Polymeric Hydrogels in Medicine

Authors: Popat Mohite[1], Shubham Munde[2], Vrushali Gokhale[3], Shweta Marade[4], Shreya Chauhan[5], Vaibhav Wagh[6], Jayprakash Suryawanshi[7]

View Affiliations

Source: Polymers in Modern Medicine - Part 2 , pp 26-73
Publication Date: December 2024
Language: English

« Previous Chapter | Table of Contents | Next Chapter »

Abstract

Preview this chapter:

This chapter of the book provides a detailed analysis of polymeric hydrogels in medicine, exploring their different properties, synthesis techniques, and biomedical applications. Starting with an introduction, it explains the definition and historical evolution of polymeric hydrogels and their importance in advancing biomedicine. The chapter then examines the physical characteristics, chemical structure, and responsive behavior of polymeric hydrogels to provide a foundational understanding. It also covers different synthesis and fabrication techniques, including polymerization approaches and various crosslinking methods, as well as advanced techniques such as microfluidics and 3D printing. The chapter then delves into the biocompatibility and bifunctionality of polymeric hydrogels, including their interactions with biological systems and the incorporation of bioactive agents for specific applications. It discusses their different applications in medicine, from drug delivery systems to wound healing and tissue engineering, with illustrative case studies. The chapter also addresses the challenges and solutions related to biodegradability, immunogenicity, and regulatory considerations