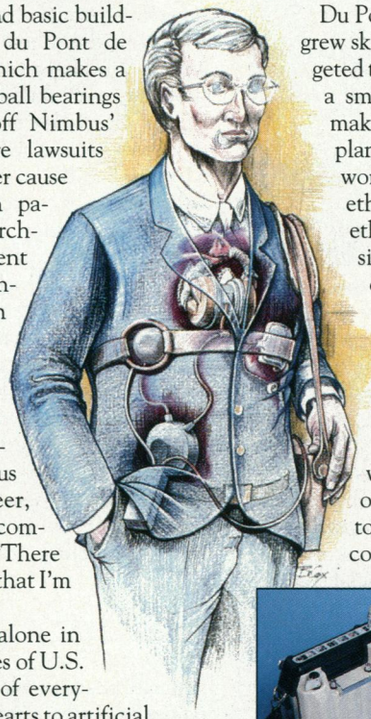
Liability Concerns Threaten Medical Implant Research

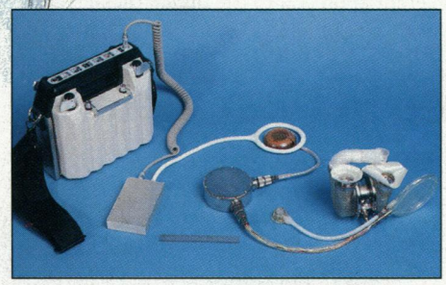
Researchers at Nimbus, a medical device company in Rancho Cordova, California, are trying to design small implantable blood pumps to assist the weak hearts of patients with cardiovascular disease. But since January, instead of improving their device, Nimbus staffers have spent much of their time scrambling to find basic building materials. E. I. du Pont de Nemours and Co., which makes a hard plastic used for ball bearings in the pump, cut off Nimbus' supply, fearing future lawsuits should the devices ever cause medical problems in patients. Nimbus researchers found a replacement material made by another company, but in September Du Pont bought the rights to that material and immediately added it to its forbidden list. Douglas Thomas, a Nimbus development engineer, isn't sure where the company will turn next. "There are no other suppliers that I'm aware of," he says.



Nimbus is hardly alone in its current bind. Scores of U.S. and overseas makers of everything from artificial hearts to artificial hips have been scraping around for backup materials as chemical companies, such as Du Pont and Dow Corning, have stopped selling polymers to medical implant companies. The move not only jeopardizes the supply for 7.5 million patients a year who rely on various implants, but it's also "having an overall chilling effect on innovation," says Paul Citron, vice president of science and technology for Medtronic, the country's largest supplier of implantable medical devices. Dollars intended for development are instead being spent on testing alternate materials for existing devices, and materials shortfalls are forcing unwanted design changes on new devices, company officials say. Last week, company executives, academic researchers, and federal regulators convened in Washington, D.C., to discuss product liability and other concerns facing implant makers.* But it was clear that there are no simple solutions waiting in the wings. Says Paul Didisheim, who heads the biomaterials program at the National Heart, Lung, and Blood Institute: "There's a lot of talk and not a lot of action because nobody seems to have come up with a clear-cut solution to the problem."

Du Pont and other materials suppliers grew skittish after a series of lawsuits targeted the chemical company along with a small Houston-based jaw implant maker called Vitek Inc. Vitek's implants, which included about 5 cents' worth of Du Pont's polytetrafluoroethylene (PTFE) and fluorinated ethylene propylene (FEP), were designed to replace damaged natural cartilage between the jawbone and skull. But in many patients the implants failed, causing pain and progressive deterioration of the surrounding bone.

Patients quickly began suing Vitek. And when the company went bankrupt in 1990, hundreds of patients then turned their suits toward Du Pont, even though the company played no role in designing or selling the implants. The patients alleged that the problems involved particles of PTFE and FEP flaking off the implant due to abrasion from the surrounding bone. Du Pont contested this charge, and thus far the company has won all but one of the cases—and that one is currently under appeal. Nevertheless, the company has spent tens of millions of dollars in legal fees defending itself, according to an industry report conducted earlier this year by the health care consulting firm Aronoff and Associates of New York City. Those fees, the report also concludes, amount to far more than Du Pont ever made in selling the polymers for permanent implants in the first place. As a result the company halted such sales at the beginning of this year.



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Heart problem. The refusal of companies to sell polymers to implant makers caused unwanted design changes in this artificial heart, which is being developed at Pennsylvania State University.

For now the supply problem appears to be restricted to polymer-based materials, but device makers worry that other commonly used compounds such as ceramic composites and metals may be next. "You don't know from day to day what the next material will be that will become unavailable," says Citron. "It creates a high degree of uncertainty."

That uncertainty is having two effects on research. First, to keep their devices on the market, implant makers are scrambling to find substitute materials for their current models. These new materials must be cleared with the Food and Drug Administration (FDA), a process that can take months or years. At ETHICON, a maker of sutures and other medical devices in Somerville, New Jersey, for example, the company has spent 18 months finding and testing a polyethylene material to replace one being removed by Du Pont. "Investments that could have gone to breakthroughs are spent on standing still," says Citron.

The second effect is that researchers are reworking their designs. At Medtronic, for example, company scientists were forced to abandon work with an insulation material for pacemaker wires that looked in early tests to be far superior to the one currently in use when the company that supplied the new material decided to stop selling it for use in medical implants. And at Pennsylvania State University, artificial-heart designer Gerson Rosenberg says his team had to make unwanted design changes to their experimental device due to difficulties in obtaining particular polymers and electronic components. "You wind up being very restricted in your design in some cases," says Rosenberg.

Consumer advocates such as Sidney Wolfe, the director of the Washington, D.C.–based Public Citizen Health Research Group, claim that the Vitek lawsuits will actually help the medical device industry by forcing poorly suited biomaterials off the market and encouraging safer products. But many biomaterials experts believe such ideas are overly simplistic. "There are no inert foreign materials," says Eugene Goldberg, director of the Biomedical Engineering Center at the University of Florida, Gainesville. The trick, says Goldberg, is to find materials that are appropriate for their designed uses. PTFE turned out to be the wrong choice to put in jaw implants, because it was under stress in that position, but it could work perfectly well in areas where it isn't under stress, says Robert Baier, the director of the Biomaterials and Biophysics program at the State University of New York, Buffalo.

Solutions don't appear to be immediately

*"Biomaterials and Medical Devices: An Industry in Transition," 23–25 October, Washington, D.C.

apparent. The FDA is trying to speed its regulatory review process for materials replacing those no longer on the market. Though device manufacturers acknowledge that this will help, they worry that with large suppliers out of the picture, the smaller companies that replace them will be even less able to withstand lawsuits, making future supplies of the material unstable at best.

The best remedy, most say, would be federal legislation designed to protect raw materials suppliers from lawsuits aimed at faulty devices. Such legislation was introduced in the recent congressional session by Senator Joseph Lieberman (D–CT). But the bill failed to make it out of the Commerce Committee. According to a Lieberman staffer, the senator intends to reintroduce the legislation next year if he is re-elected next week.

But even if such a bill does pass, "it's no guarantee that companies will start to sell to us," says Bernard Liebler, the director of technology and regulatory affairs with the Health Industry Manufacturers Association, a Washington-based trade association representing device manufacturers. Indeed, Ross Schmucki, a senior counsel for Du Pont, says that even if such a law makes it onto the books, his company is likely to stay away from medical implant companies. Lieberman's proposed law is likely to require materials suppliers to ensure that their products meet well-defined specifications for use in implants to receive liability protection. But Schmucki says meeting those specifications "would really require a separate plant to service that industry. But Du Pont doesn't consider this a core business area."

In the long term, many experts, such as Steven Weinberg, a consultant with Biomedical Device Consultants in League City, Texas, believe this uncertainty and the climate of litigation will ultimately push device manufacturers to indroduce their new devices in countries less prone to litigation, such as Europe and Japan, and possibly encourage them to transfer their R&D operations overseas altogether. That, says Weinberg, is likely to slow the introduction of new medical devices into the United States further. And in the end, he says, "the ones getting hurt will be the general public, the very people the lawsuits are designed to protect."

–Robert F. Service

BIOMEDICAL RESEARCH

Early Budget Proposals for NIH Draw Fire

The annual battle over the federal government's budget proposals usually takes place in two phases, one behind the scenes, the other in public. Private maneuvering begins in the fall, when federal departments submit spending plans to the White House, and the public fight starts in February, when the president sends his budget proposals to Congress. This year, however, things are different: Even the early maneuvering over the National Institutes of Health's (NIH's) budget is taking place in the open.

Last week, the newsletter *Washington FAX* obtained and published the draft 1996 budget for NIH that Donna Shalala, secretary of Health and Human Services (HHS), has submitted to the Office of Management and Budget (OMB). This leaked document drew immediate condemnation from research groups, who labeled it far too parsimonious. But another leaked memo, this one from OMB, indicates that life scientists may have a surprising ally: OMB may view biomedical research as a high priority this year.

HHS has proposed an overall budget for NIH of $11.8 billion—an increase of around 4.2% over the just-passed 1995 appropriation. Although this would be higher than the expected rate of general inflation, it would not be enough to keep NIH projects ahead of inflation in the medical sector, which is running at more than 4%. Furthermore, the number of new individual investigator grants would decline from 6658 in 1995 to 6182 in 1996. Spending on AIDS-related programs would climb to slightly over $1.4 billion, an increase of about 5.4% over NIH's current AIDS budget.

Samuel Silverstein, cell biologist at Columbia University and president of the Federation of American Societies for Experimental Biology (FASEB), is one of those who isn't happy with these proposals. He told *Science* he is worried that they could lead to a "serious underfunding of both new people and new ideas." He fears that if NIH is forced to fund 500 fewer competing grants, the agency will be blighting its own future. Silverstein notes that the success rate at NIH—the percentage of applicants who win grants—is now at 25% and falling. The success rate for first-year R01 applicants is only about 15%, he says. The HHS proposal would probably reduce those rates further.

FASEB's own review of NIH's budget requirements, completed last week, concludes that the agency needs a general increase of at least 10% next year. And in the area of research grants—meat and potatoes for most FASEB members—FASEB calls for an increase of 14%. This recommendation is in line with what NIH itself sought in a "professional judgment" budget, or wish list, submitted earlier this year to HHS, says David Moore, a staffer at the Association of American Medical Colleges in Washington, D.C., who keeps a close watch on the budget process.

The next step in development of the NIH budget will come sometime before Thanksgiving, after OMB has reviewed HHS's proposals and passed them back with OMB's own recommendations for cuts or increases. OMB rarely encourages additional spending in this "passback" document, but there is at least a hint that it may be favorably disposed toward biomedical research this year.

The encouraging note came to light when another internal government memo, dated 3 October and signed by OMB director Alice Rivlin, was leaked. The memo caused an election-year furor because it suggested ways to cut fixed spending programs such as Medicare. But it also sketched out an "illustrative $50-billion investment package," including a possible $1.8-billion increase in NIH funding over 5 years. Rivlin noted that the money could be used to pay for 640 additional annual research grants each year, raising NIH's success rate to 26%. The White House staff minimized the memo's importance, however, saying it had only been drafted to encourage brainstorming. There will be many more skirmishes before the final budget is sent to Congress in February.

–Eliot Marshall

NIH'S DRAFT 1996 BUDGET
(millions of dollars)

	1995		1996	
Total Research	**Number**	**Amount**	**Number**	**Amount**
Project Grants	23,420	5,993	23,737	6,263
competing	6,658	1,581	6,182	1,539
Centers	860	1,014	859	1,030
Training	14,382	380	14,248	386
R&D Contracts	1,443	808	1,440	824
Intramural Res.		1,235		1,270
Other*		1,885		2,017
TOTAL		**11,315**		**11,790**

*Includes special biomedical research support, small business funds, technology transfer awards, cooperative clinical research, cancer control, maintenance, construction, Library of Medicine, and office of the NIH director. SOURCE WASHINGTON FAX