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**ZIRCONIA THIN FILMS FOR IMPROVING THE CELL ADHESION ON TITANIUM ALLOY**Jean-Francois Pierson<sup>1</sup>, André Marlot<sup>1</sup>, Teresa Toll-Duchanoy<sup>1</sup>, Alain Billard<sup>2</sup><sup>1</sup>Institut Jean Lamour / Dpt CP2S, Nancy, France <sup>2</sup>LERMPS, Belfort, France

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Titanium alloys (TA6V) are widely used for implant applications in dentistry. This presentation aims to study the improvement of the osteointegration behaviour of such implants after deposition of a thin zirconia layer.  $Zr_{100}Y_0$  and  $Zr_{92}Y_8$ ,  $Zr_{84}Y_{16}$  targets were pulsed-DC sputtered in Ar-O<sub>2</sub> reactive atmospheres leading to the deposition of monoclinic, quadratic and cubic zirconia films, respectively. These structural features were confirmed by X-ray diffraction and  $\mu$ -Raman spectrometry analyses. These three kinds of films and uncoated TA6V samples were then used as substrates for the growth of fibroblasts. After rinsing and drying, the samples were observed by scanning electron microscopy and transmission. SEM observations have verified the colonization or no colonization of substrates and those carried out by TEM allowed to control the internal structure of cells (nuclei, mitochondria, Golgi apparatus, rough endoplasmic reticulum ...). The results obtained by SEM clearly show a difference in cell growth depending on the crystallographic structure of the zirconia film. Cells grown on a film of monoclinic zirconia have an appearance similar to those grown on a substrate TA6V. However, the use of a cubic zirconia coating leads to premature cell death. The result is very similar to a film of tetragonal zirconia. These last two crystallographic forms cannot be used for the intended applications.

**Keywords**

osteointegration

zirconia

structure