Photomodulation

Dobashi et al. proposed and demonstrated a novel in situ microcatheter-based photomodulated extrusion approach capable of dynamically tuning the physical and morphological properties of injectable hydrogels, optimizing for the local hemodynamic environment and vascular morphology. A shear-thinning and photoactivated PEGDA-nano silicate (PEGDA-nSi) hydrogel is used to demonstrate multiple extrusion modes which are controlled by photokinetics and device configurations. Real-time photomodulation of injected hydrogel viscosity and modulus is successfully used for embolization in various vasculatures, including high-flow large vessels and arterial-to-arterial capillary shunts. Furthermore, a generalizable therapeutic delivery platform is proposed by demonstrating a core-shell structured extrusion encapsulating doxorubicin to achieve a more sustained release compared to an unencapsulated payload¹⁾

1)

Dobashi Y, Ku JC, Ramjist J, Pasarikovski C, Walus K, Madden J, Yang VX. Photomodulated Extrusion as a Localized Endovascular Hydrogel Deposition Method. Adv Healthc Mater. 2023 Jan 22:e2202632. doi: 10.1002/adhm.202202632. Epub ahead of print. PMID: 36681868.

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