

Supplemental Study Guide for Exam 1

Note: The following list is NOT intended to be all-inclusive. It is intended to be used in conjunction with your lecture notes, handouts, the study questions posted for each lecture, research reviews and the textbook to help guide your studying for the first exam.

Be sure you understand phylogenetic trees! If you missed any points on the tree quiz, use the tree resources or schedule an appointment to figure out what you didn't understand.

Major Emphases of Lecture

I. Identity of and evolutionary relationships among the major groups of vertebrates. You need to know all of the major groups that were discussed in lecture and how they are related to other major groups. This means that you should be able to identify individuals to higher taxon, draw a tree of any set of taxa that are listed, fill in missing taxa on a partial tree, label higher level groups on a tree, answer questions about relationships (e.g., identify the closest living relative [sister group] of a particular taxon), and identify from a set of possible trees which one shows the correct relationships. Note: Spelling counts, though minor spelling errors will be forgiven. Use the relationships from lecture when they differ from those in the textbook.

The list below contains the smallest taxonomic groups that we will have discussed before the exam. All of these can be included in a single phylogenetic tree:

Actinistia, acoels, bichirs, bowfin, Echinodermata, Hemichordata, Cephalochordata, Dipnoi, gars, Holocephali, Myxinoidea, sharks, skates & rays, sturgeons & paddlefishes, Petromyzontoidea, teleosts, Tetrapoda, Urochordata, *Xenoturbella*

We have also talked about higher level groups that include two or more of the above taxa. You should be familiar with all of these groups, and be able to use them as above:

Actinopterygii, Chondrichthyes, Chordata, Cyclostomata, deuterostomes, Elasmobranchii, Gnathostomata, Osteichthyes, Rhipidistia, Sarcopterygii, Tetrapoda, Vertebrata

II. Contribution of fossil taxa to our understanding of vertebrate evolution. You should be familiar with when (and in what habitat, if discussed) these taxa lived, what their major features were, and what their discovery reveals about vertebrate evolution.

armored jawless fishes, armored jawed fishes (placoderms), *Bothriolepis*, conodonts, *Dunkleosteus*, *Mesomyzon*, *Metaspriggina*, *Tiktaalik* (coming Tuesday!)

III. Evolutionary origins of morphological features of vertebrate groups: Be able to identify synapomorphies (shared derived features) and primitive features of each clade discussed in lecture. (Note: there are a few monophyletic groups for which we did not identify synapomorphies, such as most lineages of actinopterygians; you are not responsible for knowing synapomorphies for these). Be able to explain the “who, what, where, when, why, and how” of these major features. You may be asked to use this information in a variety of ways, including indicating on a phylogenetic tree when particular features evolved, identifying features on pictures of organisms, identifying organisms to major group based on the mixture of primitive and derived characters that they show in either a picture or a verbal description, and comparing features (characters) of major groups.

IV. Diversity, adaptation and natural history of vertebrate groups: To the extent that it was discussed in lecture, you should know about the biology, diversity and adaptations of major vertebrate groups. You are only responsible for facts about specific species to the extent that they were a major focus of lecture (e.g., you could be asked about *Hydromantes* salamanders or manta rays; you would not be asked about how a particular teleost species regulates buoyancy or feeds, but you might be asked to describe methods used in teleosts to regulate buoyancy or feeds.)

V. Research reviews: Be able to connect information from the research review readings to course material.

Don't forget the review session Wednesday, September 24th, 6-8 pm in BPB 131. Bring questions!