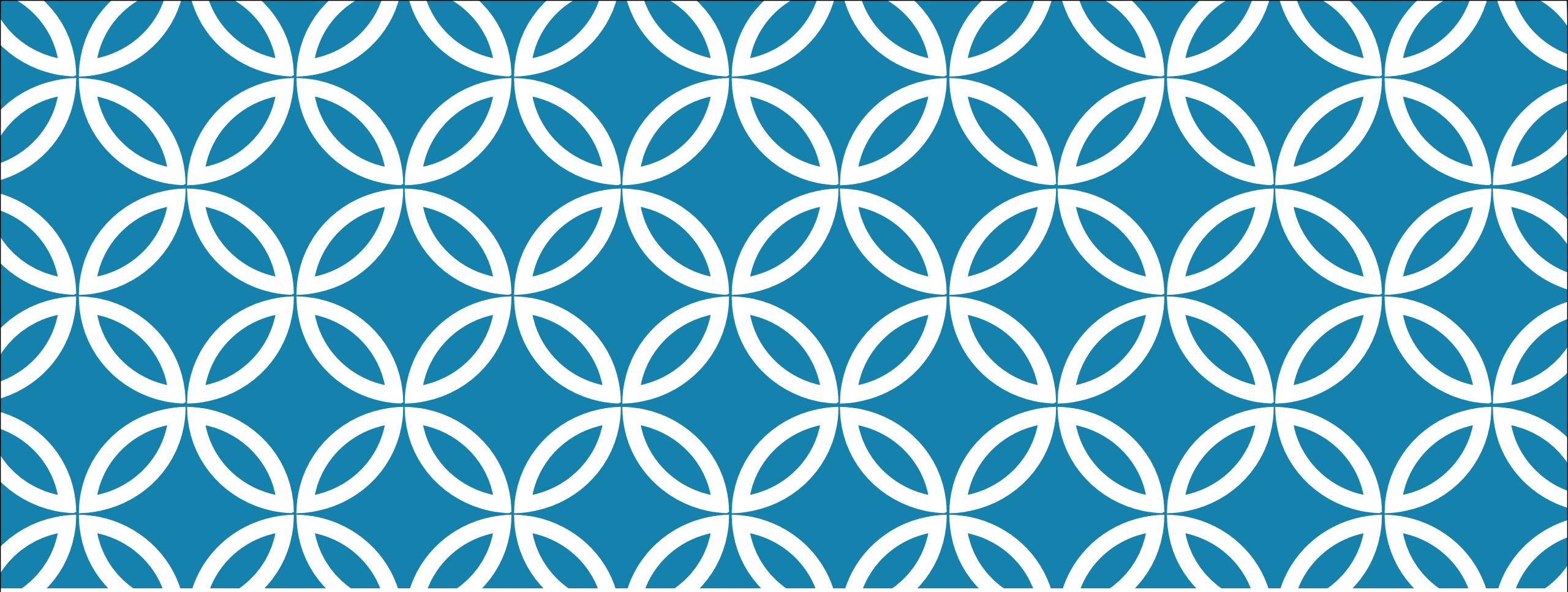


RESISTANCE

Dr. Arwa Rawashdeh

RESISTANCE

How to relate TPR to blood pressure

$F = \Delta P / R$ Ohm's Law

$CO = \Delta P / TPR$

$R = 8nl/\pi r4$ *Poiseuille's law*

$n \, \alpha \, R$

$n =$ *viscosity*

FACTORS AFFECTING THE RESISTANCE

Polycythemia (high Hct) $\alpha\ n$ *; a lot of friction between the layers, because whenever blood is flowing it flows in layers when there is a lot of friction rubbing up against between those layers because increase in viscosity and slow the flow down*

Anemia $\frac{1}{\alpha} n$

$\boldsymbol{L\ \alpha\ R}$

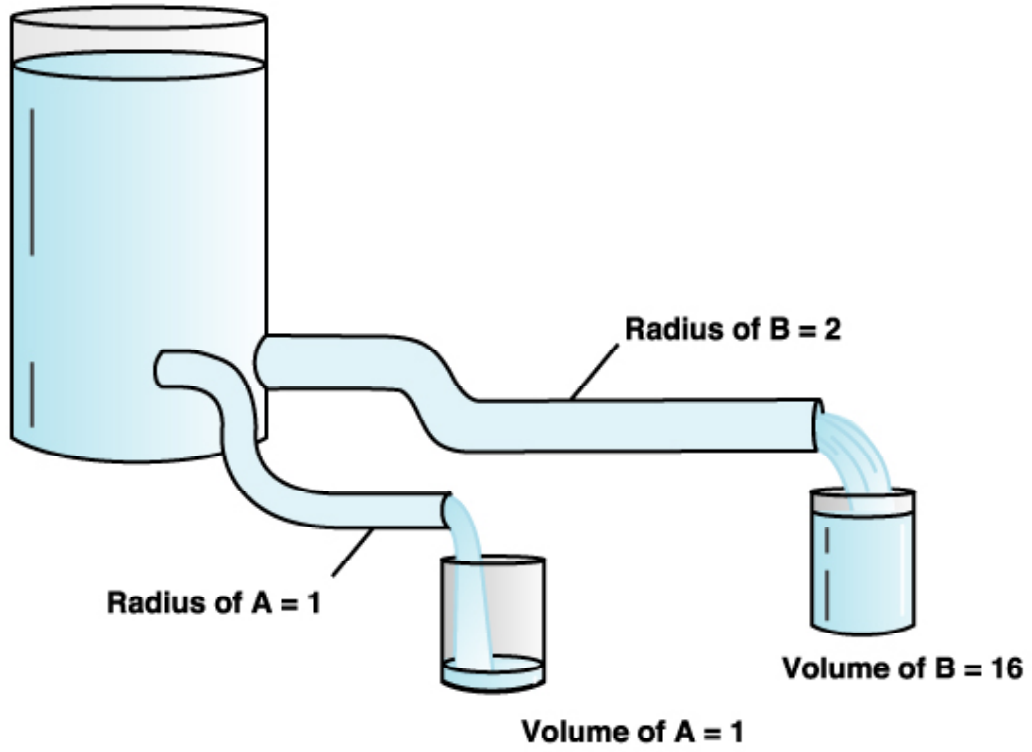
Increase in Weight and height increases in L

$\boldsymbol{r = 1/\alpha\ R}$ ***the most important factor that affecting the R because it is raised to power 4***

Vasodilation increase in r

Vasoconstriction decrease in r

Effect of radius on resistance and blood flow



Resistance $\sim \frac{1}{\text{radius}^4}$	
Tube A	Tube B
$R \sim \frac{1}{1^4}$ $R \sim 1$	$R \sim \frac{1}{2^4}$ $R \sim \frac{1}{16}$

Flow $\sim \frac{1}{\text{resistance}}$	
Tube A	Tube B
$\text{Flow} \sim \frac{1}{1}$ Flow ~ 1	$\text{Flow} \sim \frac{1}{\frac{1}{16}}$ Flow ~ 16

BLOOD PRESSURE

- Blood pressure =cardiac output X total peripheral resistance

$$BP = CO \ X \ TPR$$

First, we want to decide what CO and TPR is , then we get to the right meaning of BP

- Cardiac output (Flow)= Heart rate X Stroke volume

$$CO\ (F) = HR\ X\ SV$$

ml/min= Beat/min X ml/ Beat

CONTINUED CARDIA OUTPUT

- Anther formula relate to CO

1 ml= 1 Cm3

Flow = Cm3/min

- Anther formula relate to flow

Velocity (Cm2/min)= Flow (cm3/min)

Cross sectional area (Cm2)

V= F/A

- How to relate this to cardiac output

- Increase Flow (CO) Increase V
- Cross sectional area; measured in units of bier square because the blood vessels are cylinder in shape

A (πr^2); Increase A Decrease V