

Name of Teacher	PROF (DR) VINAY KUMAR SINGH
Mob. Number	9807110100
E-mail	vinay.zool@ddugu.ac.in
Designation	Professor
University Name	Deen Dayal Upadhyaya Gorakhpur University, Gorakhpur
Stream	BIO-GROUP
Faculty	SCIENCE
Department/ Subject	ZOOLOGY
Course	EMBRYOLOGY & HISTOLOGY
Course Duration	Annual
Sub Topic	Extraembryonic Membrane
Content	Introduction Amniota Amnion Chorion Allantois Yolk Sac
Search KeyWords	Extraembryonic membrane, Ectoderm, mesoderm, endoderm

Learning Outcomes

- Understanding about the Extraembryonic membrane
- Information of Amnion, Chorion, Allantois & Yolk Sac
- Formation and different stages of Extraembryonic Membrane

Introduction-

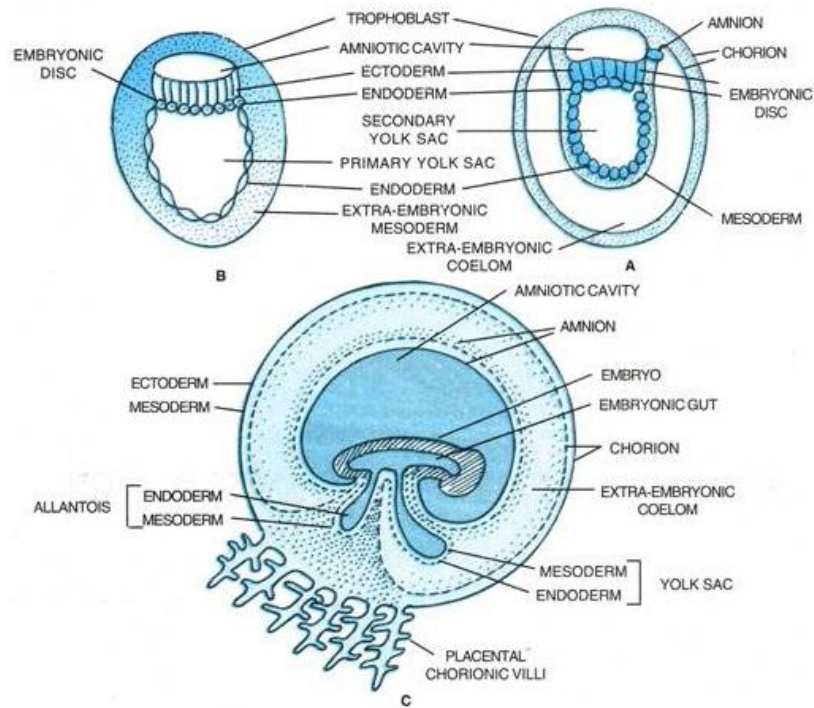
Germ layer, any of three primary cell layers, formed in the earliest stages of embryonic development, consisting of the Endoderm (inner layer), the Ectoderm (outer layer), and the Mesoderm (middle layer). The germ layers form during the process of gastrulation, when the hollow ball of cells that constitutes the blastula begins to differentiate into more-specialized cells that become layered across the developing embryo. The germ layers represent some of the first lineage-specific (multipotent) **stem cells** (e.g., cells destined to contribute to specific types of tissue, such as muscle or blood) in embryonic development. Hence, each germ layer eventually gives rise to certain tissue types in the body.

Extraembryonic Membranes

These are the membranes which do not form any part of the embryo proper but performs various functions which assist in the development of the embryo. These are discarded at the time of hatching. These membranes formed outside the embryo. The embryos of reptiles, birds, and mammals produce extraembryonic membranes, the-

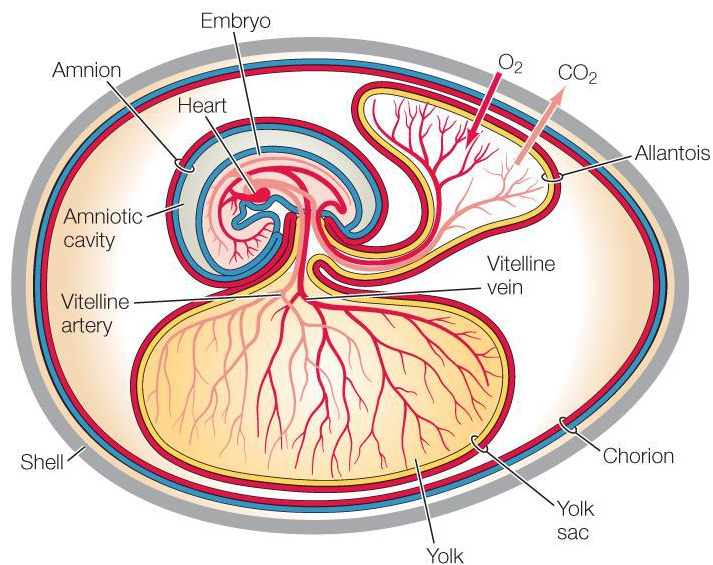
Amniotes: The formation of extraembryonic membrane of the group amniota includes-

- i. **amnion**
- ii. **chorion,**
- iii. **allantois**
- iv. **yolk sac**



Formation of extra embryonic membranes.

They serve for nutrition, respiration, excretion and protection of developing embryo and foetus. The origin and development is similar like chick except that allantois in most mammals gives rise to a placenta.



Amnion- The amnion protects the embryo in a fluid-filled cavity that prevents dehydration and cushions and mechanical shocks.

Chorion- The chorion and the membrane of the allantoises exchange gases between the embryo and the surrounding air. Oxygen and Carbondioxide diffuse freely across the egg shell.

Allantois- The allantois functions as a disposal sac for certain metabolic wastes produced by embryo. The membrane of the allantois also functions with chorion as a respiratory organ. Blood vessels in the yolk sac membrane transport nutrients from the yolk into the embryo. Other nutrients are stored in albumen.

Yolk Sac- Formed from splanchnopleure (inner endoderm and outer mesoderm). Well developed in the animals with megalecithal egg as reptiles, birds and Prototheria. Yolk sac expands over the yolk, a stockpile of nutrients stored in the eggs. Blood vessels in the yolk sac membrane transport nutrients from the yolk into the embryo. Other nutrients are stored in albumen.

Adult Derivatives of the three embryonic germ layers in vertebrates

Ectoderm	Mesoderm	Endoderm
Epidermis of skin and its derivatives (including sweat glands, hair follicles)	Notochord	Epithelial lining of digestive tract
Epithelial lining of mouth and rectum	Skeletal system	Epithelial lining of respiratory system
Sensory receptors in epidermis	Mascular system- stomach, intestine etc,	Lining of Urethra, Urinary bladder and reproductive system
Cornea and lens of eye	Excretory, circulatory and lymphatic system	Liver
Nervous system	Reproductive system (except germ cells)	Pancreas
Adrenal Medula	Dermis of skin	Thymus
Tooth enamel	Lining of body cavity	Thyroid
Epithelium of Pineal and pituitary gland	Adrenal Cortex	Parathyroid

References-

Textbook of Biology by NA Campbell

William K. Purves; Gordon H. Orians; H. Craig Heller (2003). *Life: The Science of Biology*. W. H. Freeman. p. 423