

doctor communication was highlighted in this prospective study of over 9,100 terminally ill patients as a significant problem.

Several meeting participants said some of the problem lies with the medical community not seeing its role as assisting patients' choices, rather than foisting its own agenda on them. Physicians need to be trained to bear some responsibility for the quality of their patients' lives and death, according to Callahan. "I would like every doctor, when treating a criti-

cally ill patient, to have to go through a terrible agony, saying on one hand, 'If I don't do the right thing here, the patient may die, but on the other hand, if I make a mistake or if I don't do the right thing, the patient may die a worse death,'" said Callahan.

Finally, participants noted that the Quinlan case forced the courts to deal with medicine's fear of legal liability. Although "well-intentioned," the Quinlan case leaves what George Annas of the Boston University School of Public Health calls "a

disturbing legacy" — that medical ethics will be embraced by doctors only if given legal immunity from prosecution. "This market model of medicine — in which 'the consumer is always right' will likely stand as a milestone on the road to the continuing deprofessionalization of medicine, and should serve as a cautionary tale," said Annas. "Judges can't solve medical ethics' quandaries by redefining them as issues of legal liability."

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France moves to right biotech wrongs

Concerned over the anemic state of France's biotechnology industry, François d'Aubert, Secretary of State for Research, has announced a series of measures aimed at the industry's revitalization. These proposed measures will focus on easing the restrictions imposed by the government on researchers working for public institutions in France. Furthermore, plans are under way to establish a special biotechnology program involving the government and industrialists, to develop biotech employment opportunities.

With more than 40 companies, France ranks third worldwide in number of companies engaged in biotechnology research, behind only the United States and the United Kingdom. However, "only a dozen or so [of the French companies] meet the criteria of growth and development necessary to form a 'bio-industry,'" says Marie-Christine Candellé, associate director of Sofinnova, a venture capital firm specializing in biotech companies.

One explanation for France's lag could be cultural barriers. Scientists in the public sector who produce significant research that makes them competitive on an international level often lack the reflex to move their discoveries to the development stage, even though every institute now has a department designed to help obtain patents and to establish partnerships in the industrial sector.

But career advancement (as well as the public subsidies laboratories receive) is based solely on the number of articles published in scientific journals, and is unrelated to the number of patents gained or the successful development of a discovery. Furthermore, until now anyway, government-supported researchers

have not been allowed to participate as shareholders in a company they work with nor to sit on any board. They are also restricted from receiving the lion's share of royalties from their discoveries.

Despite the current constraints, French scientists have still managed to create new companies regularly since the mid-1980s, according to Philippe Mustard, an

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economist at the École des Mines, an engineering school and research institute in Paris. Although the majority of them are "small businesses funded in part by state agencies, with few personnel and weak development programs, they serve as centers for the transfer and modification of research results and play an important role in showing us how to build biotech companies," says Mustard.

Paradoxically, small French biotech companies are looking to the research being done in American universities, even while American start-up biotech companies have been increasingly soliciting French research institutes over the past ten years, according to Francine Belaisch, head of the Partnership Department at INSERM. Belaisch says that although 60 percent of INSERM's collaborations are with French businesses, American demands for cooperation have been growing, and have become almost automatic as soon as a patent is applied for.

One of the weakest links in the system, the way biotech firms are financed in France, is undergoing modification. A new stock exchange, EASDAQ (based on the American NASDAQ and specializing in advanced technology) will open this year in Europe. The Paris Bourse, for its part, has developed a New Market so that start-up companies with strong growth

potential can obtain the financing needed to expand. For example, Genset, created in 1989 and specializing in the production of synthetic DNA, hopes to raise between US\$10–20 million on the "New Market". Furthermore, the Caisse des Dépôts

et Consignations, an organization that manages the government's savings, is forming a subsidiary with an initial endowment of \$80 million to finance technological innovations.

By acting during this favorable climate, d'Aubert hopes to boost French biotechnology and help it to compete on equal footing with biotechnology in the United States. However, the significant step of establishing a Special Biotechnology Program, which would make the government a partner in a consortium of 10 to 15 pharmaceutical companies, remains to be taken. The projected annual allowance for such an ambitious project could reach \$30 million. At a time when the President of France, Jacques Chirac, is calling for budget cuts of \$14 billion in 1997, the financing of this project is either unlikely, or will only occur to the jeopardy of other programs.

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