

## The interaction of macrophages with biomaterials

Marianne B Ariganello<sup>1</sup>\*, Sidney Omelon<sup>2</sup>, Fabio Variola<sup>2</sup> and Antonio Nanci<sup>1</sup>

<sup>1</sup>Université de Montréal, Canada

<sup>2</sup>University of Ottawa, Canada

Upon implantation, biomaterials are exposed to numerous inflammatory cells, including macrophages. The latter either promotes healing by initiating appropriate tissue repair or defends the body by degrading the material or creating a fibrous capsule around it. Many studies of biomaterial biocompatibility focus on the response of tissue specific cells (such as osteoblasts or fibroblasts). However the macrophage response during healing also needs to be addressed. Because macrophages are one of the first cell types to interact with the biomaterial, they will direct downstream cellular events. Therefore, understanding the influence of a biomaterial on macrophage signaling is essential to elucidating not only the immediate host response but ultimately also the long-term performance. It is becoming well established that the surface characteristics of the biomaterial critically influence cell function. Since cell signaling occurs at the nano level, surface modifications at the scale of the cell's sensing apparatus have a great potential to influence signaling events. In this context, we are investigating the behavior of macrophages to medically-relevant metals whose surface has been modified by oxidative nanopatterning. Our previous research demonstrated that such nanopatterning selectively affects adhesion and protein expression of both fibroblasts and osteoblasts, while our initial results using the U937 macrophage cell line reveal differences in cell morphology and spreading. Our ultimate objective is the rational design of surfaces that will achieve optimal macrophage response and clinical performance. The importance of macrophage-biomaterial studies as well as nanostructure surface effects on macrophage signaling and function will be discussed. Supported by CIHR, FRSQ and NSERC.

### Biography

Marianne Ariganello was trained in Chemical Engineering (B.Eng, Lakehead University, Thunder Bay, ON, Canada) before pursuing her PhD in Biomedical Engineering from Dalhousie University, (Halifax, NS Canada). She has completed postdoctoral studies at Ecole Polytechnique (Montreal, QC, Canada) and is currently completing her post-doctoral training at Université de Montréal in the area of cell-biomaterial interactions. Her primary research area of interest is understanding the interface between biomaterials and their host environment, specifically focusing on the role macrophages have in determining successful implant integration. She has completed a certificate in University Teaching and enjoys teaching at the university level and mentoring students in research.

marigane@gmail.com