



**Faculty of Biological Science and Technology**  
**Zoology and Botanical Department**  
**Practical Embryology**

# **Amphibian development**

## **(10 mm larvae; cross sections)**

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# Stages in the Normal Development of *Rana pipiens*

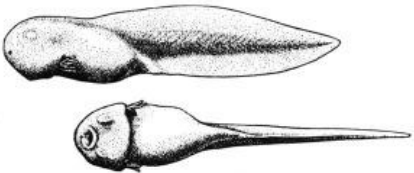
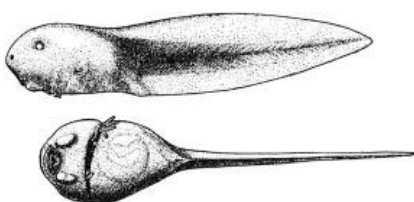
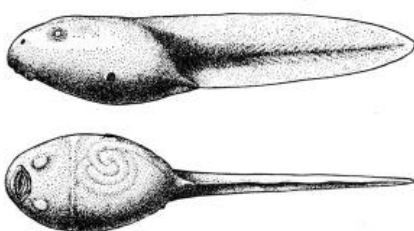
STAGE NUMBER	AGE-HOURS AT 18°C	STAGE NUMBER	AGE-HOURS AT 18°C	STAGE NUMBER	AGE-HOURS AT 18°C
1	0	7	7.5	13	50
	UNFERTILIZED		32-CELL		NEURAL PLATE
2	1	8	16	14	62
	GRAY CRESCENT		MID-CLEAVAGE		NEURAL FOLDS
3	3.5	9	21	15	67
	TWO-CELL		LATE CLEAVAGE		ROTATION
4	4.5	10	26	16	72
	FOUR-CELL		DORSAL LIP		NEURAL TUBE
5	5.7	11	34	17	84
	EIGHT-CELL		MID-GASTRULA		TAIL BUD
6	6.5	12	42		
	SIXTEEN-CELL		LATE GASTRULA		

STAGE NUMBER	AGE IN HOURS AT 18° CENTIGRADE	LENGTH IN MILLIMETERS
18	96	4
		MUSCULAR RESPONSE
19	118	5
		HEART BEAT
20	140	6
		GILL CIRCULATION HATCHING
21	162	7
		MOUTH OPEN CORNEA TRANSPARENT
22	192	8
		TAIL FIN CIRCULATION

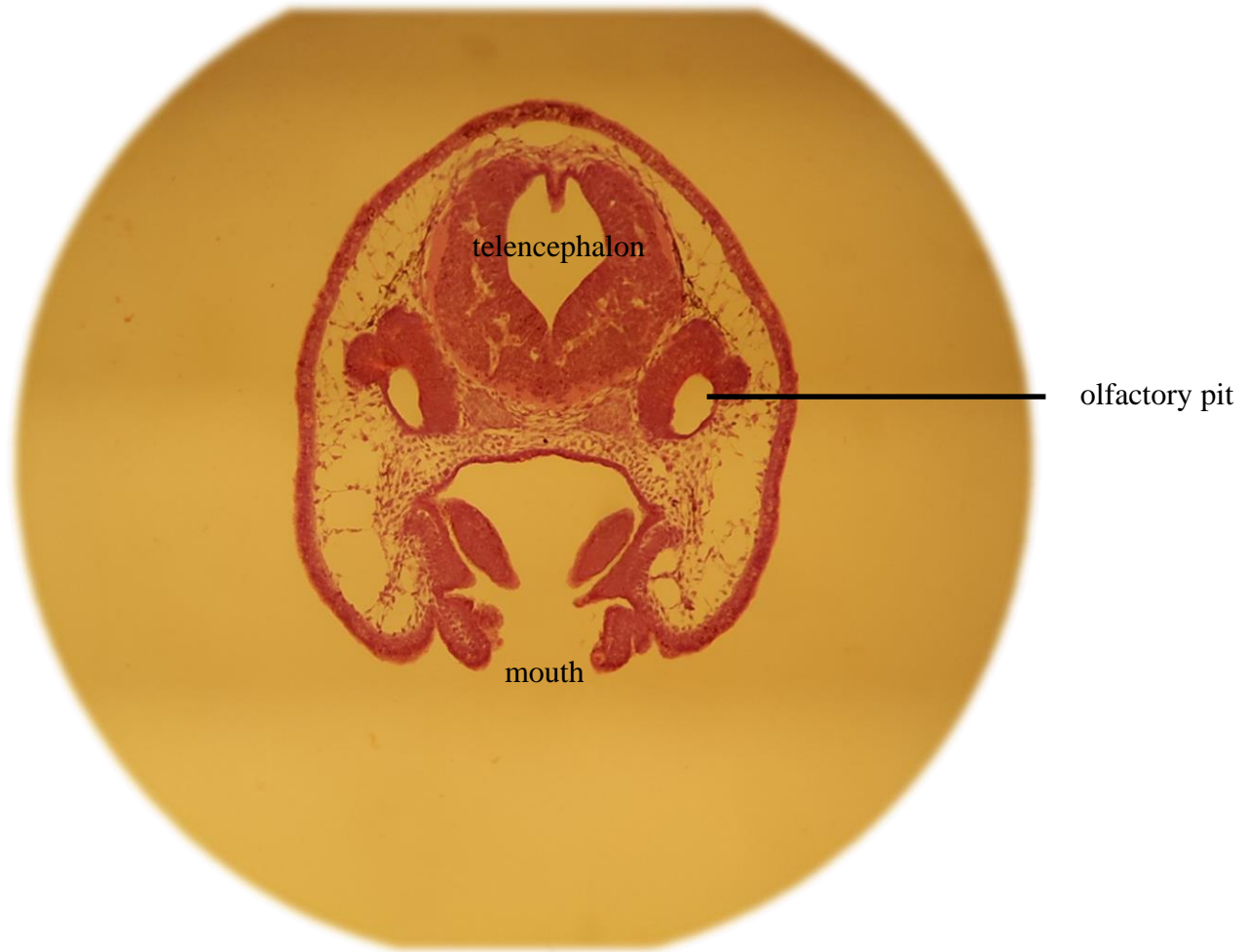
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## Stages in the Normal Development of *Rana pipiens*

STAGE NUMBER	
AGE IN HOURS AT 18° CENTIGRADE	
LENGTH IN MILLIMETERS	
23	216 9
	
OPERCULAR FOLD      TEETH	
24	240 10
	
OPERCULUM CLOSED ON RIGHT	
25	284 11
	
OPERCULUM COMPLETE	











rhombencephalon

Right gills have been covered by operculum; left gills contact with outside

4<sup>th</sup> ventricle

auditory vesicle

sclerotome

anterior cardinal vein

dorsal aorta

Cuvierian vein

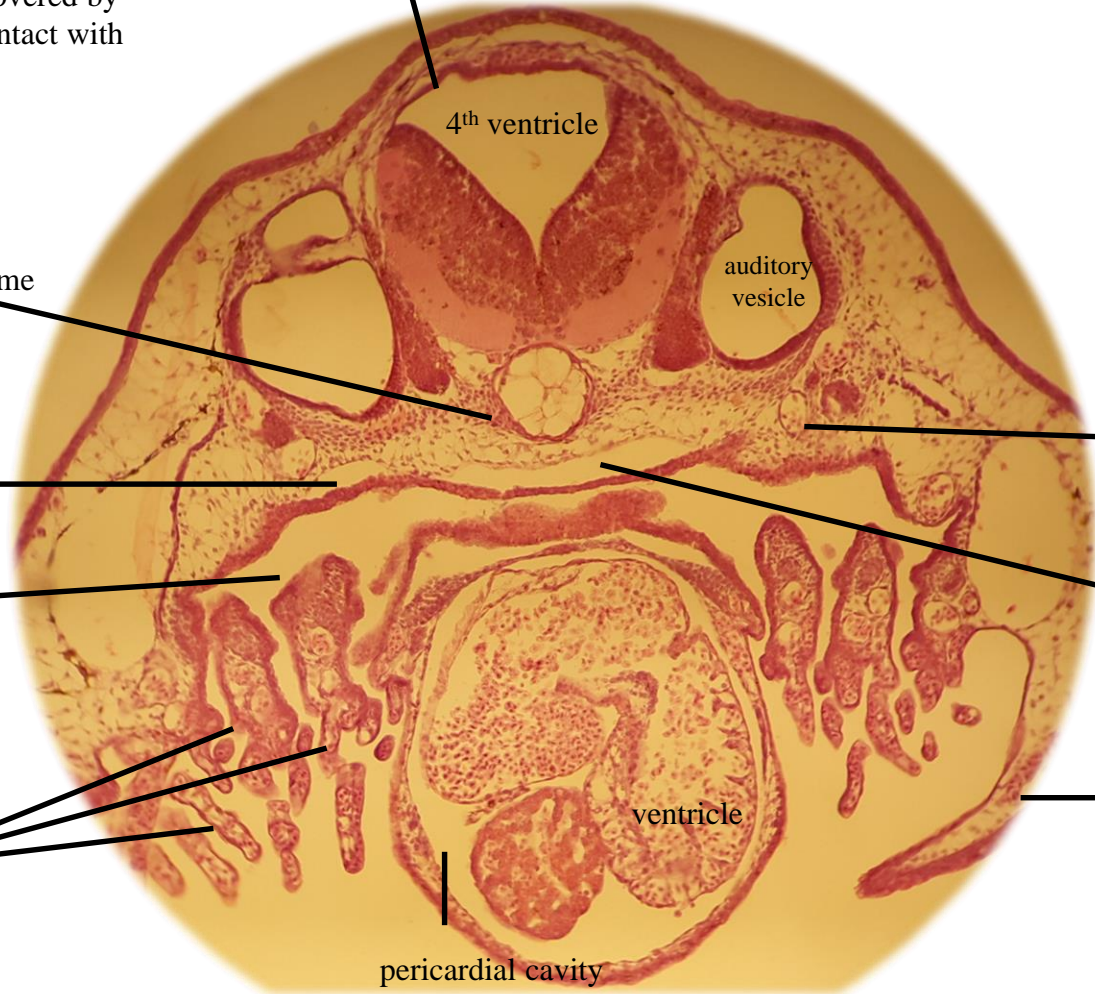
Brachial pouch

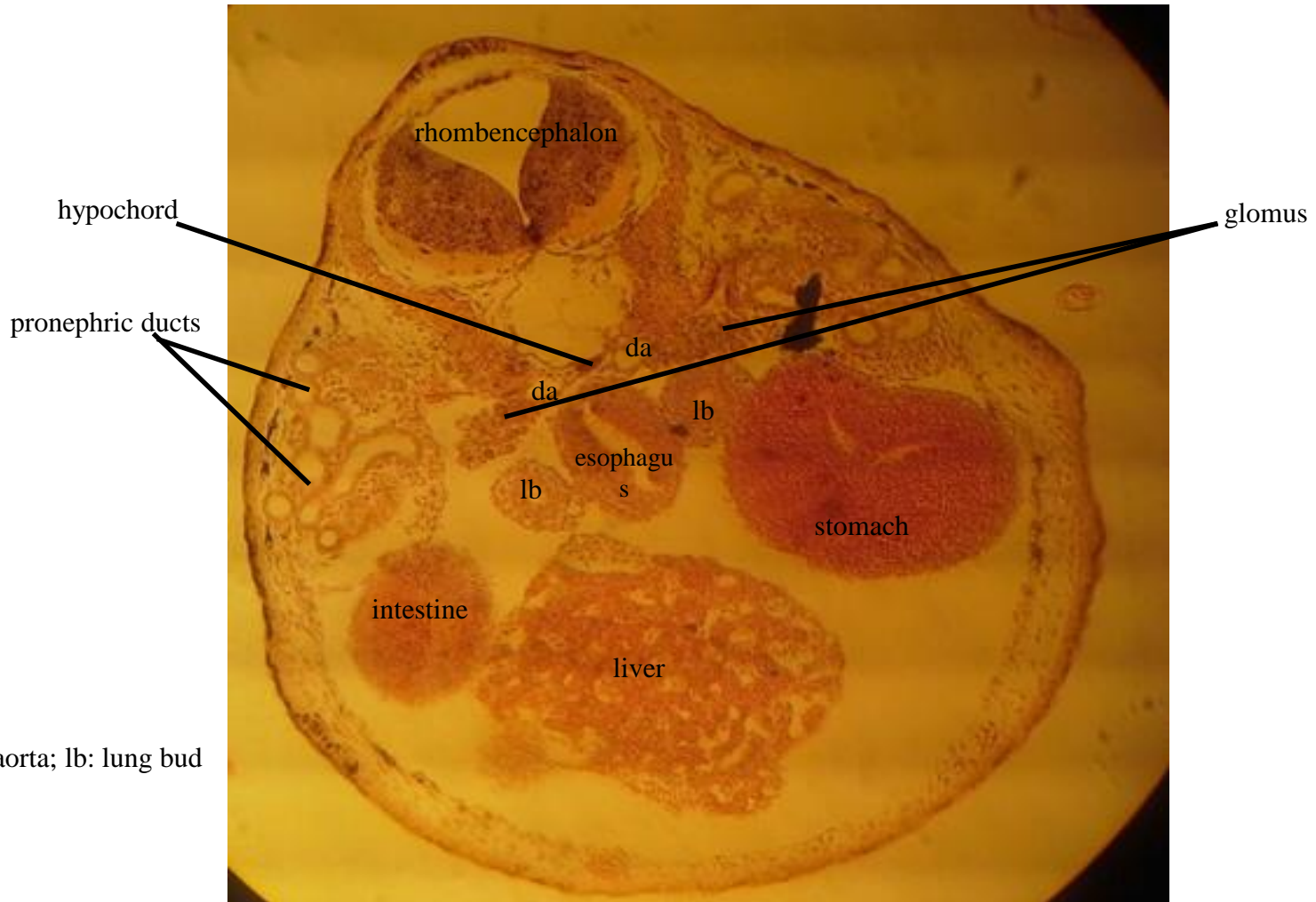
operculum

ventricle

external gills

pericardial cavity

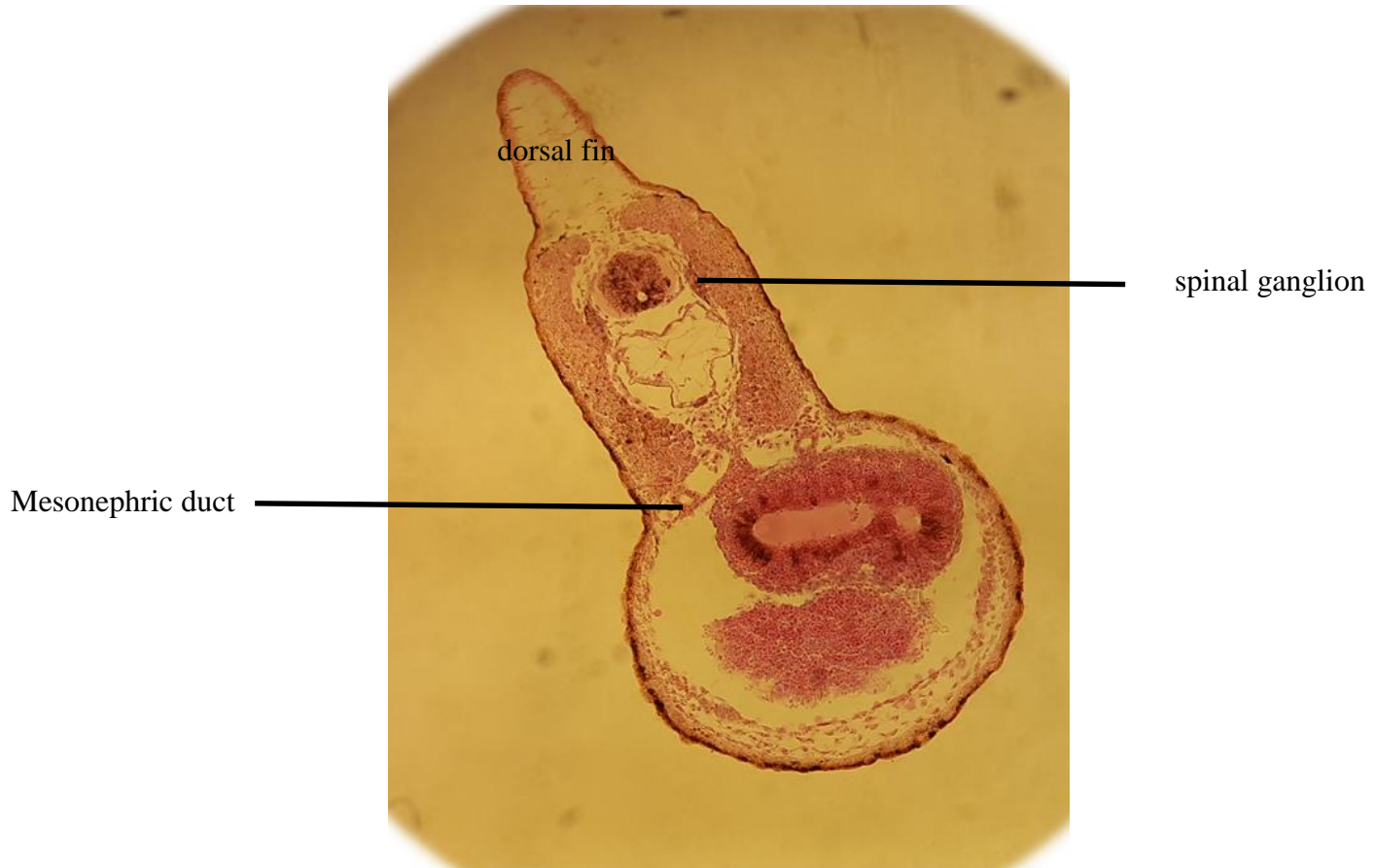




da: dorsal aorta; lb: lung bud









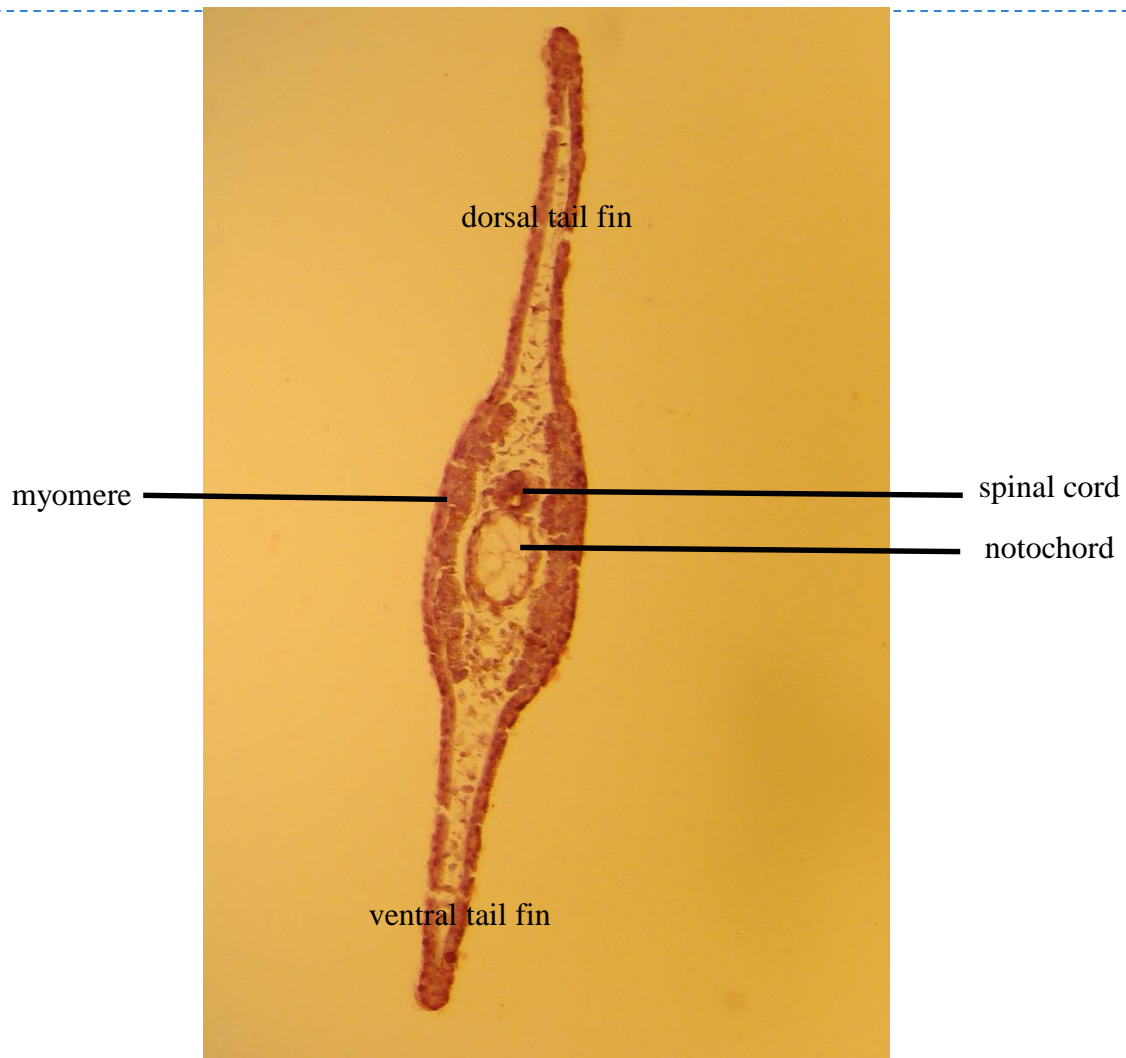
## Quiz time!

- name different part of this section
- This section cut through which part of 10 mm frog larvae? anterior, middle or posterior?





■ name different part of these sections







# Quiz time!

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■ name different part of this section



## Quiz time!

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■ name different part of this section



## Quiz time!

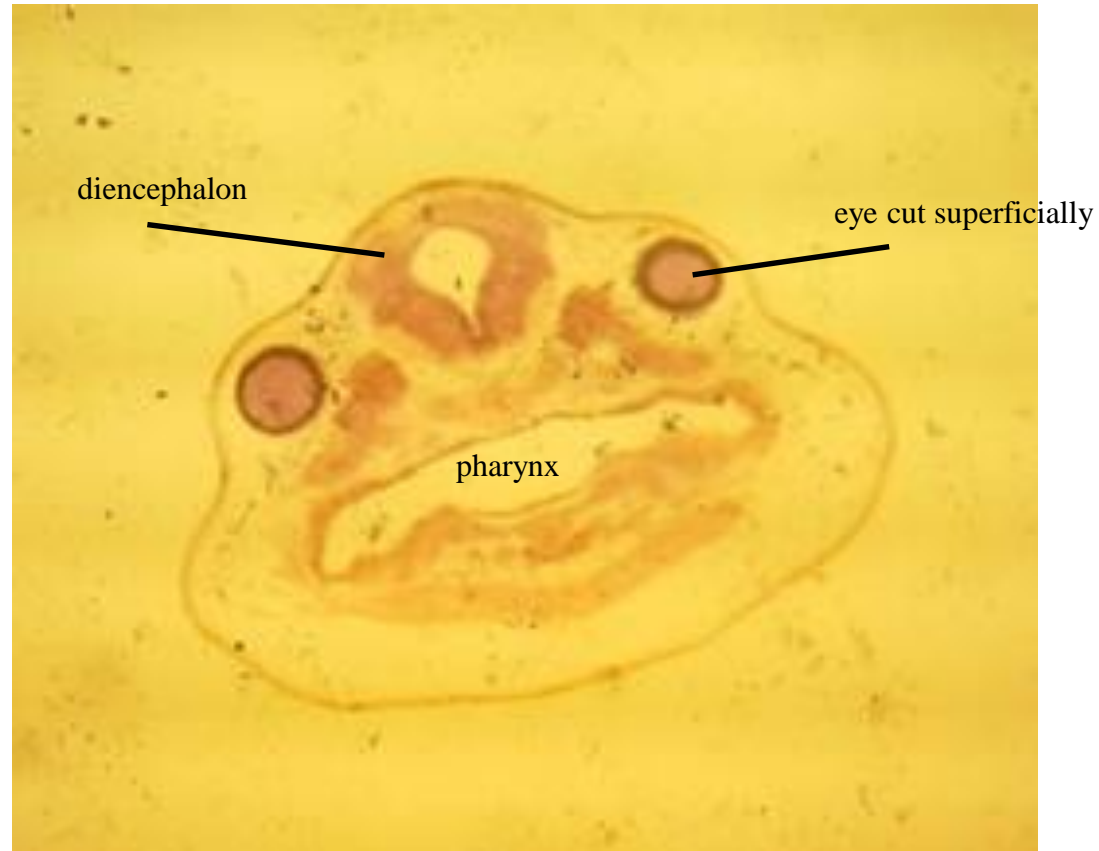
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