Fluorinated Aromatic Capping Groups in Short peptide Hydrogels

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Over the past few years, many applications of peptide-based hydrogels in drug delivery, tissue engineering, and biosensing have been reported.1 π-stacking is one of the most effective non-covalent interactions and plays a key role in self-assembly of supramolecular hydrogels. Therefore, attaching π-conjugated systems to the N-terminus of a short peptide is an efficient way to construct low-molecular-weight hydrogelators.2

In this project, the aim is to study aromatic-aromatic interactions from a kinetic point of view to obtain a more complete model of the formation and structure of self-assembled gels. In this part of the study, following to our investigation on benzene and naphthalene as capping groups, fluorinated aromatic capping groups have been conjugated to dialanine and diphenylalanine using a range of different linker lengths through solid-phase peptide synthesis (SPPS). Atomic force microscopy (AFM), oscillatory rheology, circular dichroism (CD), IR and NMR analysis have been employed to understand the properties of these peptide-based hydrogels.

We have synthesised several structures of short peptide gelators bearing Penta fluorobenzene as capping groups (Figure 1). These peptide structures afford very useful information regarding our library of different aromatic groups as they are easier to study over some analysis like NMR. Besides, comparing toxicity and drug release studies data of fluorinated and similar non-fluorinated aromatic groups gives us some idea about effects of fluorinated aromatic groups on gel’s matrix.

![Figure 1: Using fluorinated aromatic capping groups for dialanine and diphenylalanine peptides with a different length of linkers.](image)

References:

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