ItPS Friday Seminars

22nd Feb 2024 3pm CEST

LIHI ADLER-ABRAMOVICH
Professor
Tel Aviv - University
Biomaterials for Biomedical Applications

DAVE ADAMS
Professor
University of Glasgow
Adaptive supramolecular gel systems

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LIHI ALDLER-ABRAMOVIC
Professor
Tel Aviv - University

Biomaterials for Biomedical Applications

The emerging demand for tissue engineering scaffolds capable of inducing bone regeneration using minimally invasive techniques prompts the need for the development of new biomaterials. One promising route is molecular self-assembly, a key direction in current nanotechnology and material science. In this approach, the physical properties of the formed supramolecular assemblies are directed by the inherent characteristics of the specific building blocks. Molecular co-assembly at varied stoichiometry substantially increases the structural and functional diversity of the formed assemblies, thus allowing tuning of their architecture and physical properties. Here, in line with polymer chemistry paradigms, we applied a co-assembly approach using hydrogel-forming peptides, resulting in a synergistic modulation of their mechanical properties to form rigid hydrogels that supported osteogenic differentiation immunomodulation and induced tissue regeneration in vivo.

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DAVE ADAMS
Professor
University of Glasgow

Adaptive supramolecular gel systems

We describe methods to prepare supramolecular gels that adapt their properties with time. We use pre-programmed changes in pH to drive changes in molecular packing, microstructure and hence gel properties for both single component and multicomponent systems. For example, we show how we can use pH-driven annealing processes to convert between co-assembled and self-sorted networks in multicomponent gels. We can use this approach to generate many varied systems by changing composition and rates of pH change to access systems with a range of different properties, for example in supramolecule textiles.

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