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Designing 'smart' hydrogels using peptide-responsive conjugates
ALBERTO SAIANI, JEAN-BAPTISTE GUIBAUD, ALINE MILLER, The University of Manchester — Polymers displaying phase transitions in aqueous solution from a hydrophilic to hydrophobic state are of widespread interest as 'smart' biomedical materials. Hydrogels formed from self-assembling peptides have also attracted considerable attention in the past decade. These hydrogels are based on the self-assembly of short peptides into supra-molecular fibres that entangle or associate to form three dimensional networks and, ultimately, self-supporting hydrogels. In order to create a new generation of hydrogel based on self-assembling peptides but possessing an internal transition that can be used as a trigger to release a drug molecule or a specific biological signal we have synthesized a new family of peptide-polymer conjugates using free radical polymerization. We were able to create a new generation of 'smart' hydrogel in which gelation is driven by the peptide while the polymer phase transition can be used to release in a controlled fashion a specific signal or drug molecules. These materials are though to be of prime interest for tissue culture applications where they can be used to deliver specific signals stimulating a specific cell response.

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