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## **Influence of multiscale and curved structures on the behavior stem cells and macrophages**

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The direction and motion of cells have a key role in many physiological processes, such as tissue morphogenesis, or embryonic development. These interactions are regulated by the chemical surface properties of the biomaterial and its surface topography. Topographical modifications of surfaces ( $\mu\text{m}$  and  $\text{nm}$ ) are known to induce changes in cell shape and adhesion, thereby affecting cell behavior. The control of the cell contact guidance is very promising. Ko and al. have shown that the junction angles, can modulate the motion speed of cells without altering their directionality. Generally speaking, in its environment, the cell is not confronted to structures having strict corners, but to curved structures. Previous papers. have studied that the influence of curved structures on cell behavior and Laser Induced Periodic Surface Structures (LIPSS) in static mode separately. In this work, the structures which were both curved and multi-scale patterned were designed and their influence on cell behavior was studied. TA6V is one of the most commonly used metallic alloys in biomedical applications. A femtosecond laser was used as a surface texturing technique in order to create multi-scale structures on the TA6V surface: material ablation ( $30\mu\text{m}$ ) and generation of LIPSS ( $\sim 600\text{nm}$ ). The present work focused on stem and macrophage cells motion (position, direction and speed) within multi-scaled structures to verify whether the LIPSS has a competitive or a complementary effect on cell movement.