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Supramolecular dehydropeptide hydrogels: synthesis, properties and biomedical applications

P.M. Ferreira,[1*] J. A. Martins,[1] E.M.Castanheira[2]

[1]Universidade do Minho, Centro de Química, Campus de Gualtar, Braga, Portugal
[2]Universidade do Minho, Centro de Física, Campus de Gualtar, Braga, Portugal

Abstract:
Self-assembled low molecular weight peptide hydrogels have emerged in recent years as the new paradigm in biomaterials research due to their high water content; fully organic structure; intrinsic nontoxicity and biocompatibility and fibrillar nanostructure indicative of the extracellular matrix.[1] The properties of peptide hydrogels can be tuned by design and there is a large variety of possible hydrogelator structures using proteinogenic and non proteinogenic aminoacids. Our research group has recently described a series of self-assembled hydrogels based on dehydrodipeptides N-protected with an aromatic moiety. The C-terminal dehydroaminoacid residue (dehydrophenylalanine, dehydroaminobutyric acid and dehydroalanine) is prone to make the peptide resistant to proteolysis and restrains the conformational freedom of the peptide.[2] In this work the preparation and characterization of the new hydrogelators as well as the corresponding hydrogels will be presented together with some biomedical applications of the new biomaterials prepared namely as drug delivery systems or as plataforms for theragnostics.

Keywords: dehydropeptides, hydrogels, biomaterials, drug delivery systems, theragnostic

P = Aromatic Protecting Group
R = Alkyl or Aryl Group
R^1 = H, CH_3 or C_6H_5

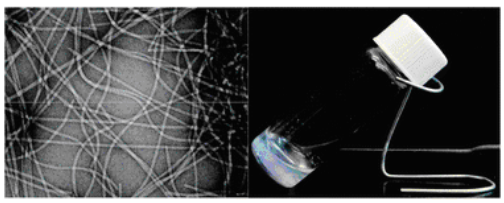

Figure 1: Figure illustrating the hydrogelators and hydrogels structure (TEM).

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