Numerical Modeling of Drug Delivery to Solid Tumor Micro-vascular Network

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A multi scale mathematical method which calculates drug delivery to a solid tumor is used in this study to investigate how capillary network structure affects drug delivery [1]. The mathematical method involves processes such as blood flow through the vessels and solute and fluid diffusion, convective transport in extracellular matrix, and extravasation from blood vessels. The effect of heterogeneous dynamic network on drug delivery is investigated by this multi scale method. The sprouting angiogenesis model is used for generating capillary network [2] and then fluid flow governing equations are implemented to calculate blood flow through the tumor-induced capillary network and fluid flow in normal and tumor tissues. Finally, convection-diffusion equation is used to simulate drug delivery. The results show that diffusion coefficient have a significant role against the physiological barrier of drug delivery to a solid tumor.

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