

# Simulating ion dynamics in neurons

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The neurosciences are a very active field of research. Numerical simulation, however, has not (yet) been broadly used where the experimental approach is costly or otherwise difficult. A key system to a huge variety of processes (such as maintenance and development of neurons in the context of learning or degenerative disease) is the regulation of intracellular calcium dynamics. Many players are involved, especially ion channel and pump activities in the cell membrane and the membranes of cell organelles are of interest and often have quite complex behaviour. We have developed a model including diffusion and reaction processes of calcium and other species as well as highly nonlinear membrane fluxes that can be applied in simulations for various neuroscientific purposes.