

# Substrate Transport in Cylindrical Multi-capillary Beds with Axial Diffusion

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In oxygen concentration profiles for capillary beds of skeletal muscles, radial diffusion may have considerably more effect on oxygen transport for long and parallel capillary beds than axial diffusion. However, axial diffusion may play an important role in oxygen transportation in tissue especially when a relatively short pathway is counted in one's consideration. A mathematical analysis that extends the solutions with axial diffusion to multi-capillary beds inside a tissue cylinder, where arbitrary characteristics include random locations and uneven oxygen strengths, is presented here. Methods are used following the scheme of a matching technique. Perturbation method is utilized to solve the associated governing equations.