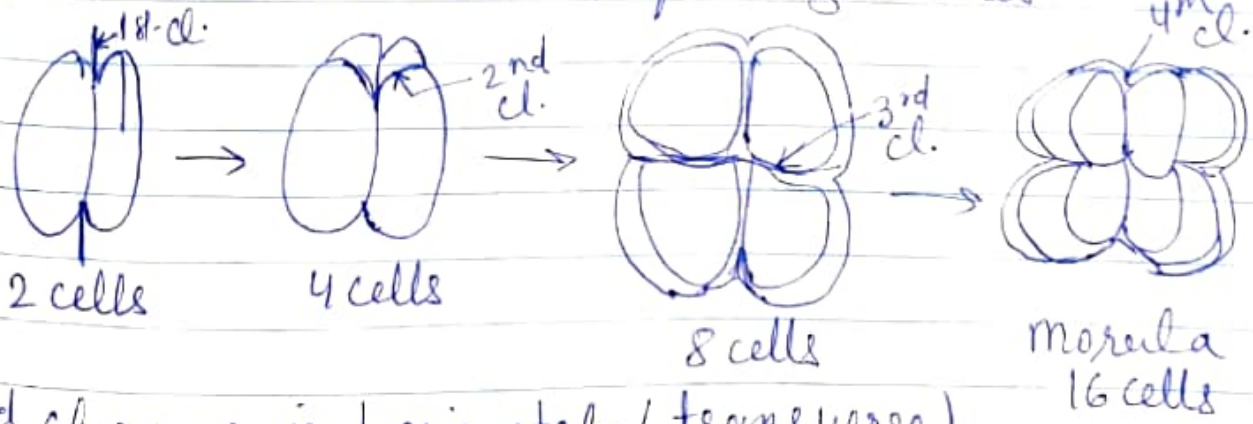
Embryology

Development of Amphioxus upto the formation of Coelom

Early development of Amphioxus is of great phylogenetic significance b/c it resembles with those of invertebrates like Echinoderm on one hand and vertebrates on the other hand. Many scientists described its development but that of Conklin is most recent and accepted one.

Fertilization — in Amphioxus is external. Ovum has an outer thin vitelline memb. enclosing a peripheral cytoplasmic layer, central yolky cytoplasm mainly towards the vegetal pole and a fluid filled germinal sac or nucleus towards the animal pole. Sperm enters the egg near the vegetal pole.

Cleavage and Blastulation — The cleavage of eggs is holoblastic and is of equal type. First cleavage is meridional i.e oriented along the median axis from animal to vegetal pole. The result of cleavage is the formation of two identical blastomeres establishing the bilateral symmetry of adult animal. 2nd cleavage is at right angles to the 1st & divides the first two blastomeres into 4 equal sized cells.



3rd cleavage is horizontal (transverse) slightly above the equatorial region and each blastomere is divided into one micro and one macromere.

4 micromeres are at top & 4 macromeres are at bottom. 4th cleavage is vertical and divides each blastomere into two thus 16 are formed 8 micromeres at top & 8 macromeres at bottom. Since division is not exactly thru the middle the resulting blastomeres do not have equal sized partners.

The zygote now is called Morula.

5th cleavage again is horizontal (latitudinal) dividing the 16 blastomeres into 32, arranged in four tiers of 8 each. The upper 2 tiers have micromeres and the lower 2 tiers have macromeres.

6th cleavage is vertical (longitudinal or meridional) It divides the 32 blastomeres into 64 arranged in 4 tiers and each tier is a ring of 16 blastomeres arranged side by side.

Further cleavage are irregular and micromeres divide slightly faster than macromeres. A jelly filled cavity now appears in the center of morula to change it into blastula. It is distinct by 64 cell stage. Jelly starts absorbing water & swells up in size. Cells become arranged in single layer around the blastocoel, called blastoderm