Institute for bioengineering of Catalonia

Press release

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Beating the regeneration blockers

Researchers shed light on inhibitory molecules in neuroregeneration

Barcelona, 11 November 2010 – It's known that the development of neuronal diseases such as multiple sclerosis and Alzheimer's disease is connected with the levels of myelin – an insulating substance around nerve fibres – in the body, although the actual causes of these conditions remain unknown. Now researchers at IBEC have discovered a new group of interacting partners for myelin-associated receptors, which could shed light on the significance of imbalanced production or modifications of the substance.

In a study published online by the *FASEB* journal this week, group leader José Antonio del Río, together with his postdocs Vanessa Gil and Franc Llorens, have been looking at axons, ligands and receptors in the mammalian central nervous system. Following injury in adults, axons have a limited capacity for regrowth; this restriction is caused by myelin-associated inhibitors (MAIs).

A release from myelin inhibition thus improves neuronal regeneration, and the three researchers from IBEC's Molecular and Cellular Neurobiotechnology group have discovered that blocking two of some of these proteins' shared receptors – NgR1, together with its coreceptors p75(NTR), TROY and Lingo-1, and paired immunoglobulin-like receptor B (PirB) – prevents the inhibitors from restricting axonal sprouting and limiting the regeneration of damaged fibre tracts.

Other elements of the myelin inhibitory pathway are still unknown, but this identification and characterization of the roles and functions of some of the inhibitory molecules sheds light on one of the most competitive areas of research into neuroregeneration of the past several years. In addition, further data from within and outside the CNS environment suggests that most of these proteins have other roles beyond axonal growth inhibition.

"Potentially there could be new physiological roles for them in other processes such as development, neuronal homeostasis, plasticity and neurodegeneration," says José Antonio. "Modifications could be considered as markers for certain neuronal diseases." ■

Source article: Llorens, F., Gil, V., del Río, J. A. (2010). 'Emerging functions of myelin-associated proteins during development, neuronal plasticity, and neurodegeneration'. Faseb J

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About IBEC: The Institute for Bioengineering of Catalonia is an interdisciplinary research centre focused on bioengineering and nanomedicine and based in Barcelona. Its mission is to conduct high quality research that, while creating knowledge, contributes to a better quality of life, improves health and creates wealth. IBEC establishes close links with international research centres, universities, hospitals and industry to exchange talent and develop and execute projects. The institute currently has 15 research groups and 200 researchers and staff from 18 different countries. IBEC's six research programmes are Cellular Biotechnology, Nanobiotechnology, Biomechanics and Cellular Biophysics, Biomaterials, Implants and Tissue Engineering, Medical Signals and Instrumentation, and Robotics and Biomedical Imaging. Its patrons and founders are the Generalitat de Catalunya, the University of Barcelona (UB) and the Polytechnic University of Catalonia (UPC).

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