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SYMPOSIUM

# Anti-Inflammatory Polymeric Coatings for Implantable Biomaterials and Devices

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## Abstract

Synthetic polymer coatings are used extensively in modern medical devices and implants because of their material versatility and processability. These coatings are designed for specific applications by controlling composition and physical and chemical properties, and they can be formed into a variety of complex structures and shapes. However, implantation of these materials into the body elicits a strong inflammatory host response that significantly limits the integration and biological performance of devices. Biomaterial-mediated inflammation is a complex reaction involving protein adsorption, leukocyte recruitment and activation, secretion of inflammatory mediators, and fibrous encapsulation of the implant. Significant research efforts have focused on modifying material properties using various anti-inflammatory polymeric surface coatings to generate more biocompatible implants. This minireview provides a brief background on the events of biomaterial-mediated inflammation and highlights various approaches used for modifying material surfaces to modulate inflammatory responses. These include both passive and active strategies, such as nonfouling surface treatments and delivery of anti-inflammatory agents, respectively. Novel approaches will be needed to extend the *in vivo* lifetime and performance of devices and reduce the need for multiple implantation surgeries.

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**Abbreviations:** (α-MSH) alpha melanocyte-stimulating hormone, (DEX) dexamethasone, (DNA) deoxyribonucleic acid, (FBGC) foreign body giant cell, (FBR) foreign body reaction, (IL) interleukin, (PEG) polyethylene glycol, (SAM) self-assembled monolayer, (TNF) tumor necrosis factor

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