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Suppressing Turbulence and Reducing Blood Viscosity to Prevent Heart Attacks and Strokes[1] KAZI TAWHID-AL-ISLAM, RONGJIA TAO, ENPENG DU, HONG TANG, XIAOJUN XU, Department of Physics, Temple University, MICHAEL AUTIERI, Independence Blue Cross Cardiovascular Research Center, Lewis Katz School of Medicine, Temple University, Philadelphia, PA — High viscosity and turbulence in blood flow greatly increase the risk of cardiac diseases. Turbulent blood flow makes the vasculature vulnerable to development of atherosclerotic plaque. In consequence, heavier workload on the heart results in high blood pressure, reduced oxygen function, heart murmur etc., which eventually may lead to heart attacks or ruptured blood vessels. Presently available medicines may reduce blood viscosity, however, only to worsen the turbulence because the Reynolds number goes up as the viscosity lowers. Here, we will report our **Magneto-Rheology** (MR) research that addresses both turbulence suppression and viscosity reduction simultaneously. When a strong magnetic field is applied along the blood flow direction, red blood cells are polarized, and aggregated into short chains, which lowers the viscosity significantly along the flow direction. And at the same time viscosity is increased in the directions perpendicular to the flow. We have observed that in an *In-Vitro* system of blood flow, such anisotropic viscosity suppresses the turbulence. The preliminary results appear to be very promising, demonstrating this MR treatment reduces the blood pressure in real human subject.

[1]American Heart Association

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