ABSTRACT OF THE TALK

Visual attention is important in our daily life. For example, we are often facing overwhelming visual inputs at a given moment that easily exceed the processing power of our brain. Attention allows us to focus on a small portion of the inputs, which are generally important or relevant to our upcoming behaviors, while ignoring the other less important visual stimuli. Thus, this attentional system regulates our perception of the visual world and our visual exploration behaviors. Feature-based attention and spatial attention are two widely investigated subtypes of visual attention, which focus on certain visual features, such as color, shape etc., and spatial locations during visual processing, respectively. After a long history of studies in animals, it seems evident that visual attention mechanisms involve a large number of brain areas and complex interactions between them. Using a multi-disciplinary approach including electrophysiology, neural signal analysis, reversible inhibition, behavior etc., we aimed to characterize the neural circuits underlying visual attention in the prefrontal cortex (FEF), visual cortex (V4), and sub-cortex nucleus (pulvinar) in alert nonhuman primates. Our results suggest that attentional influence is from FEF to V4 in the cortex with FEF as an important source of the top-down attention signals, and from V4 to pulvinar in the cortex-pulvinar circuit. While the pulvinar might not be the source of the endogenous attention signal to drive attentional modulation in visual cortex, it is important in maintaining the visual cortex in a normally active state, affecting both bottom-up visual and top-down attentional processing in the cortex.

Biography

Huihui Zhou received his PhD from Peking Union Medial College in China in 2000. After postdoc trainings at Washington University in St. Louis, National Institutes of Health (NIH), and working as a Research Scientist at MIT, Dr. Zhou joined Shenzhen Institutes of Advanced Technology (SIAT), Chinese Academy of Sciences (CAS) in 2014. He was selected into CAS Hundred Talent program in 2015. Dr. Zhou is interested in the brain mechanisms underlying vision-based cognitive functions.