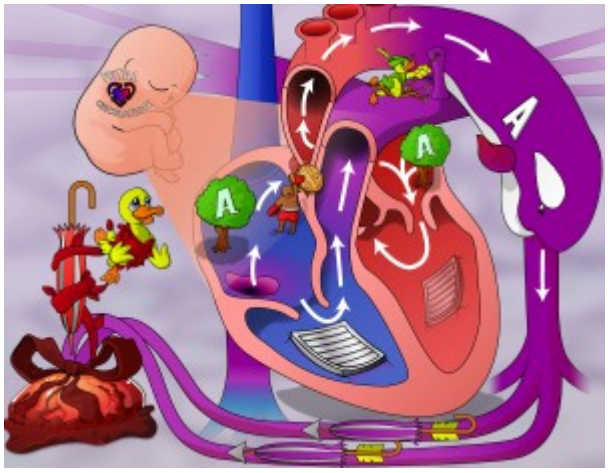
Fetal Circulation

Fetal circulation begins in the placenta. Oxygenated blood makes its way through the umbilical vein and is shunted via the ductus venosus into the IVC, which goes to the right atrium. The blood is pumped through another shunt, the foramen ovale, towards the left atrium, where blood is pumped through the ventricle into the aorta. Similarly, deoxygenated blood comes down from the SVC but is pumped into the right ventricle instead. It then moves through the pulmonary arteries and is shunted through the ductus arteriosus. Lastly, deoxygenated blood is transported through the umbilical arteries for gas exchange at the placenta.



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Placenta
Present
The placenta is an organ that connects the fetus to the uterine wall, allowing uptake of nutrients as well as gas exchange. Blood leaving the placenta travels through the umbilical vein. It typically has a PO₂ of 30mmhg, making it roughly 80% saturated with O₂.

Umbilical Vein
Umbrella with Vines
Though veins typically carry deoxygenated blood, in fetal circulation this is not true. Via the placenta, the umbilical vein carries oxygenated blood to fetal tissues.

Ductus Venosus
Duck with Vines
The ductus venosus is a shunt that allows oxygenated blood in the umbilical vein to bypass hepatic circulation and be conducted into the inferior vena cava (IVC).

Right Atrium
Right A-tree
In the right atrium, deoxygenated blood from the SVC and mixed O₂ blood from the IVC (and umbilical vein via ductus venosus) are pumped. At this point, blood goes through either the foramen ovale or the right ventricle and ductus arteriosus.

Foramen Ovale
Foreman Oval-door
After the right atrium, most oxygenated blood is pumped through the foramen ovale, a shunt between the right and left atria. This shunt allows right heart blood to bypass pulmonary circulation and flow into the left heart.

Left Atrium
Left A-tree
After passing through the foramen ovale, blood goes into the left atrium. The foramen ovale is a flap that allows blood flow only one way; thus, when the left atrium contracts, the foramen closes, and blood can only flow through the mitral valve into the left ventricle.

Aorta
A-orca
Blood that has been shunted to the left heart goes through normal circulation. After passing through the foramen ovale, left atrium, and ventricle, the blood goes through the aorta and perfuses various tissues and organs throughout the body.

Right Ventricle
Right Vent
Deoxygenated blood enters the right atrium through the superior vena cava (SVC) and is pumped into the right ventricle from the right atrium.

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Ductus Arteriosus

Duck Archer

Blood coming from the right ventricle would typically flow into the pulmonary vasculature and circulation. This, however, is not the case in the fetus, and the deoxygenated blood in the right heart is conducted back into circulatory flow via the ductus arteriosus. This is a shunt connecting the pulmonary artery to the aortic arch.

Umbilical Arteries

Umbrella Archery

The umbilical arteries are the anterior branches of the internal iliac arteries. These arteries carry blood from the descending aorta back to the placenta for gas exchange.

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