ty. For example, says Rousse, at such high speeds, close to that of light, the mass of the electron increases, changing completely the interaction between light and matter. "It will be very interesting to see what happens if we can increase the energy of the laser even further," he adds.

Umstadter believes that the feat will also lead to new laboratory x-ray sources. If the pump laser is powerful enough, the electrons should reemit most strongly in the x-ray region of the spectrum, he explains, "so we presumably will be able to convert 1 micrometer [infrared] light into 1 angstrom x-rays." The dance of electrons might ultimately lead to a tabletop laser producing very short x-ray pulses, useful for snagging a glimpse of other quick moves such as the molecular choreography of photosynthesis.

–ALEXANDER HELLEMANS

Alexander Hellemans is a writer in Naples, Italy.

BIOETHICS

Britain Urged to Expand Embryo Studies

Biologists in Britain who want to use human stem cells to develop new medical therapies say the chances for government support are looking brighter. They're encouraged by an opinion issued in London by a senior advisory panel urging the U.K. government to enact a new law to ban "reproductive cloning" of humans while permitting a limited type of cloning for research on new methods of treating disease.

The recommendations, written by a joint working group of the two agencies that regulate the use of human reproductive technology in the country—the Human Genetics Advisory Commission (HGAC) and the Human Fertilisation and Embryology Authority (HFEA)—are expected to carry substantial weight in the U.K. The report could also become a model for other countries, say U.S. researchers, including developmental geneticist John Gearhart of Johns Hopkins University in Baltimore, who has cultivated human stem cells from fetal tissue.

Limited approval. Advisory committee chair Sir Colin Campbell.

CREDIT: UNIVERSITY OF NOTTINGHAM

The joint HGAC and HFEA working group, headed by the Reverend Dr. John Polkinghorne—an Anglican minister and mathematical physicist—began reviewing U.K. policy last January at a time when the press was full of speculation that humans might soon be cloned. The working group drew up a summary of key issues and sought public comment. On cloning for reproductive purposes, the outcome was "conclusive," says legal philosopher Sir Colin Campbell, HGAC's chair and vice chancellor of the University of Nottingham: "86% of the people who commented supported a ban on human reproductive cloning." The working group also endorsed a total ban.

But a fraction of respondents also favored limited research that involves DNA transfer into oocytes, the process that produced the sheep Dolly. Besides offering a way to copy an organism, cloning might enable researchers to transfer DNA from a defective to a healthy embryo, and it might also allow them to create new tissue for transplants. The working group, says Campbell, supports research in these two areas.

In the first, aimed at studying diseases rooted in the mitochondria—the cells' energy-producing organelles—DNA might be transferred from a cell with deficient mitochondria into a healthy oocyte, creating an embryo that could develop into a healthy child. The goal of the second line of research would be to clone a patient's DNA in stem cells derived from an embryo and coax those cells to develop into tissues that would be accepted by the patient's immune system. "The eventual clinical use of such [transplantation] procedures," the report notes, "would be to provide immunologically compatible tissues for the treatment of degenerative diseases of, for example, the heart, liver, kidneys, and cerebral tissue, or repair damage to skin or bone." The potential medical value, it adds, is "enormous." The report recommends that research licenses be granted for these areas of research.

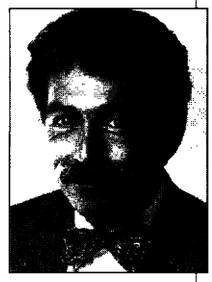
"This seems like a very positive signal that may open the door to research" on new methods of human cell therapies, says developmental biologist Austin Smith of Edinburgh University in Scotland. Existing U.K. guidelines allow researchers to obtain a license for research on human embryos up to the 14th day of development, but only for narrow applications such as improving fertilization methods. (At present, Britain has licensed 24 such projects at 18 centers.) Under the proposed new rules, however, these early embryos could be used for broader purposes, such as developing stem cells that can grow into a full range of specialized tissues—one of Smith's goals.

The HGAC-HFEA report lets agencies know that they should now give serious consideration to grant requests in these areas, says Smith. In the past, he says, restrictive legal policies have made it difficult to obtain funding even for research that would lay the

ScienceScope

SCIENCE EDITOR-IN-CHIEF TO STEP DOWN

Science is looking for a new editor. Editor-in-Chief Floyd Bloom (below) last week told the board of directors of the American Association for the Advancement of Science (AAAS), which publishes *Science*, that he will not seek a second 5-year term when his current appointment expires in May 2000. He said he wants to spend more time doing research at The Scripps Research Institute in La Jolla, California, where he is chairman of the Department of Neuropharmacology.



During Bloom's tenure, *Science* regularly published research reports that ranked among the most cited papers of the year. The journal also underwent a major redesign and made the leap onto the World Wide Web. Bloom "brought the vision, energy, and focus necessary to make it happen," says *Science* Publisher Richard Nicholson. The AAAS board plans to appoint a search committee within a few weeks, with hopes of naming Bloom's successor sometime next year.

NOT-SO-CRITICAL TECHNOLOGIES

Japan's industrial might in the 1980s created a bull market for studies assessing whether U.S. industry was falling behind in the race to master so-called "critical technologies" such as x-ray lithography. But a new White House report suggests that the once-hot topic has become cold, thanks to a healthy U.S. economy and Asia's financial crisis.

The report, based on interviews with 39 industrial titans from the likes of Merck, Motorola, and Lockheed Martin, is largely an exercise in chest-pounding. "Most speakers expressed their belief that the U.S. has regained its edge," the authors note. At the same time, the industrialists register grave concern with the state of U.S. public school education, a finding that the authors admit seems far removed from anyone's definition of a critical technology.

Perhaps the best gauge of how far techno-fears have ebbed is the affiliation of the authors. The report is from a federally funded think tank called the Science and Technology Policy Institute. Until recently, Washington insiders knew it by another name: the Critical Technologies Institute.

Contributors: Eliot Marshall, Michael Baker, David Malakoff, and Jeffrey Mervis

groundwork for stem cell experiments. The new approach would "allow the science to move forward," Smith says.

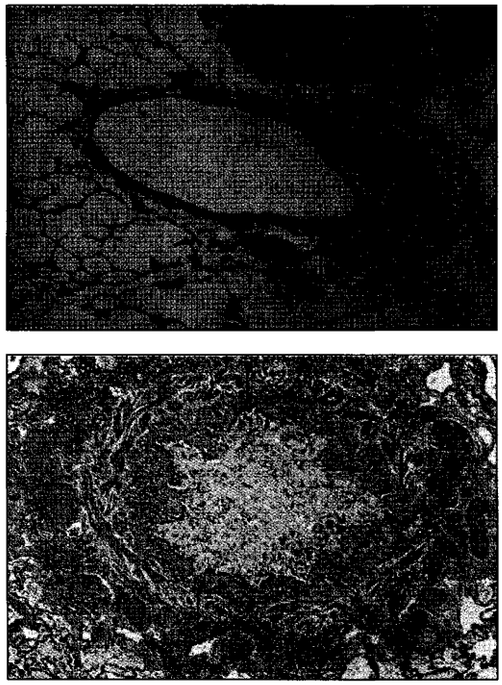
The decision on whether to accept these recommendations, however, rests with the health ministry and the HFEA, which have not announced what they plan to do.

–ELIOT MARSHALL

IMMUNOLOGY

Interleukin-13's Key Role in Asthma Shown

As any sufferer can tell you, an asthma attack is nothing to sneeze at. In a dramatic—and dangerous—overreaction by the immune system, the lungs pump out mucus and inflammatory molecules, clogging and swelling constricted airways; in severe cases, all airflow is cut off, and the attack can be fatal. Now, on pages 2258 and 2261, two independent teams present evidence that an immune system messenger called interleukin-13 (IL-13) may be a key culprit in such attacks. The results come from mouse studies, but if they hold up in humans, they suggest two promising targets for antiasthma therapies.



Taking your breath away. A normal lung is clear (*top*), but the molecule IL-13 may trigger mucus production and airway tightening, as shown in a patient who died of an asthma attack (*above*).

Although IL-13 was known to play a role in asthma, it was typically overshadowed by its better-known sibling molecule, interleukin-4, another member of the cytokines—a group of messenger molecules that help coordinate the body's immune responses. The new work suggests, however, that IL-13 was unjustly overlooked. "[The work] alerts people who have dismissed IL-13 to its importance, along with IL-4, in asthma," says immunologist Charles Maliszewski of Immunex Corp. in Seattle.

Until now it was difficult to separate the roles of IL-13 and IL-4, because they seemed to have very similar effects and dock on very similar receptor complexes at the surface of immune system cells. But a new molecule that selectively mops up IL-13 from airways has allowed the two teams of scientists to clarify the roles of these twin messengers—and show that IL-13 is a key player in its own right.

The new molecule, developed by immunologist Debra Donaldson of Genetics Institute in Cambridge, Massachusetts, is a soluble version of a recently cloned piece of a cell surface receptor that is specific to IL-13. The molecule binds to the cytokine, preventing it from attaching to its receptors.

Immunologist Marsha Wills-Karp of Johns Hopkins University and her colleagues gave the IL-13 blocker to mice already primed for an asthma attack. When the researchers exposed the mice to an allergen, the IL-13 blocker prevented airway tightening and the increase in mucus production typical of asthma. Conversely, giving IL-13 to mice not primed for an attack caused airway tightening and an increase in eosinophils, a kind of inflammatory cell prevalent in asthmatic lungs but scarce in healthy tissue.

In independent work, Gabriele Grünig and David Corry of the University of California, San Francisco, and their colleagues came up with similar results. The team applied either an inactive control protein or a drop of IL-13 blocker to the nasal passages of a different strain of mice, then exposed the animals to an asthma-inducing protein. The mice that received the IL-13 blocker had almost no airway tightening. They also had roughly one-third of the eosinophils and only half of the mucus-producing goblet cells seen in mice that received only the allergen. The team also tested IL-13 and IL-4 head-to-head by applying them directly to the mice's nasal passages. The mice that received IL-13 appeared to have worse symptoms. "While IL-4 plays a role," Corry says, "IL-13 may be more potent."

The papers present "very convincing evidence that IL-13 has a role in these mouse models," says immunologist Paula Jardieu of Genentech in South San Francisco. But few asthma researchers, including Jardieu, are ready to discount IL-4. They note that IL-4 prompts immature T cells to develop into a type of cell called T_H2 (for T helper 2), which are a hallmark of asthma and allergic diseases. These cells produce IL-13, more IL-4, and several other asthma-inducing molecules. "Maybe IL-13 does more on a quantitative basis, but you don't get T_H2 cells in absence of IL-4," says immunologist Lanny Rosenwasser of National Jewish Medical and Research Center in Denver. And without T_H2 cells, he says, there is no asthma.

Several researchers say that perhaps a more promising drug target than either cytokine is the portion of the receptor molecule on immune system cells that is shared by both IL-4 and IL-13. Indeed, in Corry's experiments, a strain of mice genetically engineered to lack this part of the receptor did not develop signs of asthma when they were given either cytokine. Several companies are already seeking an effective way to block the receptor's signaling. "[The cytokines] won't give you asthma without that receptor," Corry says. "That kind of bottleneck is the perfect target for designing new therapies."

–GRETCHEN VOGEL

FISHERIES SCIENCE

Papers Posit Grave Impact of Trawling

WASHINGTON, D.C.—A group of marine scientists has lobbed a rhetorical warning shot across the bows of the world's trawling fleets. In a press conference this week, they presented evidence that dragging heavy nets across the seafloor causes far more environmental damage than does the more visible clearing of forests. Some trawlers are returning fire, however, saying that the scientists have overstated their case and that some fishing grounds have remained productive despite more than a century of trawling. Caught in the crossfire are government fisheries officials, who believe the new findings will fuel but not settle an increasingly rancorous debate over whether to curtail trawling in some heavily fished waters.

The latest battle over sustainable fishing was triggered by a suite of seven papers released on Monday* and by a flotilla of results discussed last week at a conference in the United Kingdom.† Some seafloor researchers and the American Oceans Campaign, a Washington, D.C.–based environmental group, hope the findings will prompt an outcry against the largely invisible impact of trawling, a technique traditionally confined to shallow coastal seas that has recently extended its reach into waters up to 2

* *Conservation Biology*, December 1998.
† "Effects of fishing on non-target species and habitats: Biological, conservation and socio-economic issues," Baumaris, Anglesey, Wales, 7 to 10 December 1998.

CREDITS: (TOP) WARNOCK *ET AL., PRACTICAL PATHOLOGY OF CHEST DISEASE*, 1996; (BOTTOM) MARTHA WARNOCK