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## Frequency dispersion on the vessel wall - Primary reason of atherosclerosis

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**The objectives:** To study the blood flow conditions by the MRI and CT.

**Methods:** In 17 healthy volunteer (18-52y) at the different sites of the aorta peak velocity, net flow and flow acceleration has been investigated.

**Results:** At the outer curvature of the aorta in the end systole flow separates. At the isthmus, flow acceleration in the initial diastole is 8.7 times higher than that in systole. Net flow from systole to diastole increases  $2.5 \pm 0.5$  folds. From the end systole to the initial diastole there is a plateau on the net flow graph. At the outer curvature of isthmus, group waves at the boundary reflection, changes in phase at 1800 at the oscillation - 0.8Hz and 1.6Hz. Blood density from the aortic isthmus, to the abdominal aorta equals to  $-51 \pm 3H$  to  $31 \pm 4H$  respectively.

**Conclusion:** Blood motion at the boundary layerforms the surface wave. At the outer wall isthmus of the aorta, pulse pressure at the reflection is in resonance with the end systolic pressure drop and amplitude of the wall stress increases. At the end systole at the outer wall, wave packets with the different frequencies are formed. Erythrocyte aggregation at the ejection facilitates to the energy high efficiency transmission from the heart, to the blood. Wave frequency dispersion destroys the flow cell aggregates, whereas at the wall reflection and cyclic loading it shears the endothelial sheet.

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