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BiotaBB

Modulation of brain barrier function by microbiota-derived factors in cerebral ischemia

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Stroke is one of the leading causes of death and the most common cause of long-term disabilities, worldwide, with very few therapeutic options. Hence, there is an enormous need for new therapeutic options for stroke patients.

When a stroke happens, the brain's blood vessels are damaged, causing inflammation and injury to neurons. This can lead to permanent trouble in walking, speaking and to impaired memory. Blood vessels inside the brain are not only important for providing oxygen and nutrients to neurons, but they also prevent harmful substances from entering the brain, acting like a selective barrier that protects neurons. In this project, we want to understand how we can prevent the damage to this blood brain barrier, in order to save neurons.

Recent research has discovered that bacteria in our gut - called the microbiota - can communicate with cells in our body via small molecules that only the microbiota produces. These bacterial molecules can travel everywhere in our body, including the brain, and they can change the function of the cells they interact with. Here, we had the novel idea to test whether these molecules formed by the gut microbiota can protect the brain barriers, preventing inflammation and neuronal damage caused by stroke. By understanding better how microbial molecules work, it should be possible in the future to offer treatment to people at risk of stroke; they could drink a solution of beneficial bacteria, or beneficial molecules produced by bacteria and ultimately save neurons from being damaged after a stroke.