Neuronal Networks of the Hippocampus

Paperback Re-issue

How does a large population of neurons in the brain work? How can synchronized firing be achieved? What factors regulate how many and which neurons will fire under different conditions? These questions form the central theme of this book. Using a combined experimental-theoretical approach the authors present important techniques for the physiological reconstruction of a large biological neuronal network. They begin by discussing experimental studies of the CA3 hippocampal region in vitro, focusing on single-cell and synaptic electrophysiology, particularly the effects one single neuron is able to exert on its connected followers. This is followed by a description of a computer model of the system, first for individual cells, and then for the entire detailed network. The model behavior is compared with experiments under a variety of conditions. The results shed significant light on the mechanisms of epilepsy, EEG, and biological oscillations and provide an excellent "test case" for theories of neural networks.

Researchers in neurophysiology and physiological psychology, physicians concerned with epilepsy and related disorders, and students and researchers in computational neuroscience will find this book an invaluable resource.

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