



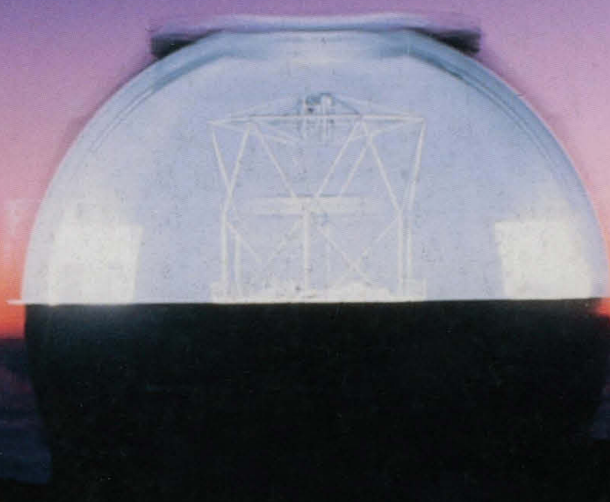
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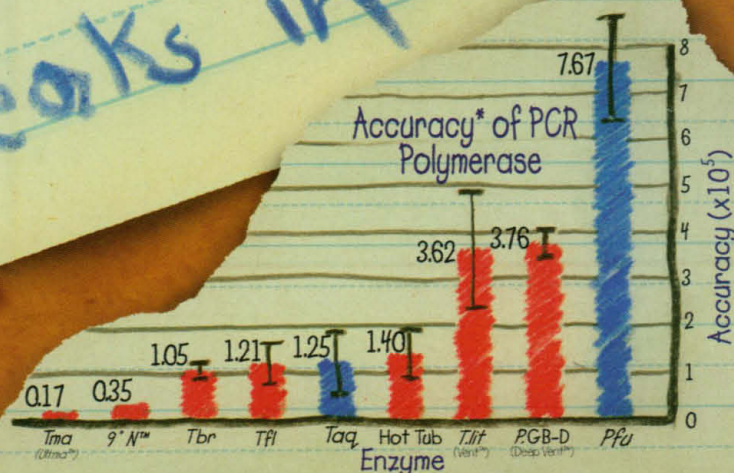
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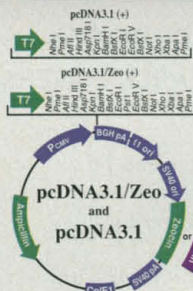
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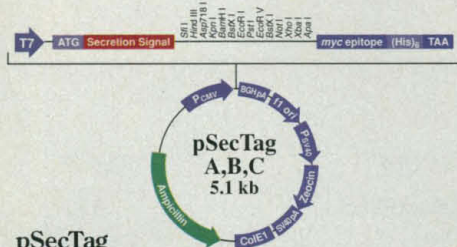
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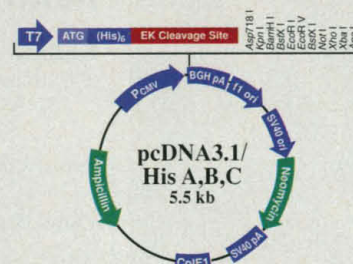
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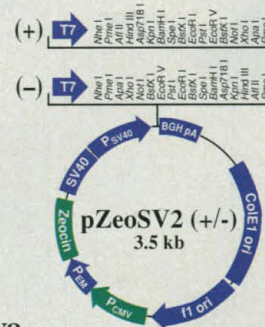
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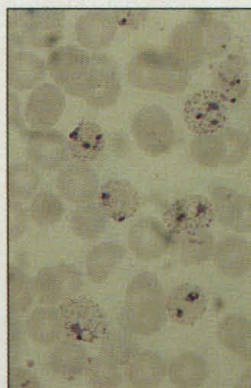
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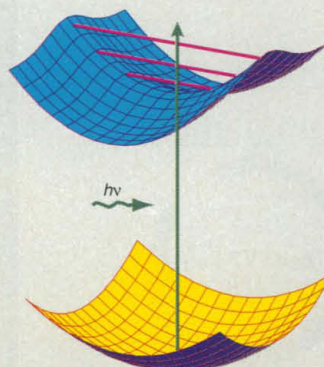
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Malaria and pregnancy



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Reactions revealed

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COVER

The open dome of the 10-meter Keck Telescope on Mauna Kea, Hawaii, rotated during this time exposure, making it look transparent. The Keck, the repaired Hubble Space Telescope, and other new instruments and techniques are lifting a veil from the early universe

and revealing details of its architecture and makeup, which are beginning to pose a challenge for existing theories. See the Special News Report beginning on page 1426. [Photo: R. Ressmeyer/Corbis]



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Twist and flies

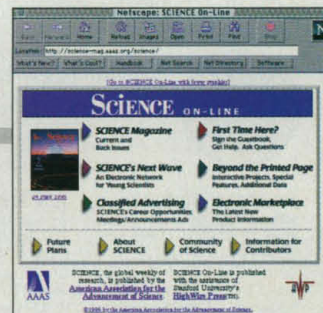
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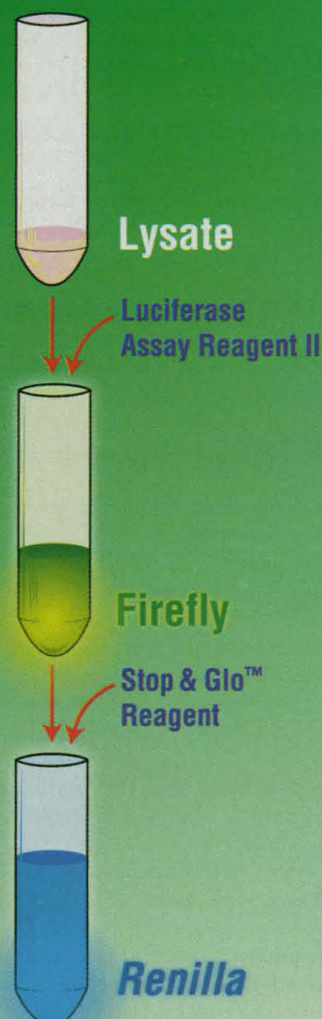


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THIS WEEK IN SCIENCE

edited by PHIL SZUROMI

Pushing the limits

Field-effect transistors have been made with organic materials but need further optimization before they can be used in applications such as flexible displays. Torsi *et al.* (p. 1462) measured the field-effect mobility of electrons in α -sexithiophene from over a temperature range from 4 to 350 kelvin and obtained an excellent fit to their data with Holstein's model, which describes the transport as small polaron motion, or hopping transport, for the higher temperature conditions. These results indicate that materials with lower polaron binding energies should be sought.

With the crust on

Magmas derived from the mantle may interact with the crust during their ascent. A key problem in tracing the origin of the magmas is resolving crustal contamination. Kersting *et al.* (p. 1464) examined a suite of volcanoes lying astride thin but chemically distinct continental fragments in Japan. The chemical variations among the volcanoes change across the crustal boundary, implying that even thin continental crust has modified the mantle magmas.

Viral protein versus p53

The transcriptional regulatory protein p53 controls the expression of proteins that regulate cell growth, and p53 mutations are frequently associated with human cancers. Dobner *et al.* (p. 1470) found that an adenovirus protein, E4orf6, can inhibit p53 transcriptional activation. E4orf6 binds to the carboxyl terminus of p53 and prevents the amino terminus of

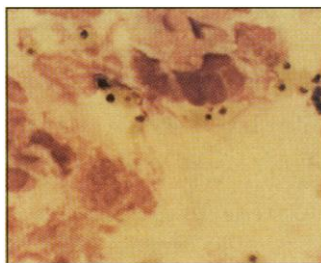
A mechanism for deep earthquakes

The structural transformation of serpentine, an abundant mineral in subducting slabs under high pressures and temperatures, is considered to be a primary cause for the deepest earthquakes (450 to 650 kilometers) recorded along subduction zones. Irifune *et al.* (p. 1468) studied the structure of serpentine in a multianvil apparatus. At pressures from 14 to 27 gigapascals and relatively low temperatures (200 to 300 degrees Celsius), serpentine became amorphous and dehydrated and rapidly recrystallized at higher temperatures. Deep earthquakes, assumed to occur at higher temperatures, may result primarily from the dehydration of serpentine.

p53 from interacting with TAFII31, a TFIID component in the initiation complex.

Parasites and pregnancy

One of the great mysteries of malaria is the increased susceptibility of pregnant women to develop the disease, even if they were immune prior to pregnancy. The immunomodulatory effects of pregnancy are usually invoked to explain this phenomenon, but Fried and Duffy (p. 1502) suggest an alternative. They find that malaria-infected red blood cells



from the placenta adhere to chondroitin sulfate A, whereas infected red cells from the periphery of pregnant women are less likely to do so and those from nonpregnant women do not. Thus, there appears to be a subpopulation of parasites that can flourish under the special conditions created in pregnancy, causing disease.

Chromatin connection

The packaging of DNA into chromatin helps regulate transcription. *SPT6*, an essential gene in the yeast *Saccharomyces cerevisiae*, has been implicated in the control of chromatin structure. Bortvin and Winston (p. 1473) found that *spt6* mutations cause alterations in chromatin structure in vivo. The Spt6p protein interacts directly with histones and can also mediate the assembly of nucleosomes in vitro in an adenosine triphosphate-independent manner.

Passing information

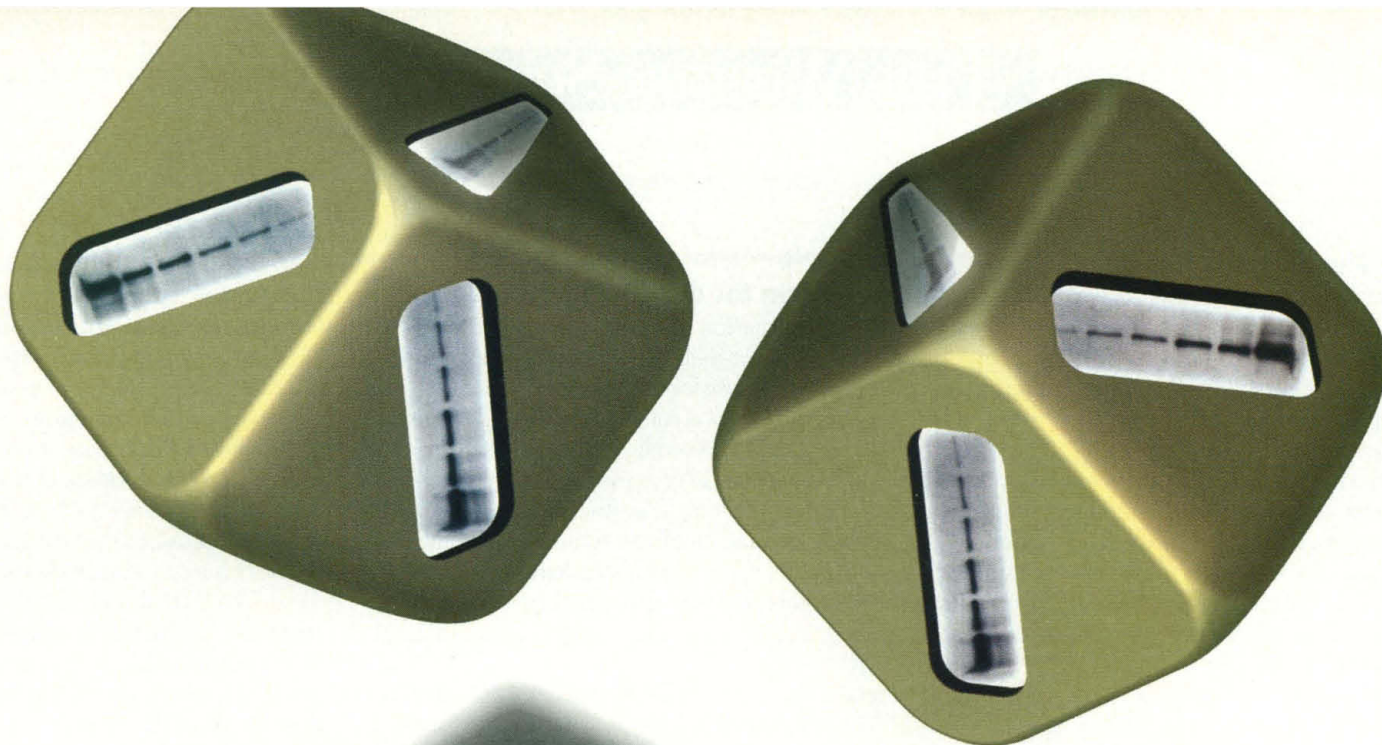
In the mammalian brain, information from sense organs converges at the hippocampus, and associations that contribute to short- and long-term memories are formed and passed onto other areas of the cerebral cortex. Risold and Swanson (p. 1484) show that these associations are also received by the hypothalamus. The three parts of the hypothalamus that are involved in motivated behaviors (such as feeding and social behaviors) communicate with three distinct portions of the hippocampus, suggesting that information processing within the hippocampus itself may be segregated functionally.

Controlling calcium

Coordinated regulation of cellular functions requires interaction between signaling pathways. Jayaraman *et al.* (p. 1492) provide evidence for regulation of intracellular calcium concentrations by a tyrosine kinase of the Src family. Activation of the T cell receptor caused the tyrosine kinase Fyn to associate with the inositol 1,4,5-trisphosphate (IP3) receptor, a calcium channel that releases calcium from intracellular stores. Phosphorylation of the IP3 receptor increased the probability of opening of the calcium channel. The results reveal a mechanism by which activation of nonreceptor tyrosine kinases in response to stimulation of receptors on the cell surface can then cause an increase in intracellular concentrations of calcium.

Environmental estrogens

Chemicals in the environment that act like natural estrogens have been suspected to have the potential to disrupt normal reproductive function of exposed organisms. However, these compounds are much less potent than natural estrogens. Arnold *et al.* (p. 1489; see the Perspective by Simmons, p. 1451, and the news story by Kaiser, p. 1417) tested the effects of combinations of two environmental estrogens on binding and activation of the estrogen receptor. Combinations of the compounds were 10 to 1600 times more potent than the individual compounds in activating estrogen receptor-mediated transcription. The synergistic biological activity of the compounds reflected synergistic binding to the estrogen receptor.



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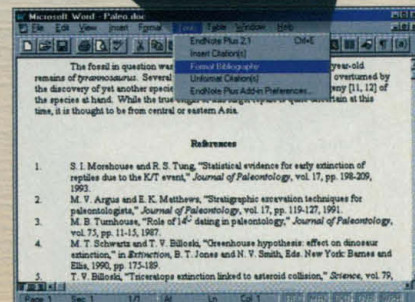
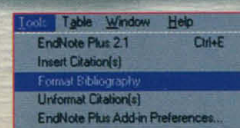
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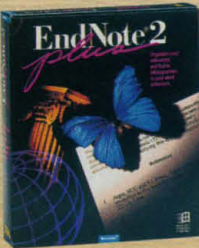
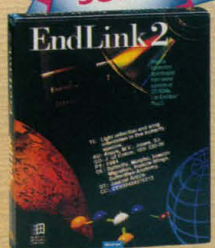
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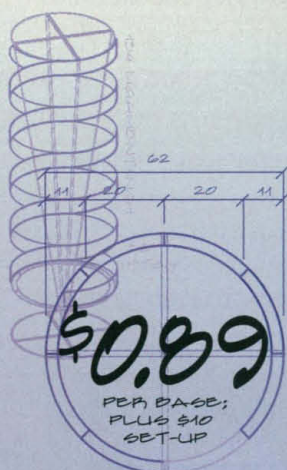
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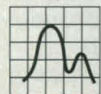
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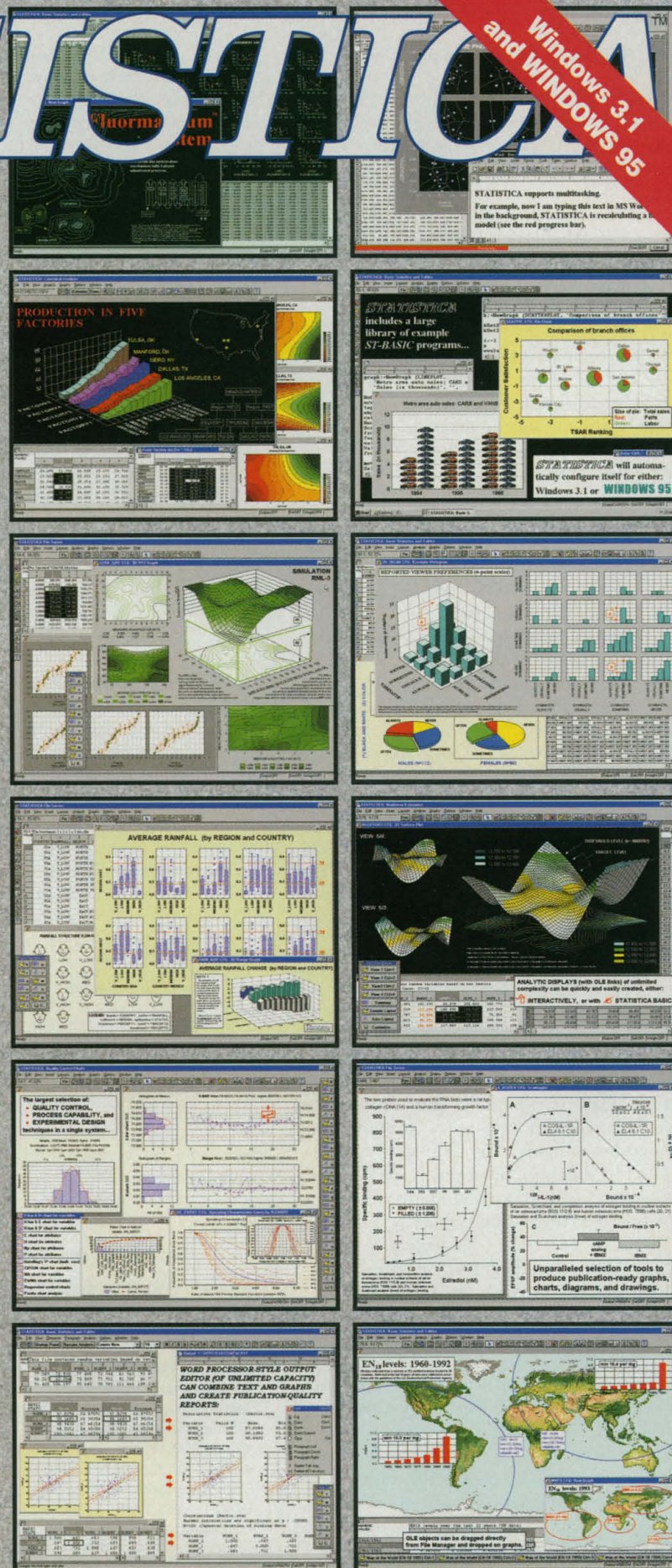


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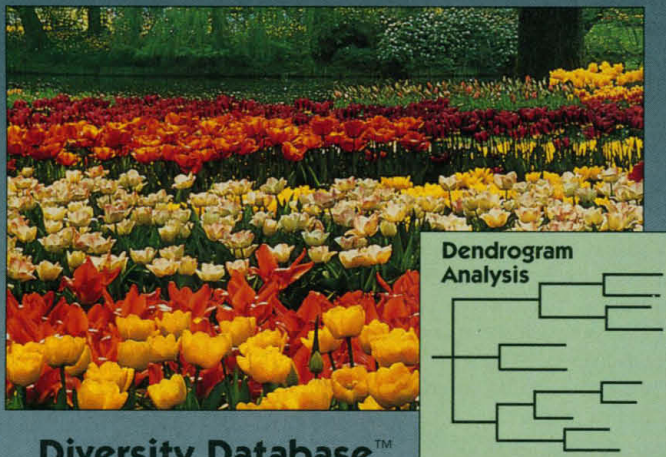
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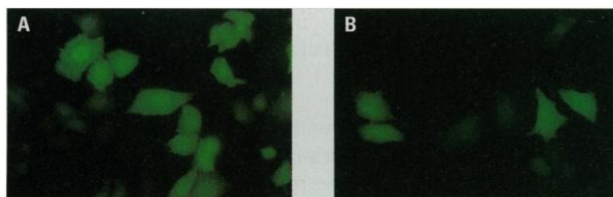
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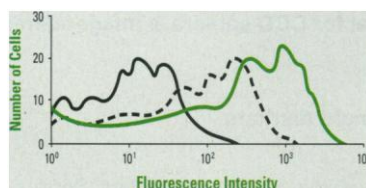
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Expression of pEGFP-C1 (Panel A) and pEGFP-N1 (Panel B). CHO-K1 cells were transfected with the indicated vector using a liposome-mediated method. Cells were fixed in 4% paraformaldehyde/PBS 48 hr post-transfection and examined with a fluorescence microscope using a double-pass filter set for FITC/PI (Chroma Technology Corp. #CZ909).



FACS analysis of CHO-K1 cells expressing **GFP with S65T** mutation (Heim *et al.*, 1995; solid black line), **"humanized" GFP-S65T** (Zolotukhin *et al.*, 1996; dotted black line), and **Enhanced GFP** (GFPmut1; Cormack *et al.*, 1996 & Haas *et al.*, 1996; green line). Enhanced GFP demonstratively gives the most intense fluorescence.

Vector	Size	Cat. #
pEGFP-1	20 µg	6086-1
pEGFP-N1	20 µg	6085-1
pEGFP-N2	20 µg	6081-1
pEGFP-N3	20 µg	6080-1
pEGFP-C1	20 µg	6084-1
pEGFP-C2	20 µg	6083-1
pEGFP-C3	20 µg	6082-1

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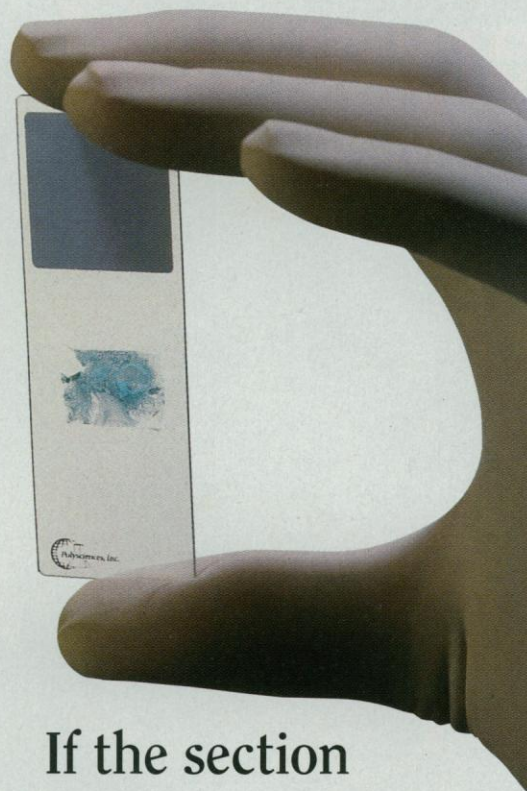
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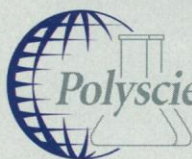
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Wang, X. et al. Matrix metalloproteinase inhibitor BB-94 inhibits human colon tumor growth and spread in a patient like orthotopic model in nude mice. *Cancer Res.* 54, 4726-28 1994

Hoffman, R. Orthotopic is orthodox: why orthotopic transplant metastatic models are different from all other models? *J. Cellular Biochem.* 56, 1-4, 1994



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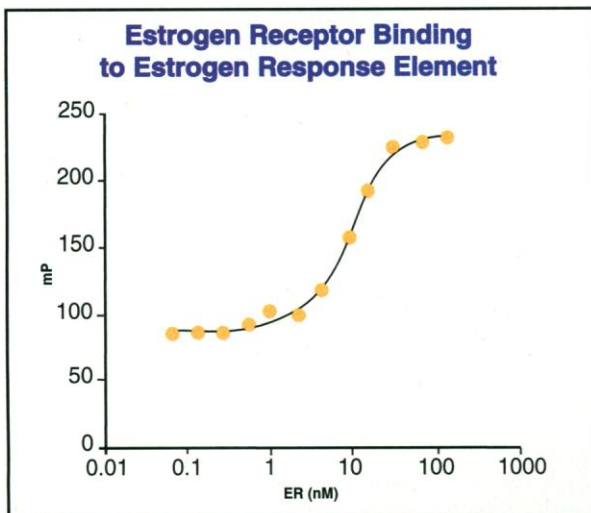
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