

CVS

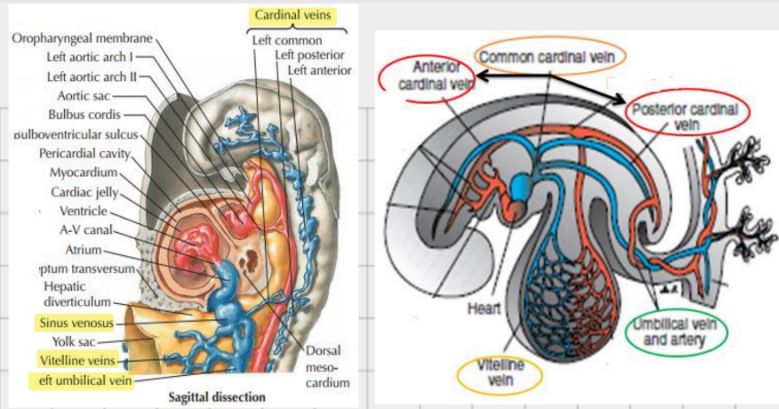
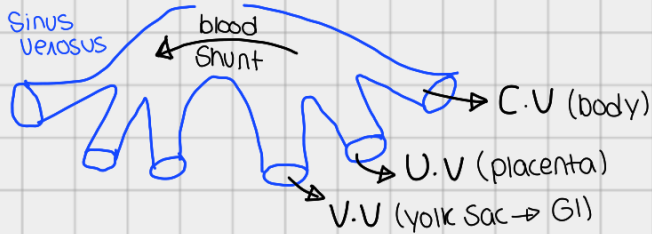
EMBRYOLOGY

Written by Inssaf Alammouri

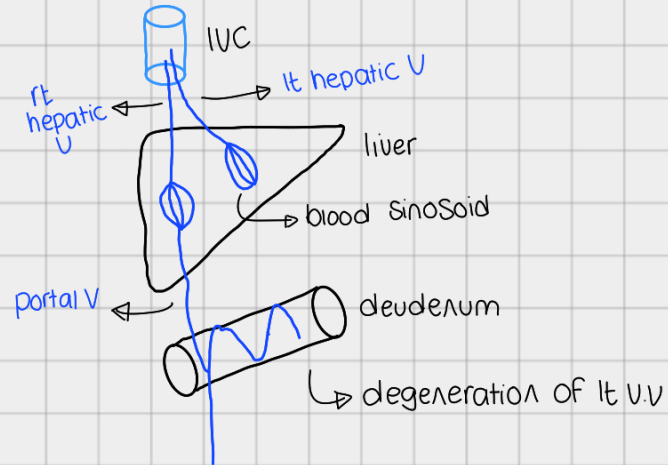
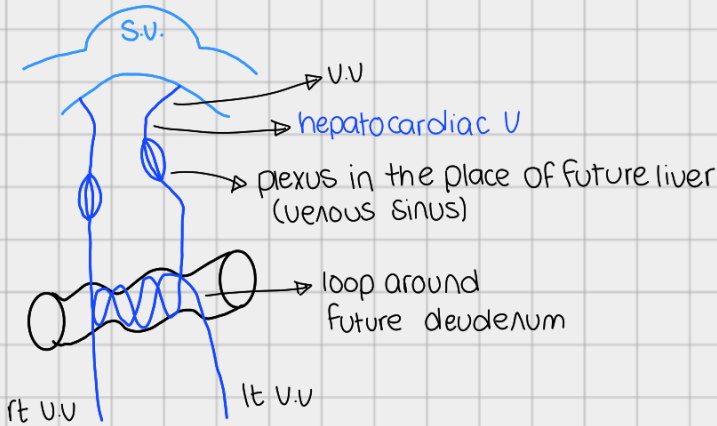
Corrected by Dr.Ahmad Alsalman

#الفريق_العلمي

EMBRYOLOGY (lec 4)



① Vitelline V (2 veins)

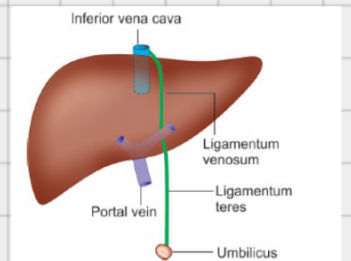
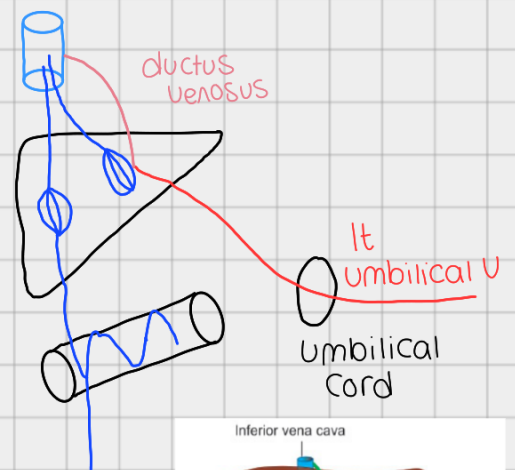


* rt & lt vitelline Vs begin from yolk sac → loop around duodenum → continue as rt & lt → form 2 plexuses of veins (in the area of future liver) → continue as rt & lt hepatocardiac veins → form rt & lt vitelline Vs & drain into S.V

* lt V.V. degenerates so we have only the plexus & hepatocardiac V on the lt side
 * the rt side V.V forms portal V
 * rt hepatocardiac channel forms the hepatocardiac portion of IVC / lt becomes hepatic V & drains into IVC

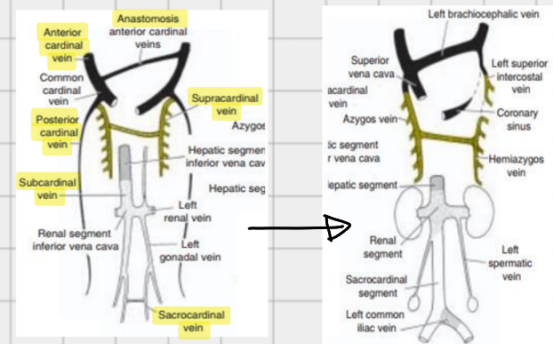
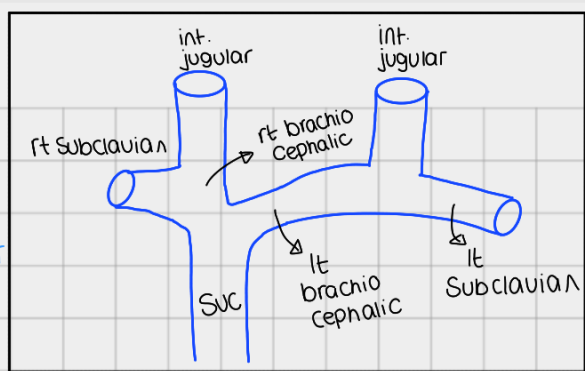
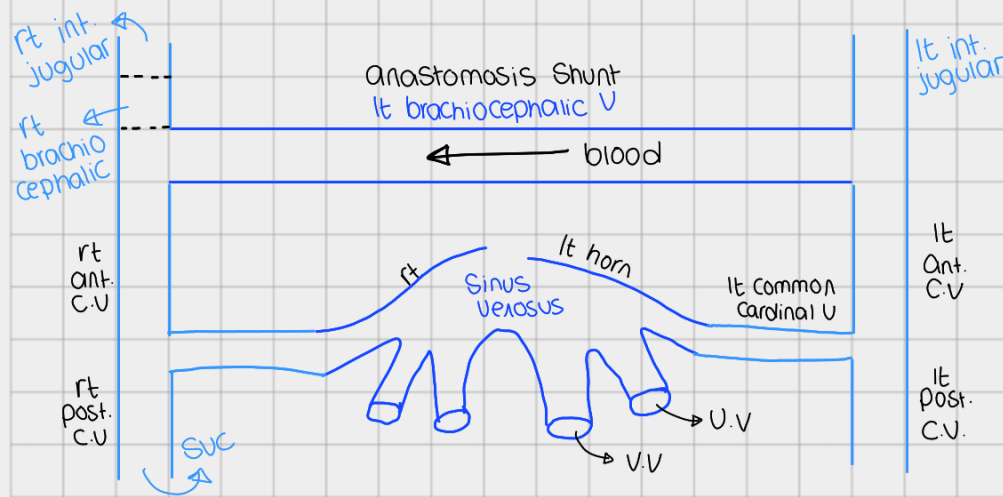
② Umbilical V (1 vein, has oxygenated blood)

* Umbilical V enters the umbilical cord → goes to embryo & then divides into rt & lt → their proximal part degenerates → remainder of rt V degenerates → lt V is the only one that carries blood from the placenta to the liver → with the increase of placental circulation, a direct communication forms between lt umbilical V & rt hepatocardiac channel to form ductus venosus → this vessel bypasses sinusoidal plexus of liver & directly connects the lt U.V to hepatocardiac portion of IVC



* after delivery → lt umbilical V degenerates & forms ligamentum teres / ductus venosus forms ligamentum venosum

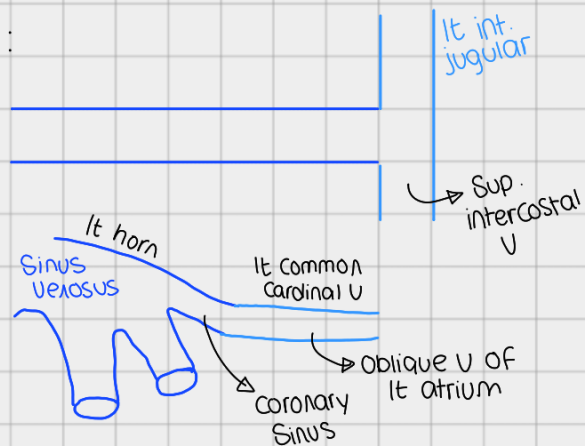
③ Cardinal V



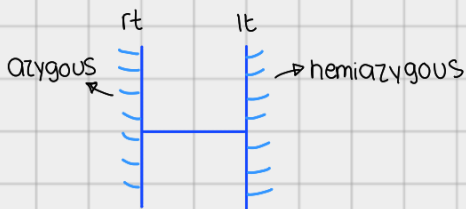
* Ant. cardinal V (from cephalic area) & post. cardinal V (caudally) unite into Common Cardinal V (rt & lt) → each one (rt & lt) drain into its horn in S.V

* later on, lt post. cardinal V degenerates & :

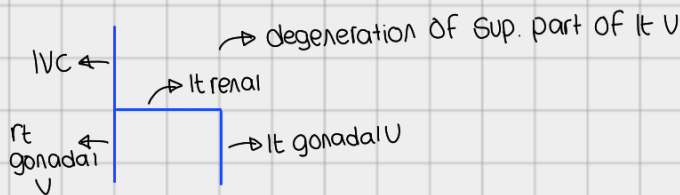
- ① lt horn forms coronary sinus
- ② lt common cardinal V forms oblique V of lt atrium
- ③ it leaves a small oblique opening that forms sup. intercostal V
- ④ 3 other vein systems (cardinal values) form to drain the lower half of the body (that lt post. cardinal V used to drain) & each of these systems has a shunt to connect rt & lt Vs



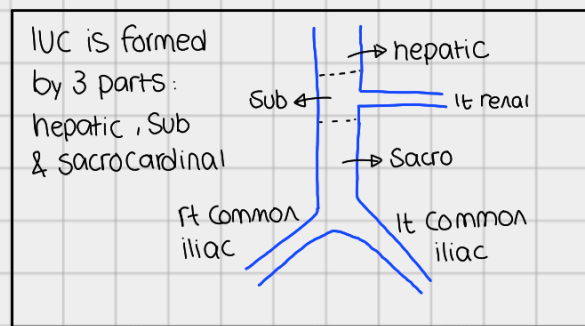
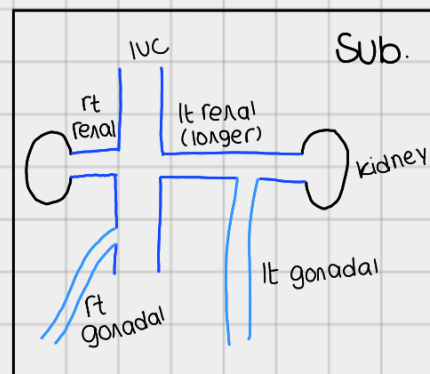
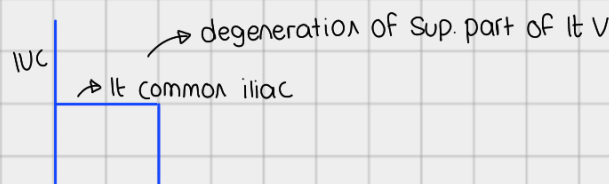
a) supra Cardinal (future thorax)



b) sub cardinal (near kidney)



c) sacro Cardinal (future pelvis)

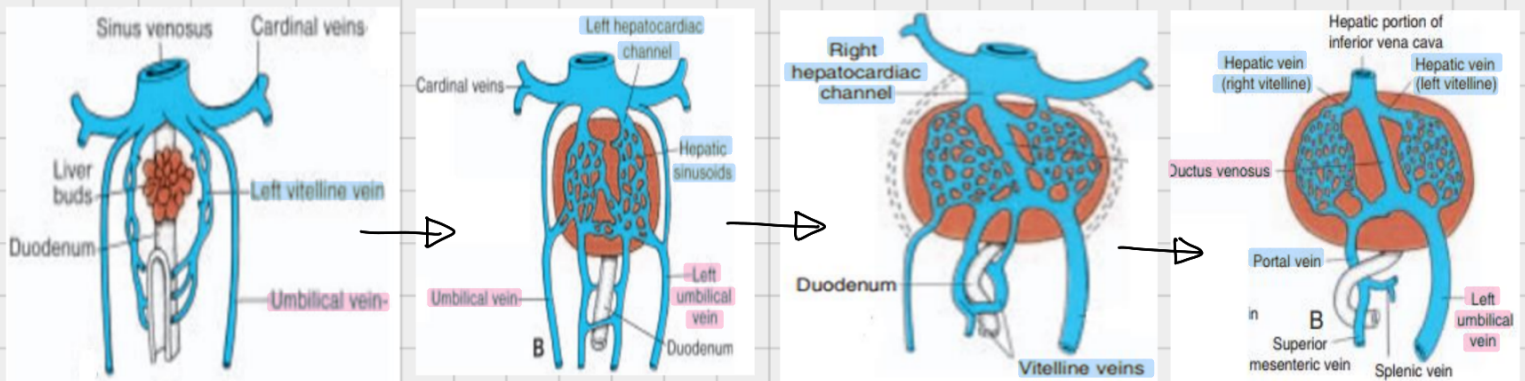


Notes:

* It → rt Shunts of blood:

- the 1st one is a result of the transformation of both Vitelline & Umbilical Vs
- the 2nd one occurs when the lt ant. Cardinal V becomes connected to the rt ant. Cardinal V by an oblique anastomosis (develops into the lt brachiocephalic V)

* Vitelline & Umbilical Vs



* What do these veins drain?

- Supracardinal → body wall by way of intercostal Vs taking over the functions of post. Cardinal Vs
- Subcardinal → mainly kidneys
- Sacrocardinal → lower extremities

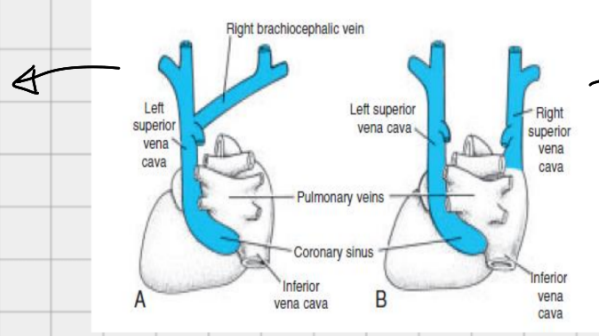
* the terminal portion of lt post. cardinal V entering into the lt brachiocephalic Vs is retained as a small vessel (lt sup. intercostal V)

* SVC is formed by → rt common cardinal V
→ proximal portion of rt ant. Cardinal V

* IVC is formed by → hepatocardiac segment (by hepatocardiac channel)
→ renal segment (by rt subcardinal V)
→ sacrocardinal segment (by rt sacrocardinal V)

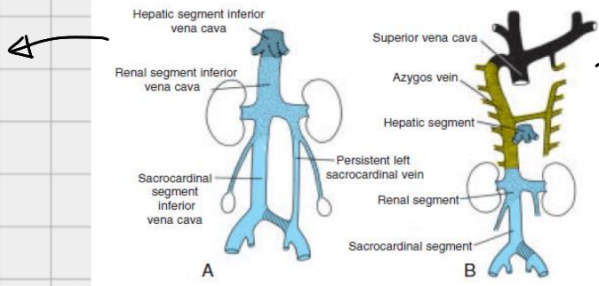
* Congenital Anomalies:

① **IT SUC**
(Failure of Rt brachiocephalic V to form)



② **double SUC**
(It Ant cardinal V persistence)

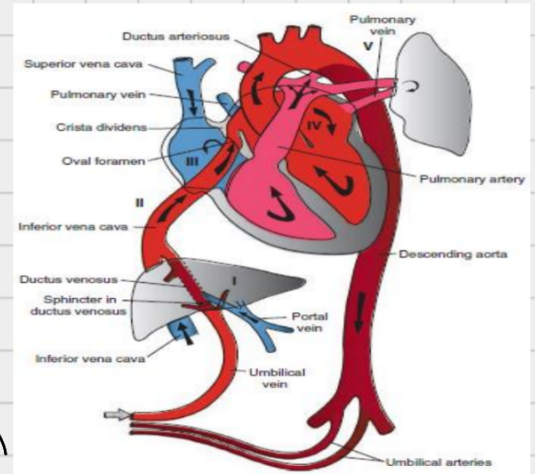
③ **double IVC**
(It Sacrocardinal V remain connected to It subcardinal V)



④ **absence of IVC**
(Rt Subcardinal V fails to make connection with liver)

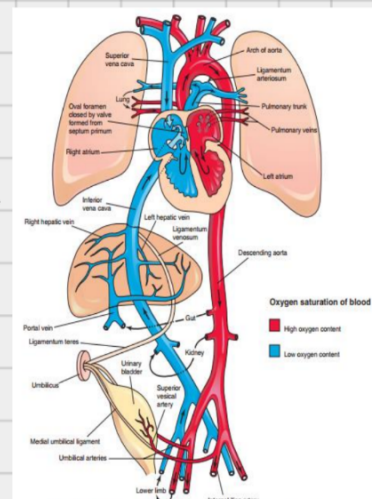
* fetal circulation:

- Umbilical V (oxygenated) → goes to liver → Shunt to IVC (ductus venosus)
- portal V brings blood from GI → goes to liver → IVC
- IVC drains all lower half of body & SVC drains all upper half of body → both go to Rt Atrium
- No pressure to pump blood to Rt ventricle (lung is collapsed) → blood Shunts to Lt atrium / Some blood reaches Rt ventricle & reach pulmonary trunk → Shunt to aorta by ductus Arteriosus
- Lt atrium → Lt ventricle → aorta → Umbilical As (2, deoxygenated) → placenta (oxygenation) → back to umbilical V



* after delivery (neonatal circulation)

- ① degeneration of Lt umbilical V → ligamentum teres
- ② degeneration of ductus venosus → ligamentum venosus
- ③ closure of Atrial opening → fossa ovalis
- ④ closure of ductus Arteriosus → ligamentum Arteriosus
- ⑤ Umbilical As → form medial umbilical ligament



By: INSAF IYAD

Reviewed by Dr. Ahmed Salman