"Derivatives of Mesodermal Germ Layer"

The mesoderm is the middle germ layer, forming between the ectoderm and endoderm during gastrulation. It gives rise to musculoskeletal, cardiovascular, urogenital, and connective tissue structures.

Divisions of Mesoderm

- Initially forms a thin sheet on each side of the midline.
- Around day 17, cells near the midline proliferate to form the paraxial mesoderm (thickened plate).
- Lateral cells remain thin as lateral plate mesoderm.
- Intercellular cavities in lateral plate mesoderm divide it into:

- Somatic (parietal) mesoderm → covers amnion
- Splanchnic (visceral) mesoderm → covers yolk sac

Flowchart: Mesoderm Divisions

Mesoderm →

→ Paraxial mesoderm

→ Intermediate mesoderm

→ Lateral plate mesoderm

→ Somatic (parietal) mesoderm

→ Splanchnic (visceral) mesoderm

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1. Paraxial Mesoderm

Somitomeres and Somites

- Week 3: Paraxial mesoderm segments into somitomeres in the cephalic region, arranged concentrically.
- Somitomeres then organize into somites along the head-to-tail (cephalocaudal) axis.

Rate of Somite Formation:

Feature	Details
First occipital somite pair	Day 20
Formation rate	3 pairs/day
Total pairs by end of week 5	42–44 pairs

Neuromeres

- Cranial somitomeres (ahead of occipital somites) form neuromeres, contributing to head mesenchyme.

- This aligns with segmentation of the neural plate.

Flowchart: Paraxial Mesoderm → Somites

Paraxial mesoderm →

- Somitomeres (cephalic region) → Neuromeres → Head mesenchyme
- Somites (occipital → caudal)
    → Skeletal muscles
    → Dermis of back
    → Vertebrae & ribs

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2. Intermediate Mesoderm

- Connects paraxial mesoderm to lateral plate mesoderm temporarily.
- Differentiates into urogenital structures.

Urinary Structures

- Kidney
- Ureter
- Urinary bladder
- Urethra

Reproductive Structures

- Testis / Ovary
- External genitalia
- Forms segmental cell clusters (nephrotomes) in cervical/upper thoracic regions.
- Forms nephrogenic cord (unsegmented mass) in caudal region.

Flowchart:

Intermediate mesoderm

→ Nephrotomes (cervical/thoracic) → Kidneys

→ Nephrogenic cord (caudal) → Ureters, bladder, gonads

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3. Lateral Plate Mesoderm

- Splits into:
  - Somatic (parietal) layer → lines body wall
  - Splanchnic (visceral) layer → covers organs

Somatic (Parietal) Layer Derivatives

- Dermis of body wall and limbs
- Bones & connective tissue of limbs
- Sternum, costal cartilages
- Muscles of limbs and most body wall muscles
- Mesothelial membranes lining peritoneal, pleural, and pericardial cavities (secretes serous fluid)

Splanchnic (Visceral) Layer Derivatives

- With embryonic endoderm → gut tube wall
- Forms thin serous membrane around organs

Flowchart: Lateral Plate Mesoderm

Lateral plate mesoderm →

→ Somatic (parietal) mesoderm

→ Body wall & limb dermis

→ Bones & connective tissue of limbs

→ Muscles & sternum

→ Mesothelial linings of body cavities

→ Splanchnic (visceral) mesoderm

→ Gut wall

→ Serous membrane around organs

High-Yield Points

1. Somites → 42–44 pairs by week 5; crucial for vertebrae, ribs, muscles, and dermis of back.
2. Intermediate mesoderm → forms both urinary & genital systems.
3. Lateral plate mesoderm → forms body wall and serous linings; somatic vs visceral layers.
4. Neuromeres → head mesenchyme, cranial somitomeres.
5. Remember the timeline:
    - Day 17 → paraxial mesoderm forms
    - Day 20 → first occipital somite
    - Week 5 → full complement of somites

-> The End <-