Doctorate (Ph.D.) or Master (M.Sc.) position

Project title: Asymmetric division

We are looking for a motivated M.Sc. or Ph. D. student with background in molecular biology, biomedical sciences or biomedical engineering interested to work on asymmetric division.

We recently developed a technology to labelling the membrane of live cell, a method termed Cell Labeling via Photobleaching (CLaP). It allows arbitrary tagging of individual cells among a heterogeneous population within a microscopy field. CLaP consists of crosslinking biotin to the plasma membrane of chosen cells with the lasers of a confocal microscope, followed by use of fluorescent streptavidin conjugates to reveal the tagged cells. In this manner, the same instrument used for imaging can be adapted to label particular cells based exclusively on any visible trait that distinguishes them from the ensemble. The mark is stable, non-toxic, retained in cells for several days, and does not produce detectable alterations in cell morphology, viability, or proliferative capacity. Moreover, genome-wide transcriptomic profiling demonstrated no major changes in gene expression associated with the procedure. We aim to apply this method to study genetic mechanism governing asymmetric division.

Keyword: Asymmetric division, single-cell sequencing, biophotonics, biomedical engineering.

Interested candidates can communicate with the PI, Santiago Costantino
santiago.costantino@umontreal.ca

Background literature:

Binan L, Bélanger F, Lemay J-F , Pelletier-De Koninck JC, Roy J, Drobetsky E, Wurtele H, and Costantino S. (2019). Opto-magnetic capture of individual cells based on visual phenotype. eLife
https://elifesciences.org/articles/45239/figures

Binan L, Mazzaferri J, Choquet K, Lorenzo LE, Wang YC, Affar EB, De Koninck Y, Ragoussis J, Kleinman CL, Costantino S. Live single-cell laser tag. Nat Commun. 2016 May 20;7:11636.
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4876456/