

## **Step & Stamp Imprinting Microlithography Studies of Chemical and Topographical Signaling on Osteoblast Cells.**

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Understanding the dynamical processes in bone development at the cellular and sub-cellular level will be an important key for understanding and developing effective treatments for bone formation disorders. In order to study living bone cell function, a method using micrometer-scale materials process technology to create an artificial environment to study bone cells under the microscope is being developed. In this study murine pre-osteoblast cells have been grown on lithographically produced substrates. The Si substrates were first coated with a thin layer of hydroxyapatite-like material by sputtering or atomic layer deposition. Subsequently, 2D patterns were written using electron beam lithography and mass production for substrates can be made using Step & Stamp imprinting lithography at VTT [1]. After culturing the cells they were fixed and stained with a fluorescent stain to image the cytoskeleton under the confocal fluorescence microscope. Cell-growth substrates where a hydroxyapatite-like surface is exposed or covered in micrometer-scale geometric patterns are used to investigate how this signal effects pre-osteoblast cell proliferation, function and cytoskeleton organization [2].

### REFERENCES:

[1] T. Haatainen and J. Ahopelto, *Physica Scripta* 67, 357 (2003)

[2] Wei He, Craig R. Halberstadt, Kenneth E. Gonsalves, *Biomat.* 25, 2055 (2004)