Editorial & Letters

EDITORIAL

Challenges for European Biology

The historic achievement of European monetary union invites bold choices for the future. Our knowledge-based society needs to nurture and utilize science to remain true to our cultural legacy and to compete effectively on the world scene. A case in point is the biosciences which, flowing from fundamental molecular biology, are transforming medicine and hold immense promise for industry, agriculture, and the environment in the 21st century. Europe, which made critical contributions at the origin of molecular biology, retains considerable strength but is facing a triple challenge that must be recognized and candidly addressed.

The first challenge is the stunning pace of change in biology. Interdisciplinarity has become essential as the barriers between traditional disciplines crumble. Discoveries in model organisms highlight the fantastic unity of life, resulting from evolution by common descent, and are readily applicable to human biology. An informational science of the whole organism is in the making as molecular, cellular, and developmental biology merge and connect with physiology, and as genomics and bioinformatics shift the focus of analysis from individual components to biological systems. There is renewed emphasis on interfaces with chemistry, physics, and engineering. Biology is now a "bigger science," dependent on novel synchrotrons, microscopes, DNA chips, stock centers, and interconnected global databases. In parallel, the time frame of application of knowledge—the distance between laboratory and factory or hospital bed—is short, and the flow of information reciprocal; cooperation between academic or medical centers and biotechnology companies is at a premium.

The second challenge to European biology is structural inflexibility. This includes organizational and disciplinary conservatism in academia; excessive reliance on pyramidal power structures, when scientists need independence in their creative 20s and 30s; neglect of advanced postdoctoral training through overemphasis on lifetime employment; and top-down reflexes rather than trust in investigator initiative coupled with critical peer review. Despite the evident advantages of centers of excellence with critical mass, some countries succumb to the temptation to "spread the rain evenly." International schemes for postdoctoral mobility are successful but do not extend to independent investigators. The culture of collaboration is recognized as a European advantage, but internationalism is not yet as strong as the visionaries of the previous scientific generation would wish.

The third challenge is stagnant funding for both national and international institutions, contrasting sharply with world trends. We encounter an almost obsessive preoccupation with the sentiment "we have done enough science, now let's apply it." In the United States, public funding focuses on basic research, strongly advocated by the biotechnology industry as the source of novelty and trained personnel. The National Institutes of Health, already the world's largest funder of biomedical research, has experienced 7% annual increases recently and enjoys a remarkable bipartisan consensus that its budget should be doubled within 10 years, possibly 5. Similarly, China is quadrupling research funding from 1995 to 2000, and Japan is launching new initiatives in brain science and the human genome and plans a massive facility for large-scale protein structure analysis.

The contrast with Europe is dramatic. For example, last year lack of funds forced the European Molecular Biology Organization to cancel plans for third-year postdoctoral fellowships, despite strong consensus about the need for them. Germany's parliament, the Bundestag, rejected the promised 5% sustained annual increases for the Max Planck Society. Funding for the European Molecular Biology Laboratory will not permit any growth in real terms in 1998–2000. In February 1998, the Council of Science Ministers cut, in real terms, the European Union (EU) science and technology budget for 1998–2002, approving only 84% of the funds voted by the European Parliament. We are beginning to see some relative reorientation toward the life sciences, notably in Germany and the EU, but overall national science budgets remain flat (with a few exceptions, such as Finland).

Europe has excellent established scientists and talented, well-trained, and mobile young biologists. But structural reform and increased flexibility in the science system are overdue. And substantial investment in biology, across the continent, is necessary if Europe is to retain a position in the front rank of this major scientific and technological revolution.

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LETTERS

Stopping AIDS

Debate about AIDS vaccine trials in the United States and elsewhere continues (right, distribution of condoms in Thailand, where AIDS is widespread and vaccine trials are planned). Jonathan Mann answers his critics, and readers from Australia and the West Indies comment on the ethics of conducting trials in developing countries.

M. TRESSIN/GAMMA LIASON

The Ethics of AIDS Vaccine Trials

The letter "AIDS vaccine development" by Moises Agosto *et al.* (8 May, p. 803) was not altogether accurate and did not address substantive issues raised in my testimony before the President's Advisory Committee on HIV/AIDS.

The major problem is the urgent need for a coherent, milestone-driven process for AIDS vaccine development. A strategic approach leading from basic science through all stages of vaccine development would set realistic targets to guide progress, identify critical decision points, and mobilize available resources.

Second, the decision-making process that has been created within the U.S. National Institutes of Health (NIH), while rich in basic science, needs adequate representation and input from experts in clinical vaccine development and in public health. National and global public health would be better served by a restructuring of the federal program for AIDS vaccine development to achieve maximal synergy among basic scientists, clinical vaccine researchers, and public health experts.

Third, the estimated 40,000 new human immunodeficiency virus (HIV) infections in the United States in 1999 will occur predominantly in marginalized populations, including ethnic or racial minorities, inner-city poor, adolescents, and women. In this context, the federal government has a particular responsibility. Put bluntly, if 40,000 new HIV infections were occurring among middle- and upper-class college students, progress toward efficacy testing of AIDS vaccine candidates would likely be further advanced. This raises legitimate human