

P037 Nanostructured hydrogels by enzymatic dephosphorylation
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Enzymatically triggered hydrogel formation is of potential interest in 3D cell culture applications. We will report on the adaptation of a novel self-assembled hydrogel formed from a single amino acid derivative, fluorenylmethoxycarbonyl-tyrosine-phosphate (developed by Yang and Xu (2004)) that forms a stable self-supported gel upon alkaline phosphatase triggered hydrolysis. We aim to adapt these systems for 3D stem cell culture by (i) developing systems that are stable at physiological pH, (ii) exploiting kinetically controlled gelation to create gels with identical chemical compositions and different elastic moduli. The hydrogels have been characterised by a number of techniques, including oscillatory rheology, CD, Fluorescence spectroscopy, HPLC, cryo-SEM, TEM and AFM, to determine their mechanical and structural properties. The hydrogel mechanical properties could be tuned by varying the concentration of alkaline phosphatase. CD indicated that the tyrosine groups were in multiple configurations, or environments, within the fibres. A small shift in the red region observed through fluorescence spectroscopy revealed Fmoc-excimer formation, indicating that pi-pi interactions play a key role in gel formation. Nanofibres (average fibre size 58-68nm) were observed in an interconnecting network by cryo-SEM. The hydrogels produced have a similar structure to the extracellular matrix and are currently investigated in the context of three-dimensional cell culture of embryonic stem cells.