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Ultrafast *In Situ* Forming Poly(ethylene glycol)-Poly(amido amine) Hydrogels with Tunable Drug Release Properties via Controllable Degradation Rates



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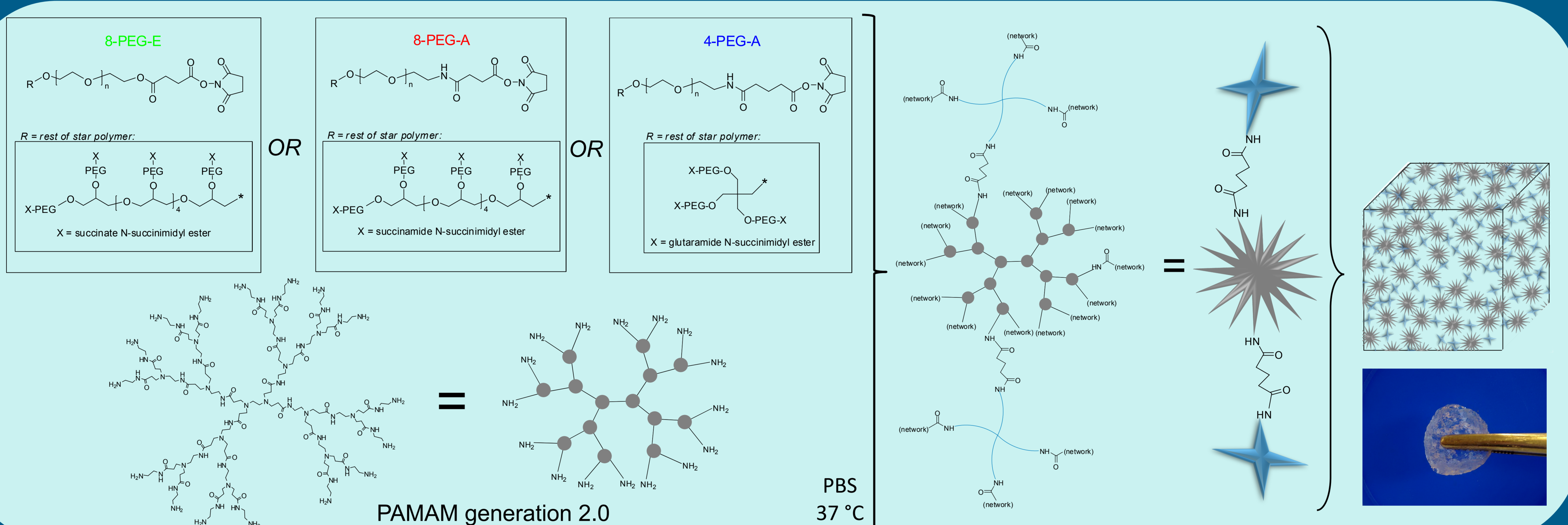


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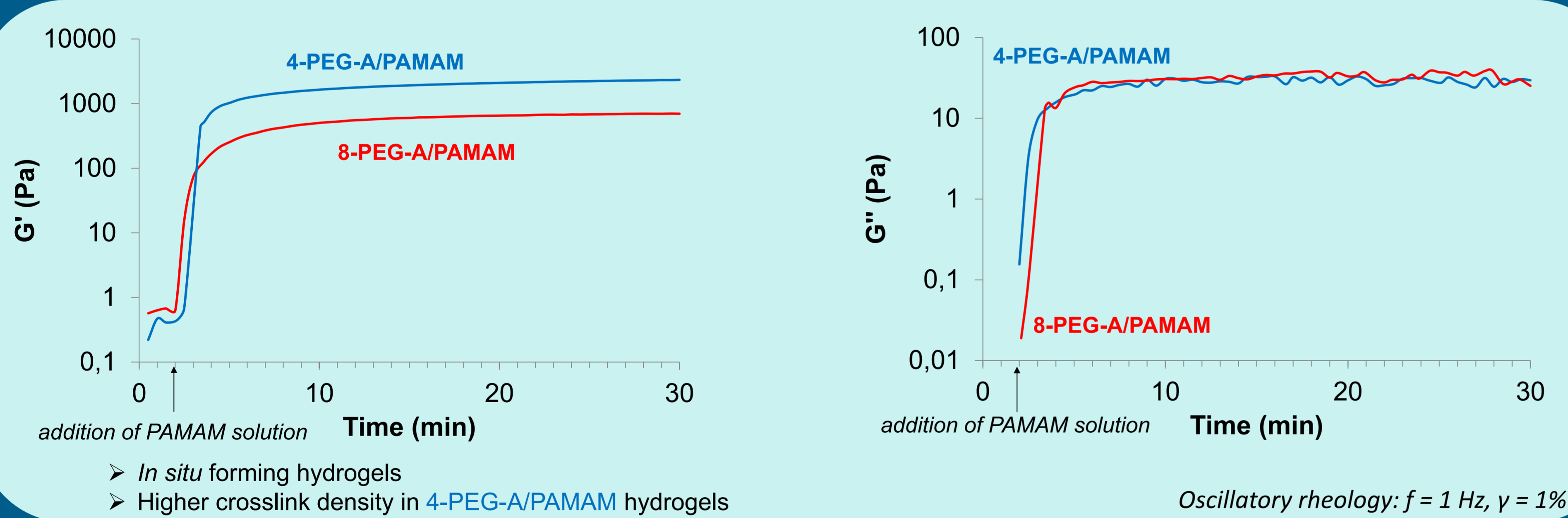
Introduction

Dendrimers have attracted increasing attention for the preparation of biomedical hydrogels thanks to their uniformity combined with control over their size, architecture, density and surface groups. In most poly(amino amide) (PAMAM) based hydrogels, linear poly(ethylene glycol) (PEG) was employed as crosslinking agent. However, star-shaped PEGs offer various advantages over linear PEGs, such as a higher concentration of end groups, which may result in faster gelation. Furthermore, control over hydrogel degradation is an important item that has yet received little attention regarding PEG-PAMAM hydrogels. This prompted us to prepare *in situ* forming PEG-PAMAM hydrogels by reacting PAMAM with multi-armed PEGs containing either a hydrolysable ester group or a stable amide group near each PEG end.

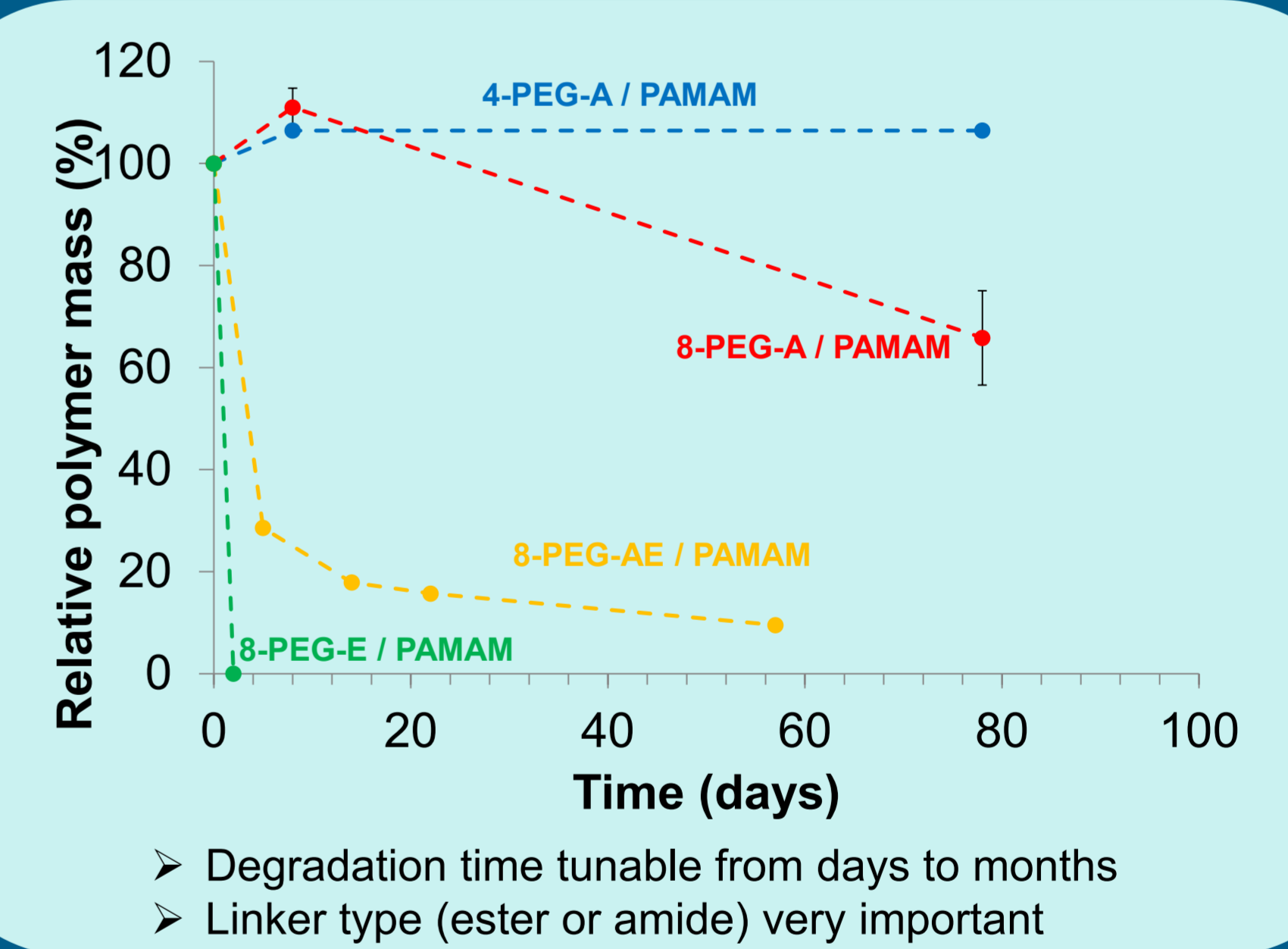
Preparation of PEG-PAMAM hydrogels



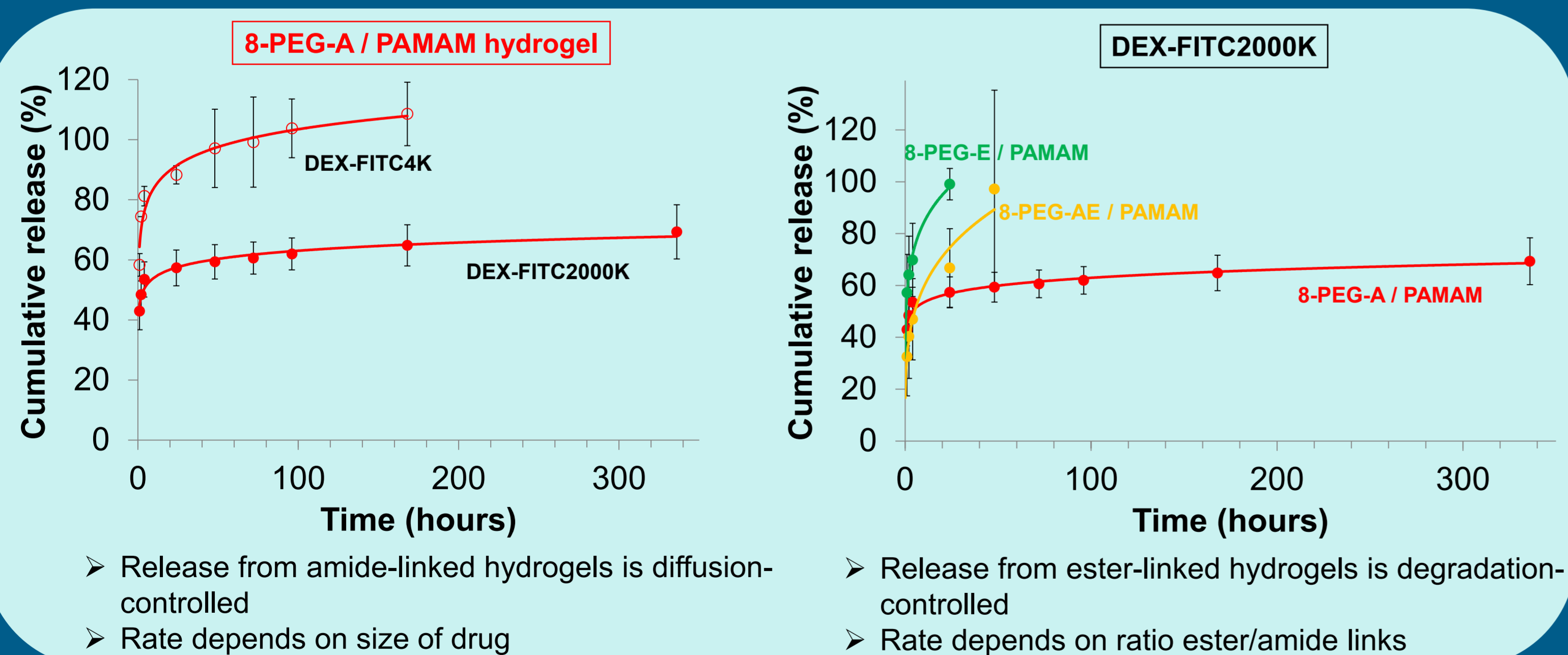
Gelation behavior



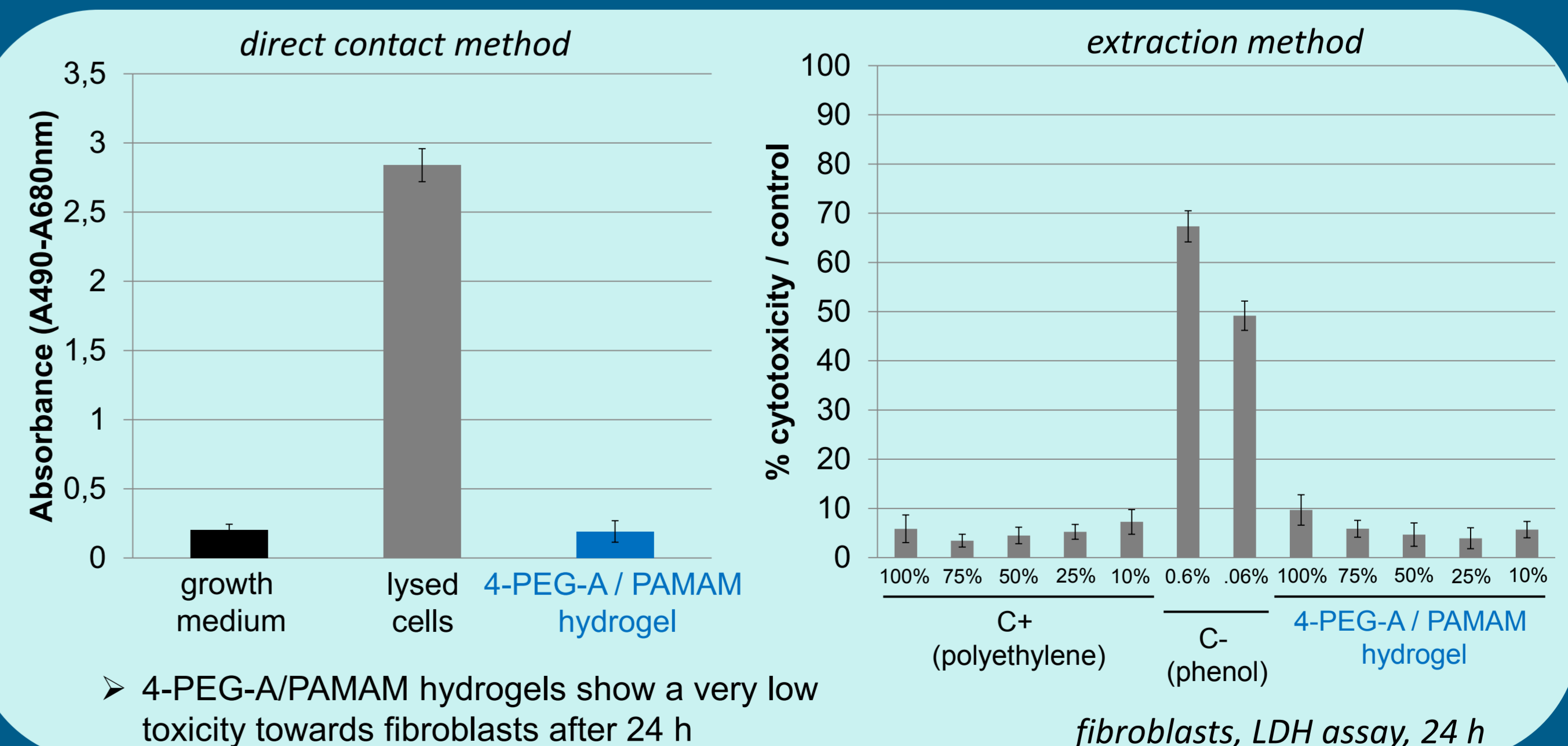
In vitro degradation



Release of model compounds *in vitro*



Cytotoxicity



Conclusions

The possibility to be formed *in situ* and their tunable mechanical, degradation and release properties make these PEG-PAMAM hydrogels appealing as controlled drug delivery systems.

S.J. Buwalda, A. Bethry, S. Hunger, S. Kandoussi, J. Coudane, B. Nottelet, Ultrafast *in situ* forming poly(ethylene glycol)-poly(amido amine) hydrogels with tunable drug release properties via controllable degradation rates, *European Journal of Pharmaceutics and Biopharmaceutics* 2019, 139, 232-239.



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