

Stuff you should know for Quiz 1 (not necessarily an exhaustive list!)

Know the entities and the processes that comprise the central dogma and Know their relationships to one another

Know the basic composition of DNA – double strands of nucleotides, strand polarity, bonding specificity

Know and be able to distinguish chromatin, euchromatin and heterochromatin

Know the structure of RNA, the three major kinds, and their functions

Know the basic steps in transcription and the major players (template strand, RNA polymerase, promoter) and the role of each player

Know what goes on during mRNA processing and exon splicing.

Know the differences between Prokaryotes and Eukaryotes and know how their genomes differ

Know the basic steps in translation and the major players (tRNA, ribosomes), what the genetic code is, and its role in transcription

Understand what cell differentiation is and how the Waddington model has features that represent the processes of development and cell differentiation

Know the two early hypotheses about how cells of the same organism become differentiated and know the experiments conducted to distinguish them and the evidence each supplied (carrots, nuclear transplantation in *Xenopus*)

Know the major features of the operon model and the role of each player (promoter, operator, structural gene, regulatory gene, regulatory protein, signal molecule – be able to label these in a diagram).

Be able to distinguish between positive and negative gene regulation and between induction and repression and know when each kind of gene regulation would be expected

Recognize why and how gene regulation differs between Prokaryotes and Eukaryotes

Know the levels at which gene expression can be regulated and the major mechanisms that control expression at each level (see the handout I gave you)

Be able to define the following as used in class: gene amplification, polytene chromosome (=c'some), Barr body, DNA methylation, histone acetylation, control elements, enhancer sequence, transcription factor, initiation factor

Recognize the consequences of regulation at different levels and when regulation at different levels might be favored

Know the roles of male and female gametes and how they are specialized for those roles

Know the sequence of events in sea urchin fertilization

Be able to describe the events and consequences of the acrosomal reaction, the fast block to polyspermy, the cortical reaction, the slow block, egg activation

Know the major features of cleavage including the pattern of cell divisions characteristic of Protostomes and Deuterostomes. Be able to draw and label diagrams of an unfertilized amphibian egg, a morula, and a blastula