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Cancer is a complex, multiscale process, in which genetic mutations occurring at a sub-cellular level manifest themselves as functional changes at the cellular and tissue scale. Both the immediate microenvironment (cell-cell or cell-matrix interactions) and the extended microenvironment (e.g. vascular bed) are considered to play crucial roles in tumour progression as well as suppression. Stroma is known to control tumor growth and invasion to surrounding tissue. However, it also prohibits therapeutics from accessing the tumor cells, thus causing drug resistance. Therefore, a thorough understanding of the microenvironment would provide a foundation to generate new strategies in therapeutic drug development. A mathematical model based on experiments has been developed in order to understand this complex relationship between tumor cells and host tissue. (Received January 15, 2010)