A Numerical Simulation of Arterial Mass Transport in Presence of Magnetic Field-Links to Atherosclerosis

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Abstract : This paper has focused on the most important parameters in the LSC uptake; inlet Re number and Sc number in the presence of non-uniform magnetic field. The magnetic field is arising from the thin wire with electric current placed vertically to the arterial blood vessel. According to the results of this study, applying magnetic field can be a treatment for atherosclerosis by reducing LSC along the vessel wall. Homogeneous porous layer as a arterial wall has been regarded. Blood flow has been considered laminar and incompressible containing Ferro fluid (blood and 4 % vol. Fe_3O_4) under steady state conditions. Numerical solution of governing equations was obtained by using the single-phase model and control volume technique for flow field.

Keywords : LDL surface concentration (LSC), magnetic field, computational fluid dynamics, porous wall
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