MULTIPLE SCLEROSIS NEWS TODAY

Researchers Identify Nerve Pathway Linking Brain Inflammation, Gut Dysfunction in MS [1]

AUGUST 23, 2017 BY ALICE MELÃO IN NEWS.

Chronic stress and inflammation in the brain can cause multi-organ dysfunction including severe gut failure, mediated by a newly identified nerve pathway in animal models of multiple sclerosis (MS), a Japanese study shows. [1]

The discovery of this underlying mechanism of MS is described in the study, "Brain micro-inflammation at specific vessels dysregulates organ-homeostasis via the activation of a new neural circuit," which appeared in the journal *eLife*.

MS is an autoimmune disease caused by $CD4^+$ T-cells that cross the blood-brain barrier protecting the central nervous system. This inflames and stresses the brain and spinal cord.

In previous studies, a team led by professor Masaaki Murakami of Japan's Hokkaido University showed that these cells could cross the blood-brain barrier in specific sites. These entrance sites depend on brain regional activation, which was found to be triggered by specific nerve interactions — a mechanism the team called gateway reflexes.

In collaboration with other Japanese researchers and a team from Germany, the project aimed to address the potential correlation among chronic stress, brain inflammation and organ failures in MS.

Using mice with MS-like disease — the experimental autoimmune encephalomyelitis model — researchers found that animals that had autoreactive $CD4^+$ T-cells and which were exposed to stressful conditions developed severe symptoms such as gastrointestinal failure, or even death.

Detailed analysis of the animals' brains showed that in stressed mice, $CD4^+$ T-cells accumulated in two specific sites in the center of the brain around blood vessels. This event would cause inflammation around those vessels, and activation of a nerve pathway that is commonly turned off. This switch led to gut dysfunction, bleeding and failure.

"These results demonstrate a direct link between brain micro-inflammation and fatal gastrointestinal diseases via the establishment of a new neural pathway under stress," [1] Murakami, the study's senior author, said in a news release.

Researchers were able to prevent gut symptoms by inhibiting inflammation in the brain or blocking the nerve pathway responsible for driving the signals from the brain to the gastrointestinal tract.

"Micro-inflammation in the brain is also seen in Alzheimer's disease and Parkinson's disease," Murakamai concluded. "So it's of particular interest to investigate possible connections between brain micro-inflammations and organ dysfunctions, including those within the brain itself, in those patients."

TAGGED BRAIN, GUT, INFLAMMATION, NERVE PATHWAY, ORGAN DYSFUNCTION, STRESS, T-CELLS.

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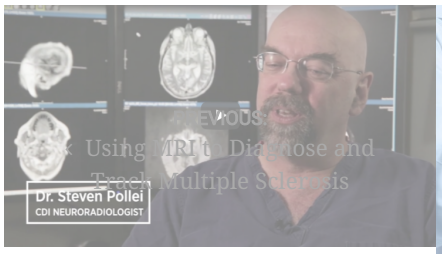

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brian hibbs says: August 28, 2017 at 11:08 AM

The enteric nervous system is the direct link between the stomach and the brain thus having access to the CNS.

* We also need to study Spirochaetes and how to destroy them!

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charles says: August 28, 2017 at 2:01 PM

i think that another conceptual wrinkle may be the density of neural tissue in the gut itself. while multiple sclerosis attacks the central nervous system (brain, spinal cord, optic nerves), might not other heavily innervated tissues also be at risk? i'm looking at you, gut.

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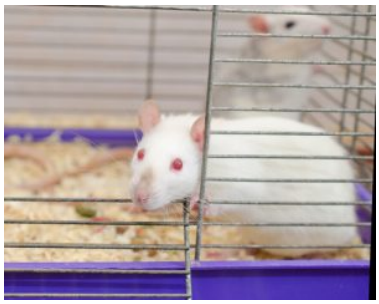

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