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Microfluidic Method for Measuring Blood Viscosity

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Abstract : Many cardiovascular diseases, such as thrombosis and atherosclerosis, can change biochemical molecules in plasma and red blood cell. These alterations lead to excessive increase of blood viscosity contributing to peripheral vascular diseases. In this study, a simple microfluidic-based method is used to measure blood viscosity. Microfluidic device is composed of two parallel side channels and a bridge channel. To estimate blood viscosity, blood samples and reference fluid are separately delivered into each inlet of two parallel side channels using pumps. An interfacial line between blood samples and reference fluid occurs by blocking the outlet of one side-channel. Since width for this interfacial line is determined by pressure ratio between blood and reference flows, blood viscosity can be estimated by measuring width for this interfacial line. This microfluidic-based method can be used for evaluating variations in the viscosity of animal models with cardiovascular diseases under flow conditions.

Keywords : blood viscosity, microfluidic chip, pressure, shear rate
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