Soutenance

THESE

Lundi 18 Novembre 2019 à 09h

Salle des séminaires

Institut de biologie structurale - 71 avenue des Martyrs CS 10090 38044 Grenoble Cedex 9 - T.+33 (0)4 57 42 85 00

www.ibs.fr

par **Zlatomir Todorov**

Institut de Biologie Structurale

Groupe Canaux

Computational study of the structure-function relationship of Kir3 channels and applications to the design of light-gated Kir3 channels

Thèse de Doctorat de l'Université de Grenoble

This doctoral thesis focuses on a particular family of biomolecules called Kir3 channels. These proteins, found in vertebrates, modulate potassium flux through cell membranes. As such, they play a critical role in the regulation of neuronal excitability. Kir3 channels are linked to health conditions such as Alzheimer's and Parkinson's diseases, epilepsy, ataxia, drug and alcohol addictions. We used experiments and computations to describe and manipulate the biophysical properties of Kir3 ion channels. Our models provide detailed description of some of the dynamics of the channel, and we discovered an autoregulation mechanism underlaying the specificity of its activity. Additionally, by wet-lab experiments, we developed a Kir3 channel which can be deactivated by light. Our results add to the current knowledge about Kir3 channels and could be employed for research in physiology and development in pharmacology.