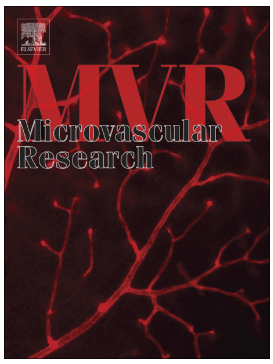

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Interaction between blood and solid particles propagating through a capillary with slip effects

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Abstract

This article describes the interaction between solid particles and blood propagating through a capillary. A slip condition is considered on the walls of the capillary. The rheological features of the blood are discussed by considering as a two-phase Newtonian fluid model, i.e., the suspension of cells in plasma. A perturbation method is successfully applied to obtain the series solution of the governing coupled differential equations. The series solution for both fluid and particle phase are presented up to second order approximation. The expressions for the velocity and pressure distributions under slip effects are determined within a tube. Furthermore, the current results are beneficial to understand the rheological features of blood which will be helpful to interpret and analyze more complex blood flow models.

Keywords: Blood flow; Capillary motion; Particle-fluid; Slip effects; Perturbation solutions

1. Introduction

The principal task of blood in circulation is to transport materials and heat from the tissues of the body. Such transport mostly takes place at the capillary level. The capillary is permeable and non-conducting. The blood contains the blood plasma suspended in a red blood corpuscles "erythrocytes" white blood corpuscles "leucocytes" and platelets "thrombocytes." Further, the