



CLaS-CCD Research Seminar Colloquium 2011

Professor David Ryugo

Professor David Ryugo uses neurophysiology and neuroanatomy in his studies of the auditory system. He spent 9 years on the faculty at Harvard Medical School and 23 years at Johns Hopkins University School of Medicine before moving to Sydney to join the Garvan Institute. His research focuses on understanding brain mechanisms that underlie hearing in mammals by examining the structure-function relationships in neuronal circuits of the auditory system. He is especially interested in how deafness and hearing loss alter brain organization, and in exploring strategies for hearing restoration. Professor Ryugo is the Curran Foundation Chair of Neuroscience at the Garvan with a conjoint appointment at the School of Medical Sciences, UNSW. He is also a Principal Honorary Fellow at the Bionic Institute in Melbourne and Professor Emeritus at Johns Hopkins University.

Date: Wednesday, 5th October 2011

Time: 2.00pm – 3:30pm

Venue: Building C5C Room 498

Topic: The Auditory System: Sound, Hearing Loss and Neuronal Plasticity

Abstract

The primary focus of our research is to understand brain mechanisms of hearing. The goal is to acquire knowledge about the normal brain so that we might devise more effective treatment strategies for dealing with the pathophysiology of hearing loss. It is generally accepted that interplay between genes and environment ultimately determines brain function. In the auditory system, two major components of sound, frequency and timing, have structural substrates in the brain that can be studied, quantified, and experimentally manipulated. We have applied light and electron microscopy along with *in vivo* electrophysiology to investigate these issues. Congenital deafness in cats results in distinct abnormalities in auditory synapses and circuit organization; electrical stimulation of the auditory nerve via cochlear implantation restores some but not all of the pathology. There is an age-related critical period for this effect, and for younger subjects, the degree of recovery might be determined by the duration of stimulation. There is obviously still much to be learned about hearing and hearing loss.