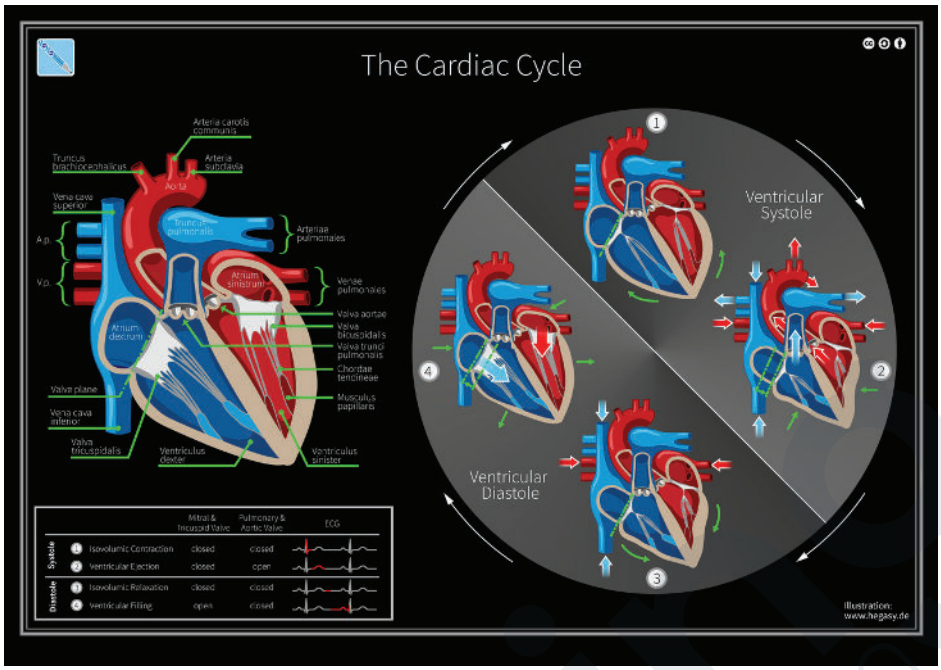
PHYSIOLOGY OF THE HEART



Important Cardiac Equations

- CO = Cardiac Output
- SV = Stroke Volume
- HR = Heart Rate
- MAP = Mean Arterial Pressure

- $CO_{[L/min]} = SV_{[L/beat]} \times HR_{[beat/min]}$
- $MAP \simeq \frac{(2 \times DP) + SP}{3}$

Nervous System Control of the Heart

Parasympathetic

- R. Vagus → SA node
- L. Vagus → AV node & ventricles
- Neurotransmitter = Acetylcholine (Ach)

Sympathetic

- T_1 - T_6 spinal nerves
- SA node, AV node, lots to atrial & ventricular myocardium
- Neurotransmitter = Norepinephrine (NE)

Controlling Stroke Volume (SV) & Heart Rate (HR)

Decrease Heart Rate

- Increased vagus input to SA node
  - More Acetylcholine at SA Node
- ↓Rate of depolarization of SA node
- Decreased HR = Decreased CO

Increase Heart Rate

- Increased sympathetic input
  - More Norepinephrine at SA node
- ↑Rate of depolarization of SA node
- Increased HR = Increased CO

Decrease Stroke Volume

- Increased parasympathetic input to ventricular myocardium
- Slightly decreased force of contraction in the ventricles
- Decreased SV = Decreased CO

Increase Stroke Volume

- Increased sympathetic stimulation to atrial and ventricular myocardium
- Increased force of contraction
- Increased SV = Increased CO