

Oxygen Delivery Through Capillaries

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ABSTRACT

The determination of oxygen concentration profiles in surrounding tissue of capillaries is a most interesting problem in studying mathematical biology. The mathematical analysis of oxygen distribution in a region containing multiple non-homogeneous capillaries is presented. Even the occurrence of anoxia area after losing stable state by rough movements such as exercise is explained using exact solution.

ASSUMPTIONS

A large circular region of radius R , consisting of N capillaries of uneven locations and diffusion strength, is considered for the physical modelling. We assume there is no hypoxic area in the region, that is, everywhere the consumption is k per volume in stable state. On each source, the oxygen amount of solute-out is stable, that is, independent of time and the rate of amount of solute-out is the function of the size of capillary.

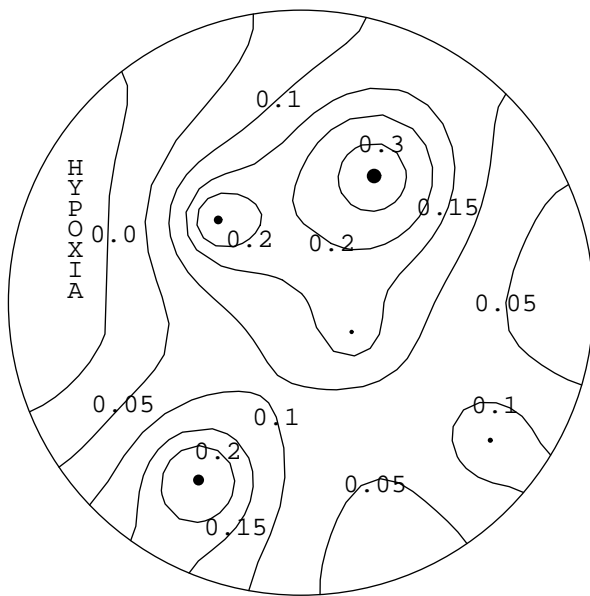


Figure 1. Concentration level curves of five capillaries of unequal strength when $t = 10$

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