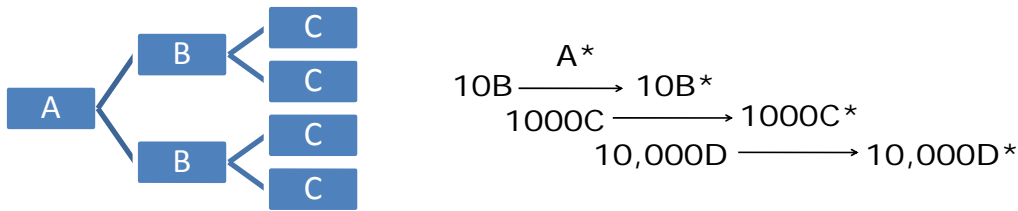


Quiz 4 Key  
 BI-102-2, Fall '07, Dr. C. S. Tritt

Please keep your answers concise (more words will not necessarily lead to more points). Use the amount of space provided as a guide as to how detailed to make your answers. **Answer any 5 of the following 6 questions!** Each question is worth the same amount.

1. Briefly explain the purpose and mechanism of enzyme cascades (including kinase cascades).

Enzyme cascades involve series of enzymes that catalyze reactions involving enzymes later in the series resulting in the activation of the later enzymes. The enzymes are sometimes, but not always, kinases. This sequence results in the amplification of weak chemical signals (illustrated below with A activating B which activates C, etc. (the illustration on the right being better)). Saying “more efficient” or “faster” was -2. Purpose worth 10 points, mechanism worth 10 points.



2. Briefly describe the structure and function of any **one** of the following: *tight junctions*, *anchoring junctions* or *communicating junctions*.

Tight junctions seal the gap between adjacent cells and opposing cell surfaces.

Anchoring junctions provide mechanical connections between cells allowing the transmission of forces.

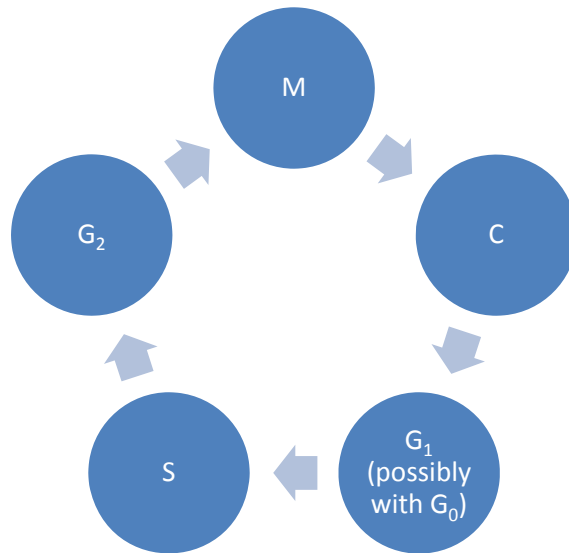
Communicating junctions permit the transport of materials, such as ions, between cells.

3. Briefly explain the difference between the diploid and haploid states of typical animal cells with respect to genetic content and the life and reproductive cycle of organisms.

Diploid cells have two sets of chromosomes (called 2N) while haploid cells have a single set (called N). Most animal cells are diploid. These cells make up the body of the animal and have a variety of functions. Haploid cells are solely involved in reproduction. They are egg and sperm cells. They unite to form a diploid cell that then can develop into an individual of the following generation. Accepted 46 and 23 chromosomes, but 2N and N is better.

4. List or diagram, by name or description, the 5 or 6 phases of the cell cycle in sequential order.

See illustration below and/or provide brief descriptions of each phase (4 points each). Not putting  $G_0$  between  $G_1$  and S was -2. Listing phases of mitosis was -10 or mixing mitosis and cell cycle was -15.



5. Explain in some detail what *crossing-over* is and why it is important.

Crossing over is the exchange of DNA (and corresponding genetic information) between homologous chromosomes (Saying it is between chromatids was -8). Crossing over creates new genetic combinations by dispersing or combining different traits. Independent assortment of homologues relates to variation between parents, their children and siblings while crossing over prevent inherence of complete, unchanged chromosomes from grandparents to grandchildren.

6. List or diagram, by name or description, the phases of meiosis.

See illustration below and/or provide brief descriptions of each phase (about 2 points each). Confusing with mitosis was -10.

