

# A03 – Material surface charges and cell physiology - Research goals

## Principal investigators

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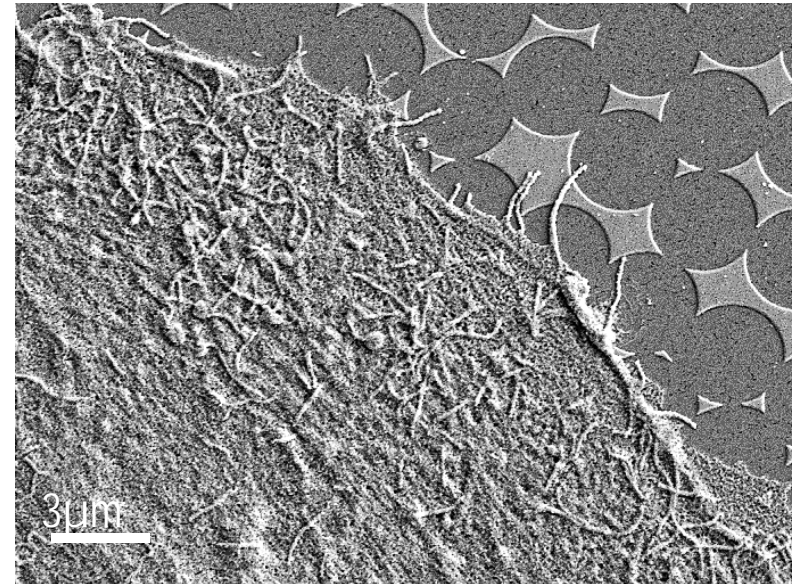


## Long-term goal

Influence of material surface charges and electromagnetic field landscapes on cellular behaviour at the interface *in vitro*

## Challenges

- To study how structural, chemical, and electric parameters at the interface to the bio-system and their interplay govern cell physiology and morphology
- To shed light on the impact of chemistry/surface charge versus surface topography on cell adhesion and alignment

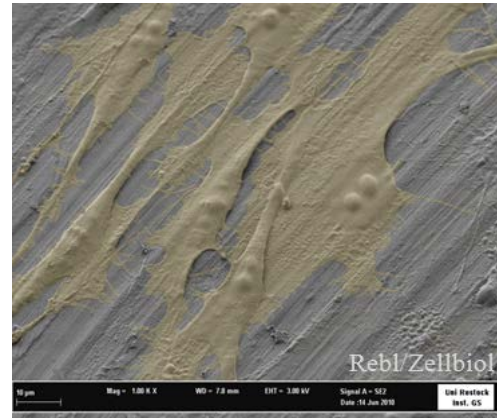


Osteoblast. on a plasmon gold array (Scanning Electron Microscopy).

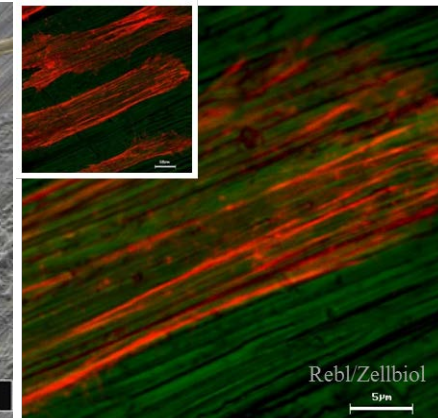
# A03 – Cell adhesion and growth - Preliminary work

Topographical influence:

- cells align in relation to grooved surfaces
- cells follow the surface features also with their intracellular adhesion components
- cells overcome the restrictions of structures if plasma-chemically modified



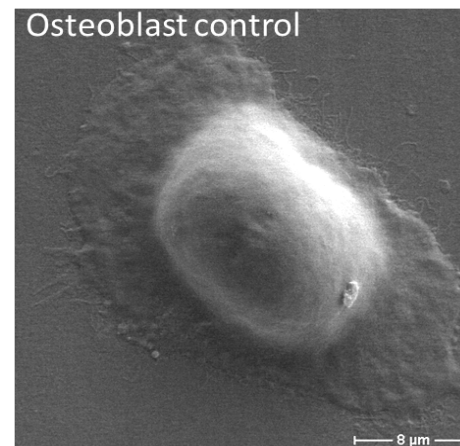
Osteoblasts aligned on titanium grooves.



Osteoblasts' actin cytoskeleton (red), aligned on grooves.

Initial cell adhesion in the first minutes:

- mediated by the negatively charged hyaluronan pericellular coat
- hyaluronan involved in cell spreading  
(Finke B...Nebe B. *Biomaterials* 2007, doi:10.1016/j.biomaterials.2007.06.028)



Normal spread osteoblast.



Osteoblast without its hyaluronan coat.