Comparative Vertebrate Anatomy

Biology 324

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Introduction

Vertebrate Story

A.S. Romer

In Lab:

FISH	→	Ostracoderm, Placoderm ☹ Shark
AMPHIBIAN	→	*Eryops* ☹ *Necturus*
REPTILE	→	Lizard ☹
MAMMAL	→	Cat

Technique?

Comparative Anatomy

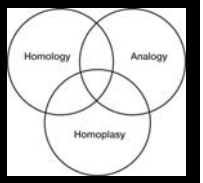
Changes in vertebrate body with the passage of time

CORRESPONDENCE BETWEEN PARTS

a) Homology
   - Common ancestry
   - Forelimb – bird/croc

b) Analogy
   - Similar Function
   - Bird wing/Bat wing

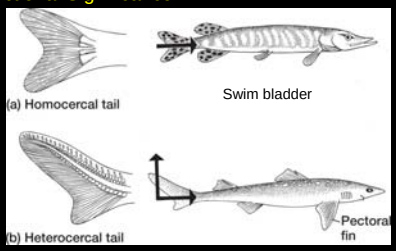
c) Homoplasy
   - Similar appearance
   - Sail fin (fish) / sail back reptile



Comparative Anatomy (cont.)

SIGNIFICANCE OF THOSE CHANGES

a) Functional Significance



Comparative Anatomy (cont.)

Significance of those changes

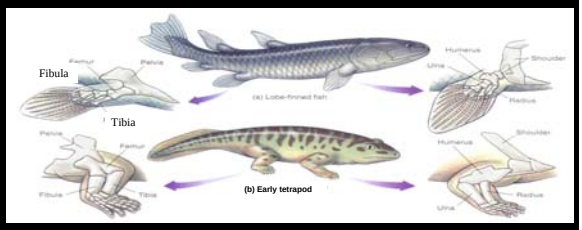
b) Evolutionary significance

Evolutionary processes, principles, phylogeny

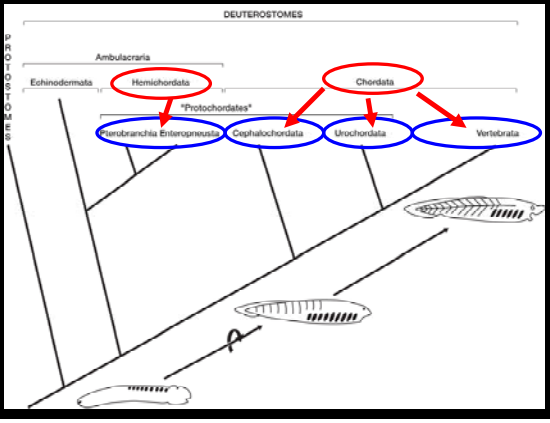
Platypus – mosaic

Archaeopteryx -- intermediate

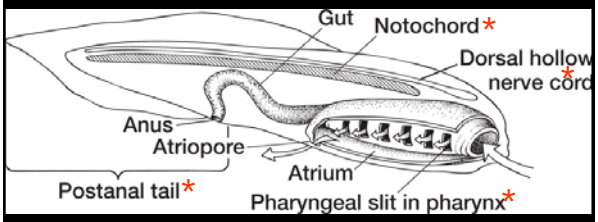
Lobe fin -- preadapted



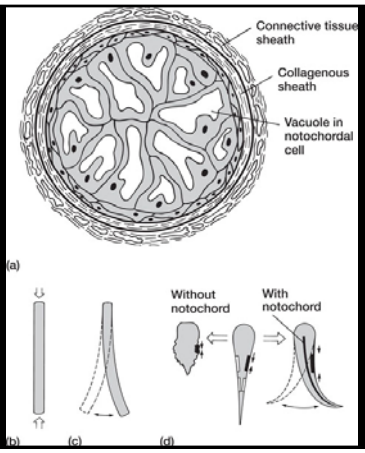
Cast of Characters



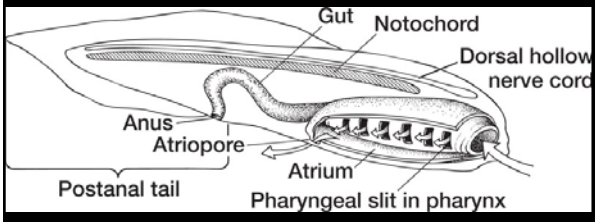
Chordate Characteristics



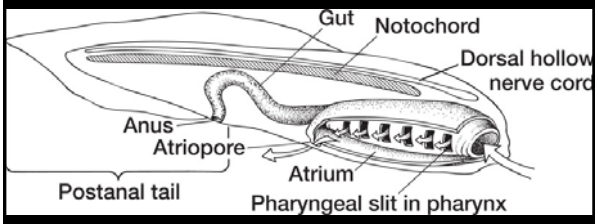
1) Notochord



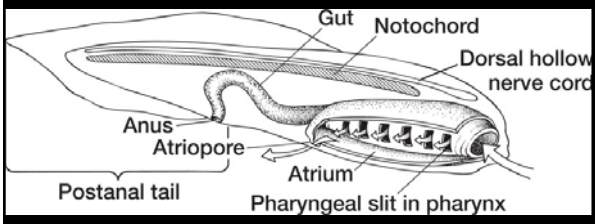
2) Dorsal, hollow nerve cord



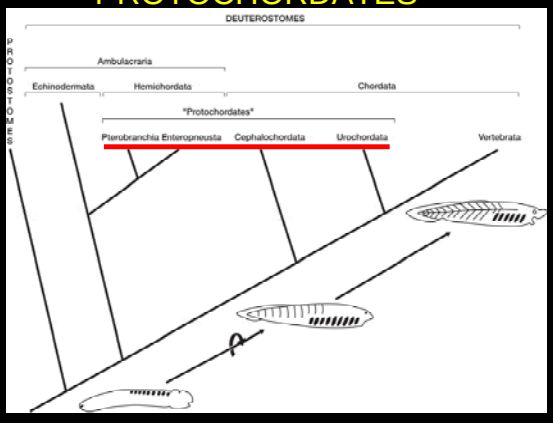
3) Pharyngeal slits



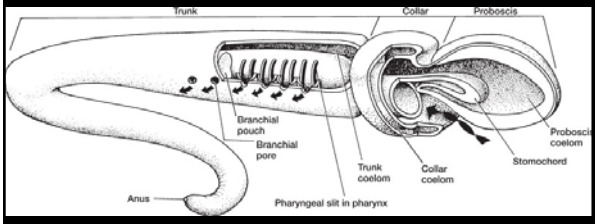
4) Post-anal tail



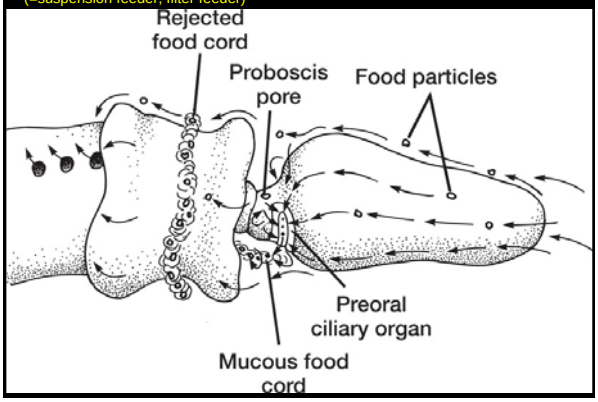
PROTOCHORDATES

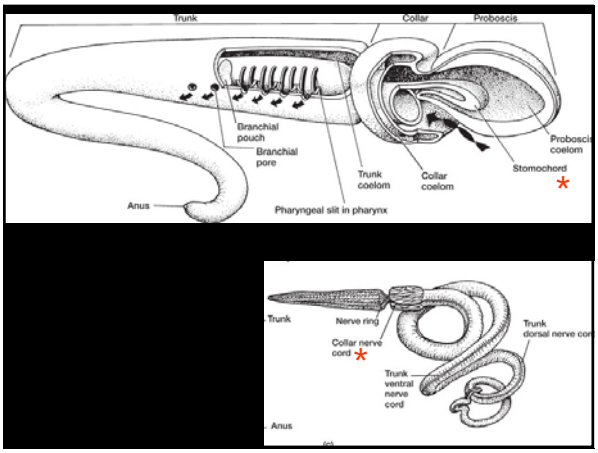


Hemichordate—acorn worm

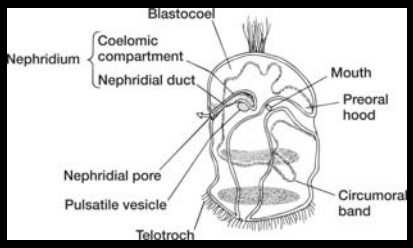


Ciliary-Mucous Feeder
(=suspension feeder, filter feeder)

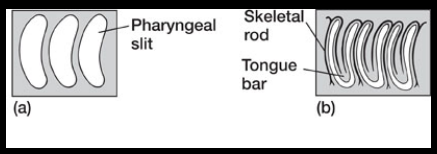




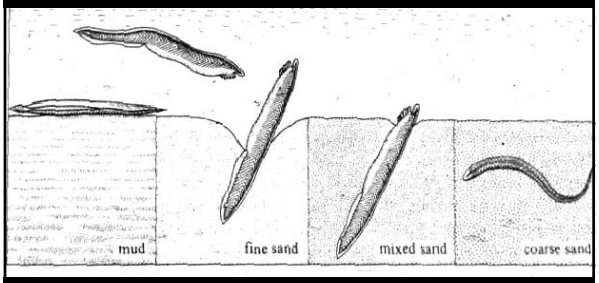
Hemichordate—tornaria larva



Hemichordate



Cephalochordate—amphioxus



Cephalochordate—amphioxus

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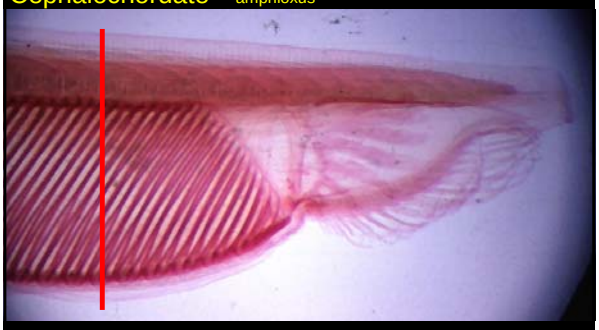
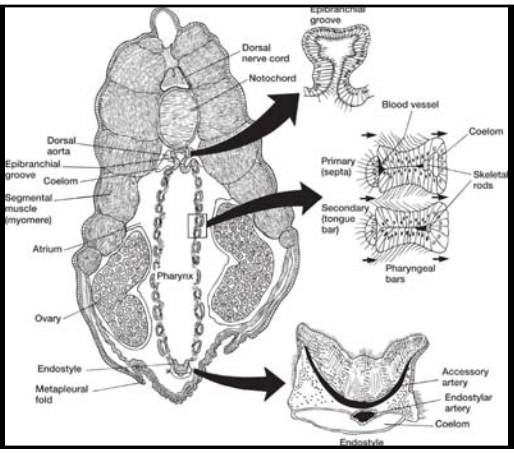
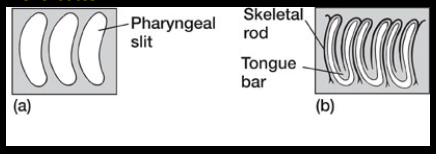
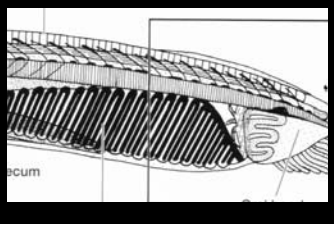




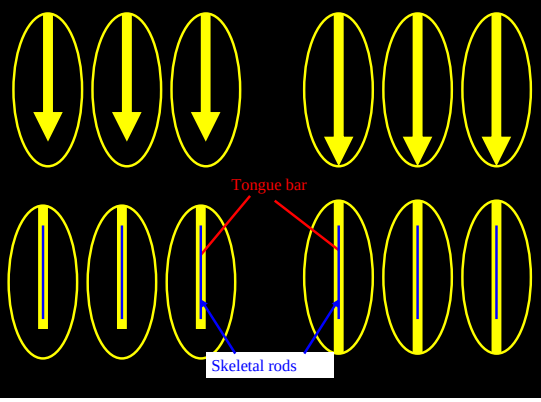
Hemichordates



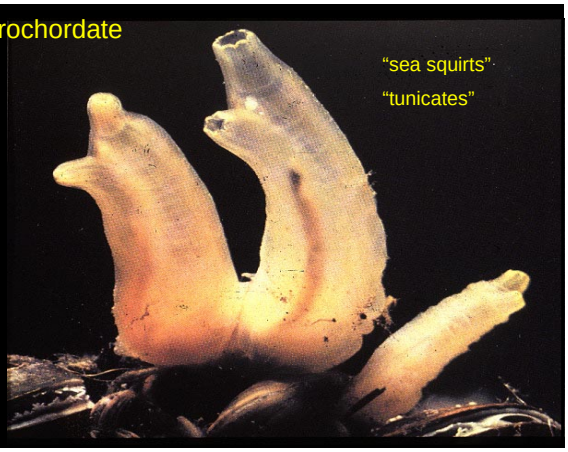
Cephalochordates—amphioxus

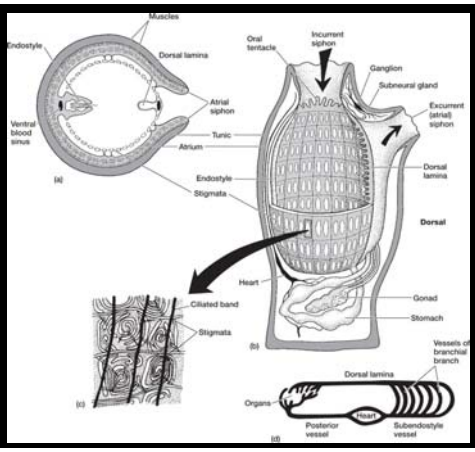


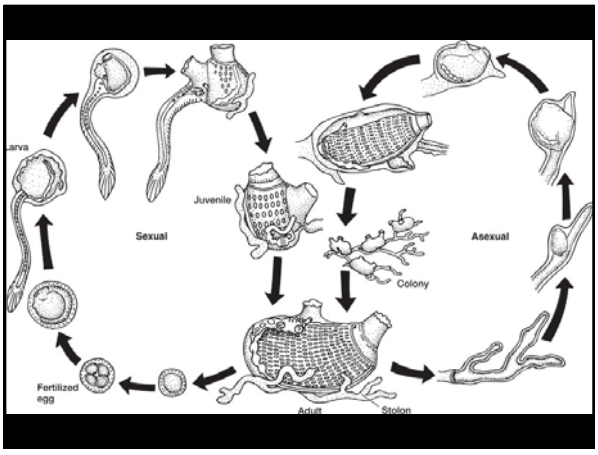
Hemichordates Cephalochordates



Urochordate







Urochordate—larva

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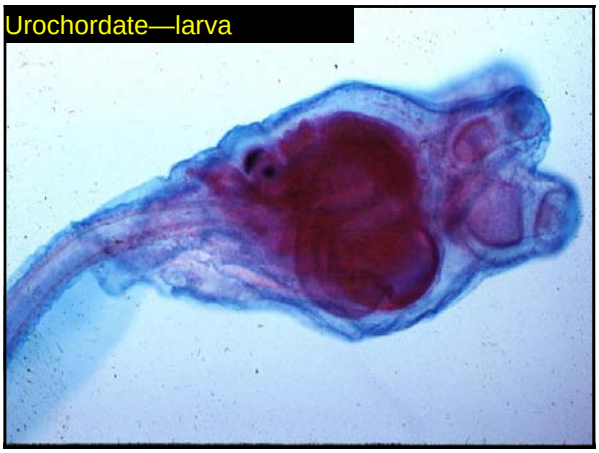
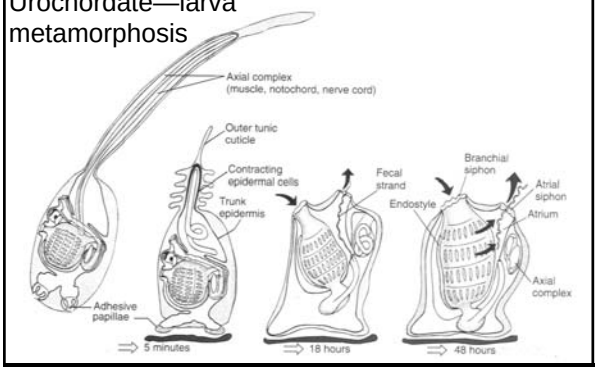
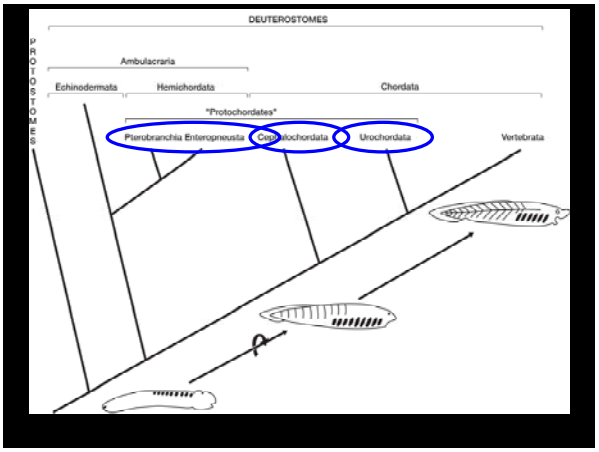


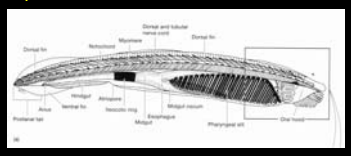
Urochordate—larva metamorphosis



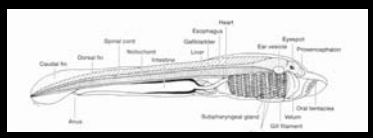


Amphioxus related to vertebrates?

Amphioxus



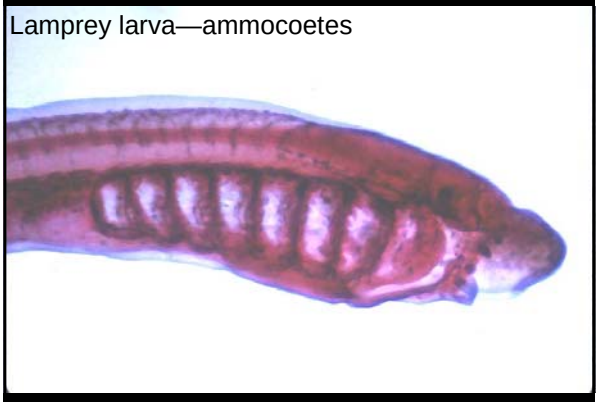
Ammocoetes larvae (Lamprey)

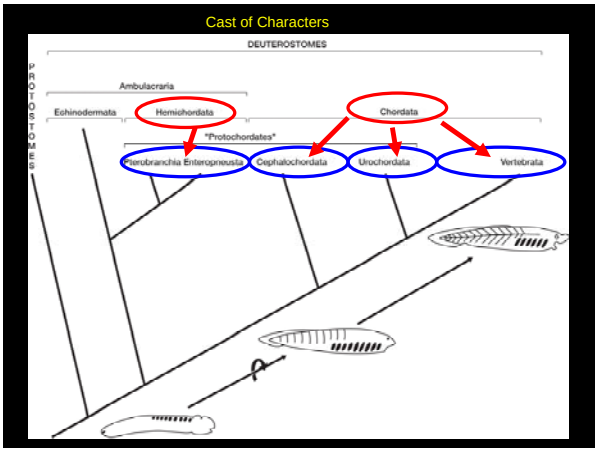


Vertebrate—lamprey

Lamprey larva—ammocoetes

Lamprey larva—ammocoetes





Origin of Chordate Body Plan