EuroSciCon

World Congress on
Polymer Engineering

August 09-10, 2018
Prague, Czech Republic

Ki Dong Park et al., Polym Sci 2018, Volume 4
DOI: 10.4172/2471-9935-C3-015

TYROSINASE-MEDIATED POLYMERIC SURFACE MODIFICATION FOR ANTI-BACTERIAL AND ANTI-THROMBOGENIC ACTIVITY

Ki Dong Park[1], Si Min Lee[1], Yunki Lee[1], Kyung Min Park[2] and PhUong Le Thi[1]

[1]Ajou University, Republic of Korea
[2]Incheon National University, Republic of Korea

Medical devices-related thrombosis and infection formation cause serious adverse clinical events, leading to higher hospital costs and increases in morbidity/mortality. To overcome this, surface modification is getting much attention to improve the performance of implantable medical devices. In this study, we introduced a new strategy to simultaneously impart antithrombotic and anti-infective properties to surfaces in a one-step process, using tyrosinase (Tyr)-catalyzed oxidative reaction. Heparin, an anticoagulant agent approved by FDA, was conjugated with tyramine (termed "HT") to provide the phenol moieties as substrates for enzymatic activities of Tyr. The catechol forms generated by Tyr were used for two functions: (1) immobilization of HT molecules for antithrombotic activity through anticoagulant properties of heparin and (2) *in situ* formation of Ag NPs for antibacterial activity. The successful immobilization of both heparin and Ag NPs on surfaces was confirmed by analyses of water contact angles, XPS, TEM and AFM. The resulting HT/Ag NPs immobilized surfaces possess high stability for over 30 days. Importantly, the modified surfaces achieved thromboresistant properties by inhibiting the fibrinogen absorption, platelet adhesion and prolonging the blood clotting time. In addition, the integrated HT/Ag NPs immobilized surfaces exhibited excellent antibacterial performances against both Gram-positive (*S. aureus*) and Gram-negative (*E. coli*) bacteria. From the obtained results, we suggest a useful, effective and time-saving method to reduce the thrombosis and infection associated with medical devices.

Biography

Prof. Ki Dong Park has completed his B.S. in Industrial Chemistry from Hanyang University in 1981, Seoul, Korea. He completed his Ph.D and Postdoctoral studies in Pharmaceutics from University of Utah in 1990, and 1991 respectively. He was awarded from American Society for Artificial Internal Organs (ASAIO), Outstanding Paper Award, KIST, Korean Minister of Science and Technology Award, Grand Prize of Korean society for biomaterials, LG Chemical Polymer Award of The Polymer Society of Korea, Grand Prize of Korean society for biomaterials. He is editorial Board of 11 journals. He is presently President and Honorary President of Korean Society for Biomaterials.

kdp@ajou.ac.kr