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Press release

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ULB Neuroscientists perform an important step towards cell therapy for diseases of the cerebral cortex.

Researchers at the ULB – IRIBHM and ULB Neuroscience Institute – have tested the therapeutic potential of cortical neurons generated at the laboratory, by transplantation in the brains of adult mice. Their research is published in the journal *Neuron*[1].

The work of ULB team of researchers led by **Pierre Vanderhaeghen**, **Kimmo Michelsen** and **Sandra Acosta** (WELBIO, IRIBHM and ULB Neuroscience Institute (UNI)), in collaboration with the laboratory of **Afsaneh Gaillard** (INSERM / U. Poitiers , France), opens new perspectives for the repair of damaged cell replacement cerebral cortex. This work is published February 4, 2015 in the prestigious journal *Neuron*[1].

The cerebral cortex is the most complex and essential structure of our brain. The nerve cells or neurons that constitute it are the essential elements of its function, and the loss of cortical neurons is the cause of many neurological diseases (stroke, Alzheimer, ...).
The same ULB researchers had previously discovered how to generate in the laboratory cortical neurons from embryonic stem cells. But the question had remained widely open whether these findings could be applied to therapies for brain diseases by cell replacement. This is what the team has now tested successfully.

In this study, the researchers tested the therapeutic potential of cortical neurons generated in the laboratory, which were then transplanted into the brains of adult mice who had undergone brain damage resulting in massive neuronal loss in the visual cortex (Figure).

Remarkably, the researchers found that the transplanted neurons integrated effectively into the brain after injury, but most importantly they could connect with the host brain, as some of them even responded to visual stimuli, like the visual cortex (Figure).

This approach is still experimental (so far only performed in laboratory mice), and much research is needed before any clinical application in humans. Nevertheless, the success of these experiments combining cell engineering to generate nerve cells in a controlled and unlimited fashion, together with transplantation into damaged brain, opens new avenues to repair the brain following damage or degenration, such as following stroke or brain trauma.

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[1] Area-specific reestablishment of damaged circuits in the adult cerebral cortex by cortical neurons derived from mouse embryonic stem cells. Michelsen KA , Acosta-Verdugo P, Benoit-Marand M, Espuny-Camacho I, Gaspard N, Saha B, Gaillard A , Vanderhaeghen P. Neuron (2015),*http://dx.doi.org/10.1016/j.neuron.2015.02.001.*

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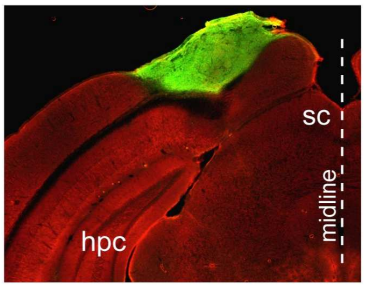
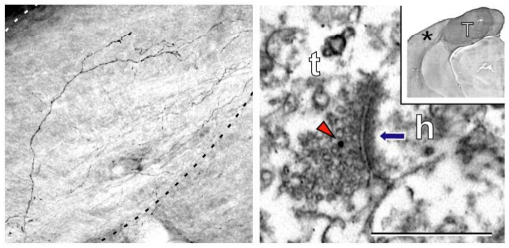
1. Lésion du cortex visuel (mort neuronale)

2. Transplantation de neurones dérivés de cellules souches embryonnaires

3. Les neurones transplantés survivent



4. Les neurones transplantés se connectent



5. Les neurones transplantés sont fonctionnels (réponse à des stimuli visuels)