

A review of the designs and prominent biomedical advances of natural and synthetic hydrogel formulations

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Abstract

Hydrogels are three-dimensional hydrophilic polymeric networks, capable of absorbing large quantities of water and biological fluids and simulating biological tissue when swollen. Hydrogels are frequently explored for use in numerous biological and biomedical applications due to their desirable properties. Hydrogels are characterized as either synthetic, natural or hybrid, based on the nature of their constituent polymers. The use of natural polymers in hydrogels for biomedical applications is advantageous due to their biocompatibility, biodegradability and non-toxicity, whereas, synthetic polymers are hydrophobic, possessing strong covalent bonds within their matrix, which improves the mechanical strength, service life and absorbability of the gels. Their polymeric crosslinking structure defines their physical or chemical nature, while their polymeric composition indicates whether they are homopolymeric, copolymeric or multipolymeric. All the classifying properties of hydrogels affect their applicability and types of areas in which they can be incorporated. In this review, we critically detail the most common natural and synthetic hydrogel formulations, their designs and their most significant and current biomedical applications.

Biography:

Desireé Gyles is a Pharmaceutical Scientist holding a Masters of Science degree in Pharmaceutical Science from the Federal University of Para (UFPA), and an undergraduatedegree in Biological Science. Her area of emphasis includeDrugs and Medicines, with interest in the biological evaluation of natural and synthetic products.She has contributed two publications thus far: A review of the designs and prominent biomedical advances of natural and synthetic hydrogel formulations (2017); The synthesis and evaluation of polyacrylamide-methylcellulose hydrogel containing *Aloe barbadensis* Miller as a wound healing treatment (2020). She has collaborated on research teams including the Pharmaceutics and Natural Products Development Team – University of Technology, Jamaica (UTech, Ja) (2017 - present),and the team in theLaboratory of Physicochemical Quality Control and Nanotechnology at UFPA (2015-2017).Currently, shelectures in the School of Pharmacyat UTech, Ja as she continues her work with Nanogels and their application to viral replication.

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