DANDRITE
Danish Research Institute of Translational Neuroscience
Nordic EMBL Partnership for Molecular Medicine

AARHUS UNIVERSITY

DANDRITE Topical Seminar

Wednesday 21 June 2017

15.15 – 16.00

The Biomedicine Auditorium, building 1170, 3rd floor, room 347

Ole Worms Allé, 8000 Aarhus C

Jacob Dreyer

PhD, Center for Neuroscience, University of Copenhagen

The swiss-army-knife dopamine model: A model for reinforcement learning, ADHD, and Parkinson's disease

Dopamine (DA) is a neuromodulator involved in reinforcement learning and motivation. DA neurons reside in several nuclei in the midbrain and project to multiple targets including ventral and dorsal striatum. However little is known about the relationship between DA cell firing and DA levels and how DA cell firing is translated into a functional signal by post synaptic neurons. I have developed a mathematical model that describe the signal by a small group of DAneurons. The model is able to provide quantitative predictions of DA levels, their dynamics, and their communication with post synaptic D1 and D2 receptors. Importantly, the model can provide firm predictions of how these observables are changed by DA uptake inhibitors and by loss of DA neurons as in Parkinsons disease.

Jacob will first introduce the model and show its predictions in normal state and how DA signaling is affected by cell loss. Then he will discuss how the model can be applied to experimental data.

Host: Group Leader Duda Kvitsiana, DANDRITE, Dept. MBG, Aarhus University