1 **FETAL CIRCULATION**

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2 **Fetal Circulation**

- Placenta exchange
  - Oxygen
  - Carbon dioxide
  - Nutrients
  - Waste materials
- Fetal and Maternal blood do not mix

3 **Fetal Circulation**

- Fetal blood to placenta
  - Paired umbilical arteries
- Capillaries of the chorionic villi
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- Placenta to Fetus
  - Single umbilical vein

4 **Fetal Circulation**

- ½ blood through hepatic sinusoids
  - Liver sinusoids mix with blood from portal circulation
- ½ blood bypasses liver
  - Through ductus venosus into IVC
- Mixes with desaturated blood:
    - Liver with portal system
    - IVC from lower ext., pelvis, kidneys
    - Right atrium from head and extremities
    - Ductus arteriosus into the descending aorta
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5 **Fetal Circulation**

- IVC/SVC to right atrium
- Foramen ovale
- Right atrium
- Pulmonary artery
- Lungs or patent ductus arteriosus

6 **Fetal Circulation**

- Pulmonary veins
- Left Atrium
- Mitral valve
- Left ventricle
- Aorta

7 **Blood Flow Patterns**

- Change after birth
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- Right and left sides of the heart
  - Foramen ovale
- Aorta and pulmonary artery
  - Ductus arteriosus

8 **General Changes at Birth**

- Cessation of placenta blood flow
  - Increase in carbon dioxide
  - Decrease in oxygen
- Infant inspires
  - Inflates the lungs
    - Lowers their resistance to blood flow
    - Increases amt of blood returning from the pulmonary truck to the heart
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9 **Neonatal Circulation**

- Withdrawal of placental circulation
  - Fall in blood pressure
  - Lungs expand with air
    - Fall in pulmonary vascular resistance
    - Increase in pulm blood flow
  - Left atrial pressure increase
    - Foramen ovale closes

10 **Neonatal Circulation**

- Ductus arteriosus constricts
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- Once closed turns into the ligamentum arteriosum

11 **Neonatal Circulation**

- Umbilical arteries
  - Constrict
- Umbilical vein
  - May remain patient

12 **Summary**

- Ductus venosus
- Foramen ovale
- Ductus arteriosus