the number of proteins that can be separated. Moreover, he points out that simply increasing the size of a gel lets spots of protein move farther apart. Consequently his company's devices recently changed from 18-centimeter strips to 24-centimeter ones. So it looks as though 2-D gels will continue to separate thousands of proteins in laboratories around the world for some time to come.

Sorting the Spots

A run of 2-D gel electrophoresis leaves a scientist with a thousand spots or so, each being a collection of one or more proteins. Identifying these proteins begins with staining them. Some of the better protein stains include coomassie blue, sil-

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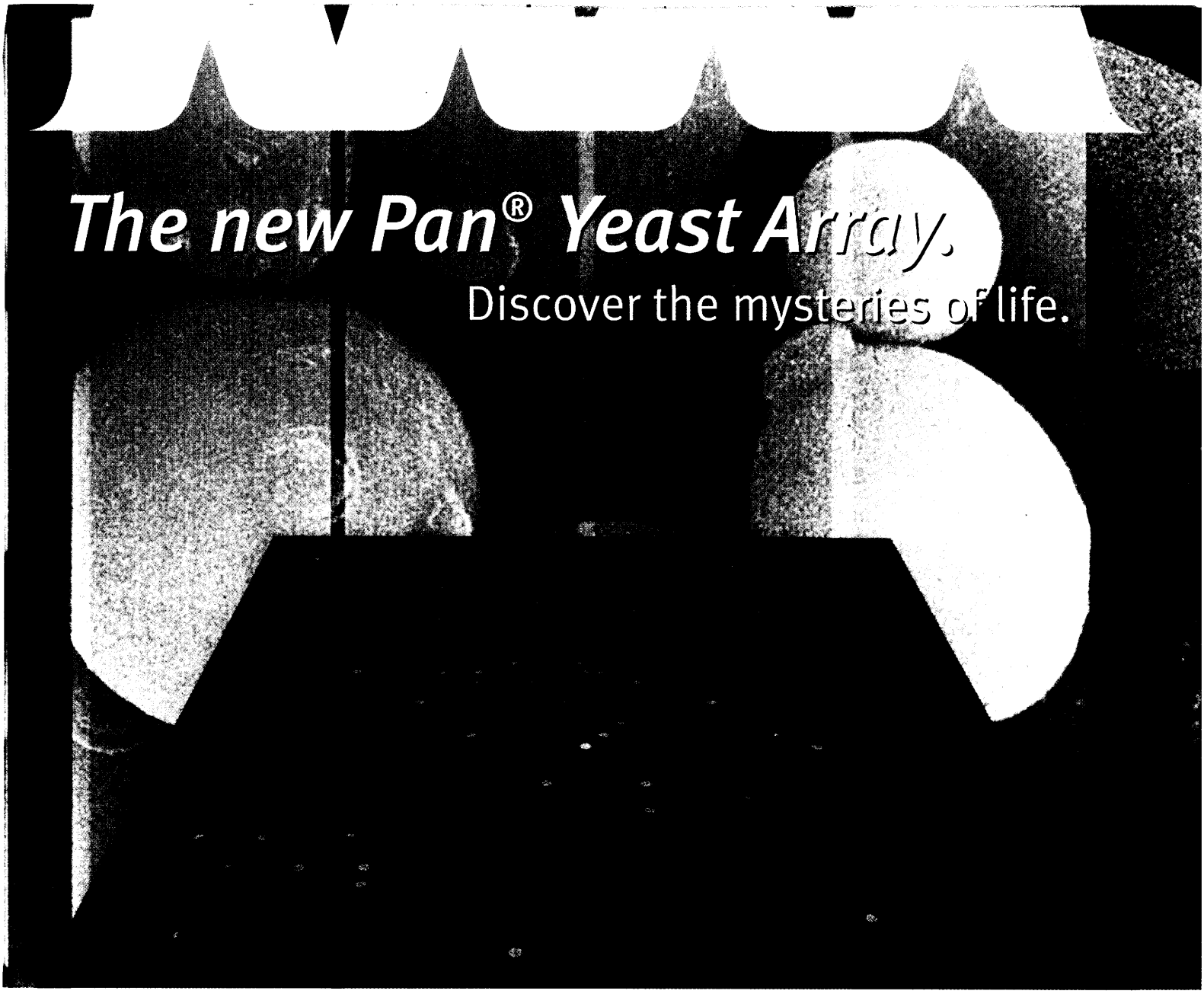

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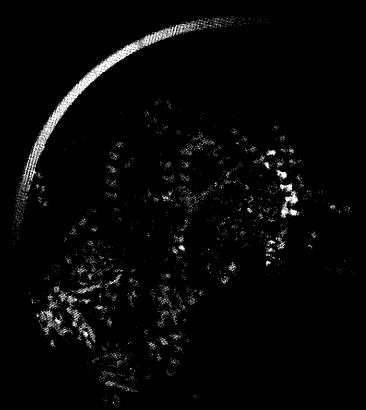

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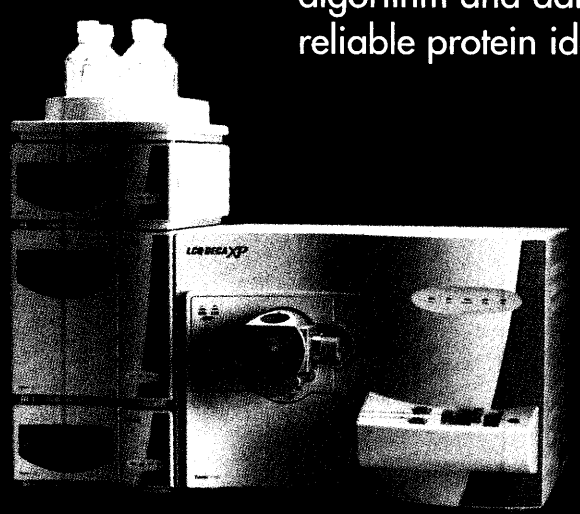

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The Main Event

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This four-day meeting will provide sessions in a wide variety of areas, including functional genomics, sample preparation, structural genomics, strategic alliances, proteomics analysis technologies, proteomics applications, and bioinformatics for proteomics. In addition, IBC promises a collection of exciting keynote presentations: B. Robert Franza, research professor at the University of Washington, will talk about "Creating Biosystematics;" Hanno Langen, scientific specialist at **F. Hoffmann-La Roche AG**, will deliver an "Overview of Sample Prep Today and the Impact of Mass Spectrometry on the Application As It Applies to Proteomics;" Stephen K. Burley, Furlaud professor at the Rockefeller University, will describe "Structural Genomics: An X-Ray Crystallography Approach;" Gunnar Weikert, president and chief executive officer at **Inventage GmbH**, will give a talk entitled "The Way to Success—Deal Making in the Post Genomics Area;" and Scott D. Patterson, senior director at **Celera Genomics**, will explain "Analyzing the Human Proteome."

To register or for more information, contact meeting coordinators at website http://www.lifesciencesinfo.com/proteomics or by telephone at 508-616-5550. For information about available sponsorship and exhibiting opportunities, contact Sherry Johnson by e-mail (sjohnson@ibcusa.com) or at 508-616-5550 extension 451.

ver stain, and a series of newer fluorescent ones. After staining, investigators can run a gel through a flatbed scanner and then assess the results with specialized software, which detects and documents the collection of proteins from each cellular extract. Companies that provide such systems include **Alpha Innotech**, Amersham Pharmacia Biotech, and Bio-Rad. In addition, **Nonlinear Dynamics Ltd.** recently announced Progenesis, an automated image analysis system that company literature promises will provide "new levels of quantitative reliability."

In explaining the imaging of gels, Walker says, "Relatively speaking, that's the easy part. What really is the clincher here is the image analysis." Bio-Rad provides a system called PDQuest, which is software that can compare 2-D gels. Perhaps surprisingly, such software starts by determining what is a protein spot and what's an irrelevant smudge. Nevertheless, comparing one gel to another will probably form the foundation of this work. For example, an investigator might compare gels from a control and a disease state, and look for changes in protein levels. Walker adds, "I think the days of just looking for pluses and minuses have gone. Now, there has to be some semiquantitative measure as well. You can then go back to the gels, take out the spots that changed, and identify them."

Identifying the proteins depends on mass spectrometry, which analyzes spots after chemical digestion of the proteins. In very general terms, a mass spectrometry instrument includes two distinguishing features: the type of ionization that it uses and the form of mass analysis. In present instruments, proteins get ionized with either matrix-assisted laser-desorption ionization or electrospray ionization. Various forms of mass analysis exist, including quadrupole and time-of-flight. Then, software systems compare data from a single protein spot with properties of known proteins, and an exact match or identification can be made. Many companies supply these systems. For example, Applied Biosystems—along with its partner **MDS-SCIEX**—and Bio-Rad's alliance partner **Micromass** offer a broad line of mass spectrometers.

"Mass spectrometry is the most important detection technique for proteomics purposes," according to Johnson of Amersham Pharmacia Biotech. He adds that manufacturers improved the ability of mass spectrometers to ionize larger molecules throughout the 1990s, and those improvements allowed the identification of peptides and proteins. Moreover, different kinds of mass spectrometers can be joined, one after the other, to distinguish finer details that characterize a protein. This process can reveal a protein's side structures, including phosphorylations or glycosylations. "All of these are very, very important for the functionality," Johnson says, "and change in these is very important for adjustments of functionality within the cell." Nevertheless, unveiling such fine detail takes time. So investigators save this approach for only the most interesting proteins.

A Chip Challenge

In the future, proteins will be studied with protein arrays, or protein chips. Such a device consists primarily of an array of elements—antibodies or antigens, enzymes or substrates, membrane receptors or ligands, or various chromatographic systems—that recognizes proteins of interest. This technology could monitor a cell's metabolism or a response to an external stimulus. Moreover, these arrays will address a wide range of biological and clinical questions.

In part, the breadth of protein chip applications arises from the wide variety of devices that could be created. For example, **Ciphergen Biosystems, Inc.**, is working on a product called the ProteinChip® System. This product will rely on a type of mass spectrometry that uses surface enhanced ProteinChip arrays and laser desorption ionization and time-of-flight detection. In addi-

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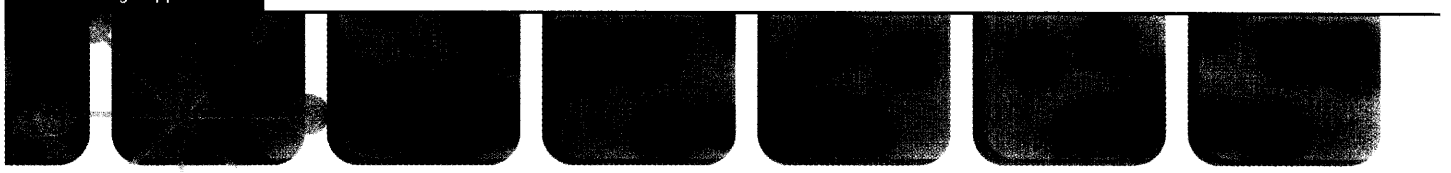

tion, it will come in two general configurations. One version, an expression profiling chip set, includes a variety of chromatographic surfaces that capture a wide range of proteins. William Rich, president and chief executive officer of Ciphergen, says, "You can think about this as a miniaturized, multidimensional chromatographic process implemented on biochip surfaces, combined with online mass spectrometric detection. We're looking at the molecular weight readout." The second version of this product includes high affinity, biochemical surfaces that will be used to explore protein interactions by way of antibodies, receptors, and so on, which are bound to the surfaces. This version also provides direct molecular weight detection of the antigens.

Beyond identifying proteins, these chips will also provide quantitative comparisons between samples. Rich says, "It gives us a broad, medium resolution look at the proteome. We can see which areas are tending to over or under express, relative to some normal state." Equally important, investigators can do this fast—collecting differential expression sets in just a few hours. Moreover, this technique requires only a very small sample. For instance, Rich and his colleagues needed only about 1,000 cells to get a full expression profile of some types of cancer tissues. Rich concludes: "We think that enabling a biologist at the benchtop to do his own protein work at a much more sophisticated level is going to open up discovery in a new way, by scaling the biologist as opposed to simply scaling data."

Increasing Throughput

The variety of technologies used in proteomics prove valuable, but also defiant. Scientists spent considerable time and effort arranging a collection of dissimilar instruments. They also fought to make each process move along as fast as possible, in hopes of making some dent in a mountain of proteins. In many cases, these challenges demanded integration, or creation of systems that worked together. The development of such high throughput systems will certainly simplify life at pharmaceutical companies that sort thousands of proteins in search of therapeutic applications.

As an example, **Oxford GlycoSciences** created a system that separates, detects, quantifies, and identifies proteins expressed in clinical material. This integrated system is used in the company's high throughput data factory to pick out proteins that could offer important clinical value, such as proteins on the surface of a tumor that could be targets for immunotherapy. According to Raj Parekh, this company's chief science officer, they already identified interesting membrane protein antigens that they are pursuing in collaboration with **Medarex, Inc.**, which has human monoclonal antibody technology. Oxford GlycoSciences also used its system to identify a compound that is now in late-stage clinical testing against Gaucher's disease. Parekh explains, "We are very protein focused, because it is the molecular layer in the body at which disease processes take place, are sustained, can be measured, and can be treated."

In many cases moving along developments in proteomics requires robotics. Many robotic systems perform various functions and can be designed and programmed to meet specific laboratory needs. For instance, **Zymark Corporation** makes a modular system of robotics, computers, and hardware that can be modified to perform many tasks. Other companies also create automated systems. Mario Genero, research and development director for **GEMA**, says, "Our proteomics robotic platform is a completely integrated system based on direct protease digestion of complex samples from laser capture microscopy and identification by electrospray ionization and two stages of mass spectrometry. The sample management and automated mass spectrometry acquisition have been combined with powerful bioinformatic tools and have been successfully tested on human occlusive artery, or coronary, disease." In addition, Bio-Rad, in alliance with Micromass, offers The Proteome Works™ System—an integrated package of devices that start with sample preparation and carry it through mass spectrometry identification. Walker says, "The key issue is the integration, being confident that you're going to be able to move from one environment to another without having to change things."

Dealing with the Data

As all of the stages of bioinformatics pick up speed, proteomics produces massive amounts of data. To store, sort, and study so much information, many investigators rely on considerable computing power and the techniques of bioinformatics. This field uses software to analyze information about sequences of DNA or proteins by comparing it with databases of molecular information. As you might imagine, scientists in this field require a good working knowledge of biology and extensive capabilities in programming and mining databases. Some bioinformatics packages come from individual investigators, and others arise from companies, including Amersham Pharmacia Biotech, Applied Biosystems, Bio-Rad Laboratories, and **Incyte Genomics**.

When asked about the current state of bioinformatics for proteomics, Christopher Hogue—who works as a research scientist in bioinformatics at Samuel Lunenfeld Research Institute of the Mount Sinai Hospital and as the chief information officer for **MDS Proteomics**—indicates that many packages exist to analyze the output from mass spectrometry, but he adds that most of them simply supply a graphical user interface and still require a human interpretation of data. Nevertheless, he notes that some packages do more, including comparing mass spectrometry and genomic information for a protein. He adds: "We've been focusing quite a bit on the analysis of interaction data—molecular interactions, pathways, complexes, and pair-wise interactions." Related to that work, he and his colleagues recently released their Biomolecular Interaction Network Database, which they made available, along with the source code, for anyone who wants to contribute to this project.

Hogue's work at MDS Proteomics also involves bioinformatics. He describes this company's work by saying: "Rather than selling databases, we want to take it to the next step. We have a capability of producing targets that we deduce from analysis of proteomics, all the way to lead compounds. So we're actually trying to create a new kind of drug discovery company."

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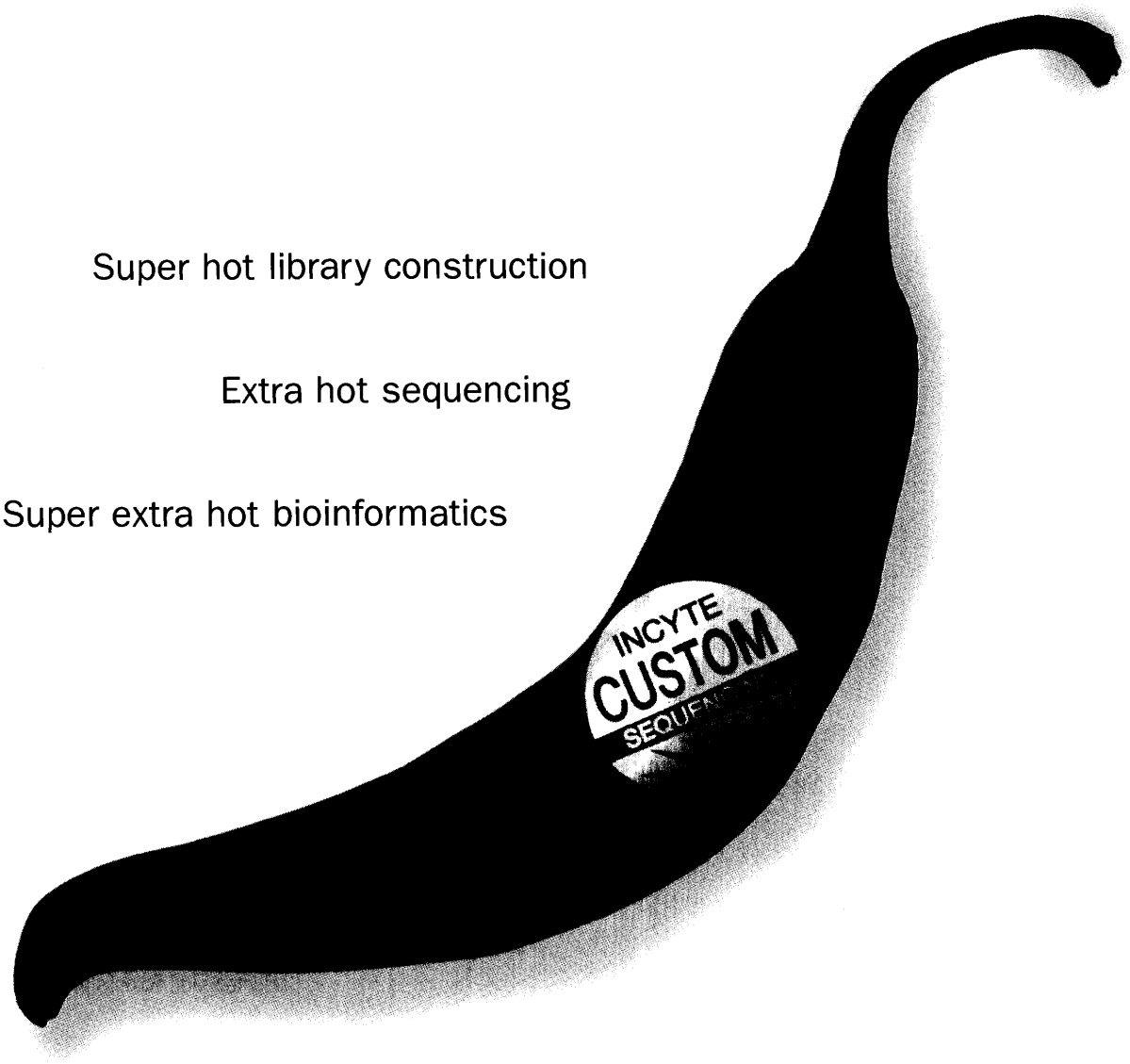

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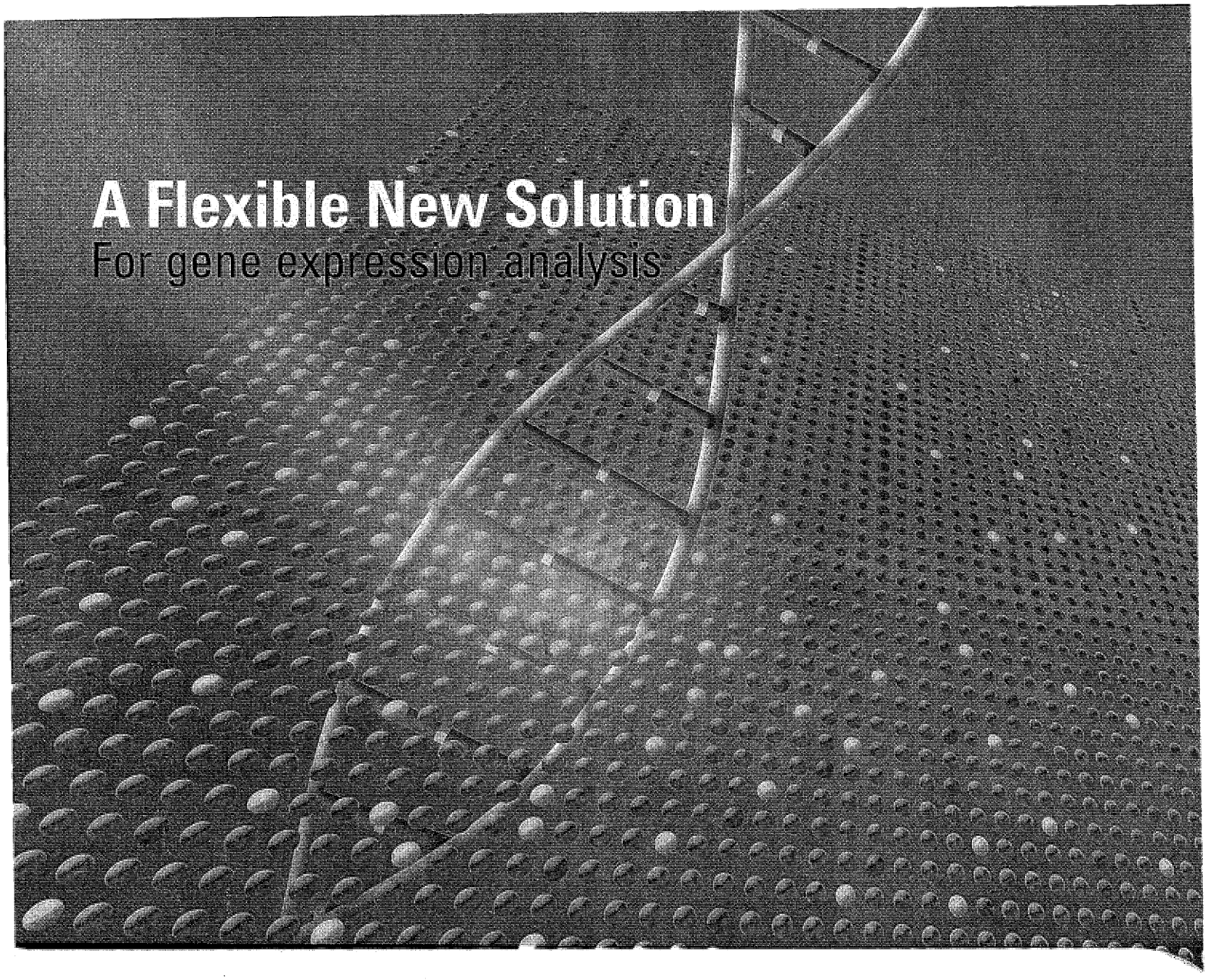

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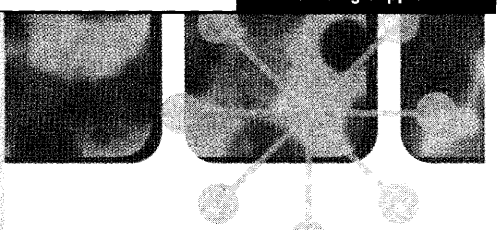

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Note: Readers can find out more about the companies and organizations listed by accessing their sites on the World Wide Web (WWW). If the listed organization does not have a site on the WWW or if it is under construction, we have substituted its main telephone number. Every effort has been made to ensure the accuracy of this information. The companies and organizations 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.

Mike May is a freelance writer based in Clinton, Connecticut, U.S.A.
Gary Heebner is president of Cell Associates, a scientific marketing firm in Chesterfield, Missouri, U.S.A.

Such work, though, demands enormous computing power, and MDS has that: a total of 700 teraflops of computing power—or 700 trillion floating point operations per second—thanks to a recent investment from **IBM**. Hogue indicates that this work necessitates such incredible computing power, and then adds, "It's going to prove to be a very computer-intensive world to get from proteomics to therapeutics."

The need for such computing breadth pulled a variety of companies into this area. Some of these providers even offer their software services over the Internet, which eliminates the need for a laboratory to own high powered computers and the software to perform these comparisons. Internet based providers include **Bionavigator**, Incyte Genomics, and **Z3OnWeb**.

A Proteomics Future

With everything going on in proteomics, scientists can expect this field to continue advancing rapidly. The accumulation of more data and more robust techniques for analysis will surely push this field in many directions. In all likelihood, though, proteomics will really change the world of medicine.

Last January, for example, the Large Scale Biology Corporation announced a big step toward enhancing the power of proteomics with their Human Protein Index. Anderson explains, "We began working on this project about 20 years ago. [It] is a survey of the abundance of major proteins in 157 different human tissues." By using this information, Anderson and his collaborators at **Biosite Diagnostics** plan to make 2,000 to 5,000 high affinity antibodies to proteins that could provide diagnostic and therapeutic advances. Such antibodies could provide the content for protein chips. Anderson says, "If possible, we intend to find markers of every tissue. These are early days, but that's the direction that we're going."

As the people and companies described here reveal, proteomics promises many new tools and techniques. Anderson says: "You can envision, in the far future, having a catalog that includes an antibody to every human protein that there is. That would be a mighty interesting day!" ▩

astex TECHNOLOGY

Astex Technology Ltd is a fast-growing biotechnology company developing High Throughput X-ray Crystallography (HTX™) for the discovery of novel small molecule therapeutics.

Bioassays-Group Leader **(Ref: B-GL01s)**

A senior PhD/post doctoral-level bioassay scientist is required to establish and lead a bioassay team. Key accountabilities will be to define bioassay progression paths that complement the X-ray crystallography-based lead generation strategy, and to establish novel bioassays capable of profiling low-complexity drug compounds.

Protein NMR/Biophysics-Group Leader **(Ref: PB-GL01s)**

PhD-level biophysicist required to set-up and lead a protein NMR facility with a particular focus on protein/ligand interactions. Expertise with other biophysical techniques for protein characterization is highly desirable. A background in pharmaceutical research would be ideal.

Structure-based Medicinal Chemistry-Group Leader **(Ref: MC-GL02s)**

A senior medicinal chemist with several years' industrial experience in structure-based drug design is required to lead a medicinal chemistry team. The Group Leader will be responsible for the development of novel leads based on X-ray crystallographic screening of low-complexity drug compounds.

Molecular Biologist **(Ref: MB-01s)**

A PhD-level molecular biologist with experience in gene cloning, mutagenesis and expression is required for recombinant protein production. Familiarity with high-throughput methods is highly desirable, and knowledge of protein engineering or laboratory automation would also be valuable.

Patent/Information Scientists **(Ref: PS-01s)**

Research scientists interested in moving away from laboratory-based research but keen to use their scientific expertise are required for IPR portfolio management and to assist with patent drafting. Previous experience of information services is desirable. You should have a background in biology, chemistry, computational science, or a related discipline.

The salary and benefits package, including stock options, will be highly competitive. Please send CV, quoting reference number, to Ms Nicola Lawrence, Astex Technology Ltd, 250 Cambridge Science Park, Milton Road, Cambridge, CB4 0WE, UK.
Tel: +44 (0)1223 226200, e-mail info@astex-technology.com or see www.astex-technology.com for further information. The closing date for applications is 30th April 2001.

Careers in Pharmaceutical and Biopharmaceutical Organisations

Modern pharmas invariably rely on collaborative projects to complement their internal research. As a result, scientists who want to work in drug discovery have plenty of career options.

BY PETER GWYNNE

Aventis Pharmaceutical · Bayer AG · F. Hoffmann-La Roche Ltd
Novartis Pharmaceutical · Serono Institute

The consolidations that have transformed the pharmaceutical industry in the past five years have had the desired effect of improving the efficiency of individual drug firms. But the rate at which pharmas have grown in size pales beside the acceleration of relevant scientific knowledge during the same period. Combinatorial chemistry, genomics, proteomics, and the technologies that enable them have developed at an extraordinarily rapid rate, far outpacing individual companies' efforts to keep up with them.

"The concept of big pharmas that you can lead in all phases of drug discovery is no longer true," says Tim Wells, head of discovery for the Geneva, Switzerland-based Serono Institute. "Despite our size it's clear that the scientific community at large is several orders of magnitude bigger than us," adds Paul Herrling, head of research for Novartis Pharmaceutical based in Basel, Switzerland. "Technologies and discoveries will emerge with a higher probability in the rest of the world than in our own laboratories."

To capture the broad range of research necessary to maintain their drug pipelines, large pharmas are increasingly turning to research collaborations – with academic departments, biotechnology companies, technology vendors, and even other pharmas. "Go back 15 to 20 years and the pharmaceutical industry was largely pharmacology and chemistry," points out Jonathan Knowles, head of global research for F. Hoffmann-La Roche Ltd., also headquartered in Basel. "That has changed completely. This increasing complexity makes collaborations of growing importance."

By helping to identify key new areas of R&D fast, alliances can give pharmas a market edge in an increasingly competitive industry. "To reach

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

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Roche

Pharmaceuticals

Bioinformatics Opportunities at the Roche Center for Medical Genomics

Who we are
Headquartered in Basel, Switzerland, Roche is one of the world's leading research-oriented healthcare groups in the fields of pharmaceuticals, diagnostics and vitamins. Roche's innovative products and services address needs for the prevention, diagnosis and treatment of disease, thus enhancing people's well-being and quality of life.

The Roche Center for Medical Genomics is a new, independent research center located in Basel, dedicated to advancing our understanding of the molecular pathology of major human diseases and translating research findings from genetics and genomics into new diagnostic tests and innovative treatments. Research at the Center will concentrate on:

- Genetics, as a basis for understanding gene functions and the role of genes in disease
- Bioinformatics, for efficient use of new scientific data and intelligent decision making
- Functional genomics, as a basis for developing medicines and diagnostic tests for integrated healthcare products that address patients' needs

We are a dynamic, growing, collaborative organization with a strong focus on harnessing the power of genetics, bioinformatics and computing for innovative scientific discovery. The Informatics Department of the Roche Center for Medical Genomics invites applications from qualified candidates for the following challenging positions:

Group Leader, Data & Application Management
You will provide leadership and line management for bioinformatics data management, application development and systems design to support genetics and functional genomics. You should have an MSc in computer science or a related field and at least 4 years' experience in scientific computing, with expertise in LIMS, GUI, Unix/NT, Java, VB and Oracle. Strong managerial and organizational skills are essential.
Job Code: GL

Senior Bioinformatics Engineer
You will develop and implement applications for automated data acquisition, analysis and visualization to support genetics and functional genomics. You should have an MSc in computer science or biology and at least 3 years' practical experience in scientific programming (Unix/NT, VB, Java, XML, Oracle). Job Code: SB

Database Architect/Developer
You will design databases and provide implementation and integration support for all informatics projects and activities. You should have a BSc in computer science and 4 years' database programming experience (Java, JDBC, SQL). Experience in architecting and developing large transactional databases (Oracle), as well as a thorough understanding of OO and ER design techniques are essential. Job Code: DA

Group Leader, Genetics & Genomics Computing
You will provide leadership and line management for bioinformatics tool development, data mining and data integration to support genetics and functional genomics. You should have a PhD in biology and at least 4 years' experience in sequence analysis, SNP discovery, expression profiling, pathway analysis, as well as practical scientific programming experience in a drug discovery environment. Strong managerial and organizational skills are essential. Job Code: GG

Senior Bioinformatics Scientist
You will lead data mining, application prototyping and data integration to support genetics and functional genomics. You should have an MSc or PhD in bioinformatics or biology, with at least 2 years' experience in sequence analysis, expression profiling and pathway analysis. Expertise in VB, Java, XML and Oracle would be very desirable. Job Code: BS

Who to contact
If you wish to be considered for one of the above positions, please send your résumé and a covering letter to: F. Hoffmann-La Roche Ltd, Mr Werner Aschwanden, PSPB, Building 52/205, P.O. Box, CH-4070 Basel, quoting reference: As4203.

NOVARTIS

Novartis Pharma Research, Basel, Switzerland offers a

Post-doctoral position in
Protein Chemistry, Structural Biology, Cancer Therapy

Novartis is a world leader in healthcare with core businesses in pharmaceuticals, consumer health, generics, eye-care and animal health.

As part of the Oncology Research Department, we are offering a position for a qualified and highly motivated protein biochemist/structural biologist. The Department offers a complete, state-of-the-art infrastructure, with all technologies and required reagents available internally to persue the project.

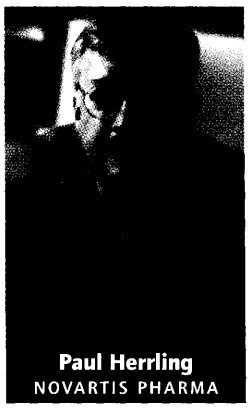
The successful applicant will work within the Programme which previously identified Glivec®, an acclaimed kinase inhibitor which displays extremely promising efficacy in Phase II clinical trials. The project is to study the structural biology of one of the key enzymes involved in intracellular signalling pathways and which is inhbited by Glivec.

For this challenging job in a highly competitive field, we are looking for a skilled person, with a good theoretical understanding of protein kinases. The candidate should have a strong background in biochemistry, molecular biology (site directed mutagenesis) as well as solid practical experience in baculovirus expression as well as crystal grade protein purification.

We are offering this position with a competitive salary for 18 to 36 months, in a stimulating interdisciplinary environment of molecular biology, biochemistry, structural biology and drug discovery, together with excellent connections to leading academic institutions.

Applications with full CV and references should be sent to:

Novartis Pharma AG
Human Resources
Mr. René Zbinden, Ref. 1641
CH-4002 Basel, Switzerland
E-mail: rene.zbinden@pharma.novartis.com



Paul Herrling
NOVARTIS PHARMA

our strategic goals we have to increase our productivity," says Wolfgang Hartwig, executive vice president and head of global pharmaceutical research at Bayer AG in Leverkusen, Germany. "You really need a competitive edge right from the beginning. You can't fool around waiting for something to happen."

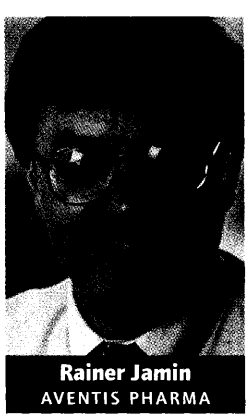
Alliances are not restricted to fundamental studies. "Research collaborations go along our entire value chain," explains Günther Wess, senior vice president, R&D for Aventis Pharma, Germany and a member of Aventis's global R&D management team based in Frankfurt. "They are important for exploratory research and also at the later stages in which we have partners with whom we develop new compounds."

IMPACT ON EMPLOYMENT

The growth in research alliances will have an impact on pharmas' hiring practices. Scientific skill remains the foundation for new recruits. But the ability to work with scientists from different disciplines and other corporate cultures plays a role in the selection process. "We search for and identify potential candidates according to our company strategy of networking, collaboration, and knowledge sharing," explains Rainer Jamin, Aventis Pharma's senior vice president, human resources and head of R&D human resources in Frankfurt, Germany, and Bridgewater, New Jersey.

Jamin's bilateral base indicates a fundamental fact about modern collaborations: They have no geographic boundaries. Thus, corporate recruiters put international experience high on their list of requirements for applicants. "We look for colleagues with some global experience," explains Matthias Schuster, senior vice president of human resources in Bayer's health care and consumer care division in Leverkusen. "We want people who have spent perhaps six or 12 months abroad. Candidates should know at least one country in addition to Germany."

Thus, while this report focuses on collaborations and their effects on employment opportunities in Europe, the issue is a universal one. "There's not very much difference between Europe, the U.S., and Japan," says Knowles. "The point of contact for any disease-related or technology-related collaborations will be where the expertise is in Roche. The global perspective is very important on that point."



Rainer Jamin
AVENTIS PHARMA

Indeed, the characteristics that employers seek in scientists who will participate in research collaborations with external partners differ little from those required of any scientist. "In both academe and industry it's becoming increasingly difficult to make a major impact without the ability to collaborate across disciplines," says Knowles. "Most major scientific papers now involve several groups around the world. This is the nature of biology and medicine. Scientists of the future must be able to collaborate."

Of course, research collaborations and alliances can go wrong. Cultural differences between partners. Overreliance on a partner to make the key advances. The "not invented here" syndrome that belittles any research not carried out in the corporate research laboratories. Poorly written contracts that lack specific goals and milestones. Excessive adherence to the legalities of partnerships rather than the science they are designed to stimulate. All these factors can lead to disappointment on both sides of a partnership.

Nevertheless, most pharmaceutical and biopharmaceutical companies based in Europe have found that the positives of collaborations far outweigh the negatives. "I don't see any negative aspects if you do research collaborations in the right way," says Bayer's Hartwig. "Our strategy involves developing Aventis into the most collaborative company in the world," adds Jamin. "We aim to develop a collaborative mindset across our work force."

NUMBERS TELL THE TALE

Numbers illustrate the extent of that mindset in European pharmas. Aventis, for example, devotes 15 percent of its discovery budget to alliances, a proportion that is increasing. For Roche the present figure of 12-15 percent is also increasing. Serono currently spends less than 20 percent of its R&D funds on partnerships. "But we aim to reach 40 percent external by 2005," says Wells. "While internal research is growing, external is growing much faster." Bayer and Novartis Pharma, meanwhile, already devote more than one-quarter of their research budgets to collaborative efforts, with figures of 25 to 30 percent and 28 percent respectively.

Pharmas don't go into partnerships willy-nilly. Bayer, for example, looks for collaborations "if we see a gap in our technology or a new technology," says Hartwig. "We analyse and monitor, very carefully, technologies that come up. We have international technology managers for each field." Roche's Knowles makes a similar point. "We look for things we need but can't possibly do ourselves," he explains. "An example is our collaboration with Decode of Iceland, which has been extraordinarily successful in identifying genetic risk factors in common diseases."

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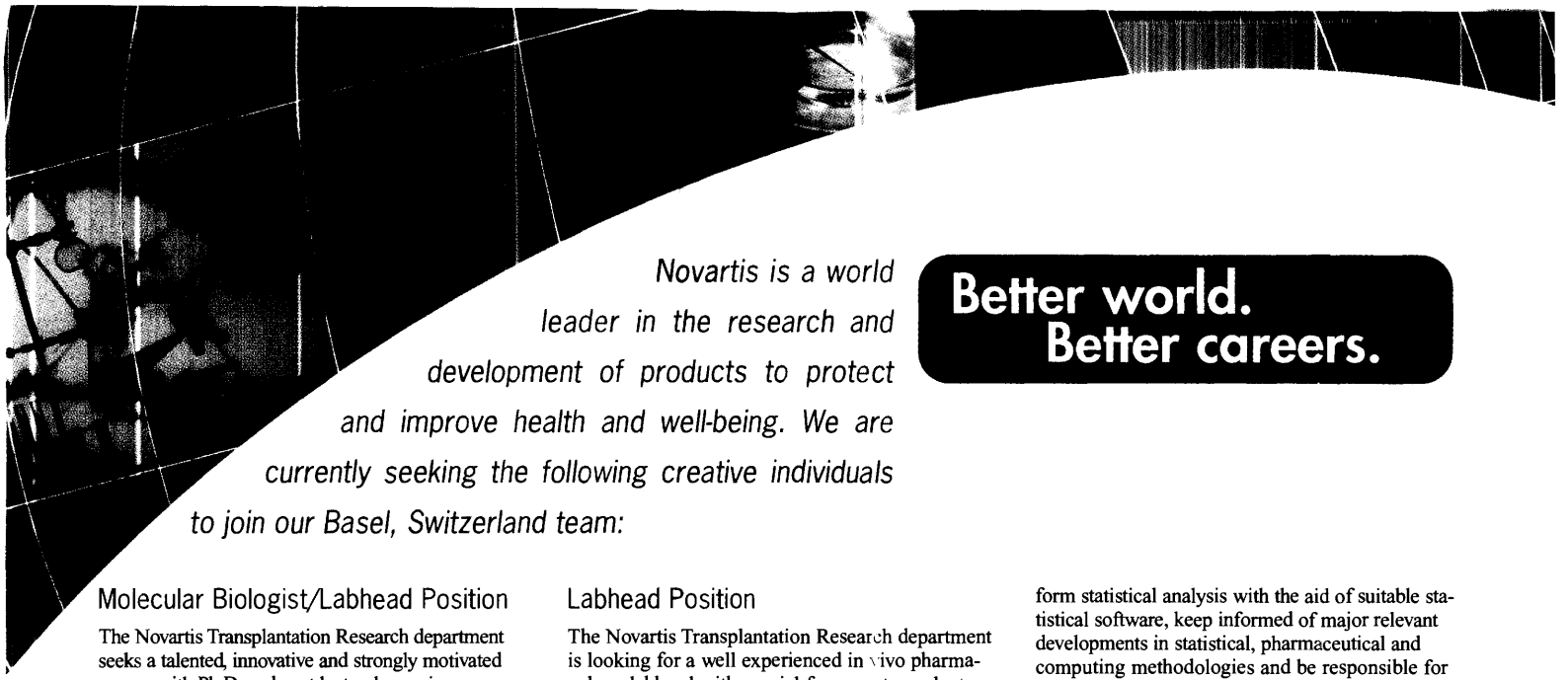
A Collection of Collaborations

Research alliances come in all types. Here's a list of selected partnerships that involve companies featured in this report.

- **Aventis Pharma, Germany:** Ludwigshaven Hospital; Millennium Pharmaceuticals, Inc.
- **Bayer:** Affymetrix; LION Bioinformatics; Millennium Pharmaceuticals, Inc.; Morphosys; Oxford Glycoscience.
- **Novartis Pharma:** Celera Genomics; Dana Farber Cancer Institute; EVOTEC BioSystems; Incyte; Zürich Polytechnic.
- **Roche:** Affymetrix; Carl Zeiss; Decode; Morphosys; Pharmacopeia; Tularik; Vernalis.
- **Serono:** EVOTEC BioSystems; Oxford Asymmetry; Powder Jet; Vertex.

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



Novartis is a world leader in the research and development of products to protect and improve health and well-being. We are currently seeking the following creative individuals to join our Basel, Switzerland team:

Better world. Better careers.

Molecular Biologist/Labhead Position

The Novartis Transplantation Research department seeks a talented, innovative and strongly motivated person with Ph.D. and postdoctoral experience as well as proven publication record. Background and interest in molecular immunology research are a strong plus in addition to general molecular and cell biology technical expertise.

The candidate should have excellent personal skills to interact with a group of multidisciplinary scientists in a team setting. Fluency in English and computer skills are required. **(Ref. 207629)**

Programme Team Head/ Records Manager

The Pharma Knowledge Information Management team is looking for an individual to lead an interdisciplinary programme team consisting of laboratory scientists, records, QA managers and IT specialists to specify and globally roll out an Electronic Record Keeping System within Novartis R&D, according to patent, legal and quality requirements.

You must possess an M.S. or Ph.D. in Natural Sciences with several years of laboratory experience or an equivalent degree with professional experience in record keeping; experience in managing global, interdisciplinary projects are advantageous. Additional education and/or basic knowledge in Information Technologies, particularly database technologies (e.g. Oracle, Documentation, Lotus Notes), is a prerequisite for the position. You must be familiar with document formats HTML & XML, as well as with instrument interfacing systems (LIMS). Working experience with commercial chemical and biological information systems (CAS, ISIS, Tripos, GCG, LifeSeq, etc) would be an advantage. Excellent interpersonal and communication skills in English and German (spoken and written) are required. **(Ref. 207244)**

Labhead Position

The Novartis Transplantation Research department is looking for a well experienced in vivo pharmacology labhead with special focus on transplantation research. One major task is the development of new in vivo models to characterize potential development compounds and to explore new therapeutic approaches by animal modeling.

We seek a talented, strongly motivated Ph.D. with at least 2 years postdoctoral experience and a proven track record in therapeutic research. The candidate should have profound in vivo pharmacology experience, preferably in Transplantation/Immunology research. Excellent communication skills in English, both written and verbal, are essential. The candidate will head a research laboratory with technical staff and will collaborate in a multidisciplinary team dedicated to the discovery and profiling of new, innovative therapeutic principles to achieve long term organ graft survival. **(Ref. 207233)**

IT System Engineer

Establish and integrate software systems and architectures for the automation of diverse business processes in the Lead Finding/Drug Discovery environment. You will also be responsible for the design/development of databases, client/server software applications and components. Work will range from conceptual design to actual implementation and operational support.

We are seeking several years of experience in the development of software for Oracle databases. Indepth knowledge of Oracle and Microsoft development tools (C, C++, VB), experience with object oriented design concepts and programming languages, strong abstraction and system design skills, as well as familiarity with various programming techniques will be required. **(Ref. 207245)**

Statistician

The successful candidate will bring statistical expertise and input for the design and analysis of studies, bioassays and experiments. You will perform statistical analysis with the aid of suitable statistical software, keep informed of major relevant developments in statistical, pharmaceutical and computing methodologies and be responsible for the development, maintenance and deployment of a statistical concept. Additionally, you will train and educate for statistic tools, methods and new state-of-the-art procedures; support all sites of Research with these statistical method advice and data analysis.

Requirements include a MSc or Ph.D. in Statistics or Mathematics, minimum 3 years' of professional experience in Biostatistics and the application of biometrical methods and data analysis in a scientific environment. **(Ref. 205171)**

DMS Business Analyst

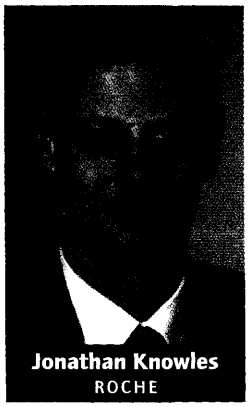
Incumbent will be responsible for product and release management of the Pharma standard document management systems (DMS), technical consulting and operation of the DMS test lab as well as for the contribution on the development and implementation of the Pharma document management strategy.

We seek a Computer Scientist with excellent experience in software engineering and knowledge in document management or Scientist with comparable experience. Experience in the Pharma R/D environment is a must; technical knowledge of Documentum and Adobe is a plus. **(Ref. 207777)**

At Novartis Pharmaceuticals Corporation, we offer excellent compensation and benefits programs that reflect our position as an industry leader. Find out how fulfilling your career can be. To find out more about these challenging opportunities, please send your CV, indicating appropriate reference # and names and addresses of references, to: Novartis Pharma AG, Human Resources, Herrn HP. Rüedi, CH-4002 Basel / Switzerland. For more open positions and to post your resume online, please visit. **www.novartis.com** We are equal opportunity employers M/F/D/V.

NOVARTIS

The Spirit of Discovery


Jonathan Knowles
ROCHE

Speed is important. Companies frequently choose collaborative development over in-house projects because they promise to save valuable weeks and months getting diagnostic tests, drugs, and other therapies to market. "When we know what we want to do we go straight to partners," says Wells.

Having identified the need for a research collaboration, pharmas' executives must then spot the appropriate partner. How? "We do analysis. We know the R&D environment. We do an active search for partners with the help of business development and our new technology group," explains Aventis Pharma's Wess. Pharmas can sometimes manage without a search procedure. "Because we are known as a major partner in industry we get literally hundreds of unsolicited proposals every year," says Herrling of Novartis. "By sifting through these opportunities we try to catch the unexpected."

Identifying potential partners represents just a start. Collaborators need to apply due diligence before they sign collaborative agreements. "We have a checklist that we have developed by asking about the key components that have been responsible for success or failure in the past," says Herrling. "Emotional chemistry is the key. If that doesn't work, we don't start." Knowles echoes that point. "A certain amount of good personal chemistry is required," he says. "It's difficult to collaborate with people who are very secretive; we look for a certain degree of openness. We also like to work with groups who set themselves tough goals."

Once they agree to collaborate, companies must devise agreements that lay out the targets of the partnership. "The collaboration must be a win-win situation for our partner and us," says Wess. "We have to be competitive so that we can meet milestones. We need the right balance between what we do and what our partner does." Adds Hartwig: "We need quantitative goals and a clear-cut commitment from the partner, who must also have a clear business point of view."

FORMS OF COLLABORATION

Within those criteria, research alliances can take several forms. Collaborations with technology vendors have taken on growing importance as new techniques of biology and chemistry have emerged. "You cannot have the same level of competence in all technologies in a large organisation," explains Knowles. Thus Roche has a significant collaboration with Affymetrix, the Santa Clara, California, manufacturer of DNA chips and microarrays. "They supply one of the technologies that we use in-house to ask questions about differential gene expression and toxicogenomics," he explains.

Alliances of this type frequently involve closer collaboration than is usual in vendor-buyer relationships. Novartis, for example, has worked side by side with German company EVOTEC BioSystems on miniaturized high throughput fluorescence technology. "The entire chemistry was done in our laboratory in Vienna," says Herrling. "We cross-licensed the intellectual property between EVOTEC and ourselves." Similarly genomics company Millennium Pharmaceuticals, Inc., based in Cambridge, Massachusetts, has close collaborations with several large pharmas who rely on its technology platform to produce well-defined disease targets and to configure assays for screening. "We have 10 people actually working at Millennium," says Schuster of Bayer. Aventis Pharma is another partner of Millennium. "In addition to technology transfer and collaborative technology development, we join our efforts in the inflammation portfolio," says Wess. "This collaboration has an impact on various areas. It's very broad-ranging."

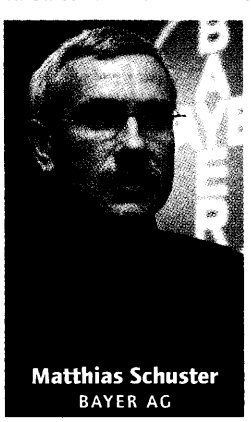
Be sure to read next week's supplement
Careers and Events in Drug Discovery
focusing on opportunities in the US.


Günther Wess
AVENTIS PHARMA GERMANY

European pharmas undertake several smaller collaborations. Novartis's major academic partners include the Scripps Institution of Oceanography in La Jolla, California, Boston's Dana Farber Cancer Institute, the University of Maryland, and the Zürich Polytechnic Institute. Aventis participates in a new type of collaboration that links German biotechnology companies, universities, and hospitals in an effort to determine whether osteoarthritis has a genetic predisposition. Serono has collaborated with Israel's Weizmann Institute for more than 20 years. The biotechnology company has also worked with two Swiss polytechnics and has organized a collaboration with Indian partners worth no more than $300,000.

INFLUENCE ON HIRING

How do research alliances influence European pharmas' hiring of individual scientists and laboratory managers? Partnerships are directly responsible for some jobs. "To process the output of our external research collaborations successfully we need highly competent and well-equipped, in-house 'receiving functions' that relate to all areas of the research process," says Schuster. "About 30 percent of our personnel have been hired to fulfill these needs." Several of those scientists work in the laboratories of Bayer's partners, in order to facilitate technology transfer and to enlarge the company's in-house core competency.


Matthias Schuster
BAYER AG

In other cases, companies seek collaborative skills in all applicants for scientific positions. "One of the things we look for is the ability to work in large interdisciplinary teams. Scientists must be comfortable working with people who are experts in subjects different from their own," says Serono's Wells. "Those are the types of skills you need to work in collaborations. We don't deliberately select people for external collabora-

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Wolfgang Hartwig
BAYER AG

tions, but the qualities that we seek in all scientists help in collaborations."

Aventis Pharma takes the process further. "Scientific skills are a given, but certain behaviours are also important in our hires," says Jamin. "We have developed 'leadership profiles' that determine a couple of success factors and perhaps 50 to 60 behaviours that are really important for us. We use these behaviours more and more in the recruitment process." Similar criteria apply to individuals who apply to Aventis for work in the laboratory. "We have developed an 'individual contributor profile' for bench scientists in which we have the same kind of categories and questions to identify suitable people for a collaborative work environment," he adds.

The fact that a pharma is involved in several research alliances, particularly of the cross-border type, can stimulate applications from the best and the brightest. "We are more attractive when we have more collaborations," says Jamin's colleague Wess. "Scientists like to work in international environments. The fact that we do so gives us some reputation. Young talents like it." Indeed, adds Wells, "People in Serono are used to cross-cultural collaboration. We have sites in Geneva, Boston, Rome, Iphrea, northern Italy, and Tel Aviv."

THE VALUE OF DIVERSITY

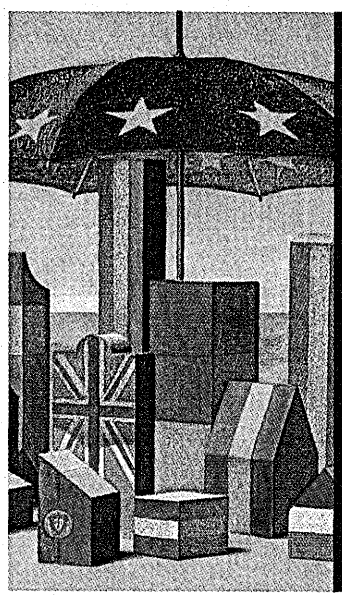
Experience with, and the ability to accept, diversity in the lab has become a major nonscientific requirement for any research job in pharmas, European and worldwide, and in organisations that do and don't participate in large numbers of collaborative ventures. "As a global research organisation with laboratories in Germany, the United Kingdom, the U.S., and Japan, we require scientists to be ready to move outside their home countries," says Schuster of Bayer.

At present Schuster is seeking synthetic organic chemists, particularly with interests in medicinal and combinatorial chemistry, as well as molecular biologists, geneticists, bionformaticists, and pharmacologists. "As an absolute requirement we need highly qualified scientific personnel in all areas," he continues. "In addition, applicants need above average communication capabilities and the ability to work in teams. Straight goal-directed thinking combined with sound implementation skills is of utmost importance. Working in the pharmaceutical industry means actively participating in the company's value-generating chain."

Herrling, from Novartis Pharma, makes a similar point. "The ability to participate in collaborative research is a fact of life for big pharmas," he says. "You have to be able to work in multidisciplinary teams, as any product results from multidisciplinary research. In addition science is extremely multicultural. In my building we have people from 26 different nations. You have to learn to accept all different kinds of diversity. That is a general trait of incalculable importance for internal and external collaborations. Multiculturalism is particularly useful when it comes to finding different approaches to solving problems."

Bayer's Hartwig sums up European pharmas' expectations for future employees. "Most of the scientists here will be involved with collaborative efforts," he says. "It's clearly important at the point of hiring that people know what we expect. Everybody working in our company is part of the value-generating chain. Scientists need to know this and to know how to handle collaborations." "Collaboration is essential and critical," adds Jamin of Aventis. "It is the way we have to go. No company can afford to have all the expertise in the world inside it. We have to see with whom we can best work together to obtain skills that we do not have." ■

Tim Wells
SERONO INSTITUTE



Drug Discovery for Europe

Managers seeking research partners and scientists looking for jobs in pharmas undertaking collaborative work will have an opportunity to meet at Drug Discovery Technology, Europe 2001. The meeting, taking place in Stuttgart's Messe Stuttgart International from April 23 to 26, will feature technology sessions on lead generation and lead optimization, genomic and proteomic technologies, and licensing and IP.

Keynote scientific speakers will include Peter Ringrose, president of Bristol-Myers Squibb; Tom Willkie, adviser in bioethics to Wellcome Trust; Crispin Kirkman, chief executive of BIA, UK; Robert Atwater, director of NASDAQ Europe; and Alfredo Aguilar-Romanillos, head of the Cell Factory in the Research Directorate-General of the European Commission. In addition, more than 80 exhibitors will display their technologies, products, and services.

A new feature of this year's program will be a session on biopartnering opportunities for early-stage start-ups in the life sciences. This session is designed for entrepreneurs who want to set up their own start-ups and scientists and other individuals who want to learn more about the process of building new businesses in life science.

NOVARTIS

Novartis Pharma Research, Basel, Switzerland offers a

Post-doctoral position in
Nervous System Research

Novartis is a world leader in healthcare with core businesses in pharmaceuticals, consumer health, generics, eye-care and animal health.

To support our team working in the area of Neurodegeneration/Regeneration we require immediately a post-doctoral fellow trained in molecular and cellular biology. We have recently begun an exciting activity which aims to characterize and isolate the receptor targets involved in the regenerative processes which take place in the CNS following nerve injury.

The candidate should have a PhD in Biomedical Sciences with at least one year of postdoc experience. He/She must be familiar with state of the art methodology in molecular biology. Good skills in expression cloning techniques are essential. Furthermore, the candidate should also be familiar with the expression and purification of recombinant proteins in bacteria as well as in mammalian cells. A background in Neurosciences would be preferable, ideally in the area of neuronal regeneration. The postdoc will work within a network of different internal groups in Basle and also in the US, as well as together with Prof. Martin Schwab from the University of Zurich/Switzerland, who is a world-wide leader in this field. The contract runs for 18 to 36 months.

We offer a position with a competitive salary in a stimulating interdisciplinary environment.

Applications with full CV and references should be sent to:

Novartis Pharma AG
Human Resources
Mr. René Zbinden, Ref. 1639
CH-4002 Basel, Switzerland
E-mail: rene.zbinden@pharma.novartis.com

BIOMÉRIEUX PIERRE FABRE

JOIN A FRENCH COLLABORATIVE CONSORTIUM AIMING AT IDENTIFYING NEW CANCER TARGETS USING PROTEOMICS

Institut de Recherche Pierre Fabre
Pierre Fabre Médicament

This program has received a grant by the French Ministry of Industry, as part of the post-genomics effort of the French government.

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RÉPUBLIQUE FRANÇAISE

The Centre d'Immunologie Pierre Fabre, part of the BioMérieux-Pierre Fabre Group, in collaboration with the CNRS, the Université Louis Pasteur (Strasbourg), the Université Paul Sabatier (Toulouse) and the Université des Sciences et Technologies (Lille), is setting up a proteomics research program aimed at discovering new targets against cancer. If you are seeking an outstanding opportunity to be on the cutting edge of discovery, join our exciting collaborative project. The following positions are now available for a period of 2 years.

Centre d'Immunologie Pierre Fabre

At the CIPF, scientists are discovering, developing and manufacturing innovative therapeutic biotechnological products that challenge immune-mediated human diseases. The CIPF is located within exceptional scientific and geographical environments with its proximity to Grenoble, Lyon, Geneva and Lausanne.

Staff Scientist, Protein Purification and Characterisation

Candidate will be responsible for sample preparation (protein extraction, sub-cellular fractionation) and protein purification by chromatography (FPLC, HPLC) and electrophoresis. He/She will also be in charge of protein separation by 2D electrophoresis, and data analysis. Ph.D. in Biochemistry with 2 years experience in protein purification and separation is required.

Staff Scientist, Mass Spectrometry

Candidate will be responsible for mass spectrometry analyses of proteins and peptides. He/She will also handle preparation and treatment of acrylamide gels and blot membranes for HPLC, mass spectrometry and sequencing analyses. Ph.D. in Biochemistry with 2 years experience in a proteomics environment is required, as well as strong experience in MALDI-TOF and LC-MS analyses of proteins.

Staff Scientist, Bioinformatics

Candidate will use public and private sequence databases to identify proteins from mass spectrometry and sequencing data. He/She will also be responsible for the development and management of an intranet network : data collection and presentation ; database design and implementation ; and development of interfaces for database query. Good programming skills are highly desirable. Practical experience with database design is required.

Contact : Dr Jean-Yves Bonnefoy, Director of the CIPF (jean.yves.bonnefoy@pierre-fabre.com)
CIPF, 5 Avenue Napoléon III, BP 497, 74160 Saint-Julien en Genevois, France (http ://www.cipf.com)

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ulp UNIVERSITÉ LOUIS PASTEUR STRASBOURG

Laboratoire de Spectrométrie de Masse BioOrganique, LSMBO
UMR 7509 CNRS / Université Louis Pasteur, Strasbourg, France

CNRS CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

The LSMBO - in the newly built School of Chemistry in Strasbourg - is part of the Strasbourg Génopôle. LSMBO activity is focused on the development and use of mass spectrometry for the characterisation of synthetic and biological molecules, and thus is situated at the chemistry-biology interface. Mass spectrometry equipment is composed of MALDI-TOF, Ion Trap, Q-TOF and triple quadruple instruments.

A post-doctoral position, Mass spectrometry and proteomics methods

He/She will be responsible for exploring proteomes of different cancers, and develop mass spectrometry and proteomics methodologies. A strong background in protein chemistry, or biological mass spectrometry, or 2D electrophoresis and bioinformatics experience would be appreciated.

Contact : Dr Alain Van Dorsselaer (vandors@chimie.u-strasbg.fr)
ECPM LSMBO, 25 Rue Becquerel, 67087 Strasbourg Cedex 2, France.

IPBS Institut de Pharmacologie et de Biologie Structurale

Institut de Pharmacologie et Biologie Structurale
UMR 5089 CNRS / Université Paul Sabatier, Toulouse, France

CNRS CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

The primary focus of IPBS is to understand the structure-function relationships of macromolecules of pharmaceutical interest. The two main objectives are : identification and characterisation of new pharmacological targets, determination of the structure of these targets and the understanding of their mechanisms of action. As part of the Toulouse Génopôle, the IPBS is one of the French academic research institutes developing proteomics strategies in the field of cancer.

A post-doctoral position, Mass Spectrometry of Biomolecules and Structural Immunopharmacology

He/She must have a Ph.D. in biochemistry or biology. Experience with micro-purification of proteins and peptides (including protein extraction and sub-cellular fractionation), and 2D electrophoresis is required. Knowledge in biological mass spectrometry would be appreciated.

Contact : Dr Bernard Monsarrat (monsarat@ipbs.fr) or Dr Jean Edouard Gairin (gairin@ipbs.fr)
IPBS CNRS, 205 Route de Narbonne, 31400 Toulouse, France (http ://www.ipbs.fr)

USTL

Unité de Glycobiologie Structurale et Fonctionnelle
UMR 8576 CNRS / Université des Sciences et Technologies Lille, France

CNRS CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE

The LGSM is one of the leading French group in the field of Glycobiology, and is part of the Lille Génopôle. Different research topics focus on the structure-function relationship of glycans. The laboratory possesses facilities in cell-culture, molecular biology as well as in physico-chemical methods (mass spectrometry, NMR).

A post-doctoral position, Glycomic

He/She will be responsible for the identification of cancer-associated post-translational modifications using the proteomic approach. The candidate must have a Ph.D. degree, and experience with glycoprotein purification and carbohydrate biochemistry would be appreciated.

Contact : Dr Jean-Claude Michalski (Jean-Claude.Michalski@univ-lille1.fr)
USTL, Bâtiment C9, 59655 Villeneuve d'Ascq Cedex, France.

R E D
LABORATORIES

R.E.D. Laboratories is a Belgian biotechnology company developing diagnostics and therapeutics for a number of medically important chronic immune diseases including multiple sclerosis, cancer, and chronic fatigue syndrome. We now have employment opportunities for the following skilled professionals:

Manager, Regulatory Affairs

This position requires an individual experienced with the challenges of developing an infrastructure to transform a research and development stage company into a fully functional pharmaceutical concern. You must be able to lead the regulatory strategy for the company, develop and monitor the present QC/QA policies, and interact at the highest levels with the regulatory departments of other biotech and pharmaceutical companies as well as the FDA and the EMEA. The candidate qualified for this position will have a minimum of three years of hands on experience with a substantiated track record of success. *Please indicate Job Code MRA*

Clinical Research Scientist

Responsibilities will include working directly with international clinical teams to design and implement clinical studies, prepare informed consent documents and protocols, coordinate the collection of samples, monitor sample processing and use, assist in the processing of data, and prepare documentation for regulatory approvals. You should have a University degree or higher and direct experience working with clinical investigators. A background in research and/or pharmacology is desired. *Please indicate Job Code CRS*

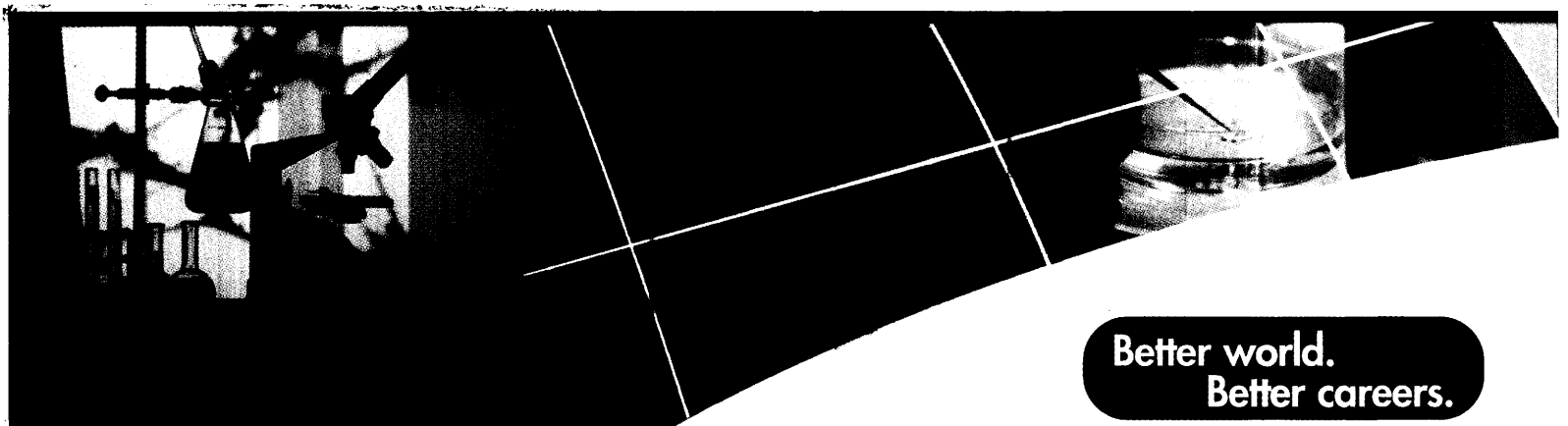
Manager, Laboratory Sciences

The successful candidate will have operational experience in the management of a broad range of laboratory sciences, from handling the analysis of clinical specimens to the development of sophisticated diagnostics, advanced therapeutics, and the preparation and documentation of clinical trials. You will interact with every member of the R&D team as well as the Company s management. Qualified candidates should have an M.S. and five or more years of experience within a biotechnology and/or pharmaceutical company. *Please indicate Job Code MLS*

Scientist, Therapeutics Development

You will work as a member of a growing team to manage the development of high throughput screening assays (HTSA) and early lead profiling for a variety of small molecule compounds. This position requires experience with a number of cell-based assays, such as flow cytometry, as well as having the proficiency to design other assays based on fluorometry, nephelometry, and spectrophotometry. Qualified candidates should have an M.S. or Ph.D. and two or more years experience. *Please indicate Job Code STD*

All the positions above will require the successful candidate to speak a minimum of two languages (one of the Belgian national languages and English). Candidates interested in applying should forward a resume, indicating Job Code, by mail to R.E.D. Laboratories, Pontbeek 61, Zellik, Belgium, or by fax to 00-32-2-481-5311, or by e-mail to **vherst@redlabs.com**. Please visit our web site at **www.redlabs.com** to learn more about our company. R.E.D. Laboratories is an equal opportunity employer.



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Better careers.

FUNCTIONAL GENOMICS

Executive Director - Drosophila Genetics

The candidate will serve as a Unit Head and lead a group of scientists, Ph.D. and non-Ph.D., dedicated to applying Drosophila genetics to the study of human diseases. The group will use Drosophila to elucidate the function of human genes and to define molecular pathways of diseases. Additionally, this individual will lead an active laboratory and play a key role in managing and setting strategic direction for the Drosophila genetics group and for the Functional Genomics Department.

Qualifications include a Ph.D. and at least 10 years' postdoctoral experience. The candidate should have made significant contributions to the field of Drosophila genetics with particular emphasis on the study of disease relevant processes and have a strong record of publications. **Requisition #9678AD**

Scientist - Transgenic Mice

You will be responsible for the construction and characterization of transgenic and knockout mice, DNA cloning, ES cell culture and transformation, production of chimeric mice by blastocyst injection and in situ hybridization.
Qualifications include a B.S. or M.S. in Biological Sciences or a related discipline. Must be able to work as part of a team and have at least 2 years' experience in molecular biology and gene targeting technologies. **Requisition #9524AD**

Sr. Scientist - Bioinformatics

The candidates will be responsible for the design, implementation and utilization of novel algorithms in the fields of functional analysis of genes, genome-wide gene discovery, and expression profiling with large proprietary data sources.

Qualifications include a Ph.D. in either Informatics, Computational Biology, Molecular Biology or a related science. Candidates must have working knowledge of molecular biology and several years' experience in programming on Unix-platforms. Additional experience in relational databases, Web software development or statistics is a plus. Excellent interpersonal skills, communication abilities and experience with multidisciplinary interactions in a team based setting are required. We are seeking candidates to join our Basel, Switzerland or Summit, NJ operations. **Requisition #9324AD**

Scientist - Molecular Genetics

Candidates will carry out molecular biology experiments to identify genes directly affecting disease processes. You will be responsible for isolation of DNA and RNA from cells, and for construction of cDNA libraries for large-scale functional analysis. Large-scale gene transfer technologies, including retroviral vectors and high throughput functional analysis will also be used to identify genes that modify disease pathways.

Qualifications include a B.S. or M.S. and more than 2 years' experience in molecular biology research in industry or academics. The individual should have extensive experience in construction of recombinant plasmids and/or cDNA libraries. Experience in mammalian tissue culture and retroviral vectors is helpful.
Requisition #8258AD

PHARMACOGENETICS/GENOMICS GAITHERSBURG, MD.

Novartis Pharmaceuticals Corporation, a global leader in exploring new frontiers in Life Science is expanding its Pharmacogenetics Department. The Pharmacogenetics Department located in Gaithersburg, Maryland and led by Dr Mihael H Polymeropoulos focuses on the application of genetic and genomic concepts in drug discovery. We seek to recruit highly motivated, creative individuals for the following positions:

Senior Scientists

The successful candidates will manage collaborative projects in therapeutic areas such as Oncology, Metabolic and Cardiovascular Disorders, Arthritis and Bone Metabolism, Nervous System, Respiratory diseases, and Dermatology. Responsibilities will include analysis of gene expression and genotyping data, publishing, and patent application.

Minimum Requirements: Ph.D. + 1 to 4 years' experience in cell biology, biochemistry, human genetics or a related field. Strong knowledge of drug metabolism, signal transduction pathways, and experience in gene expression profiling are a plus. These positions require excellent communication skills and the ability to work efficiently within a team environment. Demonstrated record of scientific publishing desirable. **Requisition #8866AD**

Scientists

The successful candidates will be involved in high throughput genotyping and gene expression profiling, positional cloning of complex disease genes and mutation analysis of candidate genes. Technologies used include general molecular genetics protocols, DNA/RNA extraction, PCR, sequencing and cloning, microarray analysis.

Minimum Requirements: B.S. in Molecular Biology, or related field. Candidates should have excellent organizational skills, be efficient and dependable. Ability to adapt to new technologies and to work in a high throughput and challenging environment is essential.
Requisition #8864AD

Scientific Writer #9562

Minimum Requirements: B.S. in Molecular Biology, Genetics, or related field. Candidates should have excellent organizational and communication skills. Experience in writing scientific reports, publications or patents is essential. **Requisition #9562AD**

Our global commitment of $2.5 billion is advancing science through research.

Enter the world of Novartis Pharmaceuticals. Our dedication to R&D is the driving force powering our pharmaceuticals pipeline. And our pipeline is stronger than ever—connecting the world to breakthrough treatments that help people live longer, healthier lives. Today, we're introducing innovative treatments for an ever-increasing variety of diseases and disorders. From Alzheimer's and epilepsy to cancer and Parkinson's. And you could be an integral part of the innovation.

With a global investment of $2.5 billion, we're assembling leading-edge research teams from a broad spectrum of specialties including Functional Genomics, Pharmacogenetics, Oncology, Arthritis and Bone Metabolism, Metabolic and Cardiovascular Disease, Transplantation, Central Nervous System and Infectious Disease. Join our Summit, NJ operation, work with experts in both New Jersey and Switzerland and be the key to tomorrow's discoveries.

ONCOLOGY

Scientist - Chemistry

Selected individual will be responsible for the design, synthesis, purification and characterization of appropriate quantities of novel chemical entities in support of various cancer drug discovery programs. Incumbent will also interact with an interdisciplinary team of scientists in oncology research as well as several other therapeutic areas.

Qualifications include a B.S. degree in Chemistry with 5 years' related industrial experience in organic or medicinal chemistry, or an M.S. degree with 3 years' of related industrial experience in organic or medicinal chemistry. Must possess chemical synthesis expertise as well as experience in modern separation techniques, compound analysis and chemistry related computer software. **Requisition #8164AD**

ARTHRITIS AND BONE METABOLISM

Sr. Scientist - Medicinal Chemistry

Incumbent will be responsible for the design and synthesis of novel organic compounds as potential drugs within the Arthritis and Bone Metabolism Research area. Additionally, you will participate on multidisciplinary program teams and supervise a medicinal chemistry lab including 1-2 chemists.

Qualifications include a Ph.D. in Synthetic Organic Chemistry with at least 2 years' of postdoctoral experience. Additional experience in bioorganic chemistry, computer modeling, medicinal chemistry or combinatorial chemistry would be useful. **Requisition #9700AD**

Scientist - Medicinal Chemistry

You will provide medicinal chemistry support for drug discovery programs operated by Arthritis and Bone Metabolism therapeutic area. Additionally, you will perform organic synthesis experiments and purification procedures, use standard organic chemistry laboratory techniques or new methods to obtain pure characterized compounds for biological evaluation. In addition state-of-the-art tools and high throughput synthesis robotics will be utilized as appropriate.

Qualifications include a B.S. degree in Chemistry; M.S. in Organic Chemistry preferred. Minimum 2 years' experience in the synthesis and characterization of organic compounds, experience with common spectroscopy (NMR, IR, UV, MS), chromatography purification systems and analytical techniques required. **Requisition #8766AD**

METABOLIC AND CARDIOVASCULAR DISEASE

Sr. Scientist - Lab Head

The Pharmacology unit of Metabolic and Cardiovascular Diseases Research is seeking a highly qualified life scientist with demonstrated evidence of creativity and the desire and ability to contribute to innovative drug discovery programs in the metabolic diseases area, with particular focus on type 2 diabetes and obesity. Incumbent will be expected to possess the relevant in vivo and ex vivo pharmacology skills necessary to validate animal models of diabetes, to effectively profile new candidate drug molecules, and to interpret and translate the therapeutic relevance of findings in a multidisciplinary program team setting.

Qualifications include a Ph.D. in one of the life sciences, with expertise in in vivo physiology or pharmacology and at least 4 years' postdoctoral experience gained in a cutting-edge environment. Must possess a demonstrated record of creativity and achievement, evidenced by a high-quality publication record and peer-group recognition, and a strong desire to apply this background to contribute to drug discovery for metabolic diseases (particularly type 2 diabetes). Particular consideration will be given to candidates with demonstrated expertise in primate models. **Requisition #8826AD**

Scientist II/III

The primary responsibility of this position will be the performance of in vitro molecular and cellular biology experiments in support of drug and target discovery programs. Incumbent will be required to plan experiments, record data, prepare data summaries and reports, present results at internal meetings and collaborate effectively with external scientists. You will also operate and maintain laboratory equipment (including an ABI 377 DNA sequencer), employ methods such as cell culture, DNA cloning, DNA transfection, heterologous expression (including mammalian and baculovirus/insect cell methods), PCR, bioinformatics, and assays to advance research goals.

Qualifications include significant and broad experience in modern molecular biology; this experience will be demonstrated by a suitable academic degree (M.S. in Biological Science or Biochemistry), and by contributions to the scientific literature. **Requisition #9707AD**

CORE TECHNOLOGIES - ANALYTICS US

Sr. Scientist NMR - Lab Head

Incumbent will head the analytical NMR laboratory and will be responsible for supervising the work of Master/Bachelor level NMR personnel as well as be expected to apply a variety of state-of-the-art NMR-based techniques to support drug discovery and development efforts. Additionally, you will maintain a high standard and quality of both core services and open-access NMR services, and provide leadership by keeping the analytical NMR area current with modern trends in the NMR field that are relevant to the NMR laboratory's function.

Qualifications include a Ph.D. in Chemistry or a related field, 3+ years' managerial experience in an industrial drug discovery setting and extensive hands-on experience using NMR for structure elucidation of small molecules. A broad knowledge of NMR techniques, such as LC-NMR, MAS-NMR, and high-throughput NMR and their application is highly desirable. **Requisition #8803AD**

Scientist NMR

Incumbent will perform NMR structure determination using 1-2D NMR techniques, use LC/NMR and MAS NMR to solve structural problems and maintain NMR instrumentation.

Qualifications include a B.S. degree or equivalent in Chemistry or related field. Must possess minimum 2 years' experience, working knowledge of Bruker NMR instrumentation and knowledge of multidimensional NMR. Knowledge of UNIX is helpful. **Requisition #8279AD**

At Novartis Pharmaceuticals Corporation, we offer excellent compensation and benefits programs that reflect our position as an industry leader. The programs include medical, dental, vision, legal and financial planning services, life insurance, 401(k) as well as leadership development initiatives. Open the door to a better career at the epicenter of pharmaceutical discovery.

Please email your resume as a 'Microsoft Word' attachment to: **rd@recruitmentsolutions.com.** Include in your email message the following information: 1. In the subject area and in the main copy of your email, reference the requisition # (4 digit req #) for sorting purposes. 2. In a brief note or cover letter, indicate where core competencies align with requisition.

As an alternate methods of submission, you may fax your resume and cover letter to: 800-343-8850. If you would like to know more about openings available at Novartis, please visit our website at: **www.joinnovartis.com.** We are equal opportunity employers M/F/D/V.

NOVARTIS

The Spirit of Discovery

TENURE-TRACK FACULTY POSITION

Assistant Professor - Molecular Virology

The Department of Molecular Microbiology and Immunology (MMI) at the University of Missouri-Columbia, School of Medicine, in Columbia, MO, invites applications for a new tenure-track position at the Assistant Professor level in the area of molecular virology. Preference will be given to individuals using modern molecular approaches to address problems in either viral pathogenesis or viral oncogenesis, broadly defined. Applicants must possess either a Ph.D., M.D., or equivalent degree, and have appropriate post-doctoral training. Successful candidates will be expected to establish outstanding, independent research programs that will attract continued extramural funding, and to participate in the teaching and training missions of the Department. The Department is currently in a significant growth phase, enjoying a substantial University commitment of resources. MMI is an integral part of state and federally supported programs in Molecular Biology (MBP), Microbial Pathogenesis and Immunity (PMPI), and Prevention of Animal Infectious Diseases (PPAID), and provides a highly interactive, rich, and supportive scientific environment. Facilities are excellent and include state-of-the-art core facilities for nucleic acid sequencing, flow cytometry, confocal, fluorescence and electron microscopy, mouse transgenics, ES cell manipulations, hybridoma production, comprehensive protein analysis and production, and microarray facilities. Salary and start-up packages are highly competitive. More information can be viewed at *www.biotech.missouri.edu*.

Interested candidates should submit a curriculum vitae, a statement of research interests and future research goals, and the names, postal and email addresses, and phone numbers of at least three referees to the address below. Applications will be reviewed starting May 1, 2001 and considered until the position is filled.

Molecular Virology Search Committee
attn: Ms. Shelly Crawford, Executive Staff Assistant
M616 Medical Sciences Building
Department of Molecular Microbiology and Immunology
University of Missouri-Columbia, School of Medicine
Columbia, MO 65211
(573) 882-8989
crawfords@missouri.edu

The University of Missouri is an affirmative action, equal opportunity employer. Women and members of traditionally under-represented minorities are encouraged to apply. To request ADA accommodations, please contact our ADA Coordinator at (573) 884-7278, or email adawww@showme.missouri.edu.

Endowed Professorship
Department of Pathology
Emory University School of Medicine

The Department of Pathology invites applications for a tenured, named, endowed professorship. The Department and the Medical School are greatly expanding their research programs and laboratory facilities. The Department seeks an investigator for this position that is applying molecular approaches to a problem related to oncology/transformation and/or development. The theme of the research program should fit broadly to the molecular pathobiology of human disease theme of the Department. This particular position would be among the senior-most professorships at the institution and would come with considerable resources. Accordingly, the candidate should possess an international level of visibility in his/her field. The faculty participates in strong interdepartmental graduate training programs. The School of Medicine is located on the main campus, in a highly desirable residential community within minutes of the many cultural and recreational opportunities of Atlanta and Georgia.

Send curriculum vitae, a brief description of the proposed research program, and the names, addresses, and telephone numbers of three references electronically to: **dkilcul@emory.edu**.

James L. Madara, M.D.
William Patterson Timmie Professor and Chairman
Department of Pathology and Laboratory Medicine
1364 Clifton Road, NE EUH H-184
Atlanta, GA 30322

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EMORY UNIVERSITY

Biotechnology

Best in your field? We're looking for the cream of the crop!

Torrey Mesa Research Institute, (formerly Novartis Agricultural Discovery Institute, Inc.), a research institute of Syngenta Research & Technology, is one of the largest, single, fully-funded research endeavors dedicated to agricultural genomics, consumer health, and post-genomics technology. As an innovative and team-oriented company, we develop and apply cutting-edge biotechnology to match genes with traits for improved agribusiness products, including consumer and animal health products. We are seeking the following qualified individual:

Staff Scientist

Position available at the interface of pharmaceuticals/health care, nutrition and plant science. Requires M.D. or Ph.D. in Immunology or Biochemistry with post-doctoral experience. Candidates should possess a strong background in veterinary or human infectious disease with expertise in molecular immunology and/or mucosal immunology. Opportunity to build a team with post-doctoral associates focused on novel preventative and therapeutic approaches to health care.
Job Code: SS/GHAN-SCI

TMRI offers excellent compensation and a great benefits package, including 401(k) with match and immediate vesting. For confidential consideration, please send cover letter indicating position of interest and resume including salary history and expectations to:
Torrey Mesa Research Institute, Attn: HR/(Job Code), 3115 Merryfield Row, San Diego, CA 92121-1102. Fax: (858) 812-1096. EOE

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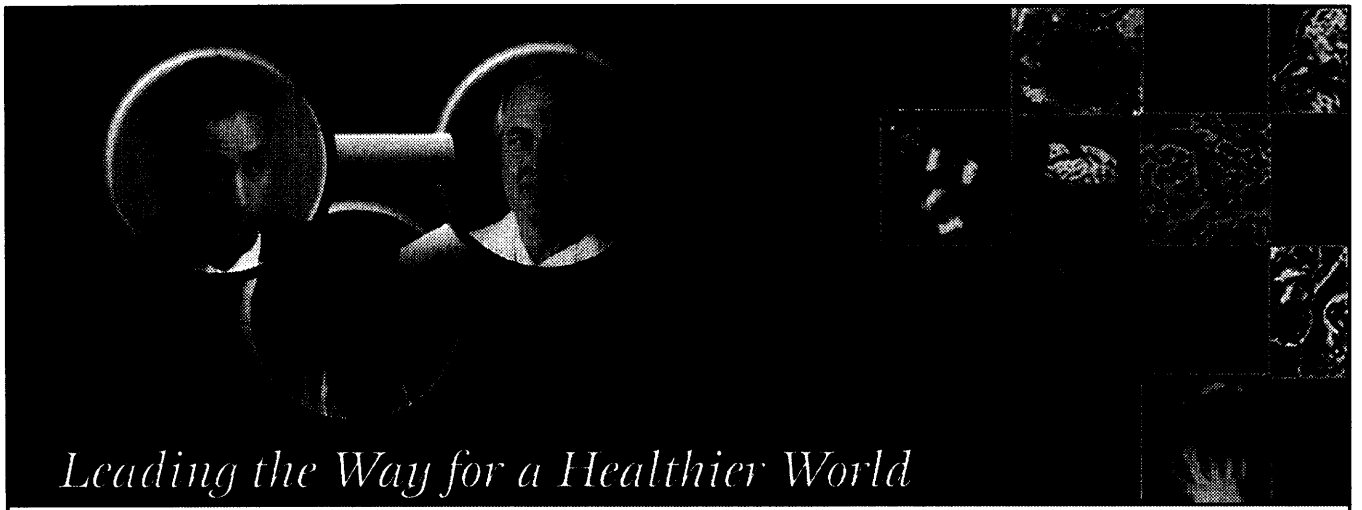
www.tmri.org



Leading the Way for a Healthier World

Lead the way! Become a leader by furthering your career and experience with one of the world's largest research-based companies. At Genetics Institute, a unit of Wyeth, your knowledge will help lead the way into a healthier world.

The Musculoskeletal Sciences group at Genetics Institute/Wyeth, which has pioneered the biology and applications of the Bone Morphogenetic Proteins, has several exciting job opportunities in our **Cambridge, MA** location. We are seeking highly motivated individuals to participate in programs ranging from the molecular and cellular biology of the BMPs to applications of the BMPs in preclinical models of musculoskeletal conditions.

Senior Research Scientist - BMP Applications

- Ph.D. with proven track record in bone biology to evaluate our first compound, rhBMP-2, in a new therapeutic application
- Extensive experience in bone and connective tissue research, including familiarity with orthopedic models for bone augmentation and repair
- Knowledge of imaging techniques, biomechanical testing, and histologic evaluation useful, as is familiarity with current osteoporosis therapeutics
- Must be able to interact well on teams in a multi-disciplinary, fast-paced environment

Research Scientist - BMP Applications

- Help assess protein therapeutics in orthopedic models of bone and connective tissue augmentation/repair
- Ph.D. degree and 2+ years' experience with orthopedic models and associated assessment techniques
- Proficiency in imaging techniques (e.g., pQCT, CT), biomechanical testing, and/or histologic evaluation essential
- Should be able to contribute to basic science in the field of bone, tendon/ligament, and cartilage

Research Scientist - BMP Biology

- Direct research activities aimed at evaluating the roles of BMPs in tissue growth and repair, as well as determining the molecular mechanisms of action in bone and other tissue types
- Ph.D. degree or equivalent with at least 4 years' bone and/or connective tissue research expertise
- Experience must include cell, molecular, and/or developmental biology; familiarity with biology of the BMP family of proteins also desirable
- A high degree of initiative and strong collaborative skills are vital

Research Scientist - Bone Resorption

- Ph.D. with osteoclast biology and bone resorption expertise to investigate molecular mechanisms involved in the direct/indirect effects of BMPs on bone resorption and osteoblast-osteoblast signaling
- At least 2 years' postdoctoral research in bone resorption assays and basic molecular biology techniques
- Well-versed in BMPs and orthopedic models of bone formation and repair helpful; initiative and willingness to contribute to team goals essential

Postdoctoral Fellowships

- Several postdoctoral fellowships also available that will be filled by independent, motivated individuals
- Develop research programs centering around the cellular and molecular actions of BMPs in bone and other tissue types

Genetics Institute, a unit of Wyeth, the Pharmaceutical Division of American Home Products, offers competitive salaries and benefits, including comprehensive health care, dental and life insurance, matching 401(k), pension plan, relocation assistance, dependent care subsidy, and an on-site exercise facility. Genetics Institute is proud to be an equal opportunity employer, dedicated to building strength through diversity. Please forward your resume with salary requirements to: **Genetics Institute, Reference OPSCI, P.O. Box 7886, Philadelphia, PA 19101-7886. Fax to: (610) 989-4854. Email: jobs@labs.wyeth.com**

For more information, please visit our websites at: **www.wyethjobs.com** or **www.genetics.com**

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The Aga Khan University

DEPARTMENT OF BIOLOGICAL AND BIOMEDICAL SCIENCES

ASSISTANT/ASSOCIATE PROFESSORS IN MOLECULAR AND GENETIC MEDICINE

The Aga Khan University, chartered in 1983 as Pakistan's first private international university, is committed to the provision of effective health education and health services relevant to Pakistan and the region. As part of a significant enhancement of its basic biomedical science research programs, the University is undertaking a major interdisciplinary initiative in the area of Molecular Medicine. The newly-founded Department of Biological and Biomedical Sciences (that merges the former departments of Anatomy, Biochemistry, Pharmacology and Physiology) seeks candidates for Assistant and Associate Professorships in several areas.

Candidates should have a PhD, MD/PhD, or equivalent qualification. Candidates for Assistant Professorships should demonstrate the potential of establishing vigorous independent research programs. Candidates for Associate Professorships should have demonstrated excellence in both research and teaching, as well as substantial recent success in obtaining peer-reviewed grant support. Successful candidates should have good interpersonal skills as well as an ability to work as part of a team.

The following two positions will involve, besides strong research emphasis, teaching at the undergraduate level and participation in the activities of the department.

ASSISTANT/ASSOCIATE PROFESSOR IN HUMAN GENETICS

Candidates should have demonstrated knowledge in classical genetics and pedigree analysis. They should also have ongoing research in the area of defining and understanding the genetic basis for susceptibility to common diseases, including but not limited to: heart disease, hypertension, cancer, obesity and diabetes.

ASSISTANT/ASSOCIATE PROFESSOR IN MOLECULAR PHARMACOLOGY

Candidates with expertise in molecular therapy of the cardiovascular system will be given preference, and expertise in the techniques and methods of molecular and cellular biology will be an added advantage.

The following two positions will be assigned to the **PhD *Program in Health Sciences***, which was started in 1999. As such, they will be expected to participate in the design and expansion of the graduate program, particularly in the areas of genetics, as well as cellular and molecular biology.

ASSISTANT/ASSOCIATE PROFESSOR IN POPULATION GENETICS

Candidates should have a good record in statistical genetics, genetic epidemiology, bioinformatics and population genetics, as well as experience in gene-environment interactions and at least two years' experience in applying bioinformatics to human populations. Applicants should hold a doctoral degree in Genetics, Biostatistics, or a related discipline, and have demonstrated good research productivity.

ASSISTANT/ASSOCIATE PROFESSOR IN CELLULAR BIOLOGY

Candidates with a distinguished record in any area of signal transduction and cell signalling pathways of the nervous system will be given preference, although those with experience in applying the tools of cell, structural and/or developmental biology to the understanding of basic biological processes are encouraged to apply.

Salary and academic rank will be commensurate with qualifications, experience and level of responsibility. Interested candidates are requested to submit a current resumé, summary of research experience and future plans, along with the names and addresses of three referees **within six weeks of this publication** to the **Personnel Director, The Aga Khan University, PO Box 3500, Stadium Road, Karachi 74800, Pakistan; fax (92-21) 4934294/4932095; email: recruitment@aku.edu**

Assistant Professor Neuroscience/Engineering Brown University

The Department of Neuroscience at Brown University has a tenure-track faculty position at the Assistant Professor level for an individual with interests bridging neuroscience and biomedical engineering. The position requires the Ph.D. or M.D. degree and at least 2 years of postdoctoral training. Research interests might include advanced neurophysiological recording methods and devices, neural-computing interfaces, or mathematical methods used in analysis of neural signals. Knowledge of the design, fabrication and use of implantable recording devices suitable for human application is desirable. Experience or potential for research involving other leading-edge neural recording technologies is also useful. The individual will participate in the development of a new biomedical engineering center, and in teaching at the undergraduate and graduate level.

For more information see:
http://www.brainscience.brown.edu/
http://www.engin.brown.edu/undergrad/NewUndergrad/bioengin/

All applications received by May 15, 2001 will be given full consideration. Submit a curriculum vitae, a set of representative reprints, a concise description of research interests and goals, and arrange for three letters of reference to be sent to:

Barry Connors, Department of Neuroscience Brown University, Search Committee/S10, Box 1953 Providence, RI 02912

Brown University is an Affirmative Action/Equal Opportunity/ Employer

Dean, School of Medicine Medical College of Georgia

The Medical College of Georgia, Georgia's health sciences university, invites applications and nominations for the position of Dean of the School of Medicine. The Medical College of Georgia, chartered in 1828, is the only academic health sciences center of the University System of Georgia and has schools of medicine, dentistry, allied health sciences, graduate studies, and nursing. The Medical College of Georgia has successfully completed its search for a new President to succeed its retiring previous President. Information concerning the President Designate can be obtained from **http://www.mcg.edu/news/2001features/newpresident.html**. The School of Medicine has 180 entering medical students and 555 full-time faculty (449 clinical and 106 basic scientists). An excellent medical education program is overseen by a progressive and innovative curriculum office. The Medical College of Georgia provides clinical service to all segments of Georgia's population, including outreach to rural and underserved communities. The Medical College of Georgia is associated with MCG Health, Inc.(MCGHI), a nonprofit organization that operates the MCG Hospital and Clinics, Children's Medical Center, Georgia Radiation Therapy Center, more than 80 specialty clinics, a regional trauma center, and rural outreach programs. The Medical College of Georgia is also affiliated with a large regional VA hospital on an adjacent campus, an on-campus state veterans nursing facility and other local and regional hospitals.

Additional information about the position of Dean of the School of Medicine at the Medical College of Georgia may be obtained from **http://www.mcg.edu/facultyjobs/medicinedean.htm**. Nominations and applications will be accepted immediately. The review process began March 14, 2001 and will continue until the position is filled. Nominations and letters of application including a curriculum vitae should be directed to: **Joseph Hobbs, M.D., Professor and Chair of Family Medicine, Chair, School of Medicine Dean Search Committee, Medical College of Georgia, School of Medicine Dean's Office (AA-152), 1120 15th Street, Augusta, GA 30912-4750**. *The Medical College of Georgia is an Equal Opportunity/ADA/Affirmative Action Institution.*

Vacancy Announcement

Director, National Institute of Neurological Disorders and Stroke (NINDS) National Institutes of Health (NIH)

THE POSITION: The NIH is seeking exceptional candidates for the position of Director, NINDS. The Director provides leadership and direction to the national research program on the causes, prevention, diagnosis, and treatment of neurological disorders and stroke, and basic research in related scientific areas. Through NINDS' intramural laboratories and the extramural scientific community, the Institute supports laboratory and clinical investigations and training of scientists with particular interest in the biomedical and behavioral sciences for research careers in the neurosciences. The NINDS has a FY 2001 budget of approximately $1.3 billion and a staff of approximately 800 to support the Institute's efforts.

The Director develops Institute goals, priorities, policies, and program activities, and keeps the Director, NIH, abreast of developments and needs of the categorical diseases of the Institute as they relate to the overall mission of the NIH and identifies needs for new or amended NIH-wide policies, procedures and practices. The Director, NINDS, maintains liaison and/or fosters collaborations with other government research programs, private foundations, universities and private research institutes, scientific societies, voluntary health agencies, and international health and research organizations with interest in the categorical disorders of the Institute

In addition to the leadership and managerial/administrative responsibilities described, the incumbent may carry out his/her own research program. Resources commensurate with the proposed program will be provided.

THE CHALLENGE: NINDS has occupied a central position in the world of neuroscience for nearly 50 years. Scientific opportunities are abundant, the task of preventing and treating nervous system disease has never been more urgent, and the public's confidence in biomedical research has never been stronger. This position offers a unique opportunity for the right individual to provide strong and visionary leadership to an organization dedicated to reducing or eliminating the burden of neurological disease through the support and performance of the highest quality laboratory and clinical research aimed at increasing our understanding of the different disorders affecting the brain and nervous system and developing the most appropriate and effective means of prevention, treatment, and rehabilitation, and through the timely dissemination of research findings and information that will promote neurological health.

Inherent in this challenge is the investigation of healthy and diseased brain, spinal cord, peripheral nerves, and the neuromuscular junction and muscle so that a more complete understanding may be gained of the abnormal processes that lead to neurological diseases. These investigations are conducted in hundreds of extramural laboratories and clinics throughout the United States and in the NINDS' own intramural facilities in Bethesda, Maryland.

THE QUALIFICATIONS REQUIRED: Applicants must possess an M.D. and/or Ph.D. degree and senior-level research experience and knowledge of research programs in one or more scientific areas related to fundamental neurosciences, or problems in clinical neurology. They should be known and respected within their profession, both nationally and internationally, as individuals of outstanding scientific competence. Candidates should have demonstrated leadership of a research program involving dealings with outside groups and extensive planning, program assessment, and analysis of program objectives; the development of plans for the resolution of major operational problems and issues; and management of financial and human resources, including selecting, managing, and motivating staff using fair and equitable staffing/recruitment practices.

SALARY/BENEFITS: The Director, NINDS, will be appointed at a salary commensurate with his/her qualifications and experience. Full Federal benefits, including leave, health and life insurance, retirement and savings plan (401K equivalent) will be provided.

HOW TO APPLY: Applicants must submit a current Curriculum Vitae, and bibliography to: Ms. Carmen Garcia, Division of Senior and Scientific Employment, National Institutes of Health, Building 31, Room B3C08, 31 Center Drive MSC2203, Bethesda, MD 20892-2203. Applications may also be sent via E-Mail to: garciac@od.nih.gov

APPLICATIONS MUST BE RECEIVED BY CLOSE-OF-BUSINESS JUNE 15, 2001

The NIH is an Equal Opportunity Employer

Assistant, Associate and Full Professor Positions

Department Environmental and Occupational Health
Graduate School Public Health
University of Pittsburgh

The Department of Environmental and Occupational Health, Graduate School Public Health (GSPH), invites applicants for several tenure and non-tenure track faculty positions (assistant/associate/full professor). Qualified M.D. or Ph.D. candidates from any subdiscipline of Life Sciences including toxicology, pharmacology, biochemistry, molecular biology, physiology, immunology or neurobiology with research programs focusing on molecular biology of signal transduction, mechanisms of gene regulation and molecular models of environmental science (lower eukaryotes, invertebrates, transgenic mice, human genomics, computational toxicology) and with a track record of research funding are especially encouraged to apply. Opportunities exist for collaborative interactions within GSPH and School of Medicine including programs with extensive recent growth such as pulmonary and cardiovascular biology, stem cell and developmental biology, neuroscience and cancer biology. Further collaborations and support are available from outstanding resources in genomics, structural and computational biology, drug discovery, structural imaging and gene therapy programs. Applicant who will complement existing strengths in pulmonary biology, free radical biochemistry, computational toxicology, molecular biodosimetry and carcinogenesis and occupational medicine are encouraged to apply.

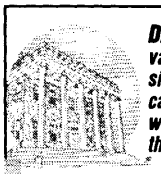
Successful candidates will be expected to develop outstanding independent research programs and participate in graduate teaching. Very attractive start-up packages and competitive salaries have been committed. Successful applicants' rank will be determined by qualifications.

Applications will be received until positions are filled. Applicants should provide a one-page statement of research, a curriculum vitae and names and contact information of three references to:

Bruce R. Pitt, Ph.D., Professor and Chairman
Department of Environmental and Occupational Health
Graduate School Public Health
University of Pittsburgh
260 Kappa Drive
Pittsburgh, PA 15238

Brucep@pitt.edu

The University of Pittsburgh is an Affirmative Action, Equal Opportunity Employer



Drew University, a small, private liberal arts institution situated on a 186 acre wooded campus in Madison, NJ, 30 miles west of NYC, seeks candidates for the following positions:

TEMPORARY FULL-TIME
ASSISTANT PROFESSOR
Molecular Genetics

Drew University seeks a full-time, one-year faculty replacement, beginning in September, 2001. Teaching responsibilities of eighteen contact-hours per year include two half-semester lecture modules (genetics/evolution and molecular biology), two upper level courses in molecular genetics/biology (one with lab), and mentoring of undergraduate student research. See our webpage for more information: **www.drew.edu/depts/biol**. Applications should include curriculum vitae, copies of college transcripts, three letters of reference, and evidence of teaching interest/effectiveness. Ph.D. preferred. The application deadline is April 20, 2001. Submit application materials to: **Dr. Louise Temple, Search Committee Chair, Department of Biology, Drew University, Madison, NJ 07940. FAX: 973-408-3824; e-mail: calfone@drew.edu.** AA/EOE

EARTH SCIENCES DIVISION DIRECTOR

The Earth Sciences Division of the Lawrence Berkeley National Laboratory has an opening for a Division Director. This is an exciting opportunity to provide scientific leadership for the division's research programs and develop new programs that address the national needs in Earth Sciences. The Earth Sciences Division has a staff of approximately 170 scientists, engineers, and technical and administrative personnel, as well as participating faculty and students from the nearby UC Berkeley campus, with an annual budget of approximately $27M. Our research is primarily funded by Basic Energy Sciences and applied DOE programs, and focuses on environmental issues and energy resources, including nuclear waste disposal, climate change and carbon management, environmental remediation, oil and gas recovery, and geothermal energy. For more information about our scientific programs, visit our website at http://www-esd.lbl.gov/.

Qualified candidates should have a distinguished record of scientific accomplishments in a discipline relevant to the research of the Earth Sciences Division and experience with program management and development. Demonstrated ability to interact effectively with funding agencies such as the Department of Energy is also necessary. You must be capable of providing scientific leadership for a multidisciplinary group of scientists that includes hydrogeologists, geochemists, geophysicists and atmospheric chemists and possess strong management and administrative skills, creativity in decision making and problem solving, and experience in human resource management. Prefer PhD in a scientific discipline relevant to the Earth Sciences Division.

Candidates should submit an application with CV and a list of references sent before May 1, 2001 to: Search Committee, c/o Katrina Printup, Lawrence Berkeley National Laboratory, One Cyclotron Road, MS 50-4037, Berkeley, CA 94720. Applications should reference job number LDDO/013394/JS.

Berkeley Lab is an Affirmative Action/Equal Opportunity Employer committed to the development of a diverse workforce.

BERKELEY LAB

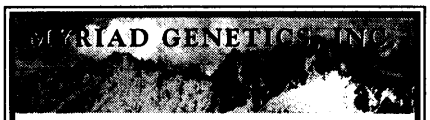
SUNY DOWNSTATE
Medical Center

INVESTIGATOR/ASSOCIATE DIRECTOR OF SURGICAL RESEARCH

The Department of Surgery at SUNY Downstate Medical Center is seeking an established investigator with a Ph. D. in molecular biology or physiology preferably with an externally funded laboratory in pancreatic exocrinen/endocrine physiology. The individual should have published in peer reviewed scientific journals. This individual will also be the Associate Director of Surgical Research who will assist in the directing laboratory related functions, supervising personnel, supervise and teach surgical residents and research fellows; develop and supervise techniques such as cloning expressive and isolation or recombinant proteins, DNA; quantitative PCR, protein biochemistry, and creation of antibodies and assisting and writing grant applications as well as serving as a faculty member for residents in the laboratory.

Interested candidates should submit their curriculum vitae to:

Lauren Urban
Department of Surgery
450 Clarkson Avenue, Box 40
Brooklyn, New York 11203
(718) 270-2728
FAX (718) 270-2826



Myriad Pharmaceuticals, Inc. has been established as a wholly-owned subsidiary of Myriad Genetics, Inc. to create novel therapeutic products for the treatment of human diseases.

Pharmacology (3-200-1)

Research Associate – We are searching for talented individuals to join our pharmacology group. The position requires familiarity with recombinant DNA technologies; recombinant protein expression and purification techniques including FPLC and Western blot analysis. Additionally, qualified individuals will possess experience in the development of ELISA and colorimetric/fluorescent enzymatic assays in 96 and 384 well formats. BS or MS in a relevant scientific discipline with at least 2 years of experience in drug development.

Drug Target Validation (3-200-2)

Research Associate - Myriad Pharmaceuticals seeks an experienced Research Associate with the following skills: Experience with mammalian tissue culture, FACS analysis, cellular biochemistry and protein expression systems. The qualified candidate will be familiar with vector construction, biochemical analysis of cellular extracts, western blots and real-time PCR. A BS or MS in the biological sciences is required. We seek a bright, creative person who has the ability to develop and implement a wide variety of research techniques, think independently and likes challenges.

Pre-clinical Drug Development (3-200-3)

Research Associate - Myriad Pharmaceuticals seeks an experienced Research Associate with the following skills: Experience in anti-neoplastic pharmacological rodent models, isolation of pathological specimens and cellular biochemical analysis of rodent tissues. Tissue culture experience and familiarity with a wide variety molecular biological techniques is also required. The qualified candidate will have a BS or MS in the biological sciences and the ability to work in an independent manner.

Myriad offers an attractive compensation package and a stimulating, interactive research environment. Please mail or fax your letter of interest and include a complete resume and the names of three references to: Human Resources Department, Myriad Genetics, Inc., 320 Wakara Way, Salt Lake City, UT 84108. Fax: 801-584-1144. You may also e-mail us at: hr@myriad.com

We are an equal opportunity employer. To learn more about Myriad Genetics, visit our corporate web site at http://www.myriad.com/

MYRIAD

Discover the Power of Protein Engineering

Applied Molecular Evolution, Inc. (AME) is a leader in the application of directed evolution for the improvement of the clinical properties of human therapeutic proteins. Our proprietary AMEsystem technology has been applied both to currently marketed, FDA-approved biopharmaceuticals and to the development of novel therapeutics. The technology permits the discovery of molecules with increased efficacy and decreased side-effects, while keeping potentially immunogenic changes to a minimum. AME seeks Scientists/Senior Scientists (Ph.D.) who can work independently to achieve critical project goals in the following areas:

Recombinant Protein Expression, Purification, Characterization

We are building a group devoted to the production of a wide range of proteins, including antibodies, both as small-scale tools for *in vitro* research and at larger scale for animal efficacy studies. Relevant industry experience is preferred.

- **Expression (Job Code 411S4)**
  Requires knowledge of bacterial, insect and mammalian expression systems and the ability to evaluate and implement novel expression procedures and strategies.
- **Purification (Job Code 412S4)**
  Responsible for the purification of soluble and insoluble recombinant proteins from a variety of expression systems. Requires hands-on knowledge of standard chromatography procedures and instrumentation and the ability to design and implement project-specific purification protocols.
- **Characterization (Job Code 413S4)**
  Responsible for the chemical and physical characterization of proteins including the determination of microheterogeneity and post-translational modification. Preferred candidate will also have familiarity with analytical concerns relating to IND filing.

Animal Models (Job Code 414S4)

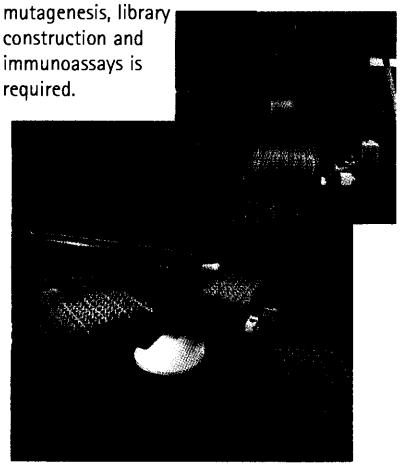
The successful candidate will establish and lead our animal facility. Requires significant prior experience in the development of small animal models of human disease, the ability to support multiple projects and familiarity with IND submissions. This will entail both in-house activity and the identification of appropriate contract organizations or collaborators. Preference will be given to scientists comfortable working in a variety of therapeutic areas.

Reporter Assays (Job Code 415S4)

This position will assume primary responsibility for the development and implementation of cell-based assays. Requires a strong background in molecular biology, biochemistry or cell biology with previous experience in signal transduction and cellular receptor biology, preferably in a biotechnology or pharmaceutical environment.

Protein Engineering (Job Code 416S4)

Responsible for the design, construction and screening of libraries of engineered protein variants. Previous experience in protein engineering or a strong molecular biology/biochemistry background with expertise in mutagenesis, library construction and immunoassays is required.



APPLIED MOLECULAR EVOLUTION

Send cover letter and resume to:

HR Department - Applied Molecular Evolution, Inc.
3520 Dunhill Street, San Diego, CA 92121
careers@AMEvolution.com

www.AMEvolution.com

Golden Opportunities

FACULTY POSITIONS

Pharmacogenetics • Pharmacogenomics

The Department of Pharmaceutics, College of Pharmacy, at the University of Minnesota, Twin Cities campus, invites applications for two faculty positions in the areas of pharmacogenetics, pharmacogenomics, and/or pharmacoproteomics, with application to the understanding of absorption, distribution, elimination, and metabolism of drugs (pharmacokinetics), or of drug effects (pharmacodynamics). Applications at the assistant and associate professor levels will be considered. Successful applicants are expected to initiate and maintain an externally funded independent research program, and to develop and teach courses in the pharmaceutics graduate and pharmacy professional programs. A Ph.D. or equivalent degree and post-doctoral experience in a related area is required. The successful candidate will be determined by the quality of their research experience, education and ability to teach.

The Twin Cities campus has established the Biomedical Genomics Center (www.bmgc.umn.edu) with substantial instrumentation and bioinformatics resources. The College of Pharmacy is recognized as one of the outstanding pharmacy research and education institutions in the world. With the proximity of both basic sciences and a university hospital, faculty in the College of Pharmacy are ideally situated to carry out basic, translational, and clinical research.

Screening of applications will begin April 30, 2001 and will continue until the positions are filled. Submit curriculum vitae, description of research plan, and have three letters of recommendation sent separately to: **Search Chair, Dr. Cheryl L. Zimmerman, c/o Chris Nelson (coton001@umn.edu), College of Pharmacy, 5-130 Weaver Densford Hall, 308 Harvard Street SE, Minneapolis, MN 55455.**

UNIVERSITY OF MINNESOTA

Equal Opportunity Educator and Employer

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mayo

POSTDOCTORAL FELLOWS
Mayo Clinic Rochester

Mayo Clinic Rochester has established a Molecular Medicine Program with several groups working on gene therapy using different viral systems. In the group of **Dr. Roberto Cattaneo** motivated individuals are required to continue developing measles virus molecular biology, in particular particle assembly and cell entry, with the aim of transforming a safe and effective vaccine strain in a vector for targeting cancerous cells. Appropriate animal systems will be used to study the *in vivo* effects of the new viruses. Experience in molecular biology is required, training in virology is desirable.

Application deadline is June 1, 2001. Salary will be determined by the successful candidate's experience. There is also an attractive benefit package. Mayo Foundation is a non-profit physician led clinical practice integrated with education and research in a unified multi-campus system. For further information please visit http://www.mayo.edu/research/mmp. Please send curriculum vitae and bibliography to:

Roberto Cattaneo, Ph.D.
Mayo Clinic
Molecular Medicine Program
Guggenheim 18
200 First Street SW
Rochester, Minnesota, 55905, USA

Plemper et al. *J. Virol.* **74**:6485–6493, 2000
Schneider et al. *J. Virol.* **74**:9928–9936, 2000
Hammond et al. *J. Virol.* **75**:2087–2096, 2000
Roscic-Mrkic et al. *J. Virol.* **75**:3343–3351, 2000

Mayo Foundation is an affirmative action and equal opportunity employer and educator.

St Jude Children's Research Hospital
ALSAC • Danny Thomas, Founder

Postdoctoral Position in Neurobiology

A postdoctoral position is available to investigate the biological role of the recently cloned neuronal PDZ domain protein, NIL-16 (Kurschner & Yuzaki, J. Neurosci. 19: 7770-7780, 1999), using knock-out mice, electrophysiology, molecular biology, and biochemical approaches. NIL-16 is uniquely bifunctional, serving both as a specific ion channel-binding molecule and as the neuron-specific precursor of the cytokine, interleukin 16. Therefore, NIL-16 represents the first molecular link between cytokine signaling and ion channel function. In addition, NIL-16 interacts with components of the endocytosis machinery. Therefore, NIL-16 may serve as an adapter that regulates the turnover of bound ion channels, thereby contributing to synaptic plasticity. The ideal candidate for this position is a trained electrophysiologist who wishes to receive comprehensive training in molecular and cellular biology and biochemistry.

St. Jude Children's Research Hospital has a highly interactive research environment and state-of-the-art facilities including core laboratories for proteonomics, micro array analysis of gene expression, transgenic/knock-out facilities, etc. Competitive stipends and a benefits package are offered. Interested candidates should send a curriculum vitae and the names of three references (postal and E-mail addresses and phone numbers) to:

Connie Kurschner, Ph.D.
Dept. of Developmental Neurobiology
St. Jude Children's Research Hospital
332 N. Lauderdale St. • Memphis, TN 38105
E-mail: cornelia.kurschner@stjude.org

SJCRH is an Affirmative Action/Equal Opportunity Employer.

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nature immunology

seeks an **ASSISTANT EDITOR**

Nature Immunology is a prestigious international monthly journal covering all aspects of immunology. We have an exciting opportunity available for an immunologist eager to enter the editorial world. *Nature Immunology* needs an Assistant Editor to help develop all aspects of the journal. Working closely with the *Nature Immunology* team, the Assistant Editor will be responsible for peer review and manuscript selection; commissioning of Reviews, Commentaries and News & Views; writing and editing. Close ties with the immunology community will be forged and maintained through travel to international meetings and visits to individual laboratories. Applicants should have a Ph.D. and post-doctoral experience with a strong research background in immunology, an intense curiosity and broad understanding of the field. The ideal candidate will have excellent literary skills and an enthusiasm for, and commitment to, the communication of science.

Based in our central New York City office, the *Nature Immunology* team is part of a dynamic editorial and publishing environment that includes *Nature Genetics*, *Nature Structural Biology*, *Nature Medicine*, *Nature Biotechnology* and *Nature Neuroscience*. The successful applicant will also enjoy a close working relationship with the London-based *Nature* and *Nature Cell Biology* teams.

To apply, please submit a CV, a short (700-900 words) News & Views-style article on an exciting and newsworthy recent development in any area of immunology and a short cover letter explaining your interest in the post to Dr. Linda J. Miller, Editor, *Nature Immunology*, Nature America, 345 Park Avenue South, New York, NY 10010 (fax 212.696.9594; email admin@natureny.com) to arrive as soon as possible and **not later than 20 May 2001**.

POSITIONS OPEN

FACULTY POSITIONS
Chemical and Structural Biology
University of Massachusetts Medical School

A major expansion of the Program in Molecular Medicine at the University of Massachusetts Medical School includes immediate openings for **SENIOR TENURED** and **JUNIOR TENURE-TRACK** faculty positions. The Program consists of Basic and Physician Scientists representing a broad range of disciplines in the biomedical sciences. The Program will expand to fully occupy its current modern building of approximately 80,000 square feet. Instrumentation related to research in combinatorial and medicinal chemistry as well as structural biology is available. Core facilities for tissue culture, media preparation, DNA sequencing, protein chemistry and proteomics, fluorescence-activated cell sorting, digital imaging and confocal microscopy, genomics, and transgenic/knockout mice are also available. The positions will be highly competitive with regard to start-up funds, laboratory space, and salary. The Program also seeks individuals of outstanding research potential in the broadly defined areas of cell, developmental and molecular biology, genomics, and bioinformatics.

Applicants should send curriculum vitae, statement of research interests, and names and addresses of three references to:

Dr. Roger Davis
Search Committee Chair
or
Dr. Michael P. Czech, Director
Program in Molecular Medicine
University of Massachusetts Medical School
373 Plantation Street
Worcester, MA 01605

An Equal Opportunity/Affirmative Action Employer.

ASSISTANT VICE CHANCELLOR, OFFICE OF ACADEMIC CAREER DEVELOPMENT. The University of Pittsburgh is seeking a dynamic individual to lead a new office dedicated to advancing the careers of Biomedical Scientists in its six health sciences schools. Responsibilities will include implementing mentoring and career development programs; stimulating interest in academic careers among preprofessional, undergraduate, graduate, and postgraduate students and trainees; obtaining extramural funding for special projects; and tracking data regarding the status of faculty and outcomes of programming. The ideal candidate will possess a Doctoral degree and experience as an independent biomedical researcher and administrator in an academic institution. Please send curriculum vitae and letter of interest to: **Barbara Barnes, M.D., Associate Dean, Continuing Education, University of Pittsburgh School of Medicine, Center for Continuing Education, 200 Lothrop Street, Pittsburgh, PA 15213. FAX: 412-647-1244; e-mail: barnesbe@msx.upmc.edu**. *The University of Pittsburgh is an Affirmative Action/Equal Opportunity Employer.*

RESEARCH INVESTIGATOR
ORGANIC CHEMISTRY

International biomedical reproductive health research organization is immediately seeking professional to join our group working on development of contraceptive and noncontraceptive vaginal products that will protect women and men against HIV and other STIs. The products under development are sulfated polysaccharides and polymers. This position will involve modification of existing formulations and development of new formulations. Additional responsibilities will be chemical analyses for Food and Drug Administration compliance and assisting in preparing USP monograph(s). Requires a Ph.D. in organic chemistry or related field; experience with polymers is helpful but not essential. Please send résumé and cover letter referencing Job Number 76/00 to: **Ms. Kim Bailey, Human Resources Specialist, Population Council, CBR, 1230 York Avenue, New York, NY 10021; FAX: 212-327-7678; e-mail: jobs@popcouncil.org**. *Affirmative Action/Equal Opportunity Employer/Minorities/Females.*

POSITIONS OPEN

MISSION ENHANCEMENT
BACTERIAL PATHOGENESIS POSITION

The Program in Microbial Pathogenesis and Immunity at the University of Missouri seeks applications for an **ASSOCIATE PROFESSOR** in bacterial pathogenesis as part of an exceptional ongoing Mission Enhancement Program. This position offers a unique opportunity for a highly motivated Investigator to participate in and contribute to a campus-wide, interdisciplinary microbial pathogenesis program (College of Veterinary Medicine and School of Medicine). The specific opportunities are available for participation in joint programs of these departments in (1) Program in Microbial Pathogenesis and Immunity and (2) advanced vaccine research for the control and prevention of disease in food animals.

This position would be a full-time faculty position in the Department of Veterinary Pathobiology. The primary responsibilities will be to conduct internationally recognized research on microbial pathogenesis related to human and/or animal disease. The successful candidate will collaborate with a diverse group of faculty who have interest in infectious diseases of humans, laboratory and/or food animals, molecular biology, molecular genetics, and food safety. Other potential faculty positions will be added in the Department over the next two years through Mission Enhancement. The philosophy of the Department is to encourage the development of intra- and interdisciplinary research and teaching teams. The candidate is expected to develop/continue a vigorous, externally funded research program; direct Ph.D. and postdoctoral students, and contribute to professional or graduate student instruction in their specialty.

The Microbial Pathogenesis Program at MU is a highly interactive scientific environment with access to CORE facilities for nucleic acid sequencing; flow cytometry; confocal, fluorescence, and electron microscopy; mouse transgenics; hybridoma production; comprehensive protein analysis and production; and microarray technologies. The successful candidate will be located in recently renovated state-of-the-art laboratories and would have the opportunity for a joint appointment in molecular microbiology and immunology in the School of Medicine.

Candidate should have an earned Doctorate (D.V.M., M.D., Ph.D., etc.), and applicable postdoctoral experience to quality for the academic rank of Associate Professor and be committed to interdisciplinary research. Salary for this position is competitive and commensurate with experience. Applicants should send a letter of intent, curriculum vitae, summary of research accomplishments and future research directions, and the names of three references to: **Bacterial Pathogenesis Search Committee, Department of Veterinary Pathobiology, College of Veterinary Medicine, University of Missouri, Columbia, MO 65211. Telephone: 573-882-1385; FAX: 573-884-5414.**

Applications will be reviewed as they arrive and will continue until position is filled.

The University of Missouri is an Equal Opportunity Institution and complies with the guidelines of the Americans With Disabilities Act of 1990. If you have special needs as addressed by the ADA and need assistance with this or any portion of the application process, notify us at the above address or telephone number as soon as possible. Reasonable efforts will be made to accommodate your special needs.

GEORGIA INSTITUTE OF TECHNOLOGY
School of Biology

A **RESEARCH SCIENTIST** position in bioinformatics is available immediately to work on developing algorithmus of DNA and protein sequence interpretation, particularly on gene-funding algorithmus using Markov and Hidden Markov models of DNA and protein sequence and structure **website: http://dixie.biology.gatech.edu**. Salary range: $40,000 to $60,000. Please respond with curriculum vitae and contact information for three references to: **Professor Mark Borodovsky, School of Biology, Georgia Institute of Technology, Atlanta, GA 30332-0230. E-mail: mark@amber.gatech.edu.**

POSITIONS OPEN

NEUROSCIENTIST

The University of South Dakota School of Medicine invites applications to fill the tenure-track position of **ASSISTANT** or **ASSOCIATE PROFESSOR**. We seek candidates who have research interests in systems, cellular, or molecular neuroscience and who will be able to integrate into the Neuroscience Group within the Division of Basic Biomedical Sciences. The Neuroscience Group recently obtained a Center of Biomedical Research Excellence (COBRE) award for studies of adaptive behavior; information about the Group and the Division can be found at **website: www.usd.edu/neurogroup/**. Candidates must have a Ph.D., M.D., or equivalent; postdoctoral experience; and must show a high potential for external funding. The candidate will be expected to participate in the teaching responsibilities of the Division, including courses in the graduate and medical programs. Rank and salary will be commensurate with qualifications. Salary and start-up packages are competitive. Please submit curriculum vitae, brief statement of research and teaching goals, and names of three references to: **Ms. Carleen McNeely, Neuroscience Search Committee, Division of Basic Biomedical Sciences, University of South Dakota School of Medicine, Vermillion, SD 57069**. Review of applications will begin May 13, 2001, and continue until the position is filled. *USD is an Equal Opportunity/Affirmative Action Employer.*

FACULTY POSITION
ANATOMY DEPARTMENT

Midwestern University seeks applicants for two tenure-track positions at the level of **ASSISTANT PROFESSOR** of anatomy to teach in our Colleges of Osteopathic Medicine and Allied Health. One position is available at our campus in Downers Grove, Illinois, and a second at our campus in Glendale, Arizona. Applicants must have a Ph.D. or equivalent, postdoctoral training, and a commitment to excellence in teaching. Applicants are expected to establish an independent research program capable of attracting extramural funding. Preference will be given to individuals broadly trained in the anatomical disciplines with an emphasis on human gross anatomy. Send curriculum vitae, names of references, and a statement specifying teaching interests and research plans to the individuals listed below. Applicants who wish to apply to both campuses should send separate applications to the appropriate individual. For Downers Grove: **T. Dombrowski, Ph.D., Department of Anatomy, Midwestern University, 555 31st Street, Downers Grove, IL 60515**. For Glendale: **Linda Walters, Ph.D., Arizona College of Osteopathic Medicine, 19555 North 59th Avenue, Glendale, AZ 85308**. *Affirmative Action/Equal Opportunity Employer. Minorities/Females/Disabled/Veterans are encouraged to apply.*

ASSISTANT PROFESSOR
(RESEARCH TRACK)
Cell Signaling/Digital Imaging Microscopy
University of Massachusetts Medical School

A junior faculty position on a research track is offered as part of a team of interdisciplinary Investigators working on localization and structures of multiprotein signaling complexes in living cells. Opportunities for independent as well as collaborative research would be available for the successful candidate. Career growth to the research-track Professor level will be encouraged. Laboratory space, instrumentation, and facilities for confocal and digital imaging microscopy are state-of-the-art within an excellent scientific environment. In general, candidates are expected to have completed three years of postdoctoral training that includes microscopy. Salary and benefits will be highly competitive. Applicants should send curriculum vitae and names and addresses of three references to: **Dr. Michael P. Czech, Program in Molecular Medicine, University of Massachusetts Medical School, 373 Plantation Street, Worcester, MA 01605**. *An Equal Opportunity/Affirmative Action Employer.*

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Roche Bioscience

***Roche Bioscience** is committed to innovation in human pharmaceutical research. Our research units are focused on breakthroughs in small molecule drug discovery. We intend to lead the industry through research excellence, sound business decisions and timely delivery of novel drugs. If you want to work in a dynamic, challenging environment that capitalizes on your strengths and abilities, consider the following career opportunities in our **Molecular Structure** group.*

X-RAY CRYSTALLOGRAPHY, GROUP LEADER

Using your expertise and knowledge in protein crystallography, you will conduct and direct x-ray crystallography research with a focus on drug discovery. You will provide assistance to multi-disciplinary teams in utilizing protein structure information for discovering new drugs and you will have access to the latest techniques and technologies in protein crystallography and related disciplines. To qualify for this position, you should have a PhD in a relevant field, 4-6 years academic or industrial experience and a proven record of research success.

X-RAY CRYSTALLOGRAPHY, RESEARCH SCIENTIST

Using your expertise in x-ray crystallography, you will work on multi-disciplinary teams to discover new drugs. You must have a PhD with proven expertise in x-ray crystallography (experience with MAD, MIR and molecular replacement methods), and experience in protein chemistry and molecular biology to support structure studies. Knowledge of UNIX and related crystallography software is required.

CADD/COMPUTATIONAL CHEMISTRY, RESEARCH SCIENTIST

You will investigate small organic molecules using computational methods, including conformation analysis, pharmacophore generation and analysis and protein docking studies. Requirements include a PhD with 0-4 years experience or a BS/MS degree and 10+ years experience and a strong background in organic chemistry. Expertise in computational methods for small organic molecules and extensive knowledge of UNIX and related computational software are essential.

We reward results by offering competitive salaries, incentive compensation and a full benefits package, which includes a 401(k) and a pension plan. Apply today by sending your resume, indicating Job Code 0413-SCI, via email to: paloalto.hr_staffing@roche.com. You can send your resume to us at Roche Bioscience, 3401 Hillview Avenue, A2-HR, Palo Alto, CA 94304 or fax (650) 424-8159. As an equal opportunity employer, we are committed to workforce diversity.

Visit our website for more information at **www2.roche.com/bioscience.**

Global Opportunities

National Health Research Institutes (NHRI)

128 Yen-Chiu-Yuan Road, Section 2, Taipei 115, Taiwan, ROC
Tel: 886-2-2653-4401; Fax: 886-2-2651-3723

DIRECTOR POSITION

Division of Biotechnology and Pharmaceutical Research

The NHRI—a newly established, non-profit research organization supported by the Government of Taiwan, Republic of China—cordially invites qualified individuals to apply for the director position in the Division of Biotechnology and Pharmaceutical Research, preferably with the capability to serve for at least an initial 5-year term. The Division will serve as a leader in the biotechnology and pharmaceutical research field in Taiwan, both in research and industry leading to the betterment of Taiwan people. The division should also serve as a crucial link between Taiwan and other institutions overseas. The mission of this division, specifically relevant to biotechnology and pharmaceutical research in Taiwan, is to:

1) devise and develop innovative research on biotechnology and pharmaceutical research;
2) promote collaborative research with other research centers both in Taiwan and internationally;

This mission can be accomplished by addressing issues including, but not limited to, basic and clinical research in biology, pharmacology, chemistry, and pharmacokinetics, biotechnology as well as drug discovery.

The director's responsibilities include planning research and clinical programs related to biotechnology and pharmaceutical research. The applicant should have an advanced degree, such as an M.D. or Ph. D., and have 10 years or more of academic and/ or industrial experience with an excellent publication record and solid administrative experience. Experience preferred in a leadership position for more than five years with a proven track record in biotechnology and pharmaceutical research. Candidates should possess strong leadership qualities in medicine, science, pharmaceutical research and administration, and be highly innovative, creative, communicative and dynamic. S/he should also be familiar with the Taiwan scientific research and pharmaceutical industry community, proficient in the Chinese language, and capable of working effectively in the research environment under current circumstances in Taiwan. Salary will be highly competitive with comparable positions in Taiwan.

Apply to: President Cheng-Wen Wu (Tel: 886-2-2653-4401 ext 8000; Fax: 886-2-2651-3742; E-mail: Ken@nhri.org.tw). The application should include a complete curriculum vitae, a brief written description of your vision for the Division (2 pages or less), all professional certification (such as board certification), five representative papers, and five or more names/addresses for references.

Closing Date: Applications will be closed on May 28, 2001.

POSITIONS OPEN

SEARCH REOPENED, ANALYTICAL CHEMISTRY. Viterbo University Chemistry Department invites applications for a full-time, tenure-track position at **ASSISTANT PROFESSOR** level starting August 2001. Ph.D. in analytical chemistry required with interest in environmental chemistry or biochemistry preferred. Successful applicant will have a commitment to excellence in undergraduate teaching and will teach courses in analytical chemistry and instrumental analysis, environmental chemistry and/or other upper-division electives, and general chemistry. Development of a research program with undergraduates is expected. ACS-certified department. A new ethics, science, and technology center is scheduled to open in fall 2003. Viterbo University is a Catholic, Franciscan, ecumenical liberal arts institution with an undergraduate enrollment of 1,500 located in La Crosse, Wisconsin, in the scenic upper Mississippi River valley. Submit application letter, statement of teaching philosophy and research interests, curriculum vitae, graduate and undergraduate transcripts, and three letters of reference to: **Dr. Mary Hassinger, Dean, School of Letters and Sciences, Viterbo University, 815 South Ninth Street, La Crosse, WI 54601.** Review of applications will begin immediately and continue until position is filled. *Applications by women and members of other underrepresented groups are encouraged.*

BIOLOGICAL IMAGING FACILITY MANAGER

Life Sciences Departments at Northwestern University invite applications for a Biological Imaging Facility (BIF) Manager position. The newly established BIF is an interdepartmental facility that provides state-of-the-art instrumentation and technical support for photonic and electron microscopic imaging to researchers at Northwestern. BIF is equipped with multiple confocal microscopes, a multiphoton microscope, a scanning/transmission electron microscope, sample preparation equipment for electron microscopy, and equipment for digital image analysis. Duties of the facility manager include maintenance of facility instruments, training new users, sample preparation for electron microscopy, and maintaining facility records. Experience with biological electron microscopy is required; experience with confocal and/or multiphoton microscopy is highly desirable. Salary range is about $45,000 to $50,000 depending on experience. Interested individuals should send a detailed cover letter and curriculum vitae to:

Catherine S. Woolley, Ph.D.
BIF Manager Search Committee
2153 North Campus Drive
Northwestern University
Evanston, IL 60208

ECOSYSTEM/COMMUNITY ECOLOGIST

The Department of Biology seeks to hire an Ecosystem/Community Ecologist working on the importance of biodiversity to the stability and functional integrity of ecological processes (e.g., energetics, nutrient cycling, N-fixation, decomposition). The position is needed to maintain strength in ecosystem ecology, an area in which the Department has a strong international reputation. Besides ecosystem ecology, our group has strength in evolutionary, behavioral, and conservation ecology from a theoretical and an empirical perspective. The applicant is expected to develop a vigorous research program, to supervise graduate students, and to teach in the biology core program in basic ecology. Applicants should submit curriculum vitae, statement of research and teaching objectives, and three letters of reference to: **Louise Sabaz, Chair's Secretary, Department of Biology, McGill University, 1205 Docteur Penfield Avenue, Montreal, Quebec H3A 1B1 Canada.** The deadline for applications is June 1, 2001. *In accordance with Canadian immigration requirements, this advertisement is directed to Canadian citizens and permanent residents. McGill University is committed to Equity in Employment.*

POSITIONS OPEN

DUKE UNIVERSITY MEDICAL CENTER & HEALTH SYSTEM
Department of Anesthesiology

POSTDOCTORAL POSITION available to study the molecular mechanisms of hormone signal regulation. Expertise in signal transduction and molecular biology is helpful. Studies are performed in cultured cells as well as primary cell culture. We are investigating the mechanisms governing gastrointestinal hormone signal transduction with an emphasis on receptor desensitization and resensitization. We have identified novel targets in the signal termination of peptide hormone receptors, which are typical G protein-coupled receptors. Please contact: **Michael A. Shetzline, M.D., Ph.D., Division of Gastroenterology, Department of Medicine, Duke University Medical Center, Box 3083 Medical Center, Durham, NC 27710. E-mail: shetz001@mc.duke.edu.** Curriculum vitae to **FAX: 919-684-4983.**

PLANT GENOMICS
The Geneva Campus of Cornell University

As part of a genomics initiative, the Geneva campus of Cornell University, in partnership with the Ithaca campus, the Boyce Thompson Institute for Plant Research, and USDA/ARS, is soliciting applications from outstanding candidates for Faculty and Staff Scientist positions in plant genomics. The appointees are expected to participate in a Universitywide interactive team utilizing genomic approaches and, as appropriate, the latest techniques in biochemistry, genetics, analytical chemistry, and molecular and cell biology.

FACULTY POSITION

ASSISTANT PROFESSOR of applied plant genomics. Responsibilities: to develop an innovative program in genomics to examine the genetic and physiological basis of plant responses to their environment. Use of appropriate state-of-the-art structural and functional genomic, molecular, and biochemical tools is expected. The appointee will be expected to develop a program to examine the interaction of plant resistance genes with pest organisms and/or plant responses to specific abiotic stresses such as temperature extremes and adverse soil conditions. This position should emphasize research on topics relevant to fruit and/or vegetable crops important to New York.

Qualifications: A Ph.D. plus at least one year of postdoctoral experience emphasizing research in genomics, molecular biology, or similar disciplines is required as is a solid grounding in botany, horticulture, or a similar field.

Applicants should send curriculum vitae, statement of research interests, and names of at least three references to:

Search Committee
Sturtevant Hall
Cornell University
Geneva, NY 14456
Attention: Gary Harman
E-mail: geh3@cornell.edu
Telephone: 315-787-2452
FAX: 315-787-2320

Position open until filled; review of applications to commence on June 1, 2001.

POSTDOCTORAL POSITION. This laboratory is interested in acquiring a Postdoctoral Fellow with a deep interest in all levels of protein function: structure, dynamics, ground- and transition-state structure and energetics, ligand binding, allostery, the conformational coupling of energetics (molecular motors), and the higher-order organization of catalysis in the cell. Out projects, many of which are structurally grounded, include numerous enzymes that are loosely but not exclusively centered around biomedically important issues in sulfur metabolism. Please send or e-mail your résumé and three letters of recommendation to: **Professor Thomas S. Leyh, Department of Biochemistry, The Albert Einstein College of Medicine, Jack and Pearl Resnick Campus, 1300 Morris Park Avenue, Bronx, NY 10461. E-mail: leyh@aecom.yu.edu.** *Equal Opportunity Employer.*

POSITIONS OPEN

TENURE-TRACK POSITIONS
CHEMICAL PHARMACOLOGY AND MOLECULAR PHYSIOLOGY
Pharmaceutical Sciences, Mercer University
Southern School of Pharmacy, Atlanta, Georgia

The Department of Pharmaceutical Sciences at Mercer University Southern School of Pharmacy invites applications for two 12-month tenure-track faculty positions, one each in the areas of chemical pharmacology and molecular physiology. Both positions are at the **ASSISTANT PROFESSOR** level and require earned Doctorate degrees. A degree in pharmacy and postdoctoral experience are desirable but not essential.

Qualified candidates will be expected to teach in both the professional and graduate programs; to mentor graduate students; and to establish an independent, extramurally funded research program. We are seeking broadly educated individuals to participate in a collaboratively taught, highly integrated curriculum. A strong commitment to excellence in teaching and research is essential. The successful candidate for the position in chemical pharmacology must be able to teach pharmacology as well as the chemical and biochemical processes relevant to the action of specific drugs. The position in molecular physiology involves teaching general and molecular physiology, molecular biology, molecular genetics, and microbiology. Fair consideration will be given to all research interests.

The Southern School of Pharmacy is located on Mercer University's Cecil B. Day Campus in Atlanta, Georgia. The campus' 335 wooded acres create a serene and secluded atmosphere despite its close proximity to downtown Atlanta. The Department of Pharmaceutical Sciences is composed of 10 full-time tenure-track faculty, two full-time research faculty, and 13 Doctoral degree students.

Review of applications will begin June 1, 2001. Applicants should provide curriculum vitae, a statement of research interests and professional goals, a statement of teaching philosophy, and the names and addresses of three references. Please send applications to:

Stephen J. Cutler, Ph.D.
Department of Pharmaceutical Sciences
Mercer University
3001 Mercer University Drive
Atlanta, GA 30341-4155

Affirmative Action/Equal Opportunity Employer–Americans With Disabilities Act.

The Basic Science division of a growing professional college is soliciting applications to fill a new position in the Department of Anatomy. This is a **FULL-TIME TEACHING POSITION** that requires experience in gross anatomy and embryology. Additional experience in histology and neuroanatomy is also useful. Qualified applicants must have teaching experience, communicate effectively in English, and possess a Doctorate in anatomy or a related discipline. Qualified individuals should submit résumés, including three references, to: **The Dean of Instruction, Cleveland Chiropractic College, 6401 Rockhill Road, Kansas City, MO 64131.** *Equal Opportunity Employer.*

RESEARCH ASSOCIATE POSITION is available immediately to study mechanisms of pulmonary vascular reactivity. Experience with patch clamping techniques and confocal fluorescent microscopy in cultured cells is required. Send curriculum vitae and three letters of reference to: **J. T. Sylvester, M.D., Division of Pulmonary and Critical Care Medicine, The Johns Hopkins Asthma and Allergy Center, Baltimore, MD 21224. FAX: 410-550-2612; e-mail: jsylv@welch.jhu.edu.**

GENETIC RESEARCH POSITIONS. The new Center for Human Genetics Studies at the Mid-Hudson Family Health Institute in New Paltz, New York, is recruiting for a laboratory technician, **RESEARCH ASSISTANT**, and a **POSTDOCTORAL** individual for NIH-funded projects on movement disorders and mental retardation. Experience in molecular biology and positional cloning required. Interested candidates forward curriculum vitae, attention: **L. Karol. FAX: 845-255-7340; e-mail: lkarol@fpinstitute.org.**

Science Writer

The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) is seeking applications from individuals who are currently in post-doctoral positions, but who wish to leave laboratory research for a career as a science writer. Particularly encouraged to apply are individuals with post-doctoral experience in molecular biology, coupled with demonstrated writing and other communication skills. Incumbent will develop a wide range of documents that analyze and present the scientific accomplishments and plans of the NIDDK to the Congress, voluntary health organizations, and other lay audiences and must thus be able to convey in global, understandable terms the contributions of biomedical research to human health. Total salary is competitive and will be commensurate with the experience of the selectee.

Please submit current curriculum vitae to the attention of:

Ms. Deidre Davis
Office of Human Resource Management
National Institute of Diabetes and Digestive and Kidney Diseases
National Institutes of Health
Building 31, Room 9A30
31 Center Dr., MSC 2560
Bethesda, Maryland 20892-2560

Applications must be postmarked by April 20, 2001, and received by close of business April 25, 2001.

NIDDK

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Biophysicists, Biophysical Chemist and Biochemist Positions Available in West Point, PA

Merck Research Laboratories presently has openings for Senior Research Biophysicists, Biophysical Chemists and Biochemists at our **West Point, PA** facility (25 miles NW of Philadelphia).

Biophysics candidates are expected to have an interdisciplinary background at the interface of biology and physics, including a Ph.D. in biology, biophysics, or physics with significant experience in a complementary area, as well as at least 2 years' post-doctoral experience. Candidates are expected to think creatively in applying physical reasoning and approaches to a diverse set of biological problems. Previous assay development, rigorous data analysis, and computer programming skills preferred.

Biophysical chemistry and biochemistry candidates should have a Ph.D. in biochemistry, chemistry or physics and experience in the area of thermodynamics and kinetics of macromolecular interactions, biochemical assay development and/or protein purification and characterization. Candidates are expected to think creatively in the characterization and analysis of biochemical systems relevant to drug discovery and vaccine development.

Excellent salary and benefits programs accompany these positions in our modern research facility. To be considered, please submit your resume and cover letter, indicating salary requirements to: **Merck Research Laboratories, Ad #AJS, WP16-225, West Point, PA 19486.** We are an Equal Opportunity Employer. M/F/D/V. Principals Only.

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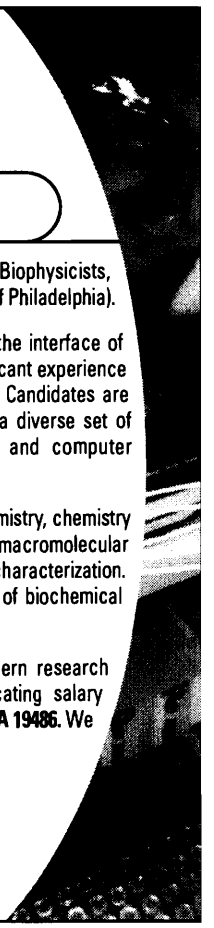

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1 *Science*, June 2000, BPA Publisher's Statement
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For information, contact Daryl Anderson
Tel 202-326-6543
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E-mail ..... danderso@aaas.org

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NIDA NATIONAL INSTITUTE ON DRUG ABUSE NATIONAL INSTITUTES OF HEALTH

DIRECTOR, DIVISION OF EPIDEMIOLOGY, SERVICES AND PREVENTION RESEARCH

The National Institute on Drug Abuse (NIDA) is responsible for leading the nation in bringing the power of science to bear on drug abuse and addiction and is seeking a highly energetic and creative individual to head its Division of Epidemiology, Services and Prevention Research to:

- Provide leadership in support of basic and applied epidemiology, prevention research, community-based research and health services research that relates to drug abuse and addiction.
- Develop and administer a national program of scientific research through grants and contracts with universities and medical centers concerned with the impact of the organization and financing of drug treatment and prevention programs and service systems on the quality, cost, and outcome of care.
- Collaborate with national and international scientific experts and organizations to maintain liaison with leaders in the field.

Mandatory qualifications include:
1) an M.D., Ph.D. or equivalent; 2) ability to lead a scientific program of national scope, based on demonstrated scientific excellence and research experience; 3) ability to provide leadership and vision to a large multi-disciplinary research program of national scope and complexity with extensive managerial and executive level responsibilities, including: managing a diverse workforce; developing and executing organizational, budgetary and human resource plans; resolving major operational issues; and planning program objectives.

NIDA offers competitive salary and benefits, plus incentives. For additional qualifications and complete vacancy announcement NIDA-01-0023 (SES) or NIDA-01-0024 (PHS Act), visit http://careerhere.nih.gov or contact Lynnita Parrish at parrishl@mail.nih.gov or 301-402-0741.

NIDA is an Equal Opportunity Employer

POSITIONS OPEN

POSTDOCTORAL POSITIONS NEUROENDOCRINOLOGY

Two NIH-funded Postdoctoral positions are available for recent Ph.D. awardees to study postreceptor transduction pathways involved in hypothalamic control of anterior pituitary function. These positions will use patch clamp and immunocytochemical/*in situ* hybridization approaches to study effects of anterior pituitary hormones and recently described peptides on hypothalamic neuronal activity (See *Endocrinology* **138:** 3141, 1997; ibid. **139:**5164, 1998; ibid. **141:**366, 2000; *Brain Research* **802:**141, 1998). A molecular biological background is desirable for each position. Both positions will be for a minimum of two years and *require citizenship or permanent residency status.* Please send curriculum vitae, a brief statement describing what role you would like to assume in the project(s), and names of three references to: **Dr. Marc E. Freeman, Department of Biological Science, Florida State University, Tallahassee, FL 32306-4340. E-mail: freeman@neuro.fsu.edu**.

POSTDOCTORAL POSITION MOLECULAR MECHANISMS OF EUKARYOTIC TRANSCRIPTION Vanderbilt University Medical Center

Two Postdoctoral positions available to examine the role of TBP, the TATA box binding protein, and its associated protein factors in RNA polymerase II-mediated transcription initiation using the baker's yeast *Saccharomyces cerevisiae* system. We currently utilize a combination of biochemical, genetic, and biophysical methods to study the regulation and interactions of these proteins with each other, DNA, and other transcription factors; details can be obtained at **website: www.mc.vanderbilt.edu/vumcdept/mpb/weil/weil_lab.html**. Interested parties should send curriculum vitae and names of references to: **Dr. Tony Weil, Department of Molecular Physiology and Biophysics, Vanderbilt University, School of Medicine, Nashville, TN 37232-0615. FAX: 615-322-7236**. *Vanderbilt University is an Affirmative Action/Equal Opportunity Employer.*

FIVE POSTDOCTORAL POSITIONS

Five Postdoctoral positions are available immediately at the NIH Center for Protein Structure and Function. The Center is fully equipped with modern NMR, X-ray crystallography, and mass spectrometry laboratories for the study of protein structure, function, and dynamics. Current research projects include (1) design of collagen-binding peptides for drug delivery and nerve regeneration, (2) principles of protein folding and rational protein design, (3) protein targeting and signal recognition, (4) calcium regulation of macromolecular assembly in striated muscle, (5) mechanism of oxidative phosphorylation in alkaliphilic bacteria, and (6) use of new ruthenium photoexcitation techniques to study electron transfer in mitochondrial cytochrome oxidase and cytochrome bc_1. Send curriculum vitae, statement of research interests, and names of three references to: **Frank Millett, Department of Chemistry and Biochemistry, University of Arkansas, Fayetteville, AR 72701. E-mail: millett@uark.edu**. *Affirmative Action/Equal Opportunity Employer.*

POSTDOCTORAL FELLOWSHIP available to explore novel strategies for the immunotherapy of cancer and HIV infection (see our **website: http://www.med.upenn.edu/~immun/paterson.html**). In addition to intensive research training in our laboratory, Fellows may participate in the job skill training programs offered by the University of Pennsylvania Office of Postdoctoral Programs (see **website: http://www.med.upenn.edu/postdoc/**). Positions are open for recent or imminent Doctoral graduates in either bacterial pathogenesis or mucosal, cellular, or tumor immunology. A knowledge of modern immunological and bacterial recombinant techniques would be an advantage. Interested candidates should send curriculum vitae and names of three references to: **Dr. Yvonne Paterson, Professor of Microbiology, University of Pennsylvania, 323 Johnson Pavilion, Philadelphia, PA 19104-6076**.

POSITIONS OPEN

PHYSICIAN/INVESTIGATOR

The Division of Rheumatology, Department of Medicine, at the University of Massachusetts is seeking a Rheumatologist with a laboratory-based research program to join the faculty at the **ASSISTANT** or **ASSOCIATE PROFESSOR** level. Substantial time (80%) can be devoted to laboratory research.

Applicants for this tenure-track position are requested to send curriculum vitae, bibliography, names of three references, and statement of research interests to: **Robert B. Zurier, M.D., Director of Rheumatology, Department of Medicine, University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, MA 01655**. *The University of Massachusetts is an Affirmative Action/Equal Opportunity Employer with a strong commitment to fairness and diversity.*

The Field Museum invites applications for a **STAFF SCIENTIST** to function as Manager of its Pritzker Laboratory for Molecular Systematics and Evolution, a core facility used by curators, Postdoctoral Research Associates, technicians, visiting Scientists, and graduate students. M.S. required; Ph.D. preferred. The applicant must have extensive practical experience with various molecular techniques including PCR, DNA sequencing, and cloning. Applicants should send curriculum vitae, statement detailing experience with molecular evolutionary techniques, and three letters of reference to: **Dr. Shannon Hackett, Department of Zoology, Field Museum, 1400 South Lake Shore Drive, Chicago, IL 60605-2496. E-mail: shackett@fieldmuseum.org**. The Field Museum's **website** is: **www.fieldmuseum.org**. Review of applications will begin May 1, 2001. *The Field Museum is an Equal Opportunity Employer and applications from women and minorities are encouraged.*

POSTDOCTORAL POSITION available to study the biochemistry and cell biology of intracellular signaling processes using biologically active natural products. We are identifying novel targets that are involved in angiogenic, proinflammatory, and cell cycle regulatory pathways. Experience with techniques in molecular biology, tissue culture, and signal transduction pathways preferred. Please send curriculum vitae, a brief statement of past research, and names/addresses of three references to: **Dr. Craig Crews, Yale University Department of Molecular, Cell, and Developmental Biology, P.O. Box 208103, New Haven, CT 06520-8103. E-mail: www.yale.edu/crews**.

POSTDOCTORAL POSITION: Molecular virology. Two Postdoctoral positions in the field of HIV particle exit are available in the Department of Molecular Genetics and Microbiology at the University of New Mexico. Applicants should have a Ph.D. Experience in molecular virology, immunology, or molecular biology is desirable. Please send curriculum vitae and three letters of reference to: **Dr. Antonito Panganiban, Department of Molecular Genetics and Microbiology, 915 Camino de Salud, University of New Mexico, Albuquerque, NM 87131. E-mail: apanganiban@salud.unm.edu**. To learn more about us, visit our **website: http://hsc.unm.edu/som/micro/index.html**.

ANATOMIST. Full-time **ASSISTANT PROFESSOR** to teach gross anatomy. Seventy-five percent research, 25% teaching. Ph.D. and experience teaching medical gross anatomy required. Prefer candidates in evolutionary morphology, paleontology, or physical anthropology. Review of applications begins May 15, 2001, to continue until position is filled. Submit curriculum vitae; research and teaching statements; and names, addresses, and e-mail addresses of three references to: **Nikos Solounias, Chair of Anatomy, New York College of Osteopathic Medicine, Old Westbury, NY 11568**.

PHARMACOGENETICIST

Midwest - Marshfield Clinic

Marshfield Clinic employs nearly 600 physicians in multiple specialties at 38 sites throughout central, western and northern Wisconsin. Marshfield Medical Research Foundation (MMRF) is the research division of Marshfield Clinic. It employs approximately 200 people and includes the Clinical Research Center, Marshfield Epidemiology Research Center, National Farm Medicine Center, Rural Cancer Research Center, and Centers for Community Outreach, Medical Genetics, Health Services Research and Personalized Medicine.

Currently, we are seeking a Pharmacogeneticist to provide expertise within MMRFs Center for Personalized Medicine. This is a tenure track position.

Here, you will have responsibility for the following:

- Performing independent research
- Supervising and leading staff
- Publishing
- Collaborating with internal and external resources
- Developing external funding support

We provide: competitive salary and benefits; fully vested retirement plan; 401K plan; health, dental, life and disability insurance; four weeks paid vacation, first year; two weeks CME, with up to $4000.00 allowance; generous relocation allowance and more!

Interested candidates are encouraged to submit a CV, to:

Mary Treichel
Physician Recruitment
MARSHFIELD CLINIC
1000 N Oak Avenue
Marshfield, WI 54449

Telephone:
800-782-8581
Extension 19774
Fax: 715-221-9779

E-mail:
treichem@mfldclin.edu

Website:
www.marshfieldclinic.org/recruit

MARSHFIELD CLINIC

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OHSU
VACCINE & GENE THERAPY INSTITUTE

Oregon Health Sciences University, located in Portland, OR, has recently established the Vaccine and Gene Therapy Institute. Our mission is to understand the fundamental biology of the pathogenic immune response and develop protective mechanisms for a variety of diseases.

The Institute resides in a state-of-the-art 25,000 square foot facility located on the OHSU West Campus, approximately 10 miles from Portland. Core facilities include: Animal housing (small animal and non-human primates), flow cytometry, monoclonal antibody production, virology, molecular biology, DNA-microarray, and imaging. The West Campus also houses the Oregon Regional Primate Research Center.

Postdoctoral, graduate student and research associate positions are available under the following investigators:

•**Klaus Früh**, Functional genomics approaches to viral infection and evasion of host immune responses •**Ashlee Moses**, Bone marrow involvement in HIV disease and mechanisms of viral carcinogenesis in HHV8/KS and AIDS related lymphoma •**Jay Nelson**, Molecular mechanisms involved in viral pathogenesis of chronic diseases •**Janko Nikolich-Zugich**, T-cell development, antigen recognition, homeostasis and antiviral function •**Louis Picker**, Human and non-human primate T-cell biology, immunologic memory, immunity to and vaccine development for persistent viruses (HIV/SIV, CMV) •**Mark Slifka**, Regulation of antiviral T-cell-mediated cytokine production •**Scott Wong**, Elucidation of mechanisms associated with viral-mediated pathogenesis.

Send a CV and references to:
Paul Woloshin, Ph.D.
Administrative Director
OHSU Vaccine and Gene Therapy Institute
505 NW 185th Avenue
Beaverton, OR 97006

Taking our lead from nature, Genencor International creates biocatalytic proteins and biomaterials for a wide variety of applications in the healthcare, agriculture and industrial/consumer chemical markets. As a diversified biotechnology company, our proprietary *i*-biotech™ approach uses integrated technology platforms to deliver innovative solutions to our customers rapidly and cost efficiently. With 250 products and over $300 million in sales, we're working to make safer, more effective drugs and more powerful cleaning products. We're also enabling the efficient production of chemicals and are working on new breakthroughs to advance "green chemistry" as well as fuel the world of the future. To get us there, we are seeking more talented professionals who—like us—are innovative by nature.

Scientist II, Mass Spectrometry

As a member of our growing Proteomics group, you will be a key contributor to our projects using mass spectrometry techniques. Using your in-depth knowledge of protein biochemistry, chromatographic methods, and mass spectrometry, you will establish a vigorous research project to develop liquid chromatography interfaces with mass spectrometry. In addition, you will act as the hands-on resource in the laboratory using your project planning/management skills. Requires a PhD in Biochemistry, Analytical Chemistry or related field with 1-2 years of postdoctoral experience in chromatography and mass spectrometry (LC/MS) areas. Excellent communication, computer and data management skills are essential. Job Code: PA-15N-01SCI

Research Assistant, Proteomics

As a talented and highly motivated individual, your primary responsibilities will be high-throughput proteomics using state-of-the-art 2D-gel electrophoresis and mass spectrometric (NanoESI-LC/MS/MS or MALDI-TOF) analysis. You will need in-depth knowledge of protein biochemistry, hands-on experience in bioanalytical chemistry and different chromatographic techniques and protein/peptide mass spectrometry. Requires a BS/MS in Biochemistry, Analytical Chemistry or related field and 1-5 years academia or industry laboratory experience. Excellent laboratory and communication skills are necessary. Job Code: PA-13N-01SCI

As one of the top biotechnology companies in the world, Genencor offers an informal, highly creative work setting in which high team spirit, open communication and environmental responsibility are considered company hallmarks. Our competitive compensation and benefits package features a generous 401(k) matching plan, stock options, and a retirement plan. For consideration, please submit your resume/c.v. to: **Genencor International, Inc., 925 Page Mill Road, Palo Alto, CA 94304-1013, Fax: (650) 845-6503, email: hr@genencor.com.** Background checks will be conducted. An equal opportunity employer M/F/D/V.

For a complete listing of our job opportunities, visit our website at

www.genencor.com

Genencor International, Inc.® Innovative by Nature™

POSTDOCTORAL POSITIONS
Department of Nutritional Sciences and Toxicology
University of California, Berkeley, CA 94720-3104

Positions are available in the laboratories of **Barry Shane, Hei Sook Sul**, and **Joseph Napoli**.

Napoli Laboratory: regulation of retinoid metabolism during development and aging. Molecular mechanisms of endocrine effects on expression and activity of retinoid metabolic enzymes.

Shane Laboratory: enzymology and molecular genetics of one-carbon metabolism. Regulation of folate metabolism. Roles of SNP in human one-carbon metabolic paths.

Sul Laboratory: regulation of gene expression during fat synthesis and adipogenesis. Mode of action and down regulation of inhibitors of adipocyte differentiation. Transcriptional regulation of lipogenic enzyme genes by insulin and its signal transduction pathway.

Send curriculum vitae and three letters of reference by FAX or e-mail to: **Dr. Hei Sook Sul; e-mail: hsul@nature.berkeley.edu** or **Dr. Joseph Napoli; e-mail: jna@unclink4.berkeley.edu** or **Dr. Barry Shane; e-mail: bandie@socrates.berkeley.edu. FAX: 510-642-0535**.

HUMAN NUTRITION
Memorial University of Newfoundland

The Biochemistry Department and the Janeway Child Health Centre are searching for a Scientist to fill a tenure-track, Tier II Canada **RESEARCH CHAIR** in the area of either pediatric or maternal nutrition. Preference will be given to applicants in the area of pediatric nutrition. Appointment will be made at the rank appropriate to the candidate's qualifications. The candidate will be expected to teach undergraduate students, foster multidisciplinary approaches to research questions, and develop a vigorous graduate student research and teaching program. The review of applications will begin 30 May 2001 and continue until a qualified candidate is found. Further information about the position can be found at **website: http://www.mun.ca/biochem/human_nutrition_2001.html**. Interested persons should send a résumé, a statement of specific research interests, and the names and addresses of three references to: **Dr. J.T. Brosnan, Professor and Head, Department of Biochemistry, Memorial University of Newfoundland, St. John's, Newfoundland A1B 3X9 Canada. Telephone: 709-737-8529; FAX: 709-737-2422; e-mail: jbrosnan@mun.ca.**

POSTDOCTORAL POSITION in a newly funded project to clone the Hutchinson-Guilford progeria gene. The successful candidate will develop novel somatic cell complementation strategies based on reporter gene selection, high-titer retroviral libraries, and expression profiling by microarray analysis. Ph.D., M.D., or equivalent degree is required. Extensive experience in tissue culture, flow cytometry, immunofluorescence microscopy, and molecular biology techniques (e.g., recombinant DNA, PRC, immunoblotting, etc.) will be essential. Strong training and career development will be provided through a new Brown University strategic initiative in genetics and genomics (**website: www.brown.edu/Research/Genetics_Genomics/**). The project will be headed by: **Dr. John Sedivy, Department of Molecular Biology, Cell Biology, and Biochemistry, Brown University, Box G-J223, Providence, RI 02912. E-mail: john_sedivy@brown.edu**. To ensure full consideration, send curriculum vitae and names of three references before June 1, 2001, to: **GH Project Search, c/o Tammy Glass** at the above address. *Brown University is an Equal Employment Opportunity/Affirmative Action Employer and invites applications from women and minorities.*

POSITIONS OPEN

Stanford University School of Medicine has opened a full-time faculty position in the University tenure track in the Division of Epidemiology, Department of Health Research and Policy. The appointment may be at either the **ASSISTANT, ASSOCIATE**, or **FULL PROFESSOR** level depending on the qualifications of the candidate. We expect that the candidate will have both an M.D. and an advanced degree in epidemiology or related discipline and have a primary interest in clinical epidemiology. We expect the successful candidate will develop an independent program of research in clinical epidemiology and assume a leadership role in the teaching programs for Clinical Investigators and Epidemiologists within the School of Medicine. The successful candidate will have demonstrated a record of research accomplishments and teaching in the field of clinical epidemiology. We are particularly interested in candidates with substantial experience in large population studies or clinical trials.

Candidates interested in this position should send a copy of their curriculum vitae, a brief letter describing their interests, and the names of three references to:

Alice Whittemore, Ph.D.
Chief, Division of Epidemiology
Stanford University School of Medicine
HRP Redwood Building, Room T204
Stanford, CA 94305-5405

Stanford University is committed to increasing the representation of women and members of minority groups among its faculty and particularly encourages applications from such candidates.

POSTDOCTORAL POSITIONS

Several Postdoctoral positions are available to study vaccine development for SIV in the Rhesus macaque. Our laboratory is NIH funded and interested in the development of a CTL-based vaccine for SIV. Work will involve tetramer technology, intracellular staining, cell sorting, and analysis of the immune response of MHC-defined Rhesus macaques to vaccination and challenge with SIV. Experience in immunological techniques and flow cytometry would be advantageous. Experience in immunology or virology would be preferred. Send a letter of interest and curriculum vitae to: **Dr. David I. Watkins, University of Wisconsin, WRPRC, 1220 Capitol Court, Madison, WI 53715. E-mail: watkins@primate.wisc.edu**.

The University of Wisconsin is an Equal Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.

POSTDOCTORAL FELLOW
Massachusetts General Hospital/ Harvard Medical School

Position available to study TGFbeta family regulation of morphogenesis in *Drosophila*. Applicants should have a Ph.D. in developmental, molecular, or cell biology with some training in genetics. Send curriculum vitae and names of three references to: **Laurel Raftery, Ph.D., Cutaneous Biology Research Center, Massachusetts General Hospital, Building 149 13th Street, Charlestown, MA 02129 U.S.A. E-mail: laurel.raftery@cbrc2.mgh.harvard.edu**.

The MGH/Harvard Cutaneous Biology Research Center is a committed Equal Opportunity/Affirmative Action Employer. Minorities, women, handicapped, and veterans are encouraged to apply.

POSTDOCTORAL POSITION
IMMUNOGENETICS

A Postdoctoral position is available immediately to study the immunogenetics of the Rhesus macaque MHC. Our laboratory is NIH funded and is involved in research into the MHC of the Rhesus macaque as well as SIV vaccine development. Our area of interest includes development of MHC typing for the Rhesus macaque. Skills in molecular biology and sequencing are desired. A degree in molecular biology would be preferred. Send letter of interest and curriculum vitae to: **Dr. David I. Watkins, University of Wisconsin, WRPRC, 1220 Capitol Court, Madison, WI 53715. E-mail: watkins@primate.wisc.edu**.

The University of Wisconsin is an Equal Opportunity/Affirmative Action Employer. Women and minorities are encouraged to apply.

POSITIONS OPEN

PENN
UNIVERSITY of PENNSYLVANIA

DIRECTOR
CENTER FOR BIOINFORMATICS
University of Pennsylvania
Genomics Institute

The Center for Bioinformatics seeks a **SENIOR RESEARCH SCIENTIST** with experience in computational biology to serve as Director. Applicants must have the vision, managerial ability, interdisciplinary interests, and research skills to work with existing researchers in the Center and expand the dynamic research program already in place at the University of Pennsylvania. Appointment (with tenure) will be made within the Schools of Medicine, Arts, and Sciences or Engineering and Applied Sciences as appropriate.

In support of a new Genomics Institute, the University of Pennsylvania is making substantial investments in research space, computational and other equipment for genomics research, and new faculty at all levels. The Center for Bioinformatics was established four years ago, and its educational and research programs play a critical role in this initiative.

Please send curriculum vitae, a description of research interests, and relevant supporting materials to: **Director Search, Center for Bioinformatics/ Genomics Institute, 1313 Blockley Hall, University of Pennsylvania, 418 Guardian Drive, Philadelphia, PA 19104-6021**. *The University of Pennsylvania is an Affirmative Action/Equal Opportunity Employer. Women and minorities are encouraged to apply.*

ASSISTANT PROFESSORS
Waterfowl and Wetlands Ecology and Management
and Wildlife-Human Interactions
University of Minnesota

The University of Minnesota Department of Fisheries, Wildlife, and Conservation Biology is seeking two tenure-track **ASSISTANT PROFESSORS**, one in waterfowl and wetlands ecology and management and the other in wildlife-human interactions. Ph.D. in wildlife or closely related field required. Successful candidates are expected to develop strong teaching and externally funded research programs (25% minimum) and develop synthetic outreach programs (25% minimum) to assist diverse constituencies. Position description and application requirements can be obtained at **website: www.fw.umn.edu** or from: **David Andersen; Telephone: 612-624-3421; e-mail: fwpositions@fw.umn.edu**. Review begins May 30, 2001, until positions are filled. *The University of Minnesota is an Equal Opportunity Employer and Educator.*

POSTDOCTORAL POSITION open July 1, 2001, to apply DNA microarray and genomic approaches together with traditional research techniques to study gene regulatory circuits in pathogenic fungi that control expression of virulence factors. Applicants should have a recent Ph.D. in molecular biology or biochemistry (within previous five years) and experience with gene replacement and bioinformatics in fungi. Please send curriculum vitae and names of three references to: **Dr. Paula Sundstrom, Department of Molecular Virology, Immunology, and Medical Genetics, Ohio State University, 333 West 10th Avenue, Columbus, OH 43206. E-mail: Sundstrom.1@osu.edu**. *Applicants must be U.S. citizens or permanent residents.*

POSTDOCTORAL POSITION is available to investigate the action of the insect juvenile hormones at the molecular level. Research will focus on hormone regulation of gene expression. Applicants should have a practical background in molecular biology. Further information can be found at **website: http://entomology.wisc.edu/~goodman**. Please send curriculum vitae, statement of research interests, and the names of three references to: **Walter Goodman, Depatment of Entomology, 237 Russell Laboratories, University of Wisconsin–Madison, Madison, WI 53706. E-mail: goodman@entomology.wisc.edu**.

CHIEF, LABORATORY OF BIOPHYSICAL CHEMISTRY
NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

The Division of Intramural Research (DIR) of the National Heart, Lung & Blood Institute (NHLBI), National Institutes of Health (NIH) is soliciting applications from outstanding individuals for the position of Chief of the Laboratory of Biophysical Chemistry (LBC). The LBC has been the focus of the biophysics and structural biology program in the DIR. With the intent of expanding this program, a candidate with an internationally recognized research program in biophysics or structural biology is being sought to lead this program. Special consideration will be given to candidates with research excellence and demonstrated leadership abilities in areas of biophysics/structural biology that enhance or complement existing research in the LBC such as NMR and optical spectroscopy, protein mass spectrometry, computational biophysics or a related discipline. Specific areas of interest include protein structure including detection and characterization of post-translational modifications, receptor/substrate or protein/DNA interactions, and the study of forces involved in biological function at the atomic level. The incumbent will be funded from funds within the DIR and will be expected to maintain vibrant and innovative scientific productivity in addition to providing strong leadership. The compensation of the Chief of the LBC will be commensurate with experience and qualifications.

Applicants should submit a curriculum vitae together with a statement of research interests and plans and should arrange for three letters of recommendation to be sent to:

Ms. Christine Fisher, Personnel Office
National Heart, Lung, and Blood Institute
Building 31, Room 5A28
Bethesda, MD 20892-2484

Applications must be received no later than **June 4, 2001**.

The NIH is an Equal Opportunity Employer. Applications from women, minorities, and persons with disabilities are strongly encouraged. The NHLBI/NIH is a smoke-free workplace.

National Institutes of Health
National Institute on Alcohol Abuse and Alcoholism
Postdoctoral Fellowships
Section of Brain Eletrophysiology and Imaging
Laboratory of Clinical Studies, NIAAA

A postdoctoral fellowship under the mentorship of Daniel Hommer, M.D., is available in the Section of Brain Eletrophysiology and Imaging at the National Institute on Alcohol Abuse and Alcoholism. Candidates must have a strong research interest and background in the neurobiology of emotion or cognition. The current focus of the Laboratory is on functional brain imaging in humans as related to neural mechanisms of reward and punishment, as well as structural brain imaging as related to substance abuse. Fellowship will include training in both FMRI and PET. Candidates must have a Ph.D. (or M.D./Ph.D.) in psychology, neuroscience or a related discipline. Applicants should send a curriculum vitae with bibliography, a statement of research interests, and the names, E-mail addresses and telephone numbers of three references to:

Daniel Hommer, M.D.
Room 3C103
10 Center Drive, NIH
Bethesda, MD 20892-1256

by August 1, 2001.

NIH is an Equal Opportunity Employer. Applications from women, minorities, and persons with disabilities are strongly encouraged. The DICBR/NIAAA is a smoke-free environment.

NMRC
Ireland's ICT Research Centre

NMRC was established in 1981 and is today the largest Information & Communication Technologies (ICT) Research Centre in Ireland with a staff of over 200 and a state of the art research infrastructure. NMRC has a dual mission, firstly to be a Centre of Excellence in selected ICT fields, and secondly to be a key part of the national science, technology, and innovation infrastructure, supporting existing indigenous and multinational industry, deepening and broadening the skills pool for Irish industry, and stimulating new indigenous industry and inward investment from foreign companies. Most recently, NMRC has been designated as the host site for the National Nanofabrication Facility.

NMRC has recently been awarded a number of Postdoctoral and student fellowships under the EU Marie Curie initiative. Eligible candidates must be 35 years or less and an EU national or member of an associated state (or residing in the EU for the last 5 years). Fellowships cannot take place in the same country as the student's current host university and the project must be recognised as an integral part of their studies. NMRC is an equal opportunities employer. The following projects are available under the fellowship programmes:

Postdoctoral Positions in Micro-Fluidics: Design, Simulation and Experimentation.
The ideal candidate should have experience in fluid mechanics and computational analysis and an interest in how micro-fluidics can be applied. The salary for this position is Eur 32,807 pa. An additional mobility allowance will be paid and return travel costs will be covered.

Student fellowships: Fellowships last for periods of up to 12 months and apply to current PhD students. An annual stipend of Eur 14,400 will be paid, as well as return travel costs. Fellowships are available in the following areas:

1) **Integrated Magnetics**
- Development of Magnetic Materials for Microelectronic Applications
- Design Tools for Integrated Magnetic Components
- Applications of Embedded Magnetic Materials
- Integrated Passives for Power Conversion

Microsystems
- Molcular Microsystems
- Photonic Microsystems
- Bionics
- Nanochemistry, Nanophysics, Nanomaterials, and Nanobiology.

3) **Packaging**
- Systems Integration and Miniaturisation using High Density
- Interconnection Technologies

4) **Computational Modelling**
- Computational Materials, Process Device and Circuit Modelling
- Thermal and Thermo-Mechanical Simulation
- Microsystems CAD
- Quantum Electronic Transport
- Molecular Electronics

Further details of these fellowships are available on :
http://www.nmrc.ie/careers/index.html

Interested candidates should apply (preferably by email) with a current CV and references to:
Clodagh Gleeson, HR Officer,
NMRC,
Lee Maltings,
Prospect Row,
Cork.

Email: cgleeson@nmrc.ie. Tel: 00 343 21 4904232.

POSITIONS OPEN

United States Department of Agriculture, Agricultural Research Service, Avian Disease and Oncology Laboratory, East Lansing, Michigan, is seeking a permanent **RESEARCH GENETICIST** at the GS-12/13 level. The incumbent will contribute to a unit working on the biology and control of avian tumor viruses with an emphasis on the identification of genes and pathways associated with viral disease resistance in poultry. Preference will be given to individuals with skills in molecular quantitative genetics or bioinformatics. Ph.D. in genetics, molecular biology, animal science, or related area is required. Salary range is $51,927 to $80,279 with full benefits. *U.S. citizenship is required.* For research program information, contact: **Dr. Hans H. Cheng; Telephone: 517-337-6758; e-mail: hcheng@pilot.msu.edu**. To address specific qualification requirements and application instructions, applicants must request a copy of Vacancy Announcement ARS–X1W–1295 by calling **Telephone: 517-337-6825** or via the ARS **website: www.ars.usda.gov**. Applications must be postmarked by May 18, 2001. *The USDA is an Equal Opportunity Provider and Employer.*

Wayne State University. **POSTDOCTORAL POSITIONS** available immediately to study proliferation control in early mammalian development/placentation. Qualified candidates must hold a Doctoral degree. Experience in embryo handling, DNA plasmid construction, and/or microinjection desired. Participating faculty are **D.R. Armant, Ph.D.:** blastocyst implantation and trophoblast adhesion mechanisms; **M. Diamond, M.D.:** effects of hypoxia in postoperative wound healing and adhesions; **R.E. Leach, M.D.:** human endometrial-trophoblast interactions and fertility; **D.A. Rappolee, Ph.D.:** early embryonic/placental growth control, embryonic heart contractility.

Send current curriculum vitae and names and addresses of three references to: **Dan Rappolee, Mott Center for Human Growth and Development, Wayne State University, 275 East Hancock Avenue, Detroit, MI 48201. E-mail: drappole@med.wayne.edu; FAX: 313-577-8554**. *Wayne State University is an Equal Opportunity Employer.*

BIOLOGISTS WANTED TO WRITE PROBLEM SETS

The Association of American Medical Colleges is seeking experienced Biologists to write (about twice a year on a contract basis) a problem set consisting of a 250-word passage on a biological topic followed by 10 multiple choice questions based on that passage. The questions are designed to test knowledge and comprehension of the level of biology taught in a two-semester introductory college course. Applicants with a Doctorate and prior experience teaching introductory biology are preferred. The pay is $400 per problem set. To apply, please send curriculum vitae with relevant experience and an e-mail address to:

Dr. John Lockwood
AAMC/MCAT Program
2450 N Street, N.W.
Washington, DC 20037

VIROLOGIST/MOLECULAR BIOLOGIST

A position is available immediately to produce, characterize, and identify valuable cold viruses from combinatorial libraries in which rhinoviruses are engineered to present immunogens on their surface for the generation of therapeutic antibodies. Expertise in molecular biology and biochemistry and, ideally, virology as well is required. Send curriculum vitae, a description of research experience, and names and contact information for three references to: **Dr. Gail Ferstandig Arnold, Center for Advanced Biotechnology and Medicine and Rutgers University, 679 Hoes Lane, Piscataway, NJ 08854-5638. FAX: 732-235-5788; e-mail: gfarnold@cabm.rutgers.edu; website: http://www.cabm.rutgers.edu/~arnold**. *Affirmative Action/Equal Opportunity Employer.*

POSTGRADUATE RESEARCHER: The Marine Biology Research Division of Scripps Institution of Oceanography, University of California San Diego, seeks a Protein Biochemist with experience in gene cloning and expression or metalloprotein biochemistry to participate in a multidisciplinary project investigating manganese oxide biomineralization. The position is part of an NSF-funded Collaborative Research Activity in Environmental Molecular Science (CRAEMS), which spans the disciplines of microbiology, bioinorganic chemistry, and environmental aqueous geochemistry. The project is codirected by **B. Tebo (Scripps), T. Spiro (Princeton), G. Sposito (University of California Berkeley),** and **J. Bargar (Stanford Synchrotron Radiation Laboratory)**. The Postdoctoral Researcher will interact with other program participants to investigate the molecular mechanisms of manganese oxidation by bacteria and the mechanisms by which the resulting oxide solids impact the chemistry of heavy metals and organic contaminants in soils and natural waters. The successful applicant will be based at Scripps and will be responsible for expressing, purifying, and characterizing the products of microbial genes that have been identified as controlling manganese (II) oxidation activity. A Ph.D. or equivalent degree in a relevant field of biology or biochemistry is required. One-year appointment may be renewed up to three years subject to review and availability of funding. Rank and salary will be commensurate with University of California salary scales.

Send curriculum vitae, reprints, statement of research activities/interests, and suggested external reviewers to: **Dr. Brad Tebo, Scripps Institution of Oceanography, 9500 Gilman Drive, LaJolla, CA 92093-0202**. Telephone: **858-534-5470; FAX: 858-534-7313; e-mail: btebo@ucsd.edu; website: http://tebolab.ucsd.edu**. Review of applications will begin May 15, 2001, and will continue until position is filled. *Equal Employment Opportunity/Affirmative Action Employer.*

SCIENTIST, PROCESS SCIENTIST, PROCESS ENGINEER

Young biotechnology company located just outside the New York metropolitan area has several positions in research, process development, and manufacturing of monoclonal antibodies. We are seeking qualified individuals with experience in various areas of process development such as gene expression in mammalian cells, biological and immune assay development, bioreactor optimization, product recovery, protein purification and characterization, quality control, and formulation. Minimum qualifications are a Ph.D. degree with several years of relevant experience, preferably in the industry, or a M.Sc. degree in engineering with extensive industrial experience in process development and manufacturing of biologicals. Rank is open and commensurate with experience. Please send a cover letter with your résumé to:

Andrew Lin
International BioImmune Systems Inc.
225 West Community Drive, Suite 140
Great Neck, NY 11021
E-mail: bioimmune@aol.com
Telephone: 516-773-8255

POSTDOCTORAL FELLOW

Three Postdoctoral Fellow positions are available in the Departments of Pathology and Pharmaceutical Sciences to study antioxidants for cancer prevention/therapy and radio/chemoprotection. Candidates should have a Ph.D. and/or M.D. and a background in cancer biology, radiobiology, or hematology or a Ph.D. in organic chemistry with experience in organic chemical synthesis and analysis. Send curriculum vitae and names of three references to: **Dr. Daohong Zhou, Department of Pathology, Medical University of South Carolina, 165 Ashley Avenue, Suite 309, Charleston, SC 29425. E-mail: zhoud@musc.edu; FAX: 843-792-0368**. *An Affirmative Action/Equal Opportunity Employer.*

Tyler & Company

EXECUTIVE DIRECTOR OF RESEARCH INSTITUTE

We are seeking an Executive Director to provide innovative and creative leadership in a newly established state-of-the-art biomedical research center in western Pennsylvania. The Institute offers an outstanding opportunity to administer a comprehensive grant program to support and evaluate breast cancer research, utilizing state-of-the-art functional genomics, proteomics, and vaccine development strategies. The Director will foster collaborative working relationships with federal and civilian organizations/agencies and various public/private foundations. The ideal candidate will be a Ph.D. or M.D./Ph.D. and an accomplished leader in the field of cancer research. The successful candidate will have a demonstrated track record in an academic research and/or industry setting and be knowledgeable in contemporary issues of breast cancer research. Contact: **Ken Klunk; e-mail: kklunk@tylerandco.com; Telephone: 800-394-3934**.

The Department of Pharmacology, Physiology, and Therapeutics is seeking two tenure-track, federally funded Pharmacologists with active research programs at the level of **SENIOR ASSISTANT/ASSOCIATE PROFESSOR**. Applicants must have a Ph.D. or M.D. degree. In addition to offering nationally competitive salary, ample space, and start-up funds, the Departments contain 14 faculty, numerous common equipment rooms, and core facilities. Teaching at the graduate, undergraduate, and medical school level will be expected. Submit curriculum vitae, a comprehensive research statement outlining past accomplishments, future goals, and three letters of recommendation to:

Manuchair Ebadi, Ph.D.
Professor and Chairman
Department of Pharmacology, Physiology, and Therapeutics
Professor of Neuroscience
Associate Dean for Research and Program Development
Director, Center for Excellence in Neurosciences
University of North Dakota School of Medicine and Health Sciences
501 North Columbia Road
Grand Forks, ND 58203

University of North Dakota is an Equal Opportunity/Affirmative Action Employer.

ENVIRONMENTAL SCIENTIST

The Department of Biology and Environmental Science at The University of New Haven seeks candidates for a tenure-track **ASSISTANT PROFESSOR-** or **ASSOCIATE PROFESSOR**-level faculty appointment. Candidates are expected to have expertise in coastal ecology with a focus on biogeochemical processes. Preference will be given to candidates who have experience in applied environmental problem solving at multiple scales and geographic information systems. The Department offers a B.S. and an M.S. in environmental science with graduate program concentrations in environmental ecology, geology, health and management, and GIS. Duties include teaching graduate and undergraduate environmental science and undergraduate marine biology courses, establishing a research program that can support student projects and theses, and coordinating a newly initiated B.S. marine biology program. Applicants should send curriculum vitae, a statement of teaching experience and philosophy, a summary of current and anticipated research activity, and the names and telephone numbers of at least three references to: **Search 01-22, Search Committee Chairperson, University of New Haven, 300 Orange Avenue, West Haven, CT 06516**. The review of applications will begin on 30 April 2001 and will continue until the position is filled. *Affirmative Action/Equal Opportunity Employer.*

Post Doctoral Fellow Position

The Biological Imaging Center in the Beckman Institute at Caltech is a highly interdisciplinary environment in which optical and magnetic resonance imaging techniques are developed and applied to a number of biological systems and problems. We are seeking a Post Doctoral Fellow to work in the areas of MRI and MRS.

Post Doctoral Position available beginning Fall 2001 in the Biological Imaging Center of the Beckman Institute at the California Institute of Technology. We require an individual who is firmly grounded in NMR theory and practice. The applicant should be interested in applying MRI, MRS, and/or contrast agent technology to problems in neurobiology, neurological diseases, metabolic mapping in the brain, and/or developmental biology. We have active overlapping software, hardware, and contrast agent development programs in which the successful applicant would be expected to participate.

Interested persons should e-mail, FAX, or mail a biosketch and names, addresses, and e-mail addresses of three references to:

Dr. Russell Jacobs
139-74 Beckman Institute, Caltech
Pasadena, CA 91125
Voice: 626-395-2849
FAX: 626-449-5163
rjacobs@caltech.edu

The California Institute of Technology is an equal opportunity/affirmative action employer and encourages the applications of qualified women, minorities, veterans and disabled persons.

Postdoctoral Training Opportunities

Neurophysiology of Behavior
Neural Prosthetics

Department of Neuroscience
Brown University

Positions are available for postdoctoral training in the following projects:

1. Multielectrode Recording/Cortical Coding
The project involves using Utah 100 channel electrode arrays to record simultaneously from multiple cortical neurons in behaving monkeys. We are examining how assemblies of cortical neurons represent and transform information used in voluntary behavior. Projects involve interdisciplinary collaboration with faculty members in Applied Mathematics. Candidates with electrophysiology skills interested in learning conscious primate multielectrode recording methods are particularly well suited for this position.

2. Neural Prosthetics
Research Associate needed to participate in the development and testing of interfaces between the brain and peripheral devices to aid paralyzed humans. The project involves array testing and decoding neural signals and interfaces with prosthetic devices (computers, robotic arm). Experience in mathematics, programming and electrophysiology necessary. Individuals with a background in computer science or engineering are appropriate for this position.

3. Cortical Mechanisms of Learning
Research Associate needed to study the role of cortical synaptic plasticity in learning new behaviors. The project involves brain slice recording to analyze mechanics of synaptic modification following motor skill learning. Knowledge of eletrophysiological methods is essential; familiarity with behavioral methods and patch clamp methods is desirable.

To apply for these positions please send a CV, names of three references, position number and a letter describing your research interests to:

John P. Donoghue, Ph.D.
Department of Neuroscience
Brown University
Box 1953
Providence, RI 02912
John_Donoghue@brown.edu

For additional information see: http://brainscience.brown.edu
http://neuroscience.brown.edu/DonoghueLab/main.html

DONALD DANFORTH
PLANT SCIENCE CENTER

The Danforth Center announces positions for faculty at Full, Associate and Assistant Member levels to direct fundamental research programs. Seeking scientists with broad interests/training in at least two scientific disciplines and well formed research programs that will benefit from interactions with scientists of other disciplines. Demonstration of prior/current support and of interdisciplinary research beneficial. Up to 10 faculty appointments will be considered in structural biology, biochemistry, phytochemistry/nutriceuticals, cell biology, gene regulation, root-soil interactions, molecular plant pathology, physiology, and abiotic stress biology. Successful candidates are expected to develop collaborative research programs within the Danforth Center and/or with scientists at partner institutions. Visit our website, **www.danforthcenter.org,** for more information about the Danforth Center.

Send a curriculum vitae, reprints and four letters of reference to: **Ms. Billie Broeker, Human Resources, Donald Danforth Plant Science Center, 7425 Forsyth Boulevard, Campus Box 1098, St. Louis, MO 63105.**

The Donald Danforth Plant Science Center is an equal opportunity/affirmative action employer and encourages applications from underrepresented groups, including minorities, women and people with disabilities.

Cranfield UNIVERSITY

Chair In Nanotechnology

School of Industrial and Manufacturing Science

We are pleased to be able to invite applications to a Chair in Nanotechnology. This post will further-expand and complement the University's strong activity in this field. You will have a leading research background in any of the general areas covered by nanotechnology.

You will join an existing activity with excellent research facilities and will be expected to drive your own research into new areas, with the target of building self-sustaining research groups over a 3 to 5 year period. You will be expected to contribute to the teaching and growth of new and existing courses at Cranfield, including a new masters course in Microsystems and Nanotechnology.

Applicants should have a minimum 12 years research experience in academia and/or industry and an excellent publication record. A proven ability in obtaining funding for research is essential.

Informal enquiries can be made to Professor Roger Whatmore on 01234 754057 or email: r.w.whatmore@cranfield.ac.uk

Application form and further details can be obtained from: Director of Personnel, Vice-Chancellor's Office, Cranfield University, Cranfield, MK43 0AL. Telephone: 01234 754195/754050. Email: vcpers@cranfield.ac.uk

Closing date for receipt of applications: 4 May 2001.

www.cranfield.ac.uk

POSTDOCTORAL RESEARCH ASSOCIATE BIOLOGY DEPARTMENT
University of Massachusetts/Amherst

Full-time, temporary, nonbenefited Postdoctoral Research position available to study the control of pollen tube growth. Particular attention will be given to the role of calcium and protons using intracellular ion imaging and extracellular ion flux analysis. Minimum qualifications: Ph.D. in cell biology, experience in fluorescence light microscopy, and an understanding of membrane physiology. Salary commensurate with experience. Please send résumé and three letters of recommendation to: **Search Number R12519, c/o Lisa Barry, Biology Department, Morrill Science Center, University of Massachusetts, Amherst, MA 01003-5810**. Review of applications commences May 7, 2001, and continues until position is filled. *The University of Massachusetts is an Affirmative Action/Equal Opportunity Employer. Women and minorities are encouraged to apply.*

POSTDOCTORAL ASSOCIATE
University of Minnesota

Two NIH-funded Postdoctoral Research Associate positions available June 1, 2001. A Ph.D. in molecular biology or related discipline and an interest in molecular evolution are required. Documented experience with site-directed mutagenesis and biochemical methods preferred. We are applying cutting-edge proteomics and genetic engineering methods to reconstruct the adaptive landscapes of ancient adaptive events. Salary commensurate with experience. Position is open until filled. Send curriculum vitae including names and telephone/FAX/e-mail information of three references to: **Dr. Antony M. Dean, University of Minnesota, Biological Process Technology Institute, 240 Gortner Laboratories, 1479 Gortner Avenue, St. Paul, MN 55108. E-mail: adean@biosci.umn.edu**. *The University of Minnesota is an Equal Opportunity Educator and Employer.*

POSTDOCTORAL POSITION

Position available for Physicist/Biophysicist to work on the development/application of fluorescence lifetime microscopy and fluorescence resonance energy transfer techniques in studies of temporal and spatial protein-protein interactions and enzymatic activity during apoptosis. Experience in electronic/computer hardware/software desirable. Send application and three letters of recommendation to: **Dr. Brian Herman, Department of Cellular and Structural Biology, The University of Texas Health Science Center at San Antonio, Mail Code 7762, 7703 Floyd Curl Drive, San Antonio, TX 78229-3900. E-mail: hermanb@uthscsa.edu**. *The University of Texas Health Science Center at San Antonio is an Equal Employment Opportunity/Affirmative Action Employer.*

POSTDOCTORAL POSITION available in molecular immunology for a training-grant-qualified *U.S. citizen or permanent resident* to start on or before August 30, 2001. A background in molecular biology, biochemistry, or intracellular signaling is preferred. Send curriculum vitae and the names of three references to: **Dr. Thomas L. Rothstein, Immunobiology Unit, EBRC–437, Boston Medical Center, 650 Albany Street, Boston, MA 02118. E-mail: trothstein@medicine.bu.edu; FAX: 617-638-7530**.

POSTDOCTORAL POSITION is available for Ph.D. in molecular biology or genetics to use oligonucleotide microarray technology for mRNA expression analysis. Microarray analysis will be applied to transgenic mouse models for Alzheimer's disease. Familiarity with genomic databases is desirable. Send curriculum vitae and names of three references to: **Dr. Greer Murphy, Psychiatry Neuroscience, MSLS P–104, Stanford University School of Medicine, Stanford, CA 94305-5485. E-mail: gmurphy@stanford.edu**.

POSITIONS OPEN

RESEARCH WITH TEACHING
Postdoctoral Traineeship Positions Available

NIH-funded "Professors of the Future: Postdoctoral Career Development" program seeks applications from Biological and Medical Scientists with Doctoral degrees. A primary objective of the program is to better prepare Biomedical Scientists for academic careers of teaching and research. Traineeships include three years of support for research with a research mentor at the University of California, Davis, and a teaching/research mentor at San Francisco State University. Fellows will also receive training in science education, instructional technology-supported learning, and workplace professional skills. Most areas of biological and chemical research are available in laboratories of faculty mentors at the two universities. Trainees must have successfully completed a Ph.D., M.D., or comparable Doctoral degree in a biological or chemical science. Applications should be sent to: **Dr. Jerry L. Hedrick, Associate Dean of Graduate Studies, NIH Postdoctoral Training Program, Section of Molecular and Cellular Biology, University of California, One Shields Avenue, Davis, CA 95616-8535. E-mail: Dr. Jerry L. Hedrick, Program Director; jlhedrick@ucdavis.edu** or **Dr. Bruce Macher, SFSU Coordinator; e-mail: macher@sfsu.edu**. Visit our **websites: http://www.gradstudies.ucdavis/postdocs/jhpost.htm** or **http://www.sfsu.edu/~postdoc2** for additional information. *Trainees must be permanent residents or U.S. citizens. Underrepresented minorities are strongly encouraged to apply for these positions.*

POSTDOCTORAL FELLOW RESEARCH ASSOCIATE
University of Pittsburgh School of Medicine

A position is available to study the molecular mechanisms of ion channel regulation with special emphasis on protein interactions and membrane traffic (see *JBC* **275**:29539–29546; *JBC* **274**:30345–30348). A strong background in cell biology, protein biochemistry, and/or molecular biology is required. To apply, send curriculum vitae and names of three references with their e-mail addresses/FAX numbers to: **Dr. Raymond A. Frizzell, Department of Cell Biology and Physiology, University of Pittsburgh School of Medicine, S362 BST, 3500 Terrace Street, Pittsburgh, PA 15261. E-mail: Frizzell@pitt.edu; FAX: 412-648-2004**.

POSTDOCTORAL POSITIONS
Epithelial Growth and Differentiation

Positions are available in a five-laboratory team to study the cell and molecular biology of epithelial differentiation using bladder epithelium and hair follicle as model systems. Background in biochemistry, molecular biology, and genetics preferred. Send curriculum vitae and three recommendation letters to: **Dr. T. T. Sun, Rudolf Baer Professor and Head of Epithelial Biology Unit, Department of Pharmacology and Dermatology, New York University Medical School, 550 First Avenue, New York, NY 10016. E-mail: sunt01@med.nyu.edu**.

NERVOUS SYSTEM IMMUNOLOGY

Postdoctoral openings to study CNS immunology. Projects include basic mechanisms (cell traffic, antigen presentation) and clinical implications (brain tumor immunotherapy, autoimmunity, neurodegenerative disorders). NIH funded. Start date flexible. Apply by **e-mail** to: **Dr. L. Lampson, Neurosurgery, Brigham and Women's Hospital/Harvard Medical School. E-mail: lampson@rics.bwh.harvard.edu.**

POSITIONS OPEN

POSTDOCTORAL POSITIONS are available in the Indiana University School of Medicine, Center for Diabetes Research, a facility with infrastructure for cellular and whole animal imaging, proteonomics, DNA microarrays, and bioinformatics analyses. Recent Ph.D.s with experience in molecular, cellular, or system-level biology and research interests in insulin signaling and diabetes (**Dr. Jeffrey Elmendorf; website: http://www.iupui.edu/~medphys/elmendorf/**) or adipogenesis and obesity (**Dr. Robert Considine; website: http://www.iupui.edu/~medphys/considine/**) are encouraged to apply. Candidates may send a letter of intent with curriculum vitae to: **Indiana University School of Medicine, Department of Cellular and Integrative Physiology, 635 Barnhill Drive, MS 308A, Indianapolis, IN 46202-5120. E-mail: jelmendo@iupui.edu; FAX: 317-274-3318** or **e-mail: rconsidi@iupui.edu; FAX: 317-278-0658**.

POSTDOCTORAL POSITION

Position available to study structure/function relationships in potassium channels. The project will use protein biochemical and electrophysiological techniques to study functional properties of the prokaryotic KcsA potassium channel. Experience in membrane protein biochemistry or electrophysiology required. Interested applicants should send curriculum vitae and the names of three references to: **Lise Heginbotham, Department of Molecular Biophysics and Biochemistry, Yale University, 266 Whitney Avenue, New Haven, CT 06520-8114. E-mail: lise.heginbotham@yale.edu**.

POSTDOCTORAL FELLOW: available immediately to study hippocampal neural synaptic plasticity. A Ph.D. and background in synaptic neurophysiology is required. Experience in whole cell patch clamp recordings in brain slices is desired. The Neuroscience Center contains 10 research groups studying synaptic plasticity and molecular neurobiology; it is highly interactive with emphasis on neurobiology of disease. Interdisciplinary Ph.D. program. Salary range is $30,000 to $35,000. Send curriculum vitae including the names, addresses, and telephone numbers of three references to: **Dr. Chu Chen, Louisiana State University Neuroscience Center, 2020 Gravier Street, Suite D, New Orleans, LA 70112**. *LSU is an Equal Employment Opportunity/Affirmative Action Employer.*

POSTDOCTORAL POSITION. We are using site-specific recombinases to modify gene expression in neuroendocrine cells and livers of transgenic mice. Both the insertional and excisional reactions of these enzymes will be exploited in novel ways. Candidates must be familiar with the use of gene targeting strategies. Send curriculum vitae and names of three references to: **Mark A. Magnuson, M.D., Professor of Molecular Physiology and Biophysics, Vanderbilt University, Nashville, TN 37232. E-mail: mark.magnuson@mcmail.vanderbilt.edu**.

POSTDOCTORAL POSITIONS: Positions for recent Ph.D.s, *preferably U.S. residents*, are available to work on tumor and macrophage cell apoptosis and *in vivo* cancer regression by purified microbial proteins. Experience in gene chip/apoptosis research is preferred. Opportunities to move to regular industrial position after one or two years depending on productivity. Please write/e-mail to: **Dr. Olga Zaborina, Department of Microbiology and Immunology, University of Illinois Medical Center, 835 South Wolcott (M/C 790), Chicago, IL 60612. E-mail: zaborina@uic.edu**. *UIC is an Affirmative Action/Equal Opportunity Employer.*

POSTDOCTORAL POSITIONS available immediately to study the proteasome structure-function in trypanosome and downstream IRES translation initiation in *Giardia*. Experience in molecular biology and biochemistry is required. Must have a recent Ph.D. and/or M.D. degree. Send curriculum vitae and names of three references to: **Dr. C. C. Wang, Department of Pharmaceutical Chemistry, University of California, San Francisco, CA 94143-0446. FAX: 415-476-3382; e-mail: ccwang@cgl.ucsf.edu**.

PRE- & POSTDOCTORAL TRAINING IN MAMMALIAN GENETICS

The Jackson Laboratory, a non-profit research center, provides a unique research environment with unparalleled resources for training in animal models of development & disease.

Areas of expertise include: Cancer, Developmental Biology, Aging, Genetics of Complex Traits, Genomics, Immunology/Hematology, Metabolic Diseases, Neurobiology, Bioinformatics/Statistical Genetics, Cryopreservation/Assisted Reproduction

Letters of application should include: Curriculum vitae, statement of research interests, list of publications, and names of three references. Predoctoral program is in conjunction with the University of Maine and is limited to US citizens or permanent residents.

To apply contact: **Suzanne Serreze, The Jackson Laboratory, 600 Main Street, Bar Harbor, ME 04609; Phone: 207-288-6420, FAX: 207-288-6079, email: sbs@jax.org, http://www.jax.org.**

EO/AA Employer

Postdoctoral Positions

Tulane University recently established a Program in Molecular Pathogenesis and Immunity to Infectious Diseases at Tulane University School of Medicine. The purpose of this Program is to further our understanding of how infectious agents cause disease, to develop new vaccines against diseases for which no vaccines currently exist, and to improve delivery of existing vaccines. A principal focus of our research is the study of how organisms initiate infection, the host response to infection, and the design of effective immunologic intervention strategies (vaccines). Members of the Program study pathogenesis of retroviruses (such as HIV, SIV, and FeLV), herpes simplex virus and the mechanisms of latency and immune reactivation, Gram negative bacteria that cause acute gastroenteritis, diarrheal disease, acute and chronic pneumonia, pathogenic fungi that cause either systemic or mucosal disease, and how certain viruses cause cancer. All of these studies interface at the molecular level with the ultimate outcome of developing effective immunologic interventions.

Qualified Postdoctoral candidates will be under the direct supervision of faculty members who have international reputation for excellence in research in bacterial pathogenesis, viral pathogenesis, and the pathogenesis of fungal diseases and are at the forefront in the development of a coordinated approach to combat vaccine-preventable infectious diseases. These include:

Dr. John D. Clements
Dr. Cindy B. Morris
Dr. Michael J. Schurr
Dr. Aline B. Scandurro
Dr. Laura S. Levy
Dr. Kent L. Buchanan
Dr. William P. Halford
Dr. Robert F. Garry
Dr. Cheryl A. Nickerson
Dr. Lucy Cárdenas-Freytag

For further information regarding this Program, faculty research interests, and facilities see http://www.som.tulane.edu/departments/microbiology

Applicants must have an M.D. or Ph.D., a strong publication record and research experience in molecular biology, virology, mycology, or bacteriology with an emphasis in molecular pathogenesis. Applicants should send curriculum vitae and the names and addresses of three references to **Dr. John D. Clements, Chair, Department of Microbiology and Immunology (SL38), Tulane University School of Medicine, 1430 Tulane Avenue, New Orleans, LA 70112.**

Tulane University is an Equal Employment Opportunity/Affirmative Action Employer and encourages applications from underrepresented groups including minorities, women, and persons with disabilities.

St. Jude Children's Research Hospital
ALSAC · Danny Thomas, Founder

Postdoctoral Position to study DNA topoisomerases

A postdoctoral position is available to study the roles of DNA repair functions in cellular sensitivity to anti-cancer drugs targeting DNA topoisomerases. Current projects in the laboratory focus on identifying genes that participate in the repair of the unique DNA lesions that arise from topoisomerase inhibition, and the development of *in vitro* systems for studying these repair reactions. Candidates with a recent Ph.D. or M.D. degree and a strong background in either molecular biology or protein biochemistry are especially encouraged to apply.

St. Jude Children's Research Hospital is a premier biomedical research center that provides an outstanding scientific training environment. Highly competitive stipends and benefits are provided. Qualified candidates should send a letter detailing current scientific interests, curriculum vitae, and the names of three references to:

Dr. John L. Nitiss
St. Jude Children's Research Hospital
Molecular Pharmacology Department
332 N. Lauderdale St. • Memphis, TN 38105-2794
E-mail: john.nitiss@stjude.org
Job Code #1551

SJCRH is an Affirmative Action/Equal Opportunity Employer.

Staff Scientist
National Heart, Lung and Blood Institute

The Optical Spectroscopy Section (OSS) of the Laboratory of Biophysical Chemistry, National Heart, Lung and Blood Institute is seeking a Staff Scientist. OSS is devoted to the development of new optical (esp. time-resolved fluorescence) techniques and their application to biochemistry.

The incumbent would provide support to the research of the Section (Chief, Postdoctoral Fellows and collaborators) by both helping to develop new optical instruments or data analysis methods and applying our current devices (including femtosecond upconversion and stopped-flow lifetime instruments) to various problems in protein association and interaction with DNA.

In addition to a Masters or Doctoral degree in physical or biochemical science fields, experience is required in several of the following areas:

fluorescence, particularly time or phase-resolved; ultrafast lasers; mutagenesis, purification and labeling of proteins, esp. DNA-binding proteins; computer programming (esp. FORTRAN, VB, C) for global analysis and the automation of optical instruments; optics, detectors and electronics; transient absorbance; molecular simulation.

The successful candidate will be offered a competitive salary commensurate with experience and qualifications under Title 42. Appointees must be US citizens, resident aliens, or nonresident aliens with a valid employment-authorized visa.

Applicants should submit a curriculum vitae and arrange for three letters of recommendation to be sent to:

Ms. Christine Fisher, Personnel Office
National Heart, Lung and Blood Institute
31 Center Drive MSC 2484, Building 31, Room 5A28
Bethesda, MD 20892-2484

Applications must be received no later than **June 4, 2001**.

The NIH is an Equal Opportunity Employer. Applications from women, minorities, and persons with disabilities are strongly encouraged. The NHLBI/NIH is a smoke-free workplace.

Hamilton Regional Cancer Centre

Cancer Care Ontario *operates nine regional cancer centres in Ontario, with several new centres scheduled to open between 2002 and 2005. Our work includes programs in cancer prevention, screening, treatment (medical, surgical and radiation), supportive care, research, education and the development of treatment guidelines.*

Cancer Care Ontario is the province's leader in the integration and co-ordination of cancer control services, and the Ministry of Health and Long-term Care's principal adviser on cancer issues.

Career Scientists

Applications are invited from individuals with research interests in the area of molecular oncology. Preference will be given to applicants with strong backgrounds in Cancer Research. Minimum requirements for the position are a PhD and/or MD degree and three years postdoctoral research experience. We are seeking individuals at the Senior Scientist, Scientist or Junior Scientist levels.

The successful candidates will join a well-established interdisciplinary basic research group at McMaster University, and a group at the Hamilton Regional Cancer Centre involved in molecular aspects of tumour progression, anticancer therapy and metastasis. Excellent laboratory facilities are available in the Hamilton Regional Cancer Centre, where there is an opportunity for interaction with radiation and medical oncologists. Equipment and operating funds will be provided by Cancer Care Ontario for establishing an independent research programme.

Send a curriculum vitae, statement of research interests, representative publications and names of three referees, no later than **June 1, 2001** to: **Dr. Gurmit Singh, Director of Research, Hamilton Regional Cancer Centre, 699 Concession Street, Hamilton, ON, Canada L8V 5C2. Fax: 905-575-6338.**

In accordance with immigration requirements, priority will be given to Canadian citizens and permanent residents of Canada.

We would like to thank all who apply, but only those selected for an interview will be contacted.

Cancer Care Ontario

CHAIR
DEPARTMENT OF MEDICAL BIOPHYSICS
UNIVERSITY OF TORONTO
TORONTO, ONTARIO, CANADA

Applications are invited for the position of Chair, Department of Medical Biophysics, Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada. The University of Toronto academic health science complex is the largest in North America. The Faculty of Medicine and its eight affiliated teaching hospitals generate in excess of $230 million per annum in external research funds. The Faculty's Department of Medical Biophysics is nationally pre-eminent and internationally competitive. The Department is primarily based at two hospital research institutes - the Ontario Cancer Institute and the Sunnybrook and Women's College Health Sciences Centre. The next Chair of the Department of Medical Biophysics must have the vision and ability to take the Department to a new level of international recognition and achievement. For detailed information on the Department, visit its website at http://medbio.utoronto.ca/.

The successful candidate will be an outstanding and active researcher, with a strong commitment to excellence in graduate education. Applicants must also have a vision as to how highly interdisciplinary research (molecular and cellular biology, genomics, clinical oncology, physics, instrumentation, informatics, experimental therapy and imaging) can be used innovatively to make progress on cancer issues in the post-genomic era. The successful applicant must be able to provide imaginative scientific leadership and have the leadership qualities and administrative skills necessary to direct a diverse community and foster an environment of cooperation within it. Applicants should possess a Ph.D. or M.D. degree, or equivalent, and be eligible for academic appointment to the rank of Professor.

Please reply (electronic submission best) by May 4, 2001, with a current curriculum vitae, to: **Vice-Dean Cecil Yip, c/o Leslie Bush, Executive Assistant, Faculty of Medicine, University of Toronto, Room 2109, Medical Sciences Building, 1 King's College Circle, Toronto, Ontario, Canada M5S1A8 Fax: 416-978-1774 / E-mail: leslie.bush@utoronto.ca / Voice: 416-978-7762**

The University of Toronto is strongly committed to diversity within its community. We especially welcome applications from visible minority group members, women, Aboriginal persons, persons with disabilities, and others who may add to the diversity of ideas.

Located in the San Francisco Bay Area, **Genelabs Technologies, Inc.** is an established biopharmaceutical company focused on the discovery and development of a new class of pharmaceutical products that selectively regulate gene expression. Our continued success has created great opportunities for creative, dynamic, analytical thinkers to join our R&D team.

Associate Scientist/Scientist
MICROBIOLOGY

Using multiple biological approaches & technologies, you will investigate mechanisms of action and elucidate cellular targets of Genelabs' lead compounds. You will also apply your knowledge of microbial genetics & physiology to characterize the biological effects of lead compounds in microbial pathogens; design & implement studies to examine mechanisms by which lead compounds exert antimicrobial activity; and communicate results to scientists from diverse disciplines. The knowledge gained from these studies is expected to contribute towards structure activity relationship and lead optimization. Requires a Ph.D. in microbiology, mycology, genetics, cell biology or related life sciences field; 0-3 years of postdoctoral experience; a solid understanding of bacterial and/or fungal cell biology, genetics and physiology; a strong interest in microbial pathogenesis and in applying research experience to drug discovery and mechanisms of action studies; and excellent communication skills. A published record of excellence in research is essential. (Job# 0109-SCI)

Director/Associate Director
PHARMACOKINETICS/METABOLISM

You will provide technical & managerial leadership to our pharmacokinetics/metabolism group involved in pre-clinical drug development to evaluate novel small-molecule drug candidates using a combination of animal, cellular and biochemical approaches. You will also build a core function in pharmacokinetics/metabolism; hire, develop and manage a team to meet goals & deadlines; and design/ implement studies to determine the absorption, distribution, metabolism, and excretion of drug candidates. Requires a Ph.D. in pharmaceutical sciences, biochemistry, analytical chemistry, or related field; at least 8 years of experience with pharmacokinetics and metabolism; and extensive scientific expertise to support both IND filings & clinical studies. Must be a hands-on, pragmatic manager who can ask the right questions, anticipate problems and present viable solutions. (Job# 0103-SCI)

We offer an attractive salary & benefits package along with a rare opportunity to make significant scientific contributions. Please send your resume to: Genelabs, HR Dept, Attn: Job #____, 505 Penobscot Drive, Redwood City, CA 94063; fax: (650) 363-6080; or email: hr@genelabs.com. EOE

GENELABS
TECHNOLOGIES, INC.

www.genelabs.com

EDITOR-IN-CHIEF
THE JOURNAL OF IMMUNOLOGY

The American Association of Immunologists (AAI) seeks applicants for the position of Editor-in-Chief (EIC) for its official publication, *The Journal of Immunology (The JI)*. The term of service is from July 1, 2002 to June 30, 2007, with a required transition period starting January 1, 2002. This position is considered to be part-time for which a stipend and associated expenses are provided.

Applicants are expected to have an accomplished scientific career with a significant publication record and appropriate editorial experience. Candidates should possess strong leadership qualities, intellectual vision, and outstanding interpersonal skills. The primary responsibility of the EIC is to maintain the role of *The JI* as a definitive resource for immunology research by ensuring the scientific excellence of the content and the integrity of the peer-review process.

Interested individuals are invited to submit an application package that includes a curriculum vitae; a succinct letter of interest and qualifications; a statement on the conceptual direction of *The JI* in its pursuit of scientific excellence; and innovations that may be considered. Applicants must be members in good standing with the AAI and are required to reside within the continental US. A more detailed description of the position may be obtained by contacting the AAI Executive Office at infoaai@aai.faseb.org or the address below.

Applications will be received through **June 31, 2001**. Please address them to:
Chair
AAI Publications Committee
c/o AAI
9650 Rockville Pike
Bethesda, MD 20814

EOE

MAX PLANCK SOCIETY FOR THE ADVANCEMENT OF SCIENCE
Schloessmann Seminar on Optical Methods in Modern Biology
Schloss Elmau, Germany 16-19 December 2001

The Max Planck Society for the Advancement of Science intends to promote interdisciplinary research in selected scientific areas. For this purpose, a three-day seminar will be organized every year.
The fifth Schloessmann seminar will be focused on optical methods in modern biology, including the following topics:

- Microscopic techniques
- Other imaging techniques
- Design of optical probes
- Genetically encodable probes
- Biological applications of optical forces, optical tweezers
- Spectroscopic techniques (single molecule, FRET, FCS)
- Nonlinear optics in biology

Leading experts in the fields of the seminar are invited to present their views and young scientists are encouraged to make research proposals and present them as part of the seminar.

Schloessmann Award
Young scientists who are presently at a European university or have the European citizenship and are working as graduate students or postdoctoral fellows are invited to make challenging research proposals within the fields covered by the seminar. The scientific committee will decide - based on a two-page exposé - which proposals will be accepted for an oral or poster presentation. Acceptance of a contribution will include coverage of travel expenses as well as food and lodging at the seminar. The most outstanding oral contributions will be honoured by awards totaling DM 20,000.

Schloessmann Fellowships
Postdoctoral fellowships (up to two years) to be used at suitable Max Planck Institutes are awarded for the most original research proposals at the end of the seminar. It is a strict requirement that the recipients of the fellowship move to a new laboratory. To apply for such a fellowship, a short CV should be submitted, as well as a two-page exposé.

Scientific Committee
Tobias Bonhoeffer, Alexander Borst, Winfried Denk, Reinhard Jahn, Erwin Neher

Invited speakers and discussants include:
Wolf Almers, Scott Fraser, Amiram Grinvald, Stefan Hell, Udi Isacoff, Tom Jovin, Jeff Lichtman, Gerard Marriott, Tim Ryan, Petra Schwille, Stephen Smith, Karel Svoboda, Derek Toomre, Roger Tsien

Admission to the seminar will be limited and will be decided upon by the scientific committee.

Deadline for applications and for submission of exposé: 31 July, 2001.
For further information please contact:
www.schloessmann.de or
Dr. Tobias Bonhoeffer, Max Planck Institute of Neurobiology, Am Klopferspitz 18A, D 82152 Martinsried near Munich, Germany
Fax: +49 (89)89950-199, E-mail: info@schloessmann.de

THE KENAN INSTITUTE FOR ENGINEERING, TECHNOLOGY & SCIENCE AT NC STATE UNIVERSITY

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The Gordon-Kenan Summer Schools will be offered on subjects in advanced areas of fundamental science and technology. The subject matter will be interdisciplinary in nature and not available in graduate school curricula in the form presented in the Gordon-Kenan Summer School. The sessions will typically be two weeks in length and will meet on a daily schedule similar to the Gordon Research Conferences. Faculty will be drawn from leading research institutions and students will be admitted by invitation on application.

A typical schedule can be seen at the GRC web site at:
http://www.grc.org/programs/2000/gradsum.htm

INDIVIDUALS INTERESTED IN ESTABLISHING A SUMMER SCHOOL SESSION MAY CONTACT:

Gerri Miceli
Program Manager
gmiceli@grc.org

Gordon Research Conferences
PO Box 984
West Kingston, RI 02892

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ENGINEERING, TECHNOLOGY & SCIENCE

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2000 PFIZER SUMMER UNDERGRADUATE RESEARCH FELLOWSHIP AWARDEES

SYNTHETIC ORGANIC CHEMISTRY

Awardee	*Mentor*	*School*
Brian Lawrence Gray	Amir H. Hoveyda	Boston College
Jonathan Melnick	Tadhg Begley	Cornell University
Kira Whelan	Eric N. Jacobsen	Harvard University
Eleanor Lin	Timothy F. Jamison	MIT
John M. Antos	Robert S. Coleman	Ohio State University
David Edward Vollman	Jon Parquette	Ohio State University
Jose Paterno	Paul A. Wender	Stanford University
Jessica Chow	Justin Du Bois	Stanford University
German Alexander Cortez	Larry E. Overman	University of California, Irvine
Chris M. Gothard	James S. Nowick	University of California, Irvine
Philip W. Leonard	Viresh H. Rawal	University of Chicago
Albert Chao	Masato Koreeda	University of Michigan, Ann Arbor
Angie T. Gergen	Wayland E. Noland	University of Minnesota, Twin Cities
Stephany Michelle Schuck	Seth N. Brown	University of Notre Dame
Thomas Bryant Sundberg	Stephen F. Martin	University of Texas, Austin
Jason R. Young	Fredrick G. West	University of Utah
Siddhartha R. Shenoy	Cassandra L. Fraser	University of Virginia
Joseph R. Martinelli	Steven D. Burke	University of Wisconsin, Madison
Katherine A. Belecki	Thomas E. Smith	Williams College

MOLECULAR BIOLOGY

Awardee	*Mentor*	*School*
Courtney J. Ullrich	Michael Roberts	Dickinson College
Brian K. Bronzo	Richard B.S. Roden	Johns Hopkins University
Dana B. Harrar	Richard L. Huganir	Johns Hopkins University
Dawn N. Wilson	Howard M. Laten	Loyola University Chicago
Theresa A. Larson	Jhumku Kohtz	Northwestern University
Derick G. Holt	Linda L. Kelley	University of Utah
Susan Poulson	A. Villu Maricq	University of Utah
Hoda Ahmadi	Arthur S. Polans	University of Wisconsin, Madison
Lauren Q. Shapiro	B. Lynn Allen-Hoffmann	University of Wisconsin, Madison
Nathan C. Geething	Douglas R. Cavener	Vanderbilt University
Maegan V. Rivard	Elizabeth Ryder	Worcester Polytechnic Institute

BIOCHEMISTRY

Awardee	*Mentor*	*School*
Shannon L. Flaugh	Kevin J. Lumb	Colorado State University
Lenora J. Volk	Robert L. Matts	Oklahoma State University
Margaret E. VanMeter	Michael C. Gustin	Rice University
John W. Hanna	Suzanne R. Pfeffer	Stanford University
Eric M.Miller	Roger E. Koeppe	University of Arkansas
Gina L. Westhoff	Joseph J. Falke	University of Colorado, Boulder
Kristen E. Harring	Rebecca J. Van Beneden	University of Maine
Michael K. Tauber	John C. Warner	UMASS Boston
Kelly L. Shaffer	Michael D. Uhler	University of Michigan
Chad N. Stasik	Rowena G. Matthews	University of Michigan
Katrina N. High	Anne Baranger	Wesleyan University
Win Den Cheung	Jose Arguello	Worcester Polytechnic Institute
Jason M. Field	Pamela J. Weathers	Worcester Polytechnic Institute

CHEMISTRY

Awardee	*Mentor*	*School*
Scott N. Boyle	David A. Berges	Brigham Young University
Robert B. Levy	David G. Alberg	Carleton College
Sarah M.S. Spotts	Jerry R. Mohrig	Carleton College
Sarah E. Reisman	Timo V. Ovaska	Connecticut College
Sarah A. Cummings	Frances R. Blase	Haverford College
Anne J. DeWitt	Jeffrey H. Byers	Middlebury College
Agnes Mwakingwe	Richard C. Bunt	Middlebury College
Osemwengie U. Iyoha	Morris Waugh	Morehouse College
Joel Rosenthal	David I. Schuster	New York University
Karla A. Mark	John A. Myers	North Carolina Central University
Jeff B. Sperry	Mark C. McMills	Ohio University
Gordana Dukovic	Kathryn Uhrich	Rutgers University
Theresa M. Booth	Mark A. Forman	Saint Joseph's University
Janelle M. Comita	Louis J. Liotta	Stonehill College
Tania Magoon	Thomas C. Werner	Union College
Jonathan D. Casciano	John C. Warner	UMASS, Boston
John B. Kelly	Brett L. Lucht	University of Rhode Island
David J. Maloney	A. Paul Krapcho	University of Vermont

COMPUTATIONAL CHEMISTRY

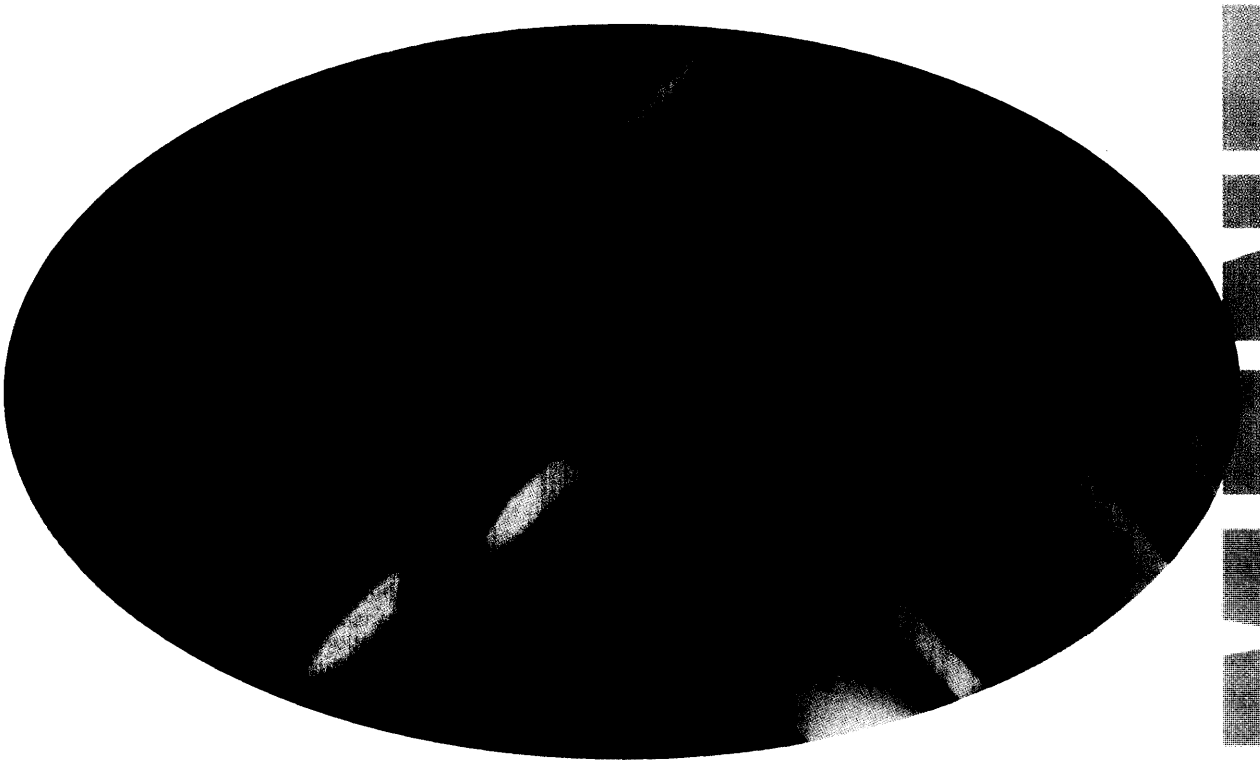
Awardee	*Mentor*	*School*
David I. Micallef	J. William Suggs	Brown University
Ming Chen	Marc Zimmer	Connecticut College
Sirinya Matchacheep	Jon Clardy	Cornell University
Christopher D. Snow	Bruce Tidor	MIT
Gerardo J. Zambrano	Martin F. Semmelhack	Princeton University
Tracey C. Botha	Jeehiun Katherine Lee	Rutgers University
David J. Young	Paul Helquist and Olaf Wiest	University of Notre Dame

PHARMACY

Awardee	*Mentor*	*School*
Charles R. Mosler	Jon E. Sprague	Ohio Northern University
Fred P. Davis	Carol B. Post	Purdue University
Megan K. Condon	Sandra C. Vigil-Cruz	University of Connecticut

BIOLOGY

Awardee	*Mentor*	*School*
Eric J. Bennett	Clare M. O'Connor	Boston College
Aryn H. Gittis	Leslie Griffith	Brandeis University
Nicholas A. Guerin	Denis A. Larochelle	Clark University
Michael G. Acker	Jill B. Keeney	Juniata College
Morgan C. Zittel	Andrea M. Mastro	Pennsylvania State University
Maryann Bradley	Diane Dean	Saint Joseph College
Reshma P. Shetty	Baldomero M. Olivera	University of Utah



ACHIEVEMENT

Each summer, Pfizer provides undergraduate fellowships that allow students to conduct independent research under the guidance of their faculty mentor. Colleges and universities throughout the U.S. nominate outstanding undergraduates. Fellowships are awarded on the merits of the students' research proposals, academic records, faculty recommendations and their passion for laboratory science. This program provides students with an important opportunity to work in a stimulating laboratory environment. We congratulate the following 2000 Pfizer Summer Undergraduate Research Fellowship Awardees.

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A senior **POSTDOCTORAL**/junior faculty **INSTRUCTOR** position is immediately available in the Institute for Smooth Muscle Biology at the Albert Einstein College of Medicine for a Molecular Biologist with expertise in gene cloning, subcloning, PCR, RT-PCR, and Northern and Western analyses. Experience with microarray gene chips/analysis also highly desirable. This is a highly interactive research environment in which the explicit goal is to understand phenotypic and genotypic distinctions between physiologicaly diverse smooth muscle cell types and to understand the effects of disease on such. Please send curriculum vitae and three letters of recommendation to: **George J. Christ, Ph.D., Professor of Urology and of Physiology and Biophysics, Ben Marden Distinguished Scholar in Urology, Forchheimer Building, Room 744, Albert Einstein College of Medicine, 1300 Morris Park Avenue, Bronx, NY 10461**. *AECOM is an Equal Opportunity/Affirmative Action Employer.*

POSTDOCTORAL POSITION to study the CFTR chloride channel that is implicated in cystic fibrosis (CF) and secretory diarrhea (SD). Current efforts are directed toward (1) characterizing the structural basis of the interactions between CFTR domains that control channel gating (e.g., *Science* **286:** 544, 1999) and (2) identifying peptides and small molecules that can alter CFTR channel activity in CF or SD. Ph.D. and/or M.D. required. Expertise in biochemistry, protein expression, and purification using FPLC/HPLC preferred. Contact: **Kevin L. Kirk, Ph.D., Department of Physiology and Biophysics, University of Alabama at Birmingham, 982B MCLM, Birmingham, AL 35294-0005. E-mail: kirk@physiology.uab.edu**. *The University of Alabama at Birmingham is an Affirmative Action/Equal Opportunity Employer.*

POSTDOCTORAL POSITION
PROTEIN ENGINEERING

Ph.D. graduates in chemistry are invited to apply for a Postdoctoral position in protein engineering available immediately. The applicant should have a strong background in organic/peptide synthesis and/or physical organic chemistry. The research will be on protein engineering using synthetic peptides as model system. Applicants should submit curriculum vitae, statement of research interests, and names of three references to: **Dr. Y. B. Yu, Department of Pharmaceutics and Pharmaceutical Chemistry, University of Utah, Salt Lake City, UT 84108. Telephone: 801-581-7216; e-mail: yby1@utah.edu**.

Two **POSTDOCTORAL POSITIONS** available. (1) Study the molecular mechanism of mRNA polyadenylation in yeast, its regulation, and its interaction with other processes involved in mRNA synthesis and utilization. Experience in yeast genetics, biochemistry, and/or the molecular biology of nucleic acid/protein and protein/protein interactions is preferred. (2) Analyze the mechanism of action of poly(A) polymerase by X-ray crystallography. Training in biophysical methods would be helpful. Please specify which position and send curriculum vitae and three reference contacts to: **Dr. Claire Moore, Molecular Biology and Microbiology, Tufts University School of Medicine, 136 Harrison Avenue, Boston, MA 02111. E-mail: claire.moore@ tufts.edu.**

POSTDOCTORAL RESEARCH POSITIONS
CARDIOVASCULAR MEDICINE

Two Postdoctoral Research positions are available to study the molecular mechanisms of cardiac ion channel modulation using transgenic mouse models, patch clamp techniques, calcium imaging, and molecular genetics. Experience in electrophysiology, fluorescence calcium measurement, or molecular biology is required. Please forward your curriculum vitae and three references to: **Nipavan Chiamvimonvat, M.D., Department of Medicine, University of California, Davis, One Shields Avenue, TB 172, Davis, CA 95616. Telephone: 530-752-4712; e-mail: nchiamvimonvat@ucdavis.edu.**

POSITIONS OPEN

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One **POSTDOCTORAL POSITION** is available immediately to participate in a study of the serotonergic system in the medulla oblongata in victims of the sudden infant death syndrome (SIDS), the leading cause of postneonatal infant mortality. Studies in this laboratory have demonstrated abnormalities of medullary serotonergic neurons in SIDS victims that are related to respiratory drive, autonomic function, and chemoreception (*J. Neuropathol. Exp. Neurol.* **59:**377, 2000). Related studies in progress in the laboratory include anatomic analysis of the development of the serotonergic system directly in the human brain and of the human rhombic lip, the putative source of at least some medullary serotonergic neurons. Experience in techniques of chemical neuroanatomy and molecular biology is desirable, e.g., immunocytochemistry, *in situ* hybridization, DiI. Supported by the Deborah Evelyn Barrett Fund for SIDS Research. Send curriculum vitae and names of three references to: **Dr. Hannah C. Kinney, Division of Neuroscience, Children's Hospital and Harvard Medical School, Boston, MA 02115. FAX: 617-738-1542**.

POSTDOCTORAL POSITION
Yale University School of Medicine

Our laboratory studies how RNA molecules are folded, processed, assembled with proteins, and sorted to their destinations within cells. We use genetics and biochemistry in both yeast and mammalian cells to examine the functions of RNA-binding proteins that play important roles in these processes (see *Genes and Dev.* **14:**777–782; *EMBO Journal* **19:**1650–1660; *EMBO J.* **17:**7442–7453; *Cell* **89:**393–402). Candidates should possess a recent Ph.D. degree and have experience in genetics, biochemistry, or molecular biology. Please send curriculum vitae, a brief summary of research experience, and the names of three references to: **Dr. Sandra L. Wolin, Departments of Cell Biology and Molecular Biophysics and Biochemistry, Howard Hughes Medical Institute, Yale University School of Medicine, 295 Congress Avenue, New Haven, CT 06536. E-mail: sandra.wolin@yale.edu**.

PHYSIOLOGY

Physiology: A **POSTDOCTORAL POSITION** is available immediately to study the activation mechanisms of platelets and leukocytes by nucleotides. The applicant should have a Ph.D. and/or M.D. in biological sciences with experience in cell culture, signaling mechanisms, and molecular biology. Experience with knockout mice is a plus. Fellowship commensurate with experience. Curriculum vitae with names, telephone numbers, and e-mail addresses of three references should be sent to: **e-mail: kunapuli@nimbus.temple.edu** or FAXED to: **Dr. S. P. Kunapuli, FAX: 215-707-4003**.

POSTDOCTORAL POSITIONS are available to study the development and function of vertebrate sensory neurons (*Science* **283:**1180–1183, 1999; *Neuron* **21:**325–334, 1998). State-of-the-art imaging and recording instruments complement our extensive transgenic and genomics facilities (**website: www.scripps.edu/cb/patapoutian**). E-mail or send application to: **Ardem Patapoutian, Ph.D., Department of Cell Biology, ICND202, The Scripps Research Institute, 10550 North Torrey Pines Road, La Jolla, CA 92037. E-mail: ardem@scripps.edu**.

POSITIONS OPEN

POSTDOCTORAL POSITION is available immediately at the Department of Pathology of the University of Pennsylvania to work on studies relating to immunotoxicology. Specific research interests are focused on the molecular mechanisms and pathways involved in the induction of apoptosis in human lymphoid cells. Applicants should have a background in cellular and molecular biology. Applicants should send a cover letter describing research and career goals together with curriculum vitae and three letters of reference to: **Dr. Bruce Shenker, University of Pennsylvania School of Dental Medicine, 4010 Locust Street, Philadelphia, PA 19104-6002**. *University of Pennsylvania is an Affirmative Action/Equal Opportunity Employer.*

POSTDOCTORAL FELLOW

Recent Ph.D. graduate or Scientists with expertise in the fields of molecular biology, virology, biochemistry, cell biology, or related sciences. Newlink Genetics is a biopharmaceutical company focused in the proteomics and functional genomics areas with the main area of emphasis in cancer and cancer biology. The company offers full medical benefits, stock options, and paid vacations. Salaries are competitive and commensurate with experience. Contact: **Charles Link, Jr., M.D., Newlink Genetics, 2901 South Loop Drive, Suite 3900, Ames, IA 50010. Telephone: 515-296-5555; e-mail: clink@newlinkgenetics.com; FAX: 515-296-5557**.

POSTDOCTORAL POSITIONS
DNA REPAIR

Two positions are available to study DNA base excision repair in *Plasmodium falciparum*. Candidates with experience in the molecular biochemistry of DNA repair and recombinant protein expression, gene knockouts, or yeast complementation are especially encouraged to apply. Send curriculum vitae and names of three references to: **Dr. T. F. Taraschi, Thomas Jefferson University, Department of Pathology, Anatomy, and Cell Biology, 1020 Locust Street, Philadelphia, PA 19107. E-mail: Theodore.Taraschi@mail.tju.edu**. *Equal Opportunity Employer.*

POSTDOCTORAL POSITION
PROTEIN TRAFFICKING

Exciting opportunity to investigate unusual protein secretory pathways in *Plasmodium falciparum*. Applicants should have a Ph.D. with experience in cell biology or biochemistry. Position will be supported with a dedicated technician. Send curriculum vitae and names of three references to: **Dr. T. F. Taraschi, Thomas Jefferson University, Department of Pathology, Anatomy and Cell Biology, 1020 Locust Street, Philadelphia, PA 19107. E-mail: Theodore.Taraschi@mail.tju.edu**. *Equal Opportunity Employer.*

POSTDOCTORAL POSITION
GENETIC TOXICOLOGY
University of California Los Angeles

For a project sponsored by the pharmaceutical industry to further develop and use a genetic toxicology assay with yeast. Advantage is to work in an academic environment at the interface with industry. Experience in molecular biology and/or microbiology required. Please apply to: **Dr. Robert H. Schiestl, Department of Pathology, UCLA, 650 Charles E. Young Drive South, Los Angeles, CA 90095. E-mail: rschiestl@mednet.ucla.edu**.

POSTDOCTORAL POSITION is available immediately to study calcium sparks and spikes in cardiac excitation-contraction coupling using patch clamp and confocal fluorescence imaging techniques. Experience in electrophysiology is required; immunohistocytochemistry and/or molecular biology in cardiac myocytes preferred. Send curriculum vitae and three references to: **James S. K. Sham, Ph.D., Division of Pulmonary and Critical Care Medicine, Johns Hopkins Asthma and Allergy Center, 5501 Hopkins Bayview Circle, Baltimore, MD 21224. FAX: 410-550-2612; e-mail: jsks@mail.jhmi.edu**.

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POSTDOCTORAL FELLOW
Harvard University Department of Chemistry and Chemical Biology

One position available immediately for Postdoctoral Fellow with background in biochemistry or molecular biology/cell biology interested in utilizing state-of-the-art instrumentation for single-molecule studies and cellular imaging to work with recognized single-molecule research team led by **Professor Sunney Xie**. Candidates should possess demonstrated expertise in the field as evidenced by publications and/or other proof of research productivity in addition to an appropriate Ph.D. Interested candidates may investigate the **Xie website: http://bernstein.harvard.edu**. Submit curriculum vitae and three letters of recommendation to: **Robert E. Holt, Harvard University, Department of Chemistry and Chemical Biology, 12 Oxford Street, Cambridge, MA 02138. E-mail: holt@chemistry.harvard.edu**. *Harvard University is an Equal Opportunity Employer.*

COURSES & TRAINING

CARDIOVASCULAR PATHOPHYSIOLOGY FOR ENGINEERS AND SCIENTISTS

A one-week intensive course sponsored by the Massachusetts Institute of Technology. June 11–15, 2001; Cambridge, Massachusetts.

Dr. Richard J. Cohen, Program Director. Basic Principles of Cardiovascular Physiology, Cardiovascular Medicine, Diagnostic and Therapeutic Technologies. Contact: **MIT Summer Session; Telephone: 617-253-2101; website: web.mit.edu/professional/summer.**

ANNOUNCEMENTS

BIOINFORMATICS TOOLS FOR COMPARATIVE GENOMICS
LBNL/NHLBI: June 11–15, 2001

Designed for postdoctorals, medical, and especially cardiovascular researchers interested in applying bioinformatics tools to their research. Techniques include database searches, annotation, microarray analysis. No tuition. Room and board provided. For further information, call **Telephone: 510-486-4162; e-mail: pgaworkshop@lbl.gov.** Register before April 20, 2001; **website: pga.lbl.gov/workshop.**

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