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# Shear-induced migration of red blood cells in the abdominal aorta and the carotid artery: considerations on oxygen transport

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Shear-induced migration of red blood cells (RBCs) is a well-known phenomenon characterizing blood flow in the small vessels (μm to mm size) of the cardiovascular system. In large vessels, like the abdominal aorta and the carotid artery (cm size), the magnitude of this migration has not been fully elucidated. RBCs migration influences platelets concentration and oxygen transport, factors involved, for example, in intra-luminal thrombus accretion and atherosclerosis. Phillip's model for shear-induced particle migration coupled to the Quemada viscosity model was employed to simulate the macroscopic behavior of RBCs in four vessels: a normal abdominal aorta, an abdominal aortic aneurysm (AAA) and two carotid bifurcations. Simulations show a migration of RBCs in the region surrounding the carotid sinus with a wall hematocrit 15% lower than the physiological value. No appreciable migration is seen in the AAA, while a slight decrease in wall hematocrit is observed in the normal aorta. This decrease in hematocrit in the carotid sinus region might be a contributing factor to atherosclerosis.

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