AMPHIPHILIC LINEAR PEPTIDE/PEPTOID AND HYDROGEL COMPRISING THE SAME

Abstract

The present invention provides an amphiphilic linear peptide and/or peptoid as well as a hydrogel that includes the amphiphilic linear peptide/peptoid. The amphiphilic linear peptide/peptoid is capable of self-assembling into three-dimensional macromolecular nanofibrous networks, which entrap water, and forming a hydrogel. These peptides/peptoids include short amphiphilic sequences with a hydrophobic portion of aliphatic amino acids and at least one acidic, neutral, or basic polar amino acid. The amphiphilic linear peptide/peptoid is build up of non repetitive aliphatic amino acids, which may be in the L- or D-form. A plurality of such peptides/peptoids assembles to supramolecular helical fibers and forms peptide hydrogels after assembly. A corresponding hydrogel is formed in aqueous solutions at physiological pH and is thus useful for inter alia cell culture, tissue engineering, tissue regeneration, wound healing and release of bioactive moieties (including cells, nucleic acids, anti-microbials, micro-/nanoparticles, cosmetic agents and small molecule therapeutics), as well as for providing mechanical support for damaged or missing tissues. Such hydrogels can also be formed *in situ*, wherein the gelation process occurs within the body following the injection of a peptide solution. Such hydrogels, which are rigid, biocompatible and entrap up to 99.9% of water, are also well suited for applications utilizing electronic devices.

Figure 4