Abstract

Blood flow through a stenosed bifurcated artery has been investigated by considering the rheology of the blood as Casson fluid. A uniform, axi-symmetric, unidirectional and unsteady flow is considered, the artery wall undergoes wall motion. The effect of the external magnetic field and periodic body acceleration has been introduced in the governing equation of the flow and analyzed its effect on the flow field. The flow variables are computed at different locations of the parent and daughter artery. Also, an unsteady laminar two dimensional flow of Casson fluid through an asymmetric stenosed artery has been analyzed under the influence of body acceleration and external magnetic field. The artery wall has been treated as an elastic cylindrical tube. An explicit finite difference scheme is applied to obtain the flow field. The effect of body acceleration, magnetic field on the axial and radial velocities, flow rate and wall shear stress is analyzed. Also, the effect of non-Newtonian blood rheology on the magnetic targeting of the carrier particles in the microvasculature has been investigated by considering the dominant fluidic and magnetic forces on the carrier particle. Inner wall of the vessel is considered to be both impermeable and permeable, several factors that influence the magnetic targeting such as the size of the carrier particle, the volume fraction of embedded magnetic nanoparticles, and the diameter of the micro-vessel are considered in the present problem. The trajectories of the carrier particles are found in both invasive and noninvasive targeting systems. The effect of the glycocalyx layer on the magnetic drug delivery is also initiated using a two phase model for the micro vessel fluid circulation. It is reported that the presence of the glycocalyx layer can strongly effect the magnetic drug targeting. It has been observed that the rheology of the blood and permeability of the inner wall of the micro vessel have considerable effect on the magnetic drug targeting.