

EVOLUTION

V Sem B.Sc. Zoology – Core Course VII – Ethology,
Evolution & Zoogeography

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EMBRYOLOGICAL EVIDENCE

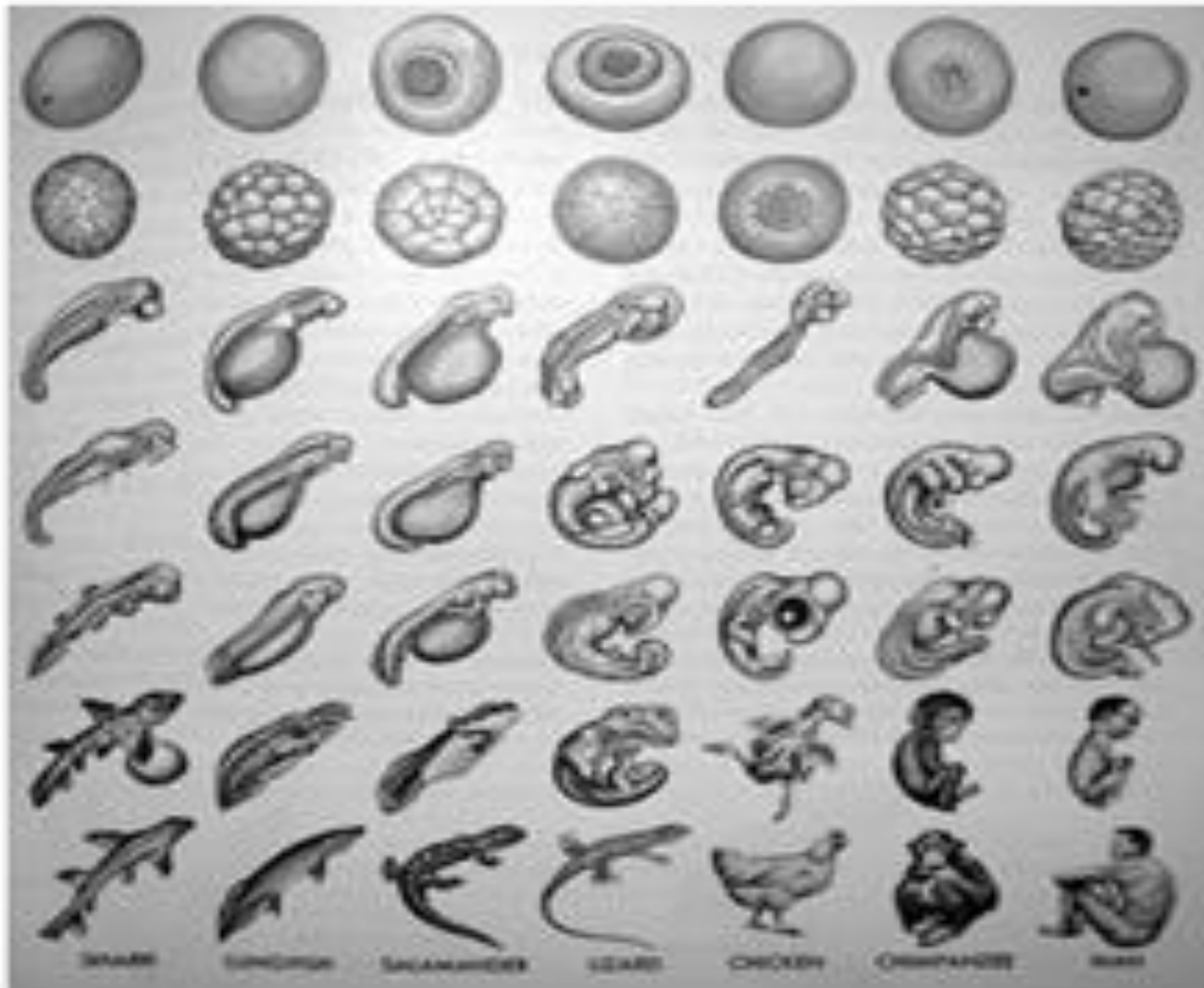
INTRODUCTION

- ✘ Embryology – study of the origin and development of an organism from egg to adult stage.
- ✘ Comparative embryology – evidence for evolution
- ✘ Ernst Haeckel – Biogenetic Law or Recapitulation Theory

EVIDENCES

- ✘ Fertilized ovum
- ✘ Similarities of embryos
- ✘ Homology in embryonic development
- ✘ Fate of Gastrula
- ✘ Extra embryonic membranes

FERTILIZED OVUM



SIMILARITIES OF EMBRYOS



Fish

Salamander

Toad

Chick

Mice

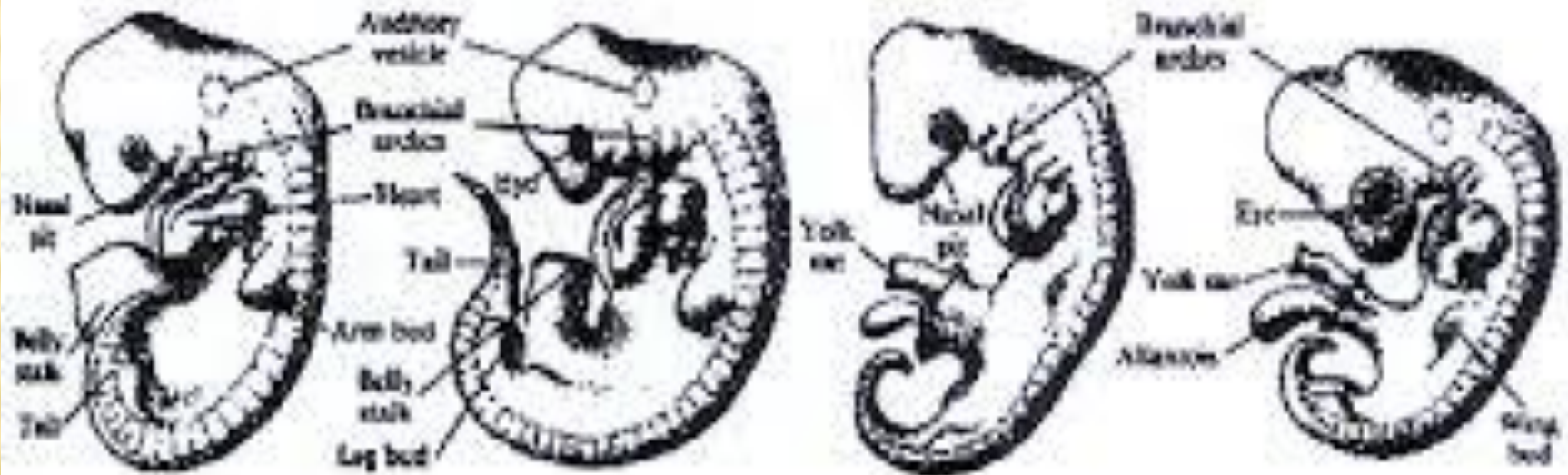
Cat

Rabbit

Human

SIMILARITIES OF EMBRYOS

Figure 2: Homologous Similarity Among Vertebrate Embryos



Man

Pig

Reptile

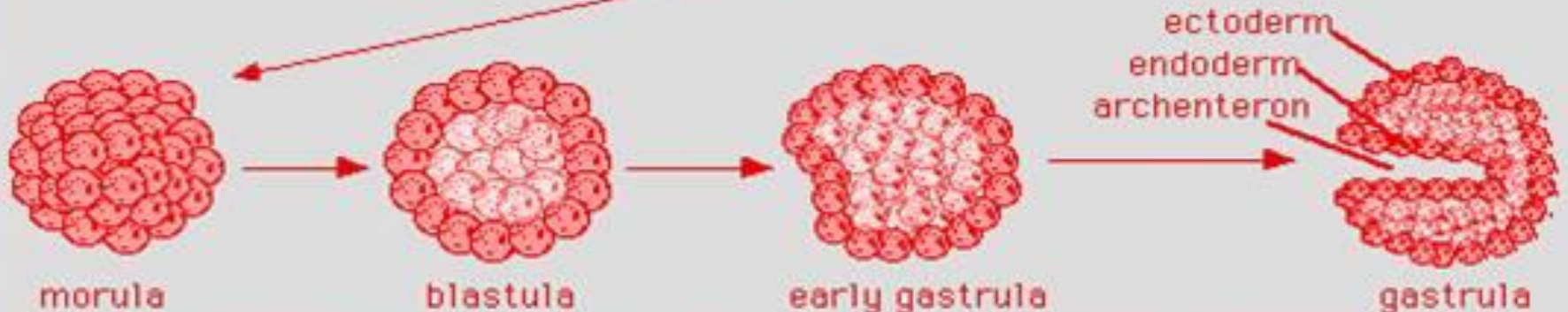
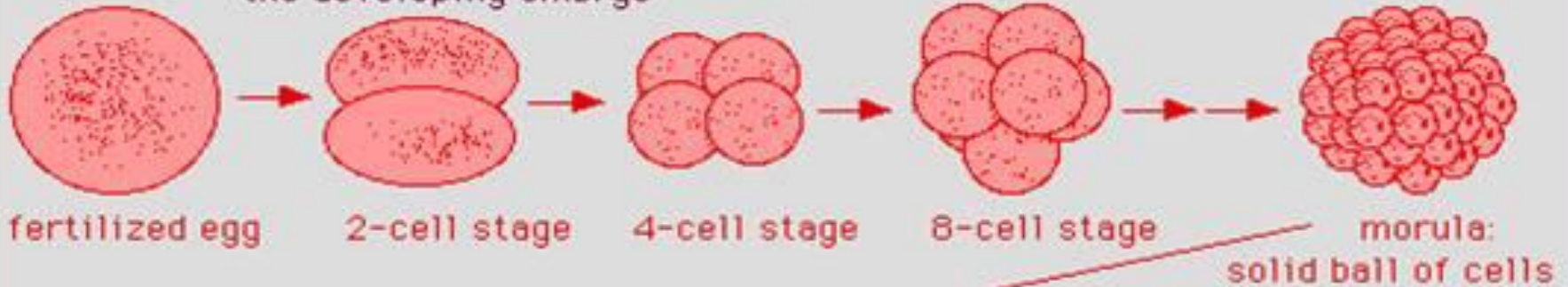
Bird

SIMILARITIES OF EMBRYOS



HOMOLOGY IN EMBRYONIC DEVELOPMENT

Cleavage: cell division increases the number of cells in the developing embryo



The morula develops into a fluid-filled sphere of cells called the blastula

Cells on one side of the blastula start to invaginate into the embryo; this starts gastrulation

Gastrulation finishes with the formation of the gastrula, an embryo with two tissue layers (endoderm and ectoderm) and a primitive digestive tract (the archenteron)

FATE OF GASTRULA

- ✘ Outer surface – ectoderm – external surfaces of the body – skin, scales, feathers, the nervous system, sensory membranes of sense organs
- ✘ Inner layer – endoderm – digestive tract, glands – liver, pancreas.
- ✘ Middle layer – mesoderm – everything else – muscles, bones, kidneys, connective tissues and so on.

FATE OF GASTRULA

- ✘ Endoderm folds inward – cavity – archenteron – digestive tract
- ✘ Archenteron one opening – blastopore
- ✘ Invertebrates – blastopore – mouth at anterior end of body
- ✘ In vertebrates – blastopore – posterior region of body.
- ✘ Remote ancestors had similar patterns of

EXTRA EMBRYONIC MEMBRANES

- ✘ Embryos of reptiles, birds and mammals – protected by extra embryonic membranes – amnion, yolk sac and allantois
- ✘ Amnion – encloses liquid – protects from mechanical injuries
- ✘ Yolk sac – early embryonic development – encloses yolk nourishes embryo.
- ✘ Mammals – different nutrition – yolk sac still present
- ✘ Allantois – respiration & excretion – birds and reptiles – man & mammals – reduced structure

BIOGENETIC LAW

- ✘ Ernst Haeckel – Biogenetic Law or Recapitulation Theory
- ✘ **Ontogeny** recapitulates **phylogeny** – **organisms** during its **development** repeats its **ancestral history**

**THANK
YOU**

