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CASE STUDY: Using PeptiGel® Alpha 2™ to support cell growth in a model of intracerebellar haemorrhage

The Challenge

Intracerebral haemorrhage (ICH) makes up 10-15% of strokes in western countries but causes disproportionately more deaths. The potential use of regenerative therapies following ICH to improve recovery is gaining interest. Hydrogels are an important part of such therapies and can be used either alone or in combination with bioactive agents ranging from small molecules to cells. To work effectively, a hydrogel must fulfil a wide range of criteria. These include lack of immunogenicity and toxicity, biodegradability, susceptibility to proteases, charge and tunability of elasticity.

The Solution

PeptiGel® is a range of self-assembling peptide hydrogel platform that provides excellent fundamental characteristics for in-vivo studies. These gels can be tuned for elasticity, charge and functionalized with peptide and protein motifs to create a perfect matrix to support the survival and growth of implanted cells or the migration of resident cells. In the present study, PeptiGel® Alpha 2™ was selected for use in rat models of ICH.

PeptiGels® offer an ideal platform for *in-vivo* studies as they have shown to be safe, well-tolerated and support the infiltration of multiple cell types. This allows for the study of applications in the brain and offers huge potential for regenerative therapies such as regeneration after ICH.

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The Results

The Alpha 2™ hydrogel was well tolerated and supported migration of resident cells into a lesion created by treatment with collagenase. The rats suffered no adverse effects from the hydrogel.

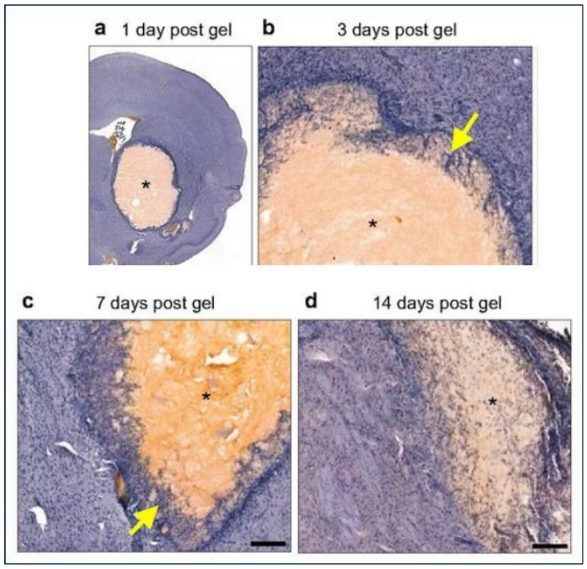

Figure: Alpha 2™ hydrogel supported cell infiltration. FITC-conjugated hydrogel was stereotaxically injected 7 days after intracerebral haemorrhage (ICH). Cell infiltration in the hydrogel (orange) was observed over 14 days post injection (yellow arrows). By day 21 (14 post injection) cells had migrated all the way to the middle of the hydrogel. [Figure adapted from ref: doi.org/10.1007/s12975-023-01189-7].

The Future

PeptiGels® are synthetic, biocompatible and tuneable. As such, they provide an ideal hydrogel carrier for the delivery of therapies or may be useful therapeutically in their own right. An increasing number of research groups are taking advantage of the versatility of PeptiGels® to develop new therapies for a range of diseases.

READ MORE
Bolan et al. Translational Stroke Research 2023.