



Award Details

Potassium channels in gut pacemaking

Research Details

Competition Year:	2011	Fiscal Year:	2015-2016
Project Lead Name:	Huizinga, Jan	Institution:	McMaster University
Department:	Medicine	Province:	Ontario
Award Amount:	45,000	Installment:	5 - 5
Program:	Discovery Grants Program - Individual	Selection Committee:	Genes, Cells and Molecules
Research Subject:	Electrophysiology	Area of Application:	Life sciences (including biotechnology)
Co-Researchers:	No Co-Researcher	Partners:	No Partners

Award Summary

Rhythms are central to all living organisms. Among other things they are the beat of the heart, the basis of information coding by nerves in the brain, they regulate breeding cycles and more prosaically, but just as vitally, they are required for the coordinated movement of the gut. The cells that produce such rhythms are often called pacemakers. Most pacemaker cells generate an electrical rhythm. This consists of a rhythmic decrease in the electrical polarization of the cell (sort of like a battery running down) called a depolarization. Each cycle of depolarization involves the coordinated opening of small pores in the pacemaker cell, through which electrically charged molecules ("ions") can pass. These "ion channels" are therefore crucial to the pacemaker mechanism. In the heart a very intimate knowledge of ion channels has been garnered over the last forty years. Testimony to this are the large number of anti-arrhythmic drugs developed over this period, used to treat diverse heart conditions, which are all targeted at ion channels. Though a number of ion channels have been identified in the gut, it is not clear which of these is important to pacemaking and if so, how they coordinate. This is complicated by the fact that the gut has several rhythms at differing frequencies, which are paced by two sets of cells - nerves and the interstitial cells of Cajal (ICC). We propose to study the involvement of potassium ion channels in the pacing of two gut rhythms - the "slow wave" and the "minute rhythm" - both of which are paced by ICC. This will provide Canadian students with experience in a diverse range of state of the art techniques in electrophysiology. It will put Canada in the forefront of research into human pacemaker systems other than the cardiac pacemaker with benefits for engineering (artificial pacemakers), pharmacology (drug design) and the health sciences.