

Q:- Describe the types of vertebrates eggs and cleavage.

TYPES OF EGGS:

The purpose to make available the necessary food to the developing embryo during its early development, the eggs store required quantity of nutrient in the form of yolk during the growth phase of oogenesis.

The presence or absence of the yolk, its quantity and pattern of its distribution in the egg categorize the eggs into different types. Besides these facts, the eggs are also categorized on the basis of the presence or absence of the shell.

Eggs are categorized into two types on the basis of the presence or absence of the yolk.

(A) ALECITHAL: — The eggs without yolk or with negligible quantity of yolk are known as alecithal eggs. This type of eggs are found in eutherian mammals.

(B) LECITHAL: — The yolk containing eggs are known as lecithal eggs.

on the basis of the quantity of the yolk present, the latter type of eggs are categorized into the following three types: —

(1) MICROLECITHAL OR OLIGOLECITHAL: — when the quantity of the yolk contained in the

egg is very small in comparison to the cytoplasm, the eggs are said to be of microlecithal or oligolecithal type.

Eg! — The eggs of lower vertebrates such as tunicates, Herdmania, Amphioxus come under this category.

<II> MESOLECITHAL: — when the yolk contained by the eggs is in moderate quantity i.e. comparatively more than that contained in the case of microlecithal then the eggs are known as to be of mesolecithal type.

Exm! — The eggs of sharks (Scoliodon), Dipnoi fishes (petromyzon), and some of the Amphibians lie under this category.

<III> MEGALECITHAL OR MACROLECITHAL: — when the yolk contained in the eggs is in an enormous quantity i.e. when the eggs contain more quantity of yolk in comparison to cytoplasm, the eggs are known as megalecithal or macrolecithal. Some people also called them as polylecithal.

eg! — The eggs of bony fishes, Amphibians, Reptiles, birds and some egg laying mammals - monotremes come under this category.

Lecithal eggs are further categorized into following three categories on the basis of pattern of distribution of yolk within the eggs.

(i) HOMOLECITHAL \rightarrow or ISOLECITHAL \rightarrow : When the yolk remains equally distributed throughout the cytoplasm of the egg, the latter is known as homolecithal or isolecithal. This condition prevails in the case of alecithal or microlecithal eggs, i.e. in eutherian mammals and amphioxus.

(ii) TELOLECITHAL: — When the yolk becomes concentrated at the vegetative pole in such a manner that it pushes the cytoplasm with its nucleus towards the animal pole, the eggs are termed telolecithal. This condition is found in mesolecithal or megalecithal eggs such as in the eggs of sharks, bony fishes, dipnoi fishes, Amphibians, Reptiles, birds and egg laying mammals. In some cases this condition becomes so pronounced that the active cytoplasm with nucleus is pushed to restrict only in a very small region at the animal pole to form a small disc like structure around the animal pole. The eggs acquiring this condition is known as highly telolecithal by some people and is found in reptiles and birds.

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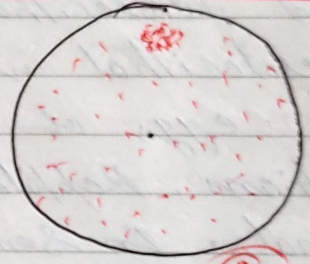
(iv) CENTROLECITHAL: — when the yolk becomes concentrated in the center of the egg surrounding only a very small quantity of the active cytoplasm and this central portion of the yolk also remains surrounded by a thin peripheral layer of the cytoplasm i.e. the yolk lies in the centre between two thin concentric layers of cytoplasm, then eggs are known as centrolecithal. This type of eggs are found in insects.

Homolecithal



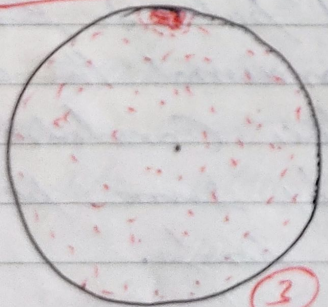
Human (1)

Telolecithal



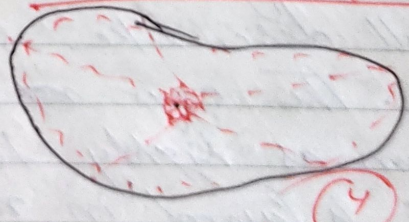
Frog (2)

Telolecithal



Birds (3)

Centrolecithal



Insect (4)

Fig: (1, 2, 3, 4) Various types of eggs.

The eggs are also classified on the basis of the presence or absence of the shell and quantity of the salts.

(1) CLEIDONIC — when the megalecithal cells are to be laid down on the dry land they become surrounded by a hard Callanians shell to protect themselves and to become independent of environment then these eggs are said to be of Cleidonic or terrestrial type. Ex: — eggs of reptiles and birds.

(2) Non-cleidonic — when the alecithal or microlecithal eggs are to remain in the uterus for the period of development and derive their nourishment through the wall of the uterus then they do not secrete a shell around themselves and are known as non-cleidonic or intrauterine eggs. Depending upon the quantity of salts contained in the eggs. The latter may be known as fresh water or marine water eggs.

(i) Fresh water eggs: — when eggs contain enormous amount of salt with yolk then they are known as fresh water eggs. Ex: — eggs of Amphibians.

(ii) Marine water eggs: — when eggs contained little amount of salt with yolk then they are termed marine water eggs. Ex: — eggs of fishes.

The eggs of annelids, molluscs, ascidians and nematodes possess portions that develop into a particular organ i.e. the fate of the particular portion is already decided to develop into special organ. These eggs are known as mosaic & determinate eggs.

However in the eggs of the majority of animals such as Amphioxus, Fishes, Amphibians, Reptiles, birds and mammals usually the fate of the particular portion of the egg is not decided to develop into certain organs.

These eggs are known as regulative or indeterminate eggs.

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