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CHINESE ACADEMY OF SCIENCES

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LEAD ARTICLE

[IMAGE: CHINESE ACADEMY OF SCIENCES]

Fighting against COVID-19: CAS IN ACTION

The novel coronavirus disease (COVID-19) epidemic is China's fastest-spreading, most infectious and hardest to contain major public health emergency since the founding of the People's Republic of China in 1949.

With the joint efforts of the whole nation, the positive trend in preventing and controlling the epidemic has been constantly consolidated and expanded, and the restoration of normal production and everyday life has been quickened.

The pandemic has recently been spreading rapidly across the world, posing a formidable challenge to global public health security. According to data from the World Health Organization (WHO), COVID-19 had affected more than 200 countries and regions with over 2.7 million confirmed cases by April 26, 2020.

Viruses know no national borders and distinguish no races. Only with solidarity and by cooperation can the international community prevail over the pandemic and safeguard the common homeland of humanity. Upholding the vision of building a community with a shared future for humanity, China has been releasing information on COVID-19 since the onset of the epidemic in an open, transparent and responsible manner, unreservedly sharing with the WHO and the international community its experience in epidemic response and medical treatment, and strengthening cooperation on scientific research. It has also provided assistance to all parties to the best of its ability.

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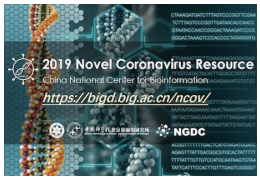
HOT ISSUE

Resource center helps virology researchers



CAS's resource center, which pools all genome sequence data and related information about the novel coronavirus, has proved popular with researchers worldwide.

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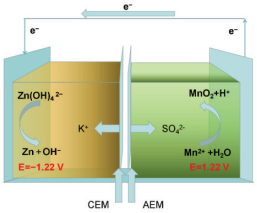
RESEARCH PROGRESS

Novel high energy-density aqueous battery successfully developed



A research team led by Professor Liu Yu and Chi Xiaowei from the Shanghai Institute of Ceramics innovatively proposed a high-energy-density aqueous battery system achieved by dual dissolution/deposition reactions separated in acid-alkaline electrolyte.

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WORLD VOICE ON INTERNATIONAL COOPERATION

TWAS calls for global collaboration to combat COVID-19 pandemic

TWAS issued a global call this week, recognizing the essential need for the global research community to act collectively to control the spread of the novel coronavirus.

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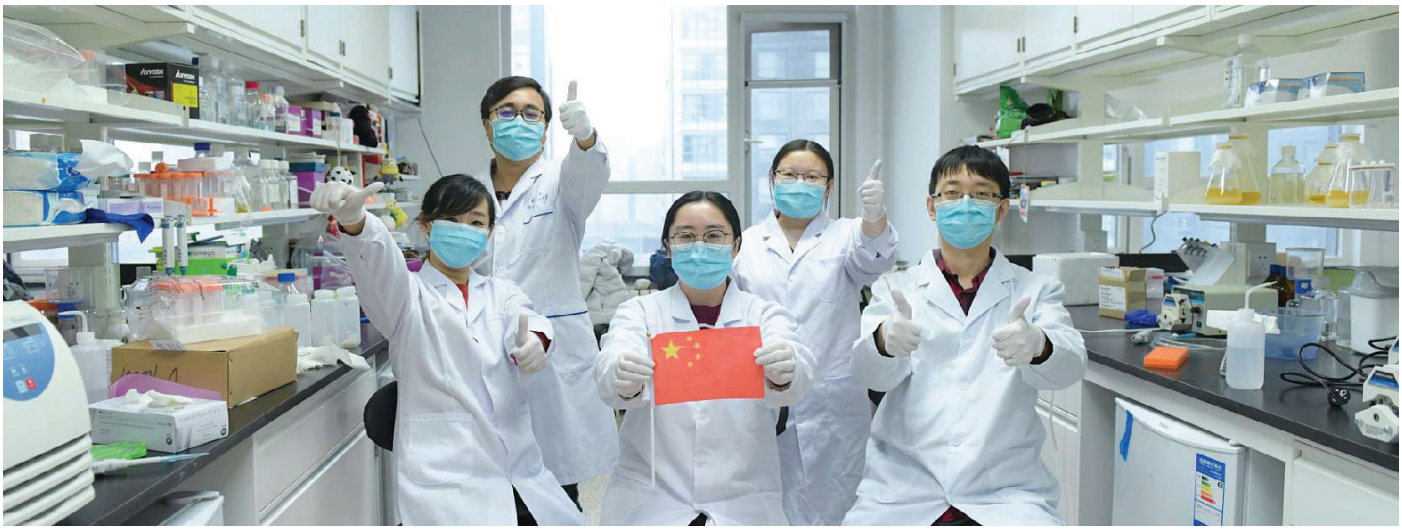
SCIENCE STORY

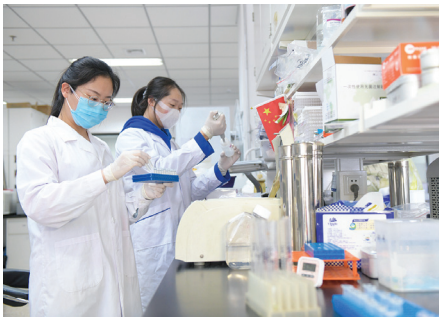
Life experience in China

In short, I have lived in Australia and South Africa but the respect and love I got here in China is unforgettable.

>> PAGE 11

Edited by Bureau of International Co-operation, Chinese Academy of Sciences
CAS Newsletter – Monthly – Editorial Board: 52, Sanlihe Road, Beijing, 100864, China





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The relevant research institutes of the Chinese Academy of Sciences have invested a lot of relevant scientific research power to carry out virus tracing, information dissemination, rapid detection, drug screening and vaccine and antibody development, providing scientific and technological support for curbing the spread of the epidemic. On April 7, 2020, Xinhua News Agency published "China Issues New Coronary Pneumonia Epidemic Situation Information and Promotes International Cooperation Chronicle of Epidemic Prevention and Control", in which 12 accomplishments of the Chinese Academy of Sciences are listed.

JANUARY 2020

January 10

— Research institutions including the Wuhan Institute of Virology (WIV) developed testing kits. Wuhan City organized testing of all relevant cases admitted to hospitals in the city.

January 12

— The China CDC, the CAMS and the WIV under the Chinese Academy of Sciences (CAS), as designated agencies of the NHC, submitted to the WHO the genome sequence of the novel coronavirus (2019-nCoV), which was published by the Global Initiative on Sharing All Influenza Data (GISAID) and shared globally.

January 21

— Researchers from the Institut Pasteur of Shanghai under CAS, the Institute of Military Medicine under the Academy of Military Sciences, and CAS Center for Excellence in Molecular Plant Sciences published a paper in the English version of "*Science China Life Sciences*," titled "Evolution of the Novel Coronavirus from the Ongoing Wuhan Outbreak and Modeling of Its Spike Protein for Risk of Human Transmission," evaluating the potential human-to-human transmission capacity of the virus, providing a scientific theoretical basis for confirming the source and transmission route of infection as soon as possible and formulating prevention and control strategies.

January 22

— The 2019 Novel Coronavirus Resource (2019nCoVR), a database developed by the China National Center for Bioinformation, was officially launched to release worldwide the novel coronavirus genome and information on variation analysis.

January 23

— Researchers from WIV under CAS, Wuhan Jinyintan Hospital and the Hubei Provincial CDC found that the full-length genome sequences of the 2019-nCoV shares 79.5 percent of the SARS-CoV sequence, and published their results on the bioRxiv preprint platform.

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January 24

— The National Microbiology Data Center and the National Pathogen Resources Collection Center jointly established the Novel Coronavirus National Science and Technology Resource Service System and released the first electron microscope picture of the virus together with strain information.

January 29

— A thesis on the genome sequence of the novel coronavirus by a research team of the WIV of CAS was formally accepted by the journal *Nature*.

— Researchers from Wuhan Jinyintan Hospital, Shanghai Jiaotong University School of Medicine and WIV under CAS published an article in *The Lancet*, titled "Epidemiological and Clinical Characteristics of 99 Cases of 2019 Novel Coronavirus Pneumonia in Wuhan, China: A Descriptive Study", sharing data regarding clinical features and treatment of novel coronavirus patients.

— A research team of the Shanghai Institute of Materia Medica under CAS published an article on the bioRxiv preprint platform that gave research results about drugs by computer-simulated screening.

— Researchers of the Institute of Automation under CAS published an article on the medRxiv preprint platform, estimating the development trend of the epidemic based on daily reported novel coronavirus cases by the China CDC.

FEBRUARY 2020

February 4

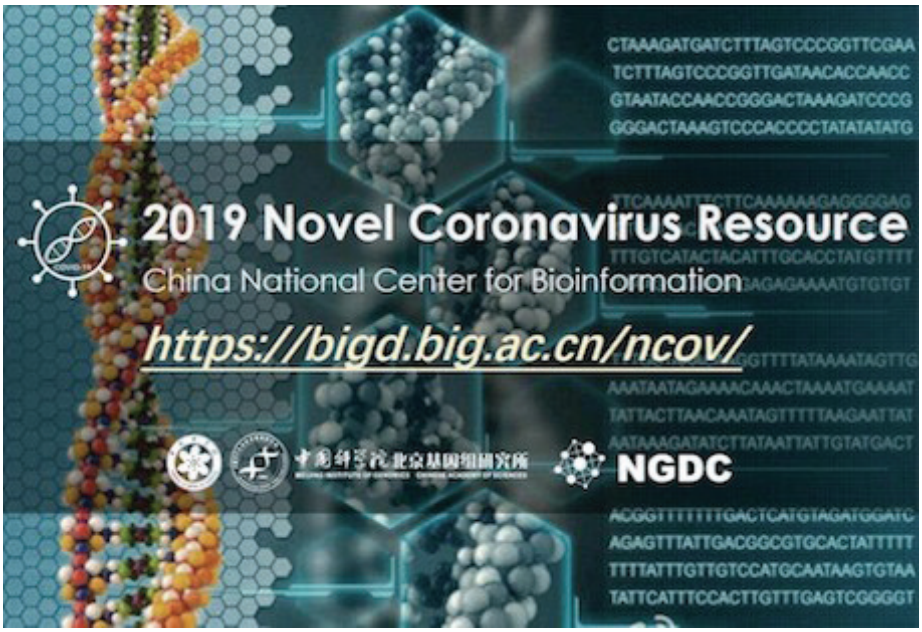
— Researchers from WIV under CAS and the Institute of Military Medicine under the Academy of Military Sciences released a paper in the journal *Cell Research* titled "Remdesivir and Chloroquine Effectively Inhibit the Recently Emerged Novel Coronavirus (2019-nCoV) in Vitro."

MARCH 2020

March 13

— Experts from the University of Science and Technology of China and its first affiliated hospital published an article titled "Pathogenic T cells and Inflammatory Storm in Severe COVID-19 Patients."

Source: Xinhua



[IMAGE: BEIJING INSTITUTE OF GENOMICS, CHINESE ACADEMY OF SCIENCES]

Resource center helps virology researchers

The Chinese Academy of Sciences' resource center, which pools all genome sequence data and related information about the novel coronavirus, has proved popular with researchers worldwide.

The 2019 Novel Coronavirus Resource Center offers free and open access for all researchers and health workers around the world to download the resources they need.

Since it began operating in late January, it has served more than 89,000 users from 158 countries and regions and has had data downloaded more than 5.1 million times, said the center's developer Bao Yiming, who is also a researcher at the China National Center for Bioinformation and the National Genomics Data Center at the Beijing Institute of Genomics, a subsidiary of CAS.

In addition to being the earliest database dedicated to COVID-19, Bao said what makes this database stand out among other existing information resources is that it also provides comprehensive information, analysis and visualized graphics of the genome variations.

The monitoring of these variations can help scientists track the development of the coronavirus — which is essential in testing the effectiveness of vaccines and antiviral drugs — and trace its origin and better grasp its transmissibility and virulence, he added.

Many novel coronavirus genome sequences have been rapidly generated worldwide. However, the information is scattered in various databases, including a few in China, the National Center for Biotechnology Information in the United States and the Global Initiative on Sharing All Influenza Data in Germany. It is highly inconvenient for users to handpick coronavirus genome sequences from different places.

"So our first task is to collect all information related to the coronavirus and then provide users with this one-stop thematic resource," Bao said, adding that they also have a quality control system to detect and report low quality data.

Scientists can find a complete collection of publications on COVID-19, and the database has partnered with the Guangdong Laboratory and Computer Network Information Center, which has developed a cloud-based diagnosis system using artificial intelligence that can help doctors diagnose COVID-19 pneumonia by simply uploading CT or X-ray images.

Bao said they have also established a data exchange mechanism with the National Center for Biotechnology Information so that submitted data will be shared more widely.

Bao said that when the database was launched, the majority of the users were from China. Now with the virus becoming a global issue, the number of overseas users has soared from less than 20 percent to more than 70 percent.

"It's also proof that our database is indeed serving the world in fighting the pandemic," he added.

Takashi Gojobori, a molecular biologist and distinguished professor at King Abdullah University of Science and Technology in Saudi Arabia, said the resource is a "very impactful achievement in such a short period".

Source: China Daily

Scientists to seek more cooperation on virus data sharing

Chinese scientists have shared scientific data related to the novel coronavirus with the world and will seek more international cooperation, said Ma Juncai, director of the World Data Center for Microorganisms, which is based in Beijing.

Ma, who is also director of the National Microbiological Data Center at the Institute of Microbiology, a subsidiary of the Chinese Academy of Sciences, said that with the epidemic now entering a mitigation phase in China, seminars are planned to communicate with international institutions and scientists to listen to their suggestions and understand their needs for data.

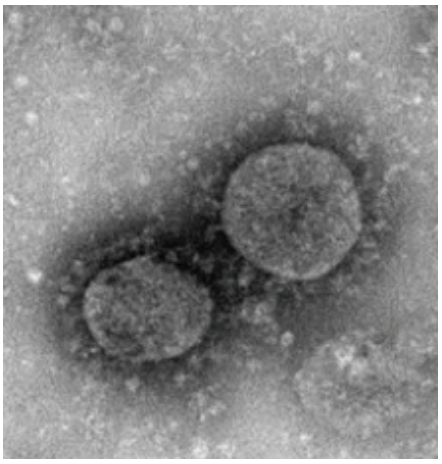
The institute is one of the Chinese scientific facilities that has published and updated novel coronavirus data in a timely manner since January.

Together with the Chinese Center for Disease Control and Prevention, it launched the Novel Coronavirus National Science and Technology Resource Service System on January 24, which unveiled data and the first microscopic pictures of a novel coronavirus strain extracted from patients.

"Information about the strain is very important. Only when the strain is isolated can development and research on vaccines and antiviral drugs be effectively carried out," Ma said, adding that as novel coronavirus pneumonia continues to affect the world, more similar information will be released.

"Therefore, we would like to develop a joint platform to put these data in a one-stop library for everyone to use," he said.

Ma said the resource service system mainly collects data garnered from independent domestic research, such as information about the strains and structure of virus proteins. It is open to all users and free to download.



The first image of the coronavirus strain extracted from a COVID-19 patient [IMAGE: NOVEL CORONAVIRUS NATIONAL SCIENCE AND TECHNOLOGY RESOURCE SERVICE SYSTEM]

From January 24 to April 2, the website received about 8 million visits from 190,000 users in 139 countries and regions, with most visitors coming from the United States, Japan and Canada.

Qi Jianxun, a researcher at the Institute of Microbiology, uploaded his findings on the structure of a key protein of the novel coronavirus, which is important for the improvement of the serology test — one of the major testing methods for novel coronavirus — to the Worldwide Protein Data Bank on February 19 and the service system on February 20.

The service system released the findings the same day they were uploaded, while the data bank released them on March 18. The information has been downloaded more than 7,000 times, and the related paper was published in *Cell*, a top peer-reviewed scientific journal focusing on life sciences, on April 7.

"I submitted my data to the protein data bank and the data center at almost the same time. I didn't expect that the center would release my data and share it with world researchers in just six hours," Qi said, adding that this could help scientists crack the virus's pathogenic mechanism in time and lay the foundation for antibody and vaccine development.

Ma said, "The timely release of data shows our openness and transparency regarding information sharing, and the large number of downloads proves the data are useful."

In order to better serve world researchers, the institute on February 18 released the Global Coronavirus Data Sharing and Analysis System, which pools 3,198 genomes of coronavirus — including the one responsible for novel coronavirus pneumonia — 33,202 sequences and 30,981 strains. It also reports where the data was collected.

In addition, the system provides tools to analyze and compare different coronaviruses, which can help researchers better trace the virus's mutations.

The Chinese Academy of Sciences also launched on March 31 the COVID-19 Pneumonia Scientific Literature Sharing Platform, which has collected 68 papers in Chinese and 62 papers in English written by Chinese researchers and will provide an important reference for coronavirus research.

"During the epidemic, we mainly published and shared China's microbiological scientific data via websites," said Qian Wei, head of the institute. "For upcoming challenges, we will cooperate with international organizations, microbiological research institutions and scientists to develop a big data platform to provide support for world health."

Source: China Daily

A staff member adjusts equipment at a vaccine production plant of China National Pharmaceutical Group Co., Ltd. (Sinopharm) in Beijing, capital of China, April 10, 2020. [IMAGE: XINHUA/ZHANG YUWEI]

China approves three COVID-19 vaccines for clinical trials

China has approved three COVID-19 vaccine candidates for clinical trials, said an official with the Ministry of Science and Technology (MOST) on April 14.

An adenovirus vector vaccine, developed by a research team led by Chen Wei, an academician with the Chinese Academy of Engineering and a researcher at the Institute of Military Medicine under the Academy of Military Sciences, was the first to be approved for clinical trials, said Wu Yuanbin, MOST director-general of science and technology for social development with, at a press conference.

The first phase of the clinical trial was completed at the end of March, and the second phase started on April 12.

It is the first COVID-19 vaccine in the world that has entered the second phase of clinical trials, according to the World Health Organization.

Accompanied by his daughter, Xiong Zhengxing, an 84-year-old man in Wuhan, was vaccinated on April 13, becoming the oldest volunteer in the second phase of the clinical trial.

Compared with the first phase, the second phase has removed the age ceiling and will enroll volunteers over 60.

As the elderly make up a high percentage of severely ill COVID-19 patients, the vaccine should build a safety shield for them, Chen said.

Taking the modified defective adenovirus as the vector, the vaccine carries the gene of the coronavirus spike protein, the major surface protein used by the virus to bind to a receptor to invade cells, so that the subject's body will produce the immunological memory of the protein. When the real coronavirus attacks, the body will identify its spike protein and stop its invasion, according to Chen.

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The 108 volunteers who completed the first phase of the clinical trial on March 27 have ended centralized medical observation and are in good condition.

The second phase will recruit 500 volunteers and introduce a placebo control group to further evaluate the immunogenicity and safety of the vaccine. As of 5 p.m. on April 13, 273 volunteers had been vaccinated.

An inactivated vaccine candidate developed by the Wuhan Institute of Biological Products under the China National Pharmaceutical Group (Sinopharm) and the Wuhan Institute of Virology under the Chinese Academy of Sciences was approved for clinical trials on April 12, Wu said.

Another inactivated vaccine candidate developed by Sinovac Research and Development Co., Ltd., a company based in Beijing, was approved on April 13, he added.

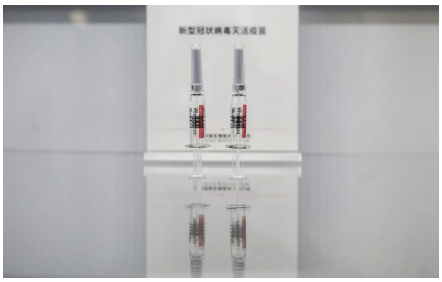
Using inert pathogenic microorganisms to enhance the immunogenicity, inactivated vaccines have advantages of mature production process, controllable quality standards and wide protection range, according to Wang Junzhi, an academician with the Chinese Academy of Engineering.

To produce the vaccine, researchers cultivated live viruses on a large scale in P3 laboratories, which have relatively high biosafety standards, Wang said.

Experts have been invited to give whole-process direction in the preclinical animal experiments of the vaccines, including acute toxicity experiments, repeated toxicity experiments and immunogenicity experiments, he said.

Sample vaccines for clinical trials have passed inspections by the Food and Drug Administration and the National Institutes for Food and Drug Control, he added.

China has laid a solid foundation for research into inactivated vaccines over recent years. Inactivated vaccines have been widely used to fight hepatitis A, influenza, hand-foot-and-mouth disease and poliomyelitis, he said.



Samples of the COVID-19 inactivated vaccine are seen at Sinovac Biotech Ltd., in Beijing, capital of China, March 16, 2020. [IMAGE: XINHUA/ZHANG YUWEI]

A staff member tests samples of the COVID-19 inactivated vaccine at a vaccine production plant of China National Pharmaceutical Group Co., Ltd. (Sinopharm) in Beijing, capital of China, April 11, 2020. [IMAGE: XINHUA/ZHANG YUWEI]

The safety and effectiveness of inactivated vaccines can be judged by internationally accepted standards, Wu said.

Five approaches to vaccines

Wu said China adopted the following five technological approaches to develop COVID-19 vaccines: inactivated vaccines, recombinant protein vaccines, adenovirus vector vaccines, nucleic acid vaccines and vaccines using attenuated influenza viruses as vectors.

Aside from the adenovirus vector vaccine and inactivated vaccine, vaccines of other technical routes are also advancing rapidly.

The strains have been constructed and quality inspection methods have been set up for the vaccine using attenuated influenza viruses. Pilot production, animal poison attack experiments and safety evaluation experiments will be carried out in the same period, according to Wu.

The recombinant protein vaccine has completed construction of the virus species, and is carrying out the genetic stability inspection, animal experiments and safety evaluation, Wu said.

The nucleic acid vaccine has also entered the research stage of animal experiments and safety evaluation, and the preparation and quality inspection of samples for clinical trials are being carried out simultaneously, he said.

He added that these vaccine candidates are expected to apply for clinical trials in April and May.

China has accelerated the approval procedures for COVID-19 vaccines that have demonstrated safety and efficacy. The seamless connection between research and approval is the major reason behind the fast development of vaccines, according to Wang.

Stressing safety as a priority, Wang said clinical trials of a vaccine usually undergo three phases.

The first phase enrolls dozens of volunteers to test the safety of the vaccine and the human body's tolerance to different doses. The second phase will expand the subjects to hundreds of volunteers to further verify its efficacy and safety. The third phase may involve thousands or even tens of thousands of people and last for an epidemic cycle to finally determine its effectiveness and provide a scientific basis for approval for clinical use, Wang said.

"We look forward to seeing a breakthrough in China's vaccine research and development, so that safe and effective vaccines can be put to use as soon as possible," he said.

Source: Xinhua

Breakthrough in study of G protein specificity mechanism

G protein-coupled receptors (GPCRs) play essential roles in cell signal transduction and serve as important therapeutic targets for a large number of diseases. Upon binding to extracellular agonists, GPCRs stimulate various signaling pathways by recruiting different G proteins (Gs, Gi, Gq, etc.) to mediate a wide variety of physiological functions. The selective coupling between a GPCR and specific G proteins is critical for the biological action of the receptor.

However, the molecular details that define how an individual GPCR recognizes different G protein subtypes remain elusive, thus limiting the understanding of mechanisms of GPCR signal transduction.

In a study published in *Science* on March 20, a group led by Wu Beili and Zhao Qiang at the Shanghai Institute of Materia Medica (SIMM) of the Chinese Academy of Sciences (CAS), a group led by Sun Fei at the Institute of Biophysics of CAS, and a group led by Denise Wootten from Monash University determined two cryo-electron microscopy (cryo-EM) structures of the human glucagon receptor (GCGR) in complex with its cognate agonist glucagon and distinct classes of G proteins, Gs or Gi.

These structures, for the first time, provide a detailed molecular map of interaction patterns between a GPCR and different G protein subtypes, and unexpectedly disclose many molecular features that govern G protein specificity, thereby greatly deepening the understanding of GPCR signaling mechanisms.

GCGR, a member of the class B GPCR family, is critical to glucose homeostasis in that it triggers the release of glucose from the liver, making it a potential drug target for type 2 diabetes and obesity.

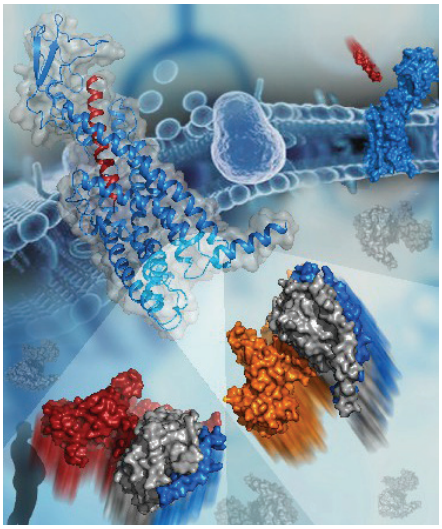


Fig. 1 The newly published science research article reports the cryo-EM structures of GCGR that play a key role in glucose homeostasis and serves as an important drug target for type 2 diabetes. The image shows the active structure of GCGR bound to glucagon (blue and red cartoon, top left corner). The two g proteins that bind to GCGR are shown as surfaces at the bottom. The subunits of Gs are colored orange, gray, and blue. The subunits of Gi are colored red, gray, and blue.
[IMAGE: DOCTOR HAN SHUO OF THE SHANGHAI INSTITUTE OF MATERIA MEDICA, CHINESE ACADEMY OF SCIENCES]

Although GCGR canonically exerts its physiological action through Gs signaling, it can also couple to other G proteins such as Gi and Gq, leading to diverse cellular responses. In 2017 and 2018, the scientists at SIMM determined the crystal structures of the full-length GCGR bound to a negative allosteric modulator or a partial peptide agonist, providing insights into signal recognition and modulation of class B GPCRs.

SIMM scientists have now made further progress by solving the complex structures of GCGR bound to two transducer proteins with opposing biological activities. This study offers valuable insights into pleiotropic GPCR-G protein coupling and G protein specificity. Notably, it reveals that the sixth trans-membrane helix (helix VI) of GCGR adopts a similar outward shift in the two G protein-bound GCGR structures, forming a common binding cavity to accommodate Gs and Gi. This is contrary to the hypothesis based on the previously determined GPCR-G protein complex structures, which proposed that the positional difference of helix VI is a major discriminator in the coupling specificity of Gs and Gi.

The common G protein binding pocket observed in the GCGR-G protein complex structures is consistent with the signaling pleiotropy of GCGR and allows for maximal efficiency in activating various pathways. Although GCGR couples to both G proteins through the common pocket, it does so with different interaction patterns, which account for G protein specificity. The measured interaction interface between GCGR and Gs is much larger than for Gi, resulting in higher binding affinity of Gs to the receptor. This offers a structural basis for the preferential coupling of GCGR to Gs.

Based on the structures of GCGR-Gs and GCGR-Gi complexes, the scientists performed extensive functional studies using techniques such as mutagenesis, G protein activation and cell signaling to investigate the roles of key residues in the receptor-G protein binding interface in Gs and Gi activation.

The results show that conformational differences of intracellular loops and residue side chains in the receptor are sufficient to guide G protein selectivity. The interactions contributed by the second intracellular loop (ICL2) and helix VII/VIII junction of the receptor play a crucial role in Gs coupling, while the other two intracellular loops, ICL1 and ICL3,

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Novel high energy-density aqueous battery successfully developed

Recent years have seen a growing development of aqueous batteries featuring high safety, low cost, and excellent performance. However, they are facing great challenges in large scale applications due to their low working voltage and energy density, which are caused by the narrow electrochemical window of aqueous electrolyte (1.23 V) and low specific capacities of traditional intercalation-type electrodes.

Recently, a research team led by Professor Liu Yu and Chi Xiaowei from the Shanghai Institute of Ceramics innovatively proposed a high-energy-density (1503 Wh kg-1 calculated from the cathode active material) aqueous battery system achieved by dual dissolution/deposition reactions separated in acid-alkaline electrolyte. An acid-alkaline dual electrolyte separated by an ion-selective membrane successfully expands the electrochemical window of electrolyte to 3 V, and also enables two dissolution/deposition electrode redox reactions of MnO_2/Mn^{2+} and $Zn/Zn(OH)_4^{2-}$ with respective theoretical specific capacities of 616 mAh g-1 and 820 mAh g-1.

The newly proposed Zn-Mn^{2+} aqueous battery shows high coulombic efficiency of 98.4 percent and cycling stability of 97.5 percent of discharge capacity retention for 1500 cycles. Furthermore, the excellent stability of 99.5 percent of discharge capacity retention for 6000 cycles is achieved in the flow battery based on the Zn-Mn^{2+} pairs.

Related research results were published in *Advanced Energy Materials* (2020, DOI: 10.1002/aenm.201903589) and selected to be featured on the inside cover of the journal. This work provides a new approach for the development of novel aqueous batteries with high voltage and energy density.

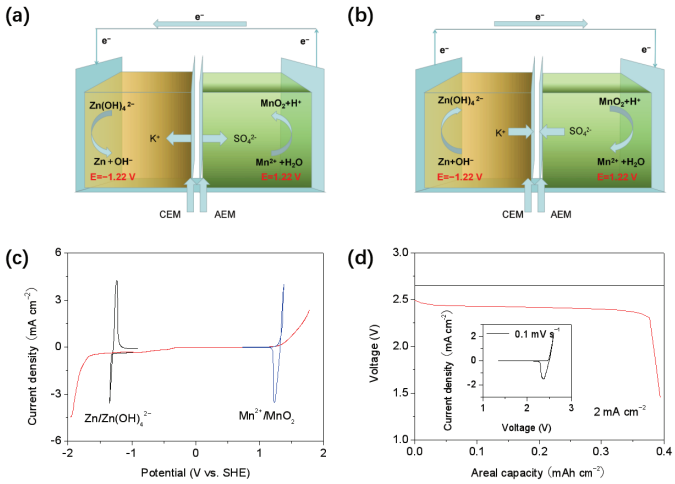

Fig. 1 Schematic illustration and mechanism of a Zn-Mn^{2+} battery using an acid-alkaline dual electrolyte

The first author of this work is Liu Chang, a PhD student from the Shanghai Institute of Ceramics. His supervisor is Professor Liu Yu.

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Shanghai Institute of Ceramics, Chinese Academy of Sciences

Source: Shanghai Institute of Ceramics, Chinese Academy of Sciences

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and the receptor hydrophobic intracellular binding cavity are more important for Gi recognition.

These findings extend knowledge of GPCR activation, pleiotropic coupling, and G protein specificity. They also present new opportunities for drug discovery by designing biased ligands to selectively block one specific signaling pathway, thus resulting in reduced side effects.

The corresponding authors of the paper are Doctor Wu Beili and Doctor Zhao Qiang from SIMM, Doctor Sun Fei from IBP, and Doctor Denise Wootten from Monash University. Other notable investigators include Doctor Wang Mingwei, Yang Dehua, Qiao Anna, and Han Shuo from SIMM, Doctor Patrick M. Sexton and Zhao Peishen from Monash University, graduate student Li Xinmei from IBP, and graduate student Li Zhixin from the School of Pharmacy of Fudan University.

The study was funded by the Ministry of Science and Technology of China, the National Science Foundation of China, the Chinese Academy of Sciences, the Shanghai Science and Technology Development Fund and the Australian National Health and Medical Research Council.

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Source: Shanghai Institute of Materia Medica, Chinese Academy of Sciences

TWAS calls for global collaboration to combat COVID-19 pandemic

The World Academy of Sciences (TWAS) for the advancement of science in developing countries issued a global call this week, recognizing the essential need for the global research community to act collectively to control the spread of the novel coronavirus.

The statement calls for international collaboration, especially South-South collaboration between developing countries, both during the COVID-19 pandemic and in its aftermath, to provide developing nations with expertise and scientific knowledge to respond to this crisis and guard against similar future events.

TWAS emphasizes that efforts to use scientific research to contain the virus must be inclusive of countries in the developing world, with an eye toward strengthening capacity for scientific research in the least-developed countries.

"International collaboration in combating the pandemic is key," said the TWAS council, "and mitigating the disease's impact depends on joint efforts inclusive of developing countries."

TWAS calls on scientists, universities and research institutions in developing countries with specific experience and expertise in mitigating outbreaks of infectious diseases to play a part in finding solutions to the pandemic.

National governments and Academies of Science in countries that have successfully responded to COVID-19 should exchange best practices in controlling the disease, according to the statement. "To date, some countries, like China, have actively shared valuable experiences and provided necessary support to many countries," said the statement.

TWAS calls upon more research institutions and policymakers in countries that are successful against COVID-19 to share best practices with countries still fighting the pandemic, and to include developing countries in opportunities to both acquire and share these "lessons learned".

Founded in 1983 as a non-governmental, non-political and non-profitable international science body, TWAS works to support sustainable prosperity through research, education, policy and diplomacy. It is a global science academy based in Trieste, Italy.

TWAS now has 1,278 elected Fellows representing more than 100 countries; 14 of them are Nobel laureates. About 84 percent come from developing nations, and the rest are scientists and engineers from the developed world whose work has had a significant impact in southern regions.

Source: Chinese Academy of Sciences

The critical need for international cooperation during COVID-19 pandemic

As novel coronavirus spreads throughout the world and the number of cases and deaths continues to rise, almost no country or community remains untouched by this rapidly evolving threat. Dramatic and urgent actions are underway at all levels in the world's societies to limit the spread of COVID-19, identify new infections, take care of the sick and prevent death, reduce social and economic disruptions, and meet basic human needs. Looming uncertainties remain and much needs to be done. Seventeen national science and medical academies from across the globe released a joint statement on April 8, emphasizing the importance of international cooperation at this critical time to ensure the following needs are met.

1. Rapid, accurate, and transparent international communication about the unfolding epidemiology of this novel viral disease, including patterns of transmission, incubation period and lethality, and the efficacy of various methods of intervention.

2. Real-time sharing of detailed scientific information about the virus, the pathophysiology of the disease it causes and the human immunologic response, the virus's origins, genetics, and mutations, and coordinated activities to advance knowledge in all of these areas.

3. Sharing of information about research and development of medical products to deal with the disease, along with collaborative efforts to advance this vital R&D.

4. Recognition of our mutual reliance, coordination and alignment of the regulatory and manufacturing processes and quality standards required to accelerate availability of reliable personal protective equipment, diagnostic testing devices, and medical treatment capacity.

5. Collaborative efforts to undertake rapid but evidence-based analysis of emerging concerns or discrete program and policy issues that may emerge as the global pandemic progresses.

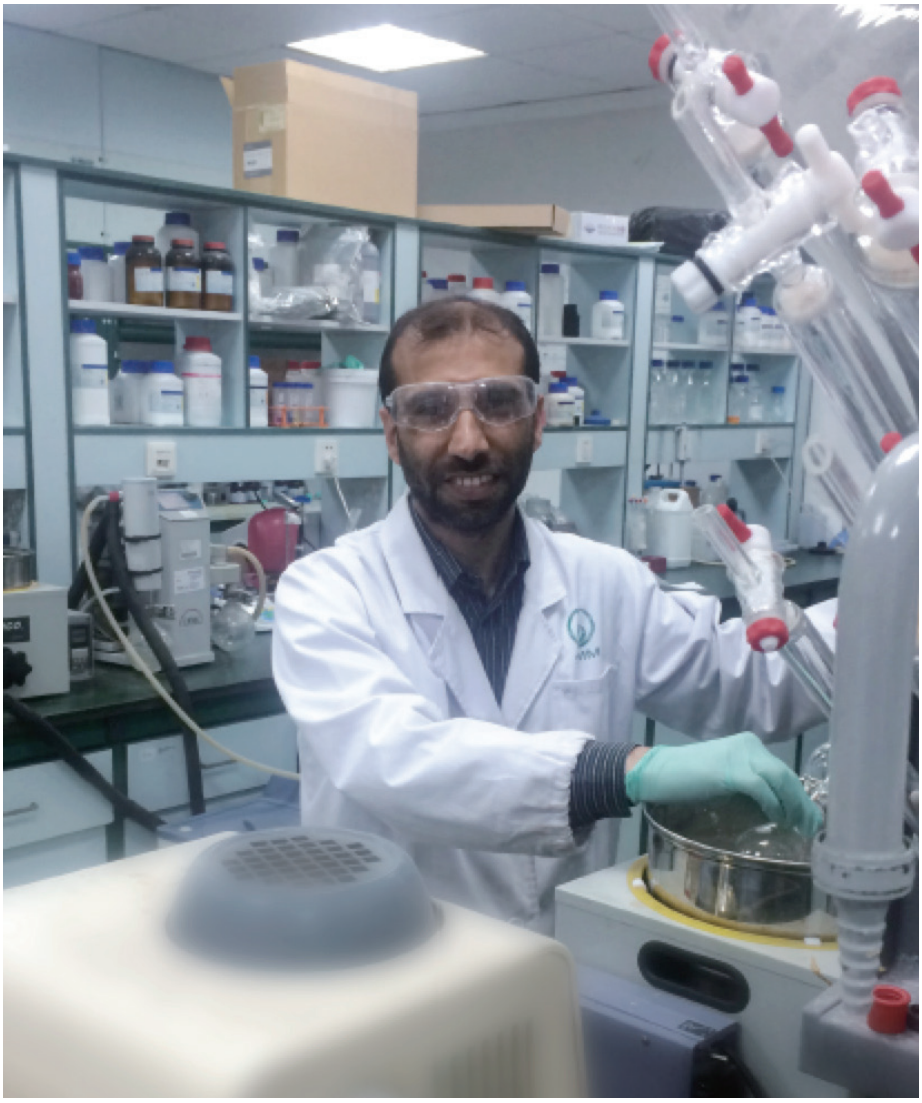
6. Coordinated development of consistent evidence-based guidance, messaging and communications for the public and policymakers in rapidly-changing circumstances.

Source: National Academies of Sciences, Engineering, and Medicine

Life experience in China

On May 16, 2016, I landed at Pudong International Airport in Shanghai. The plane arrived on time and Feng Tang and Yang Yang, my lab fellows, warmly welcomed me at the airport and took me to my apartment. It was about 6:00 pm when I reached my final destination. The next day, Feng Tang took me to Bofeng Jiang's office, and from that day on she helped me to do all the initial documentation and then started processing my application for a resident permit.

It was an amazing experience and honor to be the first foreign postdoctoral fellow in Professor Huang's lab. My first day at the lab was unforgettable. I was quite astonished and happy to see the honor given by my lab mates. Before my joining, all the presentations were conducted in the Chinese language, but soon after my arrival, Professor Huang Wei made it compulsory for all the students to speak and present their work in English. It was a good idea for the Chinese students and an excellent opportunity to learn English. During the lab work and daily communication, I started to learn Chinese but I regret to say that I could not make it. The life in the lab was normal but whenever I had to travel outside the school and to buy something, the language was always a big hurdle. The online shopping and payments with Alipay and WeChat solved the problem of buying stuff to some extent. At the beginning, it was a little hard to be far from my family but after around four months my family joined me in Shanghai. We visited many places in Shanghai but unfortunately, my family and I did not get an opportunity to travel outside of Shanghai to further explore the great country of China. My wife and I were highly impressed by Chinese hospitality. Most of the time people gave up their seats for us on metro trains. My two sons got a lot of love from the people living around our apartment and working in the nearby shops. It was always an embarrassing moment for me when people met with us and were telling us something, and we did not understand them. The most impressive and loving person I have ever met in China is the manager of our apartments. He helped us on so many occasions and always met my children with a big smile on his face.



[IMAGE: FARIDOON, SHANGHAI INSTITUTE OF MATERIA MEDICA, CHINESE ACADEMY OF SCIENCES]

In short, I have lived in Australia and South Africa but the respect and love I got here in China is unforgettable. The only thing which prevented me away from completely merging into the culture, ideology and tradition of China was difficulties with the Chinese language. Finally, I would like to thank the Chinese Academy of Sciences for my fellowship, the Shanghai Institute of Materia Medica, Professor Huang Wei and all my lab fellows for being such nice company in China.

Source: Faridoon, Shanghai Institute of Materia Medica, Chinese Academy of Sciences

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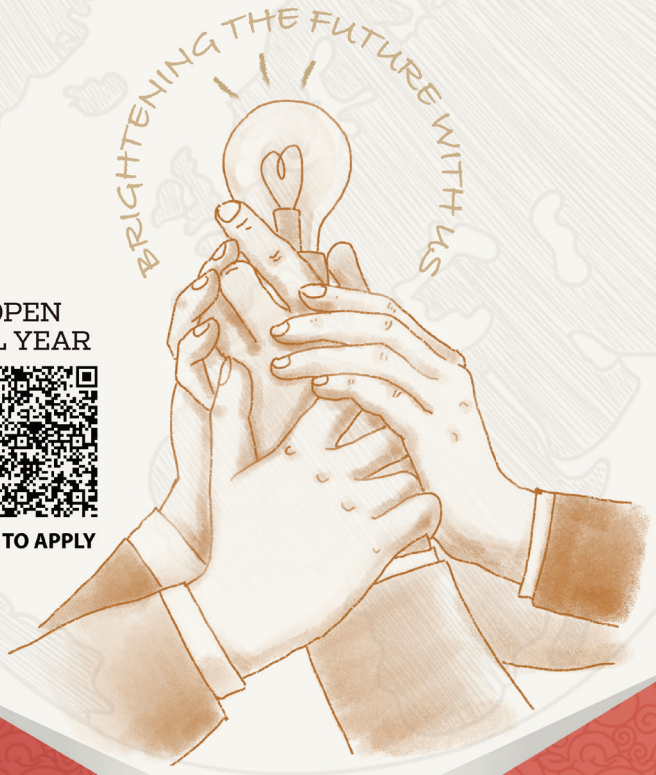

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