Exozytose-induzierte Signalbildung an Metall-Elektrolyt Grenzflächen S. Michael, Diplomarbeit, Universität Potsdam (2014).

Transient voltage variations at microelectrodes that were occupied by *Dictyostelium discoideum* cells were coincidentally discovered. Detailed investigation of this discovery revealed that those voltage variation can only be measured if microelectrodes where occupied by at least one single cell. Therefore voltage variations where assumed to be signals evoked by *Dictyostelium* cells. The number of voltage variations per time unit could be increased significantly by rapid change of the buffer composition surrounding the cells on top of the micro electrodes. The statistical analysis of the signals revealed no spatial interference between neighbored microelectrodes. If the buffer composition was locally varied by microinjection of electrolytes, artificial voltage variations where detected in addition to signals evoked by *Dictyostelium* in response to the electrolytes. These artificial voltage variations where found to be very similar to signals evoked by *Dictyostelium*. Due to this similarity the working hypothesis was formulated that *Dictyostelium* can evoke signals by releasing electrolytes on top of micro electrodes. To investigate the mechanism causing the voltage variations transient and persistent effects were classified. Transient effects were found to be majorly caused by a step-like change of the dielectric function in the metal electrolyte interface and a direct voltage at the microelectrodes was assigned as the persistent effect caused by a redox reaction. Finally the reason for voltage variation that can be measured at microelectrodes was identified to be a synergistic combination of both the transient and the persistent effect which are caused by the release of electrolytes from intracellular space of *Dictyostelium*. This adds evidence to the hypothesis that Exocytosis can evoke voltage variations on micro electrodes.