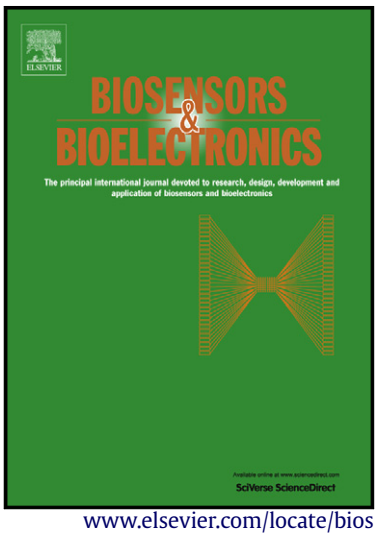

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Application of Ion-sensitive Field Effect Transistors for Ion Channel Screening

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ABSTRACT

Cell-based screening assays are now widely used for identifying compounds that serve as ion channel modulators. However, instrumentation for the automated, real-time analysis of ion flux from clonal and primary cells is lacking. This study describes the initial development of an ion-sensitive field effect transistor (ISFET)-based screening assay for the acquisition of K^+ efflux data from cells cultured in multi-well plates. Silicon-based K^+-sensitive ISFETs were tested for their electrical response to varying concentrations of KCl and found to display a linear response relationship to KCl in the range of 10 μM to 1 mM. The ISFETs, along with reference electrodes, were inserted into fast-flow chambers containing either human colonic T84 epithelial cells or U251-MG glioma cells. Application