

# **Germ Layer Derivatives**

# Ectoderm

neuroectoderm: central nervous system (CNS), retinas

surface ectoderm mnemonic: EKTODERM

**E**ars

**K**eratin (epidermis, hair, nails)

**T**all gland (adenohypophysis)

**O**phthalmologic (lenses) + **O**ral cavity

**D**renching (sweat glands, salivary glands)

**E**vacuation (lower anal canal)

**R**eek (olfactory epithelium)

**M**ammary glands

# Mesoderm

forms many of the internal organs

mnemonic: I ♥ MESODERMAL

**I**ntravascular (red and white blood cells)

♥ (cardiovascular structures)

**M**usculoskeletal (also cardiac and smooth muscle)

**E**nteric cavity (peritoneum)

**S**pleen

**O**uter adrenal gland (adrenal cortex)

**D**eep skin (dermis, subcutaneous tissue)

**E**ating cells (phagocytes → Kupffer cells)

**R**enal (kidneys)

**M**icroglia

**A**rousal (sex → reproductive tract except the lower 2/3 of the vagina)

**L**ymphatics

# Mesoderm Defects

mnemonic: VACTERL

**V**ertebral

**A**nal (including anal atresia)

**C**ardiac

**T**racheo-**E**sophageal fistula

**R**enal (defective kidney formation)

**L**imb defects

# Neural Crest Cells

mnemonic: NEURAL CREST

**N**erves (peripheral nerves, cranial nerves)

**E**nterochromaffin cells

**U**ndertones (skin color → melanocytes)

**R**oot ganglia (dorsal root ganglia)

**A**orticopulmonary septum

**L**eptomeninges (pia, arachnoid)

**C**hromaffin cells

**R**un or fight (think of the autonomic nervous system)

**E**nteric ganglia (celiac ganglion)

**S**chwann cells

**T**eeth (odontoblasts)

# Endoderm

forms the inner linings of multiple organs

mnemonic: Endo DERM

**Endo:** Think of endocrinologists treating diabetes. → pancreas

**D**ouching → vaginal (lower 2/3) lining

**E**ustachian tube lining

**R**espiratory lining (trachea, bronchi, lungs)

**M**iddle ear lining