

A circuit for brain research success

THE STATE KEY LABORATORY OF BRAIN AND COGNITIVE SCIENCES at The University of Hong Kong has played a big role in revealing insights about function, to improve brain and psychological health.

The human brain is a highly complex organ and the most efficient information processing system. In 2005, with the approval of the Ministry of Science and Technology of China, The University of Hong Kong (HKU) established the State Key Laboratory of Brain and Cognitive Sciences (SKLBCS) to provide a global platform for cutting-edge research on brain sciences. Since then, the SKLBCS has aimed to unravel the neurobiological mechanisms behind the most elusive brain functions. A major

focus is the neurobiological and neuropsychological mechanisms underpinning neuroplasticity which provides protection and promotion of brain and psychological health.

Aligned with the national drive on neuroscience research and promotion of psychological health and healthy ageing, research produced by SKLBCS has brought a new era of prevention and translational neuroscience.

A major push at the SKLBCS is to develop models of neurocognitive and affective processing. Such models can

then be applied to understand the epigenetic, biological and neuropsychological mechanisms underpinning normal and abnormal brain functioning.

In collaboration with scientists working on big data and machine learning, researchers at the SKLBCS aim to combine multiple sources of information to produce a coherent model for identifying challenges to brain and psychological health.

Building on established knowledge of neuroplasticity, a research team has successfully identified the key to re-programme fear circuits, which are hugely instructive for treating anxiety and phobia. Another team of researchers is investigating how traumatic memories may be re-consolidated and modulated during sleep. The findings are critical to form effective treatment for post-traumatic stress disorders.

Other significant research includes the potential therapeutic value of light therapy to modulate brain functions to ease the symptoms of depression.

"Advances in the prediction

of risks and provision of timely, individualized interventions would help control emerging disease epidemics, including dementia and depression," said Tatia Lee, director of the SKLBS. "They will also drastically reduce healthcare costs."

Through collaborations with internationally renowned brain science laboratories, and with the launch of Brain Projects in China, SKLBCS is uniquely positioned to capitalize on the latest advances in the field of system neuroscience and neuropsychology. The work of the SKLBCS has already made significant publication impact. In the foreseeable future, the SKLBCS aims to develop clinical applications for its multiple research areas.

"With great enthusiasm and excitement, we will find out how our long-term goal to translate research findings from bench to practice may ultimately impact human wellbeing," said Lee. ■



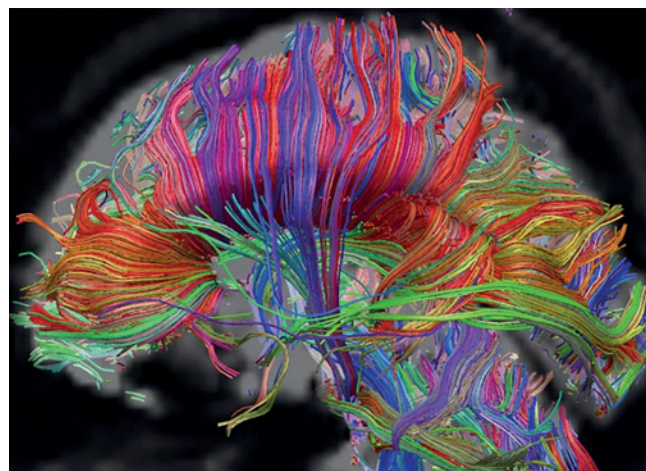
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Human brain magnetic resonance imaging from sagittal, coronal and horizontal plane



Computer simulation of white matter bundles in human brain