



Toward user defined prototyping of μ -bioreactors

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PAPER TITLE:**Toward user defined prototyping of μ -bioreactors****AUTHORS:** *Ulrich Krühne***ADDRESS:** *Teknologisk Institut*

ABSTRACT: The development of alternative methods to animal testing is based in many experimental investigations on cellular assays, in which certain cell lines are tested for their response to drug candidates. Often the cells are grown in standard equipment like slide flasks or Petri dishes and exposed to the respective substances. In subsequent analysis the cells might be analysed by optical investigation, fluorescence microscopy, or other more complex standard processing methods. However, increasing scientific investigations show that certain cell types are sensitive to mechanical stimulation (e.g. shear stress). Therefore, important receptors can not be formed or developed in the absence of shear stress present in the *in-vitro* system. Hence, the success and relevance of static experiments is questionable. By applying lab-on-chip micro-fluidic technological solutions, μ -bioreactors can improve experimental design by allowing cells to experience shear stress in contained and sterile environments. The advantage of such systems is that they can be designed to use less reagents and chemicals, perform high throughput assays, have sensor integration and be automated. The presentation will focus on user designed micro - fabrication toolkits and prototyping of miniaturised μ -bioreactors systems. The presentation will show application examples, experimental results and fabrication methods of such miniaturised systems for performing more effective *in-vitro* assays and give the respective scientist the prospect to fulfil their more complex experimental ideas.