lead to "unnecessary delays." So the panel settled on guidelines, to be implemented by IRBs and animal-care committees, that the report says should be "required of all experimenters and institutions that undertake xenotransplantation trials in humans." The report suggests that HHS form an advisory committee "to coordinate but not to regulate" research, policy, and monitoring. It also recommends studies of ethical issues.

The IOM's suggested rules—which include procedures for ensuring disease-free donor animals, surveillance of patients, and maintenance of tissue banks—are similar to those drawn up over the past year by the FDA, NIH, and the Centers for Disease Control and Prevention. Staffers say the government guidelines, still awaiting final approval by HHS, will be issued soon.

Among other things, these new guidelines would require extensive testing of cell lines and organs before they are transplanted into humans. They would ask physicians to monitor patients after surgery and report data back to an anonymous national registry, for as long as the patients live. On 8 July, the government solicited proposals for a pilot database to store such information.

Xenotransplant research was effectively put on hold last year when the FDA decided that a proposal to transplant baboon bone marrow into an AIDS patient should be subject to review (*Science*, 5 May 1995, p. 630). The trial was approved and the experiment later performed, with disappointing results. But other experimenters have been awaiting the HHS guidelines. Now, with the release of the IOM report, the research is poised to resume.

A xenotransplant researcher who has seen a summary of the IOM report, surgeon Thomas Starzl of the University of Pittsburgh, calls it a "good document" that strikes a balance between "crazies on both sides of the teeter-totter." His one criticism, he says, is that it paints an overly optimistic picture of xenotransplantation, which still hasn't overcome problems such as organ rejection. "Blastoff time isn't here yet," he warns, even if the conditions for launch are much better than they were a year ago.

–Jocelyn Kaiser

PARTICLE PHYSICS

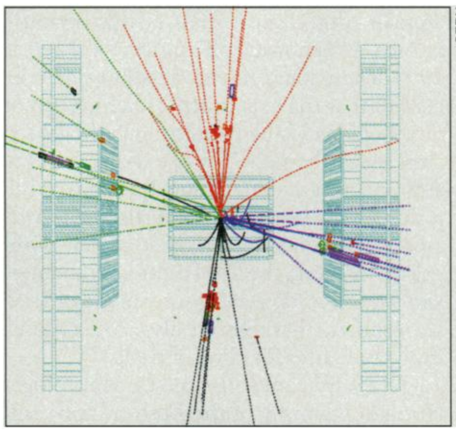
Upgraded LEP Bags First W Pairs

Just 2 days after restarting their main accelerator following a major upgrade, physicists at CERN, Europe's particle physics center near Geneva, got some welcome news. On 10 July they witnessed their first creation of pairs of so-called W particles, the charged carriers of the weak nuclear force, which controls some types of radioactivity as well as the nuclear burning of the sun. The event itself was not a big surprise, for the upgraded Large Electron-Positron (LEP) collider, dubbed LEP2, was designed to have just the right energy to produce W pairs. But it provided a reality check on the functioning of the revamped machine—indeed, since that first sighting LEP has been producing W pairs daily, and physicists can now study the particles in detail. "It's the beginning of a new era," says CERN physicist Daniel Treille.

CERN engineers have cranked up LEP's energy while leaving all of the machine's beam-bending and particle-detection technology essentially untouched. This was achieved by adding 60 superconducting accelerating cavities last autumn and a further 84 cavities over the winter. The upgrade brings the available collision energy to 161 gigaelectron volts (GeV). At such energies, colliding electrons and antielectrons, or positrons, have enough energy, in theory, to produce an entire heavy atom such as gold, but far more likely is the creation of pairs of W particles, with a mass just above 80 GeV each. Three more upgrade steps will bring the energy to 192 GeV by 1998. "The significance of the LEP events is that they signal the functioning of the LEP2 machine," says Stanford Linear Accelerator Center experimenter Morris Swartz.

As the machine begins to explore uncharted territory, physicists will be on the lookout for two of their most sought-after quarries. One is the Higgs particle, which is linked to the mechanism by which all particles acquire mass. The other is supersymmetry, a unifying principle at the heart of many attempts to construct theories combining all of nature's forces. Although beloved of theorists for many years, supersymmetry is thought to operate at energies only just within the reach of existing accelerators.

The main attraction for now, however, is the W pairs. Although W particles, and their chargeless companion, the Z^0, were discovered in 1983 at CERN, they were produced in relatively "dirty" proton-antiproton collisions. "The difference at LEP2 is that we are making the Ws in electron-positron collisions. All we are making is the W^+ and W^-, and when they decay you can see all the different possible final states," says CERN physicist Pippa Wells.



CERN

Moment of creation. Early production of a W pair in CERN's DELPHI detector.

All four of LEP's experimental detectors are looking for the production of W pairs. The first to strike lucky was the DELPHI detector, and young French researcher Achille Stocchi, from the Linear Accelerator Laboratory at Orsay, near Paris, was the first person to see the event in the DELPHI control room. "This event is a very particular shape; it's really a cross. It's what we call a four-jet event," he says. Each opposing pair of jets arises from the decay of a W, and by analyzing the energy of the jets, researchers can calculate the mass of the original W particle. "It's the moment you dream of, to be there exactly at this moment, you feel something," says Stocchi.

The ability of LEP2 to precisely "weigh" the W particles will provide a powerful test for the Standard Model. "The W mass is predicted more precisely [by the model] than it is known at the moment," says Wells. A detailed comparison of predictions with the new experiments will allow researchers to monitor the participation of particles such as the much sought-after Higgs particle.

Other possible players that could turn up are the predicted supersymmetric twins to already known particles, often known as "superpartners." While the Higgs particle is an integral part of the Standard Model, supersymmetry goes one step beyond it, and the detection of superpartners could open up whole new realms of physics. Supersymmetry predicts that the lowest energy superpartners may fall within the energy range of today's top accelerators, and there have recently been suggested sightings of superpartners at the Fermi National Accelerator Laboratory near Chicago. "If superpartners have indeed been produced at Fermilab, it is very likely that they will be produced at LEP in the run that has just begun," says theorist Gordon Kane of the University of Michigan. Adds Swartz: "The observation of any such [particle] would revolutionize particle physics."

–Andrew Watson

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