Beatrice Mozzoni, Oral Health Dent Manag 2018, Volume: 17
DOI: 10.4172/2247-2452-C4-076

31st International Conference on
DENTAL SCIENCE & ADVANCED DENTISTRY
June 25-26, 2018 | Vancouver, Canada

Role of titanium implant surface micro-topography and wettability on macrophage polarization: A systematic review

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It had been long recognized that macrophages were phagocytic cells mainly involved in foreign body rejection and tissue homeostasis, but the recent discoveries of their polarization against an inflammatory (M1) or reparative (M2) phenotype, as their ability to secrete osteoinductive factors (i.e. BMP-2) have shed new light on a potential pivotal role these cells could play in titanium implant osseointegration process. However, the literature on this topic is still poor and few works have been carried out in order to identify the role of titanium surface properties in guiding macrophage activation and polarization. To this purpose, the goal of the present work was to revise the current literature on *in vitro* works, which aimed to understand the leading mechanisms supporting macrophages differentiation. The search strategy was implemented on 2 electronic databases and grey literature between May and December 2017. *In vitro* studies analyzing the response of macrophages to titanium implant surfaces with differences in micro-topography or wettability were considered in the present work if meeting the inclusion/exclusion criteria. Ten records were finally included in the analysis, 8 investigated the response of macrophages to titanium implant surfaces with different micro-topography and 6 to surfaces with different wettability.Findings of records analyzed agreed on the immuno-modulatory effect triggered by surface topography, with rough surfaces that better promote macrophages activation, and hydrophilicity that has a major role in molding the plastic nature of macrophages towards a M2 phenotype.

Biography

Beatrice Mozzoni is an undergraduate student currently attending the sixth year of Dentistry at University of Parma. Her main interests include bone and dental biomaterials, with focus on pre-clinical laboratory research on osteoblasts and macrophages.

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