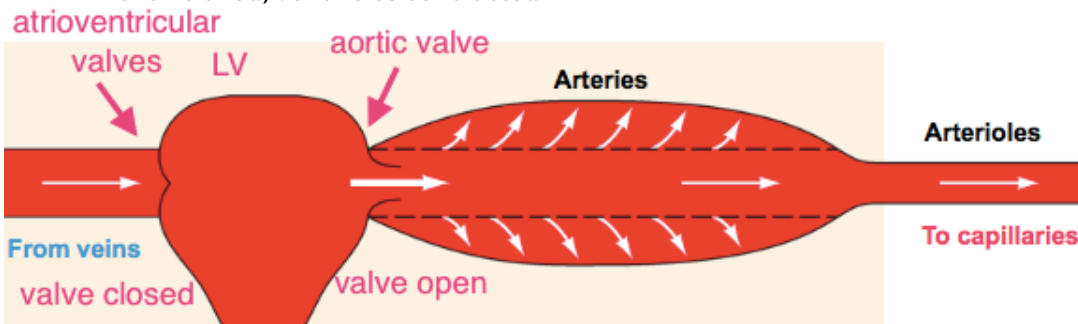


Arteries

- Arteries are **elastic tubes** – they act as pressure reservoirs to maintain blood flow through tissues during diastole
- Arteries have **large diameters** – they provide low resistance pathway for conducting blood to organs
- Arterial blood flow is **pulsatile** because blood is ejected by each contraction and the contractions are intermittent

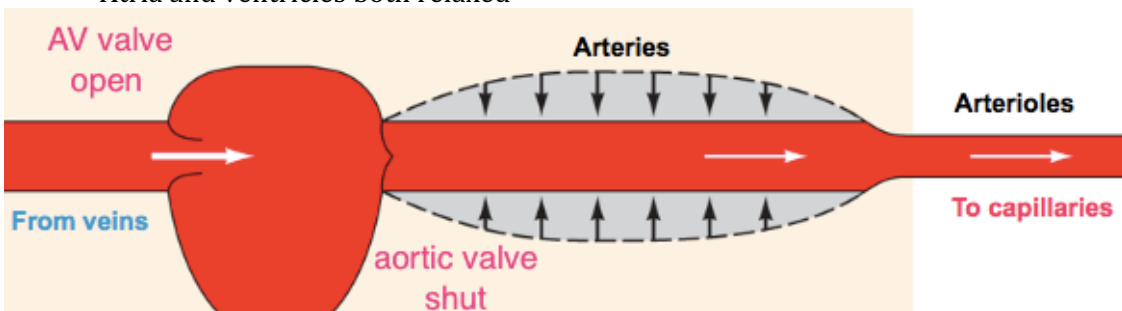
Systolic blood pressure

- Heart contracting and emptying (systole)
- 2/3 of blood goes into stretching the walls of arteries and 1/3 of blood travels into arterioles to capillaries
- Atria relaxed, ventricles contracted



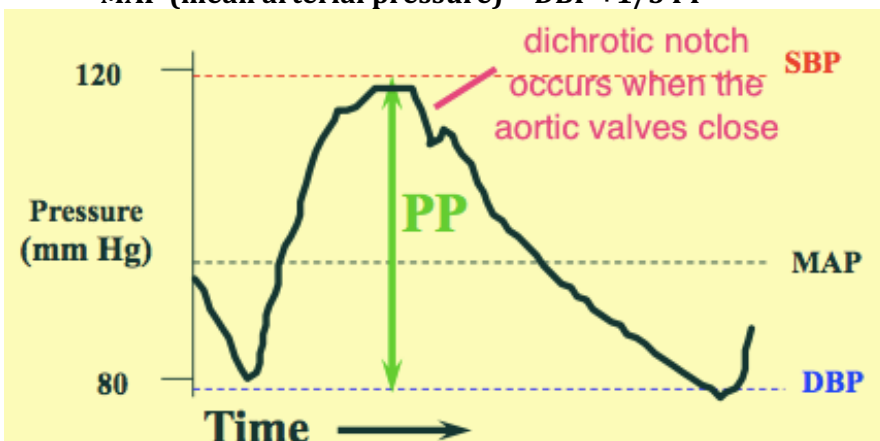
Diastolic blood pressure

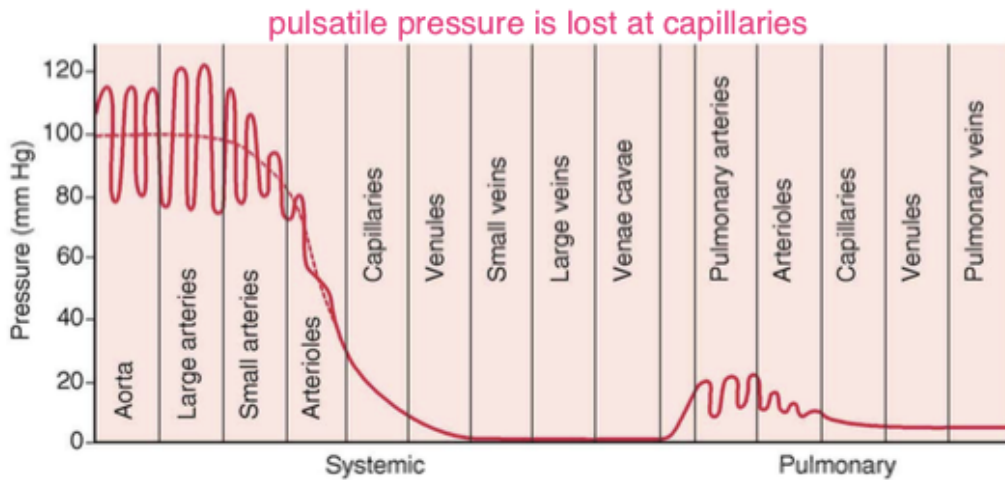
- Heart relaxing and filling (diastole)
- Blood passively filling from atria to ventricles
- Lowest pressure recording during the filling of ventricles
- Atria and ventricles both relaxed



Aortic pressure trace

- SBP – maximum. DBP = minimum.
- PP = **pulse pressure** = SBP - DBP
- MAP (mean arterial pressure) = DBP + 1/3 PP

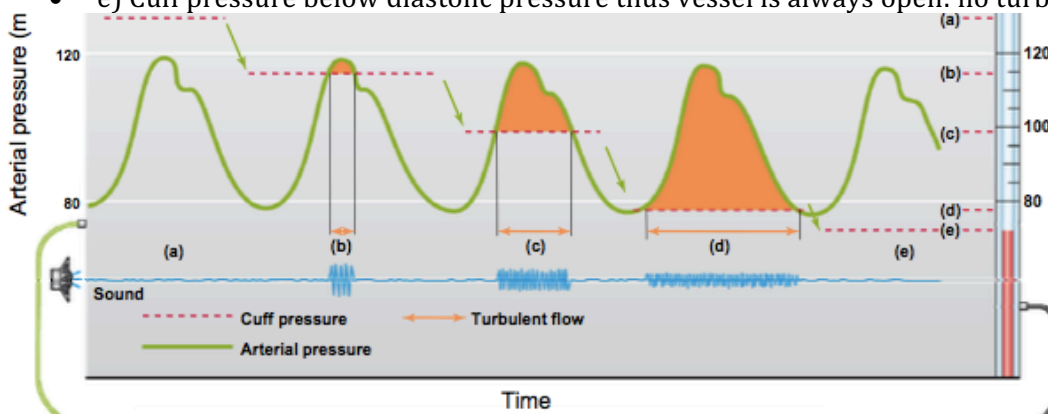




smaller diameter = decrease in pressure due to increased resistance

Measuring arterial pressure

- Sphygmomanometer records pressure
- a) No sound. Cuff pressure above systolic pressure; artery completely occluded
- b) Cuff pressure just below systolic pressure; first sounds heard; soft tapping and intermittent
- c) Sounds loud, tapping and intermittent
- d) Low muffled sound lasting continuously
- e) Cuff pressure below diastolic pressure thus vessel is always open: no turbulence, no sound



Arterial blood pressure

- **Hypertension** – high blood pressure. Consistently above 140/90
- **Hypotension** – low blood pressure. Consistently below 100/60

Arterioles and regulation of blood flow

- **FLOW = CHANGE IN PRESSURE/ RESISTANCE**
- Change in P is same for all organs/tissues supplied by the systemic circulation (MAP)
- Thus, local resistance (R) determines the flow through each organ/tissue
- Arterioles control the **proportional distribution** of blood flow to the different organs and tissues of the body through changes in their **diameter**

Local control of region blood flow for local needs

1. Metabolic control

- Blood flow increases when tissue metabolic activity increases due to dilation of arterioles by local chemical factors
- Seen in all tissues but especially important in skeletal muscle and the heart
- Endothelium causes vascular smooth muscle to contract (vasoconstriction) and relax (vasodilation)

2. Myogenic mechanism

- Response of smooth muscle to stretch