**Metal additive manufacturing in the biomedical field: the cells' point of view**

The contact of an implant surface with the biological environment, which occurs as soon as the implant is introduced, influences the sequence of initial protein adsorption, interactions with blood such as platelet adhesion and haemostasis, inflammation, and osteogenic cell responses. *In vivo*, cells are surrounded by the extracellular matrix (ECM), a complex structure composed of many types of proteins such as collagens, proteoglycans, glycoproteins and glycosaminoglycans. ECM acts like a 'reservoir' storing and presenting growth factors to cells. This control occurs through multiple physical mechanisms like ECM micro/nano-topography, elasticity, and mechanical signals that are transmitted from ECM to cells. Advances in computational design and additive manufacturing (AM) have resulted in the quick and accurate fabrication of 3D porous scaffolds whose well-controlled architecture plays an important role in the regulation of cell behaviour. In the cells' sensing of the physical and functional properties of the external environment (i.e. microenvironment), their adhesion to the scaffold's surface is the key event to cell decision-making. The cell membrane receptors called integrins transduce physical information from the microenvironment into intracellular signalling pathways, leading to changes in cell proliferation, differentiation, migration or apoptosis. Customized metal scaffolds developed by AM with appropriate planning of properties such as chemistry, topography and stiffness capable of controlling and guiding cell behaviour, could represent a step forward to match actual needs, bringing positive influence on their practical application and clinical value.