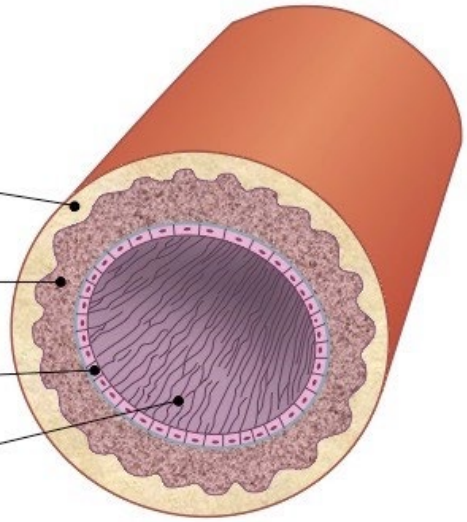
A. ARTERIES AND VEINS

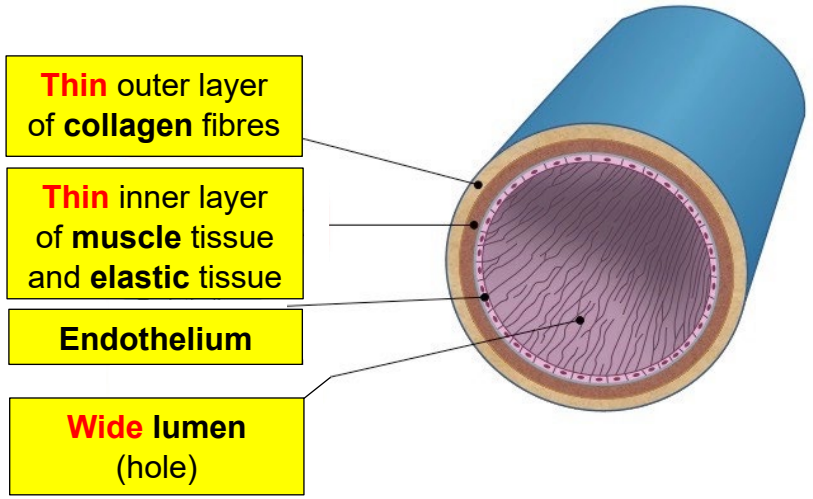
ARTERY

carry blood at **high pressure**
from the **ventricles** to the **body tissues**



VEIN

carry blood at **low pressure**
from the **body tissues** and **return it** to the **atria**

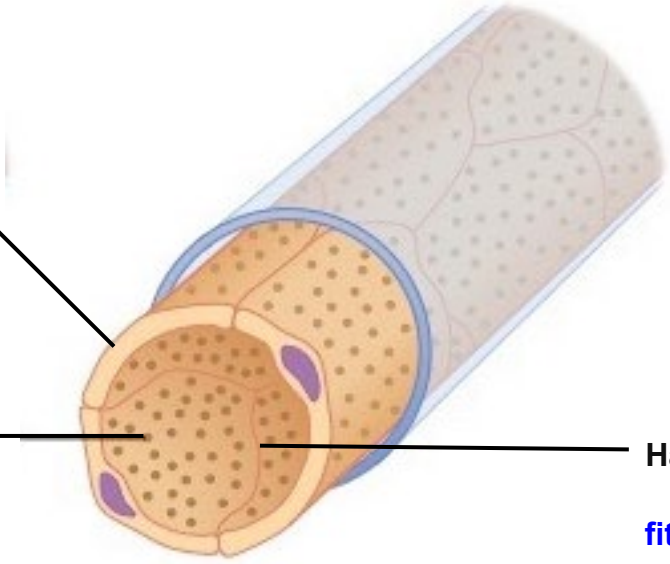


ARTERY		VEIN	
Thick outer layer of **collagen** fibres	• **Collagen** is **strong** and **prevents** the artery from **bursting** under the **high pressure**	**Thin** outer layer of **collagen** fibres	• Still provides **structural support** • As blood is flowing at a **low pressure** and **does not** flow in **pulses**
Thick inner layer of **muscle** tissue	• **Contract** and **relax** to **change** the **diameter** of the **lumen** to help **maintain blood pressure** • Form a **rigid artery wall** that **prevents** the artery from **bursting** under the **high pressure**	**Thin** inner layer of **muscle** tissue	
Thick inner layer of **elastic** tissue	• **Elastic recoil** helps to: - **push** the **blood forward** through the artery - **maintain blood pressure** between **pump cycles**	**Thin** inner layer of **elastic** tissue	
Narrow lumen	• **Maintains** a **high blood pressure**	**Wide** lumen	• Allows a **greater volume** of **blood** to pass
Endothelium (inner lining)	• **Smooth** to **reduce friction**	**Pocket valves**	• **Present** to **prevent** the **backflow** of **blood** under **low pressure** and **against gravity**

- The **muscle** and **elastic fibres** help in **maintaining blood pressure** between **pump cycles**.
- Blood is **expelled** from the heart when the **ventricles contract** and **flows** through the **arteries** in repeated **surges** called **pulses**.

B. CAPILLARIES

- Capillaries have **permeable walls** that allow **fast exchange (diffusion)** of materials between **cells in tissues** and **blood in capillaries**.



Thin wall that is **one cell thick** so a **short diffusion distance** for **faster diffusion**

Close to cells so a **short diffusion distance** for **faster diffusion**

Many tiny capillaries create a **large surface area** for **faster diffusion**

Permeable wall to allow **fast exchange** of materials **between blood (plasma)** and **tissues**

Have a very small diameter which allows them to fit in small spaces between cells for faster diffusion

C. COMPARING BLOOD VESSELS

	ARTERY	VEIN	CAPILLARY
FUNCTION	Transport blood **from** heart	Transport blood **to** heart	**Exchange** materials between **blood** and **tissues**
PRESSURE	**High**	**Low**	**Low**
LUMEN DIAMETER	**Narrow**	**Wide**	**Very narrow**
WALL THICKNESS	**Thick**	**Thin**	**Very thin (one cell thick)**
WALL LAYERS	**3**	**3**	**1**
MUSCLE & ELASTIC TISSUE LAYER	**Thick**	**Thin**	**None**
POCKET VALVES	**No**	**Yes**	**No**

D. CORONARY HEART DISEASE (CHD)

Risk factors

CAN CHANGE	CANNOT CHANGE
Diet **high** in **saturated fat** (**cholesterol**)	**Age**
Diet **high** in **salt**	**Gender**
Alcohol	**Genetics**
Smoking cigarettes	**Race**
Lack of **exercise**	
Stress	

What happens

- The **coronary artery** branches off from the **aorta** and supplies the **heart muscle** with **oxygenated blood**.

1. **Cholesterol** builds up in the **inner lining/endothelium** of an **artery**
2. Lumen **diameter decreases**
3. (So) **blood pressure increases**
4. **Calcium** builds up (from blood)
5. Over time, this forms a **plaque**, which is covered by a **cap**
6. If this plaque **ruptures** (bursts)
7. A **blood clot/thrombosis** forms
8. (Blood clot) **dislodges/breaks off** and **enters** the **blood**
9. (Blood clot) **enters/blocks** the **coronary artery**
10. (So) **heart muscle** gets **less oxygen**
11. (So) **heart muscle** stops **respiring**
12. (So) **heart muscle** releases **less energy**
13. (So) **myocardial infarction** / heart attack

- Steps **1** to **7** are known as **coronary artery disease**.
- Steps **8** to **13** are needed to cause **coronary heart disease**.