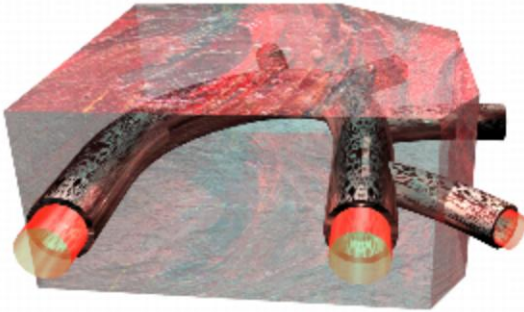
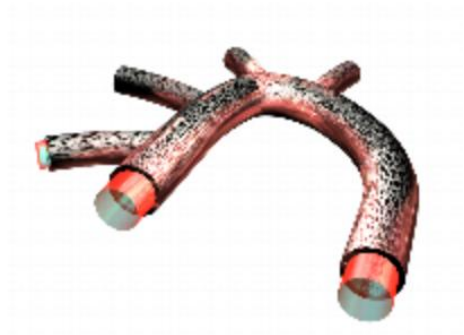
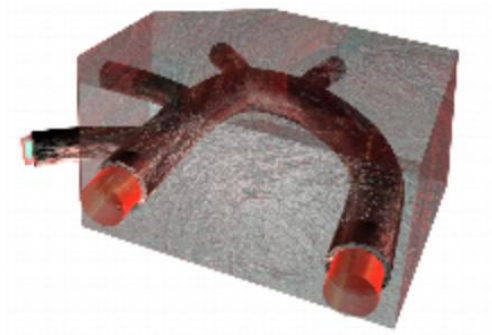


## BLOOD VESSELS - FLUID DYNAMICS ANALYSIS



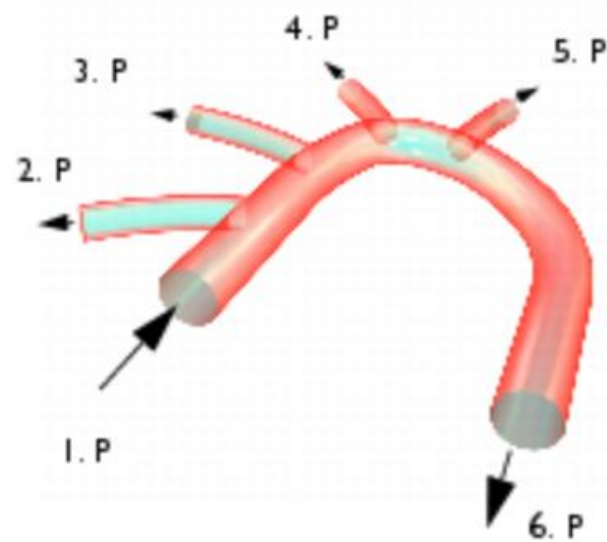
*Figure 5-1: The model domain consists of part of the aorta, its branches, and the surrounding tissue.*



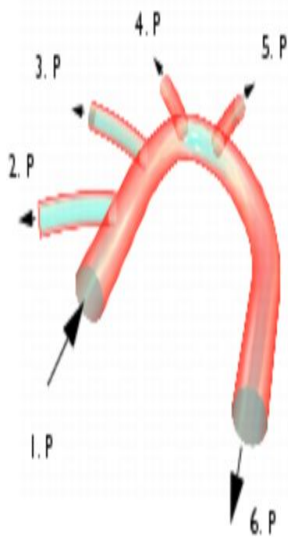
## MATERIALS

The model in this discussion uses the following material properties:

- Blood
  - density =  $1060 \text{ kg/m}^3$
  - dynamic viscosity =  $0.005 \text{ Ns/m}^2$



P = Pressure

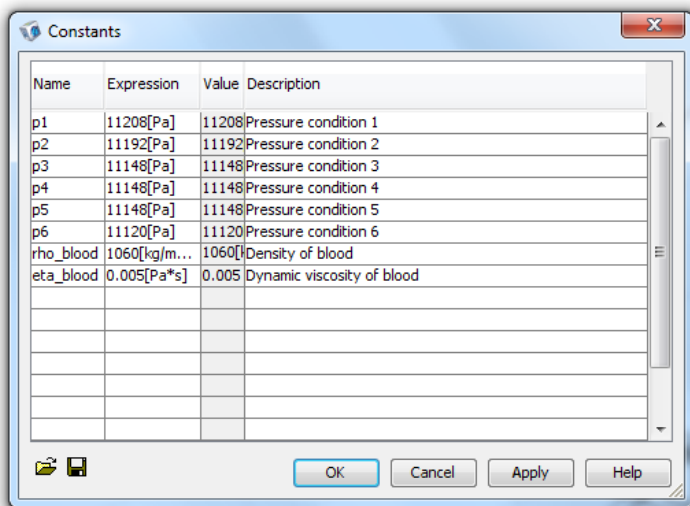


P = Pressure

The pressure conditions are:

- Section 1:  $11,208 \text{ N/m}^2$
- Section 2:  $11,192 \text{ N/m}^2$
- Section 3:  $11,148 \text{ N/m}^2$
- Section 4:  $11,148 \text{ N/m}^2$
- Section 5:  $11,148 \text{ N/m}^2$
- Section 6:  $11,120 \text{ N/m}^2$

## CONSTANTS



$$f(t) = \begin{cases} \sin \pi t & 0 \leq t \leq \frac{1}{2} \text{ s} \\ \frac{3}{2} - \frac{1}{2} \cdot \cos\left(2\pi\left(t - \frac{1}{2}\right)\right) & \frac{1}{2} \text{ s} \leq t \leq \frac{3}{2} \text{ s} \end{cases}$$

### SCALAR EXPRESSION

$$f = (t \leq 0.5) * \sin(\pi * t [1/s]) + (t > 0.5) * (1.5 - 0.5 * \cos(-2 * \pi * (0.5 - t [1/s])))$$





## NUMERICAL RESULTS

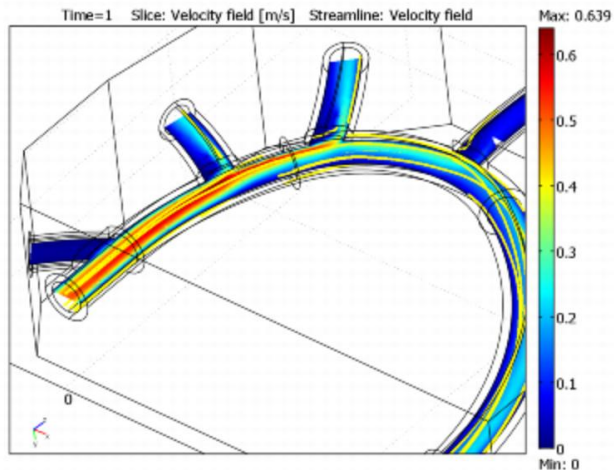


Figure 5-4: Velocity field color slice and flow lines in the aorta and its ramification (branching).