

N0.448

CHINA SCIENCE AND TECHNOLOGY

NEWSLETTER

The Ministry of Science and Technology
People's Republic of China

N0.448

August 20,2006

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SPECIAL ISSUES

111 Program for Environment

China will soon stage a triple-1 personnel training program to build up the innovation capability of the environment sector. By 2020, the program will nurture and absorb 100 academic leaders, nurture and screen out 1,000 S&T wizards, and nurture and

stabilize 10,000 S&T personnel at the grassroots level, in addition to the efforts of nurturing and selecting new academicians for the Chinese Academy of Sciences and the Chinese Academy of Engineering.

China is currently in dire need of enhancing the quality of its environmental protection S&T contingent. The sector is troubled with unusually limited talented people, especially young and middle-aged, including academic leaders, environmental strategists, and academicians, compared with other sectors.

In this context, China strives to build up an enhanced environmental protection S&T contingent, paying more attention to training and nurturing, and breaking up the old rules that ranks a person according to seniority. The existing ranking system will be changed to take into account the comments and approvals of peers, in an attempt to allow young and middle aged talents coming out. A range of supporting policies and measures will be adopted to absorb qualified academic leaders and overseas talents to work for environment institutions. The implementation of the said projects, including environment S&T innovation, environmental protection standards, and environmental protection technology management, plus training both at home and abroad, will eventually forge up an innovative environment S&T contingent. Personnel training, technology exchange, further education, establishing post-graduate centers, and wining more fixed financial support, will create a solid ground for securing more high caliber personnel for environmental undertakings. The effort will also deepen the system reform of the environment sector, and help to establish a modern academic system, upgrading public good research institutes at both national and local levels.

Innovative Environmental Projects

The Chinese State Environmental Protection Administration will launch three major projects involving environmental S&T innovations, environmental protection standards, and environmental protection technology management, said recently ZHAO Yingmin, Director of Department of S&T Standards, a part of the State Environmental Protection Administration. In addition, a national environment lab and a water body pollution control project will be initiated, to address key S&T issues restricting the economic, social, and environmental development

for a long time.

China plans to establish a platform for environment related S&T cooperation and resource information sharing, in an attempt to enhance the sustained innovation capability of environmental protection. At present, there are five national key labs addressing environment issues in the country, with six others under construction. China has seven environment engineering centers in operation, with five others under construction. By the end of the 11th Five-year period(2006-2010), there will be 30 national key environment labs and 50 national environment engineering centers in the country. In addition, the State Environmental Protection Administration will establish a number of large S&T platforms, providing infrastructure support for scientific research, technology innovation, and field experiment.

RESEARCH AND DEVELOPMENT

Phase I AIDS Vaccine Succeed

Chinese made AIDS vaccine has proved successful in phase I clinical trials, reported at a news conference held on August 18, 2006, jointly sponsored by the Chinese Ministry of Science and Technology and the State Food and Drug Administration. None of the 49 recipients has developed adverse reactions, though the vaccine arose the specific immune response to HIV viruses in their body.

According to a briefing, the clinical trials are conducted in line with international norms. Recipients are told what they are tested for, under a strict ethic review and a random control procedure. Phase I clinical trial is designed mainly to evaluate the safety and original immunity of the vaccine. The trial took 49 recipients, aged between 18 and 50. The recipients, 33 males and 16 females, are divided into 8 groups. During the period from March 12, 2005, where the first 8 recipients were vaccinated, to June 11, 2006 when the rest of recipients received vaccination, all the subjects had a 180-day tracking observation. 344 blood samples have been collected from the recipients, or 5 to 10 collections for each. Test results show that the vaccine is able to trigger a specific immune response to HIV viruses in recipients' body 15 days after vaccination.

Test results show no strong adverse reactions, even partially, in recipients. With all lab indicators lining up in the normal range, the vaccine is proved safe for use. Some of the recipients even produced the immune cells and body liquids specific to AIDS viruses.

LIU Yanhua, Vice Minister of Science and Technology told reporters that, of the 16 major national special projects, 2 work on AIDS drugs and vaccines. The Ministry of Science and Technology will enhance its support for the development of AIDS drugs and vaccines during the 11th five-year period.

Technical System for Molecular Animal Breeding

With the support of the National 863 Program, China has established a technical system for molecular animal breeding and associated scaled reproduction. The system improves understanding of QTL that affects the milk producing performance of a cow, using refined positioning techniques and molecular markers. Researchers also developed an innovative system for embryo screening and production, using molecular markers.

The efforts have resulted in numerous findings, including improved positioning of QTL using high density DNA markers, defining 15 new microsatellite markers on the 6th chromosome, obtaining high density marker clusters covering the major genetic belt involving milk producing performance, and establishing a highly efficient system for embryo screening and production using molecular markers. Researchers bred out 18 bulls featured with low fat but high proteins, which produced the cows in the first birth having a milk yield of 8,200kg, and the cows producing 10 tons of milk in the third birth, with a milk protein of 3.52% and milk fat 3.6%. Researchers also improved ovulation and egg picking techniques, and optimized fetus transplanting and separation processes. The efforts also led to the establishment of a PCR technique for telling the fetus gender at an earlier stage, and a cell cloning technique for high-yield cows. The technical system has produced 2,900 high-yield cows, and 17,605 valid embryos, or 6 embryos from each. More than 5,300 embryos are transplanted, with a fresh embryo conceiving rate of 62%. 90% of the frozen embryos can be thawed for transplanting, with a conceiving rate of 56%. Both indicators have reached an internationally advanced level. Researchers have landed an accuracy of 97.09% for screening the fetus

gender at an earlier stage using the PCR technique. They also established a technical system for collecting eggs from live cows, and for in-vitro impregnation as well. The freezing and defreezing techniques, also derived from the project, for regular and glassified embryo cloning, has successfully led to the birth of calves, the first of its kind in the country.

Accelerated Gene Tests

Thanks to two-year efforts and under the support of the national S&T program, a scientific and social project to survey genetic health of Chinese populations has achieved noticeable progresses. The effort has accelerated the development of gene test techniques. The project, chaired by the Beijing Juyuan Corp. and implemented by a number of renowned domestic research institutes and universities, has led to the establishment of a scientific and social demonstration center in Shanghai in less than two years. The center provides gene related test, identification, assessment, and accreditation, and a range of individualized services for gene test, drug use, and experiencing. Equipped with a sample database dedicated to the Chinese population, the center is able to perform gene tests on some 200 diseases.

The project team is certified to provide gene tests for major cancers, such as lung cancer, and for the cardiovascular system, using 18 proprietary patents, technologies, and standards. More than 20 research institutes, universities, and enterprises have become part of the project. Under a new operating mode targeting research, production, service, and economic returns at the same time, the project expects to become a new economic growth point through a sound cyclic development.

Geomorphological Maps for Asia and Adjacent Region

Under the financing of the Chinese National Natural Science Foundation, the Department of Basic Research under the Ministry of Science and Technology, and the Russian Foundation for Basic Research, Prof. CHEN Zhiming and his collaborators at the Nanjing Institute of Geography and Limnology, a part of the Chinese Academy of Sciences, have rolled out a continental and oceanic geomorphologic map for Asia and adjacent regions, at a scale of 1:14,000,000. The development adds an extension to the previous geomorphologic map at a scale of 1:8,000,000, also produced by the Institute for the same region. The computer

aided plate making for the two maps has been completed. According to Prof. CHEN, the two maps display three major elements: physiognomic differences over the Asian continent and oceans, the movements of continental and oceanic plates, including the semi-quantitative movement model for the Neogene, and physiognomic response.

The two new maps will not only contribute to the development of a physiognomic globe, but will also offer practical applications to other earth sciences, especially the study and control of natural disasters with inner dynamic forces, such as earthquakes and volcanoes, and satellite based plate movement measuring.

Considering the fact that earthquake activities constitute a major expression of geomorphologic and plate movement, researchers use the existing earthquake records to analyze major earthquake activities along the region and their stresses, in the course of studying the relationship between continental and oceanic geomorphology and plate physiognomy. The effort has brought up some new knowledge of earthquake genesis and associated distributions over Asia and adjacent oceans.

14-facet Crystal Synthesized

Not long ago, a study team led by Prof. YU Shuhong at the University of Science and Technology carved out a 14-facet crystal from copper sulfide. Prof. Yu and his collaborators allowed the glycol solution made of nitric copper and sulfur element to react under a temperature of 140°C in the reaction kettle for a whole day, before collecting the dark solids generated using centrifugals. Prof. YU and others discovered a special micro-structured material through scanning tunneling microscope.

The study team, headed by Prof. YU, got its inspiration from the multi-layer structured biological minerals, and achieved noticeable progresses in simulating and synthesizing diverse inorganic materials, especially in core making, crystallization, and directional growth.

The finding was firstly reported by *American Chemical Engineering* on July 24, 2006. It was then covered by *Chem.Mater*, for a highly symmetric 14-facet structure synthesized using chemical solutions. The 14-facet nitric copper crystal rolled out by Prof. YU and his collaborators using a simple

chemical formula was eventually praised as a 'geometric star' in the August 3 issue of journal *Nature*.

NEWS BRIEFS

More New National Labs

The Chinese Ministry of Science and Technology approved on July 26, 2006 to establish 17 new national key labs. The new labs will cover a variety of disciplines, including space and meteorology. The development adds national key labs to 198 in total.

To meet the strategic needs of the economic and social development, and to embrace the latest scientific development trends in cutting-edge areas, the Ministry of Science and Technology (MOST) issued on July 2005 a guide for establishing new national key labs in 16 selected areas, including population and health, agriculture, energy, ecological environment, advanced manufacturing, engineering and materials among others. Based on in-depth reviews and recommendations by authorities concerned, 44 applications are submitted. MOST organized experts to review the applications, and make field evaluations from September to November. 17 labs are finally selected out, based on experts' comments.

Upon the approval, the 17 labs will soon enter the construction phase. According to interim rules on the construction and management of national key labs, the construction period of such labs shall not exceed two years. MOST shall organize experts to make an acceptance check when the new lab is completed of the construction. The lab that passes the acceptance check will be officially listed as a national key lab.

China's First Environment Satellite

China will blast off a small satellite to monitor environment and natural disasters in the second half of 2007. The satellite and associated sounding equipment are being assembled in line with the design requirements.

The 2-plus-1 satellite constellation for environment and natural disaster monitoring and forecasting, is made up of three major components: satellites, ground system, and application system.

According to the plan, a satellite constellation, named HJ-1, consisting of two optical microsatellites (HJ-1A、 B) and one synthetic aperture radar microsatellite (HJ-1C) will be installed in the first place. The rest 4-plus-4 constellation will be installed for a global watch, through international cooperation for resources sharing.

The multi-microsatellite constellation is equipped with a variety of sounding equipment, including CCD camera with a wide coverage, infrared camera, high resolution spectrum imager, and synthetic aperture radar. The constellation makes a most advanced and sophisticated ground observing system among the domestic made satellites. As the owner of the constellation, both the State Environmental Protection Administration and the National Committee for Disasters Reduction are responsible for the operation and management of the constellation, and associated applications.

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