

# Lectures at School of Biological Sciences by Tan Kah Kee Professor: Professor Steven Schachter

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## Venue:

SBS Classroom 1, SBS-01n-33  
School of Biological Sciences  
Nanyang Technological University  
60 Nanyang Drive  
Singapore 637551

ALL ARE WELCOME

22 Oct (Wed), 2.00 pm – 3.00 pm

### “Overview of Epilepsy”

Epilepsy is a common neurological condition that affects approximately 1% of the population in developed countries. Common causes include congenital brain malformations, head injury, brain tumors, stroke, and intracranial infection, though notably up to 50% of patients have no identifiable cause.

Seizures are the primary symptoms of epilepsy. The primary goal of treatment is to completely suppress seizures without causing troublesome side effects. Therapy in most of the world consists of antiepileptic drugs (AEDs), which are selected for individual patients based on a number of factors, including the patient's seizure type (generalized or partial), age, gender and concomitant medical/psychiatric conditions; and cost. AEDs are generally prescribed and taken by patients for years; except for patients with epilepsy syndromes that spontaneously remit.

Initial treatment with a single AED achieves seizure freedom without side effects in up to 75% of patients. The prognosis for complete seizure control in the other 25% of patients is less favorable. These patients often require combinations of AEDs, and in some parts of the world they may be evaluated for possible brain surgery to remove the part of their brain causing seizures, or for other non-pharmacological therapies such as special diets or brain stimulation.

5 Nov (Wed), 2.00 pm – 3.00 pm

### “TCM and Epilepsy”

Over the centuries, a large number of Asian herbal medicines have traditionally been used to treat convulsive diseases, often in combination with acupuncture. Published reports suggest that several of these herbs may be neuroprotective, while others show efficacy in animal models of epilepsy and hippocampal slice models.

Published clinical studies have reported on over 135 different herbs used singly or in 80 different combination formulas for the treatment of seizures. The ten most frequently used herbs in published reports are: *Pinella ternate* (Ban Xia), *Arisaema japonicum* (Tian Nan Xing), *Acorus calamus* (Shi Chang Pu), *Gastrodia elata* (Tian Ma), *Buthus martensii* (Quan Xie), *Poria cocos* (Fu Ling), *Bombyx bartriticatus* (Jiang Qiang), *Citrus reticulata* (Chen Pi), *Uncaria rhynchophylla* (Gou Teng), *Glycyrrhiza glabra* (Gan Cao), and *Salivae miltiorrhizae* (Dan Shen). The majority of these studies are observational, including case reports.

Scientific studies of the use of herbal medicines for epilepsy have been limited by inconsistent descriptions of herbal acquisition and extraction methods, lack of characterization and further in vitro and in vivo testing of the active constituent compounds, and inadequately described clinical study designs and patient populations.

5 Nov (Wed), 3.15 pm – 4.15 pm

### “Neurotechnology and Epilepsy”

Despite an unprecedented increase in the number of drugs for the treatment of epilepsy, seizures in approximately 25% of patients do not respond to pharmacological treatment. Only a small fraction of these patients qualify for therapeutic brain surgery or other non-pharmacological therapies.

The integration of engineering sciences with medicine has resulted in new opportunities to improve upon the diagnosis and treatment of epilepsy. Enhancements in methods for imaging the brain may reveal the anatomic source of seizures in patients for whom conventional radiographic techniques are unrevealing. Wearable seizure prediction and detection devices offer the potential to warn patients of impending seizures or to automatically trigger treatments that would prevent the seizure or lessen its severity. New methods for directly stimulating the brain are currently being tested in patients with pharmacologically resistant seizures as are novel intracranial treatment systems that sense seizures, alter brain temperature or release drugs directly to the brain tissue that gives rise to seizures.

These technological advances offer hope to patients for whom available therapies are inadequate. Challenges that need to be addressed include demonstration of safety and effectiveness, selection of patients most likely to benefit and costs.