A new step towards the understanding of hearing

February 18 2013

(Medical Xpress)—The results published in *Nature Communication*s enables us to consider eventual therapeutic strategies to restore the sensorial innervation of the cochlea, an organ essential to hearing.

A GIGA-Neurosciences (University of Liège) team led by Dr Brigitte Malgrange and Jean Defourny has just identified several key proteins which intercede in the refinement of cochlear innervation. In the study published in *Nature Communications* the researchers show in particular that the aphrin-15 protein and its EphA4 receptor have complementary expression in the cochlea of developing mice, compatible with a role in the establishment of nerve connections between sensory cells and auditory neurones. The analysis of mice for which one or the other of these two proteins has been rendered inoperative shows major innervation flaws leading to a totally disrupted hearing capacity. The researchers have also identified intercellular cascades leading to this defective innervation and involving proteins such as ephexin, cofilin and type II myosin light chain kinase.

'Thus, for the first time, we have identified the molecular actors in the refinement of cochlear innervations, necessary for optimal hearing,' states Brigitte Malgrang.

The auditory part of the inner ear – the cochlea – is a very complex organism in which we find the organ of Corti, primarily made up of sensory cells connected to the spiral ganglion neurones, these neurones constituting the first relay station for the transmission of sound to the

central nervous system. Under the influence of numerous molecular signals – about which more is known following the results obtained by the ULg's GIGA-Neurosciences Unit – the development of the auditory system within vertebrates begins by the formation of the optic vesicle which will give birth to the sensory cells and spiral ganglion neurones. For functional hearing the fibres of the spiral ganglion's auditory neurones must be connected very precisely to sensory cells.

More information: *Nature Communications*, 05/02/2013. DOI: 10.1038/ncomms2445

Provided by University de Liege