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Histological Reactions to Metal Implants in the Subcutaneous Connective Tissue of Mouse

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Present study was performed to evaluate the histological response of mouse connective tissue following implantation of titanium and titanium alloys. The titanium and titanium alloy specimens with anodizing or heat treatment were implanted in the subcutaneous tissue of the abdominal region of mice for 2 weeks. The mice were sacrificed at 2 weeks after implantation and the implants with surrounding tissue were exercised. The tissue reaction to specimens was histologically studied. The implants were encapsulated by fibrous connective tissue consisting of fibroblast, fibrocyte, inflammatory cells, other cells and collagen fibers. Some newly formed blood vessels were located in the fibrous capsule surrounding the implant. Multinuclear giant cells were observed at the fibrous capsule adjacent to implant. Different cell types and the thickness of fibrous capsules were examined quantitatively. Most of cell types(75%-84%) located in the fibrous capsule were fibroblast and fibrocyte. The average thickness of fibrous capsules for the heat-treated specimens was much thinner than for the anodized specimens. These results suggest that modification of the surface properties of titanium and titanium alloy implants changes the biological properties of connective tissue. Our observations indicate that heat-treated specimens are more effective for the improvement of biocompatibility compare to the anodized specimens.

Keyword: Metal, Biocompatibility, Connective tissue, Mouse