A Review on Photo-immobilization of Biosignal Molecules with Medical and Biological Applications

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Abstract
Immobilization of biosignal molecules like growth factors and cytokines is important for developing biologically active materials. Because these materials have important contributions in targeted cell culture, photo-immobilization of visible-light induced crosslinkable biosealant in direct pulp capping material in the dental field, biosealants in tissue engineering and anti-adhesive agents for preventing tissue adhesions after surgery and design and fabrication of biological scaffold contributed to tissue engineering, photolithography. The photo-immobilization of biosignal molecules has more meanings than only immobilization of an enzyme in a bioreactor or ligand-receptor interactions, because the immobilized biosignal molecules work on cells which have very complex structures and functions. This review discusses so far progresses in immobilization of biosignal molecules including growth factors and cytokines with biological and medical applications. At first, photolithography and cell patterning were studied. Then biosignal molecules, photo-immobilization process and co-immobilization were reviewed. Since the material properties of surfaces have direct effect on the cellular functions and thereby affecting growth patterns, therefore, the biological properties of surfaces such as cell adhesion, cell migration and cell growth were investigated. Finally different photo biosystems active to the UV, visible and laser and some of their intercellular applications were studied.

Keywords: Photo-immobilization, Growth Factor, Biosignal Molecules, Photolithography, Laser.