

## What's Happening in... Biosciences

### **Biologists and Physicists work together to develop new drugs for diseases like cystic fibrosis**

*Unlocking how our body's cells work at the subatomic level will hold the clue to understanding many diseases like cystic fibrosis, Sudden Cardiac Arrest and Long QT Syndrome which can cause sudden death. Researchers at Lancaster University are developing new approaches to study how cells function at this level to help in the development of new treatments for these diseases.*

Ion channels are natural nanotubes that exist in the membranes of all biological cells and which act to control the vast range of biological functions involved in the basic functioning of all forms of life. Just lifting a finger requires the coordinated operation of billions of ion channels. The importance of ion channels in human health is strikingly illustrated by two astonishing facts.

First, the malfunctioning of ion channels is implicated in dozens of diseases. The most common genetic disorder leading to disease, cystic fibrosis, is caused by the malfunctioning or absence of chloride channels in endothelial cells, most notably in the lungs. As a result, the lungs of cystic fibrosis sufferers lose their ability to function and become blocked with mucus. Current treatment options are limited and consequently cystic fibrosis sufferers often succumb to chronic and fatal lung infections. Amazingly, the prevalence of cystic fibrosis is 1:2500 newborns with 1:25 of the Caucasian population thought to be carriers of the mutated chloride channel gene.

Second, 13% of current medical drugs on the market target ion channels or their associated proteins. This reflects both the importance of ion channels in human health and body function and the necessity to understand how ion channels work. If we understand how ion channels work, then we will know how to fix or treat them when they don't work.

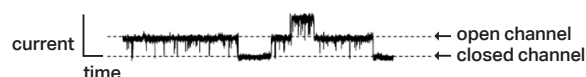
Dr Stephen Roberts (Biomedical & Life Sciences) together with colleagues in the Physics Department (led by Professor McClintock and Dr Kaufmann) are working to unlock the secrets of how ions move through these channels to gain a better understanding of how ion channels work. This groundbreaking collaboration between Biologists and Physicists brings together ideas that will help in the development of better drugs and new treatments for many diseases. The research is also relevant to the field of nanotechnology in which the ability of ion channels to transport charged atoms or ions raises the exciting possibility that they may provide the basis for building bio-computers through their integration with nano-electronics.

Bioscience students at Lancaster University can have an opportunity to undertake project work with Dr Roberts, and help his group make a difference to the health of patients suffering from diseases like cystic fibrosis.



#### Experimental data showing ion channels in action

We can measure ions moving through a channel when it opens



Dr Stephen Roberts

For more details about the Biology and Biological Sciences degrees at Lancaster University please contact the Biology Admissions Staff: -

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