Can immune system rejuvenation restore age-related memory loss? (IMMUNE/MEMORY AGING)

https://neurodegenerationresearch.eu/survey/can-immune-system-rejuvenation-restore-age-related-memory-loss-immunememory-aging/

Title of project or programme

Can immune system rejuvenation restore age-related memory loss? (IMMUNE/MEMORY AGING)

Principal Investigators of project/programme grant

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Europe-wide

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European Research Council

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1650000

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Total duration of award in months

48

The project/programme is most relevant to

- Neurodegenerative disease in general

Keywords

Research abstract in English

With increased life expectancy, there has been a critical growth in the portion of the population that suffers from age-related cognitive decline and dementia. Attempts are therefore being made to find ways to slow brain-aging processes; successful therapies would have a significant impact on the quality of life of individuals, and decrease healthcare expenditures. Aging of the immune system has never been suggested as a factor in memory loss. My group formulated the concept of protective autoimmunity, suggesting a linkage between immunity and self-maintenance in the context of the brain in health and disease. Recently, we showed that T lymphocytes recognizing brain-self antigens have a pivotal role in maintaining hippocampal plasticity, as manifested by reduced neurogenesis and impaired cognitive abilities in T-cell deficient mice. Taken together, our novel observations that T cell immunity contributes to hippocampal plasticity, and the fact that T cell immunity decreases with progressive aging create the basis for the present proposal. We will focus on the following questions: (a) Which aspects of cognition are supported by the immune system- learning, memory or both; (b) whether aging of the immune system is sufficient to induce aging of the brain; (c) whether activation of the immune system is sufficient to reverse age-related cognitive decline; (d) the mechanism underlying the effect of peripheral immunity on brain cognition; and (e) potential therapeutic implications of our findings. Our preliminary results demonstrate that the immune system contributes to spatial memory, and that imposing an immune deficiency is sufficient to cause a reversible memory deficit. These findings give strong reason for optimism that memory loss in the elderly is preventable and perhaps reversible by immune-based therapies; we hope that, in the not too distant future, our studies will enable development of a vaccine to prevent CNS aging and cognitive loss in elderly.

Lay Summary