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Dynamically crosslinked injectable hydrogels with chemically stabilized multilamellar vesicles

Stanford researchers in the Heilshorn lab have developed injectable, cell-compatible hydrogels with tunable release of therapeutic cargo. Conventional administration of therapeutics can often be hampered by poor targeting, limited serum half-lives, and systemic side-effects which can lead to lower efficacy and the need for repeat treatments. The ability to deliver therapeutic agents in a local and targeted manner, while controlling their release rate over time, is key in addressing the shortcomings of conventional therapeutic administration. These new hydrogels enable delivery of therapeutic cargo, like small-molecules or growth factors, with tunable release rates that are independent of the hydrogel's mechanical properties. Additionally, these hydrogels remain always injectable post-mixing, enhancing ease of preparation and use. These hydrogels are cell-compatible, providing opportunities for the design and application of advanced all-in-one regenerative medicine therapies.

Applications

- Site-specific drug/therapeutic delivery
- Material for regenerative medicine drug delivery
- Stem cell transplant therapies

Advantages

- Local, site-specific drug/therapeutic delivery
- Hydrogel remains always injectable
- Tunable drug/therapeutic release
- Tuning of drug/therapeutic release is independent of hydrogel properties

- Cell-compatible

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