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Development of extra embryonic membranes  
in chick embryo Part II

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Dev. of E.E. membranes in chick (Part II) (1/1/1/1)

While the cavity lying between the amnion and chorion is the chorionic cavity and it remains lined by mesoderm of somatopleura and splanchnopleura. Actually, it is the extra-embryonic coelom. As the amnion and chorion form, the somatopleura continues to grow peripherally and laterally until it completely covers the embryo and all the other membranes that are formed at this stage.

Functions of Amnion & Chorion: ① The

Amniotic cavity is at first a very narrow slit between the embryo and the inner wall of the amniotic fluid, but soon a fluid is secreted into the cavity, which deepens it so that the embryo floats freely in the cavity, connecting to the extra-embryonic parts only by the umbilical cord. The advantage that the embryo obtains from the development of amnion, chorion and allantoic cavity



Mid-stage in the development of  
Extra-embryonic membranes in chick.



an as follow -

- (i) The embryo becomes immersed in a container filled with salty fluid and thus, can accomplish its development in a fluid medium, although the egg is "on dry land". Thus, the primary function of amnion is protection of embryo from the danger of desiccation.
- (ii) The fluid of the amniotic cavity is an efficient shock absorber and protects the soft collapsible and skeletonless early chick embryo from the mechanical shocks.
- (iii) Amnion isolates the embryo from the shell of the egg and thus protects from adhesion to the shell <sup>or form</sup> against friction against it.
- (iv) During later developmental stages the mesoderm of amnion forms muscles cell, which contract rhythmically thus rocking the embryo within the amniotic fluid. The rocking results in the circulation of the amniotic fluid that moves the part of the embryo about and prevents them from joining together. It is also instrumental in preventing its



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adhesions to the different embryonic membranes. It may also help to obviate the stagnation of blood in the vessels, a condition which might tend to occur on account of the pressure from the growing organs. According to Balinsky (1970), the formation of amniotic cavity has a slightly negative effect, because it removes the embryo from the surface of the egg and from the source from which it could obtain oxygen. The chorion later on joins the allantois to serve as a capacity of respiratory and nutritional organs.

3 Development of Allantois → About the third day of incubation, the region of the future floor of endodermal hindgut begins to bulge as precocious urinary bladder, the allantois. Allantois, thus, corresponds exactly in its nature to the urinary bladder of Amphibia. The allantoic outgrowth consists of endoderm with splanchnic or visceral mesoderm layer covering it from the outside. (i.e. Splanchnopleura). It grows very rapidly and soon penetrates into the extra-embryonic coelom, the space between the yolk-sac, the amnios and the chorion. The distal part of the allantois expands and



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remains connected with the hindgut of the embryo by means of a narrow allantoic stalk. When the body folds contract, separating the embryo from the extra-embryonic parts, the allantoic stalk is enclosed together with the stalk of the yolk sac, forming an umbilical cord.

As the allantoic vesicle enlarges and spreads outward, its distal part becomes flattened and penetrates between the amnion and yolk sac on one side and the chorion on the other side. Due to this, the splanchnic mesoderm comes in contact with the somatic mesoderm lining of chorion. Both mesoderms, fused to form a single mesodermal membrane called Chorioallantoic membrane. In the meantime,

the expanding chorio-allantoic bursts through the vitelline membrane of egg and pushes outward toward the shell membrane. As it does so, it progressively envelops the albumen and so becomes a sac filled with albumen and called albumen sac. It aids in the absorption of water and albumen.

A network of blood vessels develops on the external surface of the allantois and this network is in communication with the embryo proper by blood vessels, running along the stalk of the allantois and through the umbilical cord. The chorio-allantoic circulation continues until the young chick breaks the egg-shell and begins to breathe the surrounding air. Then the umbilical vessels close, the circulation ceases and

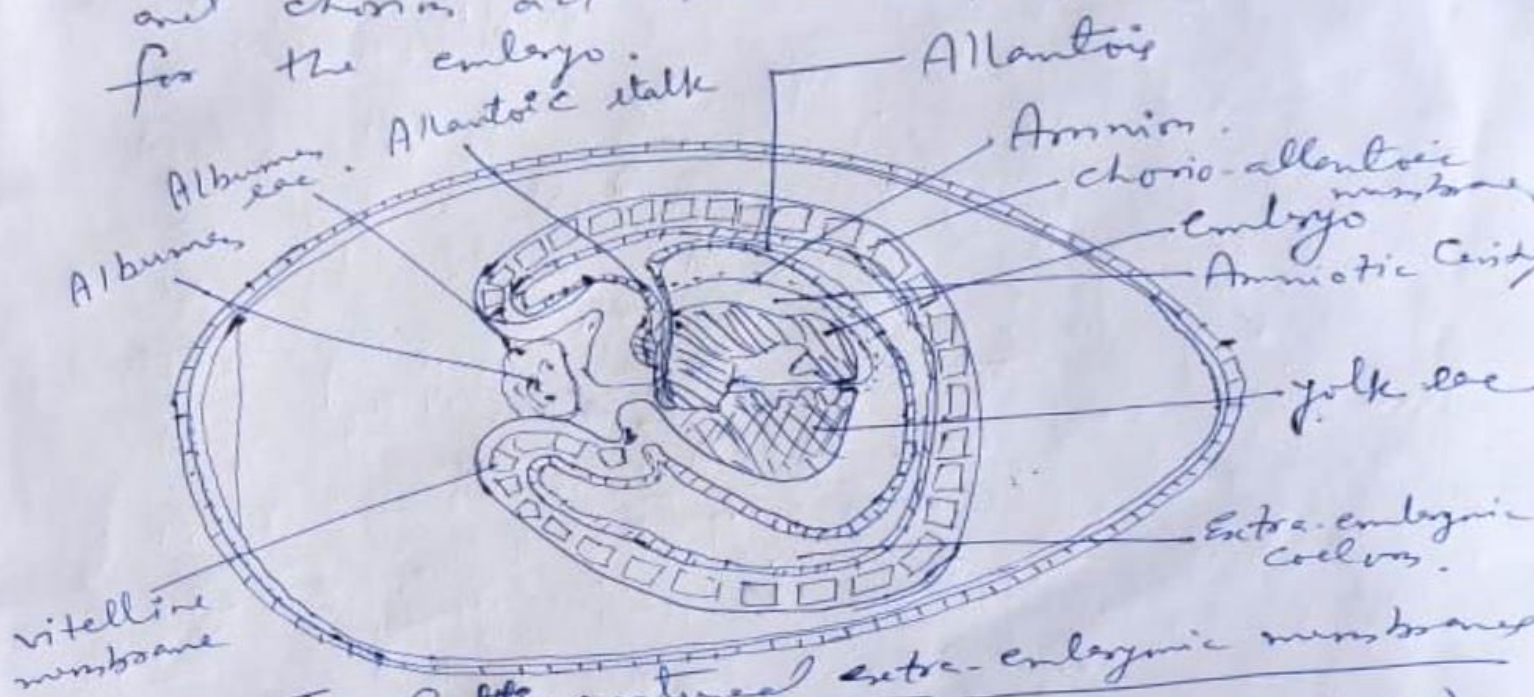


the allantois dry loses up and separates from the body of the young chick. At the time of hatching, the allantoic vesicle with its content is detached from allantoic stalk and left attached to the broken shell.

Functions of Allantois - it serves the following functions for

the embryo -

- (i) It acts as a reservoir of embryonic excretory wastes such as uric acid.
- (ii) The chorio-allantoic membranes of allantois and chorion act like a respiratory surface for the embryo.



The fully retused extra-embryonic membranes of chick. (After Torrey, 1971)

Thus, the four extra-embryonic membranes are devices which provide adequate nutrition, protection and satisfaction of metabolic requirements to the developing chick embryo

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