FIGHTING COVID-19

TSINGHUA UNIVERSITY IN ACTION

COVID-19 is currently causing disruption around the world and has rapidly expanded into a global challenge of unprecedented scale. Tsinghua University cherishes the life and health of all students, faculty and staff members. The community has responded through prudent and timely measures, helping reassure the general public and contributing to prevention and control work.

At this critical time, Tsinghua University stands with our global partners and is ready to work together to minimize disruption to collaborative activities, exchange best practice, promote inclusive online learning and share resources in the spirit of mutual learning and support.

清华大学
Tsinghua University

March 26, 2020

Scientific Research

"Science and technology are the most powerful weapon in humanity's battle against diseases. Mankind can not defeat a major disaster or epidemic without scientific development and technological innovation."

—— *Xi Jinping*
President of the People's Republic of China

On March 2, Chinese President Xi Jinping inspected the scientific research on the novel coronavirus disease (COVID-19) as well as the diagnosis and treatment of the disease during his visit to Tsinghua University.

Tsinghua launched a pilot research program for virus prevention. Over 70 research project applications have been received since January 30.

Research continues in advancing basic medical research and vaccine research, with a focus on assisted diagnosis, assisted medical care, and new test kits and equipment.

On March 13, the 18th Symposium on Scientific Research was launched, focusing on innovation in research models. The Symposium also stressed that COVID-19 research must be taken as a major and pressing task.
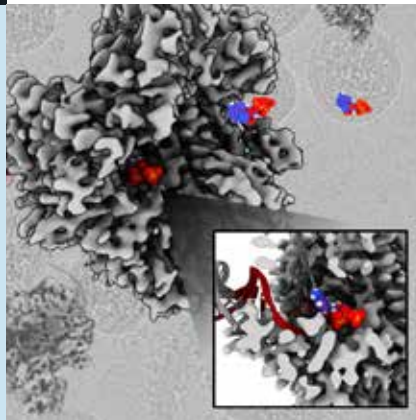
Scientific Research

COVID-19 antibody and vaccine

Research teams led by Professor Zhang Linqi from the School of Medicine have been identifying neutralizing antibodies from convalescent patients and developing safe and effective treatments for COVID-19. Together with Professor Wang Xinquan from the School of Life Sciences, Professor Zhang resolved the crystal structure of COVID-19 RBD in complex with receptor ACE2, providing structural insight and identifying the precise target for vaccine design. In collaboration with Dr. Zhang Zheng at the Shenzhen Third People's Hospital, Professor Zhang and his team have isolated several potent human neutralizing monoclonal antibodies from recovered patients, providing promising candidates for antibody-based prophylactic and therapeutic intervention against COVID-19.

Uncovering COVID-19 replication transcription machinery

Professor Rao Zihe's team and Shanghai Tech University's team were the first in the world to decode the exact architecture of the RdRp-nsp7-nsp8 at the atomic level, uncovering the RNA-synthesis machinery and providing a basis for drug development.

Understanding human adaptive immunity to SARS-CoV-2

Professor Dong Chen's team collaborated with Chui Yang Liu Hospital, which is affiliated with Tsinghua University, and the China Academy of Military Medical Sciences to analyze blood samples from discharged COVID-19 patients. They found that both humoral and cellular immunity participate in immune-mediated protection to viral infection. However, two-week-post discharged patients exhibited high titers of IgG antibodies, but with low levels of virus-specific T cells. This study lays the theoretical foundation for the diagnosis and traceability of infected patients as well as the development of therapeutic antibody drugs and vaccine research.
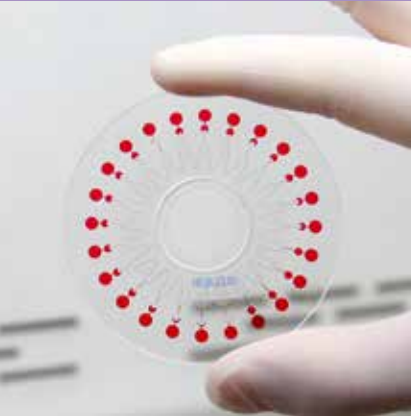
Scientific Research

Providing drug discovery capabilities and resources

The Global Health Drug Discovery Institute (GHDDI) and Tsinghua's School of Pharmaceutical Sciences joined forces to provide drug discovery capabilities and resources to all researchers working on COVID-19 treatment, accelerating the process of drug discovery for this deadly viral disease.

Respiratory virus nucleic acid detection kit

Professor Cheng Jing's team worked with the West China Hospital of Sichuan University and CapitalBio Corporation to successfully develop the Respiratory Virus Nucleic Acid Detection Kit (Isothermal Amplification on Disk Chip), the first in the world to detect six types of respiratory virus simultaneously within 1.5 hours. The kit, which includes SARS-CoV-2 among the six viruses, provides patients with quick and accurate diagnosis. Soon after National Medical Products Administration approval, Tsinghua provided Wuhan with four sets of testing equipment and donated testing chips and reagent for 12,000 persons.

COVID-19 intelligent medical system

Professor Dong Jiahong led a medical engineering team that developed a COVID-19 intelligent medical system, using big data, IoT, and AI technology to create an integrated solution for community network monitoring for virus control, intelligent medical technology, and post-hospital patient monitoring. In late February, Tsinghua donated the proprietary COVID-19 intelligent control and prevention system to the Wuhan Municipal Government and medical institutions, which was entered into use at eight COVID-19 hospitals, one cabin hospital, and 72 quarantine zones.

Scientific Research

Lin Borong and Liu Li's teams from the School of Architecture developed an online monitoring and early warning system for high density indoor environments for use in key treatment areas in the Huoshenshan and Leishenshan hospitals, Jinyingtan Hospital and two other cabin quarantine/severe case hospitals.

Li Bo's team from Tsinghua Shenzhen International Graduate School and Wu Hui's team from the School of Materials Science and Engineering developed a reusable mask using nanofiber materials, addressing mask shortages.

The teams from the Institute of Nuclear and New Energy Technology (INET) and CGN Nuclear Technology Development Co. Ltd. (CGNNT) developed electron beam irradiation as a substitute for ethylene oxide (ETO) to disinfect disposable medical protective clothing. This technology can also be used to treat hospital wastewater, which could be contaminated by coronavirus.

The team of Associate Professor Luo Haiyun from the Department of Electrical Engineering made new progress in the field of air disinfection for buildings. The newly developed electro-magnetic disinfection module can quickly and effectively kill many kinds of bacteria and viruses including COVID-19.

Professor Zheng Gangtie from the School of Aerospace Engineering researched a robot that patrols isolation wards, enabling medical professionals to monitor temperature and auscultation remotely, reducing risk to medical professionals. The robot is in trial use at facilities including Beijing Ditan Hospital.

Professor Liu Xinjun's team from the Department of Mechanical Engineering has developed a robotic system capable of unmanned rapid temperature detection. The accuracy of temperature measurement reaches 0.2℃ . This system can complete the temperature detection of the driver and passengers in a vehicle within 20 seconds, and can be applied to various scenarios such as highways, airports, checkpoints, and different entrances.

Education

January 26

The University decided to postpone the start of the 2020 Spring Semester.

January 29

The University released a letter reminding students, faculty and staff members of the guidelines to combat and prevent the epidemic.

February 1

The University released the Notice to Adjust the Teaching Schedule for the Spring Semester.

February 3

Over 50,000 Tsinghua students, faculty, staff members and alumni representatives attended a special lecture through a live broadcast.

February 17

The spring semester began online at Tsinghua as scheduled.

3,923 online sessions

2,503 faculty members

25,561 students

During this period, three expert teams and one special working team have been set up to provide support for online teaching and learning.

Online Education Steering Committee

Online Education Quality Assurance Committee

Online Education Technology Support Committee

Student Support Working Group

Education

"Special thanks goes to the teachers from the online teaching technical support expert group and the writing center's lesson preparation group for their help and inspiration, so that we can design online courses without further worries."

—— Deng Geng
Lecturer from the School of Humanities

"I think the system worked better than I had expected. This remote teaching may lead to more student participation since some of them may be less shy speaking online than in the classroom. The classroom is better for discussion and debate."

—— William Rosoff
Professor from the School of Law

"Overall, it was a very good experience. There were students from all over the world and we could all communicate clearly. Considering the very challenging times we are passing through, this seems to be a very good solution."

—— Ana Paula Perrone Kasznar
First-year graduate student from the Global Environmental Leadership Program

Online Thesis Defense

Graduation will continue despite COVID-19. On February 27, Xie Wenwen, from the School of Aerospace Engineering became the first Ph.D. candidate at Tsinghua to defend his dissertation online.

By March 21, 42 postgraduate students had finished their thesis defense online, comprising 26 doctoral students and 16 master's students.

Social Engagement

Volunteer Service

Thousands of Tsinghua volunteers, both online and offline, organized a diverse range of activities to promote epidemic prevention and support education. Some volunteers extended academic support to the children of frontline medical staff, and high school seniors from underprivileged backgrounds who are preparing for the college entrance examination. Other volunteers donated blood, and contributed to county and village level epidemic prevention.

Medical Support

On January 27, a medical team of 11 nurses and doctors from the Beijing Tsinghua Changgung Hospital left to help fight the coronavirus in Wuhan.

Psychological Assistance

Since January 25, Tsinghua's Department of Psychology launched the COVID-19 Psychological First Aid program, providing professional training and guidance for 3,000 volunteers, promoting psychology basics to 720,000 frontline medical workers and citizens, and offering one-on-one counseling for 5,351 people thus far.

On January 28, the Center for Counseling and Psychological Development launched a telephone hotline for Tsinghua students, which was recommended by the 'Mayor of Beijing Hotline' (12345) and expanded its services to local Beijing citizens.

Social Engagement

Cloned Courses

Tsinghua opened up courses to institutions impacted by the pandemic. For example, Wuhan University and Huazhong University of Science and Technology have adopted some of our courses, through the "clone course" mechanism. So far, the initiative has reached more than 2,800 students across 5 universities.

Online Job Fair

From March 16 to 20, Tsinghua launched a large-scale online career fair with 126 universities in Hubei to provide more than 30,000 positions for graduates from all over China seeking jobs this summer.

So far, the Career Development Center of Tsinghua has posted almost 2,000 job listings, attracted over 100 employers to recruit online, held 40 online recruitment talks for more than 7,000 students, and provided a dozen online career coaching sessions.

126
universities in Hubei

>30,000
positions for graduates

40
online recruitment talks

2,000
job listings

>100
employers

>7,000
students

International exchange

Tsinghua is actively sharing experience in overcoming the disruption caused by COVID-19. The University has conducted various online conferences with global partners, including UNESCO, Politecnico di Milano and Technical University of Munich, exchanging views on emergency responses to the epidemic. An online forum on universities combating COVID-19 will be held on March 27 with over ten universities taking part.

The virus knows no borders and the epidemic is the common enemy of mankind. We firmly believe that, through collective strength and partnerships, we will achieve victory against the epidemic and safeguard global public health and well-being.

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