Backlash Disrupts China Exchanges

Concern over exploitation of China's genetic heritage has temporarily interrupted the export of some human materials while the government writes new rules

BEIJING—Gene hunters rely on quantity in tracking their prey. And no country offers a larger genetic pool than China. That logic drove Harvard epidemiologist Xu Xiping last year to set up a program in population genetics that would bring the latest gene-mapping tools to the world's most populous country through collaborations with half a dozen Chinese medical centers. Rather than limiting himself to one disease, Xu hoped to unravel the genetic factors involved in a host of complex genetic disorders.

But others saw a more sinister side to the effort. Reacting to a faulty translation of a brief item on the project in *Science* (19 July 1996, p. 315), some Chinese researchers and government officials argued that the industry-funded program was a brazen attempt by Western drug companies to make money from the country's genetic heritage. The ensuing controversy spurred the government to draw up new regulations, due out by the end of the year, on the export of any human material for genetic studies. The rules, say officials, are intended to promote research collaborations and ensure that the exchange of any materials with potential commercial value is based on a fair and equitable partnership.

But the immediate effect has been to bring many existing collaborations to a screeching halt, as skittish customs officials hold up shipments of biological samples while they await word from Beijing. The chain of events has left Xu and other scientists confused and hurt. "I came from China, and I love the country. But I have been treated like a traitor," he complains.

J. MERVIS

First principles. Exchanges should stem from formal agreements and yield mutual benefits, says Shanghai's Chen Zhu.

There are several reasons why the issue has come to a head here. China is an ideal place for Western gene hunters. It has the largest and one of the most ethnically diverse populations in the world, along with more types of epidemic and endemic diseases than any other country, according to geneticist Du Ruofu of the Genetic Research Institute of the Chinese Academy of Sciences. More importantly, he says, the society is dominated by fixed settlements that have been inhabited for centuries. There is also the lure of low sampling costs.

Chinese scientists also realize the importance of these genetic resources, but they differ on how to take advantage of them. Some believe that genetic materials are a special kind of natural resource that should be protected like any other property. Others would set aside such considerations and encourage more collaborations to take advantage of badly needed foreign funds and technology.

Forbidden samples? A collaboration between Harvard's Xu Xiping, second from right, and colleagues at the Anhui Institute for Biomedical Science and Environmental Health in China feels affect of new rules.

The dispute, which has been simmering for years, bubbled to the surface last November when a translated version of the *Science* article was presented at a Beijing seminar attended by top Chinese scientists. The piece described Xu's program as seeking to "have access to 200 million Chinese through collaboration with six Chinese medical centers." But in the Chinese version, the program becomes one that will "take blood samples from 200 million Chinese."

The mistaken translation evoked anger and fierce criticism, sentiments that were picked up and fanned by the national press. For fear of being the target, local governments that had approved and supported collaboration projects promptly suspended them, and customs agents stopped the export of blood samples. Some of the subjects of the studies have even dropped out, citing patriotic considerations.

The turmoil has presented nutrition scientist Chen Junshi of the Chinese Academy of Preventive Medicine in Beijing with a problem. It has forced him to hold back on his first shipment of 8000 blood serum samples to Biomar International Inc., of Chapel Hill, North Carolina, in a collaboration that hopes to develop a statistical model for predicting chronic disease based in part on diet and lifestyle. The plan is to collect 500,000 blood samples in two Chinese cities, half of which will be sent to Biomar for analysis and storage. Chen says he trusts his U.S. partner, a small, privately held biotech company, because he has been friends for years with co-founder T. Colin Campbell, a nutritional biochemist at Cornell University. But he cannot say whether the results might someday have commercial value. "Once the blood samples are taken abroad, we have no control over their usage," he says.

Scientists involved in other collaborations say they have been caught in a trap set for others. "Our research has nothing to do with gene study, and yet we have to suffer, too," complains Shen Fumin of Shanghai Medical University. Shen is a co-investigator on a study of the etiology of liver cancer involving his university, Fox Chase Cancer Center of Philadelphia, and health officials in Haimen, a city in eastern China's Jiangsu province. Over the past 5 years, Shen has sent his U.S. partner more than 4000 serum samples and 60 samples of cancer tissue.

In an effort to rescue the latest shipment of serum samples, Fox Chase Cancer Center recently sent a letter promising Chinese authorities that no biological samples collected would be deposited in a gene bank or used for any other commercial purposes. But it's not clear whether the letter will have any effect. In fact, such terms were already included in the agreement between the participants.

Chinese scientists involved in these projects are protesting the delays through various channels, but most of them will probably have to wait until the regulations are out before they can hope to resume their collaboration. The process of drafting the regulations, now before the State Council, has lasted almost a year as the government tries to reconcile the views of those who believe that strong barriers are needed to protect an important national resource with those who fear that overly rigid rules will choke off access to badly needed foreign technology. The rules are expected to reflect that balanced approach. "We do not want to hurt the normal scientific research

and collaborations; we really want them to continue," says one official from the Ministry of Health, which is helping to draft the regulations. "Yet we don't like to be a loser or simply a gene supplier [to the industrialized world]."

That viewpoint has many supporters in China's scientific community. "International collaborations using genetic resources in China should be based on the principles of equality and mutual benefit, should be covered by formal agreement or contract, and should get approval from the Chinese government," says hemopathologist Chen Zhu, secretariat of the Chinese Human Genome Project and a vocal supporter of the need for regulations. Chen's lab at the Shanghai Second Medical University is supported in part by the New York–based Samuel Waxman Research Foundation, and Chen also works with Waxman, head of the cell differentiation lab at Mount Sinai Medical Center in New York City on cancer therapies.

Xu remains optimistic. He says that his group is preparing an application to submit to the Ministry of Health and that government officials have told him that his project will be reviewed before the regulations are finalized—which should allow him to resume the export of blood samples. Encouraged, Xu says he is organizing a conference in Boston next spring to discuss human genetics and the new regulations. It will be sponsored by the North American Chinese Science and Technology Association and will feature many Chinese scientists, including Chen Zhu. Xu says that the Ministry of Health has promised to help with the invitations and may even participate in the meeting.

It's not hard to understand Xu's optimism. Despite the temporary disruption to some of their projects, Chinese scientists say the pending regulations are an essential part of a healthy relationship with global partners. "If the present situation is allowed to continue," says Chen Zhu, "then not only will China lose her genetic resources, but also international collaborations like mine would be severely affected. The interests of both sides can only be better protected by the new regulations."

–Li Hui and Wang Jue

Li Hui and Wang Jue write for China Features *in Beijing.*

SYNCHROTRON RESEARCH

Panel Sets Out Cuts Under Tight Budget

An advisory panel to the Department of Energy (DOE) last week laid out a painful set of choices to fit a burgeoning field into a tight budget. If DOE doesn't get a substantial increase for the operation and upgrade of four big synchrotrons—an increase the panel says would be justified, but most consider unlikely—it should put the squeeze on the $100 million Advanced Light Source (ALS) at Lawrence Berkeley National Laboratory in California. Researchers say this prescription—which came from a panel led by Massachusetts Institute of Technology science dean Robert Birgeneau, and was first reported in *Science* 2 weeks ago (3 October, p. 25)—could jeopardize the future of the 4-year-old facility. "We asked for tough recommendations," says Pat Dehmer, the director of DOE's Office of Basic Energy Sciences (BES). "We got them, and now we have to live with them."

DOE asked the Birgeneau panel earlier this year to help it plot the future of a field that has won a near tripling of support in the last decade to a current $171 million. It's a field that has attracted thousands of materials scientists, physicists, biologists, and environmental scientists, who use beams of x-rays, ultraviolet (UV) light, and infrared photons to probe matter on the atomic and molecular scale, often gleaning insights that cannot be obtained by any other method. These researchers have been flocking to the four facilities DOE currently funds: the National Synchrotron Light Source (NSLS) at Brookhaven National Laboratory in Upton, New York, and Stanford's Synchrotron Radiation Laboratory (SSRL)—both of which are more than a decade old—plus the new Advanced Photon Source (APS) at Argonne National Laboratory outside Chicago and the ALS.

In its report, which was endorsed on 9 October by an advisory committee to BES, the Birgeneau panel says DOE should request an 11% increase in next year's budget for the four facilities, to $188.5 million. The extremely high caliber of the science being done at all four makes spending the extra money "fully justified," says the report's executive summary, the only part released last week. Nobody in the field is likely to object to those recommendations. But few expect that Congress would go along. "I don't think that's feasible or likely," says ALS director Brian Kincaid. The rest of the report is far more controversial.

The panel says that if DOE doesn't get such an increase, it should give highest priority to fully funding the operating budgets of SSRL, NSLS, and APS, along with an extra $3 million for NSLS for technical support for visiting scientists. Also listed as a top priority is $3 million for ongoing R&D on a fourth-generation x-ray facility. Next in line is $11 million to make initial developments on new beamlines at APS and to upgrade existing ones at NSLS. And the panel's third choice is ALS's operating budget of $35 million.

The panel also made a pitch for $27 million a year, for 3 years, to convert the older NSLS and SSRL machines into third-generation sources. Some of the money, it suggested, might come from other agencies, such as the National Institutes of Health and the National Science Foundation, that support investigators who work at the DOE synchrotrons. If those agencies are loath to contribute, the panel said DOE should dip into its own pocket before funding the ALS operating budget. The implication: If DOE's synchrotron budget is flat, funds for ALS would essentially dry up for those 3 years.

That possibility doesn't sit well with ALS users. "If they follow this recommendation, that would be a total disaster," says Brian Tonner, who heads the surface science program at the University of Wisconsin, Milwaukee. He points out that the ALS produces high-brilliance light beams of UV and soft x-ray photons, which are ideally suited for studying materials' surfaces and probing the magnetic and electronic structure of materials. And it's the only third-generation U.S. site for such experiments, adds Jim Tobin, a magnetics expert at Lawrence Livermore National Laboratory in Livermore, California.

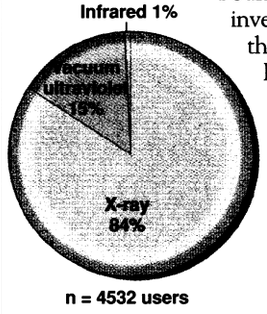
Panel members say they based ALS's low ranking more on the relative value of its contri-

SOURCE: BIRGENEAU PANEL

DIVIDING UP THE SYNCHROTRON PIE

Priority	Cost (millions per year)
1) Operating funds for SSRL, NSLS, APS, and R&D for fourth-generation x-ray source	$142.5
2) Development of new beamlines at APS and upgrades at NSLS	$11
3) Convert SSRL and NSLS to third-generation sources*	$27 (for 3 years only)
4) ALS operating funds	$35

* Should be funded from outside DOE's synchrotron budget.



SOURCE: LINDA HORTON/ORNL

Shedding light. Panel says DOE's budget priorities should reflect the science being done on the machines.