

Virtual DANDRITE Lecture

Tuesday 16 June 2020
15.00 – 16.00

Online via Zoom

Please find Zoom link via the Outlook calendar invitation. If you have not received this, please write an e-mail to Kathrine: kh@dandrite.au.dk



Prof. Leszek Kaczmarek

BRAIN CITY President,
Nencki Institute of Experimental Biology,
Warsaw

From c-Fos to extrasynaptic proteolysis in order to glimpse into a mind

C-Fos is a component of AP-1 transcription factor. Three lines of evidence support pivotal role of c-Fos in learning and memory: (i) learning experience markedly enhances its expression; (ii) blocking of c-Fos impairs, while optogenetic activation of c-Fos expressing neurons supports learning and memory; (iii) c-Fos/AP-1 gene targets in activated neurons, encoding tissue inhibitor of metalloproteinases-1 (TIMP-1) and matrix metalloproteinase 9 (MMP-9) play a major role in synaptic plasticity that underlies learning and memory. TIMP-1 and MMP-9 compose an extracellularly operating enzymatic system active locally around excitatory synapses to modulate their morphology, molecular content and efficacy. Animal studies have implicated MMP-9 in a variety of neuropsychiatric conditions, e.g., epileptogenesis, autism spectrum disorders, development of addiction, and depression. In humans, MMP-9 contributes to epilepsy, alcohol and cocaine addiction, Fragile X Syndrome, schizophrenia and bipolar disorder. In aggregate, all those conditions can be considered as reflecting either healthy or diseased mind