

Bernoulli's Equation

$$\frac{p_1}{\rho} + \frac{v_1^2}{2} + gz_1 = \frac{p_2}{\rho} + \frac{v_2^2}{2} + gz_2 = \alpha$$

$$p_1 + \frac{\rho v_1^2}{2} + \rho gz_1 = p_2 + \frac{\rho v_2^2}{2} + \rho gz_2 = \beta$$

p = fluid pressure

ρ = fluid density

v = fluid velocity

g = acc'l of gravity

z = height above reference plane

Poiseuille's Equation



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$$Q = \frac{\pi(P_1 - P_2)r^4}{8\eta l}$$

$$R \propto \frac{\eta l}{r^4}$$

Q = flow, volume/sec

P = pressure

r = radius

l = length

η = dynamic (shear) viscosity

R = resistance

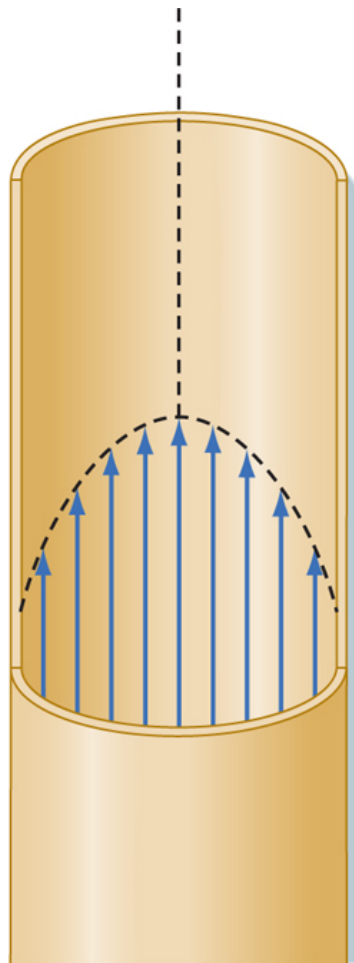
Fluid Resistance

$$R_t = \sum_{i=1}^n R_i$$

Flow paths in series

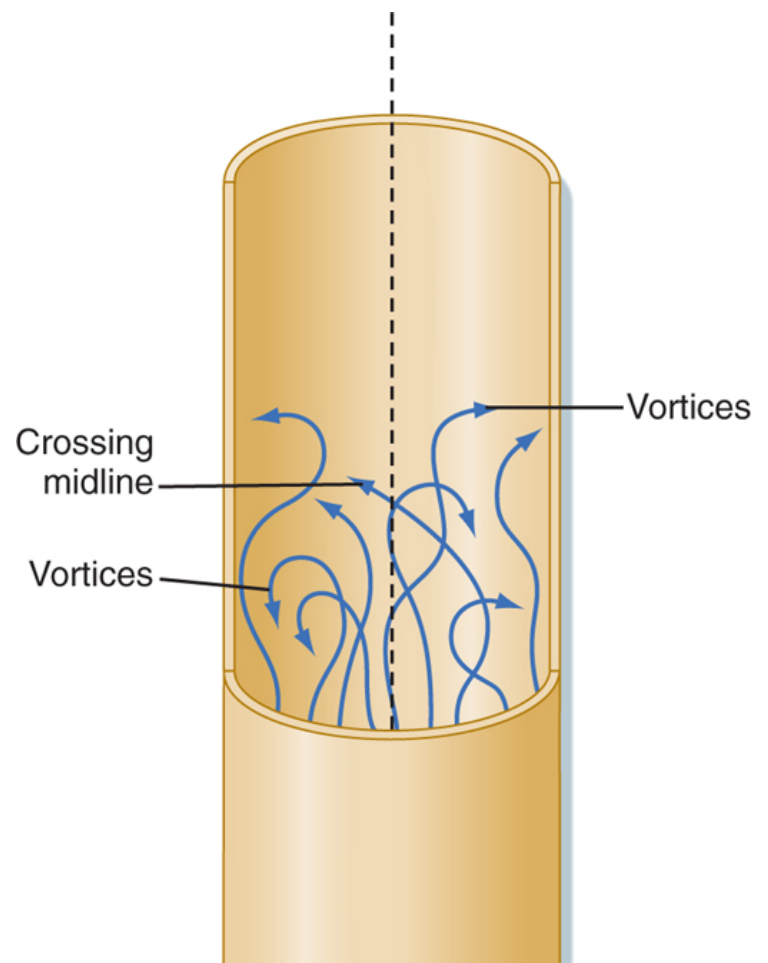
$$\frac{1}{R_t} = \sum_{i=1}^n \frac{1}{R_i}$$

Flow paths in parallel



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Video 2, Module 8