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**The role of the microenvironment in an early development  
of breast cancer: a hybrid (multiscale) model.**

Mathematical modeling and computational analysis are essential for understanding the dynamics of the complex gene networks that control normal development and homeostasis, and can help to understand how circumvention of that control leads to abnormal outcomes such as cancer. Tumor microenvironment (TME) is comprised of various signaling molecules, cell types and the extracellular matrix. We investigate how the local biochemical and mechanical microenvironment can affect the progression of potentially-cancerous cells in an early development of breast cancer. The model deals with the effects of the mechanical properties of the microenvironment on tumor growth, and we report results from a multi-scale model of the signaling pathways and the TME. The results emphasize the complexities of the interactions within the TME and their effect on tumor growth, and show that tumor progression is not solely determined by the presence of a clone of mutated immortal cells, but rather that it is communitycontrolled.