

(Fairfield, CT, USA) and Pfizer (New York), respectively—analysts do not believe a huge swath of general consolidation is imminent. General investor sentiment is that confidence, although fragile, is being gradually restored, says John Mackie, chief executive of the British Venture Capital Association

(London). “Barring any sudden shocks like increased interest rates or tax hikes, 2004 does look more positive for the public markets and therefore for exit possibilities for the private equity and VC [venture capital] industry,” he says.

Peter Mitchell, London

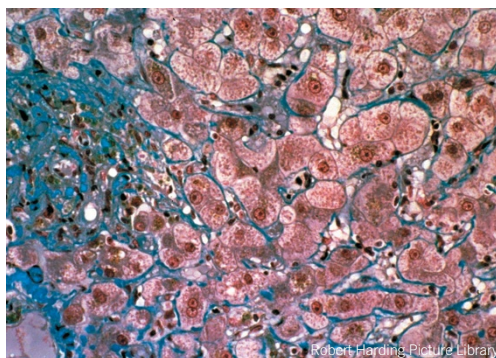
China pushes liver proteomics

The Chinese government agreed in December 2003 to invest more than RMB 200 (\$24) million over three years in the human liver proteome project (HLPP). In the process, it plans to create in Beijing the world's premier antibody bank specific to proteins that play a role in liver diseases. Government officials also hope to galvanize the Chinese biotechnology sector by licensing antibodies to foreign and local companies. Although the bank could become a useful resource for protein researchers, additional investment from pharmaceutical companies is needed to entice local biotechnology companies to take part in the project.

Diseases of the liver are widespread in China. For example, China has over 180 million hepatitis sufferers—more than half of the 350 million people affected worldwide. In order to address this serious health issue, the Chinese government launched a three-year pilot phase to build the infrastructure of the HLPP. If the project leads to progress for the diagnosis and treatment of liver diseases, the government will allocate another RMB 2 billion (\$241.5 million) to the HLPP between 2006 and 2010.

The HLPP pilot phase consists of three parts: the study of protein expression profiles in the human liver, the study of protein-protein interactions in the human liver and the creation of an antibody bank. The latter could be a great asset to the biotechnology industry. Although approximately 10,000 antibodies are currently available from commercial sources globally, they are costly and many are not fully characterized. “This is why we are combining several leading domestic and international institutes to develop a huge database of antibodies to meet the demand of the HLPP,” says Qi-Hong Sun, chair of the HLPP antibody banking subcommittee.

By creating an antibody databank, the



The Chinese government is taking action to combat liver diseases such as chronic hepatitis C, whose effect on liver tissue is pictured.

HLPP is taking commercial interests into consideration from the beginning. Antibodies from the publicly funded bank will be made available commercially to third parties, such as biotech companies, to help sustain the project. This approach contrasts with the Human Genome Project, which some analysts say failed to entice private commercial entities to exploit the findings of the public research effort.

Antibodies developed during the project will be offered for the cost of production to the labs participating in the HLPP and other projects coordinated by the Human Proteome Organization (HUPO)—such as the human brain and plasma proteome project—says Ming Li, director of the tropical disease institute at the First Military Medical University (Guangzhou, China), a member of the HLPP. Sun says biotech firms will be able to pay to access the antibody bank and buy antibodies as reagents to perform their own research, and may also obtain licenses to antibodies so they can commercialize them as new therapeutics.

Even if they have to pay for access to the antibody bank, local Chinese companies could capitalize on the local resources and expertise gained through HLPP. “Now, with the huge pool of antibodies available [from

the bank] in the near future, we may be able to create our own innovative drugs [at lower costs],” says Yaoming Liu, vice president of pharmaceutical company Jiangzhong, which has invested RMB 150 (\$18) million to build a new research center called the China Proteomic Center (Beijing, China).

But foreign companies could indirectly benefit from the heavy investment in liver proteomics. “I see substantial opportunities for partnerships to be developed between biotech companies based abroad and their Chinese counterparts or for biotech companies [that] want to be implanted in China,” says Samir Hanash, president of HUPO and a professor of pediatrics at the University of Michigan (Ann Arbor, MI, USA).

HUPO aims to save both resources and time by decentralizing the HLPP to China. “The way the [HUPO] work has been parceled out around the world is the most efficient and will save [companies like ours] the cost of developing our own antibodies,” says Clarissa Desjardins, vice president of corporate development at proteomics company Caprion Pharmaceuticals (Montreal). Typically, it would take the company six months to develop a new antibody. However, Sudhir Sahasrabudhe, chief scientific officer of Prolexys Pharmaceuticals (Salt Lake City, UT, USA), warns that the HLPP antibodies need to be good quality to be useful to biotech companies. “It will be important to carefully characterize antibody reagents and use an adequate number of patients to draw disease-relevant correlations,” he says.

But before the local biotechnology industry can benefit from the large investment of the Chinese government in an infrastructure for proteomics research, further funding is needed to perform research projects, says Sun, who suggests the funding could come from pharmaceutical companies. Some Chinese pharmaceutical companies have annual sales of more than RMB 10 (\$1.2) billion—far below the £21 (\$39) billion earned by companies like GlaxoSmithKline (London) in 2002, but significant by China's standards. But China's pharma companies seldom invest in research and development, instead relying on foreign technology. Sun believes such investment from pharmaceutical companies in proteomics would create opportunities that biotech companies have been waiting for.

Hepeng Jia, Beijing

Additional reporting by Sabine Louët, London