Local Electroporation of Single Adherent Cells by Micro-Structured Needle Electrodes.

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Abstract: *In spite of its low throughput, Patch-Clamp is the established method for intracellular measurements of the transmembrane potential. To address this problem, we have developed new biosensor-chips with micro-structured needle electrodes (MNEs). MNE-penetration of single cells growing on the MNE-tips leads to a situation comparable to the whole-cell mode in classical Patch Clamp. MNE-penetration was accomplished by local micro-invasive needle electroporation (LOMINE; Koester et al., 2008; Baumann et al., 1998a and b). In this paper, we simulate the field and potential distributions around the MNE before LOMINE assuming reasonable cell and medium parameters for a cell being in contact with the needle via focal adhesion points*