Various electrical behaviors of the excitable membrane

Terada Kazuko
Department of Medical-Informatics, Faculty of Medicine, Toho University

Various behaviors of the excitable membranes are widely known. Those come from the characteristics of ion channels.

The Hodgkin-Huxley equations for the muscle membrane (HHM) are examined numerically and theoretically. Some functional changes on an ion channel correspond to some change of a parameter value of HHM. As results, continuous changes on the chloride conductance and/or the characteristics of the sodium channel generate normal action potentials, repetitive firings which correspond to the muscle stiffness and depolarized steady state which correspond to the muscle paralysis. Though the continuous functional changes on the ion channels cause misbehaviors in this case, those support the variety of the excitable membranes. And those must be one of the sources of biological diversity. Analysis on mathematical models might be one of the strong methods of physiology.