

# **BioLithoMorphie<sup>®</sup> - A toolbox for the construction of 3D biological morphologies**

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It is known that 3D environments, in different forms and shapes at macro, micro and nano scales, influence the fate of cells. The cell fate determining environment could be considered as a combined effect of complex interplay between materials, fluidic dynamics, biochemical parameters and overall mechanical properties. Multiscale modelling of cellular niches of oligocellular systems aims to recapitulate these properties.

Complex cellular structures can be achieved by using different polymers and biopolymers processed by micromachining, chemical pattern guided cell cultivation, photo polymerization, and organ printing methods. Such a “toolbox” transferring methods from microsystem technology and surface chemistry for the production of 3-dimensional biological morphologies could be defined as BioLithoMorphie<sup>®</sup>.

The integration of different materials with different properties allows designs with complex functions, a procedure which is present in biological systems naturally. Furthermore there is sufficient evidence that such “niches” play an important role in the origin of life. With the help of the BioLithoMorphie<sup>®</sup> toolbox and related methods we envision more and more realistic 3D tissue like structures in near future. By controlling the accurate nano, micro and macroscopic architecture and the fluidic properties the complex formation of tissues might be mimicked. Biological systems like e.g. organs (liver, brain, etc.) are hierarchical and functional complex organized in the sense of interacting compartments of oligo and multicellular entities.

The task is now to find the suitable bio-technical hybrid- or model-system for the right description level of the scientific or technical problem. By this means such platforms for the examination for the conditions of self-organization of the generation of information and function in oligocellular systems should be achievable.

Potential applications of BioLithoMorphie<sup>®</sup> are in the fields of precision medicine, pharmacology and medical technology.