

Systems

Cardiovascular System

Systemic Circulation - LV(ox) --> body tissue -->RA (deox)

Pulmonary Circulation - RV (deox)--> lungs -->LA (ox)

Coronary Circulation- LV (ox) --> heart (coronary arteries) -->?

Lymphatic System

Organ filters lymph and produces phagocytic lymphocytes(WBC)

Vessels transport interstitial fluid(in between cells) to cardiovascular system

Heart control

heart = myogenic tissue - creates its own electrical contraction, subconscious (direct innervation)

how the heart beats

1. blood makes **Sinoatrial Node (SA node)/Pacemaker** to activate, causing atria to contract, moving blood to ventricles

in top wall of atrium, generates electrical impulses

2.when ventricles fill, **Atrioventricular Node (AV node)**relays impulses to **bundles of His** and **Purkinje fibres**, causing ventricles to contract, moving blood to arteries

at base of atrium to delay impulse and allow ventricles to fill

Electrical Activity in the Heart

https://www.google.com/url?sa=i&url=https%3A%2F%2Fbiologydictionary.net%2Fp-wave%2F&psig=AOvVaw2OiBJZ6EoIo_VqzH8yxT-l9&ust=1670283205835000&source=images&cd=vfe&ved=0CA8-QjRxqFwoTCNCwoKiQ4fsCFQAAAAAdAAAAABAE

Electrocardiogram (EKG/ECG) impluses of the heart picked up by electrodes on the skin

ECG wave or PQRST wave cycle -ECG pattern

P atria starts contraction, AV opens, SL closes

Q impluse from SA node to AV node is delayed, ventricles fill

R (Lub) ventricular systole in apex, atrioventricular valves close

S ventricular systole finishes

Electrical Activity in the Heart (cont)

T (Dub) ventricular diastole

Indicators of Cardiovascular Health

1. Heart Rate (bpm)

- low resting heart rate = high cardiovascular health

|_> indicates high stroke volume/ stonger pumps

- short recovery time = good

2. Stroke Volume (mL/beat)

- the extent that ventricles can fill (stretch) and empty (strength)

- cardiovascular exercise improve ventricular strength and volume

3.Cardiac Output (mL/min)

- heart rate(beats/min) x stroke volume(mL/beat)

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Blood Vessels

aorta, artery, arterioles, capillaries, venuoles, veins, vena cava

Name	Structure	Function
artery	thick, muscular, elastic walls	withstand high blood pressure/volume
	narrower than veins	recoil to propel blood
	no valves	carry blood away from heart
cappillaries	1 cell thick (diffusion)	easy exchange w/ all tissues
	v narrow, v branched	slows blood flow
	has precapillary sphincter	blood plasma can leak
veins	large internal diameter, w/ valves	lower blood flow pressure



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Blood Vessels (cont)

not elastic/ muscular valves prevent backflow

surrounded by skeletal muscle to help push blood returns blood to heart

cross sectional area of blood vessels

- changes depending on vessel

- regulates local blood flow

high surface area (cappilares = low speed of blood)

Pulse Points

arteries can be against bone at these points to feel blood flow

radial - wrist

carotoid - neck/trachea

brachial - bicep

femoral - crotch

pedal - foot

Influences on Rhythm of Heart

hormones - adrenalin, epinphrine, nor...

increases body temp high bpm

vagus nerve +blood in aorta ----> inhibitory effect (parasympatheic)

Aorta stretch receptor ----> impulse to medula oblongata ----> vagus nerve ----> decrease SA node activity

accelerator nerve +blood in vena cava -----> stimulating affect (sympatheric)

Vena Cava stretch receptor ----> impulse to medula oblongata ----> accelerator nerve ----> increase SA node activity

high [CO2] in blood pH 7.35-7.45



Chemical stimuli

+CO + heart speed

+O2 - heart speed

nicotine, alcohol, caffeine +heart speed

Blood Pressure

Factors

(1) Contraction of ventricles +mL/min = +b.p.

(2) Elasticity of arterial walls

(3) Ateriole Resistance - diameter ----> +resistance ----> +b.p.

(4) Smooth muscles in arteries controlled by: nerves (medulla oblongata), hormones, +CO2, +lactic acid

(5) Blood volume - blood volume = - b.p.

Regulation - vasomotor center (unconscious)

high b.p. ----> aorta/carotoid arteries stretch receptors ----> vasomotor center (medulla oblongata) ----> increase arteriole diameter ----> low b.p.

- high b.p can cause blood vessels to rupture

Measure

- uses sphygmomanometer to cut off blood flow in brachial artery (x/y)

- x = systolic, sound heard, max pressure during ventricular contraction

- y = diastolic, sound disappear, min pressure during ventricular relaxation

ave: 120/80mmHg

Hypertension

140/90mmHg +

factors responsible: obesity (+cappilaries to service extra fatty tissue), Stress (arteries contract), +salt (kidneys)

consequences:

Treatment: increase urine (-salt, diuretic drugs), drugs that dilate arteriole, blood thinners

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Components of Blood

Plasma - suspend blood cells

- CO₂ dissolves, forms carbonic acid in rbc cytoplasm, out of rbc as bicarbonate ions, to the lungs

Red blood cells - erythrocyte, de-nucleated, contain hemoglobin

- O₂ + CO₂ transport

largest %

White blood cells -leukocyte, colourless,w/nucluei, increase when fighting infection

--granulocytes: engulf and destroy foreign bodies, Largest

--monocytes: ^|, also leaves blood stream to destroy macrophages

--lyphocytes: include B+T cells, formation of antibodies

Platelets - thrombocytes, no nueclus bc fragment of larger cell from bone marrow, smallest

- key role in clotting:

thrombus- clot that seals blood vessel

embolus- clot that dislodges+ carries through cu=



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