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# NEWSLETTER

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## INTERNATIONAL COOPERATION

### China-Australia Science Week

Not long ago, China-Australia Science Week, co-sponsored by Chinese Ministry of Science and Technology and Australian Ministry for Innovation, Industry, Science and Research, was opened at the Shanghai Expo. At the sponsors' invitation, representatives from China National Center for Biotechnology Development, part of MOST, attended a se

minar to discuss food quality, food yield, and human health issues in the area of biotechnology. 8 Australian and 9 Chinese specialists dealt with the issues in five areas, including 1) raising crops' salinity and drought resistance; 2) improving nutritional elements in foods, securing food safety, and expanding the applications of crop products; 3) raising grain yield, and improving domestic animal species; 4) raising medical research level and associated diagnosing capability; and 5) raising the level of diagnosing and treating common diseases, including diabetes, metabolic syndrome, and infectious diseases, and improving prognosis.

## New Anti-HER2 Antibody Therapy Found

A study, led by Prof. FU Yangxin at the University of Chicago, and WANG Shengdian with Chinese Academy of Sciences Institute of Biophysics under a 'thousand talents program', has figured out a new approach to treat breast cancer using Herceptin. The new approach creates an important theoretical ground for doctors to work on a more balanced medication plan with right medication sequence, enhancing the therapeutic effects of Herceptin. The finding was published in the recent issue of *Cancer Cell*.

Experimental results show that Herceptin is able to induce anti-cancer immune response through certain signal pathways, enabling animals' immune system to fight cancerous cells. Simulated clinical trials also show that Herceptin can kill breast tumors in normally developed rats. However, it has failed to induce the same response in the rats having immune defects. Researchers also found that Herceptin kills tumors through a sophisticated process in order. It would induce cancerous cell apoptosis in the first place, releasing the signal for 'danger', which in turn increases the influx of both innate and adaptive immune cells into the tumor microenvironment by a selected immunotherapy, further enhancing subsequent antibody-induced immunity, and leading to increased tumor eradication and resistance to rechallenge. The new approach provides a solid theoretical evidence and brand new thinking line for enhancing the therapeutic effects of Herceptin in treating breast cancer.

Researchers also found that inappropriate large dose of chemotherapeutic drugs would kill immune cells, weakening the immune response induced by Herceptin. The administration of chemotherapeutic drugs and Herceptin at the same time, or the administration of Herceptin before chemotherapeutic drugs, would run the risks of killing immune cells activated by Herceptin, though the therapy is able to kill primary tumors through concerted efforts, which would weaken the memory of immune response, allowing the rechallenge. However, the administration of chemotherapeutic drugs before application of Herceptin will not affect the memory of immune response, suppressing the rechallenge while enhancing the therapeutic effects of killing the primary tumors.

## Wild Rice Genome Sequenced

GAO Lizhi and coworkers at CAS Kunming Institute of Botany have recently finished the sequence and assembly of wild rice genomes, using advanced high flux sequencing techniques and high performance bioinformatic analysis. The sequence results show that the generic wild rice has a genome consisting of 370 million base pairs and housing some 40,000 genes. The sequencing depth has reached 70 times the size of the genome, and a 92% coverage, which means more than 90% of the genes have been mapped. At present, researchers are working on the refined genome maps for the wild rice.

## New Bacterial Infection Mechanism Found

A study team, led by SHAO Feng at the National Institute of Biological Sciences in Beijing, has discovered for the first time in the world that bacterial proteins are able to directly modify ubiquitin-like proteins, which provides a new theoretical evidence and strategic clue for developing anti-bacteria drugs. The finding, published in the recent online issue of *Science*, is important for understanding bacterial pathogenesis, and associated prevention and treatment.

Researchers found that the toxic protein of pathogenic bacteria can directly modify ubiquitin-like proteins, deactivating ubiquitin and ubiquitin-like protein, and massing up the ubiquitin signal system within the body. Researchers also studied the ubiquitin signal system using bacteria's toxic protein, in an effort to deepen their knowledge of ubiquitin protein signal pathway in the host's cells.

## Chinese Scientists Identified Susceptibility Loci at PLCE1 and C20orf54

WANG Lidong, a Chinese specialist, announced at a news briefing held on August 22, 2010 that he and coworkers have identified susceptibility loci at PLCE1 and C20orf54 that are associated with the occurrence of esophageal cancer. The finding, published in the August 23, 2010 online issue of *Nature Genetics*, provides a theoretical evidence for preventing, diagnosing, and treating esophageal cancer.

Led by WANG, a large contingent made up of some 200 specialists and scholars, and more than a thousand students visited some 70,000 esophageal cancer patients in

50,000 villages, starting from 2008. Researchers collected more than a hundred thousand esophageal cancer specimens, and identified two susceptibility loci at PLCE1 and C20orf54 on No. 10 and No. 20 chromosomes using the genome-wide association technique. The discovery not only helps scientists deepen their understanding of the pathogenesis of esophageal cancer, but also provides theoretical evidences and molecular targets for prevention, earlier diagnosis, individualized treatment, and screening new drugs for esophageal cancer, opened up a new direction for future esophageal cancer studies.

The study has covered a range of ethnic groups, including Han, Kazakstan, Hui, and Mongolian, in 17 provinces and 28 prefectural cities, or 90% of the esophageal cancer prone areas in the country. 268 specialists and scholars from 50 research institutes were part of the study. 128 of them have published their findings on esophageal cancer. WANG and his team have established a close working tie with 18 hospitals in 14 provinces and cities, including Henan, Hebei, Shaanxi, and Shandong during the period from 1995 till today. These hospitals would have 200-1500 esophageal cancer operations a year, which resulted in a database containing more than a hundred thousand esophageal cancer specimens, securing the authority and representativeness of the findings.

## 'Positioning Cloud' for Satellite Navigation

Beijing UniStrong made a demonstration on August 25, 2010 to show the so-called 'positioning cloud' in global satellite navigation, based on cloud computing. The position cloud system is an integration of 3S, IT, and network technologies, including infrastructure, service, R&D platform, products, and solutions. It absorbs all the information associated with the position, providing position based solutions to different sectors.

According to UniStrong, the position cloud system is designed to be a global navigation satellite system (GNSS) rather than a single GPS system, in an attempt to shift the application focus from motor vehicles to individuals' communication needs, and from marketing the products to the operation/service, making satellite navigation part of people's life.

In 2009, China had a mobile phone population exceeding 700 million in number, and a motor vehicle amount over 75 million. The navigation and positioning industry has yielded an output of RMB 50 billion, and will reach a scale over 100 billion in next two years. By 2015, the industry will have an output worth RMB 300 billion. The navigation and positioning industry will become a powerhouse facilitating the development of national security, public security, energy efficiency and emission reduction, disaster

rescue, traffic and transportation, the Internet of things, and precision agriculture, with a 10-fold industrial stimulus coefficient, becoming a new economic growth point in the country.

So far, UniStrong has established R&D centers in Beijing, Shanghai, and Xi'an respectively, and two service systems covering civic and professional applications. It has also established a collaboration tie with IBM for cloud computing. Additionally, it has built a 1,000-seat call center, and established collaboration ties with major domestic communication vendors, 4-D map content providers, and internet content service providers.

### Sumatra Rabbit Originates from Southwest China

JIN Changzhu and coworkers at CAS Institute of Vertebrate Paleontology and Paleoanthropology recently reported their findings on the origins of the Sumatran striped rabbit, based on their study of the fossilized rabbit. The finding provides important fossilized data for understanding the systematic evolution of the Sumatran striped rabbit and associated biodiversity, and is important for exploring the origin of the rabbit and the spread of Quaternary mammals across Southeast Asia and associated paleoecological environment.



Sumatran striped rabbit

Chinese scientists unearthed a fossilized mandible specimen of the Sumatran striped rabbit during the period of 2007-2008 in Chongzuo, Guangxi. The study made by JIN an

d coworkers shows that the Sumatran striped rabbit should have originated in the southwest part of China, before spreading to other regions, including Sumatra in Indonesia. The finding provides an important evidence for understanding the spread of mammals across Southeast Asia in the Late Cenozoic Period and associated changes of paleoecological environment.

## NEWS BRIEFS

### Chinese Made Mini Submarine Hit 3700m

Chinese Ministry of Science and Technology and State Oceanography Bureau jointly announced on August 26, 2010 in Beijing that Jiaolong, the first Chinese made mini submarine at 3000m depth level has hit a depth of 3759m. The development makes China the 5<sup>th</sup> country in the world able to send man to a water depth of 3500m or more after the United States, France, Russia, and Japan.



According to a briefing, the mini submarine had made 17 dives during the period of May 31-July 18, 2010. 7 dives traversed the depth of 2,000m, and 4 dives reached 3,000m or more, with the largest diving depth at 3,759, exceeding the averaged ocean depth of 3,682 in the world. It also made a submarine operation record of 9 hours and 3 minutes. Every component of the manned deep water capsule has passed the 7000m pressure

tests, and will be further tested at the 5,000m and 7,000m levels.

## Chinese Expedition Team Reached North Pole



A Chinese expedition team reached the target site of the North Pole (88.22°north latitude, and 177.20°west longitude) at 15:38, August 20, 1020, aboard an expedition boat named Snow Dragon. In the 4<sup>th</sup> trip to the Pole, team members deployed drifting buoys over the ice surface, made deep sectional salinity observation, collected sea ice and water samples, and made biological observation at the site. They obtained temperature and salinity data of sea water at a depth from 0m to 1000m, 3 ice core samples, and some sea water specimens. They also made an observation of sea ice distributions on the way, and collected valuable scientific data for studying the fast changing sea ice and the response made by the marine ecosystems.

## Space Born Vegetables

8 vegetables species bred aboard the Shenzhou Space Capsules have been successfully grown on land by agricultural specialists in Chongli County, Hebei Province. The space bred pepper and eggplants have born their fruits. Agricultural specialists in Chongli County introduced 8 space born vegetables, including Hangjiao 3 and Hangqie 5, from a space breeding center in the west part of China. The vegetables were grown in two plots of a size of 6 mu (1 mu= 0.0667 hectare). Specialists recorded the detailed soil conditions, temperatures, and humidity desirable for growing the space bred species, in

an attempt to understand their growing habit. The space bred vegetables have shown noticeable strength in shaping, tastes, and pests resistance, with a per mu yield at 5,000 kg.

## Mobile Communication Lab Approved

An expert panel, organized by Chinese Ministry of Science and Technology, made an approval check on a national mobile communication lab sitting in the compound of China Academy of Telecommunication Research in Beijing. Experts remarked that the lab has been working on the key technologies for new mobile telecommunication systems, including Soc, TD-SCDMA, TD-LTE, SCDMA, and Mcwill, in line with China's strategic needs for mobile telecommunications. With a well defined research direction and targets, the lab has been contracted to a range of national research projects, and has rendered an important contribution to enhancing China's competitiveness in the area of mobile telecommunication. It has also established a rationally structured contingent, with fine operational mechanisms. China Academy of Telecommunication Research, where the lab is physically located has provided firm support to the operation of lab. In this context, the expert panel agreed to endorse the approval check. Meanwhile, it asked the lab to further enhance its technology innovation leading position in the area.

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