Neuroscience data talk

Decoding activity patterns across pyramidal cell dendritic trees during spontaneous behaviours

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Host: Johann Danzl

Talk title: Decoding activity patterns across pyramidal cell dendritic trees during spontaneous behaviorsAbstract:Little is known about the extent of the information available to an individual neuron during behaviour. Deciphering the information conveyed by synaptic inputs impinging onto 3D dendritic trees requires recordings across many dendritic branches. To address this we used a non-linear acousto-optic lens 3D 2-photon microscope to selective image the activity across the dendritic arbours of pyramidal cells in motor cortex expressing GCaMP6f. To image a large fraction of the dendritic tree in vivo, we combined high speed 3D imaging with our recently developed real-time 3D movement correction and semi-automated 3D dendritic tracing. We carried out arboreal scans on cells expressing GCaMP6f in layer II/III motor cortex in head-fixed mice as they rested or ran on a treadmill and during air puffs. Our results indicate that pyramidal cells exhibit mostly global, multi-branch activation that is strongly coupled to the soma. Surprisingly, modulation of branch activity was also evident. We used unsupervised dimensionality reduction approaches to identify regions of the dendritic tree that were comodulated and studied their relationship to behavioural variables. Our results suggest dendritic regions are comodulated and their activity correlates with behavioural variables.

Tuesday, April 18, 2023 04:00pm - 05:00pm
Mondi Seminar Room 2, Central Building

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