

Immune Cell Therapy for Cognitive Restoration

Harnessing Group-2 Innate Lymphoid Cells (ILC2) to Treat Age-Related and Neurodegenerative Cognitive Decline

Background:

Cognitive decline is a major health concern associated with aging and neurodegenerative diseases such as Alzheimer's disease, frontotemporal dementia, and other forms of mild cognitive impairment. These conditions not only diminish quality of life but also place a significant emotional and economic burden on patients, families, and healthcare systems. Current therapeutic strategies, including cholinesterase inhibitors and monoclonal antibodies, have shown only limited effectiveness in slowing disease progression and often fail to address the underlying mechanisms that drive cognitive loss. Increasingly, research has revealed the importance of the immune system, and specifically neuroimmune interactions, in the progression of age-related brain dysfunction. Group-2 innate lymphoid cells (ILC2), found in barrier tissues such as the meninges and choroid plexus, have been shown to play a role in regulating inflammation and maintaining brain health. However, prior to this invention, there were no established therapeutic approaches to harness the activity of ILC2 to improve cognition in aging or diseased brains.



Source:
<https://www.istockphoto.com/search/2/image?alzheimer+disease+brain>

Technology:

This patent describes a novel method for enhancing cognitive function through the use of activated ILC2 cells. The approach involves treating ILC2 cells with immune activators such as IL-33, IL-25, IL-7, or TSLP, and then implanting these cells directly into the cranial environment, either via intracerebroventricular injection or localized delivery to areas such as the choroid plexus. Once implanted, the activated ILC2 are designed to modulate neuroinflammation, support neural repair, and improve communication within the central nervous system. By reducing harmful inflammation and promoting a more balanced immune environment, this strategy has the potential to restore or enhance cognitive function in patients experiencing age-associated cognitive decline or neurodegenerative disease. The technology offers a promising therapeutic pathway distinct from traditional drug-based approaches, representing a new frontier in neuroimmune modulation for brain health.

Technology Readiness

Technology readiness level 3

Intellectual Property

US20220125849A1

Advantages:

- Novel Immunotherapeutic Approach
- Targeted Immune Activation
- Disease-Modifying Potential
- Broad Applicability
- Flexible Delivery Options

Applications:

- Treatment of age-related cognitive decline
- Alternative for Alzheimer's disease and other dementias
- Neuroimmune therapy for neuroinflammatory brain disorders

For inquiries please contact

techtransfer@amc.edu

Office for Translational Research
Albany Medical College
Albany, NY

