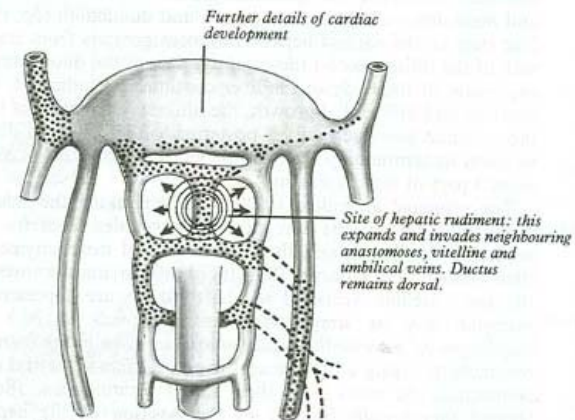

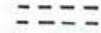



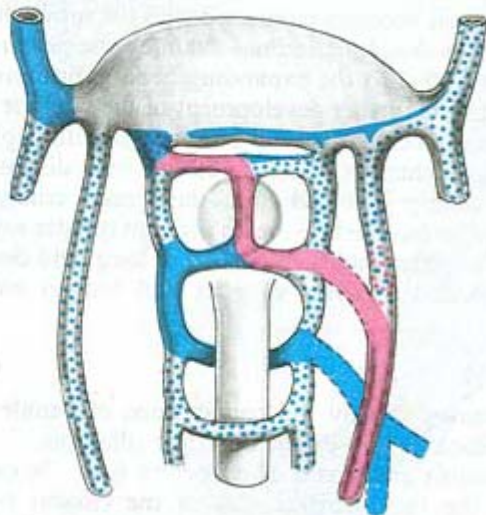
A

B



-  Parts that persist, expand and modify into many main permanent channels (but see below)
-  New connexions forming further main permanent channels
-  Channels that either retrogress completely, form fibrous cords or vessels of fine calibre. Note: postnatally both the ductus venosus, and the left umbilical vein form substantial fibrous cords.

C



ENLARGING

- ① Right precardinal and common cardinal veins
- ② Right hepatocardiac vein (termination of rt. vitelline vein - future inferior vena cava)
- ③ Right half of subdiaphragmatic anastomosis

DIMINISHING

- ① Right postcardinal vein
- ② Hepatocardiac part of right umbilical vein
- ③ Hepatic terminal rt. umbilical

DIMINISHING

Vitelline vein segments and ventral anastomosis

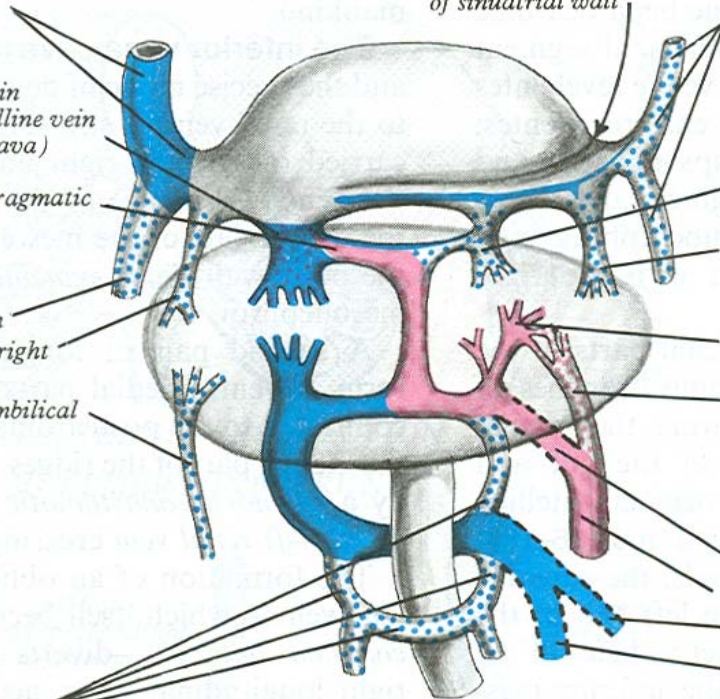
Progressive inflexion of sinuatrial wall

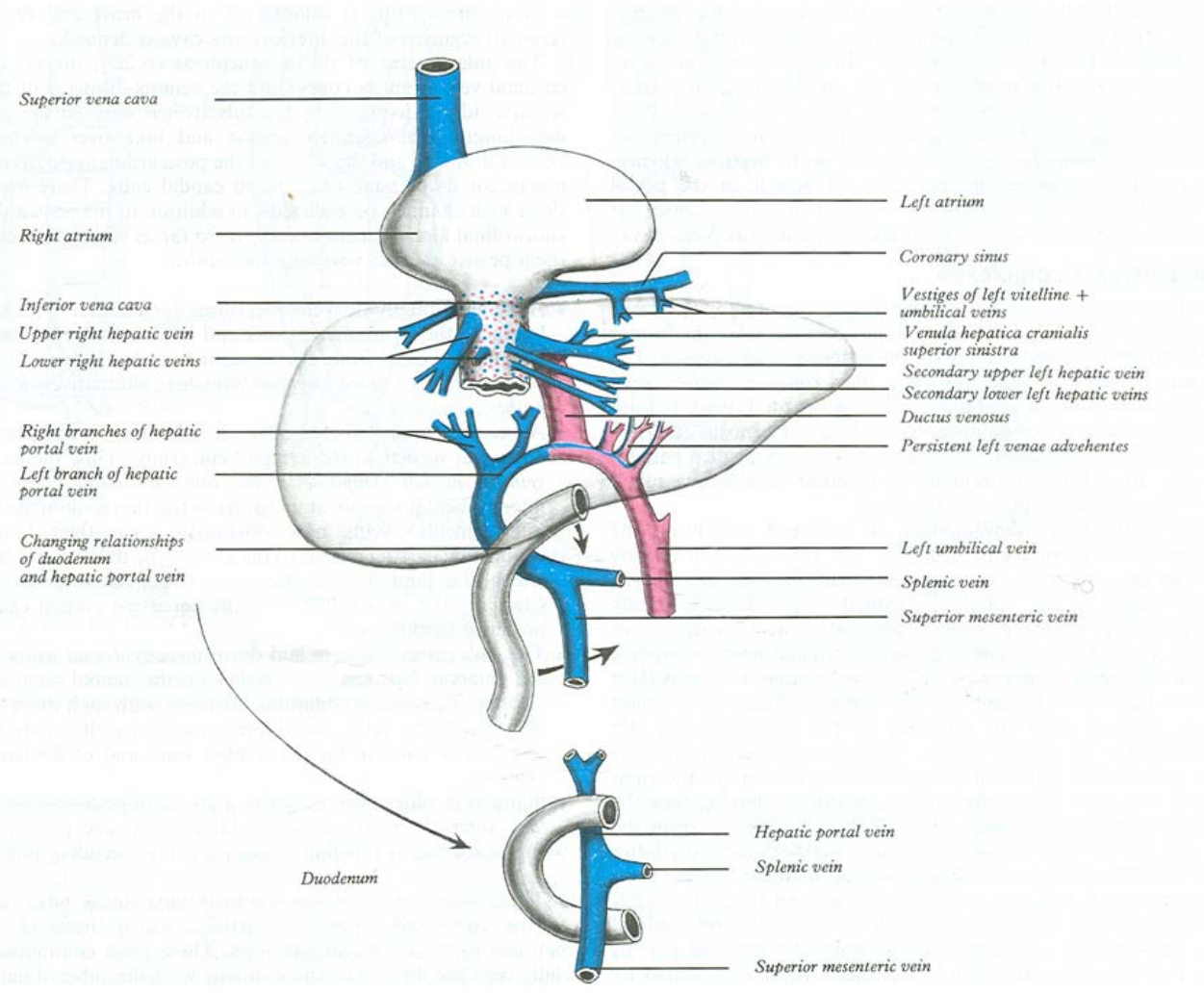
DIMINISHING

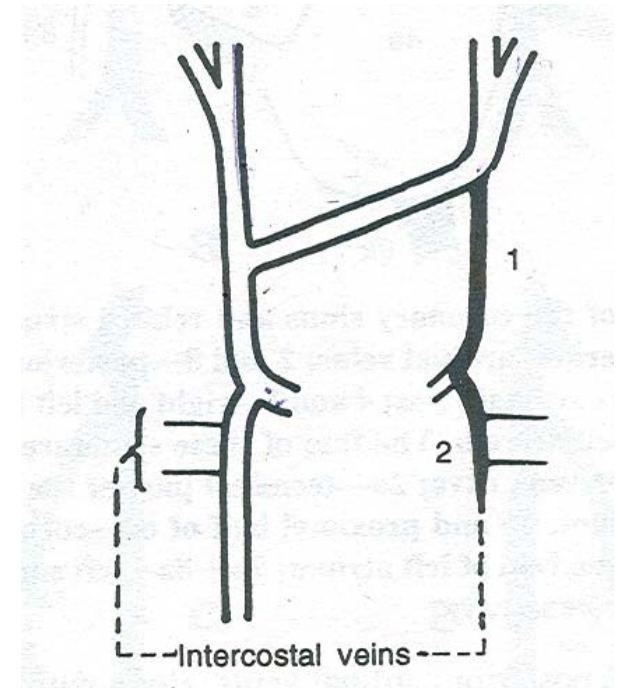
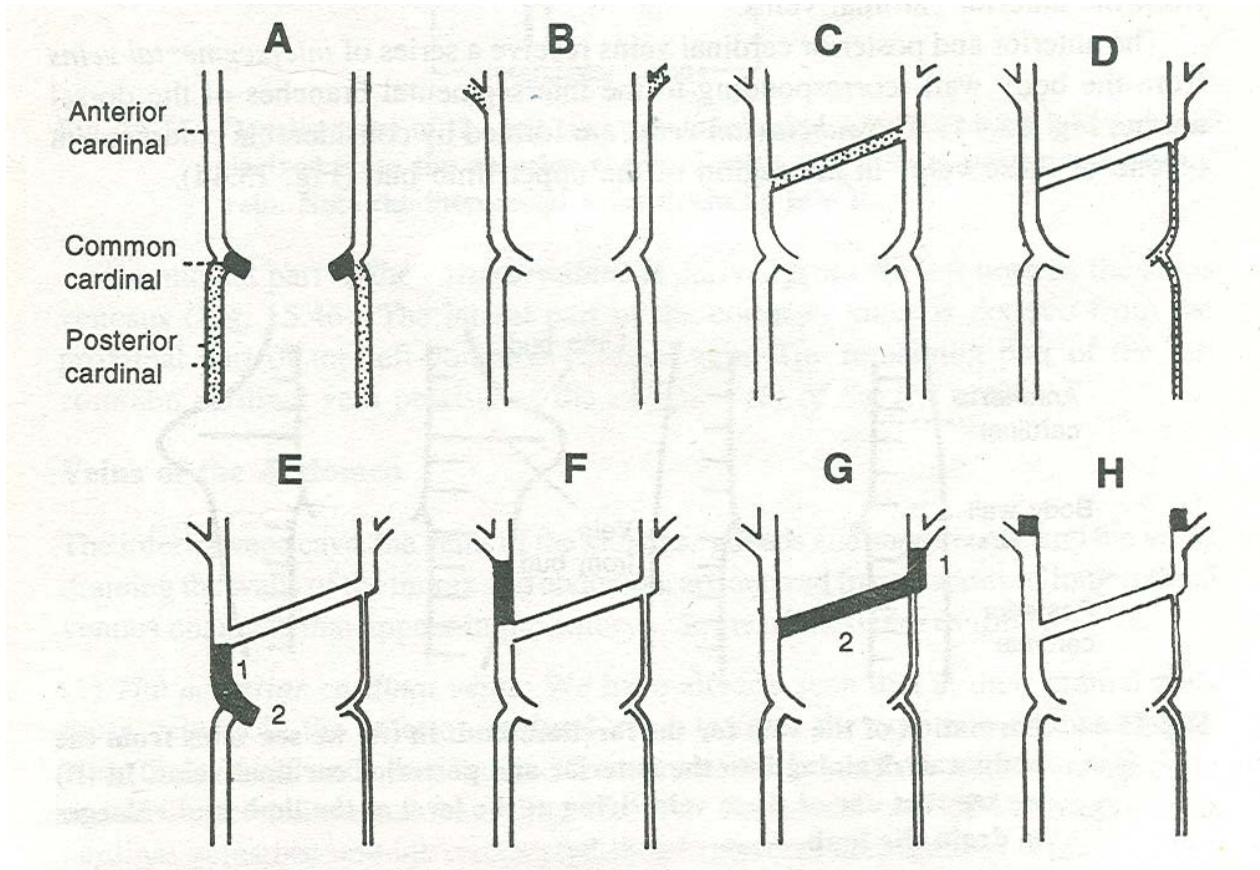
- ① Left precardinal, common and postcardinal veins
- ② Hepatocardiac part of left vitelline vein
- ③ Hepatocardiac part of left umbilical vein
- 2 + 3 = left venae revehentes
- ④ Hepatic terminals of left vitelline vein
- ⑤ Hepatic terminals of left umbilical vein
- 4 + 5 = left venae advehentes

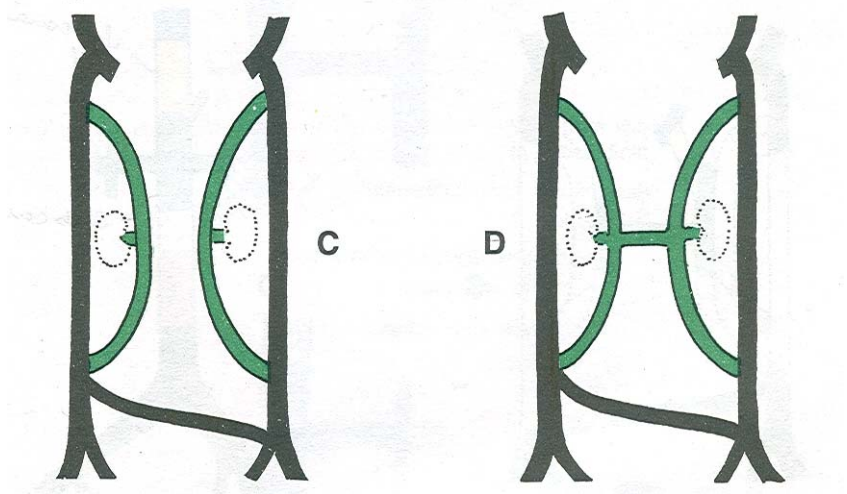
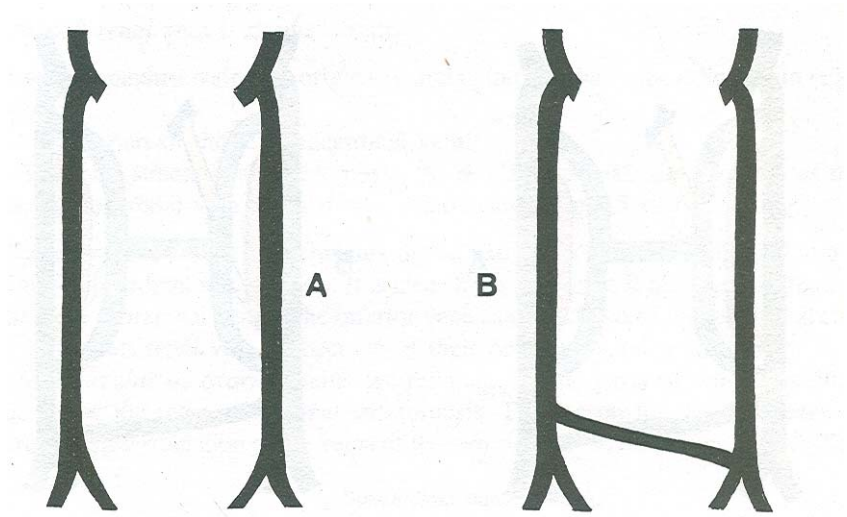
ENLARGING

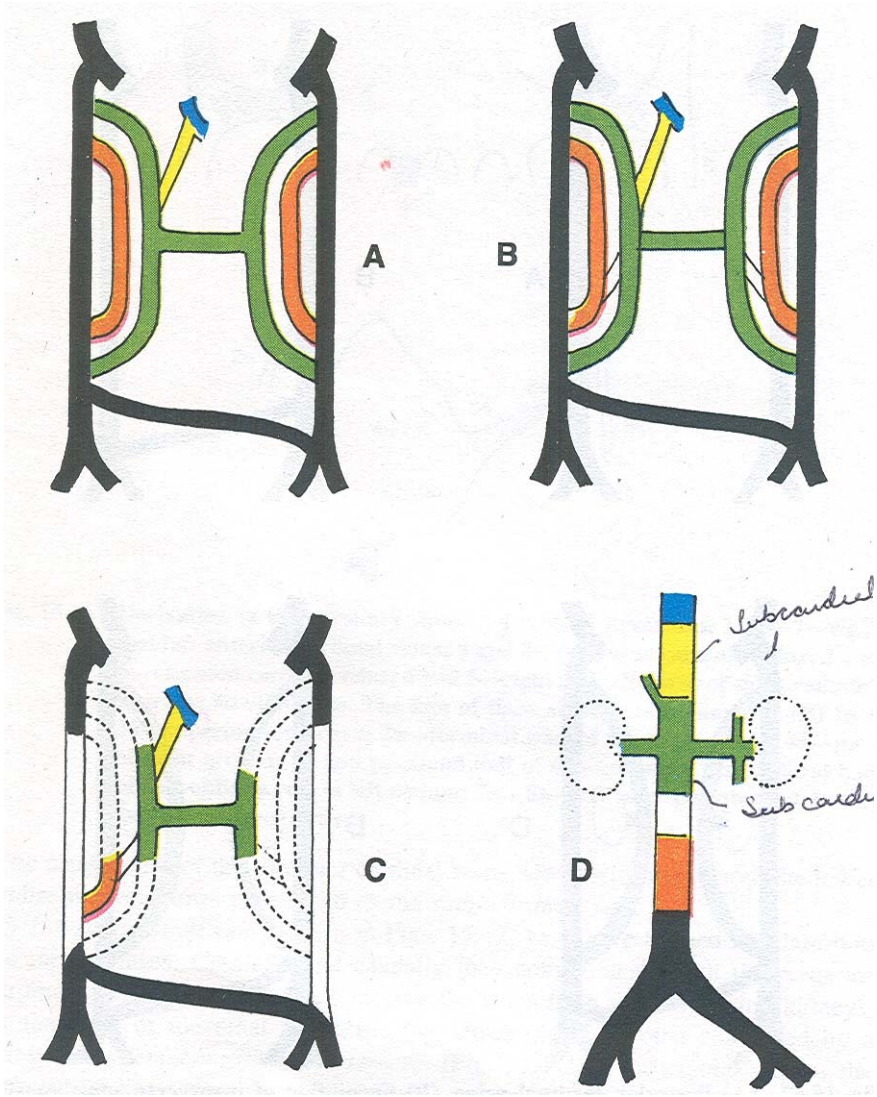
- ① New venous connexions
- ② Left umbilical vein
- ③ Presumptive splenic vein
- ④ Presumptive superior mesenteric vein
- 3 + 4 merge to form root of definitive hepatic portal vein

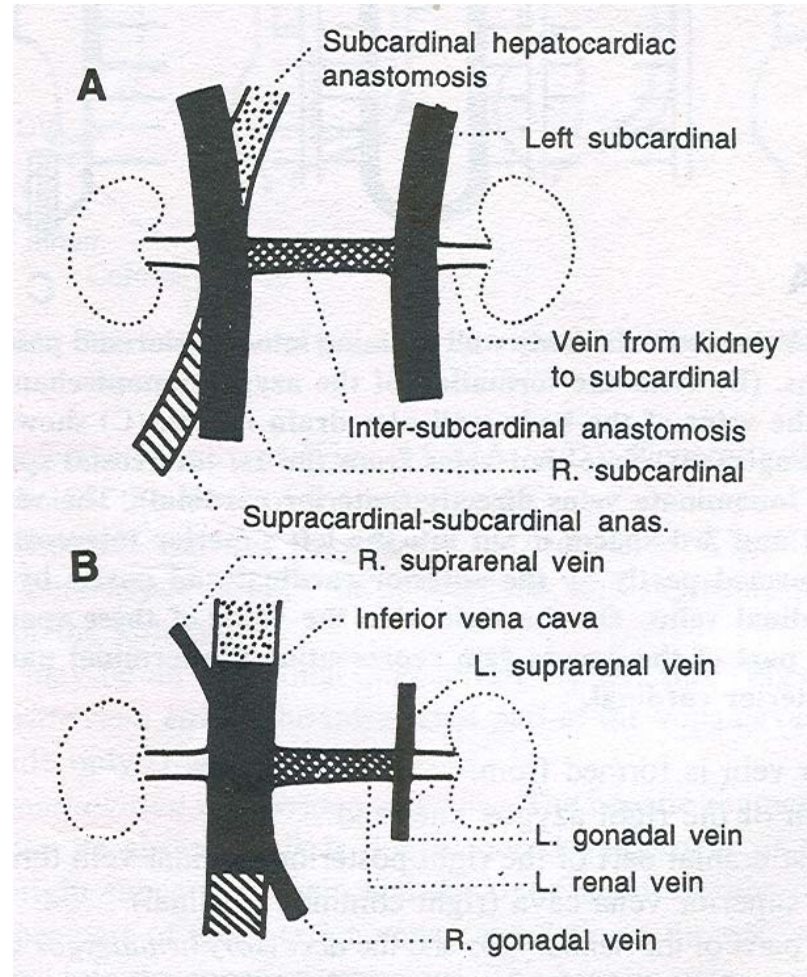


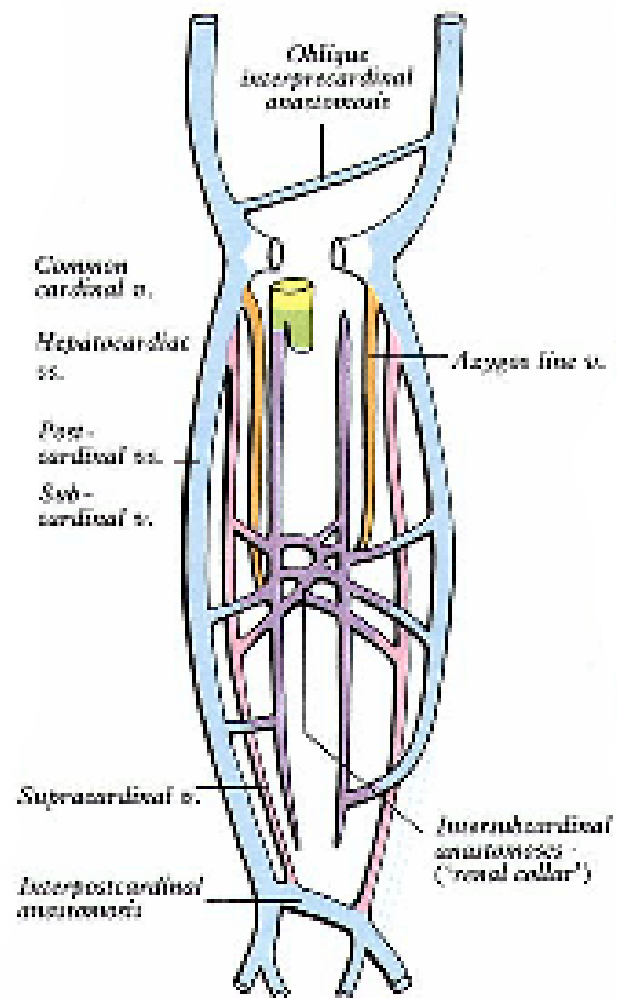
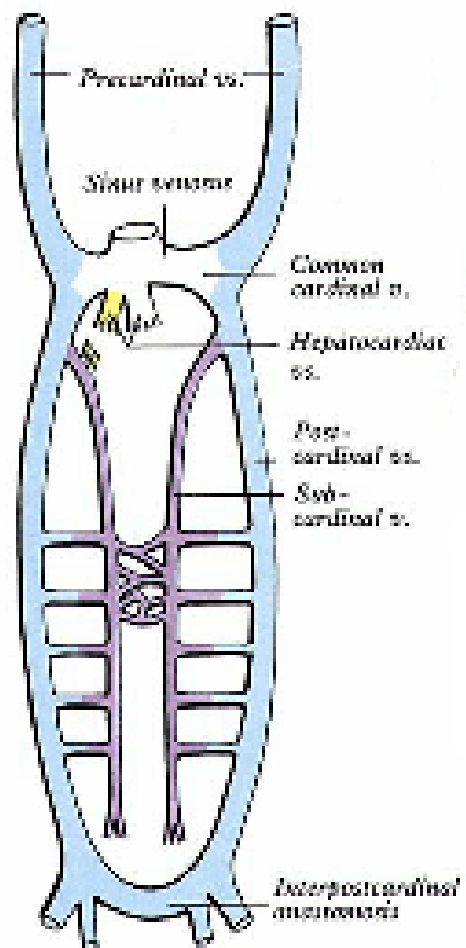


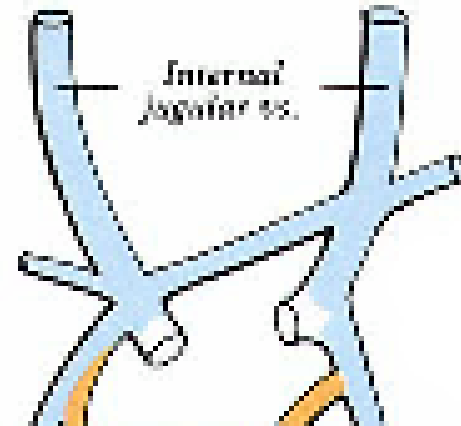
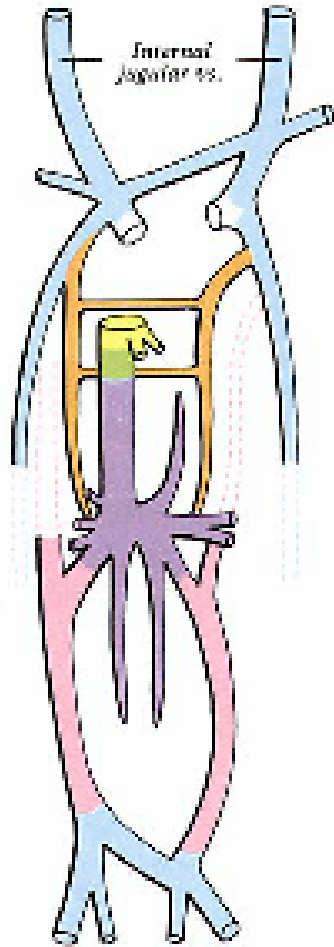


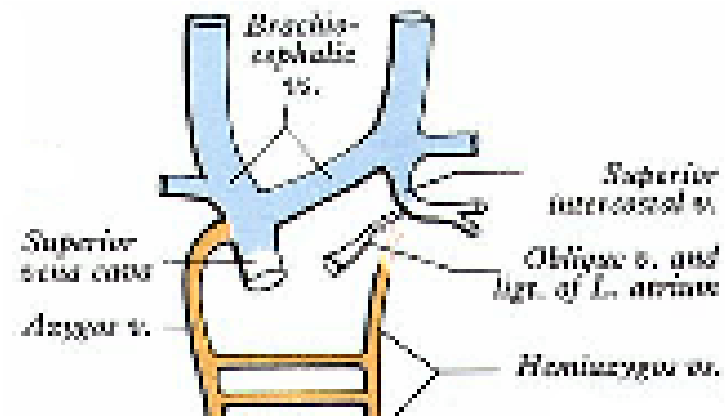
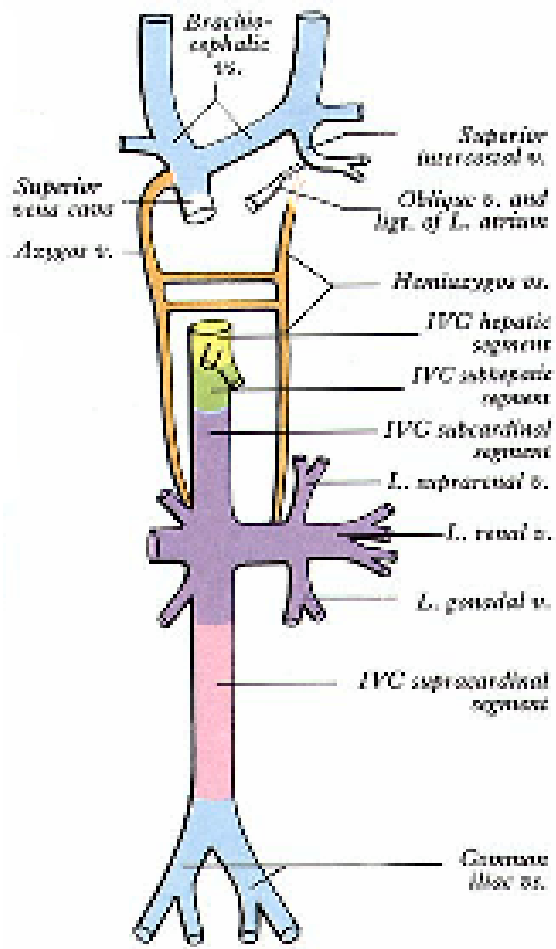






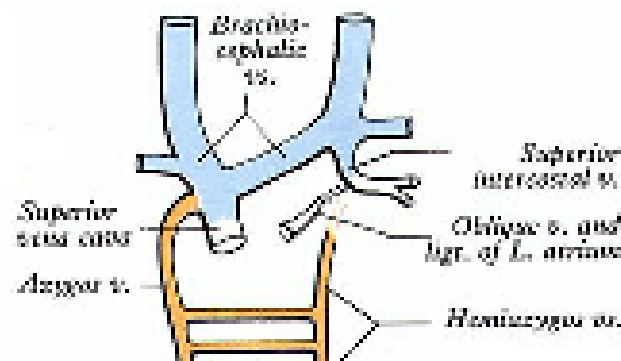
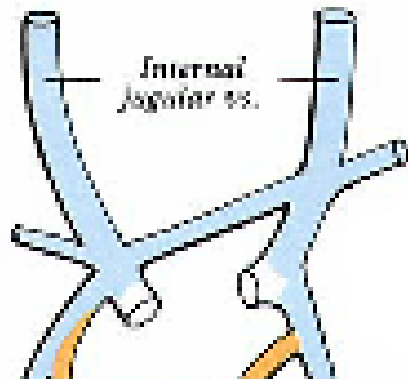






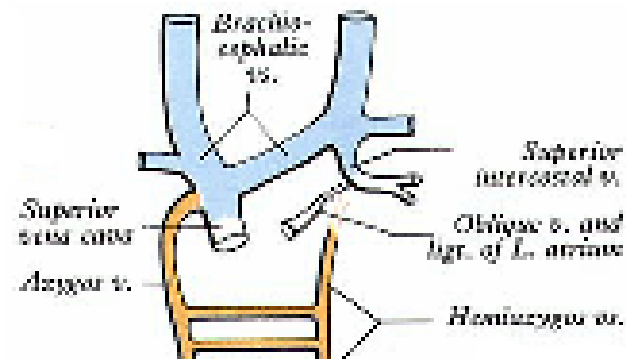
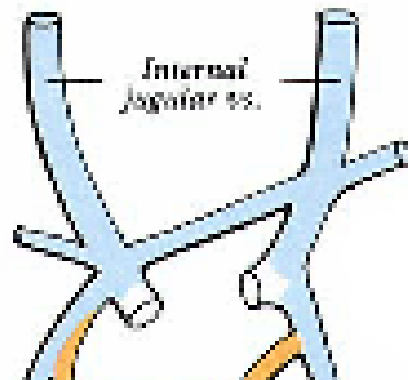
Development of brachiocephalic veins

1. Right brachiocephalic vein is formed by **cranial part of right anterior cardinal vein** and
2. Left brachiocephalic is formed by **cranial part of left anterior cardinal vein** and **the interant. cardinal anastomosis.**



Development of superior vena cava

1. The part up to the opening of vena azygos develops from **caudal part of right ant. cardinal vein** and
2. The part below the opening (intrapericardial part) is formed by the **right common cardinal vein**.

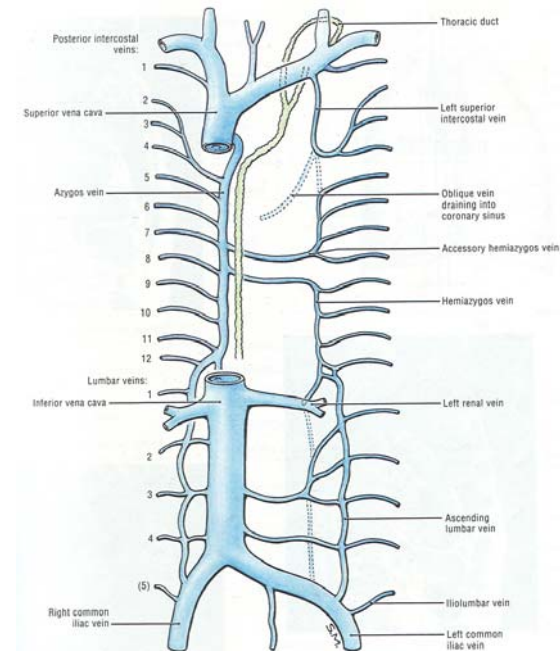
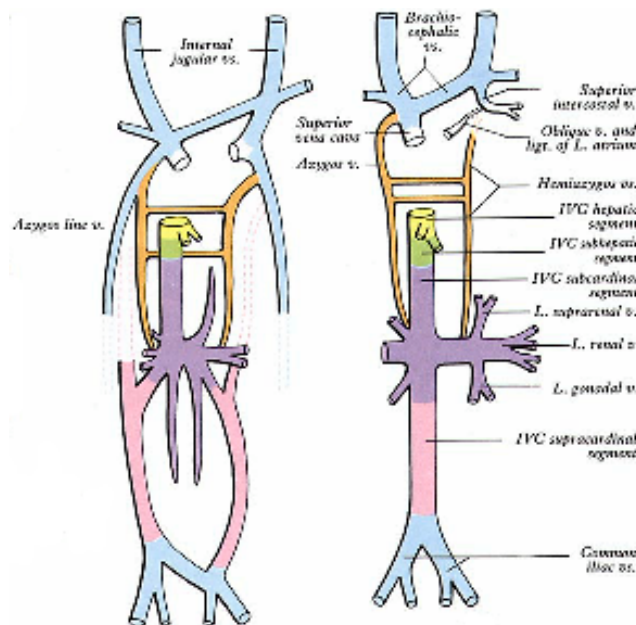


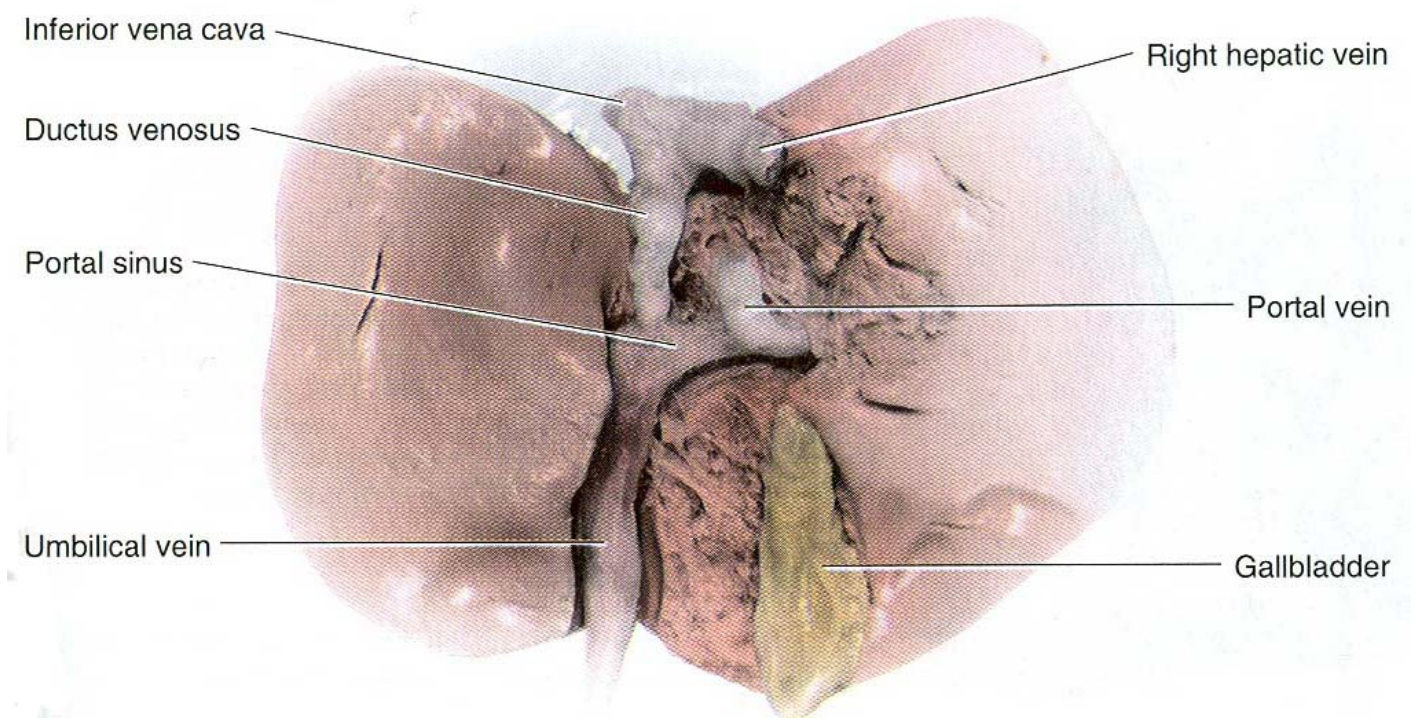
Development of azygos and hemiazygos veins

A.

1. **Vena azygos** develops from **right azygos line vein** and
2. The **arch of vena azygos** is formed by the **cranial end of right postcardinal vein.**

B. **Hemiazygos veins** are formed by the **left azygos line vein.**





Inferior vena cava

Ductus venosus

Portal sinus

Umbilical vein

Right hepatic vein

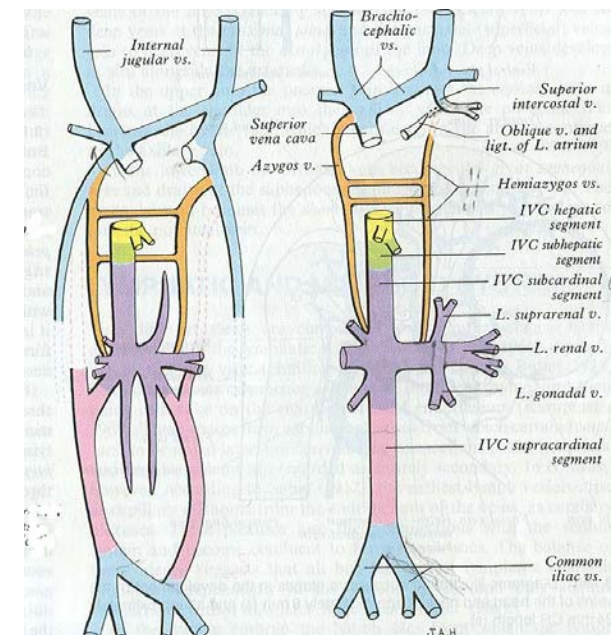
Portal vein

Gallbladder

Development of Inferior vena cava

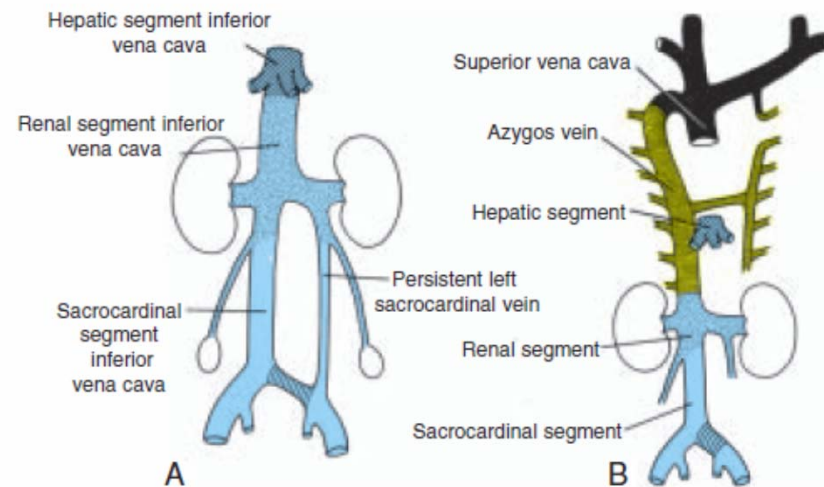
Inferior vena cava is formed, from below upwards by:

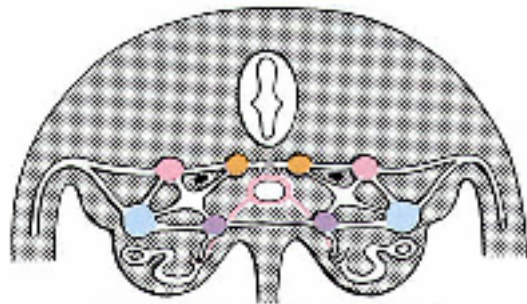
1. Begins by the union of the two common iliac veins (postcardinal veins),
2. Right supracardinal,
3. Right supra-subcardinal anastomosis,
4. Right subcardinal,
5. New formation (hepatic segment)
6. Hepatocardiac channel (terminal part of right vitelline vein).



Congenital anomalies

- Double inferior vena cava
- Absence
- Left SVC
- Double SVC



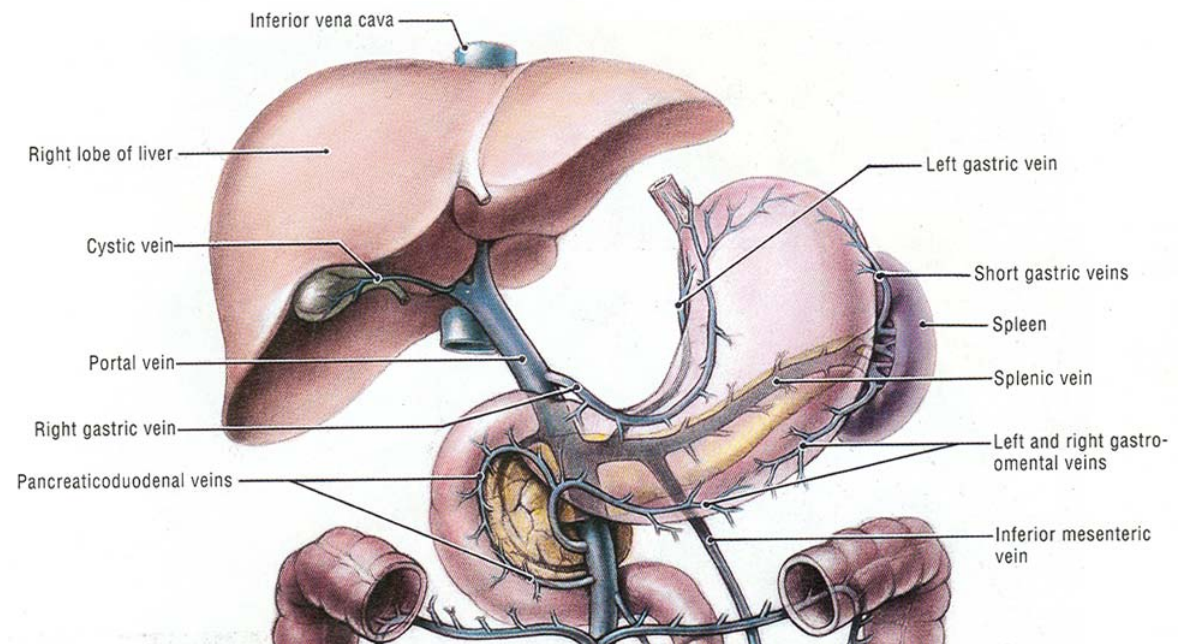


*SCHEMATIC TRANSVERSE SECTION
THROUGH EMBRYONIC TRUNK*

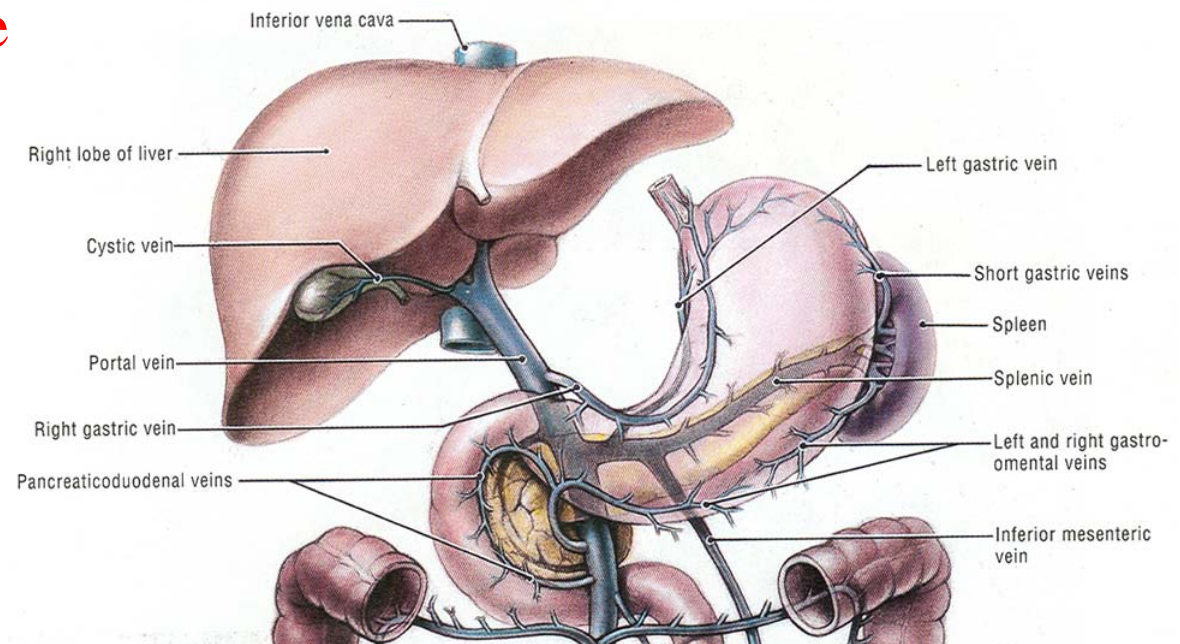
- *Postcardinal v.*
- *Supracardinal v. (thoracal/axillar line v.)*
- *Azygos line v. (medial sympathetic line v.)*
- *Subcardinal v.*
- *Subcentral v.*
- *Hepatic segment of IVC (and right vitelline v.)*
- *Subhepatic segment of IVC*

DEVELOPMENT OF PORTAL VEIN

1. The portal vein is formed behind the neck of pancreas by the union of superior mesentric and splenic vein to the left vitelline vein.
2. The part of the portal vein which is behind the 1st part of duodenum is formed by middle dorsal transverse anastomosis.



3. Part of portal vein which is in the free margin of lesser omentum is formed by **cranial or distal part of right vitelline vein.**
4. The right branch of portal vein is formed by **intrahepatic part of right vitelline vein.**
5. The left branch of portal vein is formed by the **cranial ventral transverse anastomosis and cranial, intrahepatic part of left vite**

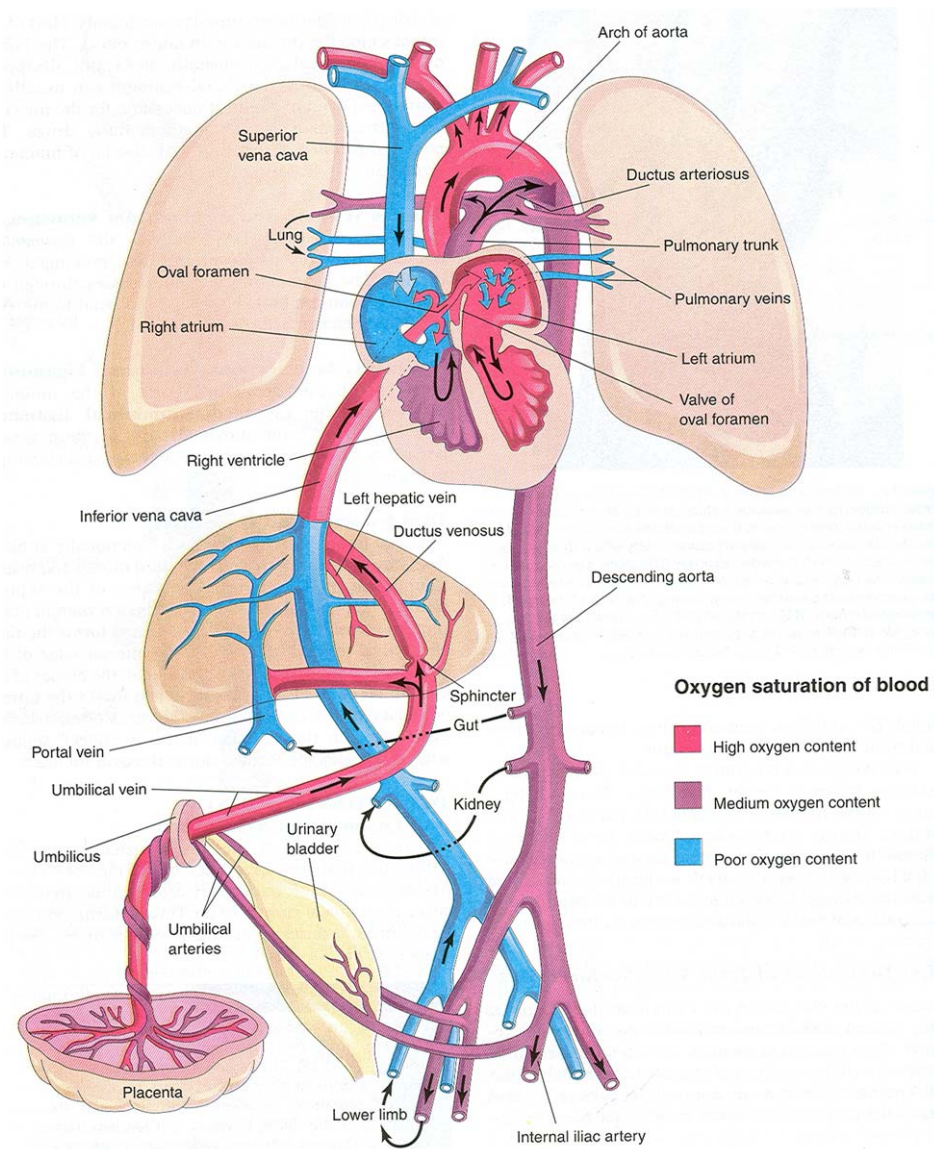


SITES OF MIXING OF OXYGENATED & DEOXYGENATED BLOOD

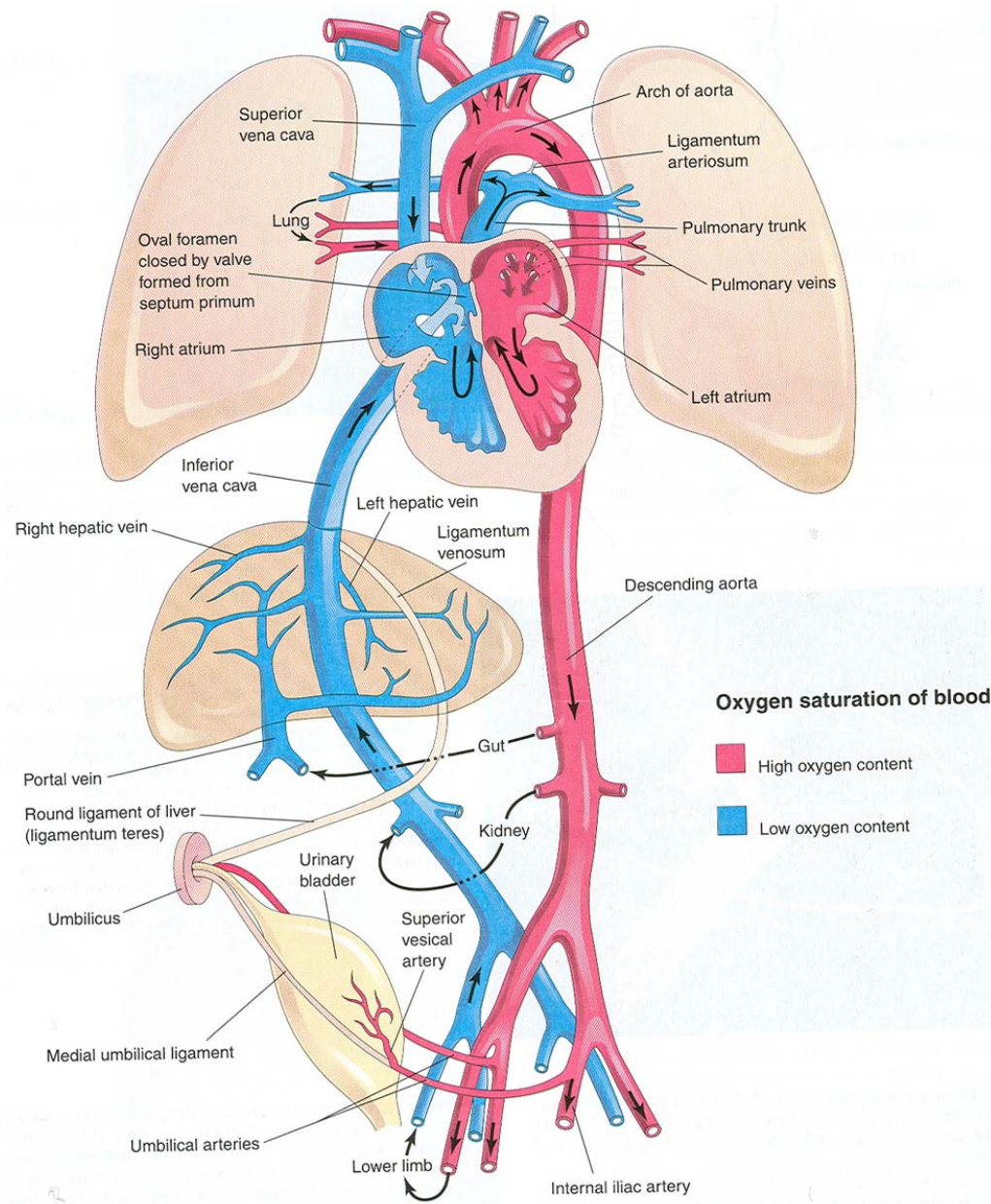
1. In the liver.
2. In the IVC.
3. In the right atrium.
4. In the left atrium.
5. In the aorta.

CHANGES AFTER BIRTH

1. Closure of umbilical arteries (minutes after birth).
2. Closure of umbilical vein (soon after).
3. Closure of ductus venosus (soon after).
4. Closure of foramen ovale (1-2 months).
5. Closure of ductus arteriosus (physiological closure-
within a few hours; anatomical closure-2-3
months).



FOETAL CIRCULATION



NEONATAL CIRCULATION