

Analysis of titanium disc surface modified by using L-DOPA after acid etching

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A large number of implants have been studied by immobilizing of biomolecules on biomaterials. The L-DOPA was attached on surface-modified titanium as biomolecule to manufacture amine groups. The water contact angles of non-treated titanium disc (negative control), etched titanium disc (positive control) and titanium disc treated with a dopamine after etching process (experiment group) were $82.4 \pm 5.7^\circ$, $67.1 \pm 0.56^\circ$ and $44.15 \pm 0.91^\circ$ individually. We could find dopamine which had been adhered to titanium surface by AFM images. The quantifications of amine groups on positive control and experiment group were approximately $3\mu\text{g}$ and $7.5\mu\text{g}$ individually. The number of human bone marrow mesenchymal stem cells (BM-MSCs) on the experiment group was much higher than that of cells on any other groups. According to the data, our report proposed that there may be a causal link between increased dopamine content and cell proliferation in BM-MSCs. In addition, the dopamine can make the titanium surface more hydrophilic and enhance the adhesion of BM-MSCs cells.