

Neurovascular Adaptation

<https://neurodegenerationresearch.eu/survey/neurovascular-adaptation/>

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Country

Canada

Title of project or programme

Neurovascular Adaptation

Source of funding information

CIHR

Total sum awarded (Euro)

€ 515,670

Start date of award

01/04/2011

Total duration of award in years

5.0

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Research Abstract

The brain responds to not receiving an adequate supply of oxygen by growing more of the small blood vessels that permeate all brain tissue. This process of adding new blood vessels can be induced by prolonged intense exercise or exposure to high altitude (low oxygen) environments. In disorders such as stroke and traumatic brain injury, growth of new blood vessels is considered critical to recovery; whereas in Alzheimer's disease and vascular dementia, new vessels either do not grow or grow abnormally. A challenge of understanding how growth of new vessels affects health is that blood vessels are all connected. This means that adding a new

vessel affects the whole blood vessel network and that not all such additions improve the delivery of oxygen. This is further complicated by the ability of existing vessel to grow, shrink, or even split in two. The goal of the present proposal is to understand how structural changes in the vessel network of the brain lead to improvements in blood and oxygen delivery. This question will be addressed by experiments using advanced 3D imaging techniques that can visualize the changing blood vessels within the brains of mice that complete a regime of voluntary exercise. The response of the healthy brain to exercise will be contrasted against that of animals where sprouting of new blood vessels has been impaired by drug treatments and to mice that show a form of Alzheimer's disease. Taken together these experiments will interrogate the mechanisms by which structural changes in the blood vessel network support the survival of brain tissue in health and disease. Understanding the mechanisms by which a network of blood vessels is reorganized with corresponding gains or losses in capacity to deliver blood is critical to treating the many disorders where this reorganization plays a crucial role.

Lay Summary

Further information available at:

Types:

Investments > €500k

Member States:

Canada

Diseases:

Alzheimer's disease & other dementias

Years:

2016

Database Categories:

N/A

Database Tags:

N/A