Blood pressure (BP) is the product of cardiac output (CO) and total peripheral resistance (TPR).

\[ \text{BP} = \text{CO} \times \text{TPR} \]

- CO = heart rate (HR) \times stroke volume (SV)

- Stroke volume is related to diastolic filling volume (preload), afterload, and contractility
  - The higher the ventricular filling volume, the higher the SV
  - The greater the strength of ventricular contraction, the greater the SV

- TPR, sometimes referred to as Peripheral Vascular Resistance, is determined by the diameter of blood vessels
  - Vasoconstriction leads to increased afterload resulting in high TPR
  - Vasodilation leads to decreased afterload resulting in low TPR

Other determinants of blood pressure include:
- Kidneys: sodium regulation via the kidneys and the renin-angiotensin-aldosterone system (RAAS)
- Brain: sympathetic nervous system and central nervous system regulation
- Blood vessels: vasculature tone regulation via release of catecholamines, angiotensin, histamine, kinins, pH, PaO2, and endothelial factors
Overview of some of the important mechanisms involved in the regulation of blood pressure. RAAS = renin-angiotensin-aldosterone system.