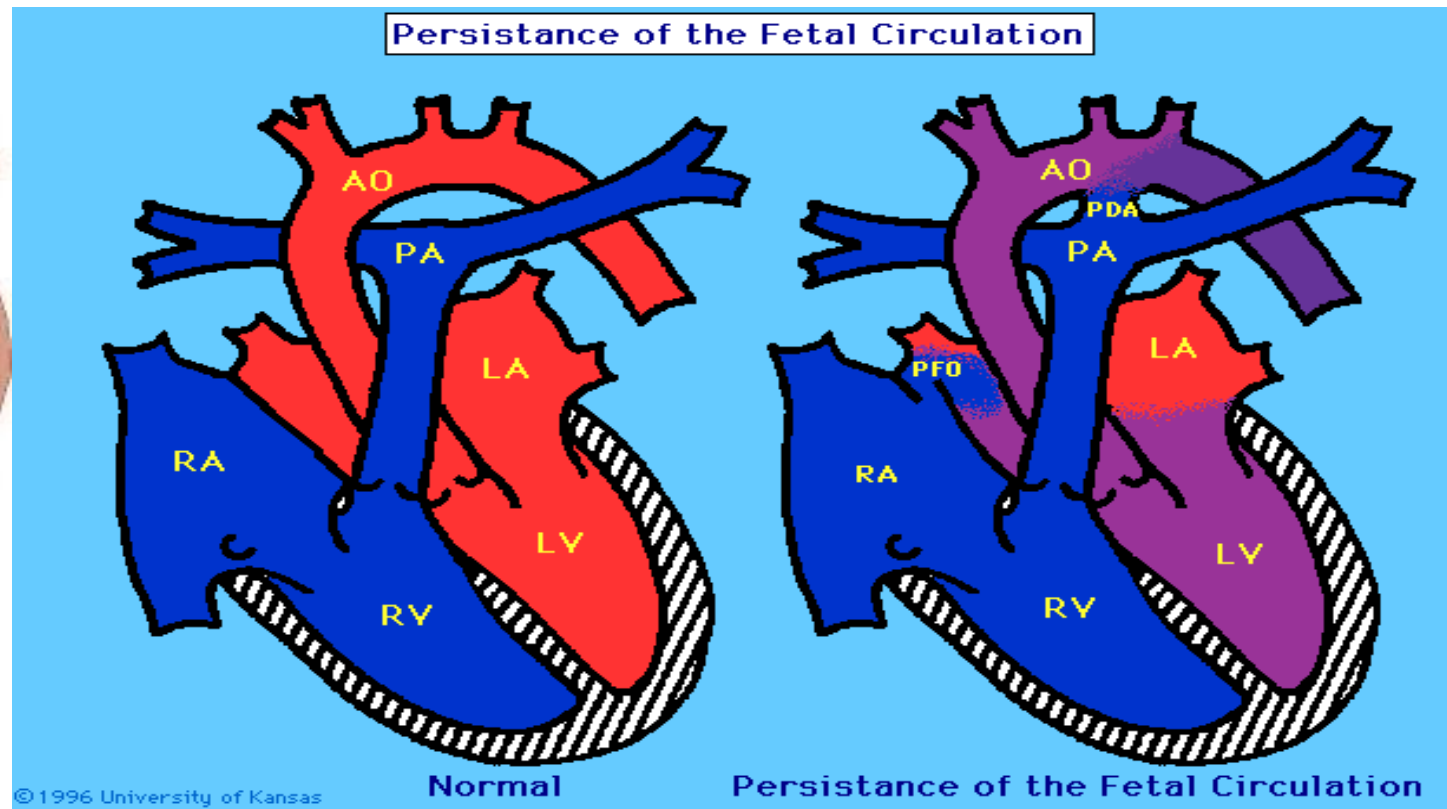


Fetal Circulation

- No circulation to lungs
 - Foramen ovale
 - Ductus arteriosum
- Circulation must go to placenta
 - Umbilical aa., vv.



In the developing fetus, the **ductus arteriosus (DA)**, also called the **ductus Botalli**, is a **shunt connecting the pulmonary artery to the aortic arch**.

- It **allows most of the blood from the right ventricle to bypass the fetus' fluid-filled lungs**, protecting the lungs from being overworked and allowing the right ventricle to strengthen.
- There are two other fetal shunts, the ductus venosus and the foramen ovale.

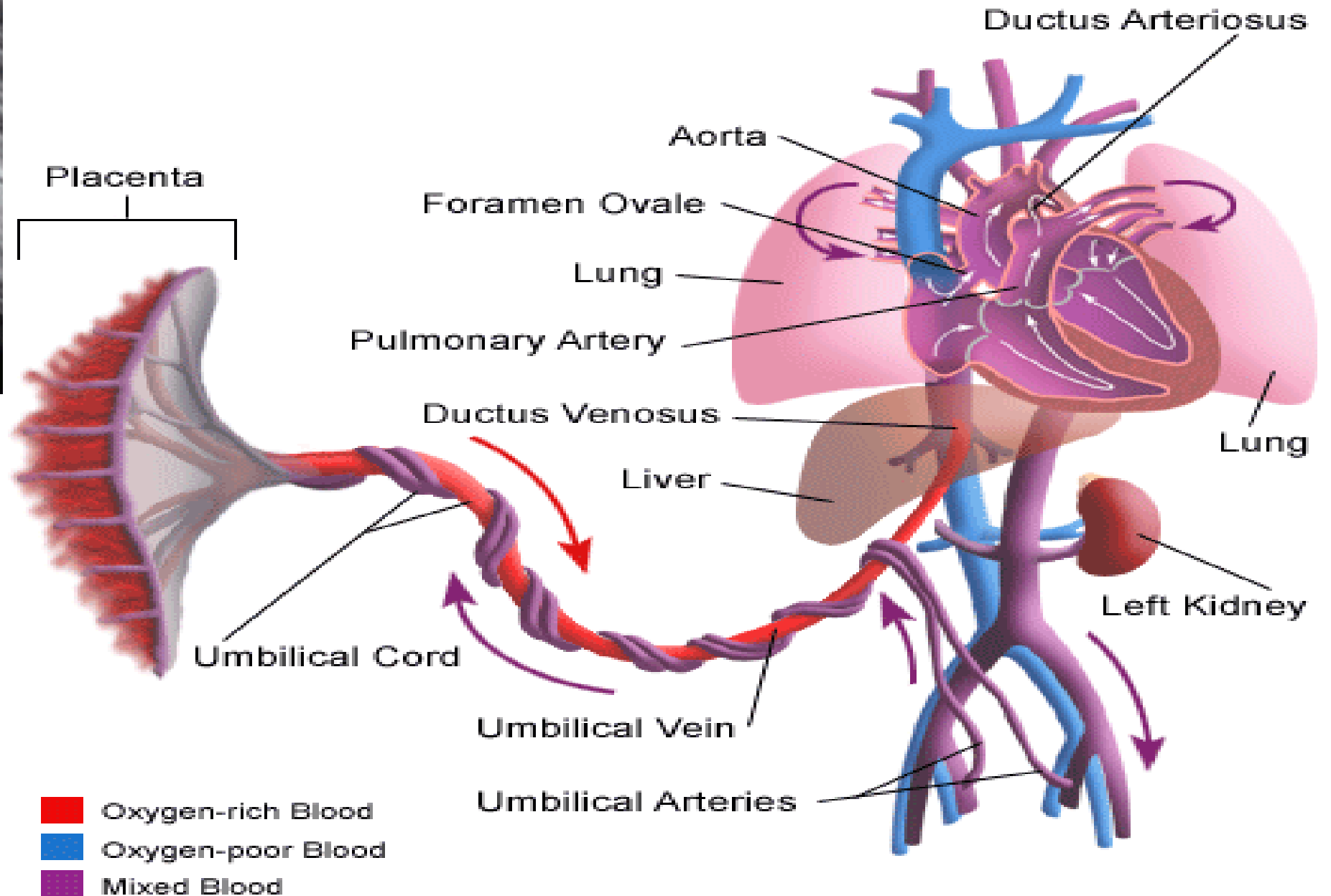
In the fetus, the **ductus venosus** shunts a significant majority (**80%**) of the **blood flow of the umbilical vein directly to the inferior vena cava**.

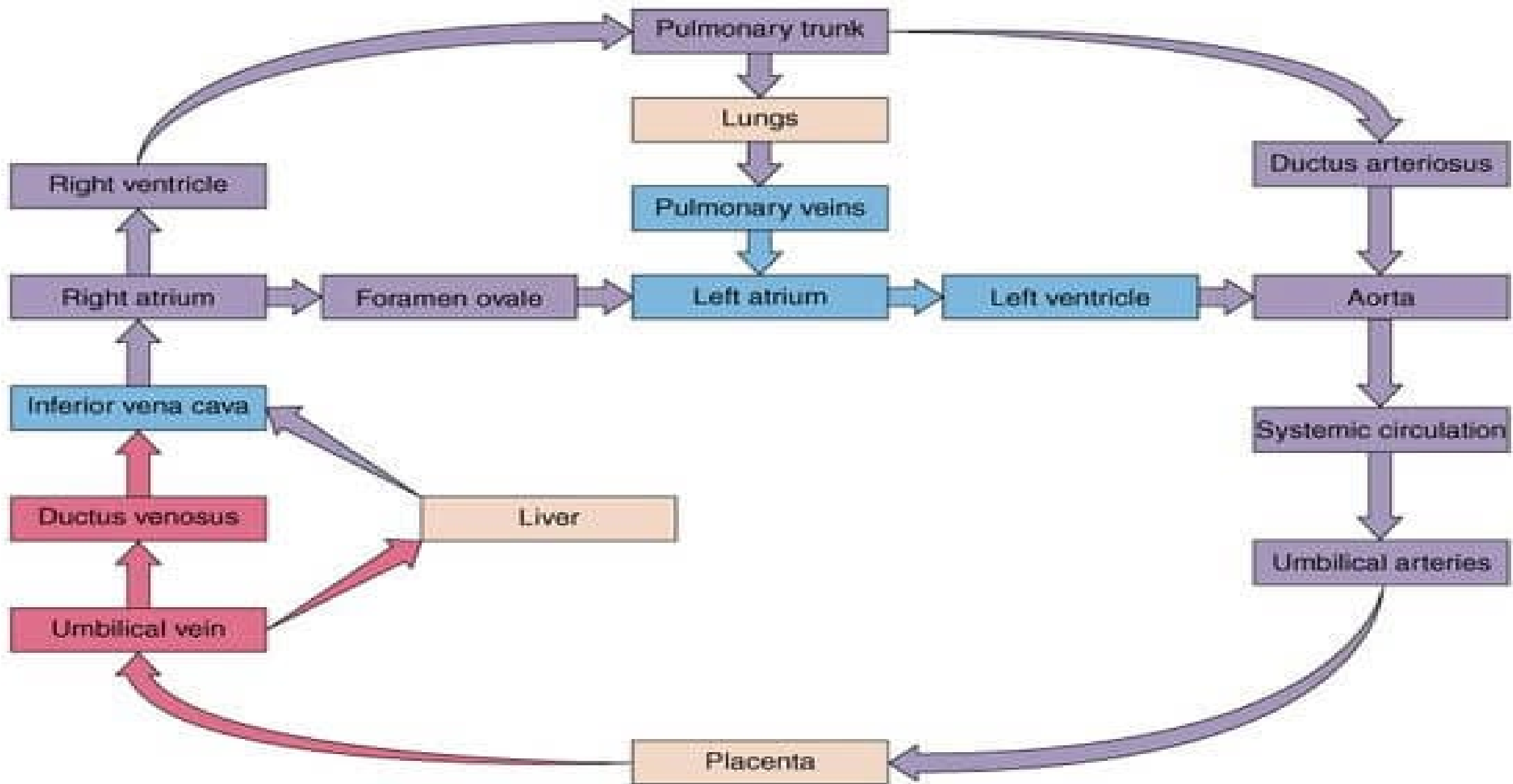
- Thus, it **allows oxygenated blood from the placenta to bypass the liver**.
- In conjunction with the other fetal shunts, the foramen ovale and ductus arteriosus, it plays a **critical role in preferentially shunting oxygenated blood to the fetal brain**



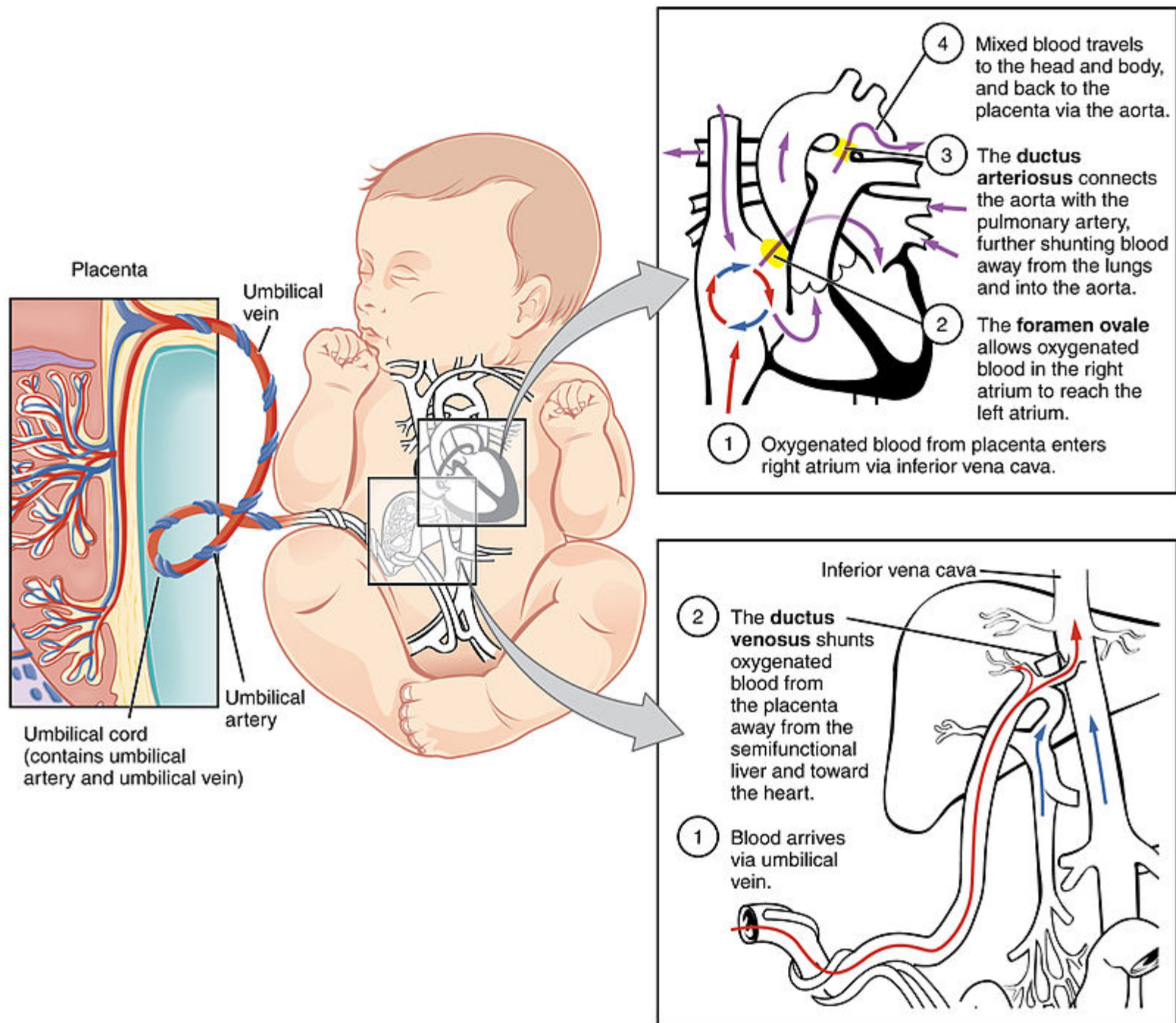
Obstetric ultrasonography of an embryo of 8 weeks with visible heartbeat.

Fetal Circulation





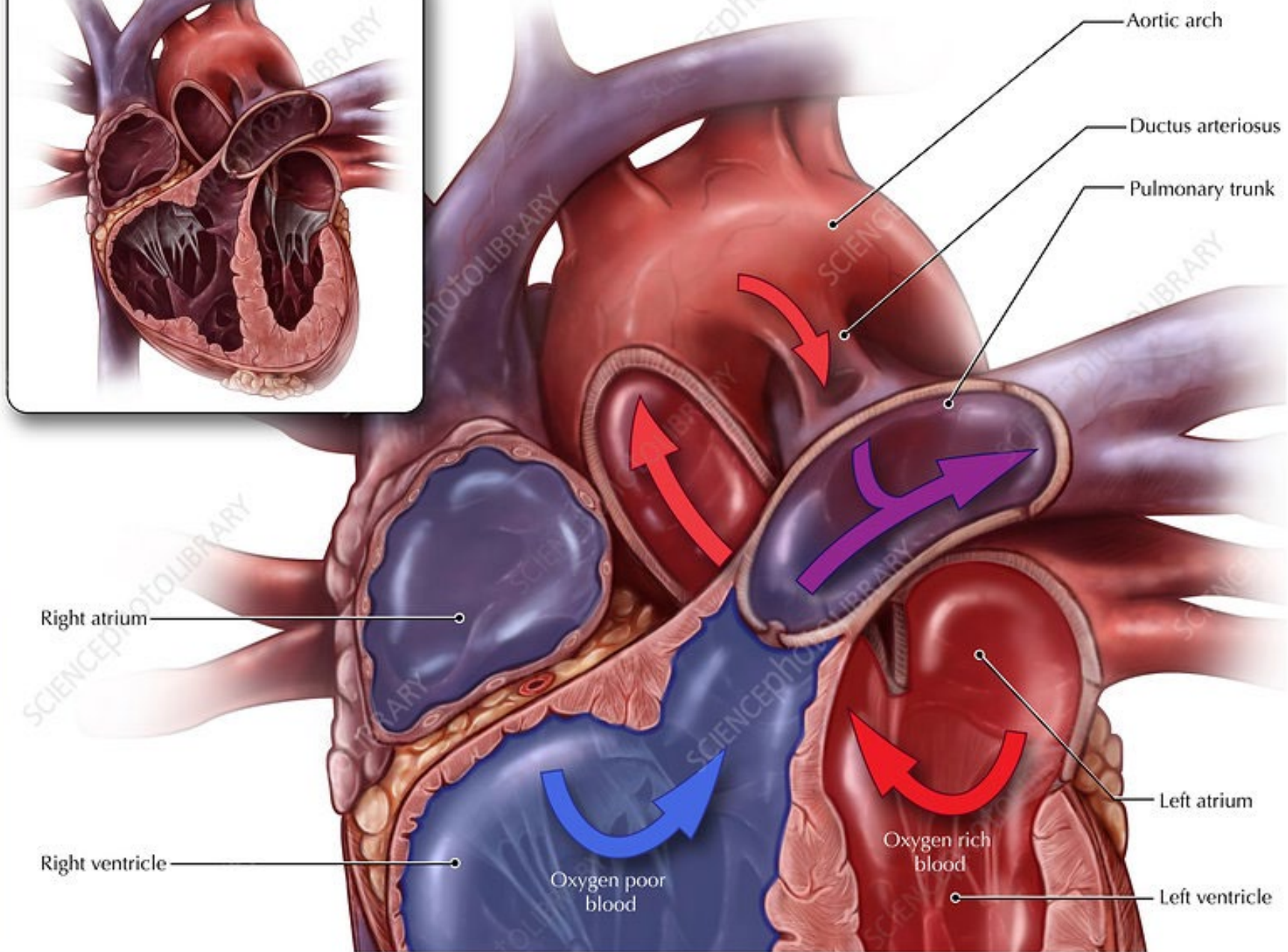
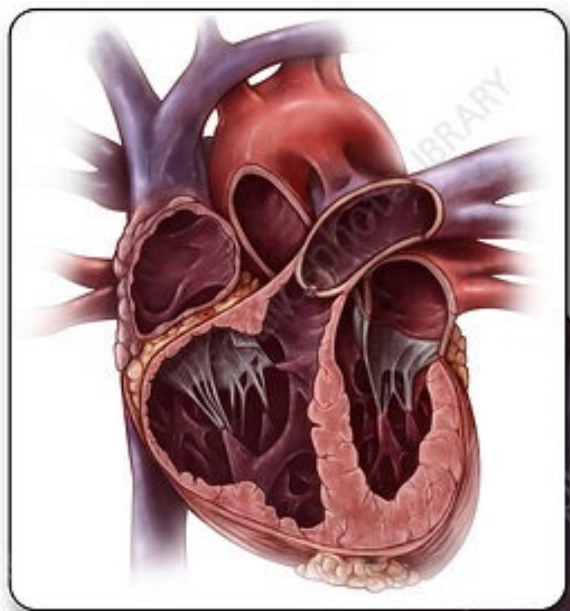
(c) Scheme of fetal circulation



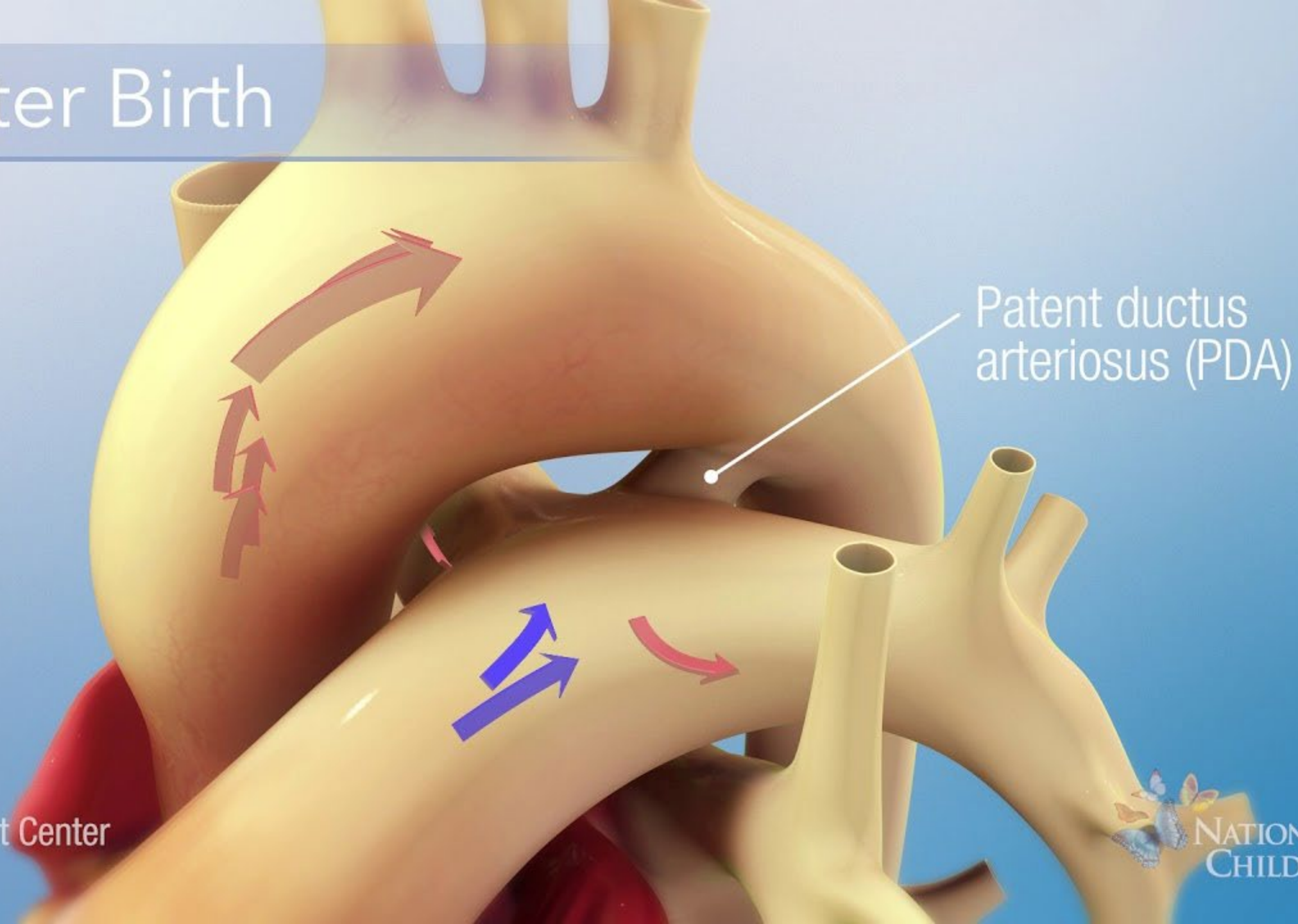
The fetal circulatory system includes three shunts to divert blood from undeveloped and partially functioning organs, as well as blood supply to and from the placenta.

A major difference between the fetal circulation and postnatal circulation is that the lungs are not used during the fetal stage resulting in the presence of shunts to move oxygenated blood and nutrients from the placenta to the fetal tissue.

At birth, the start of breathing and the severance of the umbilical cord prompt various changes that quickly transform fetal circulation into postnatal circulation



After Birth



Adult remnants of fetal circulation

Adult	Fetus
Fossa ovale	Foramen ovale
Ligamentum arteriosum	Ductus arteriosus
Medial umbilical ligaments	Umbilical aa.(within fetus)
Round ligament (ligamentum teres) of liver	Umbilical v.(within fetus)
Ligamentum venosum	Ductus venosus
Medial umbilical ligament	Umbilical cord (leaving fetus)