



## The Envirostat: A Lab-on-a-Chip Reactor Concept for Single Cell Biotechnology

By Hendrik Kortmann

Shaker Verlag Apr 2010, 2010. Buch. Book Condition: Neu. 21x14.8x cm. Neuware - Cells, equal or not equal That is the question pursued in this thesis. A question not answerable by population data reporting averaged read outs of millions of cells and answerable using flow cytometry only for a specific point in time. Here spatiotemporal single cell analysis under fully controlled environmental conditions was the aim, approached by the design, construction and use of a lab-on-a-chip reactor concept, the Envirostat. The Envirostat was based on a commercial available microfluidic chip, which provided contactless cell handling and trapping by negative dielectrophoresis. A new interface was constructed for fluidic and electric coupling of the fragile lab-on-a-chip. The interface decreased the setup-time more than six-fold to less than five minutes and more importantly made the setup highly reliable and reproducible. Chip damage due to breakage and overpressure is now almost impossible. The absence of manually metering the connection force and integration of all interconnections in one block allows automation of the chip-assembly. Single cell cultivation under environmental controlled and constant conditions, was accomplished by the Envirostat concept. First, the cultivation temperature during cell trapping was controlled by combination of the experimentally characterized negative...



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