33 HR - SERIAL

STRUCTURE	FORERUNNER	IMMEDIATE FORERUNNER	IMMEDIATE FATE	ADULT FATE	EMBRYONIC FUNCTION	ADULT FUNCTION
I. Level of Prosencephalon						
Prosencephalon	Neural Ectoderm	Neural Tube	Telencephalon Diencephalon	Cerebral Hemispheres Olfactory Lobe Thalamus, hypothalamus, epithalamus, retina	(same as adult function)	Association and Olfaction; Relay center, Temperature, Sleep, Breathing control, Circadian Rhythm, Vision
Optic Vesicles	Neural tube	Lateral walls of Diencephalon (through evagination)	Optic cups	Pigmented retina Sensory retina	Embryonic eye?	Shields the retina from excess incoming light; absorbs light; Sensory: Photoreception - allows interpretation
Optocoel	Cavity of neural tube	Diocoel		Obliterated		
Infundibulum	Neural tube	Floor of Diencephalon (through evagination)		Posterior pituitary		
Ectoderm	blastoderm	Epiblast	Neural ectoderm, surface ectoderm	epidermis, CNS		mechanical protection, nervous response
Mesenchyme	Neural Ectoderm	crest cells	Migrates to specified regions in the embryo	Connective tissues, blood, lymphatic and blood vessels		
Mesoderm	Blastoderm	epiblast	Epimere (Somites) Mesomere (Intermediate) Hypomere (Lateral Plate)	notochord, kidneys, gonads, cartilage, skeletal muscle, dermis		structural support, urogenital function, locomotion, protection
Endoderm	blastoderm	epiblast	primitive gut (foregut + Anteriror Intestinal Canal + mid gut)	Lining of digestive tract		
Blood Islands*	Splanchnic mesoderm	unaggregated hemangioblasts	anlagens of hemangioblasts?	Endocardial tube, blood vessels and blood corpuscles	food absorption	Absorbing food for embryo, transports blood in adult
Head Fold	Ectoderm and Mesoderm	Somatopleure	Ventral surface of head and foregut			

Lateral Body Fold "lateral limiting sulcus"	Ectoderm and Mesoderm	Somatopleure				
II. Level of Mesencephalon						
Mesencephalon	Neural Ectoderm	Neural Tube	Corpora quadrigemina Optic lobes	Optic lobes Tectum		Primary visual centers Auditory information
Notochord	Epiblast cells migrating through Hensen's node (Chordamesoderm)	Mesodermal rod	Persists until replaced	Pulpy nucleus	Induces development of the neural plate	Support, Distributes hydraulic pressures in all directions w/in vertebral discs
Dorsal Aortae*	Splanchnic mesoderm			Fuse to form unpaired dorsal aorta/external, internal carotid(?)		
Mesenchyme	Neural Ectoderm	Mesoderm and neural crest cells	Migrates to specified regions in the embryo Persists until it differentiates (Somites)	Connective tissues, blood and lymphatic vessels		
Foregut	Endoderm	Primitve gut (Closure into a tube of anterior endoderm)	Pharyngeal arches Pharynx	Esophagus, stomach, duodenum		Passageway of bolus Has protein-digesting enzymes Absorption
Oral Plate	Ectoderm and Endoderm	Ectoderm and Pharyngeal endoderm (thickened below foregut)	Stomodeum	Mouth	entry of food?	Entry of food
Ventral Aortic	Truncus arteriosus					
Amniotic Fold	Ectoderm and Mesoderm	Somatopleure	Choroamnionic raphe			
Somatopleure	*Ectoderm and Unsplitted Lateral plate mesoderm*	*Ectoderm and Somatic Mesoderm*		Parietal pleura		
Splanchnopleure	*Unsplitted Lateral plate mesoderm and Endoderm*	*Splanchnomesoderm and Endoderm*		Visceral pleura		

Extraembyronic Coelom	Lateral Plate Mesoderm	Splitting of splanchnic and somatic mesoderm		Degenerates		
III. Level of the						
Rhombencephalon	Neural Ectoderm	Neural Tube	metencephalon (Rh 3-1) myelencephalon (Rh 8-4)	Cerebellum (Dorsal) Pons (Ventral) medulla oblongata	differentiation of cells into meten and myelencephalon	medulla oblongata: respiratory and circulatory (including heart rate functions) pons and cerebellum: circulatory, digestive functions, movement coordinator
Heart	Lateral Plate Mesoderm (Splanchnic Mesoderm)	Cardiac Primordia	persists	inner lining of heart (endocardium); muscle and outer covering of heart (epimyocardium)	none (will not start beating until 48 hours into embryological development)	Facilitates the circulation of blood and materials in the circulatory system
Pericardial Coelom*	Amniocardiac vesicles		persists	pericardial cavity	houses the heart	houses the heart
Otic Placode*	Ectoderm	Ectoderm (thickened ectoderm lateral to myelencephalon	Otic Vesicle	inner ear (cochlea and semi circular canals)	none (no use for hearing and balance in the embryo)	cochlea: hearing semicircular canals: balance
IV. Level of Midgut						
Spinal Cord	Neural Ectoderm	Neural Tube	persist	spinal cord	posterior portion of neural tube	connects peripheral nervous system to the CNS
Neural Crest	Neural Ectoderm (Lateral to Neural Folds)	Dorsal Area of Neural Tube	mesenchyme	pigment cells, face cartilage and bone, adrenal medulla, sympa- thetic ganglia	migrates into different areas to form the different parts derived from NCCs	support, coloration, secretion, commmunication in the nervous system
Midgut	Endoderm	Primitive Gut (Posterior endoderm, continuous with foregut, that have not yet closed)	closes	Jejunum	none (not used for nutrition; still not a closed area unlike foregut)	absorption of vital nutrients for the body from food particles

Anterior Intestinal Portal	Endoderm	Posterior End of Foregut (continuous with Foregut and Midgut)	closes	Ileum	transition point between foregut and midgut; moves towards posterior region as gut closes	absorption of nutrients
Omphalomesenteric Veins*	Blood Islands		Vitelline Plexus	hepatic veins, inferior vena cava, superior mesenteric vein	bring blood from the yolk sac to posterior portion of the heart	brings blood from the lower region of the organism towards the heart
V. Level of Somite						
Neural Tube	Epiblast	Neural Ectoderm	Anterior: Primary Brain Vesicles Posterior: Spinal Cord	spinal cord	specialization into spinal cord	connects the brain to the PNS
Somites	Unsegmented paraxial mesoderm	Somitomere	Dermatome Myotome Sclerotome	musculoskeletal system, dermis	is divided into blocks along the anterioposterior axis	for movement and support
Nephrotome*	Undifferentiated Mesoderm	Intermeidate Mesoderm		urogenital system (not including germ cells)	none (extraembryonic membranes function for waste disposal)	for reproduction and waste disposal
Lateral Plate Mesoderm	Epiblast Cells that Ingressed	Undifferentiated Mesoderm	Somatic and Splanchnic Mesoderm	heart and circulatory system (splanchnic mesoderm) body wall (somatic mesoderm)	forms the coelom by delamination to splanchopleure and somato-pleure	coelom, supports the body cavities, circulation
Coelom*				coelom	formed by splanchnic and somatic mesoderm	allows body organs and digestive system to move independently
Dorsal Aortae*	Splanchnic Mesoderm			dorsal aorta and branches	takes blood to the body	brings blood from the heart to dorsal region of body