

### Answer on Question#37657 - Physics - Other

Blood flows through a section of a horizontal artery that is partially blocked by a deposit along the artery wall. As a hemoglobin molecule moves from the narrow region into the wider region, its speed changes from  $v_2 = 0.800 \text{ m/s}$  to  $v_1 = 0.442 \text{ m/s}$ . What is the change in pressure,  $P_1 - P_2$ , that it experiences? The density of blood is  $1060 \text{ kg/m}^3$ .

[http://edugen.wileyplus.com/edugen/courses/crs3976/art/qb/qu/c11/c11\\_q\\_17.gif](http://edugen.wileyplus.com/edugen/courses/crs3976/art/qb/qu/c11/c11_q_17.gif)

#### Solution:

In a flow without friction the total pressure as sum of static and dynamic pressure is constant. So we have:

$$p_{\text{st}} + p_{\text{dyn}} = \text{constant};$$
$$p_{\text{dyn}} = \frac{1}{2} \rho v^2$$

Therefore:

$$\Delta p_{\text{st}} = p_{2\text{st}} - p_{1\text{st}} = \frac{1}{2} \rho (v_1^2 - v_2^2) = \frac{1}{2} \cdot 1060 \frac{\text{kg}}{\text{m}^3} \cdot \left( \left( 0.8 \frac{\text{m}}{\text{s}} \right)^2 - \left( 0.442 \frac{\text{m}}{\text{s}} \right)^2 \right)$$
$$= 236 \text{ Pa}$$

**Answer:** change in pressure is equal to 236 Pa.