

Resistance development to molecular targeted treatment strategies

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Abstract: Most cancers are caused by either a single mutation, or more often, an accumulation of mutations and thereby altered cell differentiation properties. Nowadays, many of these mutations are known and in individual cases, as for example Chronic Myeloid Leukemia, molecular targeted drugs were developed. These drugs successfully changed clinical treatment protocols and converted ultimate life-threatening diseases into chronic diseases. Unfortunately, cancer cells tend to develop resistance, leading to treatment failures. This is an increasing problem for clinical treatment routines. Thus, detecting and understanding the effects of these mutations early is crucial. Here, we analyze a resistance inducing experiment by applying a minimalistic mathematical model. From this, one can obtain the dynamical patterns of the population on its way to resistance as well as important system parameters, highlighting different resistance mechanisms.