

SIMULATING IN VITRO EPITHELIAL MORPHOGENESIS IN MULTIPLE ENVIRONMENTS

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In vitro studies of epithelial cell morphogenesis have demonstrated the influence of environment composition and orientation in the development of multicellular epithelial structures such as tubules and cysts. We have constructed a low resolution, discrete event simulation model and report on its use to explore how experimentally observed morphogenetic phenomena under four growth conditions might be generated and controlled. We identified simulation attributes that may have in vitro counterparts. We studied how changes in the logic governing simulated epithelial cell behavior might cause abnormal growth. Simulation results support the importance of a polarized response to the environment to the generation of a normal epithelial phenotype and show how disruptions of tight mechanistic control lead to aberrant growth characteristics.