962-92-1102 **Trachette Jackson*** (tjacks@math.lsa.umich.edu). *A spatio-temporal model of the mitotic clock in avascular tumors.*

A mathematical model shows that spatial variations in the duration of the cell cycle affect the growth of avascular tumors. Progress through the cell cycle is controlled by an intracellular biochemical mechanism involving two proteins, maturation promoting factor (MPF) and cyclin, and local oxygen levels. Analysis and simulation of the model permits the determination of the spatial variation in the cell cycle between the outer region of the tumor, where oxygen levels are high, and the center, where oxygen limitation leads to the formation of a necrotic core. The model identifies a threshold oxygen level which must be exceeded if progress through the cycle is to occur. Additionally, if the level of MPF required to trigger mitosis is less than a threshold, then tumor growth ensues; otherwise the tumor regresses. These results suggest that the initiation of avascular tumors may depend crucially on the mitotic clock of the constituent cells. Mutations which reduce the length of the cell cycle or increase the duration of the M-phase may increase the likelihood of a tumor nodule being formed. These changes also reduce the proportion of the cycle during which the cell identifies and corrects any internal defects, and may promote subsequent mutations. (Received October 02, 2000)