



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

Amphibian development

(10 mm larvae; sagittal sections)

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Stages in the Normal Development of *Rana pipiens*

STAGE NUMBER	STAGE NUMBER	STAGE NUMBER
Age-Hours at 18°C	Age-Hours at 18°C	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	

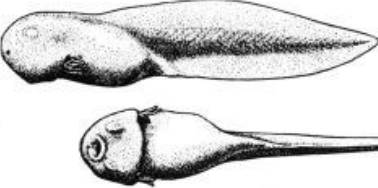
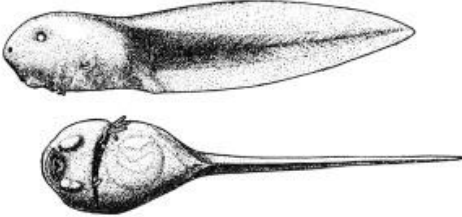
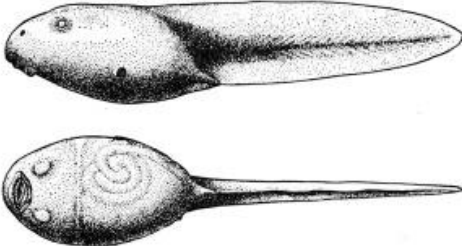
STAGE NUMBER	AGE IN HOURS AT 18° CENTIGRADE	LENGTH IN MILLIMETERS
18 96 4		MUSCULAR RESPONSE
19 118 5		HEART BEAT
20 140 6		GILL CIRCULATION HATCHING
21 162 7		MOUTH OPEN CORNEA TRANSPARENT
22 192 8		TAIL FIN CIRCULATION

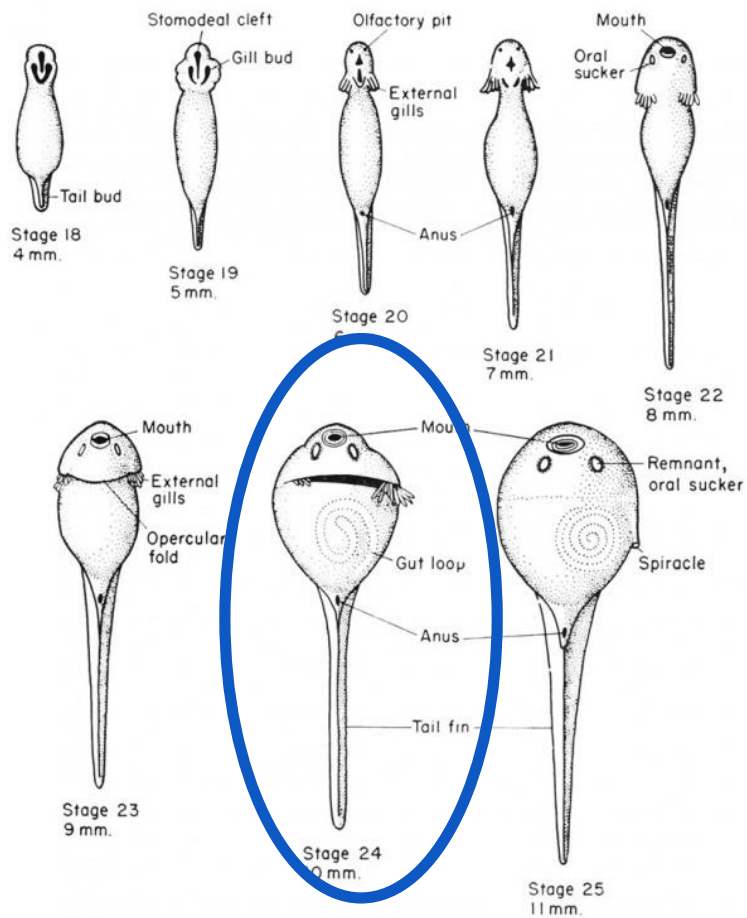
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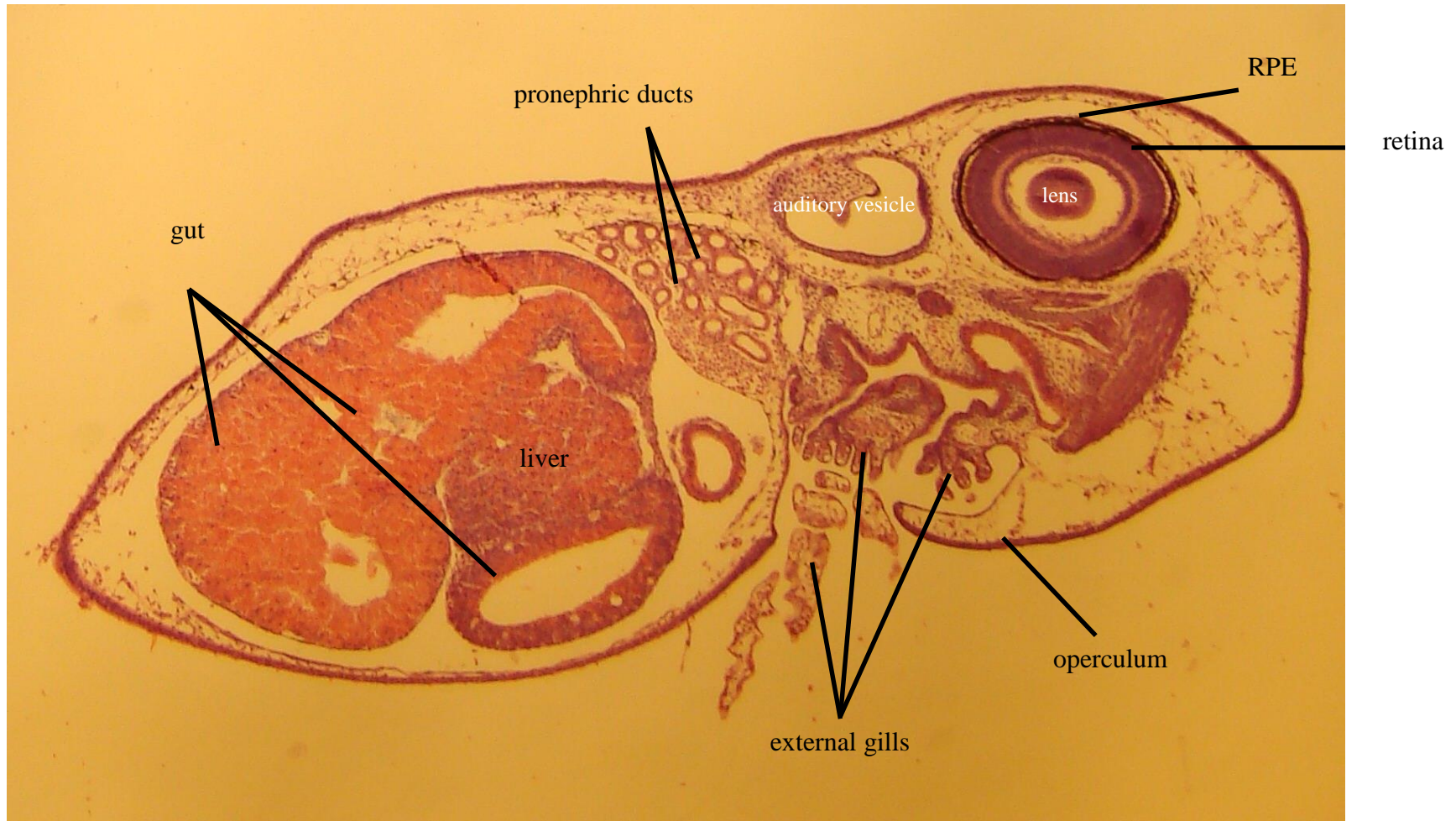


STAGE NUMBER	AGE IN HOURS AT 18° CENTIGRADE	LENGTH IN MILLIMETERS		
23	216	9		OPERCULAR FOLD TEETH
24	240	10		OPERCULUM CLOSED ON RIGHT
25	284	11		OPERCULUM COMPLETE



ventral surface

- stage 24, 240 hpf, 10 mm
- Head and trunk are expanded
- Tail is long and muscles are segmented
- Brain is more developed
- Optic cup obviously differentiated to retinal pigmented epithelium (RPE) and neural retina
- Mouth has been opened and gut differentiated further
- Horny jaws, teeth and papilla are seen in mouth
- **operculum closed on right**
- One pair pigmented oral suckers are seen in ventral surface of head



retinal pigmented epithelium (RPE)



Mes.: mesencephalon; Rho.: rhombencephalon

