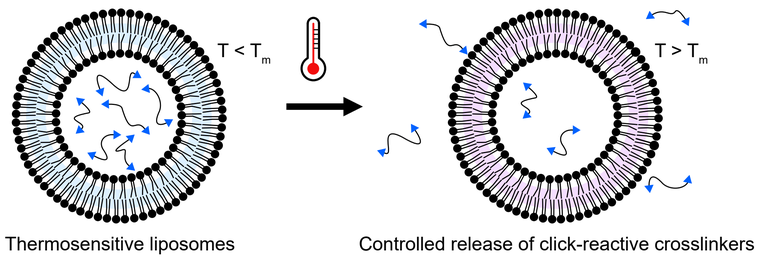
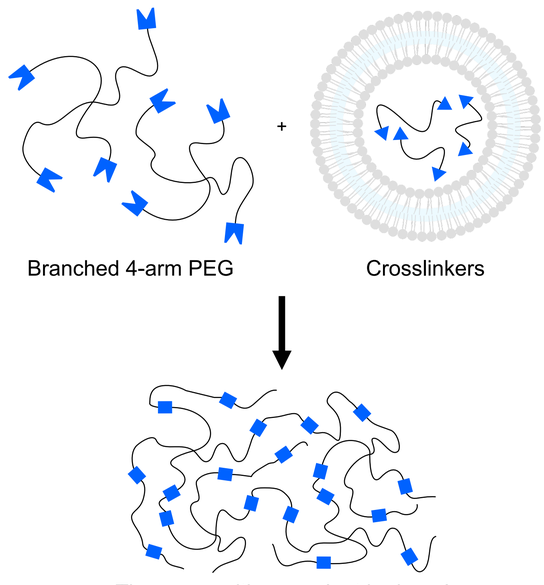
Novel strategy for designing elastic and thermosensitive self-crosslinking hydrogels

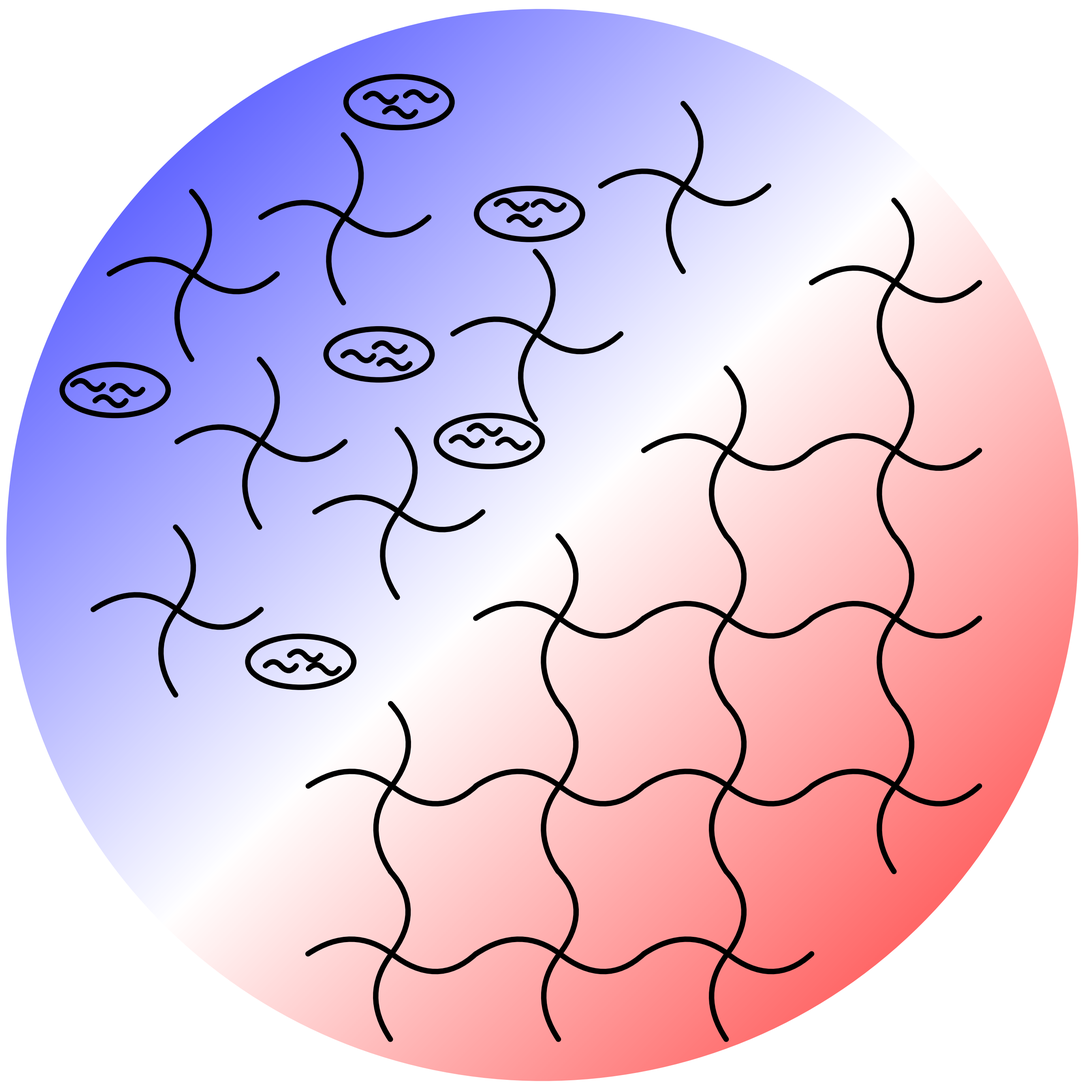
Oriol Palomeras Martínez[1], Vasileios Nikolaidis[1], Andrew J. Urquhart[2], Johan U. Lind[1]
1: Tailored Materials and Tissues, DTU Health Tech
2: Ocular Drug Delivery, DTU Health Tech

1. Introduction

- Thermosensitive hydrogels are mechanically weak
- Covalent crosslinking can't be thermally controlled
- Thermosensitive liposomes could control the reaction kinetics

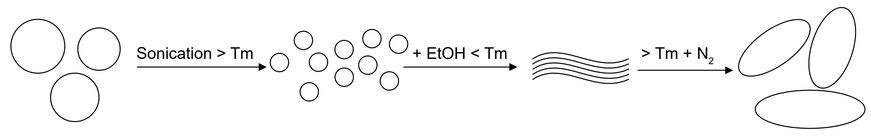


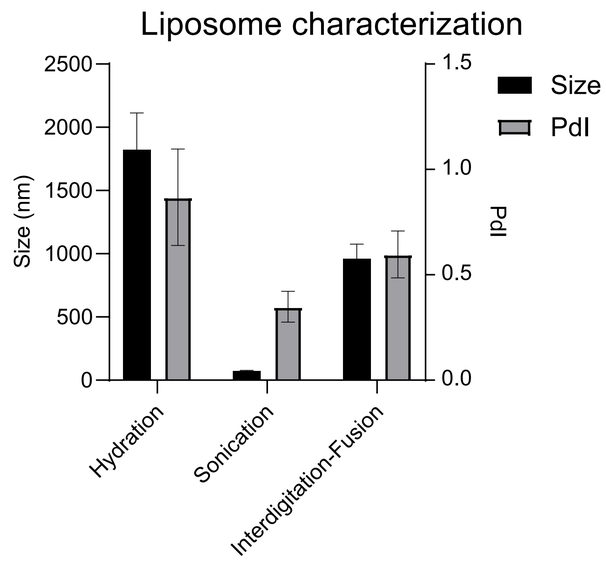


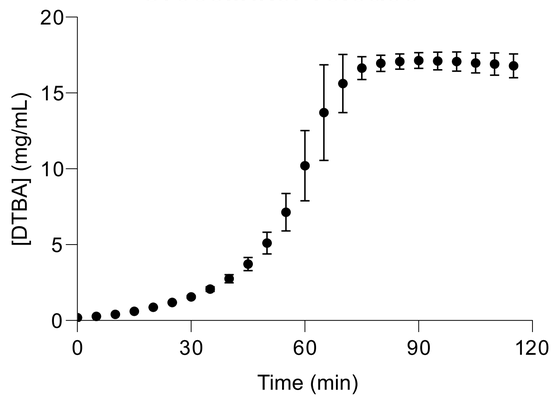


2. Methods

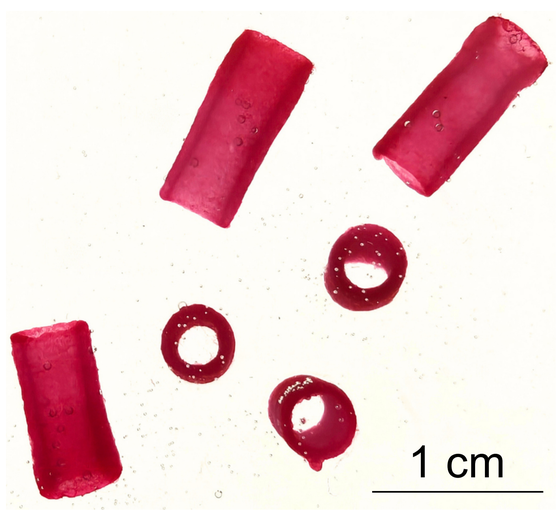
Liposomes were prepared via **interdigitation-fusion**, which creates **high internal volume vesicles**, thus achieving high enough crosslinker encapsulation efficiency

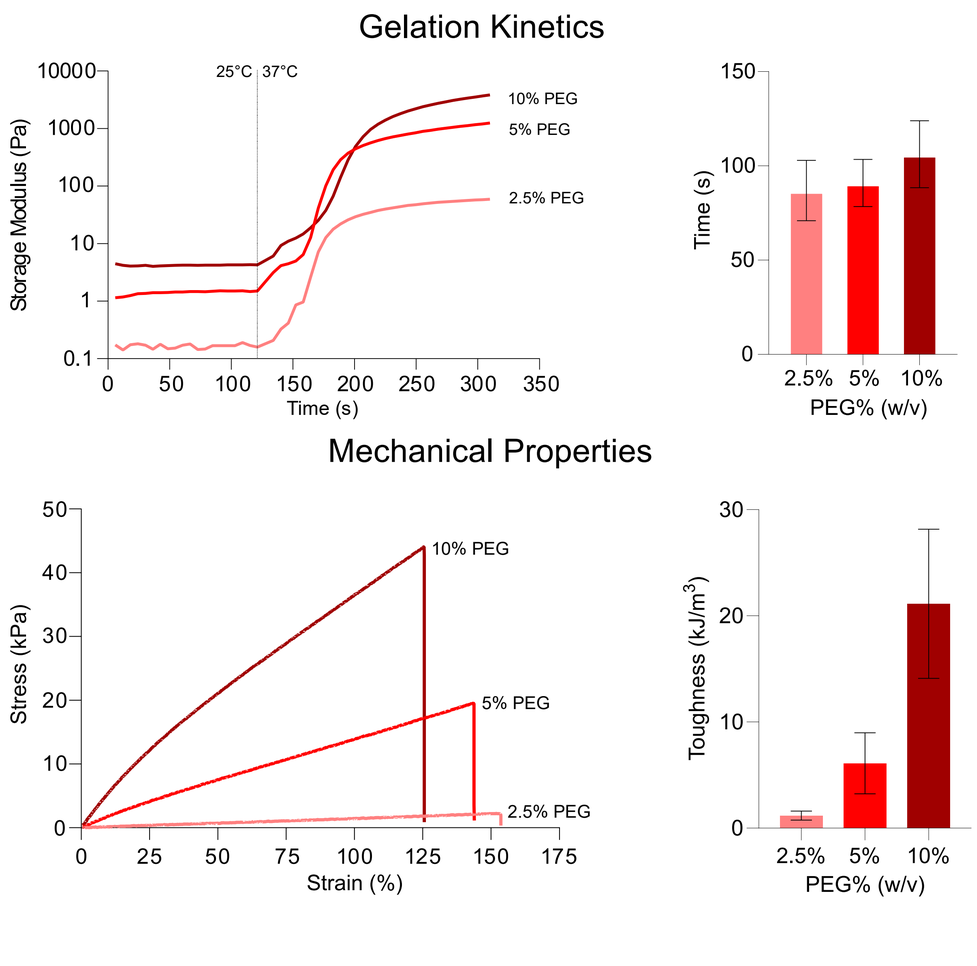






3. Results





4. Conclusions

Due to their **non-covalent gelation mechanisms**, thermosensitive biomaterials lack the **long-term stability and mechanical properties** required when replicating certain tissues.

By **encapsulating a crosslinker** inside **thermosensitive liposomes** we are able to **trigger** the system's **gelation** via increasing the temperature to physiological values.

By using **embedded 3D-printing**, we have been able to produce 3-dimensional stable structures via **thermally-induced crosslinking.**

We have observed that these hydrogel's **mechanical properties** can be tuned by changing the concentration of its main polymer component while keeping its **elastic** and **non-degradable** nature.

Contact: opima@dtu.dk