METHODS FOR ELECTROSCOPIC IMAGING FOR ANALYSIS OF CELLS

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit under 35 U.S.C. § 119(e) of U.S. Provisional Application no. 63/272,361, filed October 27, 2021. The entire contents of the aforementioned application are incorporated by reference herein.

SUMMARY

[0002] According to one aspect of the present disclosure, a method for analyzing cells disposed on a sensor array surface of a ChemFET sensor array device, may include flowing a solution having a step change in pH across the sensor array surface, wherein a plurality of ChemFET sensors of the ChemFET sensor array generate a plurality of signals in response to the step change in pH of the flowed solution to produce electroscopic image data; acquiring multiple frames of the electroscopic image data during an acquisition time interval, wherein each frame corresponds to signal samples of the plurality of signals generated by the ChemFET sensor array measured at a sampling time during the acquisition time interval, wherein each frame comprises a plurality of pixels, wherein a given pixel in the frame corresponds to a signal sample from a given sensor in the ChemFET sensor array; and segmenting the electroscopic image data into one or more cell regions corresponding to locations of the cells on the sensor array surface and one or more background regions corresponding to areas on the sensor array having no cells based on characteristics of the signal samples generated response to the step change in pH of the flowed solution.

[0002a] According to another aspect of the present disclosure, a system for analyzing cells disposed on a sensor array surface of a ChemFET sensor array device may include a processor and a data store communicatively connected with the processor, the processor configured to execute instructions, which, when executed by the processor, cause the system to perform a method including acquiring multiple frames of electroscopic image data during an acquisition time interval, wherein the electroscopic image data is produced in response to flowing a solution having a step change in pH across the sensor array surface, wherein a plurality of ChemFET sensors of the ChemFET sensor array generate a plurality of signals in response to the step change in pH of the flowed solution to produce the electroscopic image data, wherein each frame corresponds to signal samples of the plurality of signals generated by the ChemFET sensor array measured at a sampling time during the acquisition time interval, wherein each frame comprises a plurality of pixels, wherein a given pixel in the frame corresponds to a signal sample from a given sensor in the ChemFET sensor array; and segmenting the electroscopic image data into one or more cell regions corresponding to locations of the cells on the sensor array surface and one or more background regions corresponding to areas on the sensor array having no cells based on characteristics of the signal samples generated response to the step change in pH of the flowed solution.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] The novel features are set forth with particularity in the appended claims. A better understanding of the features and advantages of the present teachings will be obtained by reference to the following detailed description that sets forth illustrative embodiments, and the accompanying drawings of which:

[0004] FIG. 1A is a block diagram depicting a chemical field effect transistor (ChemFET)-based cell analysis system that produces electroscopic images, according to various embodiments of systems and methods of the present teachings.

[0005] FIG. 1B is a schematic depiction of a cell positioned on a cell analysis system of the present teachings.