

**P035** Understanding the Molecular Structure of Fmoc-peptide Hydrogels

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Peptide-based self-assembled biomaterials have the potential to act as artificial extracellular matrices for wound repair and tissue engineering. We recently demonstrated that di-/tri-peptides modified with fluorenylmethyloxycarbonyl (Fmoc) form highly tuneable hydrogels that support cell culture in 3D. Understanding the process of gel formation and the nano-fibrous structures formed is important to begin the rational selection of peptide sequences to produce hydrogels with desirable properties that may ultimately be used to control and direct cell behaviour. Monitoring the environment of the large, aromatic Fmoc group was achieved by observing fluorescence emission of the molecule as the hydrogel forms. Current data indicates that the aromatic fluorenyl rings form  $\pi$ - $\pi$  interactions. Circular dichroism has been used to investigate the peptide backbone arrangement within the hydrogel. Data indicates that a  $\beta$ -sheet structure is formed in the gel state.

These observations imply that the peptides hydrogen bond to one another in addition to aromatic interactions to further stabilise the system. A molecular model suggests that the self assembled structures form via a  $\pi$ -stacking interlocked antiparallel  $\beta$ -sheet arrangement, a number of sheets twist together to form nanotubes.

Transmission electron microscopy confirmed formation of these nano-structures and demonstrates how variations in amino acid sequence alter the structure.