current system of journals, or instead of it? If there was a consolidated site that published online versions of all the articles that are currently published... that would be fantastic. If it's instead of, and especially if it has this non-peer-reviewed track to it, I think that is a much less good idea."

The Varmus proposal suggests that scientific societies could be one source of peer review. But the societies are worried that E-Biomed may undermine the journal revenues on which many of their other activities, such as fellowships and meetings, depend.

The head of one society says he is open to change, but would need guarantees that revenues would be preserved. Given such guarantees, societies might consider joining the initiative, he says. "E-Biomed will only fly if learned societies and their journals can be brought to the table," predicts Tony Delamothe, web editor of the *British Medical Journal*, and a supporter of E-Biomed's goals.

Another broader threat, expressed by many scientists, is that NIH might come to dominate much of the biomedical literature, leading to homogenization or to discrimination against scientists from smaller countries. "Who would select the governing body?" asks an official at one European scientific society. "Who would select the editors and decide what is allowed to be published? Who will determine costs and access rights?"

Many are also uncomfortable with the prospect of public funding for scientific publishing, an activity currently dominated by for-profit and non-profit publishers in the private sector. At the same time, however, there is growing resentment among scientists and librarians at the spiralling inflation in journal subscriptions.

Competition between scientific publishers is less than in other industries because of distortions in the market, and profit margins as high as 40 per cent are not uncommon (see *Nature* 397, 195–200; 1999).

Graham Cameron, head of services at the European Bioinformatics Institute (EBI) in Cambridge, England — an outstation of the European Molecular Biology Laboratory — points out that public domain databases such as PubMed and GenBank and the EBI are widely considered to provide high levels of cost-effective service to the community.

Many believe, however, that the wider and cheaper access promised by E-Biomed may happen anyway as a result of market forces. "Most scientific society publishers are already doing what Varmus is proposing," says Frank. "We are putting our journals on the web. We are linking our journals through PubMed to our sister journals on the web. We are developing interfaces for the submission and review of manuscripts on the web." Similarly, consortia of library and other users are increasingly negotiating electronic licences for journals for entire institutions and even countries. Scientists at such institutions can already access much of the literature online.

"My initial reaction to E-Biomed is, 'so what?'. Virtually every library has almost all major journals," says Heinz Steiner, a neuroscientist at the University of Tennessee College of Medicine in Memphis.

Market forces are also driving a flurry of deals among publishers that may enable researchers to move rapidly and seamlessly from a citation to full text across journal boundaries.

Frank asserts, for example, that the web site of HighWire Press already accounts for a large proportion of the biomedical literature. This not-for-profit outfit was set up in 1995 by Stanford University Libraries and Academic Information Resources to help universities and societies to publish on the web at low cost. "So I don't know why we need to create E-Biomed," says Frank.

Indeed, the head of one scientific society argues that resentment over the huge costs of the current journals system is confusing the many complex issues involved in scholarly publishing. "If publishers are charging too much then we should attack this problem directly, but not attack the entire system. E-Biomed is a not very selective nuclear bomb."

Noorman, while admitting that Elsevier's profit margins "are higher than the average," says that the arrival of web publishing is putting pressure on commercial publishers. "Scholarly publishing will become a proper [not distorted] market," he predicts. "Elsevier is not in the world to keep that profit margin high. We are in the world to stay in the market. If the web causes us to have to agree to lower profit margins, then so be it." **Declan Butler & Meredith Wadman**

Automation 'could crack the big problems in science'

[WASHINGTON] A new type of laboratory that would collect and analyse vast amounts of data to solve complex biological problems is being proposed by scientists from US universities and government laboratories.

The approach, called 'batch science', would use laboratory automation to address areas of research that its advocates say are being held back because existing laboratories lack the capacity to collect and analyse the necessary volumes of data.

They argue that existing biology laboratories in universities and government agencies are too small and labour-intensive to produce the experimental data to answer important scientific questions.

Questions suited to the approach include the characterization of pathogens carrying infectious diseases, so as to anticipate the mutation of virulent strains; rapid assessment of agents used in biowarfare or bioterrorism attacks; and the screening of food products to ensure food safety.

Last week in Washington, about 200 scientists from different disciplines met at the National Academy of Sciences to exchange ideas on laboratory automation and batch science. The meeting, "Automation in threat reduction and infectious disease research: need and new directions", was instigated by the University of California at Los Angeles and the Los Alamos National Laboratory in New Mexico. It was also sponsored by the National Academy of Engineering, the Institute of Medicine and three government agencies.

Kumar Patel, a physicist at the University of California and former president of the American Physical Society, who helped to organize the meeting, says the government tends to support traditional models of 'small' or 'big' science, but should be persuaded to build the highly automated, medium-sized laboratories that could do batch science.

While pharmaceutical companies have been using such approaches for drug development, and genome sequencers are engaged in the automated mass production of sequencing data, government agencies and universities analyse samples manually and on a small scale. Agencies such as the Centers for Disease Control and Prevention, which exists to protect the country from infectious disease, have little or no capability for the large-scale processing of samples. Some scientists argue that such a capability, combined with computer analysis of the results, could enable the agencies to function far more effectively.

Patel said people at the meeting "had generally agreed that having such an automated scheme might go a long way toward filling the holes" in these disciplines. **Colin Macilwain**

EMBO seeks European role in E-Biomed

[PARIS] Frank Gannon, executive director of the European Molecular Biology Organization (EMBO) in Heidelberg, will meet Harold Varmus next week to discuss possible European input into E-Biomed.

"Europe has to be intensively involved [in the

discussions]," says Gannon. "I welcome the discussion that has been stimulated by the E-Biomed proposal," says Gannon. "It has brought [debate on electronic publishing] to a head."

Gannon, who shares many of the scientists'

concerns about the proposal, says that "the European Bioinformatics Institute and EMBO are willing to play a part in seeing that there is a successful outcome."

"If it is going to happen, EMBO is uniquely placed to represent European interests."

D. B.