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IN THIS ISSUE

*China' s Top Ten S&T Events for Health
* New Immune Response to Viruses
* Oral Small Molecules for Diabetes Patients
* Biocontrol Microorganisms
*Platform for Sharing Earth Data

SPECIAL ISSUE

China' s Top Ten S&T Events for Health

China' s top ten health events for 2006 were unveiled on December 28, 2006 as follows:

1) Prof. WU Mengchao, academician of the Chinese Academy of Sciences and reputed liver surgeon, was honored with the Top National Award for Science and Technology, at a national S&T conference held in 2006. WU makes the first medical professional who is conferred with the honor, since the creation of the Award in 2000.
2) China has enhanced its efforts in AIDS prevention and control, and associated scientific research. Chinese State Council published a regulation on AIDS prevention and control; the Guangxi Diseases Prevention and Control Center has completed the phase I clinical trials of AIDS vaccine, the first of its kind in the country; China Diseases Prevention and Control Center has been approved to kick off the clinical trials of its proprietary AIDS vaccine; screening desirable therapeutic solutions for Chinese AIDS patients, an initiative led by the Beijing Union Hospital, has produced an optimized AIDS therapeutic solution desirable for Chinese patients; and China has added the number of provinces, autonomous regions, and cities enjoying free AIDS treatment to 14.
3) China enhances its investment in health in the 11th Five-year period (2006-2010). China has launched a number of new health enhancement initiatives under the existing national programs, including the National S&T Support Program, and the National 863 Program, in a move to implement the National Outline for Medium and Long Term S&T Development Planning (2006-2020). China is currently working on two key projects concerning drug innovations and preventing major infectious diseases, such as AIDS and viral hepatitis.
4) China has established gene expression maps for human fetal liver. Prof. HE Fuchu, academician of the Chinese Academy of Military Medical Sciences, and his research team has developed the world largest gene expression maps for human fetal liver, which makes interpretation of the behaviors of human fetal liver at a molecular level possible. The finding has laid a ground for further improving the treatment of advanced hepatitis and aplastic anemia using human fetal liver. The finding is honored with a second-place award of National Natural Science.
5) Xijing Hospital, part of No. 4 Military Medical School, has successfully performed a 'face changing' (allograft transplantation with compound tissue) operation, the first of its kind in the country, and second of its kind in the world. Researchers have landed a range of technical breakthroughs, including design of cuts and operation flow, facial skin blood shortage, and immune inhibition therapy.
6) China published top ten major causes for death. Based on survey statistics of 30 cities and 78 counties, the Chinese Ministry of Health listed out ten major causes for death in the country, including malignant tumors, cerebrovascular disease, heart disease, respiratory disease, injury and toxication, digestive disease, urinary and reproductive diseases, endocrine and metabolic diseases, tuberculosis, and mental disorders.
7) Science and technology demonstrates its critical role in addressing food and drug safety issues. In 2006, a number food and drug poisoning events occurred in China. Important evidences provided by researchers have played an important role in determining the nature of the accidents.
8) China' s high altitude medical team has made an outstanding contribution to improve health and life of the workers who built the Qinghai-Tibet railway that was put into official operation in the year. The effort has resulted in the zero-spread of plague under a tough natural condition, and the zero-death of 'high altitude disease'. The research findings derived from the high altitude medical science has played an important role in securing the health and safe journey of passengers on the plateau railway system.
9) WANG Yumin and his team with the Chinese Academy of Military Medical Sciences has developed China' s first mobile P3 lab, along with some 10 invention and utility patents. The development makes China one of few countries in the world capable of designing and manufacturing the equipment. The other countries have the capability are the United States, France, and Germany.
10) China has achieved new breakthroughs in drug innovation. A research team, headed

by Prof. ZHENG Xiulong with No. 2 Military Medical School, has rolled out an innovative drug which can enhance patients' sensitivity to chemotherapy. The finding is granted with a second-place award of National Technological Inventions. Artemisinin compound, a new drug for treating advanced and drug-resistant malaria developed by Prof. LI Guoqiao of Guangzhou University of Traditional Chinese Medicine, is honored with a second-place award of National S&T Progress.

RESEARCH AND DEVELOPMENT

New Immune Response to Viruses

Writing in a recent issue of journal *Immunology*, a research team, led by Prof. CAO Xuetao of No. 2 Military Medical School, unveiled a new immune response to viruses.

Based on their multi-year study of Toll-like receptors and immune regulation, researchers found that inhibiting the expression of Protein Phosphatase-2 in macrophage using Ribonucleic Acid (RNA) can noticeably enhance interferon and inflammatory factors expressed by macrophage in Toll-like receptor3 and Toll-like receptor-4. They also found that phosphatase activity in Protein Phosphatase-2 does not contribute to the inhibiting effects. It is protein kinase-1 path signal that works out the magic. Research results show that Protein Phosphatase-2 inhibits its kinase activity through working with protein kinase factor-1, noticeably inhibiting Toll-like receptor from making macrophage to produce inflammatory factors and interferon-I, which in turn regulates the immune response to viruses in a negative manner. The finding improves the knowledge of regulating an immune response to viruses, and makes Protein Phosphatase-2 a potential target for immune therapy.

Oral Small Molecules for Diabetes Patients

A study team, led by WANG Mingwei, Director of the National Center for Drug Screening, has successfully spotted a type of small molecules desirable for oral intake, through a screening process. The development will eventually lead to a new therapy for treating diabetes and other metabolic diseases.

Writing in a recent issue of the Proceedings of the *National Academy of Sciences*, Chinese researchers explained that the non-peptidic small-molecule works like incretin mimetics, namely it regulates blood sugar by simulating the role of GLP-1. However, it works better than the latter, as it can be taken orally. A commentary accompanying the article believes the new approach makes a major breakthrough in treating diabetes.

In an effort to work out non-peptidic small-molecules bearing the activity of GLP-1, researchers have screened out from some 48,000 compounds two candidate structures that can mimic GLP-1 through cell culture and live animal models. Experiment results show that a compound named Boc5 has successfully reduced the food intake of rodents either through injection or oral intake. A diabetes-II rodent model shows that the injection of the same compound can keep rodents from adding more weight, and reduce the glycated haemoglobin, a long term control indicator for diabetes patients. Results also show that Boc5 can be a brand new small-molecule for oral delivery in treating diabetes, obesity, and metabolic diseases.

Biocontrol Microorganisms

R&D of biocontrol microorganism product, a project undertaken by the Beijing Institute of Agriculture and Forestry, has achieved phase results. Researchers have screened out more than a hundred of microorganism strains that can be used to fight major vegetable and fruit tree diseases, in the course of establishing a microorganism resource bank. They have rolled out seven high performance biocontrol microbe strains for vegetable blasts, Botrytis cinerea, Meloidogyne incognita, and Peach brown rot. The microbe strains bank has so far collected more than 4,000 specimens.

Researchers enhanced the R&D and application of fungus activator proteins and glycoprotein, through working on the genetic express system of strains. They developed a cDNA database for Alterm~rm tenuis Ness, enabling it to activate proteins, and worked out the expression of prokaryotic cell on three activator protein genes selected from the cDNA database, in an attempt to create a basis for better understanding of the functions of activator proteins and associated structures.

In addition, researchers developed an innovative technical system for producing mini-capsules for fighting Meloidogyne incognita, allowing a safer and more environment friendly application.

NEWS BRIEFS

Platform for Sharing Earth Data

A network for sharing earth data has recently passed an approval check. It takes two years for the platform to be filled up with 21 standardized subsystems, covering 7 major categories, including geography, resources, humanistic process, polar study, space science, geophysics, and terrestrial observation, in a volume of 6.2TB. About 2TB of data can be shared online. The distributed data sharing system is made up of a general center, five regional sub-centers, five disciplinary sub-centers, and a number of data source links. As of the end of November 2006, the website (www.geodata.cn) has attracted 16,911 subscribed users, with 738,686 visitors browsing the website, an online download of 5995GB, and an offline data service of 2270GB. The website has also accommodated 1100 service requirements for diverse applications, including continental carbon cycle study, urban planning of Beijing-Tianjin-Hebei, the Qinghai-Tibet railway, and space projects.

Enhanced Meteorological Data Sharing

Thanks to 5-year improvements from 2001 to 2005, the campaign for sharing meteorological data has achieved rich results in establishing a support system for meteorological data sharing, capacity building of meteorological data resources, and setting up a sharing platform. The effort has opened up a huge amount of meteorological data for sharing.

A range of policies, standards, and regulations supporting meteorological data sharing have come out of the project, which makes the support system. The project has collected, integrated, processed, and analyzed 230 standardized meteorological data sets in a volume exceeding 2000GB, which houses the core observational data collected by Chinese meteorological authorities since 1951. Also derived from the project are a national platform, and 21 provincial platforms installed in a distributed manner, with online sharing resources in 1200GB.

The sharing platform （cdc.cma.gov.cn）was put into official operation on December 2001. As of November 2006, the website has been visited more than 300,000 times, with 694 registered users. The platform has fed users wit data exceeding 4000GB, either in online or offline manner. It has provided basic meteorological data to more than a hundred major national projects, including the National 973 Program, the National 863 Program, the National Natural Science Foundation, and the National Key Technology Program.

Mapping Data Sharing Improved

It takes four years for China to establish a well-functioned system for sharing mapping data. The platform is made up of sharing data sets in 5TB, supported by a policy and standard system.

The project has completed the consolidation of 228 data sets in 10 major categories, covering land mapping, laser ranging, geographic base maps, grid data, ancient data, world maps, and remote sensing data, in a volume exceeding 5TB. Its open data can be downloaded free of charge, while classified date have to be retrieved according to an interim regulation. The online sharing service platform, derived from the project, publishes all metadata, with an array of software for data entry, information publication, and maintenance. Sitting in a special room with powerful servers, the online system allows a high speed broadband (10M) connectivity and round-clock service.

The project, since its operation, has offered free download for 34,000 times, in a combined volume of 200GB. Offline metadata service has provided 600GB worth data sharing for the users in the area of research, teaching, experiment, and government departments. It plans to further enhance the R&D of sharing technologies, in an attempt to allow more to be shared, and establish a three-tiered service system made up of the links at the national, provincial, and municipal levels.

More for Marine Data Sharing

An enhancement effort initiated in 2003 and 2004 has made China’ s marine data center enjoy a more regulated and standardized collection, processing, management, and service. It has created a practical environment for online sharing, and raised the service level for sharing basic marine data.

The project has completed the drafting or revision of 10 standards and regulations, of which Formats for Marine Data Exchange has been published in 2006 as a national standard. Some 500,000 entries of historical survey data have been consolidated. Updates and maintenance have also been made to six basic marine databases, including ARGO, sea water temperature and salinity, surface meteorological data, surface currents, marine environment, and basic marine data, housing the site data of 23 million observations. In the meantime, an array of new databases have been created, including GTSPP, sea water chemical data, MODIS, marine biological survey data for the Xisha Isles, and marine biological specimens. The effort has enhanced the development of grid datasets and maps for the marine environment of China South Sea, which adds the strength to the sharing service. The platform has so far provided a download of 13.3 GB on a combined basis, and made an offline data service of 550 GB for major scientific projects, including the marine 863 and 973 programs.

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