

ENGINEERING MEDICAL BRILLIANCE

Drawing on its 115-year history, Xiangya Hospital of Central South University (XYH) is poised to make a difference with **WORLD-CLASS BASIC AND CLINICAL RESEARCH**.

Located in Changsha, the capital of China's Hunan province, Xiangya Hospital of Central South University (XYH) has a history of utilizing highly engineered medical resources to benefit its patients and improve surgical techniques.

"We have a strong research and education portfolio, and in a nod to the roots of our founding in 1906, a history of leading international emergency relief missions when needed," says Guanghua Lei, XYH

president and chief physician of orthopaedic surgery.

ACCELERATING SURGICAL AND RESEARCH INNOVATION

For the past 20 years, Juyu Tang, director of XYH's department of hand and microsurgery has been focused on flap surgery, a plastic surgery technique where live tissue, with an uninterrupted blood supply, is used to close wounds. In a paper published in *Microsurgery* in 2020, Tang and colleagues discussed how

67 patients surveyed between 2008 and 2017 were treated with an innovative form of microsurgery which involves compound vastus lateralis (VL) muscle and anterolateral thigh musculocutaneous perforator flaps (ALTP) to repair soft tissue defects.

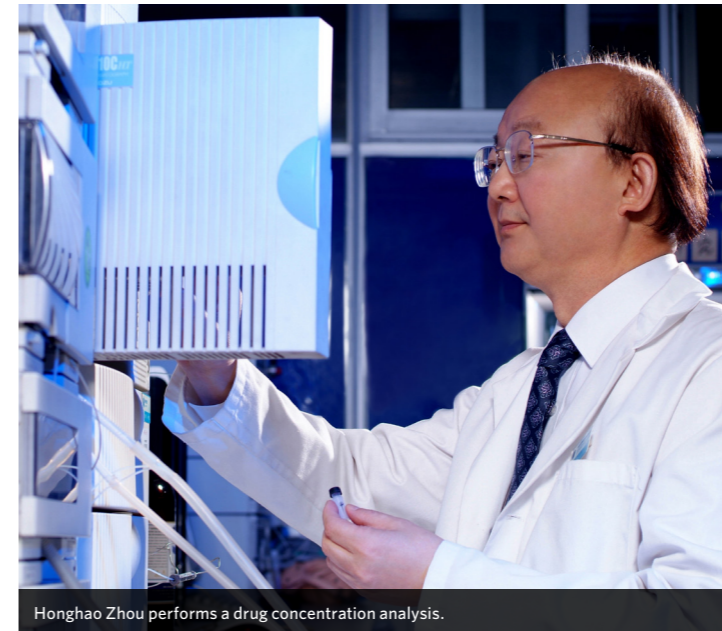
Successful surgeries for patients with some of the rarest tumours, from deep in the brain, to the main artery of the body known as the aorta, also demonstrates the skill of XYH teams. Skull base surgery, for example, exhibits the close-knit collaboration between the ear, nose and throat, and neurosurgery departments led by Xianrui Yuan and his team. Their 2020 paper describing 168 cases of petroclival meningioma was published in *Scientific Reports*. Named after the membranes that surround the brain and spinal cord, this type of tumour has close proximity to the brainstem and neurovascular structures, and as demonstrated in the study, demands microsurgical management based on tumour classification and individualized approaches. The team has also supported patients with other technically demanding brain tumours over the past two decades, including more than 2,000 successful surgical cases of acoustic neuroma (benign brain tumour), 490 of craniopharyngioma (tumours

near the hypothalamus), and 200 of complicated petroclival meningioma (tumours on the underside of the brain).

Besides using technology to improve their surgical edge, XYH also has a strong research background, including work on hereditary genes. Honghao Zhou, a member of the Chinese Academy of Engineering, is the director of the Institute of Clinical Pharmacology of Central South University. His contribution to genetic effects on high blood pressure included a patented gene chip design, which detects pathogenesis within the genetic variants of the CYP2 gene family.

Central South University's vice president, Xiang Chen, specializes in skin disease. In a paper published in *Cancer Cell* in 2020, Chen demonstrated, in mouse models, how the inhibition of the tumour gene *ADORA1* induces the upregulation of PDL1 levels. They suggest combination therapy with an *ADORA1* antagonist and a PD-1 monoclonal antibody as a potential therapeutic strategy for the treatment of melanoma and non-small cell lung cancer (NSCLC).

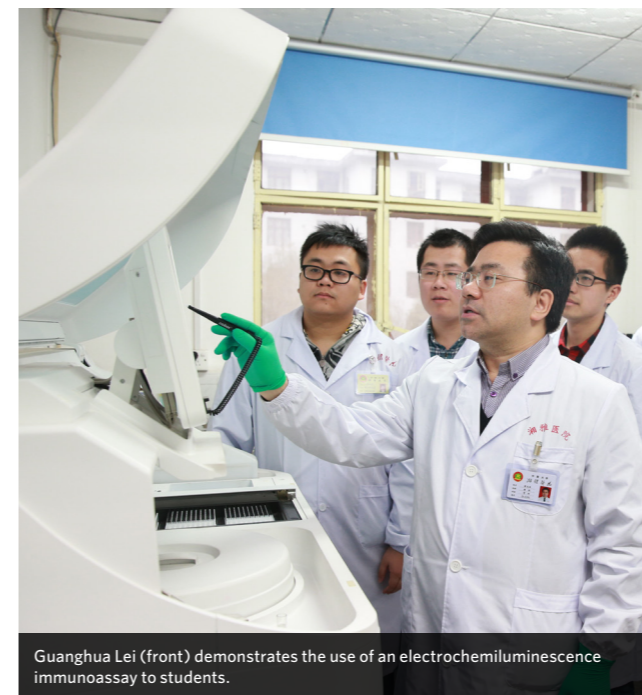
XYH president, Guanghua Lei, has been supporting international studies into the pathogenesis, treatment and prognosis of osteoarthritis, including a cohort study published in 2019 in *JAMA*



Honghao Zhou performs a drug concentration analysis.



Xiang Chen, a melanoma specialist, leads the hospital's dermatology team.



Guanghua Lei (front) demonstrates the use of an electrochemiluminescence immunoassay to students.



Juyu Tang (right) performs vessel reconstruction of the perforator flap.

FUELLING SUSTAINABLE GROWTH WITH WORLD-CLASS FACILITIES:

Class-A tertiary hospital, ranked eighth among **2,413** comprehensive hospitals in China by the National Health Commission in 2019

Top hospital in Hunan province with **seven** national key disciplines and **25 national key clinical specialties**, including neurology, neurosurgery, dermatology, orthopaedics, ENT (ear, nose and throat), geriatrics, and respiratory medicine

510,000 m² with **3,500** beds, **111** clinical medical technical departments and subspecialties, **77** wards, and **103** nursing units

Internationally advanced infrastructure including **da Vinci surgical systems**, BrainLab neuronavigational system, digital subtraction angiography, and PET-CT scan systems, radiation therapy (TomoHD and Varian)

PROMOTING OUTSTANDING EDUCATION AND EXCHANGE:

A complete teaching system from undergraduate to hospital training: **ranks eighth** in the first national evaluation of clinical education of university-affiliated hospitals in 2020, and among the first to house a national demonstration centre for clinical education

410 students have joined a two-year exchange programme with top-tier international medical schools between 2012 and 2019

Established long-term partnerships with medical schools at the University of Toronto in Canada, Lund University in Sweden, and **20 world-class institutions**.

Established dual degree programmes with **Yale University** and the **University of Michigan**

conducted together with Harvard Medical School and other institutions, which examined drug prescription patterns in 88,902 osteoarthritis patients aged 50 and over.

SAFEGUARDING PUBLIC HEALTH

Xiangya hospital has established mobile centres supporting emergency rescue during

earthquake relief efforts in Sichuan Province, and sent medical personnel to remote and poverty-stricken regions, including Xinjiang and the southwestern provinces.

More recently, the XYH team has supported China's effort in containing contagious diseases, especially in Hubei province during the COVID-19 pandemic. A total of 12 medical teams

were dispatched to support the prevention and control of the pandemic in Sierra Leone, Zimbabwe, Equatorial Guinea, and in China, including 142 doctors within Hubei province.

"As we expand our connections in Africa and beyond, we have also rapidly strengthened international exchange to expand on our basic and translational medical

innovations, welcoming students and researchers from the rest of the world, transforming the future of health care," says Lei. ■



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