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CONNECTION

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MESSAGE FROM THE EDITOR-IN-CHIEF

Summer has arrived with the 10th edition of *Connection*. We are never short of surprises, whether they are discoveries of a new mechanism to develop liver cancer resistance or a new triboelectric nanogenerator, or the 2019 KPMG National business award won by one of our students' team.

By and large, our faculty members take an increasingly active role in public policy debates about issues related to health, science and technology. Two stories in this issue show how ZJU professors' social commitment helps influence policy making and agendas.

As always, we wish you a pleasant time reading through these pages which will help you to know more about Zhejiang University.

LI Min, Editor-in-Chief
Director, Office of Global Engagement

The 2nd International Higher Education Forum held on International Campus

The 2nd International Higher Education Forum was held on March 4 on the International Campus. More than 40 scholars from the University of Edinburgh, the University of Illinois at Urbana-Champaign, the University of Cambridge, University of Birmingham and the University of Southampton joined the forum and showed their support on the open-up and sharing of international education resources.

President WU Zhaohui introduced ZJU's global strategy, and all the attendees rooted for scientific collaboration to meet global challenges. In addition, it's announced that ZJU and UoE would establish a joint center to promote cooperation in biomedical and health-related translational research.

ZJU and Merck enter into CRISPR Core Partnership

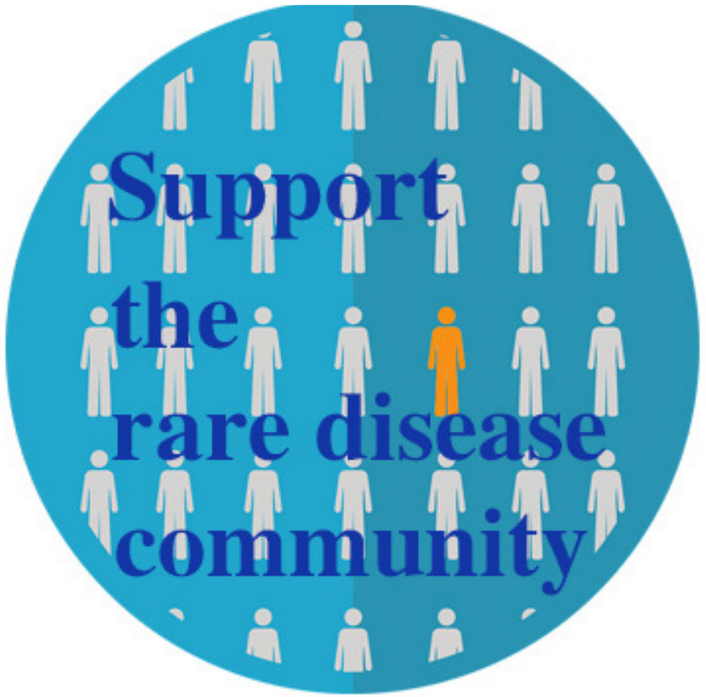
On March 14, ZJU and Merck Group signed an MoU for CRISPR Core Partnership.

"Zhejiang University attaches immense importance to academic research and scientific innovation. We hope that ZJU research teams and professors will cooperate with top gene-editing experts to promote the construction and development of relevant disciplines and create a new paradigm of the partnership between a leading university and a well-renowned company," said Vice President LUO Jianhong.

Global Innovation Center set up in Xiaoshan

On Feb. 28, Hangzhou Municipal Government and Zhejiang University signed an agreement to co-establish the ZJU-Hangzhou Global Scientific and Technological Innovation Center. As part of the strategy to build Hangzhou into a leading innovation hub, this center will be located in Xiaoshan District, the eastern part of Hangzhou.

"We firmly believe that with the joint efforts of the City and ZJU, this Center will bring fresh impetus to Hangzhou's plan on a world-famous city, while providing additional municipal support to ZJU as it is heading to a world-class university," said ZHOU Jiangyong, secretary of the CPC Hangzhou Municipal Committee.



Professor of economics won the Best Advocacy Award for Rare Disease

In honor of the World Rare Disease Day of 2019, China Charity Federation announced six winners of the Best Advocacy Award for Rare Disease. HE Wenjiong, professor of economics at the School of Public Affairs won the prize for his contributions to welfare policies of rare disease at the provincial and state level, as well as his significant efforts towards increasing the awareness and understanding of rare diseases among the public. Prof. HE focused on healthcare, policy, and social and work issues related to rare diseases. Due to his efforts, Gaucher's disease, Amyotrophic lateral sclerosis and Phenylketonuria have been added onto the covered disease list of provincial healthcare since January, 2016.

Red raspberry may help lower your blood sugar after a meal

The research team led by Prof. CHEN Wei at the College of Biosystems Engineering and Food Science isolated a novel α-glucosidase inhibitor (AGIs)—pelargonidin-3-O-rutinoside (Pg3R). As a natural substance isolated from raspberries and strawberries, Pg3R can ease the symptom of high blood glucose after a meal. Unlike other clinical AGIs, Pg3R has no side effects such as abdominal discomfort and flatulence.

Their findings are published as a cover article in the Journal of *Chemical Communications*.

tRNA mutation contributes to coronary artery disease, researchers report

Coronary artery disease (CAD), a disease of the blood vessels in the heart, kills a growing number of people in recent years.

The research team led by Prof. GUAN Minxin at the Institute of Genetics recently published their research on CAD in the Journal of *Nucleic Acids Research*. They were the first to construct the Human Umbilical Vein Endothelial Cells (HUVEC) line and detect the deleterious effects of tRNA Thr15927G>A mutation that contributes to the pathogenesis of CAD.

ZJU launches three new convergence research projects

ZJU announced in February 2019 a new batch of convergence research projects under its Innovation 2030 — a university-wide strategic framework to foster greater inter-disciplinary collaboration, fuel significant breakthroughs and find innovative solutions.

The three projects center on quantum computing and sensing, conservation of ecology and environment, and agricultural breeding by design. Following the first project on brain research and artificial intelligence released in September 2018, ZJU has so far put forward four projects aligned with the national and regional strategic goals.

Bitter food may help initiate immune responses

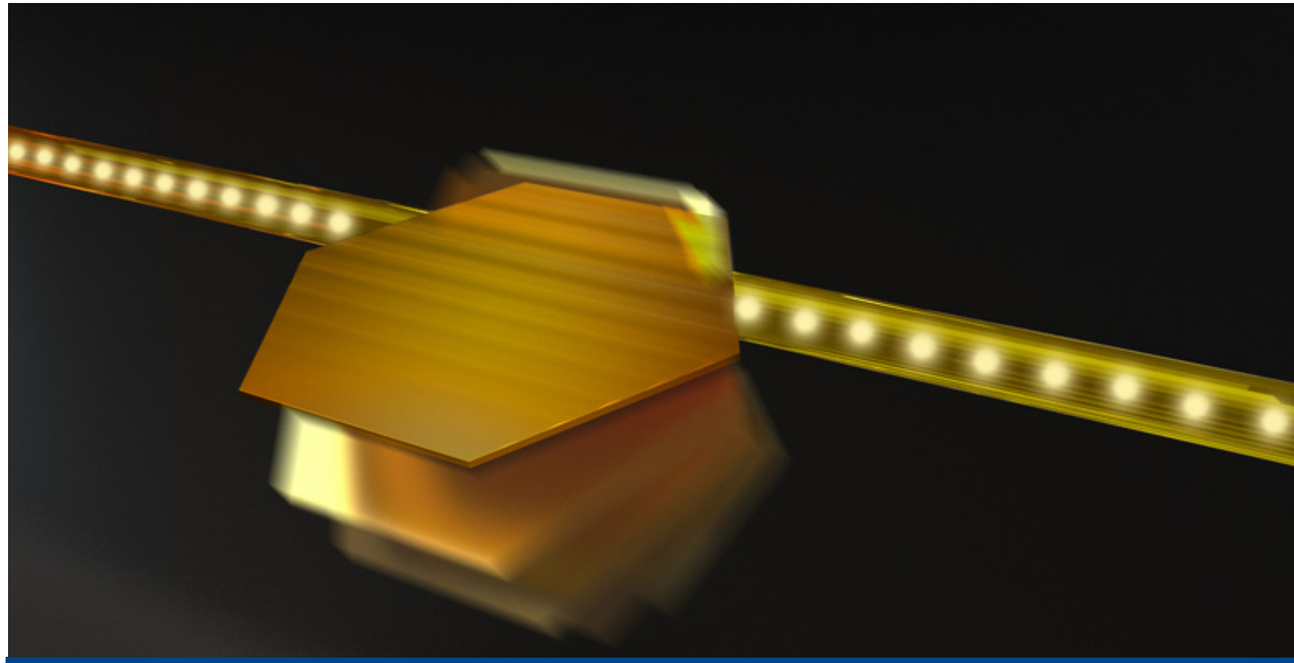
While our mouth can taste bitterness by taste buds, our gut senses bitterness by tuft cells. Recently, HUANG Liquan's team at the College of Life Sciences published their research into intestinal tuft cells in the March 19 issue of *PNAS*.

They found that the bitter-taste receptors (Tas2rs) express in tuft cells, and their signaling pathway plays a crucial role in detecting infections by the parasitic helminth Trichinella spiralis and triggering type 2 immune responses.

T cells use mechanical force to "hook" cancer cells

As human body's great fighters against cancer, T-cells use T-cell receptors (TCRs) to identify cancer signals.

Prof. CHEN Wei's team at the School of Medicine of ZJU has been working with Dr. LOU Jizhong's team at the CAS Institute of Biophysics on T-cells research. In their research article entitled "Mechano-regulation of peptide-MHC class I conformations determines TCR antigen recognition" in *Molecular Cell*, they report a dynamic structural mechanism of mechano-chemical coupling for TCR antigen recognition.



RESEARCH HIGHLIGHTS

Light makes a gold plate dance gracefully in the air

Making a plate rotating around a stick is a piece of cake, but it's a feat if it is the light that provides power, and the "stick" is 1/50 as thin as a piece of hair.

A circular dance, born in the State Key Laboratory of Modern Optical Instrumentation, made its debut on the cover of *Science Advances*. Driven by light, the gold plate revolves ceaselessly around the microfiber in a graceful manner. It is the first time that a micrometer-sized gold plate has rotated around a microfiber powered by light.

"Inspired by the inchworm motor, we crack this hard nut," said LU Jinsheng, the leading author of this research and a PhD candidate at the College of Optical Science and Engineering, "Like a nano-reptile, this gold plate can crawl around the microfiber by utilizing elastic waves and adhesion force."

The research offers unprecedented application potential for integrated micro-opto-electromechanical systems, outer-space all-optical precision mechanics and controls, and laser scanning for miniature lidar systems.


HEPATOLOGY AASLD

Original Article | Full Access

Blocking TREM-1⁺ Tumor-associated macrophages induced by hypoxia reverses immunosuppression and anti-PD-L1 resistance in liver cancer

Qinchuan Wu, Wuhua Zhou, Shengyong Yin, Yuan Zhou, Tianchi Chen, Junjie Qian, Rong Su, Liangjie Hong, Haohao Lu, Feng Zhang, Haiyang Xie, Lin Zhou, Shusen Zheng

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Researchers discover a novel mechanism for reversing anti-PD-L1 resistance in liver cancer

Liver cancer is hard to discover. At present, there are few medicines available. Tumor-associated macrophages (TAMs) are recognized as an antitumor suppressor, but how TAMs behave in the hypoxic environment of hepatocellular carcinoma (HCC) remains elusive.

The research team led by CAE fellow ZHENG Shusen found that hypoxia acted as a catalyst for anti-PD-L1 resistance in liver cancer. They discovered that hypoxia-inducible factor 1α (HIF-1α) induced an increased expression of triggering receptor on myeloid cells-1 (TREM-1) in TAMs, resulting in immunosuppression. And their data revealed that blocking TREM-1+ TAMs with GF9 offered a promising therapeutic strategy to overcome the resistance to anti-PD-L1 therapy in HCC.

This ground-breaking discovery is published in an article entitled "Blocking TREM-1+ Tumor-associated macrophages induced by hypoxia reverses immunosuppression and anti-PD-L1 resistance in liver cancer" in the journal of *Hepatology*.

Research sheds light on the allocation of China's carbon emission allowance

As global warming continues to be a global concern, it is of paramount importance to establish theoretical models for emission conditions in order to find specific countermeasures.

The research team led by Dr. FANG Kai at the School of Public Affairs, cooperating with researchers at the University of Tokyo recently put forward a multi-criteria allocation of China's carbon emission allowance (CEA), which is published in the Journal of *Applied Energy*.

FANG Kai *et al*. predict China's overall CEA by 2030 and propose a scientific scheme for CEA alloca-

High-order clustering of the transmembrane anchor of DR5 drives signaling

Receptor clustering on the cell membrane is critical in the signaling of many immunoreceptors, and this mechanism has previously been attributed to the extracellular and/or the intracellular interactions.

CHEN Shuqing, a professor at the College of Pharmaceutical Sciences, teamed up with Prof. James J. Chou and Prof. WU Hao at the Blavatnik Institute, Harvard Medical School to conduct research into the structure and function of the transmembrane helix (TMH) of death receptor 5 (DR5). DR5 is a receptor in the tumor necrosis factor receptor superfamily (TNFRSF) and plays an important role in receptor signaling.

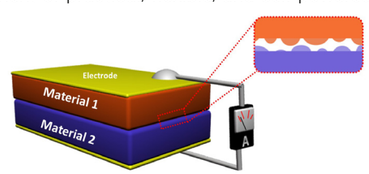
The study, published in the March 7 issue of *Cell*, opens up a novel dimension to modulating the signal transduction of the receptors for disease treatment including cancer immunotherapy. It also offers a theoretical basis for application of monoclonal antibodies, activation of bispecific and multi-specific antibodies and modulation of immunoreceptors, thus promoting antibody-based immunotherapy.

A new flexible triboelectric nanogenerator

Just imagine one day you can leave the charger at home and top up your phone battery with your body movement. Sound great? PING Jianfeng's research makes a step closer to that goal.

PING Jianfeng, a researcher at the College of Biosystems Engineering and Food Science, published an article entitled "All-electrospun flexible triboelectric nanogenerator based on metallic Mxene nanosheets" in the February 20 issue of *Nano Energy*. In this work, Mxene nanosheets are innovatively introduced into the electrospinning field to fabricate the nanofibers-based triboelectric nanogenerator (TENG).

Given its remarkable triboelectric performance, the merit of large-scale manufacturing, and environmental-friendliness, this MXene-based all-electrospun TENG holds great promise in the development of practical, flexible, and self-powered electronic devices that harvest external mechanical energy.



SPOTLIGHT ON: STUDENTS

Financial Geeks takes the crown in 2019 KPMG National Business Case Competition

The ZJU team Financial Geeks clinched the first place in 2019 KPMG National Business Case Competition at Xiamen University on March 2, winning the entrance ticket for the grand final of KICC 2019 - KPMG Innovation & Collaboration Challenge. Student teams from Sun Yat-sen University and Tsinghua University won the 2nd place and 3rd place respectively.

This year's theme was about helping disadvantaged communities through innovation. Relying on big data and genetic information, Financial Geeks took BGI as its client, and proposed innovation in their business model to improve the welfare of patients of rare diseases.

The team advisor Dr. LIU Qigui from ZJU's School of Management believed that the team's strong sense of innovation, collaboration and social responsibility was the key to their success. "I believe the team members have benefited from the University's devotion to innovation and entrepreneurship education," he said.

"It has been quite rewarding, to use our knowledge and find out what we can do for the disadvantaged groups. I am especially grateful to the professors and the School, for the efforts they have made to support us," said REN Yiming, member of Financial Geeks and a financial management student.

FACULTY

Focus on "Two Sessions"— Concerns and proposals of ZJUers

About 3,000 provincial administrators attended the meeting during the "Two Sessions". Among them, five ZJUers stand out and gave their voices.

YANG Wei, former president of ZJU and the National Science Foundation of China and chairman of the Development Committee of ZJU, suggested the "Overall Rationing System" for researchers. He believes researchers should be given more autonomy, instead of rigidly adhere to the budget.

LUO Weidong, vice president of ZJU, lauded the Government Work Report 2019 as "passionate" and "pragmatic". He summed up and praised the government's work from the aspects of macro regulation, monetary policy, and industrial transformation, etc.

CAI Xiujun, president of Sir Run Run Shaw Hospital affiliated to the Zhejiang University School of Medicine, suggested that we should adopt an optimistic outlook on the future of 5G in medicine and break through the isolated island of information in hospitals.

DUAN Shumin, dean of the Faculty of Medicine, said that the scope of talent cultivation in the universities and institutes can be more diverse and relevant policies and financial support can be more flexible.

YANG Huayong, dean of the School of Mechanical Engineering, mentioned a healthy research ecosystem involves the equibrium between competition and cooperation. He submitted a proposal about the key role of state laboratories in regional development.