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Angiogenic Peptide Hydrogels Delivering Neuronal Differentiators for Treatment of Traumatic Brain Injury

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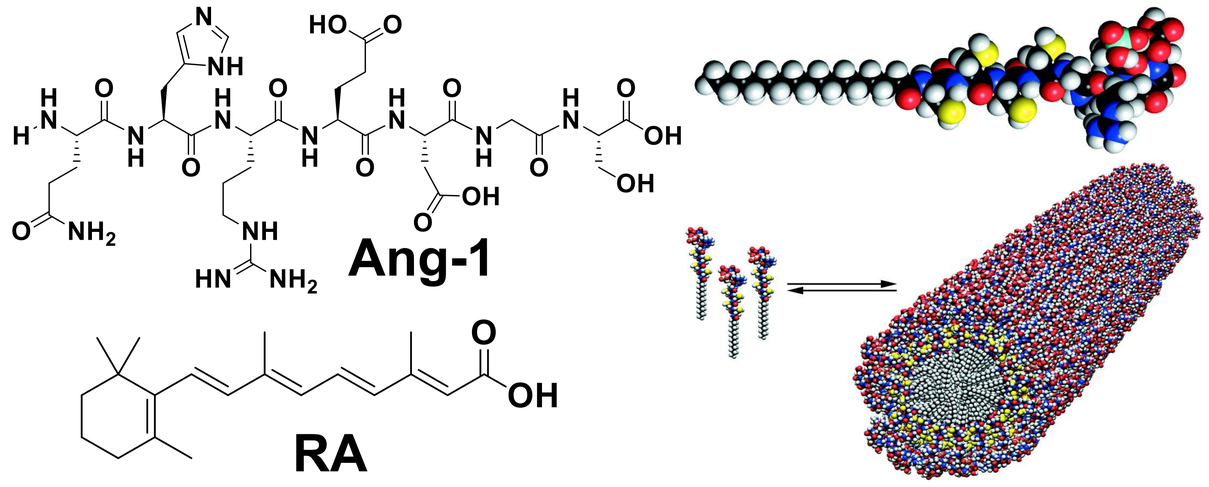
INTRODUCTION & AIM

- Traumatic brain injury (TBI) causes complex cascading damage besides primary injury, so single-target treatments work poorly.
- This study performed amphiphilic modification on Ang-1 mimetic peptides to construct supramolecular hydrogels and realize retinoic acid (RA) loading.
- This hydrogel enables sustained co-delivery of two bioactive agents, which holds promise for cerebrovascular and neural repair as well as brain functional reconstruction.

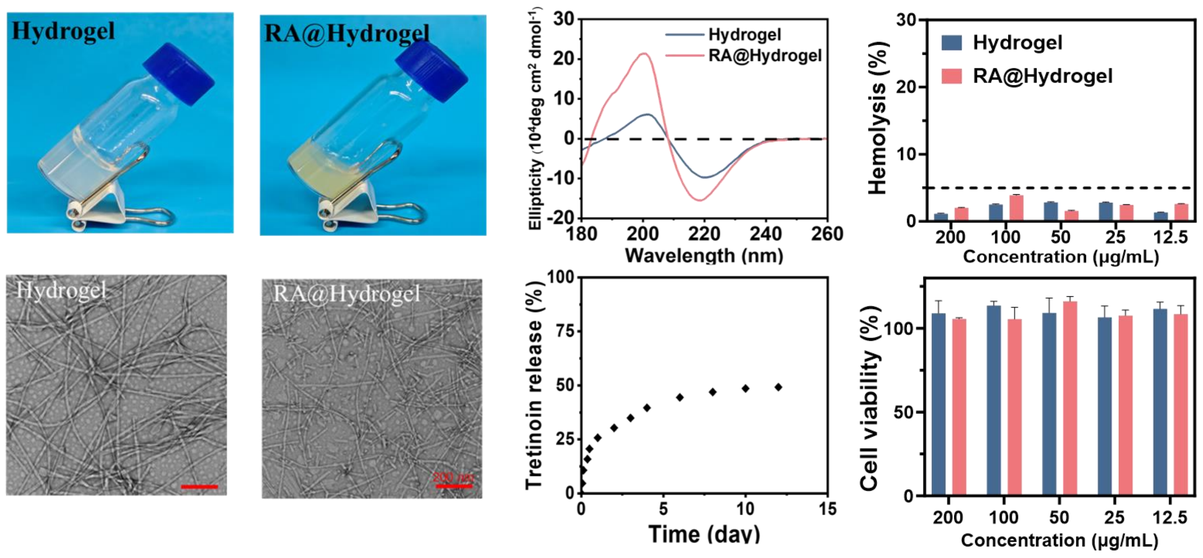
METHOD



- Molecular structures of Ang-1 and RA
- Schematic assembly of amphiphilic peptides

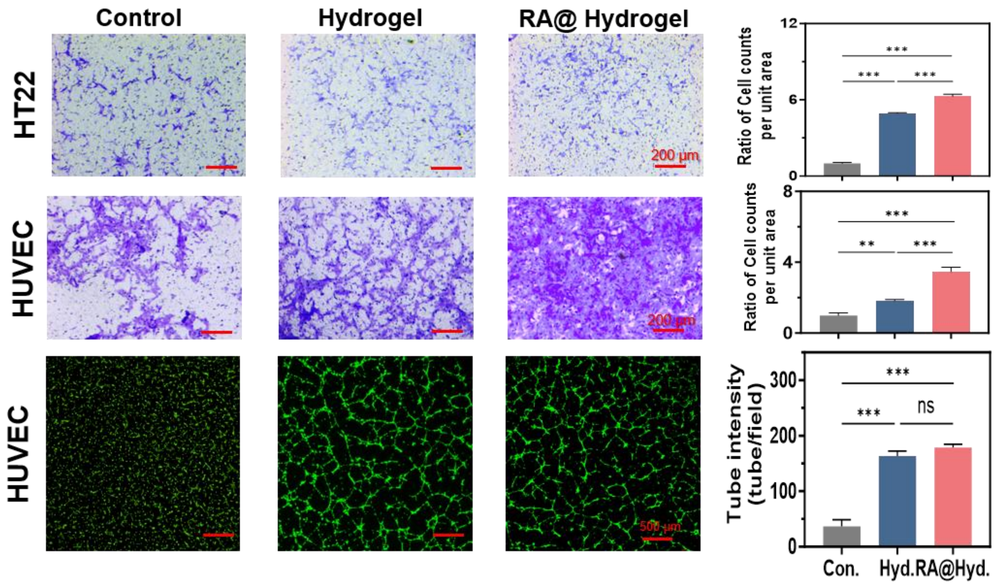
RESULTS & DISCUSSION

Physicochemical Properties



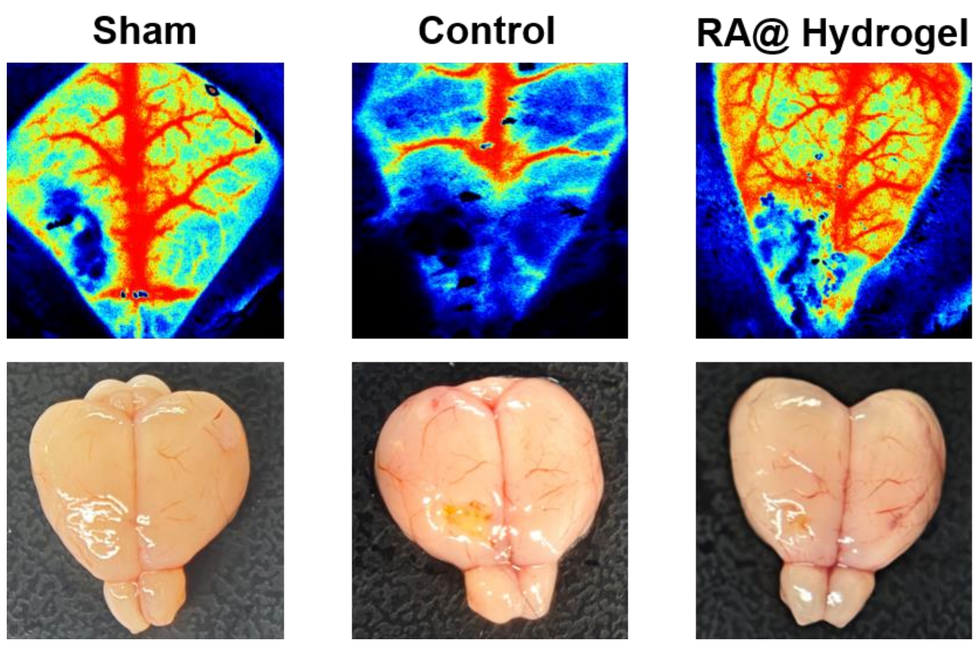
- Formation of biocompatible peptide hydrogels
- Long-term co-delivery of RA

Transwell and Tube Formation



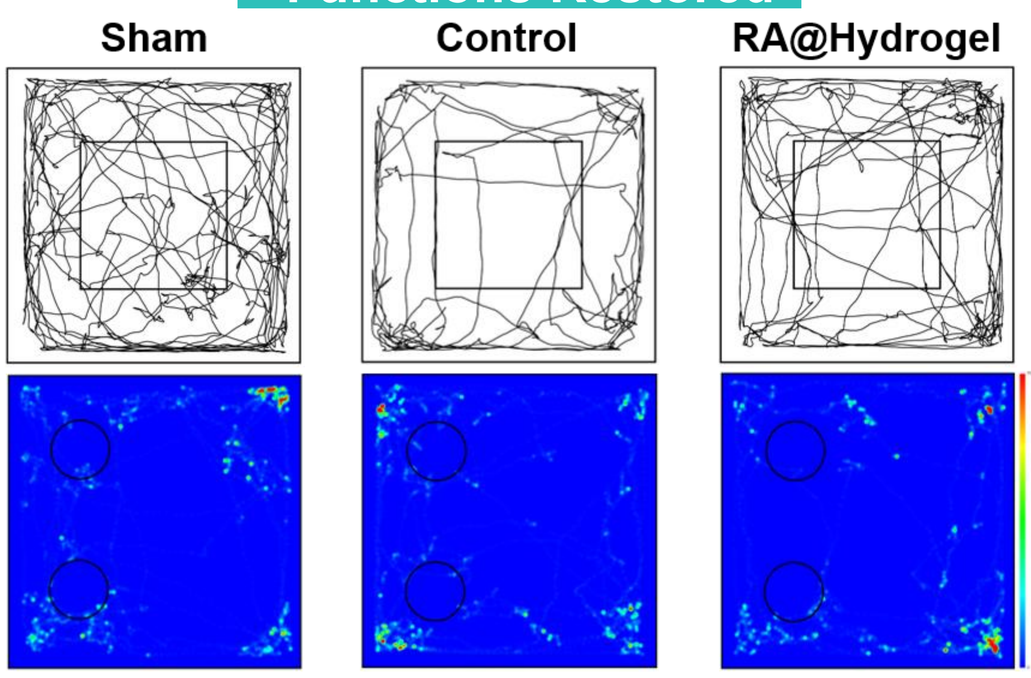
- Recruitment of neural and vascular cells
- Exhibit pro-angiogenic effects

In vivo Evaluation



- Promote cerebral angiogenesis
- Significantly reduce tissue defects after TBI

Functions Restored



- Enhanced motor and memory functional recovery

CONCLUSIONS

- RA-incorporated supramolecular hydrogels were constructed to steadily deliver angiogenic factors and RA to brain lesions at low doses.
- Such biomaterials possess great potential for translational treatment of TBI.

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