Epilepsy

Epilepsy is a neurological disorder that may result in loss of consciousness, abnormal limb twitching and body injuries. The disease incidence is between 20–50/100,000. A third of chronic epilepsy patients treated with antiepileptic drugs may continue to suffer from seizures, despite maximal drug therapy. These patients may benefit from a multidisciplinary evaluation for epilepsy surgery, which will be jointly undertaken with the Division of Neurosurgery.

At CUHK Medicine, we pioneered the use of intracranial electroencephalogram (EEG) in 2006 and were the first group in Hong Kong to use high-frequency oscillations in the evaluation of intracranial EEG. These new evaluation methods may benefit patients with discordant multi-modal investigations or non-lesional magnetic resonance imaging. With funding from the General Research Fund (GRF), Health and Medical Research Fund (HMRF), Innovation & Technology Fund (ITF) and Hong Kong College of Physicians (HKCP), we are undertaking electrophysiological studies related to EEG. We will also contribute towards the education of EEG and related electrophysiology certification. In addition, we are currently studying the application of Chinese herbal medicine in epilepsy.

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Multiple Sclerosis

Multiple sclerosis (MS) and neuromyelitis optica (NMO) are the most common central nervous system (CNS) demyelinating disorders affecting young adults worldwide. Although these diseases were once considered rare among Chinese people, our group has identified a rising incidence and prevalence of MS and NMO in our prospective registry. Our young research team, which consists of pathologists, radiologists, neuropsychologists, engineers and basic scientists, are developing novel MRI and immunological biomarkers, a computational platform for multimodal MRI image analysis, and neuroimmunological disease models. We are also collaborating with regional and international MS centres to set up the first Chinese MS and CNS demyelinating disease registry. At the Integrative Medical Centre of the Hong Kong Institute of Integrative Medicine, we are exploring the pragmatic use of integrative medicine in the management of chronic symptoms of MS, including fatigue and cognitive impairment.

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Neurology

Our brain and nervous system connect us to the outside world. This is why neurological diseases, which affect people in all walks of life, can be so disabling to patients and distressing to their families. From the laboratory bench to epidemiology and clinical studies, the Division of Neurology has pioneered multidisciplinary research in a number of key areas, such as stroke, dementia, Parkinson's disease, epilepsy and multiple sclerosis in Asia and across the world. In particular, our studies in intracranial vascular disease, cerebral small vessel disease and *in vivo* Alzheimer's pathology imaging in post-stroke dementia have been internationally recognised with numerous awards and in leading journals.

DEPARTMENT OF MEDICINE AND THERAPEUTICS
NEUROLOGY

"We endeavour to make a difference in the field of neurology by conducting high quality research to unravel disease mechanisms, explore novel diagnostic and treatment methods and, equally important, translate research breakthroughs into daily clinical practices. These goals can only be achieved through strong collaboration with our international and local partners as well as the development of future generations of clinician-scientists."

Vincent Chung Tong MOK
Head of Division

Cerebrovascular Disease

Cerebrovascular disease is a leading cause of disability and mortality globally. Our team was the first to reveal intracranial atherosclerosis as the most common stroke aetiology in Asians and to elucidate its stroke mechanism in depth.

We focus on the pathogenesis, neuroimaging and treatment of major stroke subtypes in Chinese populations. Through collaboration with stroke experts around the world, we perform randomised multi-centre clinical trials on low-molecular-weight heparin, dual-antiplatelet and statin therapy, as well as endovascular revascularisation for patients with high-grade cranio-cervical steno-occlusive lesions. Our discoveries have received international and national awards, and our research findings have been published in high-impact international journals, including the *New England Journal of Medicine,* the *Lancet Neurology, Annals of Neurology, Neurology, Stroke, Journal of Neurology, Neurosurgery & Psychiatry,* and *Journal of Cerebral Blood Flow & Metabolism.*

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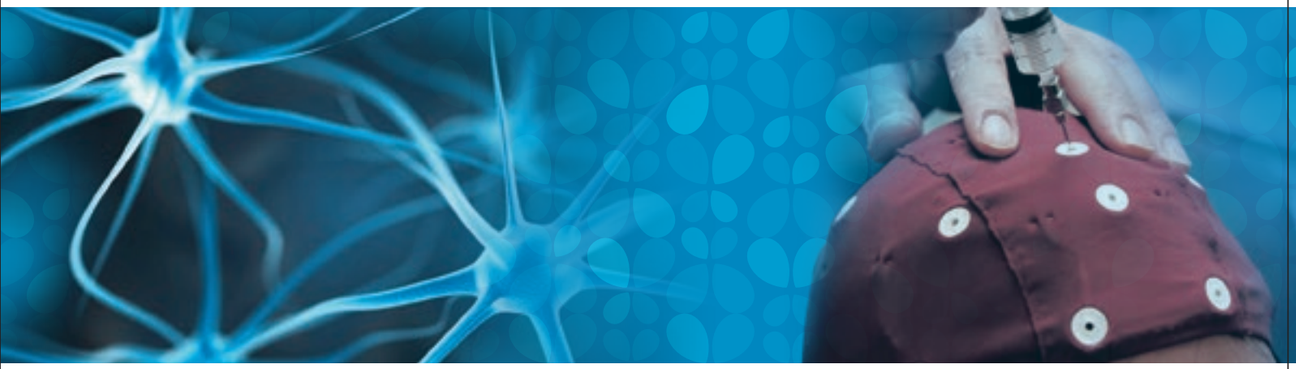

Cognitive Disorders

Cognitive impairment and dementia represent an enormous healthcare burden in the ageing population worldwide, and especially in mainland China. Driven by a multidisciplinary approach that includes clinical neurology, neuropsychology, radiology, engineering and experimental neuroscience, our group has pioneered research in cerebral small vessel disease and vascular cognitive disorders in Asia and internationally. We are the first group in the world to study the interface between stroke and Alzheimer's disease, using cutting edge *in vivo* amyloid PET imaging in stroke patients.

We have also collaborated with our international peers to set and validate standards for neuroimaging and neuropsychological assessments in vascular cognitive disorders. Moreover, we have pioneered studies in frontotemporal dementia and related disorders in the Asia Pacific region. By translating research into practice, we have set the standard for cognitive screening in public healthcare and social settings in Hong Kong, with the goal of promoting early identification and management of cognitive disorders in the community. Our work has been recognised internationally and published in *JAMA,* the *Lancet Neurology, Nature Reviews Neurology, Alzheimer's & Dementia, Stroke* and *Journal of Neurology, Neurosurgery & Psychiatry.*

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Parkinson's Disease and Movement Disorders

Parkinson's disease (PD) is the world's second most common neurodegenerative disease. In collaboration with neurosurgeons, our group pioneered the first Deep Brain Stimulation (DBS) for advanced PD in Asia. Since then, we have published extensively in this field, covering the long-term clinical outcomes and neuropsychiatric impact of DBS. Along with our neuroscientists, we are now exploring novel and less invasive methods of delivering electrical stimulation for advanced PD patients. We are also collaborating with psychiatrists, utilising PET imaging, to study markers for pre-clinical PD. Apart from PD, we are a leading centre in the study of Spinocerebellar Atrophy (SCA) in Asia. In collaboration with our basic scientists and geneticists, we recently discovered a new genetic mutation for this autosomal dominant disorder (SCA 40). Our studies in movement disorders have been published in journals such as the *Lancet Neurology, Neurology, Journal of Neurology, Neurosurgery & Psychiatry* and *Journal of Medical Genetics.*

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