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Human embryonic kidney cell behavior on a new β-type titanium alloy by Alamar Blue assay

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Development of β-type titanium (Ti) alloys with a lower elastic modulus and better ductility than common medical titanium alloys have recently attracted much attention for biomaterials applications. The aim of this *in vitro* research was to analyze the cellular behavior of human embryonic kidney 293T (HEK293T) cells grown on the β-type Ti-35.5Nb-5.7Ta alloy using Alamar Blue assay to verify the cytocompatibility of this alloy. In this research, hip implants of β-type Ti-35.5Nb-5.7Ta alloy were fabricated by powder metallurgy. An advanced surface treatment technology of Laser Engineered Net Shaping (LENS) was used to apply a ZrO_2/Zr coating on the implant surfaces where relative movement takes place between the implant and the bone, in order to enhance the wear resistance. The present work was conducted to evaluate the cytotoxicity of uncoated and ZrO_2/Zr coated β-type Ti-35.5Nb-5.7Ta alloy in both indirect and direct contact of HEK293T cells. The cellular response was quantified by cell viability assessments using Alamar Blue assay and cell attachment. Cytotoxicity experiments did not show any toxic response of the alloys on surviving cells. HEK293T cells displayed appropriate survival rates, good cell adhesion and spreading. These results indicate good cytocompatibility of the uncoated and ZrO_2/Zr coated β-type Ti-35.5Nb-5.7Ta alloy, which allowed adhesion and proliferation of HEK293T cells to occur in both indirect and direct contact cell culture methods by Alamar Blue assay.

Biography

Mehdi Razavi is currently a Postdoctoral Research Fellow in Biomaterials with the BCAST at Brunel University London. Earlier, he has joined Oklahoma State University as Research Scholar. He holds a PhD from Isfahan University of Technology in 2014. He has authored over 30 peer-reviewed journal articles, 7 conference proceedings, 2 book chapters and 2 books. He has been cited ~349 times with an h-index: 12 and i-10 index: 13. He also serves as the author, reviewer, Chief Editor and of Editorial Board Member of numerous recognized international journals, books and agencies.

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