



## BIOINFORMATICS SEMINAR

### SCOTT DIXON

*Assistant Professor, Biology*

STANFORD UNIVERSITY

#### QUANTIFYING AND CHARACTERIZING CANCER CELL DEATH KINETICS

Lethal drugs can induce incomplete cancer cell death, a phenomenon termed fractional killing. Understanding the nature and regulation of fractional killing may lead to new anti-cancer treatments or treatment regimens. In this seminar I will describe a high-throughput approach that enables fractional killing to be quantified in response to hundreds of different drug treatments in parallel. Using this method, we find that stable intermediate levels of fractional killing are uncommon, with many drug treatments resulting in complete or near complete eradication of all cells, if given enough time. We also find that the kinetics of fractional killing over time vary substantially as a function of drug, drug dose, and genetic background. Finally, we show at the molecular level that the antiapoptotic protein MCL1 is an important determinant of the kinetics of fractional killing in response to MAPK pathway inhibitors but not other lethal stimuli. These studies suggest that fractional killing is governed by diverse lethal stimulus-specific mechanisms.

#### BIOGRAPHY

Dr. Dixon was born in Ottawa, Canada. He completed a Ph.D. in medical genetics with Peter Roy studying worm neuromuscular development (University of Toronto, 2007). As a postdoc, he investigated yeast genetic interaction networks with Charlie Boone (University of Toronto, 2007-2008), and then cell death with Brent Stockwell (Columbia University, 2008-2013). Scott opened his lab at Stanford in 2014, and is an Assistant Professor in the Department of Biology. He is affiliated with the ChEM-H initiative, the Chemical/Biology Interface predoctoral training program, and the Cancer Biology Graduate Program. He currently teaches the undergraduate Biochemistry & Molecular Biology foundation course (BIO83) and the introductory undergraduate Chemical Biology course (BIO173). In the lab, Scott enjoys helping out a bit with every project. Outside the lab, Scott is a consultant for biotech and pharmaceutical companies interested in cell death.

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