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Office of Technology Management

ENGINEERED TRANSIENT AUTOIMMUNE (ETA) T CELL THERAPY FOR CNS INJURY

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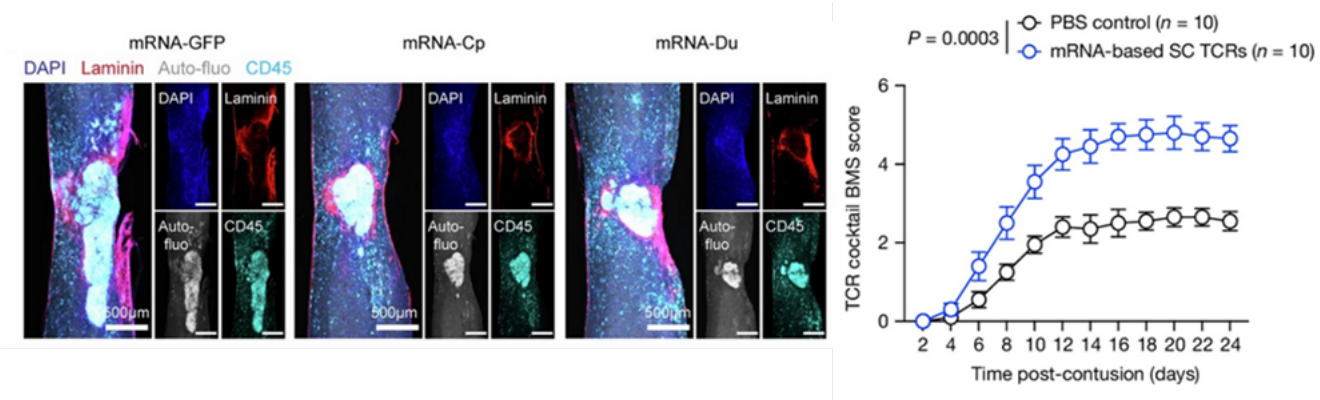
Value Proposition: *Promotion of recovery and reduction of neuronal damage following nerve injury, first T cell approach to neurological disorders.*

Technology Description

Traumatic injuries to the spinal cord or the brain currently have limited treatment options, particularly when the injury is severe. Palliative methods that reduce swelling or coma-inducing medication that give the brain time to heal are often used, but they do not address the underlying tissue damage, or the subsequent degenerative processes caused by the wound.

Researchers at Washington University in St. Louis have characterized and prototyped therapeutic strategies that protect neurons from continuous degeneration, often accompanying initial trauma. A subset of the infiltrating T-cells after CNS injury that react to proteins derived from damaged myelin, were found to confer a protective effect. Engineering injury-associated TCRs into these T-cells creates the titular ETA T cells, the specificity of which guides them to the site of injury and improves recovery through modulating local inflammatory responses.



Above: Preliminary data showing clonality in T-cells from SCI patients suggests off-the-shelf product feasibility.

Stage of Research

ETA T cells are neuroprotective in injury models such as optic nerve and spinal cord injury. Compared to control groups (bottom left panel, mRNA-GFP), treatment with two different ETA T cell types significantly decreases inflammatory responses and limits GFAP scar size (bottom center, mRNA-Cp & mRNA-Du) 4 weeks after injury. When applied as a cocktail, the ETA T cells can significantly improve recovery and mobility (bottom right) as indicated by BMS scores.

Publications:

Engineered T-Cell Therapy for Central Nervous System Injury. Nature (2024)

Applications

- Nerve injury, CNS damage, and ALS.

Key Advantages

- Improved safety – engineered to be transient; no detected ETA T cells at injury site by 4 weeks, no observed harmful autoimmune effects across ETA T cells tested.
- Confers neuroprotective effects while also reducing secondary neurodegeneration..

Patents

Non-provisional US & EP, WO2022246250A1, Neuroprotective compositions and methods

Related Web Links: Jonathan Kipnis Profile; Kipnis Lab