BMSN1601 – Anatomy

|  |
| --- |
| What is Cardiovascular System |

* Through Hemodynamics 🡪 Deeper understanding in Cardiovascular System
  + Hemodynamics = Study of Blood flow by physical methods

|  |
| --- |
| Introduction to definition of CO, HR, SV, Q and BP |

* CO is Cardiac Output
  + Amount of blood pumped by **each ventricle** in **1 minute**
* HR is Heart Rate
  + Number of Heart beat in 1 minute
* SV is Stroke Volume
  + Volume of Blood Pumped out by **a ventricle** with each beat.
* Q is Blood Flow
  + Volume of blood flowing through a vessel, an organ or the entire circulation in each period
* BP is Blood Pressure
  + Force per unit area exerted on the wall of a blood vessel by its contained blood.
    - Like e.m.f 🡪 Provide Driving Force to the Blood
  + Unit: mmHg
  + Site of measurement: **brachial artery** (large arteries near the heart)

|  |  |
| --- | --- |
| 💥 | Blood Flow is not equivalent to the Cardiac Output.  Blood Flow in the entire circulation per minute = Cardiac Output. |

|  |
| --- |
| Introduction to Blood Pressure |

* Difference in BP within vascular system 🡪 Driving force to blood 🡪 Blood Flows
  + From High Pressure to Low Pressure Area
  + Aorta (大動脈) 🡪 Arteries (動脈) 🡪 Arterioles (小動脈) 🡪 Capillaries (毛細血管)   
    🡪 Venules (小靜脈) 🡪 Veins (靜脈) 🡪 Venae Cava (大靜脈)
* Arterial Blood Pressure – Systolic Pressure
  + Arterial Pressure **during ventricular contraction**
* Arterial Blood Pressure – Diastolic Pressure
  + Arterial Pressure **during ventricular filling**
* Pulse Pressure
* Mean Arterial Pressure
  + Average arterial pressure during **a single cardiac cycle**.

|  |  |
| --- | --- |
| 💦 | Examination Technique:  Systolic Pressure @ Highest Level in cardiac cycle  Diastolic Pressure @ Lowest Level in cardiac cycle |

|  |
| --- |
| The Common Formula For Cardiovascular System |

|  |
| --- |
| Entire Circulation Formula: |
| #Blood circulation Formula:  #:The Formula is similar to the Ohm’s Law, where |
| Formula for velocity of Q:  \* The Formula is assume that there is no resistance in the blood vessel  \* Important Idea: Current in = Current Out, when there is no branches, the blood flow will always be the same |
| Poiseuille’s Law:  \* Regulation of blood vessel radius  \* is not subject to **significant short-term regulation**, in other word, t cannot  \* and not subject to **significant regulation** by body, where t cannot 0   |  |  | | --- | --- | | ❔ | * Do notice that the Blood Pressure decrease over the time   + From Aorta to Venae Cava * There is no change in the radius of blood vessel within the length L * Smaller the radius, Larger the Resistance, Smaller the speed.   + Do compare this relationship with the above formula , where the above formula omit the resistance. | |