

# SÉMINAIRES ET CONFÉRENCES



*En collaboration avec le GÉPROM*

**Catherine Vénien-Bryan**

Université Pierre et Marie Curie, Paris VI

**« Biophysical studies of a potassium channel, KirBac, showing the molecular mechanism of gating »**

Inwardly-rectifying potassium (Kir) channels regulate membrane electrical excitability and K<sup>+</sup> transport in many cell types where they control such diverse processes as heart rate, vascular tone, insulin secretion and salt/fluid balance. The physiological importance of eukaryotic Kir channels is highlighted by the fact that genetically-inherited defects in Kir channels are responsible for a number of human diseases such as in Andersen's syndrome (Kir2.1), Bartter syndrome (Kir1.1), and neonatal diabetes (Kir6.2). To date, the available treatment is unfortunately not rational but rather empirical and this is mostly due to the lack of knowledge about atomic structure of these channels.

To elucidate how channel function becomes defective in the disease state requires a detailed understanding of channel structure in both the open and closed states. We have reported the structure of a homologous bacterial KirBac3.1 potassium channel with an open bundle crossing indicating a mechanism of channel gating determined by X-ray crystallography at 3Å resolution. In this model, the rotational twist of the cytoplasmic domain is coupled to opening of the bundle-crossing gate via a network of inter- and intra-subunit interactions. We have also used EM analysis of 2D crystals of the same Kirbac channel trapped in an open state and compared these results with the 3D structure. In addition we are investigating the molecular modeling and dynamics of this potassium channel using a method recently developed by D. Perahia called Molecular Dynamics with Excited Normal Modes (MDeNM).

We are now focusing in characterizing the structural determinants correlated to malfunctioning behind Andersen mutant's forms. We are therefore studying the structure of the human potassium channel kir2.1.



Faculté de médecine  
Département de biochimie  
et médecine moléculaire

Université   
de Montréal

**Le mardi 11 avril 2017, 11h30**

**Pavillon Paul-G.-Desmarais**

**Salle : 1120**

**Invité par Jurgen Sygusch**

Tél : (514) 343-2389 courriel : [jurgen.sygusch@umontreal.ca](mailto:jurgen.sygusch@umontreal.ca)