

# Individual Cell Fate as a Factor of Colony Population Dynamics in Oncogenesis

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Cells in multicellular organisms may have distinct cell fates, such as proliferation or differentiation into specialized cell types. The individual cell fate is determined by a range of factors, such as genetic predisposition or epigenetic factors. However, for a substantial number of cells in the organism statistic homogeneity and ballance of the system may be achieved; though the fate of an individual cell may vary.

For most cell types these random individual events do not influence the final outcome due to a large number of cells of this type. Nevertheless, the switch between cell fate plays a far more important role if we consider stem cells (SC) or colony-forming units (CFU) as well as cancer stem cells (CSC) because individual cell events determine further development of a colony (metastase) or its elimination.

The report presents a mathematical model of the initial stage of cell colony development (for hematopoetic tissue). In order to establish the role of an individual event in the process of oncogenesis and its consequences, as well as to understand the mechanism of population dynamics, it is important to study in detail the interaction of probability distribution of cell events, and feedback regulation.

This paper is part of a larger research aimed at elaborating a model of a competing clonal hematopoiesis in terms of oncogenesis and oncohematological diseases [1].

## References

- [1] M. Rusinov, S. Kulikov L. Uvarova, *Composite model of a hematopoietic system with clone competition*, WIT Transactions on Modelling and Simulation **55**, 2013 WIT Press Computational Methods and Experimental Measurements XVI 69–77.