Exploring the Impacts of Neural Variability on Network Activities and Decision Making

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Human can distinguish more than 1 trillion different odor combinations. Such highly complex and rich odor information encoding and decoding is first conducted in the olfactory bulb, where distinct types of local interneurons (LNs) form a complex local neural network to compute, integrate and transform the olfactory information. Using Drosophila as a model, we found the olfactory local interneurons are highly diverse and variable in their morphologies, neurotransmitter profiles and firing patterns[1]. Intuitively, variable innervations, thus connections, of neurons in a given network would hamper the reliability of information coding and decoding. Therefore, it remains unclear why olfactory local circuit sustains such neural variability. In this talk, I will discuss how we explore the possible impacts of LN variability to local neural network through single cell morphologies, simulation[2], and self-built behavior paradigm[3].

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