

THE OPEN UNIVERSITY OF SRI LANKA

B. Sc. DEGREE PROGRAMME – LEVEL 04

ZLU2182 – ANIMAL DEVELOPMENT  
CAT 2 (OPEN BOOK TEST)



DATE: 07<sup>th</sup> April 2014

TIME: 8.45 a.m. – 9.45 a.m.

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REGISTRATION NUMBER: .....

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**Answer all questions**

**Answers should be written in the space provided**

Q 1

1.1 What is cell determination?

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1.2 How does cell determination differ from cell differentiation?

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1.3 State the three methods by which cell determination is achieved.

1. ....
2. ....
3. ....

When tissue pieces (explants) from animal hemisphere of frog early blastulae were cultured outside in simple media, they developed to form epidermal cells. When explants from vegetal hemisphere of early blastulae were cultured, they developed to form endodermal cells. None of the tissue pieces developed into mesodermal cells.

1.4 Which cell determination method stated in the Question 1.3 could be responsible for the determination of ectoderm and endoderm in frog early blastulae?

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1.5 When a piece of previously labelled tissue from the animal hemisphere (animal cap cells) of a mid-stage blastula was placed in contact with tissues of the vegetal region for about three days, in addition to the formation of epidermis, mesodermal tissues such as muscle, notochord, blood and mesenchyme cells developed from the previously labelled tissues (see Figure 1).

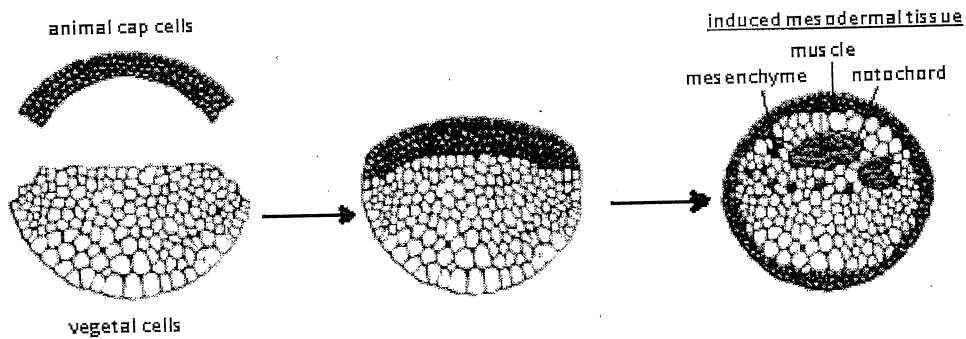


Figure 1

What is the reason for the change of the fate of the labelled tissue from animal hemisphere during this experiment?

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1.6 According to the above experiment, what is the cell determination method involved in the determination of mesoderm in frog blastula?

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In another experiment, when dorsal lip of the blastopore of gastrula of the newt *Triton cristatus* (unpigmented species) was grafted to the ventral region of the gastrulae of the newt *Triton taeniatus* (pigmented species), an entire secondary embryo was developed where the grafting was done (Figure 2).

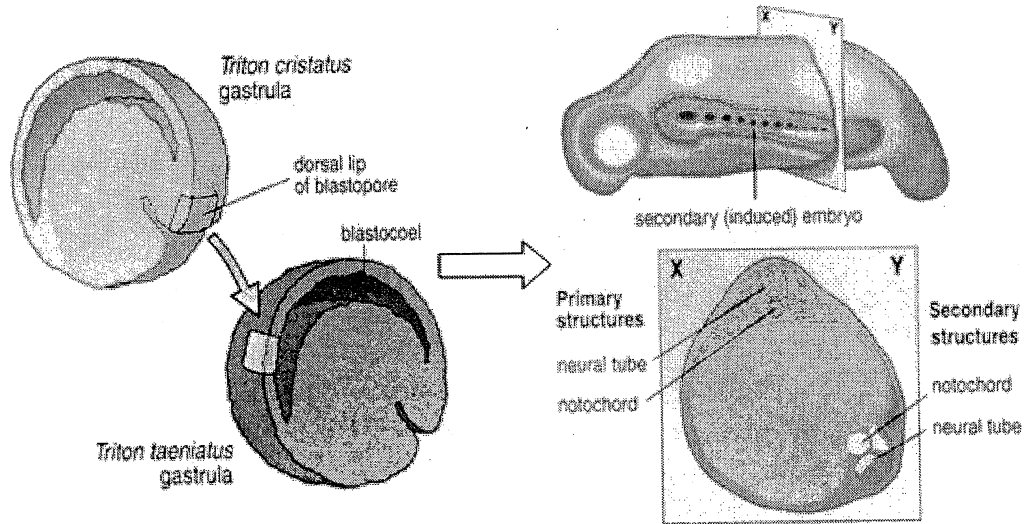


Figure 2

1.7 When selecting a donor gastrula and a recipient gastrula for the above experiment, a pigmented one and an unpigmented one of two closely related species had been chosen.

(i) Why was it necessary to select a pigmented gastrula and an unpigmented gastrula for the experiment?

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(ii) Why was it necessary to select embryos of two closely related species?

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1.8 The pigmentation of the secondary embryo was similar to that of host than the grafted tissue. What does it indicate about the nature of the grafted dorsal lip tissue?

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1.9 What is the name given to the dorsal lip area to indicate its nature mentioned in the Question 1.8?

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Later, the second experiment given above was done by taking grafts at different times to see how the nature of the dorsal lip area changes during gastrulation. The dorsal lip taken from early gastrula induced a complete additional embryo, a mid-gastrula induced a trunk and tail but no head, and a late gastrula induced only a tail.

1.10 What do the results of this experiment indicate about nature of dorsal lip area?

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1.11 What is the important task done by the nature of the dorsal lip area mentioned in Question 1.10?

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## Q 2

2.1 What do you understand by the term 'transgenic animals'?

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2.2 State three principal methods used for the creation of transgenic animals with a brief description about the method.

Method 1: .....

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Method 2: .....

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Method 3: .....

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2.3 State two problems associated with transgenic technology.

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