

Research identifies presence of neuron-producing stem cells in meninges

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A multidisciplinary research, conceived by Dr. Francesco Bifari, Department of Medical Biotechnology and Translational Medicine, University of Milan, Italy and Dr. Ilaria Decimo University of Verona, Italy, found that meninges - the protective membranes that enclose the brain - contain of a pool of neural stem cells. These stem cells are able to produce new brain neurons after birth. These findings, published in the leading scientific journal *Cell Stem Cell*, highlight the importance of meningeal tissue as well as of meningeal-resident neural stem cells in the development of innovative therapies for neurodegenerative diseases such as brain damage or Alzheimer.

This work is the result of an international collaboration that included the University of Milan, Italy, the University of Verona, Italy the Vesalius Research Center, VIB, Leuven, Belgium, the German Cancer Research Center (DKFZ), Heidelberg, Germany, the Antwerp University, Belgium and the Brain Mind Institute, Swiss Federal Institute of Technology, Lausanne, Switzerland.

New neurons are added in the cortex after birth

Only few decades ago, it was thought that no new neurons were added to the brain after childhood. This dogma has changed, with researchers finding more and more evidence that the brain is capable of healing and regenerating in adulthood, thanks to the presence of stem cells. However, neuronal stem cells were generally believed to only reside within the brain tissue, not in the membranes surrounding it.

Meninges: from protective membrane to neuron-producing stem cells niche

So far, meninges have been considered mostly as a merely protective membrane covering the brain. On the other hand, before this discovery, neural precursors - or stem cells that give rise to neurons - have been only described inside rare regions of brain tissue. This study considers the generation of brain neurons from an entirely new prospective. Thanks to a multidisciplinary approach that included novel top-notch techniques, this research identifies the presence in meninges of neuron-producing stem cells in meninges. These stem cells are generated during the embryonic period. After birth, these cells migrate from the meninges to the brain and then differentiate into functional and integrated neurons.

The finding of the presence of neuron-producing stem cells in meninges opens new prospective for the development of new drugs for neurodegenerative diseases. "The next step - comment the first authors Dr. Bifari and Dr. Decimo - will be the understanding of the role of these meningeal resident neural stem cells in those conditions where the neural tissue is damaged such as brain and spinal cord injury, multiple sclerosis and Alzheimer disease.

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