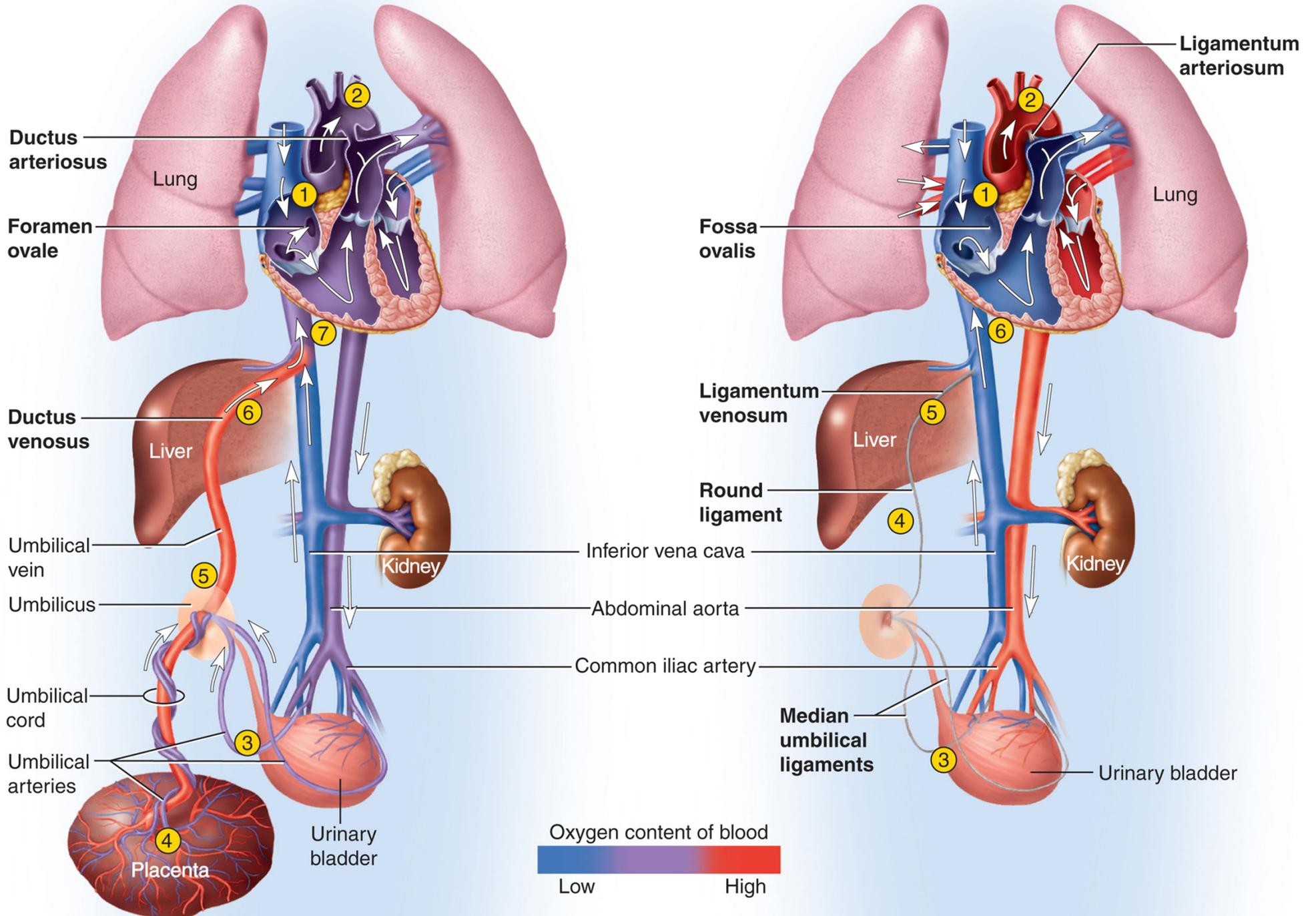
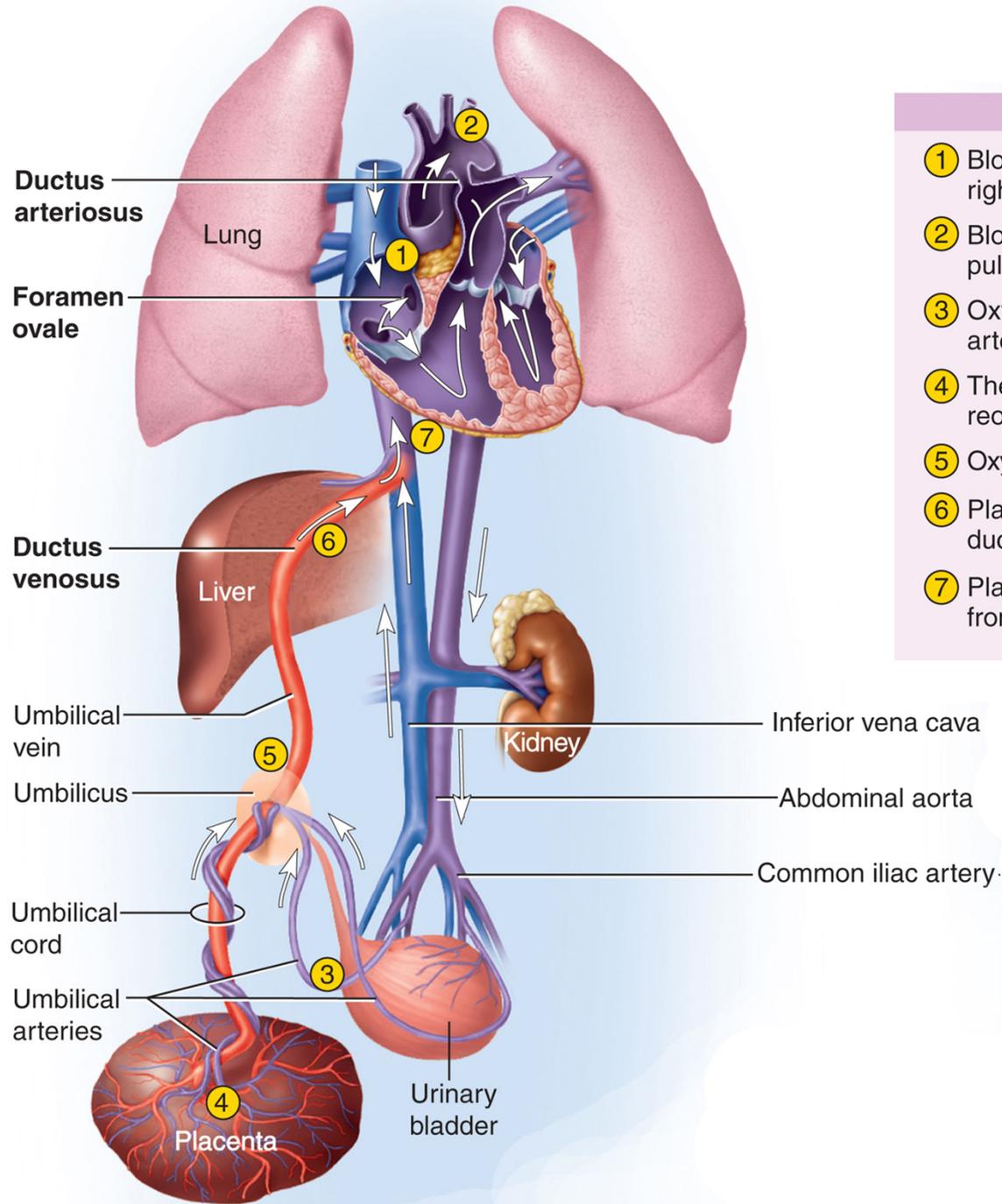


Chapter 20 (3)

Special Circulatory Routes

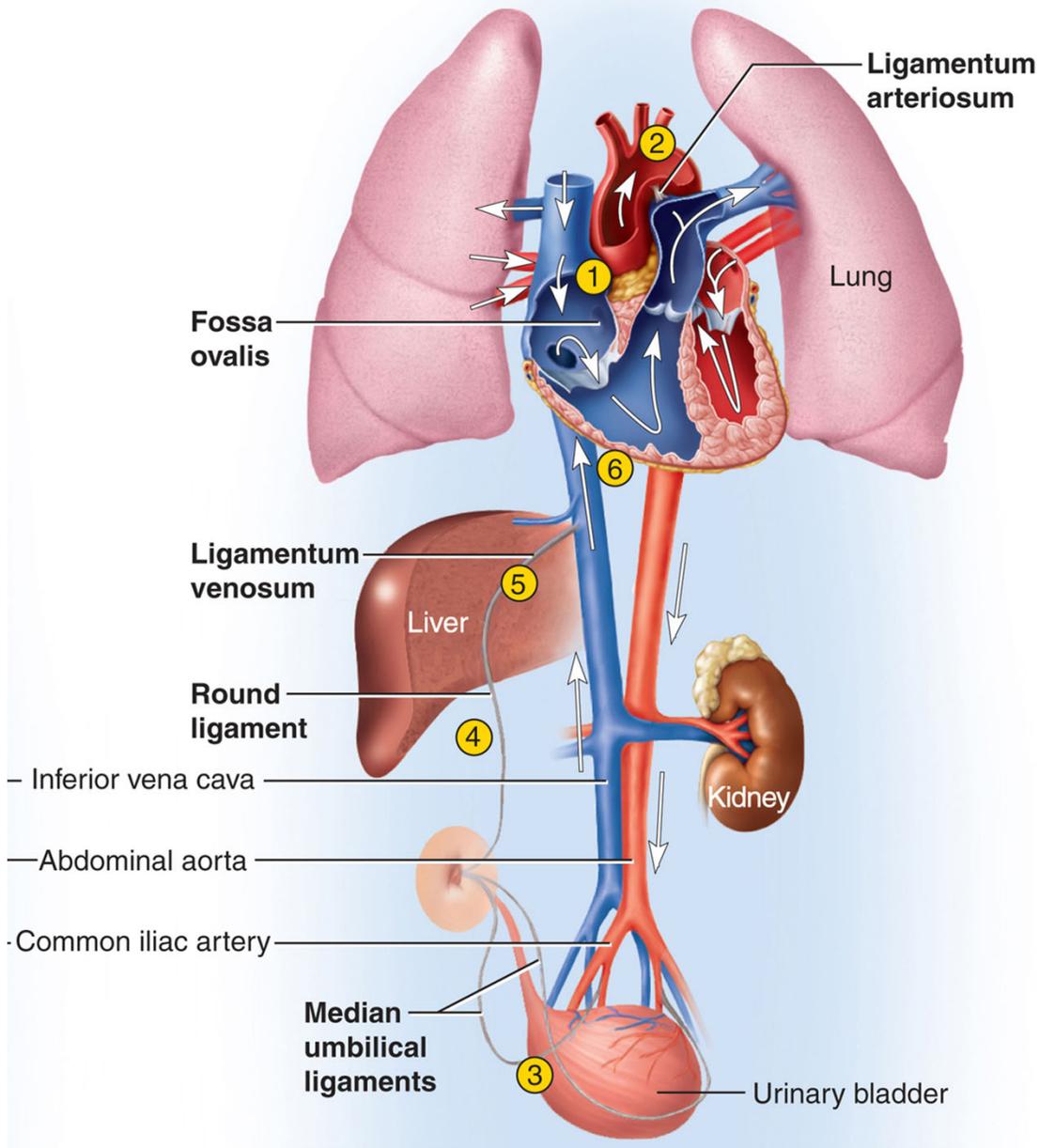






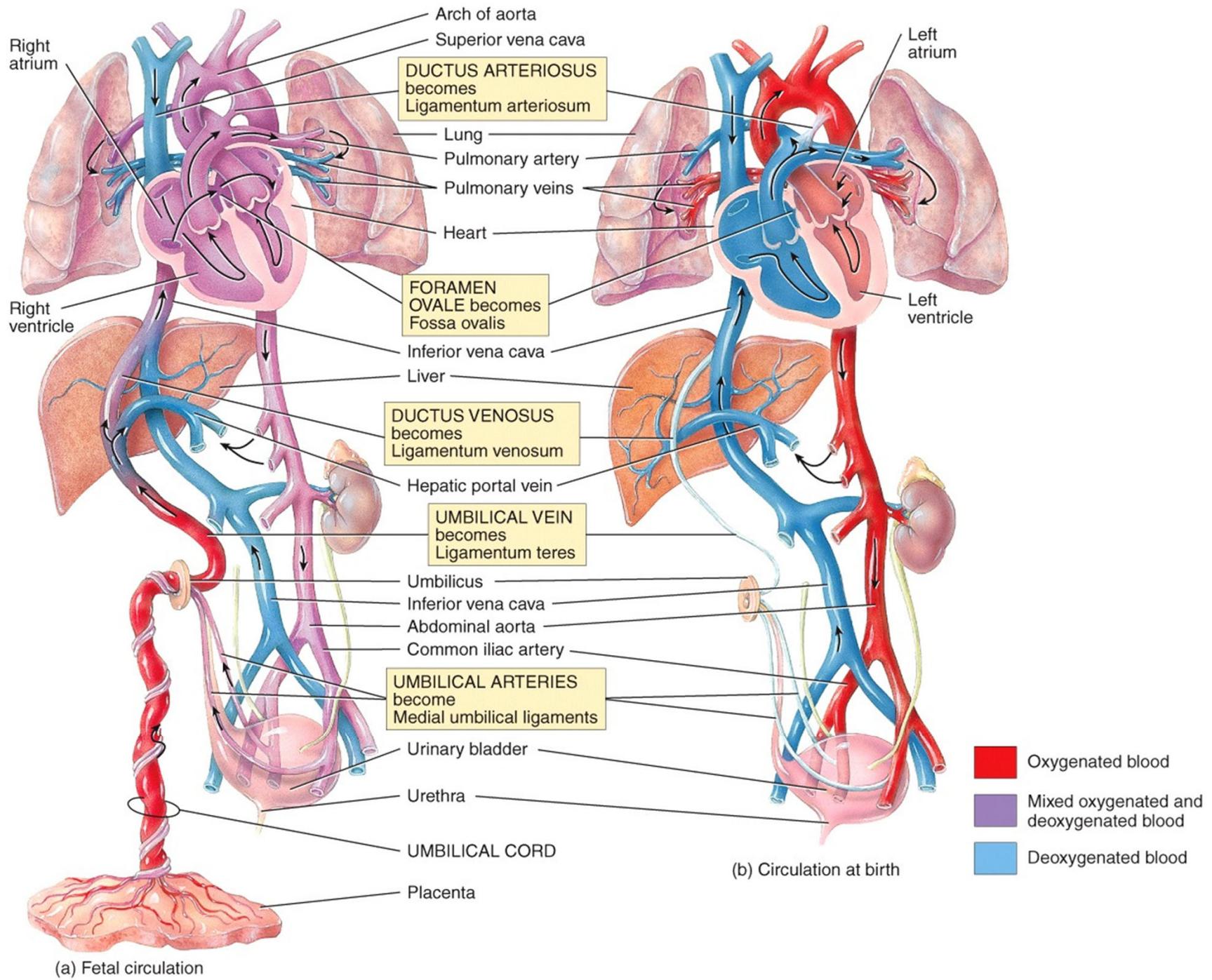
(a) Fetal circulation

- 1 Blood bypasses the lungs by flowing directly from the right atrium through the foramen ovale into the left atrium.
- 2 Blood also bypasses the lungs by flowing from the pulmonary trunk through the ductus arteriosus into the aorta.
- 3 Oxygen-poor, waste-laden blood flows through two umbilical arteries to the placenta.
- 4 The placenta disposes of CO₂ and other wastes and reoxygenates the blood.
- 5 Oxygenated blood returns to the fetus through the umbilical vein.
- 6 Placental blood bypasses the liver by flowing through the ductus venosus into the inferior vena cava (IVC).
- 7 Placental blood from the umbilical vein mixes with fetal blood from the IVC and returns to the heart.

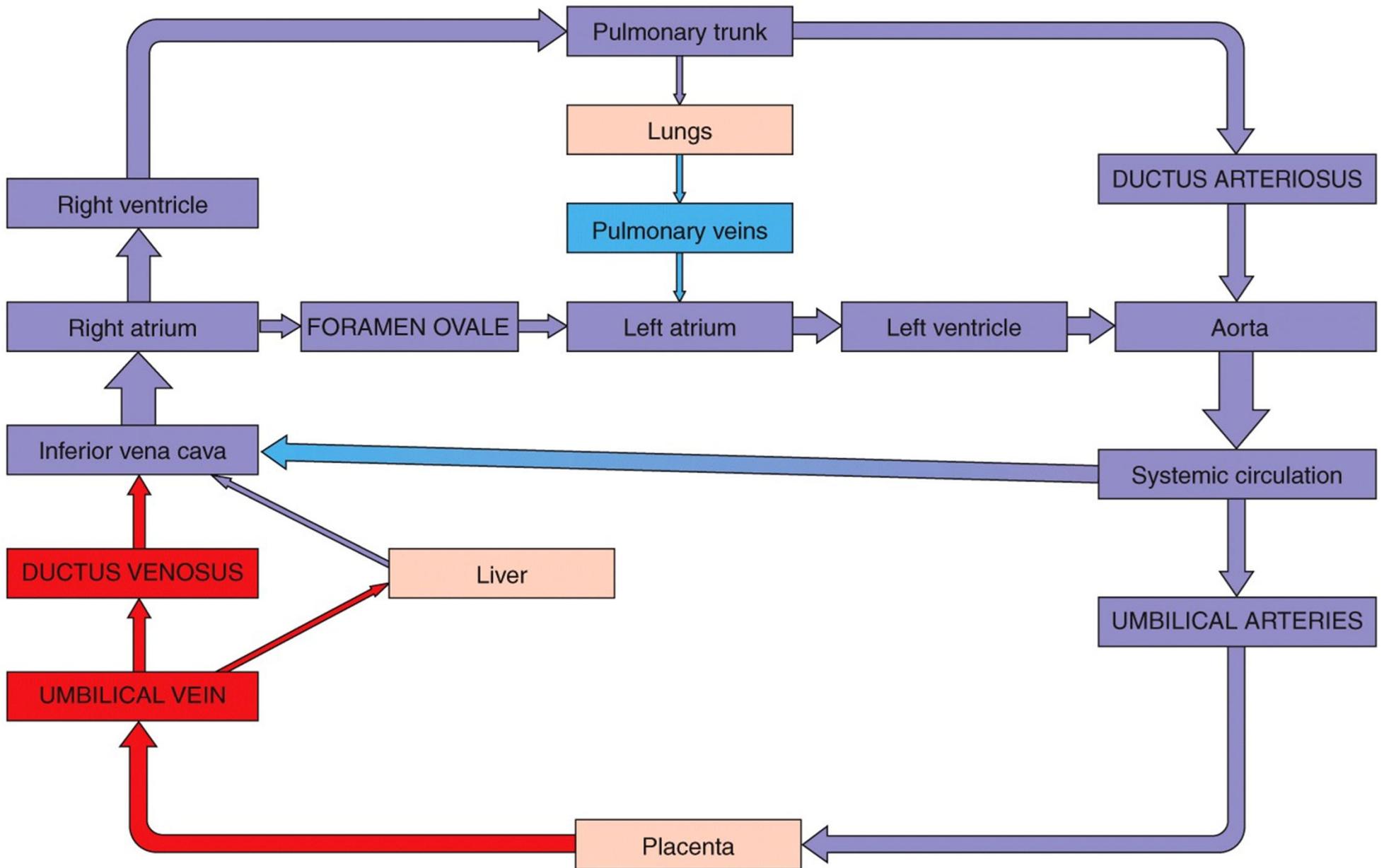


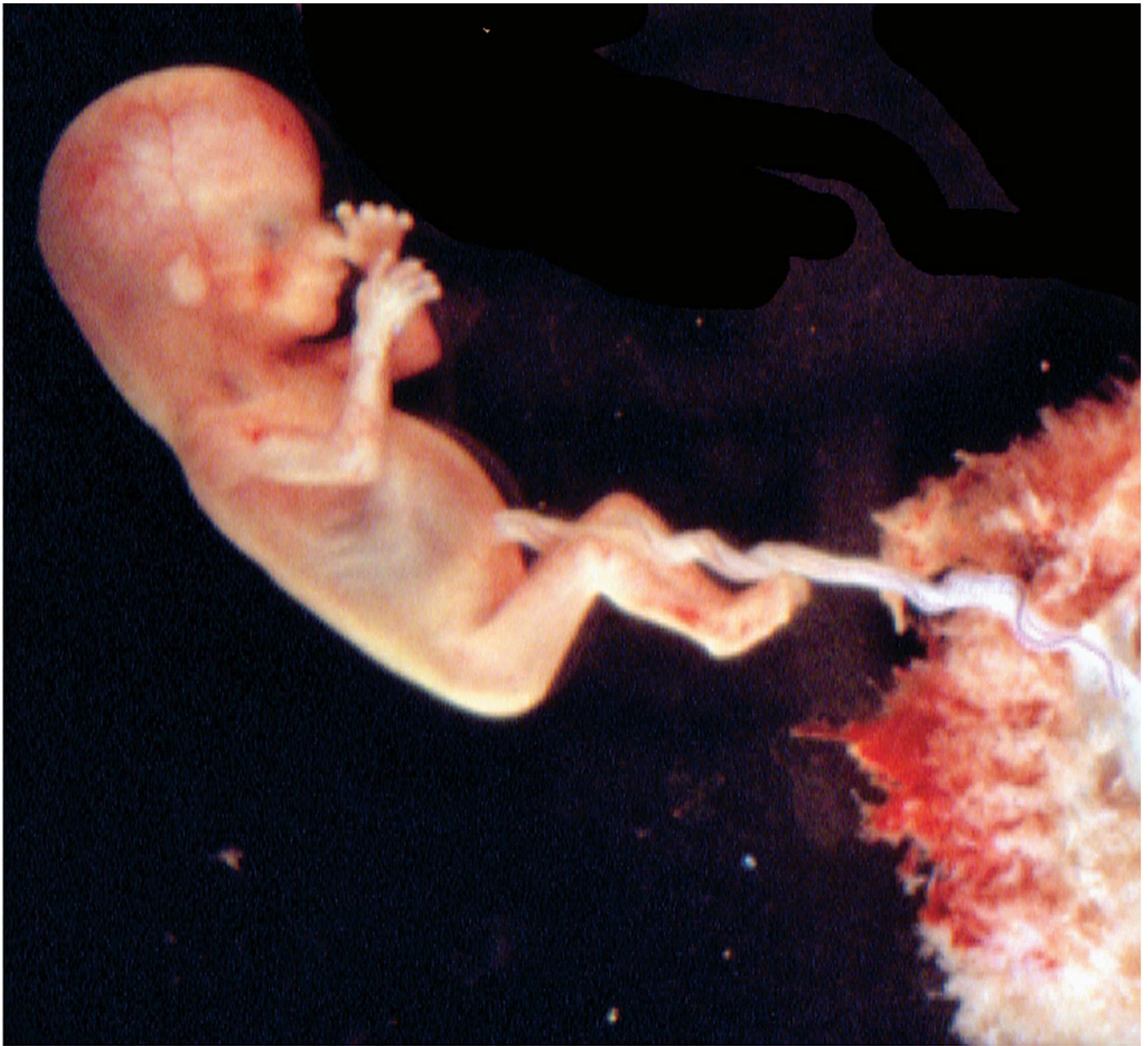
(b) Neonatal circulation

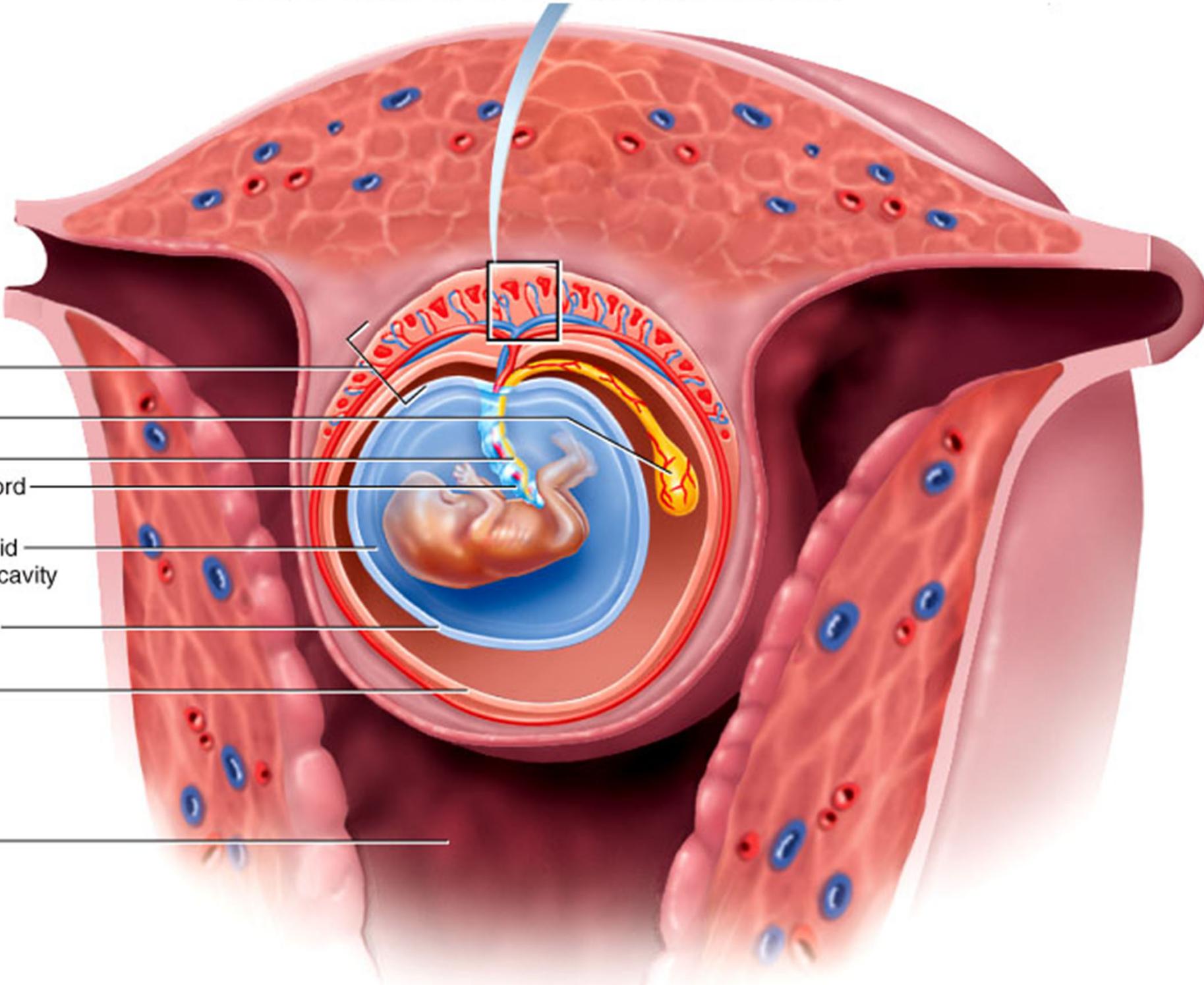
- ① Foramen ovale closes and becomes fossa ovalis.
- ② Ductus arteriosus constricts and becomes ligamentum arteriosum.
- ③ Umbilical arteries degenerate and become median umbilical ligaments.
- ④ Umbilical vein constricts and becomes round ligament of liver.
- ⑤ Ductus venosus degenerates and becomes ligamentum venosum of liver.
- ⑥ Blood returning to the heart is now oxygen-poor, systemic blood only.



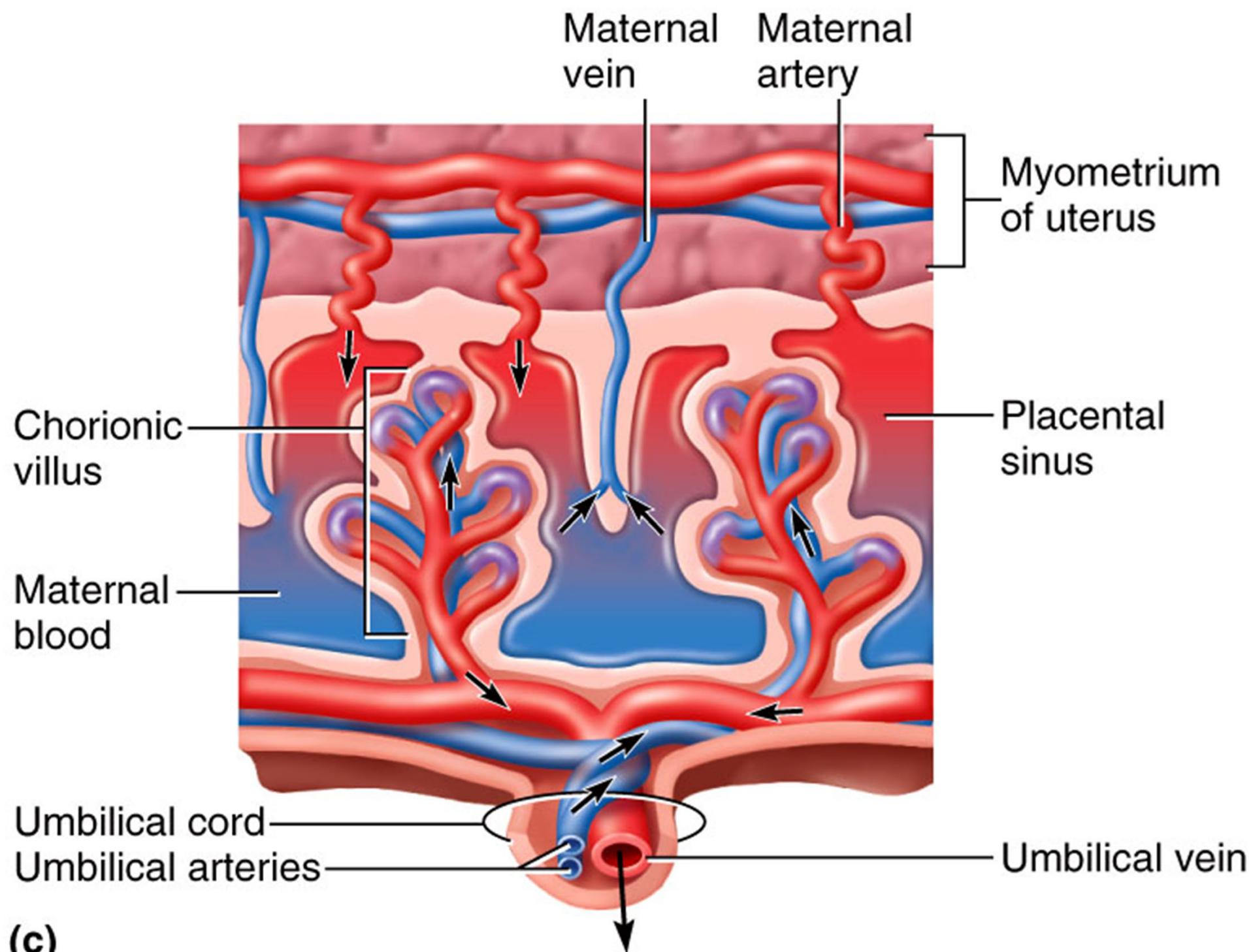
Scheme of Fetal Circulation



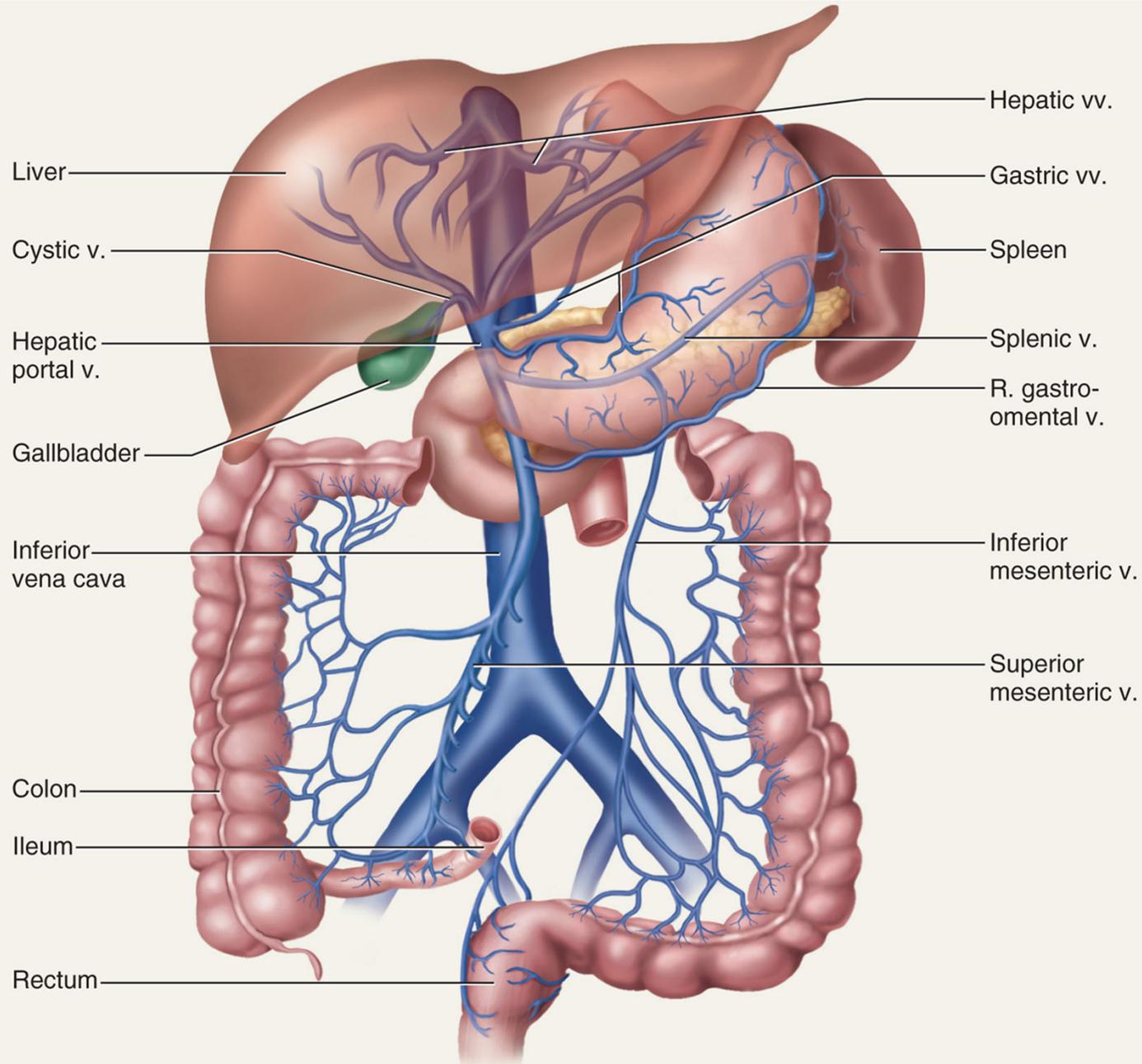


- 
- This diagram illustrates the fetal development within the uterus. A fetus is shown curled in the center, surrounded by a blue amniotic cavity. The fetus is connected to a yellow and red umbilical cord, which is attached to a placenta embedded in the uterine wall. The placenta is shown with a network of red and blue blood vessels. The entire structure is enclosed within the chorion, which is further surrounded by the amnion. The uterine wall is shown with a network of blood vessels. The lumen of the uterus is visible on the left side.
- Placenta
 - Yolk sac
 - Allantois
 - Umbilical cord
 - Amniotic fluid in amniotic cavity
 - Amnion
 - Chorion
 - Lumen of uterus

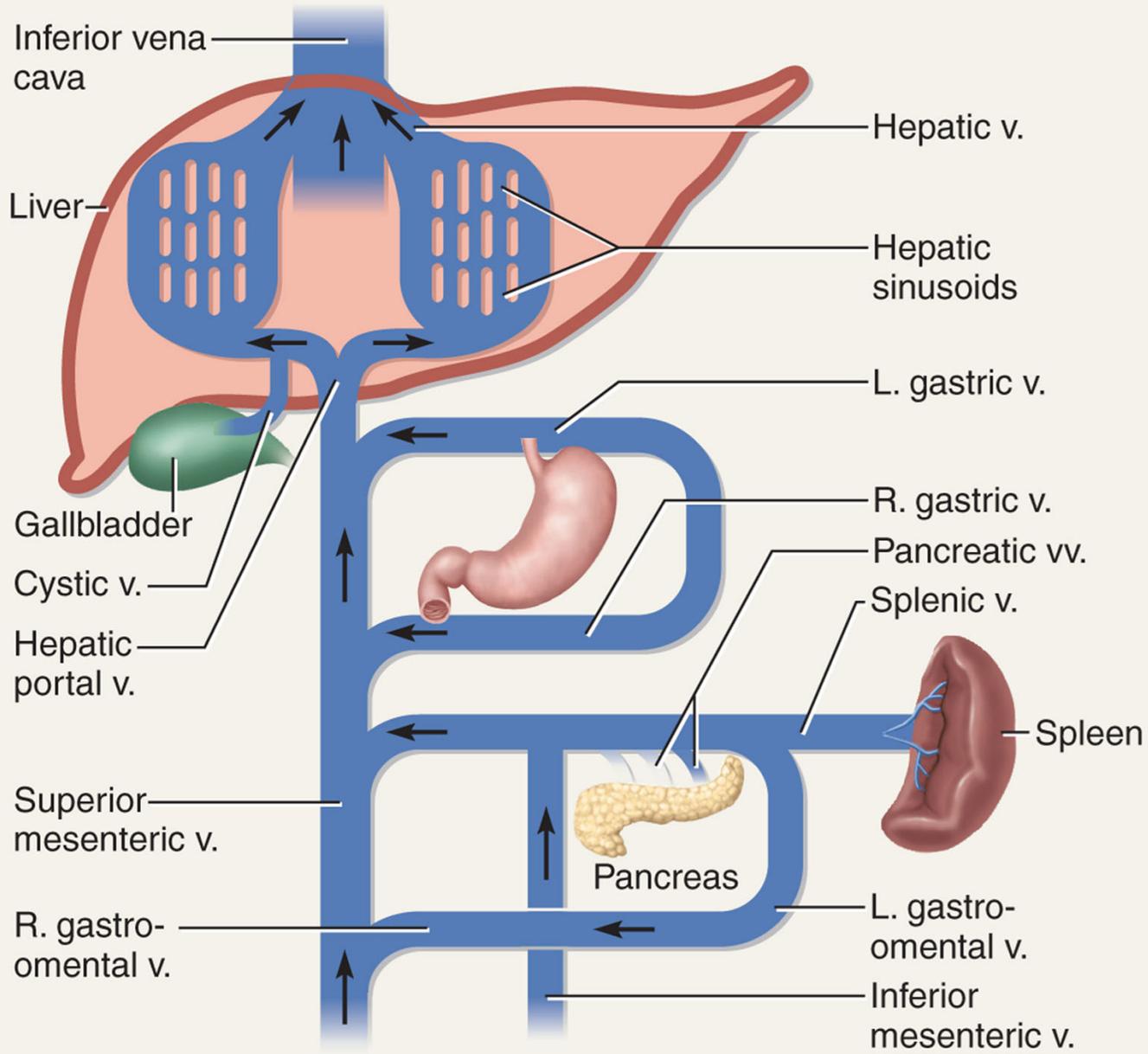
(b)



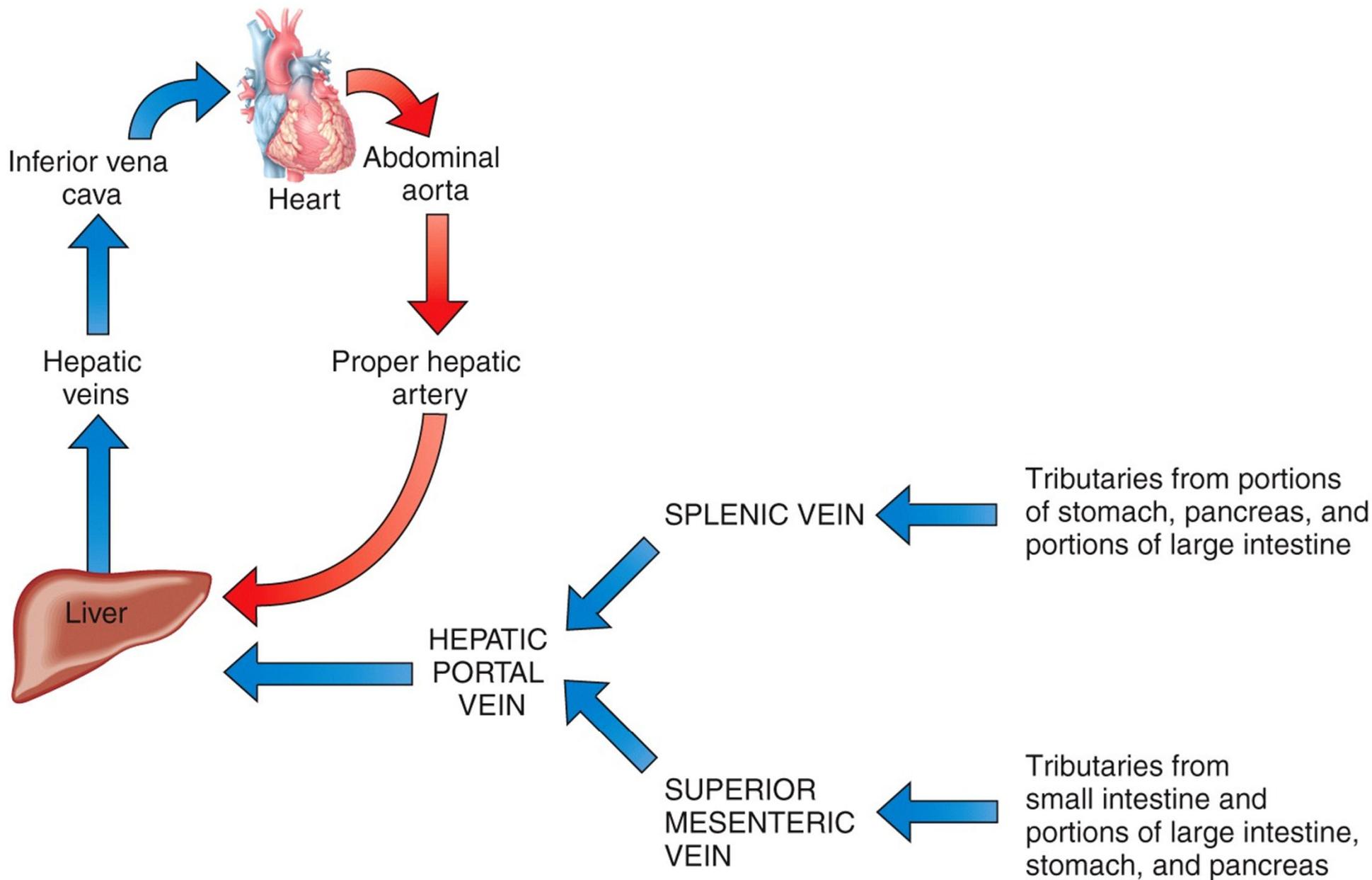
Hepatic Portal Circulation



(a) Tributaries of the hepatic portal system



(b) Blood-flow schematic



(b) Scheme of principal blood vessels of hepatic portal circulation and arterial supply and venous drainage of liver