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Barbara Bachtler

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Two Researchers from MDC and Charité receive Million Euro Starting Grants from the European Research Council

Two European Research Council (ERC) Starting Grants worth almost one and a half million euros each over the next five years have been awarded to two researchers from the Max Delbrück Center for Molecular Medicine (MDC) Berlin-Buch and the Charité - Universitätsmedizin, Berlin in Germany. American Diabetes researcher Dr. Matthew Poy and British neuroscientist Dr. James Poulet, belong to the 427 researchers the ERC has chosen from more than 2873 applicants this year.

With his research project Dr. Poy wants to improve the treatment of diabetes, especially the transplantation of pancreatic islets, and to facilitate the development of therapeutic strategies for this disease. Dr. Poulet, who is located at the excellence cluster NeuroCure and who is financed from the MDC, wants to shed light on the function of specific neurons in the cortex. This part of the brain plays a key role for example in sensory perception, control of movement, memory and attention.

MicroRNAs and Diabetes
Dr. Poy investigates a group of genes, called microRNAs, and their role in metabolic diseases such as diabetes. Using a multidisciplinary approach, his work will focus on elucidating how microRNAs within the insulin producing cells of the pancreas, the pancreatic beta cells, regulate their interaction to neighbouring endothelial cells.

The researcher believes that developing an understanding of how these interactions change during the pathogenesis of disease will provide insight into how islet growth and insulin release is dependent upon signals received from adjacent cell types. With this strategy, emphasis will be placed on genetic mouse models to identify relevant genes that can help improve the transplantation of beta cells.

Recently, the World Health Organization (WHO) gives an estimate of more than 220 million people worldwide suffering from this disease. “Both type 1 and type 2 diabetes are characterized by the deterioration and impaired function of beta cells of the pancreatic islet”, Dr. Poy points out. Beta cells produce the hormone insulin which regulates the blood glucose levels, the body’s main source of energy.

In patients with type 1 diabetes the beta cells have been destroyed due to a misguided response of the immune system, and blood glucose levels are elevated. These patients must self-inject insulin throughout their whole life.

Even in patients with type 2 diabetes, who initially can be treated with a special diet and pills, the beta cells can decline and fail over time, so that these patients, too, must self-inject insulin.

The development of more efficient and accurate insulin replacement therapies, however, has long proved to be a difficult task. This is why physicians have been trying for a long time to transplant intact beta cells or whole pancreas organs, but with little success.

For nearly two years Dr. Poy has been leading a Helmholtz junior research group at MDC, an institution of the Helmholtz Association, and at Charité – Universitätsmedizin Berlin. He came from the Swiss Federal Institute of Technology (ETH), Zurich. There he was able to show that microRNAs play a crucial role in the regulation of metabolic processes.

Matthew Poy studied biology at the Medical College of Ohio in Toledo, USA, where he also received his PhD in biomedical sciences. Prior to coming to Europe, he was working at Rockefeller University in New York City in the USA.

Brain States and Behaviour
Dr. Poulet is interested in studying changes in patterns of neuronal activity or "brain state". This phenomen was first recorded in 1929 in the awake human brain. Today recordings about these changes exist from mouse to man.

It is thought, that changes in brain state are fundamental to normal brain function and neuronal computation. "However, very little is known about the underlying neuronal mechanisms that generate these changes or their precise impact on neuronal processing and behaviour", Dr. Poulet explains.

Therefore in his new project Dr. Poulet wants to record the activity of neurons in the awake, behaving mouse to investigate the network and cellular mechanisms involved in generating brain state, using high resolution electrophysiology, neural imaging and molecular and behavioural techniques.

In previous work he had already characterized changes in brain state in the mouse during whisker movements, which he will now investigate further. With his research he hopes to be able to open new perspectives in the treatment of neurological diseases such as stroke or epilepsy.

During his PhD the neuroscientist played a key role in detecting a phenomenon researchers call "corollary discharge". It prevents crickets from deafening themselves while generating extremely loud mating songs.

Furthermore, due to "corollary discharge" it is also impossible to tickle oneself. A corollary discharge is a signal in the brain that filters out the perception of sounds or touch generated by ones own behaviour.

Until the summer of 2009 James Poulet was a postdoc at École Poly-technique Fédérale de Lausanne, Switzerland, where he succeeded in recording the intracellular activity of two nerve cells in the cerebral cortex of a conscious, behaving animal for the first time.

Dr. Poulet is originally from London, England. He studied biology at the University of Bristol, went on to graduate studies at the University of Cambridge (UK), where he received his PhD in 2002 and was a postdoc between 2002 and 2005.

Dr. Poy and Dr. Poulet are the second and third recipients of an ERC-grant at the MDC. In 2009, developmental biologist Dr. Francesca Spagnoli, received a one million ERC-grant. The ERC, established in 2007 by the European Commission, is funded through the 7th Research Framework Programme of the European Union.

Barbara Bachtler
Press and Public Affairs
Max Delbrück Center for Molecular Medicine (MDC) Berlin-Buch
Robert-Rössle-Straße 10
13125 Berlin; Germany
Phone: +49 (0) 30 94 06 - 38 96
Fax: +49 (0) 30 94 06 - 38 33

e-mail: presse@mdc-berlin.de
http://www.mdc-berlin.de/

Jens Augustin
Cluster of Excellence NeuroCure at the Charité
Press and Public Affairs
Charité – Universitätsmedizin Berlin
Charitéplatz 1
10117 Berlin, Germany
Phone: + 49 (0)30 450 539 707
Fax: + 49 (0)30 450 539 970
e-Mail: jens.augustin@charite.de
http://neurocure.de

URL zur Pressemitteilung: http://erc.europa.eu/
URL zur Pressemitteilung: http://www.who.int/mediacentre/factsheets/fs312/en/index.html
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Dr. Matthew Poy
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