Project: Strategies to exploit dielectric properties of cells

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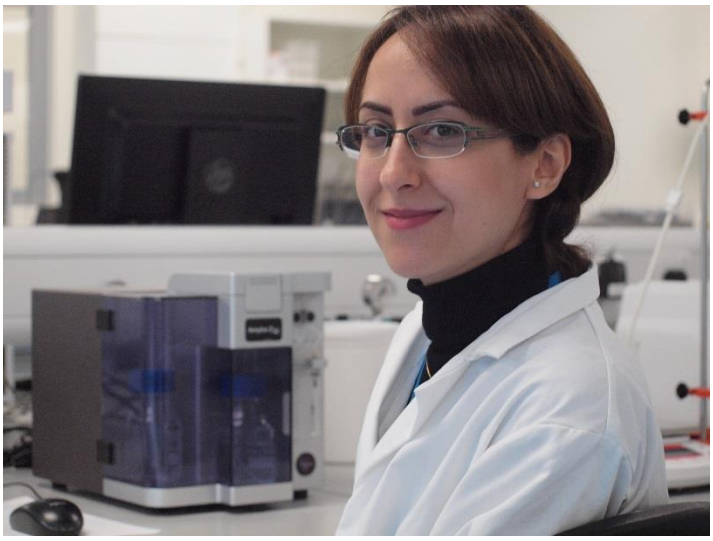

Background:

(a) Cells are capable of frequency-dependent polarization when expose to an AC electrical current

(b) Every cell line has a characteristic response profile to an applied electromagnetic field (Salimi et al, 2016)

(c) A sterilisable capacitance probe can be used to measure cell growth (Aber Instruments)

(d) A dielectrophoretic cell cytometer provides detailed information of single cells in a population (Braasch et al 2013**)**

Proposal

(a) Apply capacitance measurements to high cell density conditions under continuous culture

(b) Correlate the output with image analysis to establish profiles of metabolic behaviour

(c) Develop a miniaturized version of the DEP cytometer for measurement of single cell polarizability

(d) Develop protocols for use of the data to maintain high cell viability in bioreactors

Braasch,K. Marija Nikolic-Jaric, Tim Cabel, Elham Salimi, Greg E. Bridges, Doug J.Thomson, Michael Butler The changing dielectric properties of CHO cells can be used to determine early apoptotic events in a bioprocess. Biotechnol Bioeng. 110(11): 2902-14. (2013)

Salimi,E., , K. Braasch, M. Butler, D. J. Thomson, and G. E. Bridges. Dielectric model for Chinese hamster ovary cells obtained by dielectrophoresis cytometry. Biomicrofluidics 10, 014111 (2016)

Salimi et al. Dielectric model for Chinese hamster ovary cells obtained by dielectrophoresis cytometry. Biomicrofluidics 10, 014111 (2016)