

Emergence of cytotoxic resistance in cancer cell populations: from individual-level mechanisms to population-level consequences
Tommaso Lorenzi, CMLA Cachan and INRIA Mamba

We formulate an individual-based model and a population model of phenotypic evolution, under cytotoxic drugs, in a cancer cell population structured by the expression levels of survival-potential and proliferation-potential. We apply these models to a recently studied experimental system. Our results suggest that mechanisms based on fundamental laws of biology can reversibly push an actively-proliferating, and drug-sensitive, cell population to transition into a weakly-proliferative and drug-tolerant state, which will eventually facilitate the emergence of more potent, proliferating and drug-tolerant cells.