



Functionally tuneable peptide hydrogels for sustained drug delivery

MEDTECH

Product Type	Hydrogel-based delivery system for cells, nucleotides and small molecules
Indication/ROA	Current data supports delivery of specific stem cells for treatment of stroke and traumatic brain injury; potential for other diseases.
Target/MoA	A hydrogel that allows for encapsulation of stem cells as a potential treatment for stroke. With stem cells encapsulated in the scaffold, the gel will be injected directly into the site of injury, localising the cells and sustaining release of cellular factors that stimulate formation or regeneration of neuronal cells; injectable gel.
Development Stage	Efficacy demonstrated for delivery of stem cells in human xenograft model of stroke
Brief Description & Differentiation	<p>A novel functionally tunable peptide hydrogel that improves the delivery of therapeutic agents to the site of action for treatment of stroke and a range of other diseases.</p> <ul style="list-style-type: none"> • Modular, multi-functional hydrogel - ability to link various therapeutic or functional agents • Sustained release of agent; biodegradable over time (can last up to 5 weeks); immune-tolerated • Injectable due to shear-thinning nature of the gel • Gel is scalable; stiffness can be adjusted for various application areas <p>For stem cells:</p> <ul style="list-style-type: none"> • Protects cells and improves viability • Allows for prolonged diffusion of factors from stem cells to the site of injury
Research Team	Prof Mibel Aguilar, Dr Mark Del Borgo, Prof John Forsythe, Dr Brad Broughton
Intellectual Property	Novel compositions patent to be filed.
Key Publications	Steer D L <i>et al.</i> (2002), <i>Curr. Med. Chem.</i> 9 811-822.
Future	Additional animal models (MCAO, NHP), dose effect.

Key Data

Hydrogel physico-chemical properties have been characterized: stable, micro-syringe injectable, shear-thinning and viscoelasticity recovery, shear protection.

In-vivo proof of concept completed, showing successful delivery of specific types of cells encapsulated into the hydrogel within the infarct area and detection 7 days and 28 days after cerebral ischaemia (photothrombosis mice model).

	Gel + Cells – 7 days Post Stroke	Gel + Cells – 28 days Post Stroke
Improve functional outcomes (hanging wire, cylinder test)	✓✓	✓✓
Decrease cerebral infarct volume	✓	✗
Reduce glial scarring	✓✓	?
Increase generation of immune neurons	?	✓

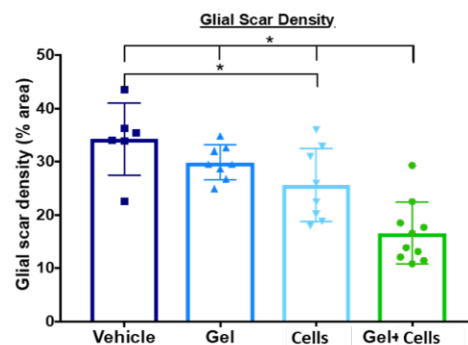


Fig 1. Combination of hydrogel and cells results in reduced glial scar density 7 days after cerebral ischaemia