

# Laboratory 8

## Mitosis and Meiosis

### Student Tip Sheet

#### Don't Be Lazy

Laboratory 8 is a real monster of a lab! This includes lots of new but very meaningful information. Spend plenty of time studying the big concepts in order to understand the details. For the most part the illustrations are excellent and the photomicrographs are very clear. Try to avoid falling into the trap of relying too heavily on charts and pictures and not spending enough time on the real thing. Please make certain that your observations are done as much as possible with your own microscopes. Use the references but remember that there is no substitute for the rewards of the search process.

#### The BIG PICTURE

This can be a very confusing section of biology. There are so many details of stages and structures to learn that it is easy to lose site of the “big picture” of cell and organismal reproduction. Understand that mitosis is simple cell duplication that occurs all over our bodies to replace or repair living cells. Meiosis ONLY occurs as a means of reduction division for sperm and egg production. Nowhere else in the body do we talk about haploid cell production.

#### Trouble Spots

##### 1. Terminology

Unfortunately science instructors, textbooks, and manuals – as well as the popular media – use the terms associated with genetic material inconsistently. The words *gene* and *chromosome* have a variety of meanings depending on the context in which they are used. The following statements may be helpful to remember:

DNA occurs in the form of a *double helix*.

A *double helix* is made of compounds formed into the shape of *one* twisted ladder.

A double helix and a chromatid are the *same* thing.

A chromosome is made of *two* identical replicated helices.

A chromosome is made of *two* chromatids.

A chromatid is the term used for one of the strands of the chromosome.

A *centromere* is the structure that connects the two chromatids of a chromosome.

One *homologous pair* is made of 4 chromatids or 2 chromosomes.

Also refer to the attached Power Point presentation titled “The Chromosome” for reference and clarification of this oftentimes confusing terminology.

(Mark, please put link to PowerPoint here)

##### 2. Diploid and Haploid

The terms diploid and haploid are often difficult for students to understand. Refer to the attached Power Point Presentation entitled “Diploid to Haploid” for a very straightforward explanation.

##### 3. Oogenesis

Please realize that the steps in the cycle of oogenesis do not happen all at the same time on a single slide as is indicated by the composite illustration in your manual. Your slides are probably a mammal ovary such as a cat showing many oocytes at a certain point in

development. There is not a visual delineation point between primary and secondary oocytes. Simply use the size of the follicle as an indicator. A primary oocyte is contained in a very small follicle, whereas the secondary oocyte is inside a large fluid-filled follicle. Do not spend time trying to define the mid-sized follicles. You also will not see the corpus luteum or the egg actually leaving the ovary during ovulation.