

## AGEING

# Are the secrets of healthy ageing within ‘young blood’?

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Plasma derived from the human umbilical cord can ameliorate certain brain ageing phenotypes in mice, according to new research published in *Nature*. The findings, reported by Joseph Castellano and colleagues, are the first to show that proteins from human blood can improve age-related reductions in synaptic plasticity and cognition in aged mice.

Ageing is characterized by a decline in cellular function and increased risk of age-related diseases and death. In the brain, ageing is associated with a marked decline in self-renewal and repair. The hippocampus, a region of the brain that is essential for spatial and episodic memory, is particularly vulnerable to age-related changes. To assess the effect of ‘young blood’ on the brain function of aged mice, Castellano and colleagues injected human plasma derived from umbilical cords, young adults and elderly donors into aged immunodeficient mice. The authors reported that plasma from young participants, in particular umbilical cord plasma,

increased hippocampal plasticity and improved the cognitive function of the aged mice.

“While it might seem obvious that plasma of an early developmental stage might possess pro-plasticity activity, our study is an important proof of concept,” explains Castellano. “We also identified a specific protein, TIMP2, as an important mediator of the cognitive benefits conferred by cord plasma.”

The mechanisms by which TIMP2 exerts its pro-plasticity effects within the hippocampus are not well understood. For example, the protein might have a direct mode of action on the brain or it could act indirectly by influencing systems throughout the body. Castellano says that one of the next steps will be to address this question.

“An additional area for exploration is the potential role of TIMP2 and related proteins in the context of age-related diseases, including Alzheimer disease,” concludes Castellano. “We believe that these are exciting times in our field with many opportunities to learn about the biology of how we age.”

Alan Morris

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