Quadrant II – Transcript and Related Materials

Programme: Bachelor of Science (Third Year)

Subject: Zoology

Paper Code: ZOC 108

Paper Title: Developmental Biology

Unit: I – Introduction

Module Name: Branches of embryology, Scope of embryology

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Notes:

Embryo is the stage of an organism before birth or hatching. Embryology is the science that deals with the development of an organism from egg to an adult.

BRANCHES OF EMBRYOLOGY

There are many sub-branches of embryology.

1. DESCRIPTIVE EMBRYOLOGY

This term is applied to the method of study concerned with the direct observation and description of embryological development. Embryology in ancient times started as a branch of study based on the direct observation and description by scientists like Aristotle (340 BC), Fabricius (1537 -1619), Harvey (1578-1657) and so on.

Aristotle wrote "the Treaties on Embryology" and his doctrines about development were accepted as authoritative through most of the medieval periods. They appear in the writings of Fabricus and Harvey who described development as "as epigenesis through the superaddition of parts." The determining cause or soul, he thought, is present in the blood.

2. COMPARATIVE EMBRYOLOGY

In comparative embryology, the embryological development of different animals are studied and compared. Comparative throws much light on the understanding of evolution and phylogenetic significance. It also gives some ideas on the developmental stages of certain animals in whose case the study of development is difficult.

3. EXPERIMENTAL EMBRYOLOGY

In experimental embryology, experiments are used for studying the developmental stages. It helps to understand the fundamental mechanisms. In experimental embryology, the various parts of developing embryo are removed, transplanted, parts exchanged or the environmental conditions altered. This helps to understand induction, gradient system, etc. Roux (1850-1924) is the pioneer in the field of experimental embryology. Experimental embryology is also called casual embryology or analytical embryology.

4. CHEMICAL EMBRYOLOGY

This branch of embryology includes all those studies which employ various biochemical, biophysical and physiological techniques for understanding embryological events at molecular level. Needham (1931) is the pioneer in this field.

5. TERATOLOGY

It is the branch of embryology concerned with the study of malformations or birth defects.

6. DEVELOPMENTAL BIOLOGY

It includes not only embryonic development but also postnatal processes such as normal and neoplastic growth, metamorphosis, regeneration and tissue repair.

SCOPE OF EMBRYOLOGY

1. Embryology helps to understand other branches of biology like genetics, cytology, physiology, evolution, etc.
2. It helps to understand the phylogenetic relationship between the different groups of animals.
3. In the medical field, embryology is immensely helpful. It helps to understand the origin of certain diseases.
4. It provides adequate facilities for birth control.
5. In modern days, embryology helps to produce test tube babies and desired sexes.
6. Developmental studies help in controlling pests and vectors.

7. With the help of ‘cloning’, a large number of individuals with identical genotypes can be produced.