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RESEARCH AND DEVELOPMENT

New Liver Cancer Susceptibility Locus Identified

A study team, headed by HE Fuchu, a CAS academician at national key lab for proteomics, has identified a new susceptibility locus for hepatocellular carcinoma in chronic hepatitis B virus carriers. The finding was published in the August 2, 2010 online issue of *Nature Genetics*.

To identify the susceptibility allele, the team made a systematic screening and tests on

the specimens collected from some 4500 liver cancer patients and control individuals, using the genome-wide association technique, in collaboration with more than 100 researchers from a dozen of research institutes, including Nanjing Medical University, the Chinese Academy of Medical Sciences Institute of Carcinoma, Fudan University, and Sun Yat-sen University Tumor Hospital. Researchers finally found an area made up of multiple genes at a special site in No. 1 chromosome, susceptible to HBV-related cancers. The finding helps scientists to deepen their understanding of the pathogenesis of liver cancer, providing theoretical evidences and biological targets for liver cancer risk prediction, early warning and prevention, individualized treatment, and for developing new effective drugs.

HE told reporters that the study, the first and largest liver cancer susceptibility allele screening effort in the world, has employed the genome-wide association technique that has been widely employed by international scientific community to sort out susceptibility allele of major diseases.

Oyster's Full Genome Map

CAS Institute of Oceanology, Beijing Genomics Institute (Shenzhen), and Zhangzidao Fisheries publicized on July 31, 2010 a full oyster genome sequence map in Qingdao, the first seashell genome map in the world. The development marks a major breakthrough in assembling short sequence based genomes with high genetic diversity. Preliminary analysis shows that oyster has a genome made up of 800 million base pairs, housing some 20,000 genes. The data derived from the genome supports the conclusion that lower marine life is of a high genetic diversity. An in-depth study of oyster DNA data will eventually lead to the discovery of a string of major functional genes regulating oyster's growth, development, reproduction, and adversity resistance, providing genetic evidences for studying oyster's economic values and new varieties breeding. With the new genetic findings, people will also be able to change oyster's living habit, allowing it to be fully utilized by humans.

Highest HLA Resolution

Beijing Genomics Institute (Shenzhen) started from July 2010 to employ new sequencing techniques to read HLA sequence data in the lab. The new sequencing techniques allow scientists to read HLA data of several thousands of specimens in a single lab test, enjoying the highest resolution and the possibilities to discover new alleles. The novel techniques have also landed a substantive leap in test flux, data quality, and cost control. It takes only half the costs to work on high resolution typing, compared with conventional techniques, easing patients' economic burden for multiple

typing, and winning more precious time for treatment.

Not long ago, Beijing Genomics Institute (Shenzhen) launched a project worth several hundred million RMB to turn the low resolution typing data in the domestic bone marrow database into high resolution data, in an attempt to raise the success rate of typing and transplantation, and save more patients' life. Meanwhile, it has worked with blood specialists to develop new techniques to detect leukemia DNA, and made a large scale leukemia epidemics survey in the country, in a move to provide first hand data for clinical leukemia diagnosis and treatment.

Capsaicin Makes Blood Vessels Better

A study team, led by ZHU Zhiming at No. 3 Military Medical School Daping Hospital, has been working on the effects of capsaicin on cardiovascular metabolism since 2003, under the financing of National Natural Science Foundation and National 973 Program. In 2007, the team unveiled the fact that the long term intervention of capsaicin is able to affect fat tissues' capsaicin receptors (TRPV1), inhibiting fat synthesis and preventing people from becoming fat. Scientists further found that the capsaicin based diet on a long term basis is able to noticeably enhance the relaxing reaction of blood vessels. Researchers tested the blood pressure reducing effects of capsaicin in the spontaneous hypertension rats. Test results show that long term dietary intervention of capsaicin would result in a noticeably reduced blood pressure, with noticeably raised protein kinase A and eNOS phosphorylation levels, along with an increased concentration of nitrogen monoxide metabolites. ZHU believes that the study has unveiled the beneficial effects of capsaicin receptors on blood pressure, which creates a new thinking line for developing new hypertension drugs, and provides theoretical evidences for guiding people and patients to have a healthy diet. The finding was published in the August 4, 2010 online issue of *Cell Metabolism*.

HIV Fusion Inhibitor Developed

FusoGen Pharmaceuticals, Inc. has recently finished phase II-b clinical trials of Sifuvirtide, a novel HIV fusion inhibitor with noticeable therapeutic effects developed the company on its own. Sifuvirtide, which was designed based on the 3D structures of HIV gp41, has been granted with the compound patent in China, USA, and Europe respectively.

Up to date, FusoGen Pharmaceuticals has finished phase I-a, I-b, II-a, and II-b clinical trials of Sifuvirtide, in compliance to GCP standard. Some 200 subjects were enrolled in the studies. Study results show that Sifuvirtide has a good safety profile and endurance. The efficacy of 20 mg of Sifuvirtide once a day was equivalent to 100 mg of T20 twice daily, the first fusion inhibitor developed in the USA. II-b clinical trials showed that

Sifuvirtide could substantially improve the efficacy over traditional treatment. After a 24- week administration, the undetectable viral loads and CD4 cell count increments for the Sifuvirtide group went up by 59% and 89% respectively. The injection site reaction is 7% for Sifuvirtide, compared with 98% for T20.

Proprietary MRI Data Processing Technology

Thanks to 10-odd-year efforts, Dr. HE Zongbin at Changjiang University developed a proprietary computer program able to process and interpret magnetic resonance imaging data in diverse forms. According to a briefing, at present stage, the home written MRI programs were only able to process one or two types of data, and the imported programs were only able to handle the data derived from their own instruments. Fortunately, the new program is able to process four types of MRIL data, including Schlumberger, Halliburton, and Baker Hughes, making itself an integrated logging data processing and interpreting platform. It makes an overall assessment of logging quality and corrects the wrong data, after identifying the structure of original data, the way to save the data, and the approach to make the measurement.

The new computer program has been tested to make a quantitative and qualitative evaluation of the oil to be tapped up from an oil field. Dr. HE identified the only level that may produce the oil from a number of oil producing candidate layers, after analyzing the data collected. The rational identification resulted in an oil well able to produce 7.46 tons of oil a day with commercial values, avoided the possible conclusion that the site has no oil. The technology has so far found wide applications in logging data processing at three major domestic oil companies, including China National Petroleum Corporation, China Petrochemical Corporation, and China National Offshore Oil Corp.

Algae Made Cloth

Thanks to countless experiments in four years, a research team, led by XIA Yanzhi at Qingdao University, has rolled out algae fibers from alginate using special equipment, and made them into cloth. Researchers so far have extracted fibers from different algae species, including the one used to cause environmental disasters to the coasts of Yellow Sea.

Researchers showed the visitors algae fibers dyed in different colors, alginate grains, and the cloth made of algae fibers in the lab. According to researchers, the algae fiber making technique has passed the initial and pilot experiments, and is ready for the large scale production. The technology is able to extract 200-250 kg of alginate from a ton of dried seaweeds, which can be further turned into 200 kg of fibers. 100 grams of algae fibers can produce one square meter of cloth. A preliminary analysis shows that the cost

of algae fiber making will range from RMB 50,000 to 70,000 a ton. Quality cloth can be produced and cost reduced, if the fiber is interwoven with cotton. In addition, algae cloth is more durable than cotton cloth.

Derived from the marine environment, algae fiber is resistant to fire. Meanwhile, the fiber contains a large amount of metal ions, which makes the fiber a good shield against electromagnetic wave and radiation. XIA said these merits, plus the one of easy processing, allows the fiber being turned into special clothes for fire fighting, chemical protection, and medical application, in addition to ordinary clothes.

Financed by the National 863 Program, a textile earmark program initiated by State Development and Reform Commission, National Natural Science Foundation, and a fund initiated by Shandong provincial government for major R&D findings spin-off, the study has applied for ten invention patents, with three grants.

NEWS BRIEFS

New Remote Sensing Satellite



China blasted off a new remote sensing satellite, Yaogan-10 aboard a CZIVC launch vehicle, from the Taiyuan Satellite Launch Center at 0649, August 10, 2010. Having entered the preset orbit, the satellite will be employed to serve for scientific experiment, land resources survey, crop yield estimation, and disaster prevention/preparedness.

New Navigation Satellite Launched

The ground control in Xi'an made 2nd capture and control to a newly launched navigation satellite, or Compass V, at 17:57, August 5, 2010, guiding it into the preset orbit. The satellite, the fifth navigation satellite manufactured by China on its own, was blasted off at 0530, August 1, 2010 aboard a CZIIIA launch vehicle from the Xi'chang Satellite Launch Center. The ground control has sent more than a thousand instructions to guide the satellite to open up its solar panel and communication antenna, make the ignition, switch orbits at apogee altitude, when it entered the transfer orbit. The ground control has successfully made 3 orbit transfers from apogee altitude and 2 orbital captures and controls, guiding the satellite into a geosynchronous orbit 36000 km away from the earth, in line with a ground control script prepared to deal with the sophisticated technologies applied in the satellite.

Chinese-Made International Standard for the Internet of Things

Not long ago, International Organization for Standardization (ISO) published an official standard for the RFID cargo shipment tag system. The standard is the first standard proposed and formulated by China and issued officially by ISO for logistics and the Internet of things. According to the officials of the Standardization Administration of China, the ISO/PAS 18186: RFID cargo shipment tag system, is prepared based on a Chinese national standard for the container e-seal technology applied in supply chains monitoring (GB/T23678—2009). The standard is designed to facilitate the diffusion of container e-seal technology featured with low cost, enhanced safety/reliability, and easy operation, desirable for raising the safety of international containing shipping.

As an integration of RFID and internet technologies, the new system is able to provide real time containers status to users, allowing them to keep abreast of, rather than 'be told' of the status of container shipping, desirable for raising the safety and efficiency of container shipping.

Large Tundra Survey Launched

Cold and Arid Regions Environmental and Engineering Research Institute, part of the Chinese Academy of Sciences, launched a baseline survey over the typical tundra region on the Tibetan Plateau at the end of July, 2010. The field team embarked on the expedition on July 31, 2010 from a cryosphere station located in Ge'ermu. The survey team is made up of more than 50 domestic and foreign specialists. According to a briefing, the expedition will study tundra, active soil layer, land surface ecology, and vegetations in Mount Kalakunlun area, west Mount Kulun area, and Qiangtang basin, using a range of techniques, including on-the-spot survey, drilling, pit digging, and prospecting. Soils will be studied using the pit digging technique, and vegetation the specimen collecting technique. The baseline tundra data will be collected from the aforesaid three areas to understand the divide line, ground temperature, ice content, frozen earth depth, upper limit of tundra, soil/vegetation status in active permafrost layers, making evidences available for getting prepared for a large scale fill-in effort in the region.

Comments or inquiries on editorial matters or

Newsletter content should be directed to:

Department of International Cooperation, MOST 15B, Fuxing Road, Beijing 100862,
PR China Tel: (8610)58881360 Fax: (8610) 58881364

<http://www.most.gov.cn>

