

Population Dynamics Virtual Seminar



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Drug-induced colorectal cancer persister cells show increased mutation rate

Recent work suggests that, during certain treatments, cultured cancer cells exhibit complex survival strategies that are similar to those observed in bacteria. We set up an interdisciplinary collaboration with the aim of gauging these claims with quantitative standards.

By a combination of mathematical modelling and quantitative experiments, we characterised the dynamics of cloned colorectal cancer cell lines under treatment with clinically approved targeted therapies. We found evidence for two phenotypic switches in response to the drug treatment: persistence and stress-induced mutagenesis. Using a custom-developed two-step fluctuation test, we could quantify the transition to persistence, and the mutation rates of cells before and after treatment. We found that persisters are largely induced by drug treatment and show a 7- to 50-fold increase of their mutation rate under treatment. If they can be translated to patients, these findings may have important implications for the planning of cancer drug treatment.

Suggested Reading: Russo, Pompei, et al (2021) Drug-induced colorectal cancer persister cells show increased mutation rate.

<https://doi.org/10.1101/2021.05.17.444478>