

Maintenance mechanism that prevents stem cells aging discovered

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A team of researchers at the Molecular Neurobiology Unit of the University of Valencia, led by Professor of Cell Biology Isabel Fariñas, just published in the journal *Nature Neuroscience*, the results of a research that may shed light on the maintenance of stem cells in the adult brain, and their activity to produce new neurons throughout life.

The group has discovered that the Cdkn1a/p21 gene is essential for maintaining the [brain stem cells](#) active and functional. Its absence causes depletion of these cells, impairing their functioning and affecting the generation of new neurons, as it occurs at the end of our lives.

Stem cells need p21 to replicate themselves in a controlled manner. As p21 is a [tumor suppressor gene](#) and regulates the proliferation of neural stem cells, it might be thought that its inactivation would lead to brain tumors. However, p21 functions differently in neural stem cells. Its absence does not cause tumors but depletion of neural stem cells, ie aging. "The reason, Isabel Fariñas says, is that p21 exerts functions in these cells that are independent of its classical action on the cell cycle and this is one of the novel aspects of the research."

Isabel Fariñas' team, in collaboration with the group of Anxo Vidal (University of Santiago de Compostela), demonstrated that p21 in [neural stem cells](#) restrains the production of molecules that induce the depletion of these cells, which occurs during aging. "The research allows us to understand better how [stem cells](#) get lost in our brains as we age, and opens the possibility to try to alleviate this deterioration," Isabel Fariñas says.

Fariñas' team belongs to the Molecular Neurobiology Unit of the Department of Cell Biology and Parasitology and to the ERI of Biotechnology and Biomedicine of the University to the Center for Biomedical Research in

Neurodegenerative Diseases (CIBERNED) and to the RETIC for Cell Therapy and it is Prometeu group of excellence.

More information: Porlan, E. et al. Transcriptional repression of Bmp2 by cell cycle inhibitor p21 links quiescence to neural stem cell maintenance in the subependymal niche, *Nature Neuroscience* (2013). [DOI: 10.1038/nn.3545](https://doi.org/10.1038/nn.3545)

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