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Structural network heterogeneities and network dynamics: a possible dynamical mechanism for hippocampal memory reactivation.[1] PIOTR JABLONSKI, Dept. of Phys. and Biophys. Research Div. University of Michigan, GINA POE, Dept. of Anesthesiology and Dept. of Molecular and Integrative Physiol. University of Michigan Medical School, MICHAL ZOCHOWSKI, Dept. of Phys. and Biophys. Research Div. University of Michigan — The hippocampus has the capacity for reactivating recently acquired memories and it is hypothesized that one of the functions of sleep reactivation is the facilitation of consolidation of novel memory traces. The dynamic and network processes underlying such a reactivation remain, however, unknown. We show that such a reactivation characterized by local, self-sustained activity of a network region may be an inherent property of the recurrent excitatory-inhibitory network with a heterogeneous structure. The entry into the reactivation phase is mediated through a physiologically feasible regulation of global excitability and external input sources, while the reactivated component of the network is formed through induced network heterogeneities during learning. We show that structural changes needed for robust reactivation of a given network region are well within known physiological parameters.

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