

DEVELOPMENTAL ZOOLOGY

II B.Sc ZOOLOGY

BY

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UNIT 4

- Hormonal control of Amphibian metamorphosis
- Extra-Embryonic membrane in Chick-Development , Type and Physiology
- Placenta in Mammals-Types and Physiology

EXTRA EMBRYONIC MEMBRANE IN CHICK
(OR)
DEVELOPMENT OF FOETAL MEMBRANES IN CHICK

- The embryos are covered and protected by a set of membranes called **foetal membranes**
- These membranes are developed from the tissue lying outside the embryo
- Hence they are also called extra-embryonic membranes
- The main functions of the foetal membranes are to **protection, nutrition, respiration and excretion** to the embryo
- All the foetal membranes disappear before or immediately after hatching
- There are mainly four types of foetal membranes. They are
 1. Chorion
 2. Amnion
 3. Yolk sac
 4. Allantois

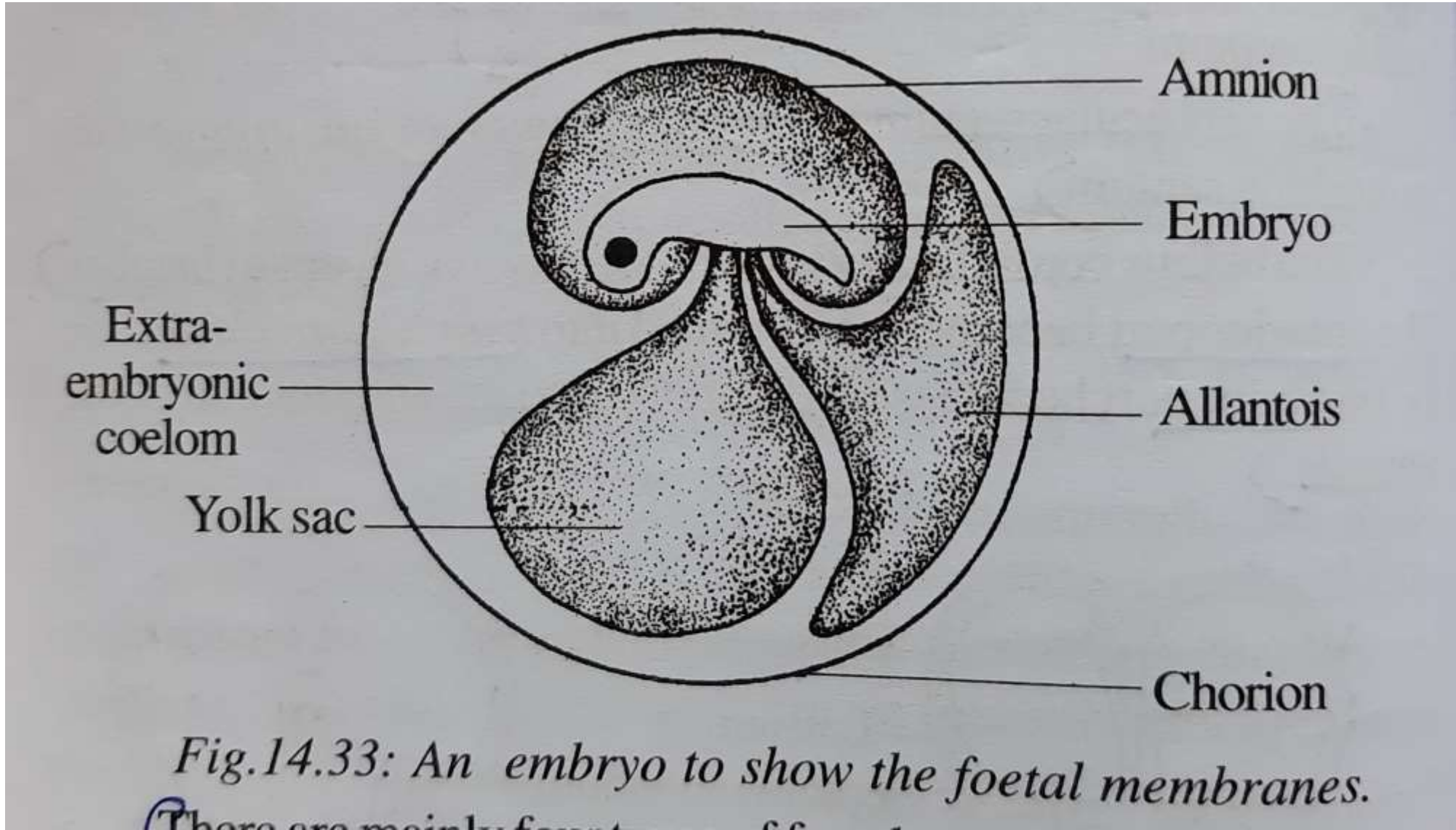


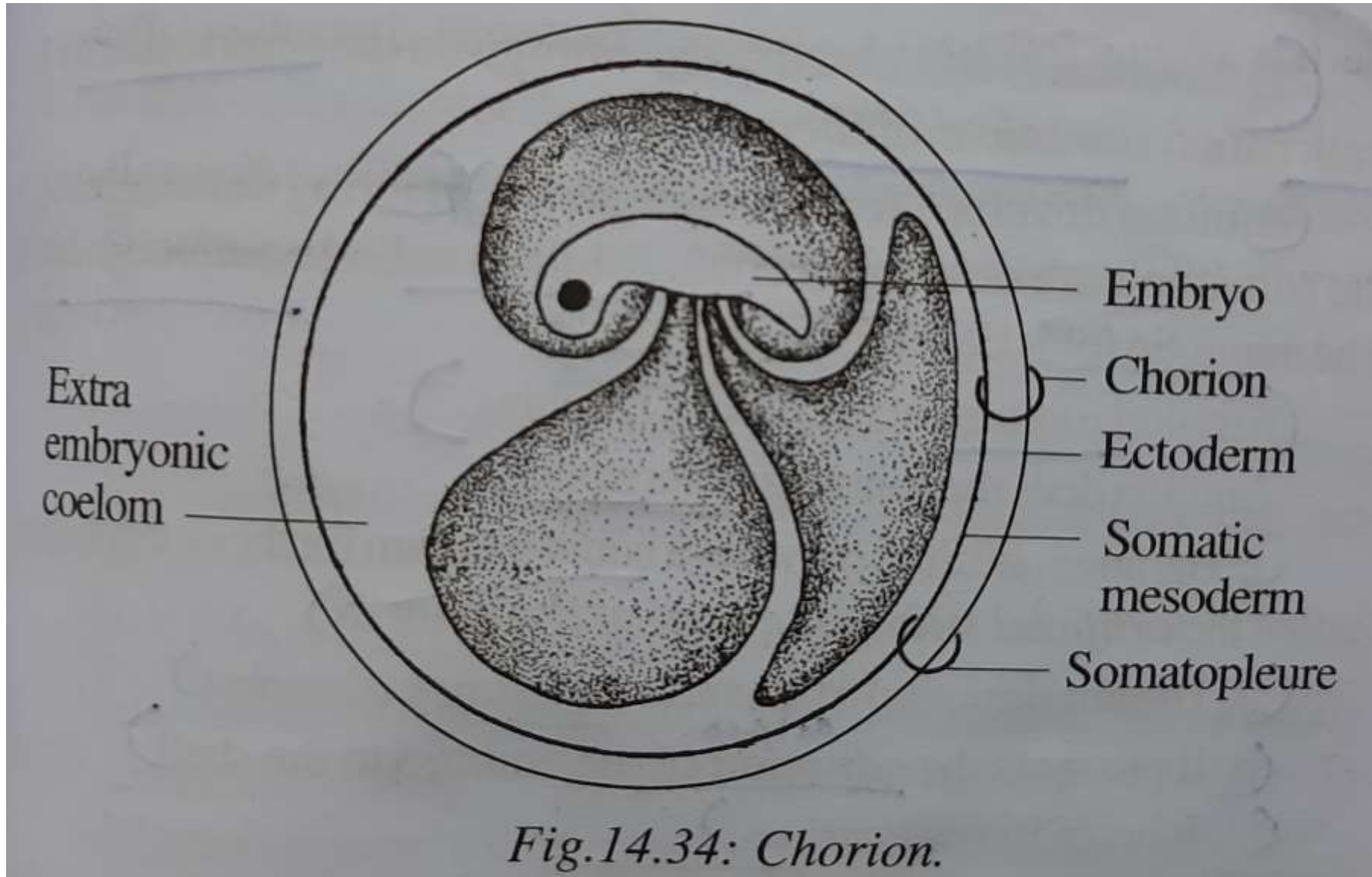
Fig.14.33: An embryo to show the foetal membranes.

(There are mainly four types of foetal membranes.)

CHORION

Chorion

- (Chorion is a *foetal membrane* or *extra-embryonic membrane*.)
- (It is also called *serosa*.)
- (It surrounds the entire embryo) and lies outside. (It lies close to the shell.)
- (It is made up of two layers, namely an outer *ectoderm* and inner *somatic mesoderm*.)
- (The cavity enclosed by the chorion is called *extra-embryonic coelom*.)
- (The chorion develops from *somatopleure* containing an outer *ectoderm* and inner *somatic mesoderm*.)
- (Chorion ruptures at the time of hatching.)
- (Chorion does two functions, namely *respiration* and *protection*.)



AMNION

Amnion

(Amnion is a *foetal membrane* or *extra-embryonic membrane*.)

(The animals developing an amnion are called *amniota*.) Eg. *Reptiles, birds and mammals*.

(The animals which do not develop an amnion are called *anamniota*.) Eg. *Fishes, amphibians, etc.*

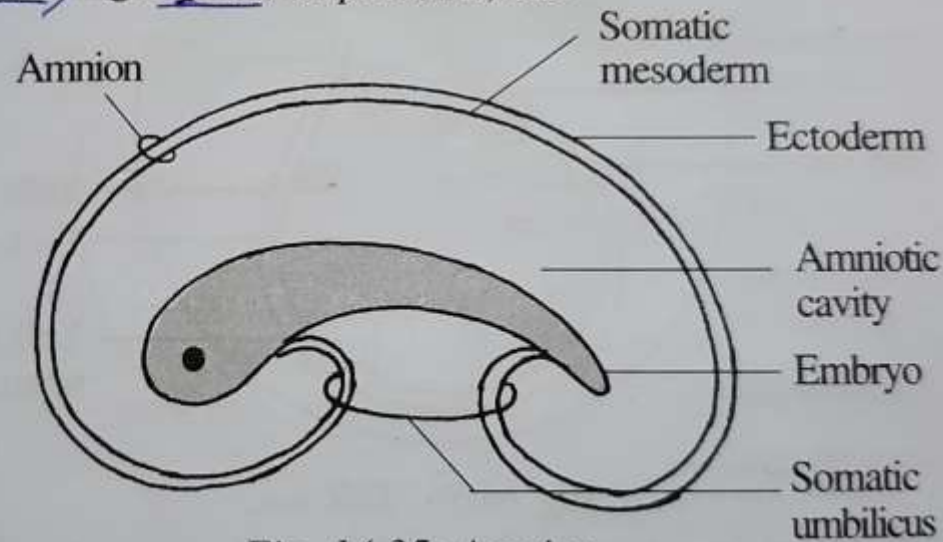


Fig. 14.35: Amnion.

(It surrounds the embryo.)

(It is made up of two layers, namely an outer *somatic mesoderm* and inner *ectoderm*.)

(It encloses a cavity called *amniotic cavity*. It is filled with a fluid called *amniotic fluid*.)

(The amnion is connected to the embryo on the ventral side by a stalk called somatic umbilicus.)

(Amnion develops from somatopleure. During development, the somatopleure develops certain foldings called amniotic folds. The amniotic folds develop into amnion.)

(Amnion ruptures at the time of hatching.)

Amnion does the following functions:

1. The amniotic fluid provides a liquid medium for the embryo. It is called the artificial swimming pool of the embryo.)

2. The amniotic fluid functions as a shock absorber.)

3. It prevents the ^{attach} adhesion of the embryo to the shell.)

4. It helps in respiration.)

YOLK SAC

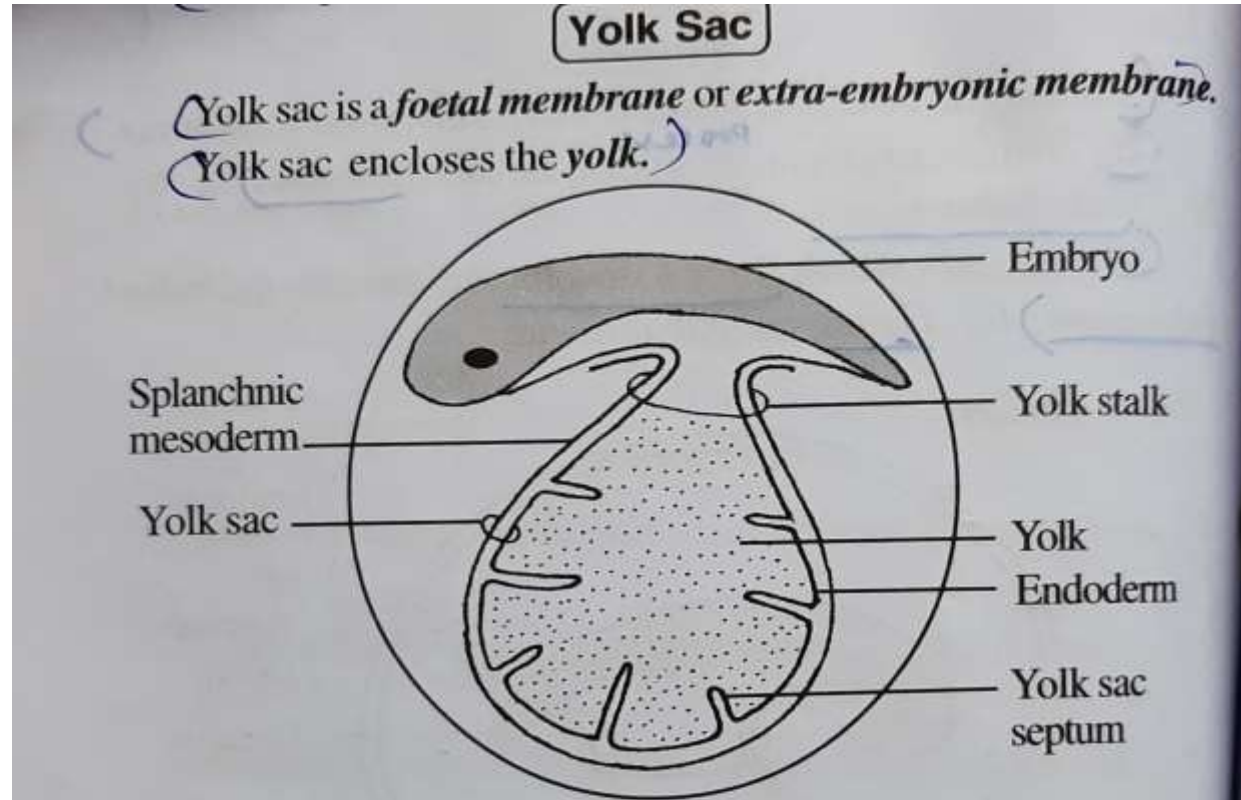


Fig.14.36: Yolk sac.

(It is made up of an inner *endoderm* and outer *splanchnic mesoderm*. It develops from *splanchnopleure*.)

(It is attached to the midgut by a narrow stalk called *yolk stalk*.)

It opens into the midgut by an *yolk duct*.

(The endoderm of yolk sac has many *finger*-like folds called *yolk sac septa*.) The yolk sac septa increase the area of absorption of yolk.

The yolk sac is supplied by a pair of *vitelline arteries*.^{and} A pair of *vitelline veins* collect the blood from the yolk sac.

The yolk sac gradually decreases in size as the yolk is consumed.)

The yolk sac provides *nutrition* for the embryo.)

ALLANTOIS

Allantois

Allantois is a *foetal membrane* or *extra-embryonic membrane*.
It is made up of an inner *endoderm* and outer *splanchnic mesoderm*.

It develops from *splanchnopleure*.

It is attached to the *hindgut* by a narrow stalk called *allantoic stalk*.

Allantois is supplied by a pair of *allantoic arteries* and a single *allantoic vein*.

As development advances, allantois increases in volume.

In later stage, *splanchnic mesoderm* of allantois and *somatic mesoderm* of chorion fuse together to form a *chorioallantoic membrane*.

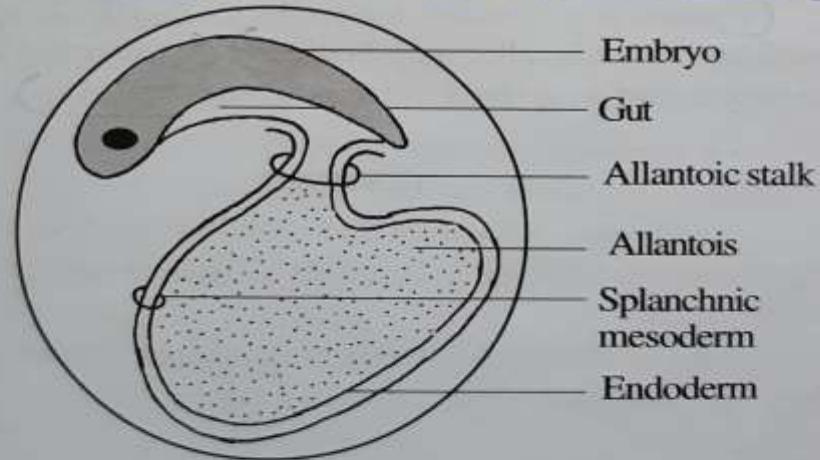


Fig.14.37: Allantois.

Allantois ruptures at the time of hatching.

Allantois does the following functions:

1. It is *excretory* in function. It *collects the excretory products* from the embryo.

2. It helps in *respiration*.

(3. It absorbs *calcium* from the shell.) (This helps the rupture of the shell at the time of hatching.)

Sero-Amniotic Raphe

The tissue connection formed by the fusion of amniotic folds is called *sero-amniotic raphe*. It is found on the dorsal side of the embryo.

The oval opening existing above the embryo previous to the fusion of amniotic folds is called *amniotic umbilicus*.

Umbilical Cord ନିଶ୍ଚରୁପାନ୍ତ ନିଶ୍ଚ

(As the embryo grows, the yolk stalk and the allantoic stalk are brought together and their mesoderms fuse together. The closely associated yolk and the allantoic stalk form the *belly stalk*.)

(The narrowing ring-like area between the ventral body wall of the embryo and the belly stalk tissue is called *umbilical ring*.)

(The umbilical ring is enclosed by the *somatic umbilicus*.)

(The complex structure, formed by the umbilical ring and the somatic umbilicus, is called *umbilical cord*. (At the time of hatching, the umbilical cord is ruptured and the wound is healed up.)