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RESEARCH AND DEVELOPMENT

Drosophila Light Preference Neurons Found

Not long ago, LIU Li and GONG Zhefeng at Chinese Academy of Sciences Institute of Biophysics reported their findings in the recent issue of the journal *Nature*, believing that two pairs of neurons in the central brain control drosophila's innate light preference.

Researchers put some 1,000 defected fruit fly under a process from microscope based hybrid, to reproduction, and further to screening, and sorted out the species fearing no light. They found that the fruit fly *Drosophila melanogaster* prefers darkness in the feeding larval stage, but prefers light in adulthood. The deactivation of NP394 neurons may simply turn the fruit fly from being photophobic to photophilic.

Researchers also proved the switch functionality of NP394 neurons in controlling drosophila's innate light preference: when inhibited, the neurons would make the fruit fly in the feeding larval stage photophilic. On the contrary, when activated, the neurons would tell the same fruit fly to be photophobic. Researchers tested the ties between PDF neurons and NP394 neurons using phased green fluorescent protein (GFP) expression. They also for the first time applied calcium imaging techniques to validate the ties between the two pairs of neurons

China Resequenced 31 Soybean Genomes

Chinese researchers, from Chinese University of Hong Kong, Beijing Genomics Institute, Ministry of Agriculture, and Chinese Academy of Sciences, reported in the November 14, 2010 online issue of *Nature Genetics* their work on resequencing of 31 soybean genome that reveals genetic diversity and evolutionary selection modes.

Researchers made a genome-wide re-sequencing of 17 wild and 14 cultivated soybean plants. They found more than 630 million single nucleotide polymorphisms (SNPs) in the plants, using SOAP v2.18, and established a high-density molecular marker map. Meanwhile, they assembled the wild and cultivated soybean plants through SOAPdenovo, in which they sorted out more than 180,000 PAVs, and obtained the genes acquired and lost in the breeding process.

Beijing Genomics Institute researchers believe that unlike other crops, soybean genome shows more genetic linkage disequilibrium and a higher proportion of single-nucleotide non-synonymous/synonymous substitution ratio. The finding shows that the molecular marker breeding technique enjoys more advantage, compared with the genetic map-based cloning technique.

Spine Surgery Robot

No. 3 Military Medical School Xinqiao Hospital in Chongqing, in collaboration with CAS Shenyang Institute of Automation, rolled out in July 2010 a robot able to perform the minimal invasive spine surgery. Having completed mock operations, the robot surgeon awaits to be tested clinically in 2011.

The robot is able to perform surgical operations taking advantage of its precision

positioning capability, and free doctors from performing operations under a radioactive environment, enjoying an enhanced precision, and reduced surgical risks, incidences of postoperative complications, and radiation damages to doctors. The new technique is desirable for diffusing minimal invasive spine surgery techniques in a clinical environment.

According to a briefing, researchers will further work on the intelligent part of the robot, enabling it with 3-D reconstruction, surgical positioning, and sensing capabilities, and allowing it to have its own "brain".

Petroleum Substitutes from Plants

LI Heng and SUN Peng, two female doctoral students at Nanjing University of Technology, recently announced that they have found petroleum substitutes in straw, dried sweet potato, and sugar cane. LI and SUN developed through countless experiments an approach to separate sorbitol and lactic acid from straw, dried sweet potato, and sugar cane, two chemicals widely employed in producing dehydrated sorbitol and acrylic acid. The effort has not only led them to finding the inexpensive and effective base materials, but also helped them work out innovative carbon supported nickel oxide catalysts and NaY zeolite catalysts with and without potassium salt modifications, which improves the selectivity of two biological processes, and raises the conversion ratio. The findings have been published in *CARBON* and *Industrial & Engineering Chemistry Research*, respectively.

High-Power Solar Furnace

Engineers from the Solar Thermal Power Lab, part of Chinese Academy of Sciences Institute of Electric Engineering, have recently installed a high-power solar furnace condenser in Huianbao, Ningxia. Thanks to 3-year painstaking efforts, engineers have enabled the facility to produce hydrogen using solar energy.

According to a briefing, the solar furnace is made up of three 120m² heliostats with a roughness of 1mm, a tracking control system, a 300m² high-precision parabolic concentrator, a solar furnace, and a hydrogen producing system. The heliostats, 11m long, were arrayed in a triangular shape, with the rear one being 1.8m higher than the preceding two. The parabolic concentrator is a rotational paraboloid, with an axis parallel to and 3m above the ground. Calculating on 1000 watts per square meter, the solar furnace is able to produce electricity worth 0.3 MW. The high-power solar furnace condenser, the first of its kind in the country, is designed with a 300m² condenser area enjoying a tracking precision larger than 1 mrad, and a peak energy density design value up to 10 MW/square meter. The furnace ranks third in the world in terms of thermal power output, after the similar systems at CNRS and the Institute of Physics in

Uzbekistan.

Using a flat heliostat as the reflector, the system is able to divert sunlight to the opposite parabolic concentrator, making it focus on the center of the solar furnace via the parabolic concentrator, enjoying a central temperature up to 3000 °C, and allowing people to observe test samples under an oxidation and high temperature environment, without being affected by fuel products. Connected to a reactor at Xi'an Jiaotong University, the system has successfully produced hydrogen.

Chinese Made Moon Sphere

Not long ago, LIU Xiaoqun, head of the ground application system for the Chang'e I project, donated to the National Science Library a moon sphere made up of the data collected by a Chinese lunar satellite. Chang'e I satellite has collected image data from the both poles of the moon. Chinese scientists prepared the 3-D moon sphere based on the data collected.

Built on the data collected by a Chinese satellite, the moon sphere shows rich lunar data, including the well-known lunar landing spots, or impact sites, such as the impact left by Chang'e-I satellite. The moon sphere is designed with a color pattern that is somewhat different from the earth sphere. In an earth sphere, land is yellow and oceans are blue in color, with a flat surface. The moon sphere made by Chinese scientists is not flat on surface, and is designed with a color closer to what people usually see as a moon.

NEWS BRIEFS

New Hi-Tech Fair Opened

A new round of China International Hi-Tech Fair opened on November 16, 2010 in Shenzhen. Chinese Vice-Premier HUI Liangyu declared the opening of the Fair. Under the theme of "the transformation led by science and technology, and the development driven by innovation", the Fair is made up of 9 pavilions, where Chinese provinces/municipalities/autonomous regions, government agencies, 26 well-known mainland universities, and delegations from a range of other countries or regions, including Hong Kong, Macao, Taiwan, the United States, Russia, France, Canada, Australia among others displayed their latest findings.

Co-sponsored by the Ministry of Commerce, Ministry of Science and Technology, Ministry of Industry and Information Technology, National Development and Reform

Commission, Ministry of Education, Ministry of Agriculture, State Intellectual Property Office, Chinese Academy of Sciences, Chinese Academy of Engineering, and Shenzhen Municipal Government, the fair was teemed with a range of related activities, including the ministerial forum, capital market forum, entrepreneurs summit, and new energy/low carbon development summit.

China Won Fastest Supercomputer

TOP500 announced on November 14, 2010 that Tianhe-1A, developed by the Chinese National University of Defense Technology and stationed at the National Supercomputer Center in Tianjin, was the fastest supercomputer on the TOP500 list of the world's most powerful supercomputers, for an achieved performance level at 2.57 petaflop/s.

TOP500, founded in 1993, is a list showing the world's most powerful supercomputers. It publicizes the TOP500 list of the world's most powerful supercomputers twice a year based on the Linpack benchmark test.

China's Petaflop System into Daily Operation

It is reported November 18, 2010 from DAWNING that a Chinese petaflop system named Nebulae was put into operation at the National Supercomputer Center in Shenzhen. The supercomputer, ranking third place on the 36th TOP500 list of the world's most powerful supercomputers publicized on November 17, 2010, has claimed in June 1, 2010 a peak speed at 3 petaflop/s, or 1.271 petaflop/s against the Linpack benchmark.

World's First 2-D Decoding Chip

The world's first 2-D decoding chip, developed by Fujian Newland Computer Co., Ltd. made its debut on November 11, 2010 in Beijing, marking a major breakthrough in the area. According to a briefing, the 2-D decoding chip is able to turn a traditional software decoder into a hardware decoder, enjoying a greatly raised decoding speed by 10 times or more, and a drastically enhanced reading efficiency by 30-50 times. The chip simplifies the peripheral circuits and components needs for a traditional decoding system, reducing both the cost and power consumption. The development will eventually simplify the making of bar code reading equipment, reducing the threshold of extensive application of 2-D coding technologies.

China's First Light Amphibious Aircraft

Seagull 300 model, a multi-purpose amphibious light aircraft independently designed and manufactured by China Aviation Industry Corporation, made its first successful maiden flight on November 10, 2010 in Shijiazhuang. With a maximum takeoff weight of 1,680 kg, a total length of 8.9 meters, a wingspan at 12.46 meters, and a cruising speed at 231 km / h, China's first amphibious light aircraft is able to reach a height up to 6,000m, and a cruising range up to 1,300 km. When taking off or landing on the water surface, the aircraft can brave a wave height up to 0.4m.

The aircraft body is designed with a unique hull, floats, and retractable landing gear, allowing it to take off or land on a simple runway, or on the river, lake or other water bodies. It is also able to lift or land from a highland site with an elevation under 3,500m. Seagull 300 model is a small passenger aircraft for 4 to 6 people, with a comprehensive performance up to the advanced level of similar foreign made models, desirable for business flights, tourism, entertainment, coastal patrol, search, rescue, environmental monitoring, forest patrol among others.

New Edition S&T Dictionary

The third edition of *Modern Scientific and Technological Knowledge Dictionary* was published in October by China Science and Technology Press. The new edition is made up of three volumes in 6.5 million words. The expanded Dictionary has raised the number of entries to some 200,000 from 10,924 in the 2nd edition, with 24 appendixes, and more than 5,000 newly added color illustrations.

The new edition reported the basic knowledge and the latest findings derived from 38 primary disciplines. The amendments and additions made to the 2008 edition found main expression in the following four areas: (1) some incorrect or outdated entries have been removed; (2) some weak areas have been strengthened, with more entries into the areas of agriculture, medicine, food, civil engineering, water resources, and computer sciences. Some new terminologies and knowledge were added; (3) illustrations or charts have been added to some entries, making them more understandable; and (4) a range of new tools were added in the Appendixes, including who's who of renowned Chinese and foreign scientists, global geological time scale, Chinese seismological intensity grading system among others.

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