Measuring the neural clocks: fifteen years of timing neurophysiology

*Hugo Merchant[1], Germán Mendoza[1], Oswaldo Pérez[1]

1. Instituto de Neurobiologia, UNAM, campus Juriquilla

During the last fifteen-years many laboratories across the globe have recorded the neural activity of different brain areas during timing tasks, including perceptual or motor paradigms that require processing single intervals or rhythmic sequences. A handful of time-varying signals in the discharge rate of neurons have been identified as potential neural clocks. Here, we show how the neural populations of cells in the medial premotor areas and the putamen encode different timing features during a set of timing tasks, strongly suggesting that neural sequences and state space neural trajectories are the substrate of timing and that these signals are interacting dynamically with other sensory and motor execution neural responses of the timing tasks. We are also discussing how this interval timing information needs to be integrated with the incoming neural signals of primary sensory areas to generate efficient loops, especially in rhythmic tasks.

Keywords: neural correlates