

Exercise walk-through

4.7

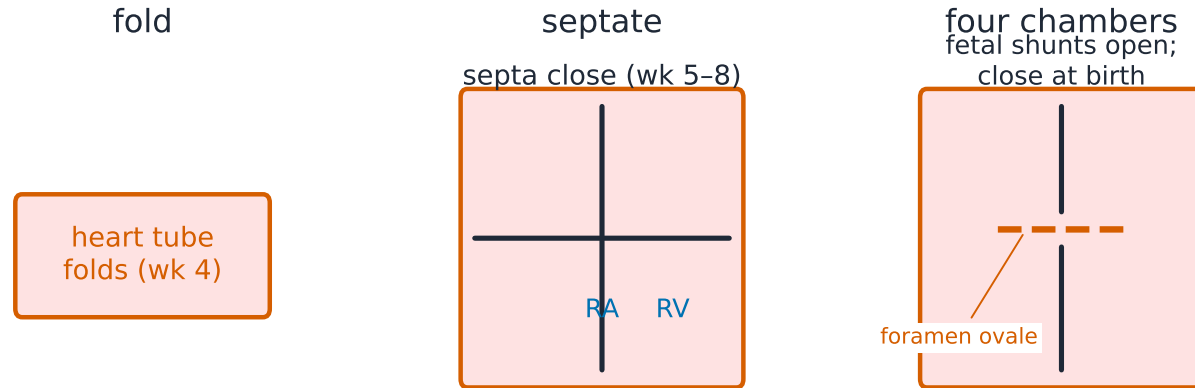
Organogenesis and congenital anomalies

University Medicine

Organogenesis and congenital anomalies

- 1 **Windows** Weeks 3–4 tube formation; weeks 4–8 septation, palate fusion (7–8), diaphragm (7), limb patterning.
- 2 **Shunts Foramen ovale** and ductus OPEN in the fetus (lungs closed); the first breath closes both.
- 3 **Logic** One week's disruption explains multi-system neighbours: palate + septum + thumb = week 7.

Organogenesis - heart septation stages



Tube → septa → four chambers, with the fetal shunts.

Check yourself

- Microscope resolution limit? (~ 200 nm.)
- Which **sarcomere** band never changes? (The A-band.)
- Blood–air barrier thickness? (~ 0.5 μm .)
- When does the **neural tube** close? (Day 26–28.)

Exercises 2.1-2.3

2.1 Why must the foramen ovale be open before birth? [3]

2.2 What closes it at birth? [3]

2.3 In which weeks does the palate fuse? [3]

Exercises 2.1-2.3

2.1 Why must the foramen ovale be open before birth? [3]

2.1

- Lungs are closed: blood must bypass them to reach the body.
-

2.2 What closes it at birth? [3]

2.2

- First breath drops pulmonary resistance → left-atrial pressure rises → functional closure.
-

2.3 In which weeks does the palate fuse? [3]

2.3

- Weeks 7–8.

Exercise 3.1

3.1 Trace a red cell from the placenta through the fetal heart to the aorta.

List the route including both shunts ✓. State the pressure reason each shunt flows as it does. Predict the immediate postnatal change. [8]

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3.1

- Placenta → umbilical vein → IVC → right atrium → (i) foramen ovale → left atrium, and (ii) the remainder → right ventricle → pulmonary artery → ductus arteriosus → aorta.
- Pressures: pulmonary resistance is sky-high in utero, so blood takes the low-resistance shunts.
- Postnatal: air inflates lungs, resistance falls, left pressure rises; both shunts reverse gradient and close.

Exercise 3.2

3.2 A newborn has a cleft palate and a heart murmur (fictional).

Date the disruptive event to its window (week 7–8). Explain why two systems share one cause. State the examination this logic demands elsewhere. [7]

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3.2

- Weeks 7–8 (palate shelves + ventricular septum both mid-closure).
- Simultaneous neighbours: one disruption, several systems.
- Examine every midline neighbour – the heart by auscultation and echo.