

Title: A review of cell adhesion studies for biomedical and biological applications

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Abstract: Cell adhesion is essential in cell communication and regulation, and is of fundamental importance in the development and maintenance of tissues. The mechanical interactions between a cell and its extracellular matrix (ECM) can influence and control cell behavior and function. The essential function of cell adhesion has created tremendous interests in developing methods for measuring and studying cell adhesion properties. The study of cell adhesion could be categorized into cell adhesion attachment and detachment events. The study of cell adhesion has been widely explored via both events for many important purposes in cellular biology, biomedical, and engineering fields. Cell adhesion attachment and detachment events could be further grouped into the cell population and single cell approach. Various techniques to measure cell adhesion have been applied to many fields of study in order to gain understanding of cell signaling pathways, biomaterial studies for implantable sensors, artificial bone and tooth replacement, the development of tissue-on-a-chip and organ-on-a-chip in tissue engineering, the effects of biochemical treatments and environmental stimuli to the cell adhesion, the potential of drug treatments, cancer metastasis study, and the determination of the adhesion properties of normal and cancerous cells. This review discussed the overview of the available methods to study cell adhesion through attachment and detachment events.