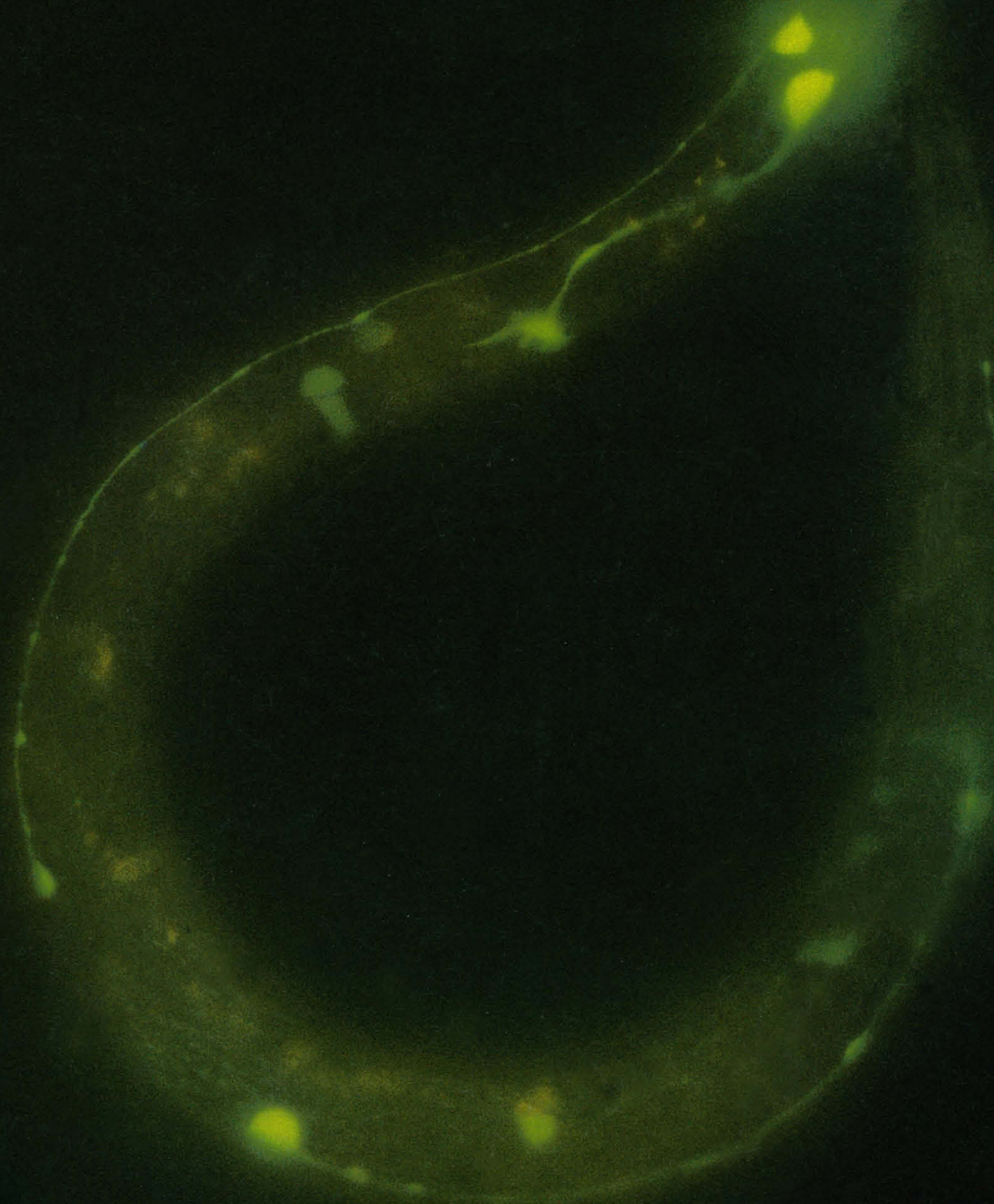


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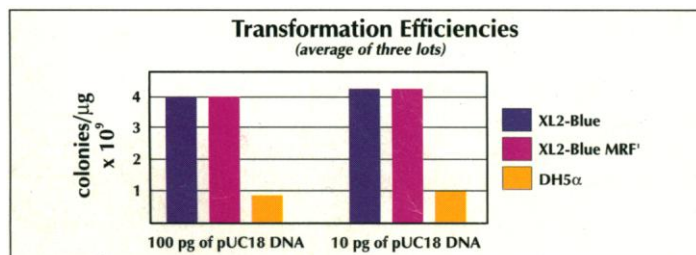
3-5 x 10⁹ colonies/μg

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The 3- to 5-fold increase in efficiency means more colonies per transformation reaction. The XL2-Blue ultracompetent cells are ideal for plasmid library construction. The highest possible efficiency also may be critical when starting DNA concentration is very low and when performing difficult ligations, as in multifragment, blunt-ended and PCR** cloning. These same advantages apply to our new SURE® 2 supercompetent cells,* which offer efficiency of >1 x 10⁹ transformants/μg of plasmid DNA.

* Patent pending

** The Polymerase Chain Reaction (PCR) process is covered by patents owned by Hoffmann-La Roche. Use of the PCR process requires a license.



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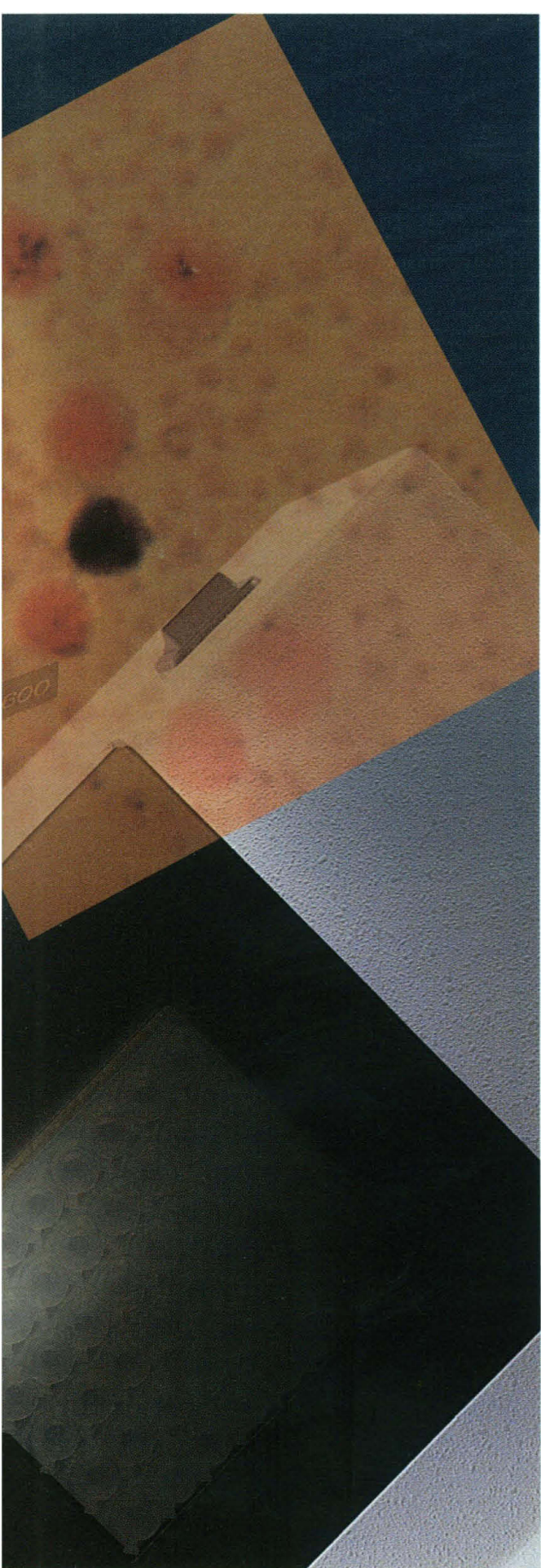
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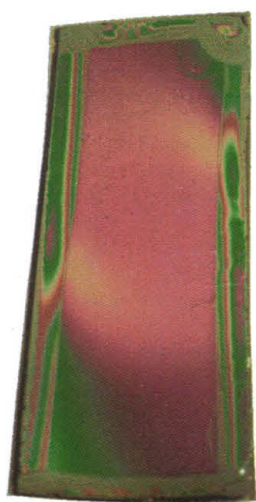
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Gene expression in living cells is often difficult to detect because of limited access of substrates to marker enzymes. Here gene expression in specific neurons of the nematode *Caenorhabditis elegans* is monitored by the bright green fluorescence of the green fluorescent

protein (GFP) from the jellyfish *Aequorea victoria*. The GFP fills entire neurons, including in one neuron an extended, fanned growth cone visible in the tail end (upper portion) of the nematode. See page 802. [Photo: Martin Chalfie]



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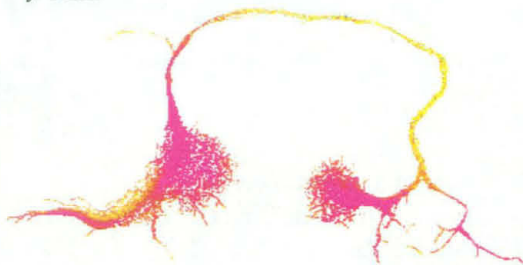
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Order out of destruction

In interstellar clouds and the atmospheres of the giant planets, many chemical pathways depend on the presence of protonized hydrogen, H_3^+ . Destruction of this molecule by slow electrons is a controlling step in many reactions. Experimental and theoretical estimates of the rate of H_3^+ destruction have varied by orders of magnitude, but now Sundström *et al.* (p. 785) have measured the rate at collision energies of millielectronvolts and less, corresponding to temperatures near 10K. In many astrochemical models, guesswork can now be replaced by data.

Rocks rock Jupiter

Hubble Space Telescope observations show that the largest fragments of Comet Shoemaker-Levy, destined to plunge into Jupiter's atmosphere this July, range up to 4 kilometers in diameter. Estimating the size of the fragments is not straightforward, because of the Telescope's optical aberration and because most of the observed luminosity in the images is due to an extended coma of dust. Weaver *et al.* (p. 787) identify 20 individual nuclei and estimate the sizes of the brightest 11. Each of these fragments, on impact with Jupiter, will generate a fireball with an energy equivalent to 100 million megatons of TNT.

Glides on smoothly

Most liquids will not wet a very clean surface, but instead break up into small droplets and roll away. Yerushalmi-Rozen *et al.* (p. 793) have developed a scheme to stabilize thin liquid films placed on an atomically clean silicon surface. A func-

Managing population pressures

The world's population is increasing at about 1 billion per decade, and much of that growth is concentrated in the developing nations of Asia, Africa, and Latin America. Bongaarts (p. 771) reviews recent population trends in these nations and evaluates various policies to effect a reduction in growth rate. He suggests that the effectiveness of many past policies has reached limits, and that further reduction may more likely ensue from reduction of population momentum—a result of a young population age structure—by encouraging a delay in the onset of childbearing and the spacing between births.

tionalized polymer is adsorbed onto the clean surface. Only one end is anchored to the silicon so that the free ends can act as a molecular brush, which stabilizes film through attractive interactions. Such an approach would find use in maintaining thin film integrity for applications such as lubrication and surface passivation.

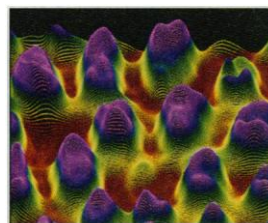
Transcription triple

Three reports in this issue relate to transcription. Li *et al.* (p. 805) have established an RNA polymerase II transcription system from *Schizosaccharomyces pombe*. RNA polymerase II and TFIIB are solely responsible for start site selection. Gerber *et al.* (p. 808) have found that homopolymeric Glu and Pro stretches can function as activation domains when bound to a GAL4 DNA binding domain. Wang and Tjian (p. 811) have found that transcription from the cyclin A, but not from the c-fos promoter, is temperature-sensitive in hamster ts13 cells. Thus, gene-specific effects on transcription may cause the cell cycle phenotype.

Intricate connections

Constructing electronic devices on the nanometer scale will likely require new approaches

for connecting circuits together. Huber *et al.* (p. 800) have used a high-pressure, high-temperature injection method to fabricate nanoscale arrays of metallic wires embedded in an insu-



lating alumina matrix. The electrical transport properties of this nanowire array were characterized with a scanning tunneling microscope.

Easily excited

Although β -galactosidase and luciferase have been extremely useful markers for tracking gene expression and protein distribution, their use in living cells has been hindered by the requirement for exogenously added substrates or cofactors. Chalfie *et al.* (p. 802; see cover) have developed a marker system in which the green fluorescent protein from jellyfish is expressed. Because green fluorescent protein only requires excitation by blue light in order to fluoresce, and is not toxic, it will be a useful tag to follow gene expression and protein localization in living cells.

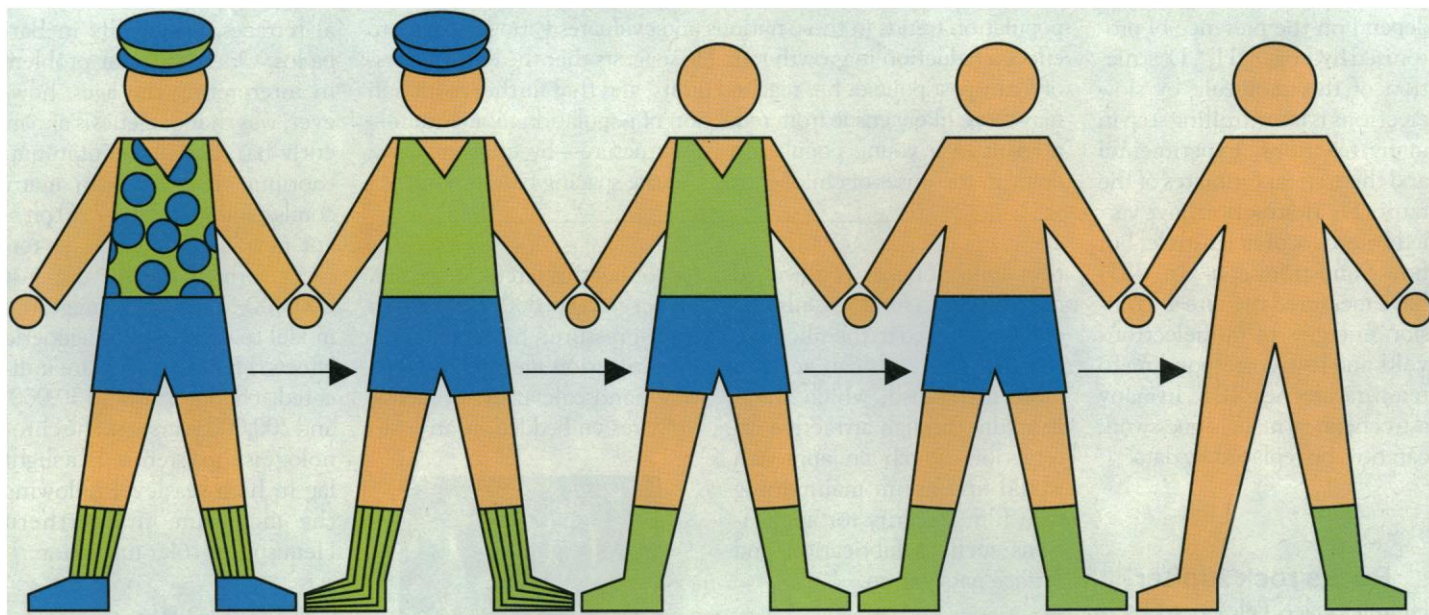
Sea changes

Key evidence for the timing of past high sea levels during interglacial times has come from dating of uplifted wave-cut coral terraces, principally in Barbados. One particular problem in interpreting the ages, however, was that diagenesis apparently has altered the uranium-thorium systematics in many corals. Gallup *et al.* (p. 796) present new ages for Barbados terraces formed during the last 200,000 years and suggest a model to correct for diagenetic effects. High sea levels are indicated at about 83,000, 130,000, and 200,000 years ago; the chronology is consistent with a slight lag in high sea level following the maximum in Northern Hemisphere solar insolation.

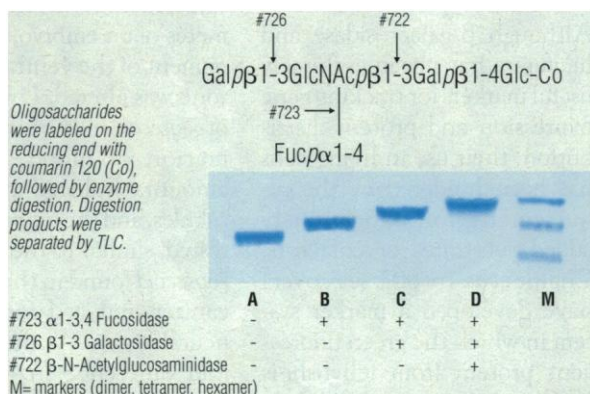
Fateful outcomes

During early development, mesoderm becomes differentiated into various tissues, including notochord and muscle. Niehrs *et al.* (p. 817) show that the concentration of *gooseoid* can affect the fate of mesodermal tissue in *Xenopus laevis* gastrulae. When *gooseoid* mRNA was injected into the ventral blastomeres of an embryo, the development of the ventral marginal zone was altered. Low amounts of *gooseoid* mRNA induced formation of blood; moderate amounts induced pronephric tubules, and the highest amount tested, similar to the amount of *gooseoid* found in the dorsal organizer, induced formation of neural tissue. As little as two-fold difference in amount of *gooseoid* mRNA could affect the result. A combination of these threshold-type responses with the gradient of *gooseoid* observed through the marginal zone could result in the pattern of tissues that normally develops.

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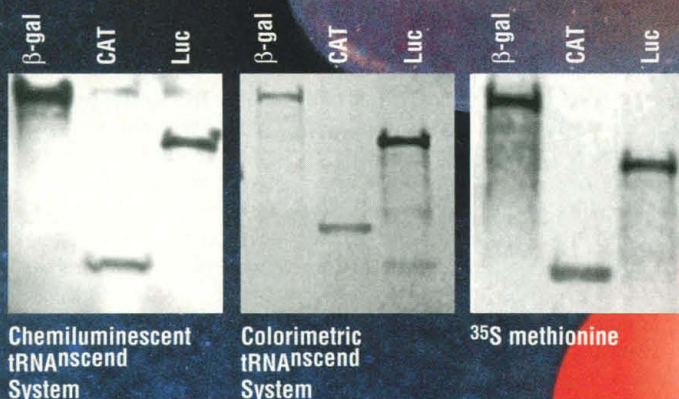
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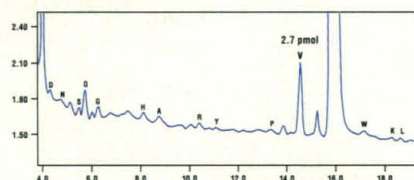
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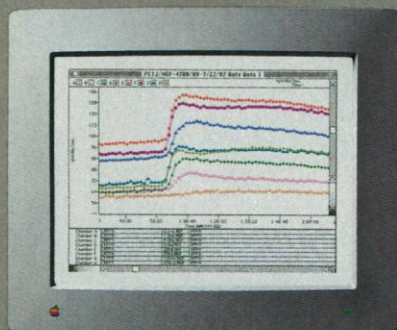
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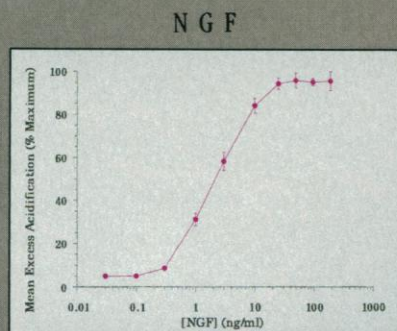
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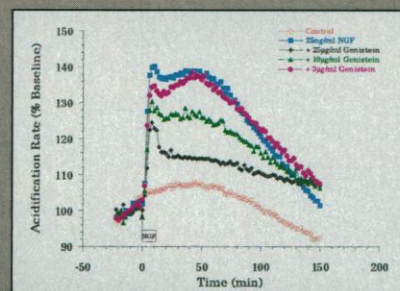
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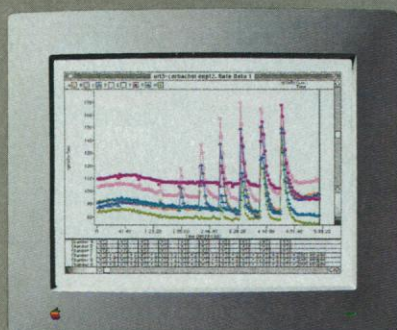
1 Real-time acidification rate data showing the response of PC12 cells to a 12 min. exposure to nerve growth factor (NGF:0.1-200ng/ml).



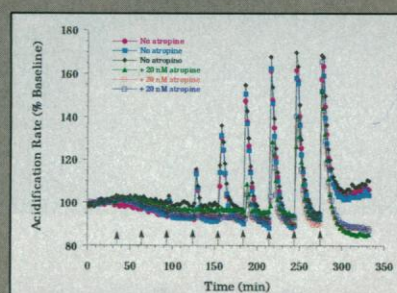
2 Dose response of PC12 cells to NGF. Each point represents data from 7 separate experiments. Calculated EC_{50} value for NGF was 1.9 ± 0.7 ng/ml ($\sim 152 \pm 50$ pM) ($\bar{x} \pm S.E.M.$).



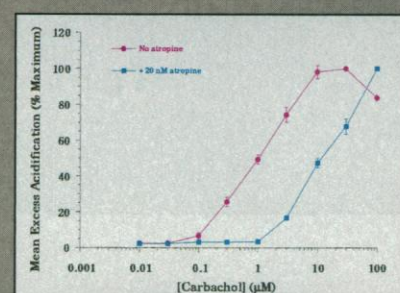
3 Dose dependent inhibition of NGF (25ng/ml) response by tyrosine kinase inhibitor, genistein (3-25 μ g/ml).



1 Real-time acidification rate data demonstrating stimulation of CHO cells transfected with muscarinic M_1 receptor. Increasing doses of carbachol (10nM-100 μ M) given in presence and absence of 20nM atropine.



2 Data from previous figure expressed as percentages of the basal acidification rates before initial addition of carbachol.



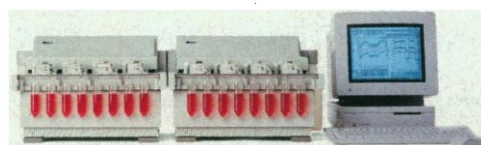
3 The EC_{50} values were calculated as 1.00 ± 0.08 μ M for carbachol alone and 11.50 ± 0.09 μ M for carbachol in the presence of 20nM atropine ($\bar{x} \pm S.E.M.$; $n = 3$).

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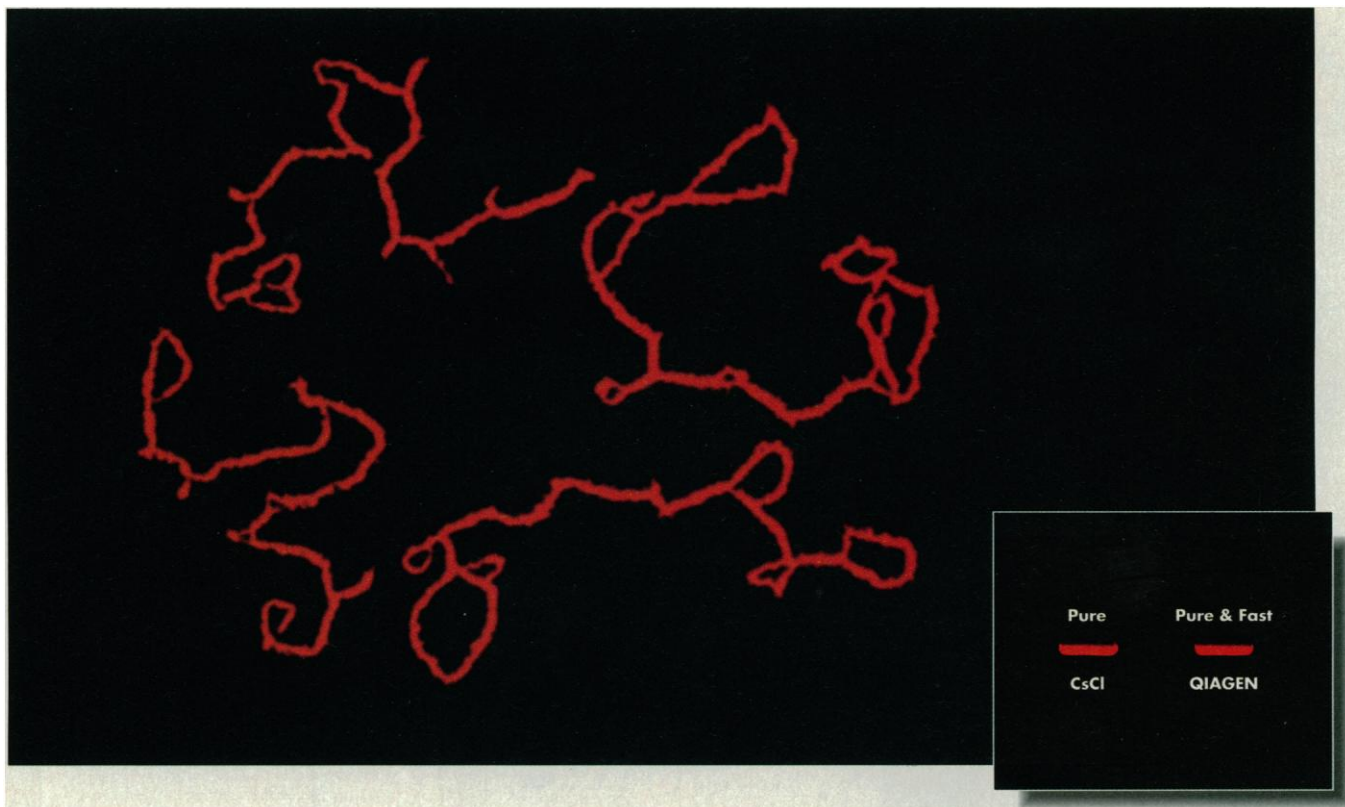
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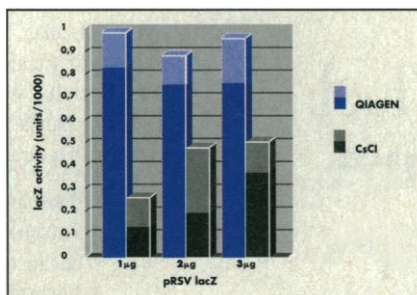


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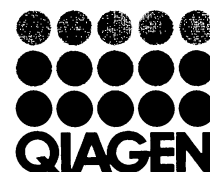
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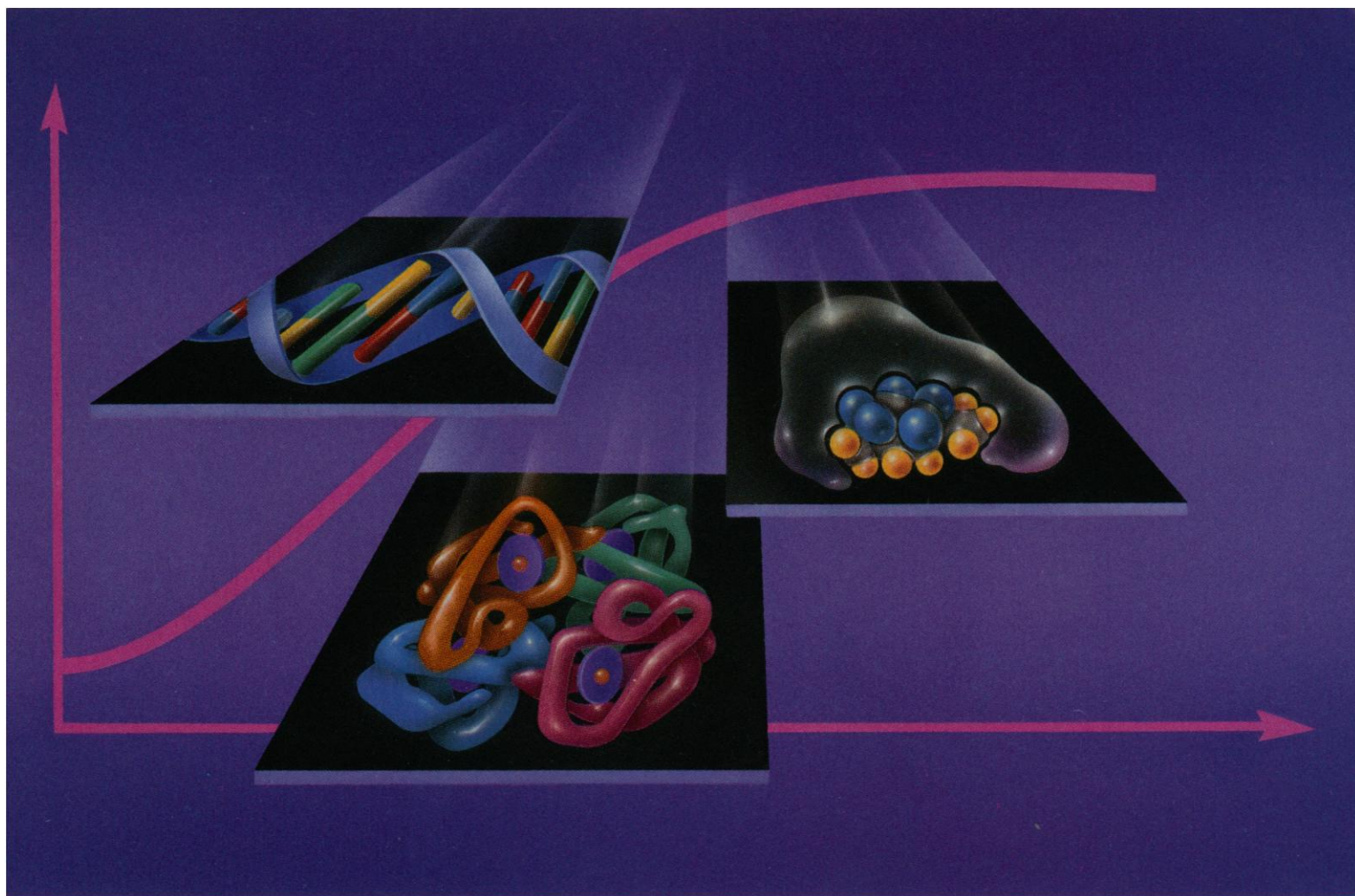
Title photo: digitalized reproduction of EM photo of supercoiled DNA prepared with QIAGEN resin.

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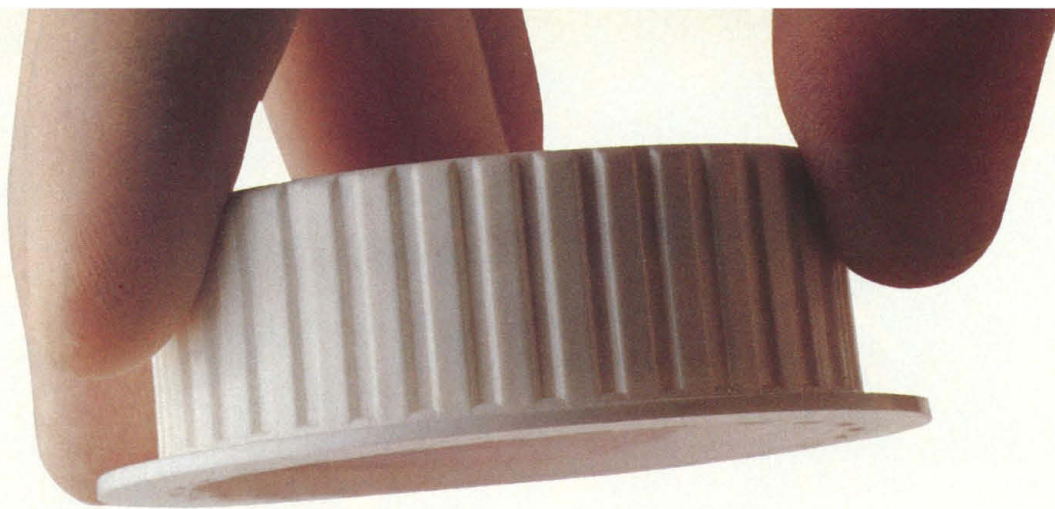
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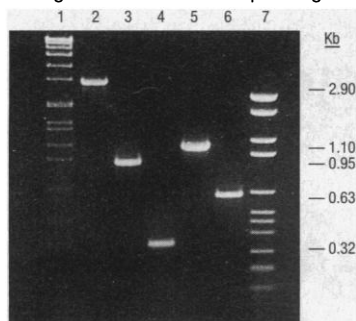
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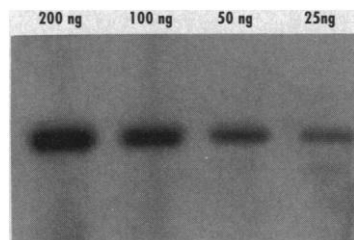
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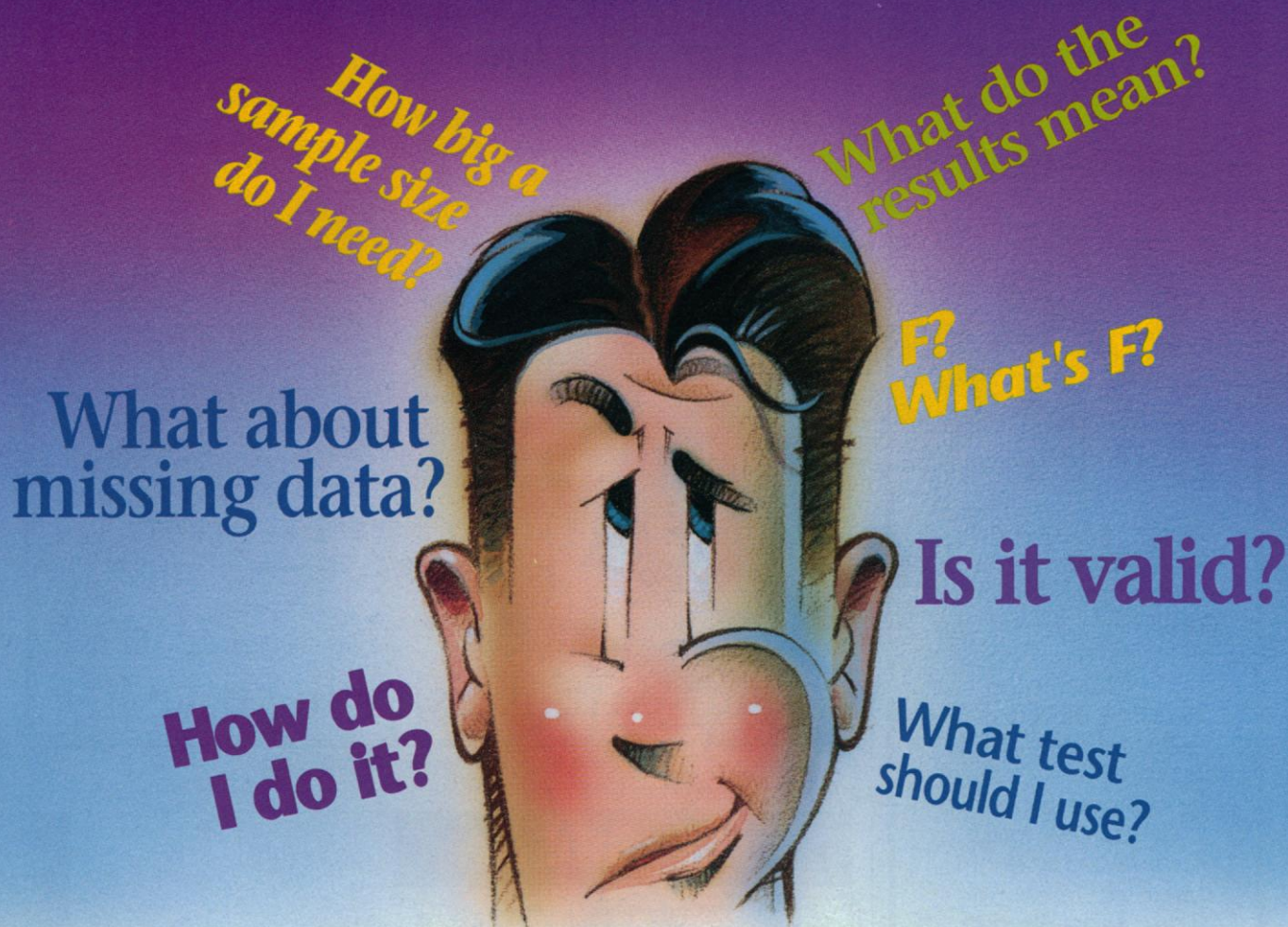
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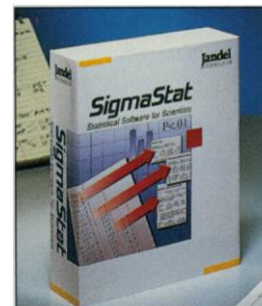
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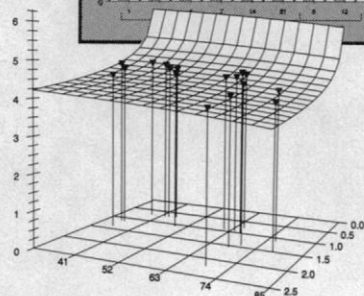
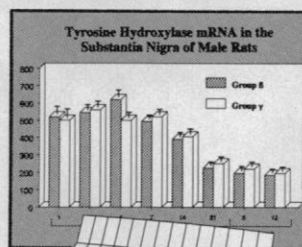
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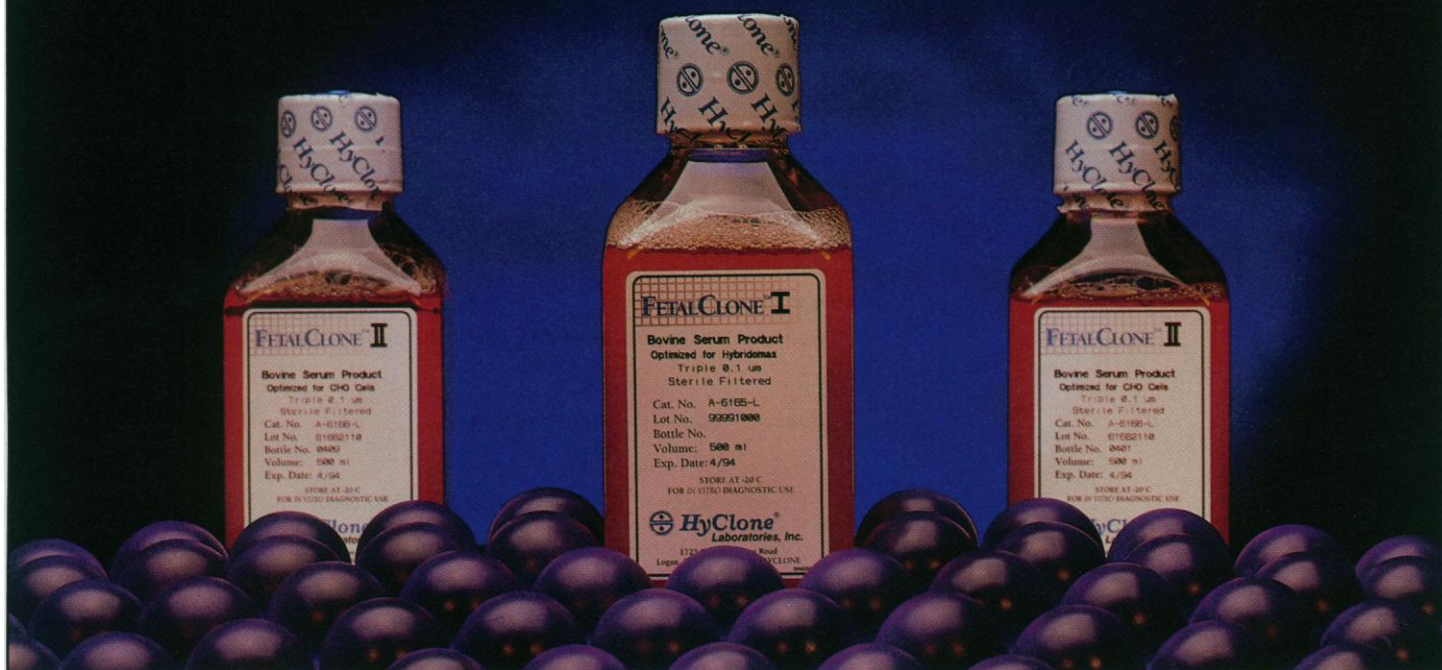
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		30%	\$13,600	\$ 2,400
		50%	\$12,000	\$ 4,000
		70%	\$10,400	\$ 5,600
		90%	\$ 8,800	\$ 7,200

*Hypothetical pricing based on current FBS market prices only. Not to be interpreted as actual price.

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1994 CALENDAR OF EVENTS

Endocrinology

Endocrinology Under 35

Scientific Organization: A. De Bellis (I) • E. Schipani (USA)

Rome, Italy • May 25-27

Paracrine and Autocrine Signals in the Hypothalamic Pituitary Complex

Scientific Organization: L. Martini (I) • D. de Wied (NL) • S.M. McCann (USA)

Stresa, Italy • September 9-10

Endothelins in Endocrinology

Scientific Organization: I. T. Cameron (UK) • M. J. Dunn (USA) • M. Serio (I)

Florence, Italy • October 6-8

Immunology

Differentiation Therapy

Scientific Organization: A. Kimchi (IL) • G.B. Rossi (I) • S. Waxman (USA)

Herzlia, Israel • March 7-10

Cytokines: Basic Principles and Practical Applications

Scientific Organization: A. K. Abbas (USA) • S. Romagnani (I)

Florence, Italy • March 28-30

Primary Immunodeficiency Diseases

Scientific Organization: F. Aiuti (I) • M. D. Cooper (USA) • F. S. Rosen (USA)

Orvieto, Italy • June 18-21

New Horizons in Gynaecological Malignancies

Scientific Organization: D. Ayalon (IL)

Eilat, Israel • November 16-18

Reproduction

Puberty: Basic and Clinical Aspects

Scientific Organization: C. Bergadá (ARG)

Buenos Aires, Argentina • April 6-8

Male Factor in Human Infertility

Scientific Organization: J. Tesarik (F)

Paris, France • April 21-22

Immunocontraception

Scientific Organization: O. Nilsson (S)

Uppsala, Sweden • June 30 - July 1

Recent Advances In:

Nutritional Aspects of Osteoporosis

Scientific Organization: P. Burckhardt (CH) • R. P. Heaney (USA)

Lausanne, Switzerland • May 5-7

Where Phenotype Does Not Match Genotype

Scientific Organization: M.I. New (USA)

Volterra, Italy • October 13-14

Gordon Research Conferences

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Fractals

May 1 - 6 • San Miniato (I)

Extrachromosomal Elements: Mitochondria and Chloroplasts

May 1 - 6 • Volterra (I)

Phase Transitions in Non-Metallic Solids

May 8 - 13 • Volterra (I)

Bioelectrochemistry

September 18 - 23 • Irsee (FRG)

New Visualization Technologies for Science Education

September 25 - 30 • Irsee (FRG)

Modern Developments in Thermodynamics

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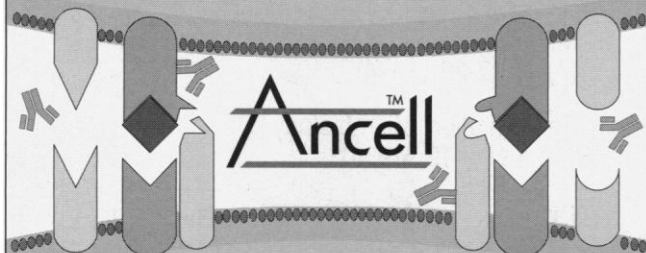
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