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CONTROLLED POLYMER SURFACE PLASMA MODIFICATION FOR IMPROVED DRUG ADHESION AND PREVENTION OF MEDICAL DEVICE RELATED BIOFILM INFECTION

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The success of an organism as a pathogen relies on its ability to adhere to the surface and remain there under the protective covering of the extracellular material, which forms the biofilm. The inclination for bacteria to become surface bound is so ubiquitous in diverse ecosystem that it suggests a strong survival and selective advantage for surface dwellers over their free ranging counterparts. Biofilm formation and persistence has profound implications for the patient, because microorganisms growing as biofilm are significantly less susceptible to antibiotics and host defenses than their planktonic forms. Surface modification and wettability of polymer treated at variable RF source power is investigated to study the effect of RF plasma power on extent of surface modification. Plasma treatment was used to modify the implant surface to facilitate the adhesion of antimicrobial drug. Surface topography of the implanted material is one key issue in medical implant infection as bacterial adhesion is a prerequisite condition for biofilm formation. RISUG® (reversible inhibition of sperm under guidance), a copolymer of styrene maleic acid, is a potent male contraceptive currently undergoing extended phase III clinical trials in India. In previous studies, RISUG® was evaluated for its antibacterial properties against both gram-positive and gram-negative strains of bacteria. The drug has proven to have effective antimicrobial properties. Therefore the drug RISUG® is proposed for coating over implanted polymer surface to overcome initial infection.

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