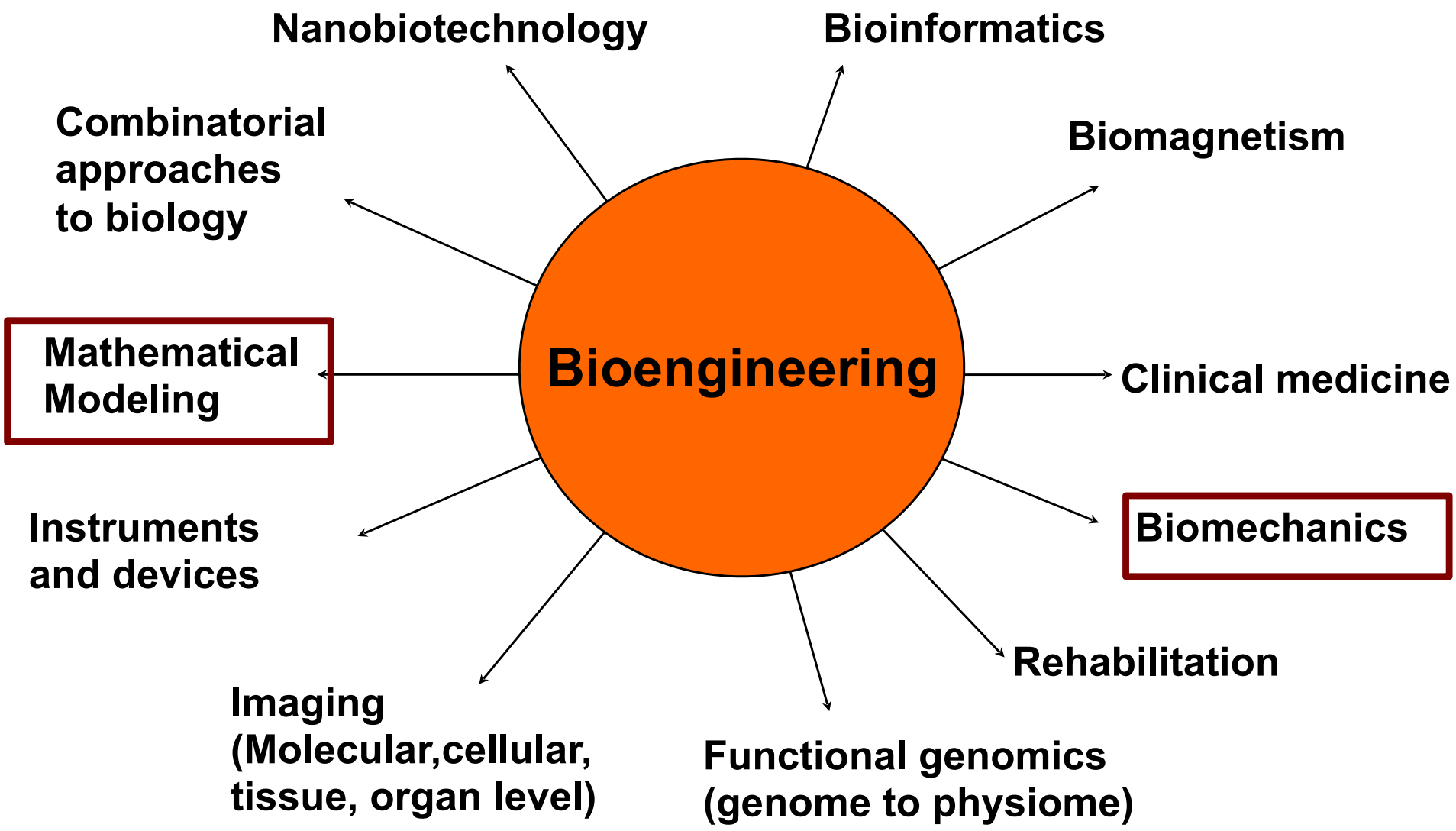
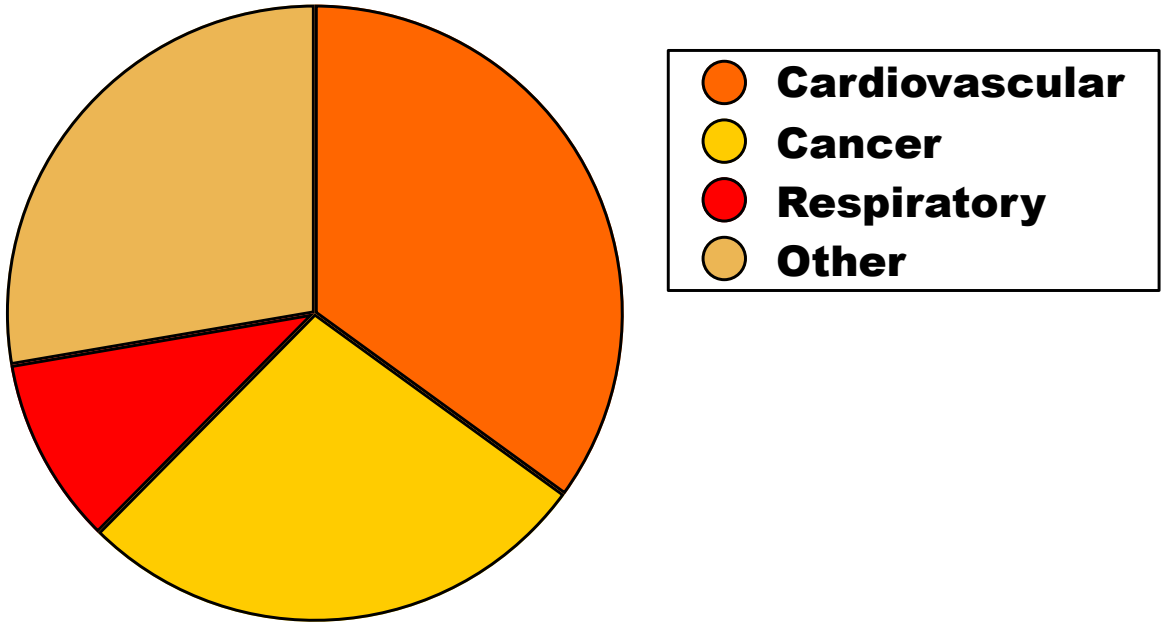
Engineering & life sciences



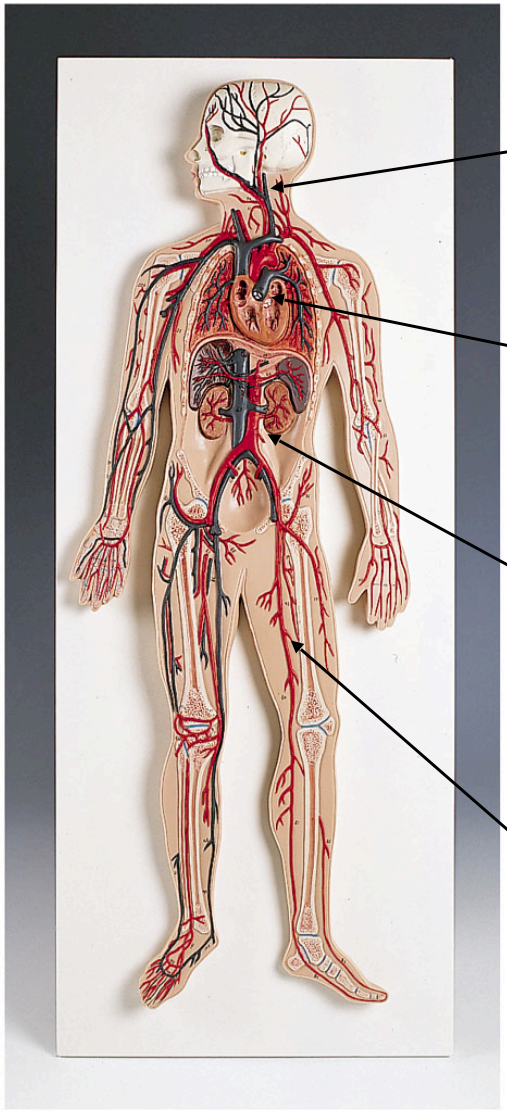
Cardiovascular disease

Morbidity in western nations

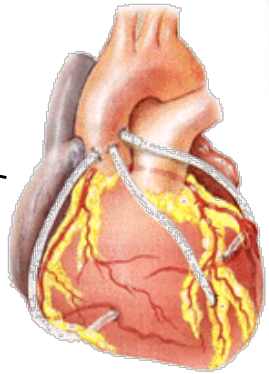


Treatment of heart failure alone costs more than the treatment of all forms of cancer

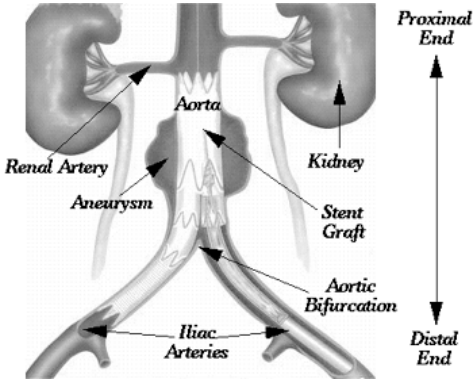
Biomechanics & vascular disease



Carotid artery stenosis
Stroke



Coronary artery disease
Coronary artery bypass grafts

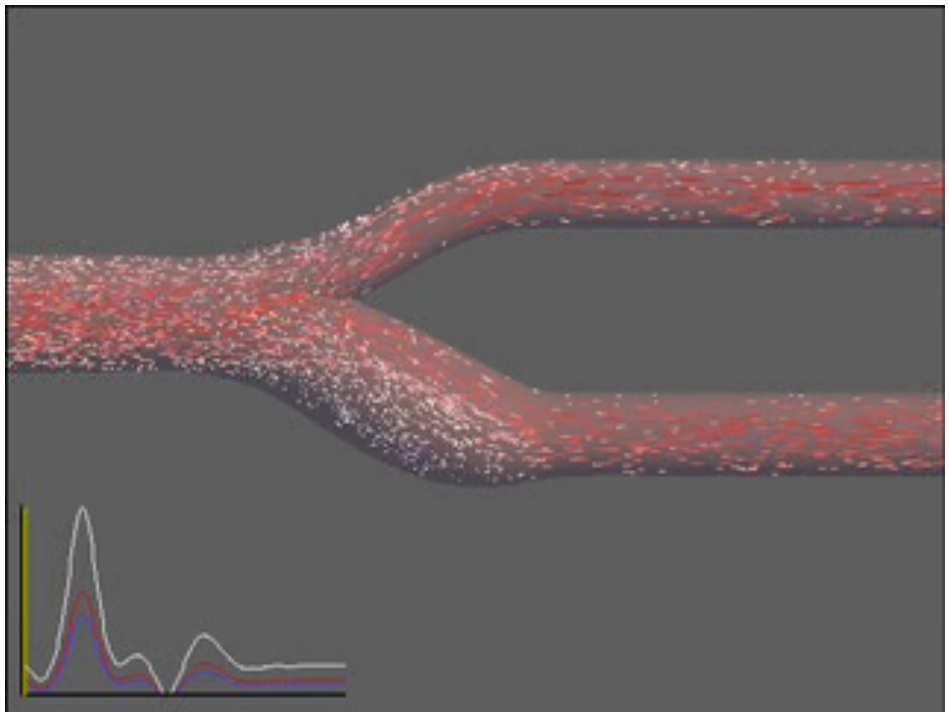


Aortic aneurisms

Peripheral vascular disease

Effect of hemodynamical forces on arterial wall

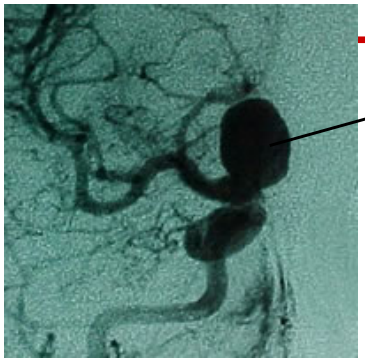
1. Wall shear stress: $\tau_{wall} = \frac{4\mu Q}{\pi r^3}$

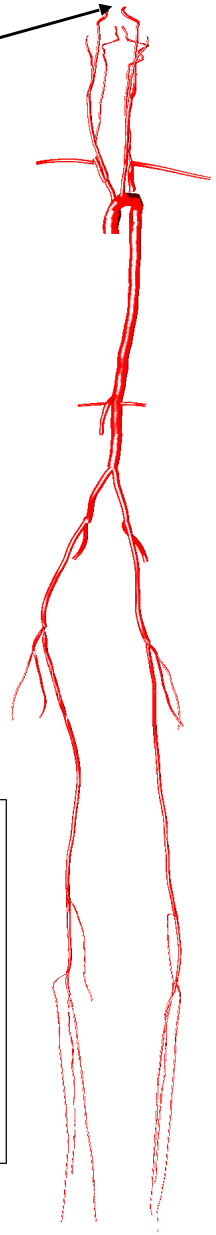


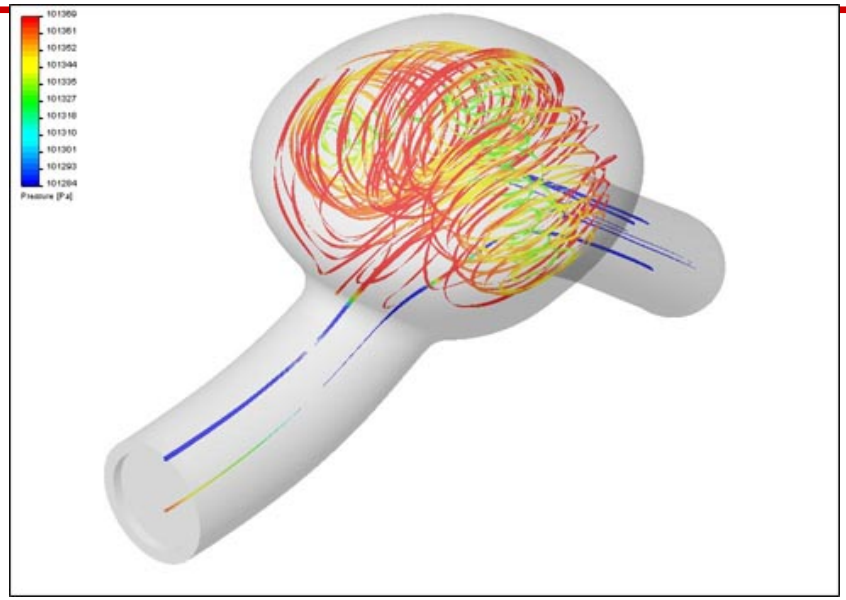
Unidirectional high shear stress: atheroprotective condition.

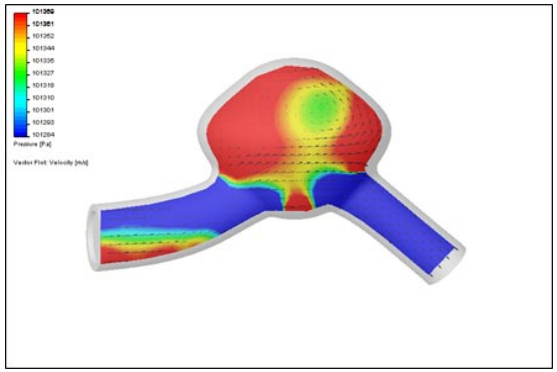
Oscillatory shear stress: plaque-prone condition.

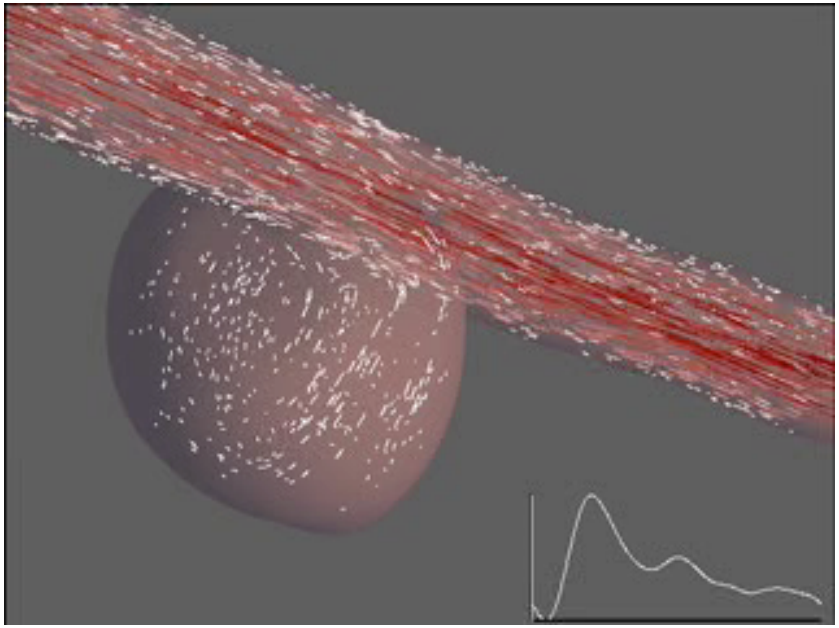
Blood flow and CV disease(3)



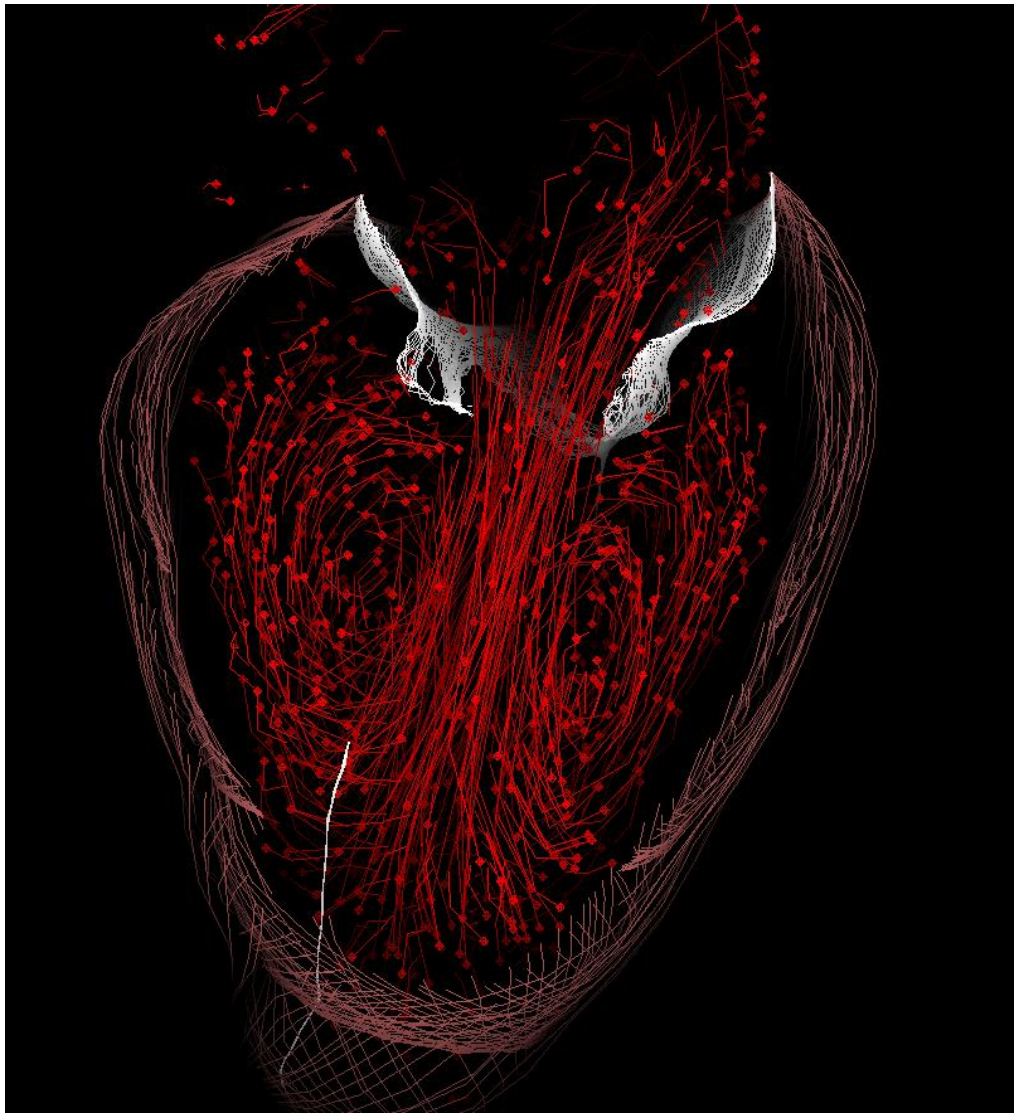






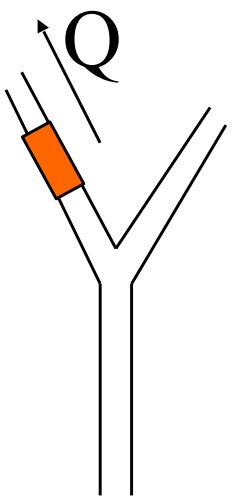


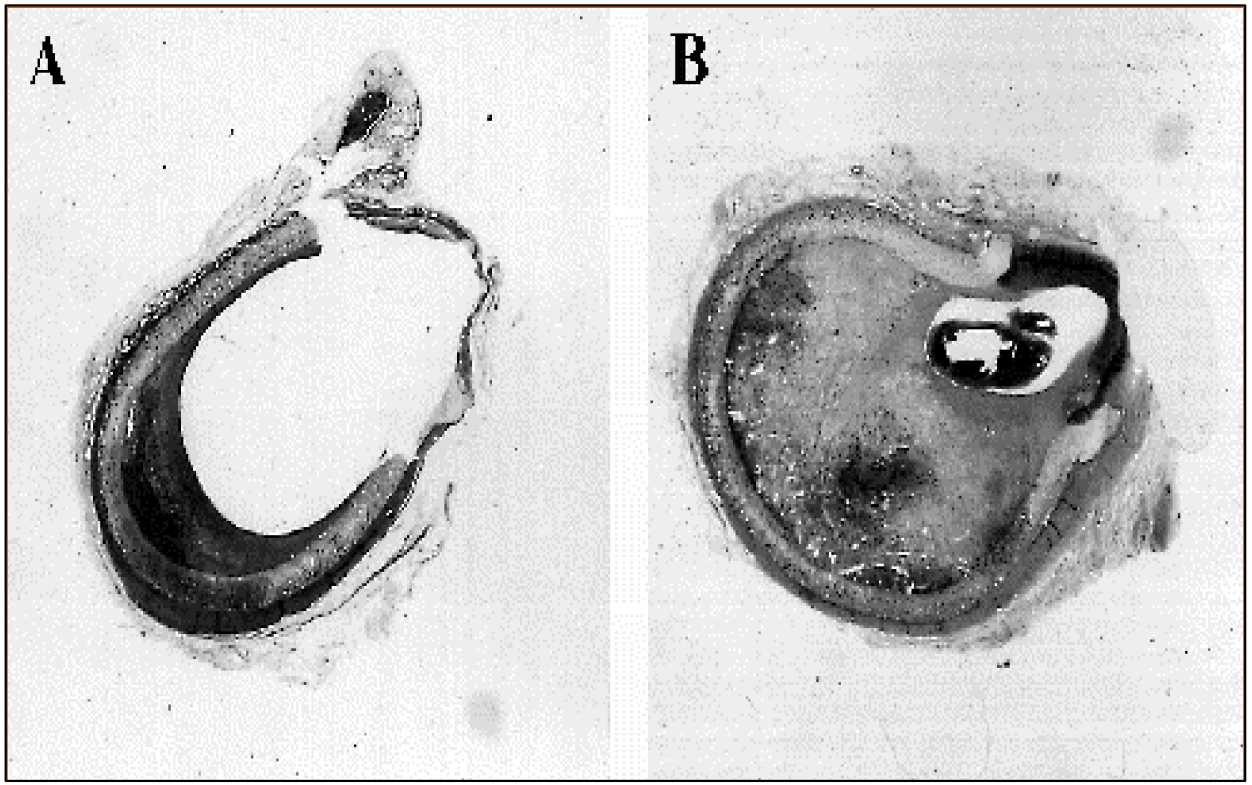
Ventricular & heart valve mechanics



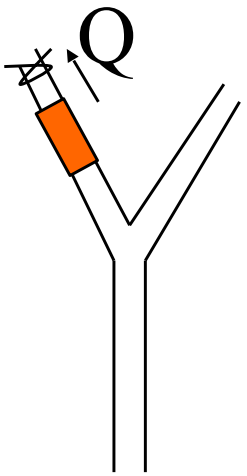
Hemodynamics and cardiovascular disease (II)

Normal flow

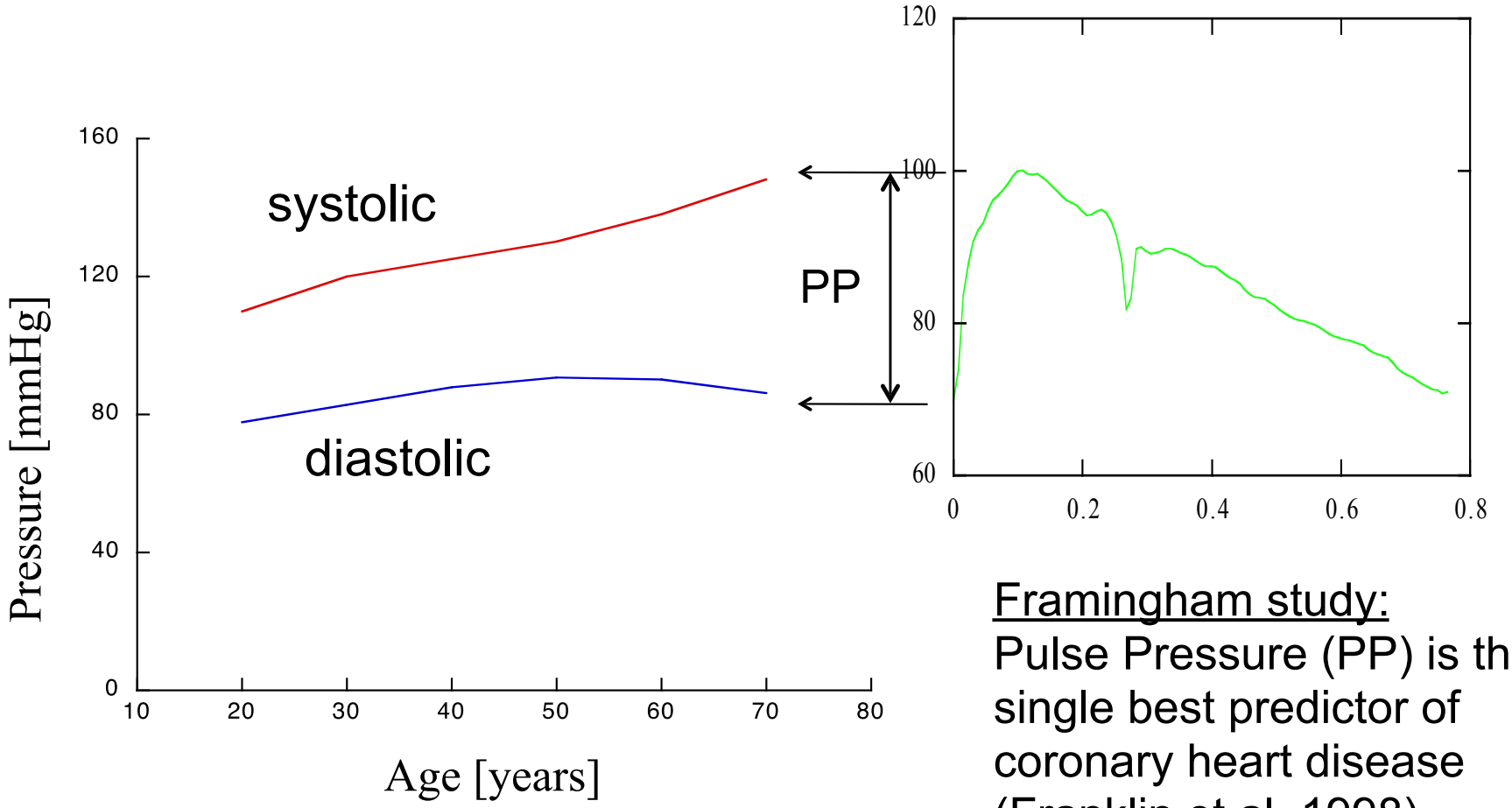


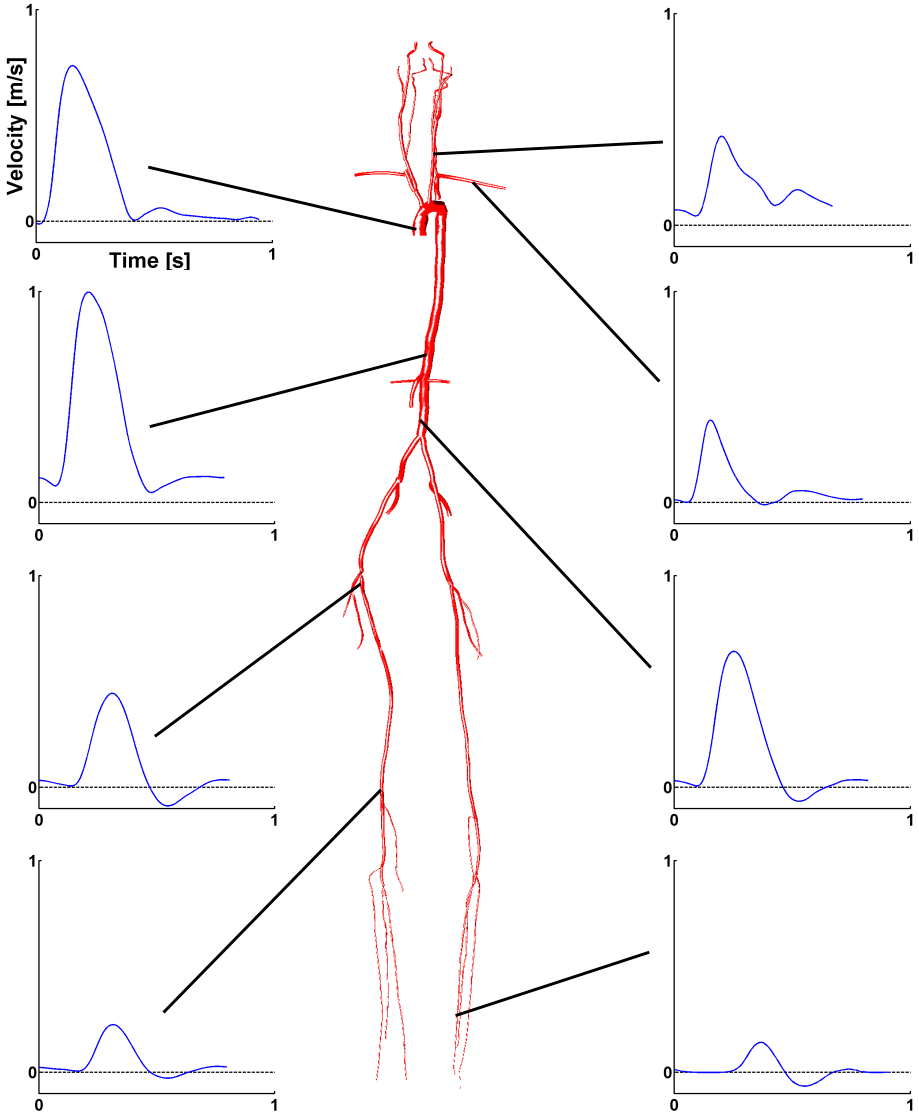
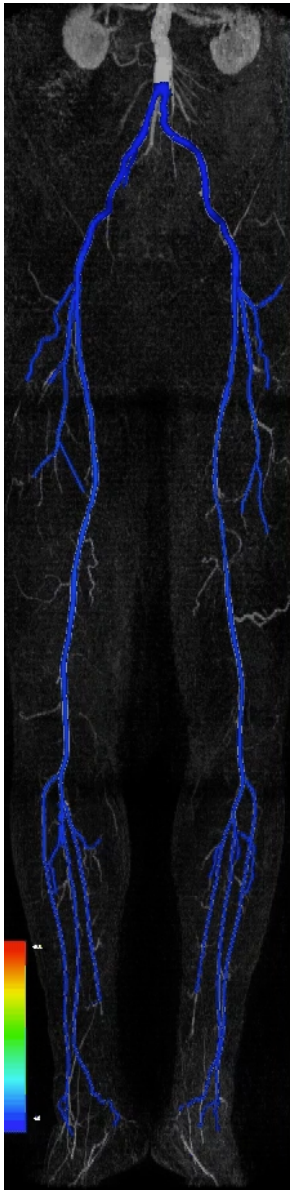


Reduced flow



Hemodynamics and cardiovascular disease (III)



Framingham study:
Pulse Pressure (PP) is the single best predictor of coronary heart disease (Franklin et al, 1998)

Pressure and flow wave propagation