

Inflammation caused by bacterial infection puts brain stem cells on alert

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A study directed by Isabel Fariñas and published in the journal *Cell Stem Cell* reveals that the inflammation produced by a bacterial infection alerts brain stem cells and prepares their activation for the production of new neurons. The study represents a new advance in the field of regenerative medicine.

Tissues are constantly renewed by stem [cells](#), which generate new specialized cells to replace those that are lost through wear and tear. These stem cells are located in very specific locations within tissues, which are known as microenvironments or niches, and in which stem cells interact with other types of cells.

The new findings indicate that brain stem cells also respond to changes that occur outside the brain. This study, carried out in mice, has verified that the [inflammation](#) produced by a [bacterial infection](#) in any part of the body is capable of temporarily activating [brain stem cells](#) and preparing them for action. When the inflammation subsides, these cells return to their quiescent state. "The work allows us to better understand the relationships between stem cells and the systemic environment, that is, the rest of the organism, as knowledge on the subject is very limited. We are used to stem cells responding to their closest microenvironment, but evidence is beginning to emerge showing that they can respond to what is happening in any part of the body thanks to molecules that are distributed through the circulatory system," says Fariñas.

The work of the research team contributes new data to the study and advancement of regenerative medicine, a field that seeks therapeutic solutions based on stem cells for degenerative processes such as Alzheimer's or Parkinson's diseases in which neuroinflammation is usually detected.

"We have always been more concerned about [chronic inflammation](#) that is associated with many diseases and is very negative for our organs, but it is a defense mechanism against damage or infection," explains José Manuel Morante, co-director of the work. "For this reason, it is important to find out the role of inflammation in the regulation of [stem cells](#)," he concludes.

More information: Germán Belenguer et al. Adult Neural Stem Cells

Are Alerted by Systemic Inflammation through TNF- α Receptor Signaling, *Cell Stem Cell* (2020). [DOI: 10.1016/j.stem.2020.10.016](https://doi.org/10.1016/j.stem.2020.10.016)

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