

Lab 3

Mitosis and Meiosis

(pp 29-35 lab manual)

Objectives: To be able to distinguish the stages of mitosis (interphase-telophase)
To know how the chromosomes sort during mitosis
To know how the chromosomes sort during meiosis
To know the differences between mitosis and meiosis

1. We will study mitosis and meiosis by looking at the stages of mitosis on prepared slides using the onion root tip, fish blastula, *Ascaris* ovary, and grasshopper testis.

a. The onion root tip is fast growing and therefore have many cells in different stages of mitosis, but be advised that there are many cells not undergoing mitosis on these slides. You need to be able to recognize the various stages of cell division on these slides (interphase, prophase, metaphase, anaphase, telophase, and cytokinesis). You will probably want to draw examples of what you see on the slides.

b. Fish blastula. We have ordered these and we hope they arrive in time. If they do, you should look for the same mitosis cells that you saw in onion root tip. In particular, fish blastulas tend to show spindle fibers very well.

c. *Ascaris* ovary. *Ascaris* is the sheep roundworm. In theory, you should be able to trace meiosis on these slides. Try it. The kinds of cells you can find are shown on the diagram that I have included with the lab handout. You may find that the various cell types are not very different from mitosis. An additional problem is that meiosis only occurs after the egg is fertilized. That means that there will be a large sperm nucleus in the center of the cell. This nucleus is not very clearly stained. The egg nucleus is the tiny nucleus to the edge of the egg cell. The chromosomes stain very clearly in the egg nucleus. They are the ones that are going through meiosis. The differences between mitosis and meiosis will be difficult to see in this preparation. Use exercise 3-2 in your lab manual as a guide to these slides. Be aware that you may not find all of the things that are listed in the manual because it is keyed to mammalian ovaries. Things are easier to see in *Ascaris*, however. The second page of this handout shows the development of *Ascaris* eggs.

d. Grasshopper testis. These should show meiosis. The sequence is not as clear as in *Ascaris*. As you move down the testis, you will see cells undergoing meiosis with chromosomes, and sperm cells that have already been formed. The sperm cells are elongate.

2. We will also be studying mitosis by using pipe cleaners to represent the chromosomes. With the pipe cleaners, you should be able to demonstrate the stages of cell division (duplication of the homologous chromosomes in interphase on through cytokinesis).

3. To study meiosis we will use pipe cleaners to represent chromosomes. Using the pipe cleaner chromosomes, demonstrate the stages of meiosis. Note the similarities and differences between mitosis and meiosis.

Terms to know: Chromosomes, chromatids, homologous chromosomes, centromere, spindle fibers and aster/centriole, diploid ($2N$), haploid ($1N$), cell cycle, interphase, mitosis, prophase, metaphase, anaphase, telophase, cytokinesis, meiosis, tetrad, synapse, metaphasic plate.

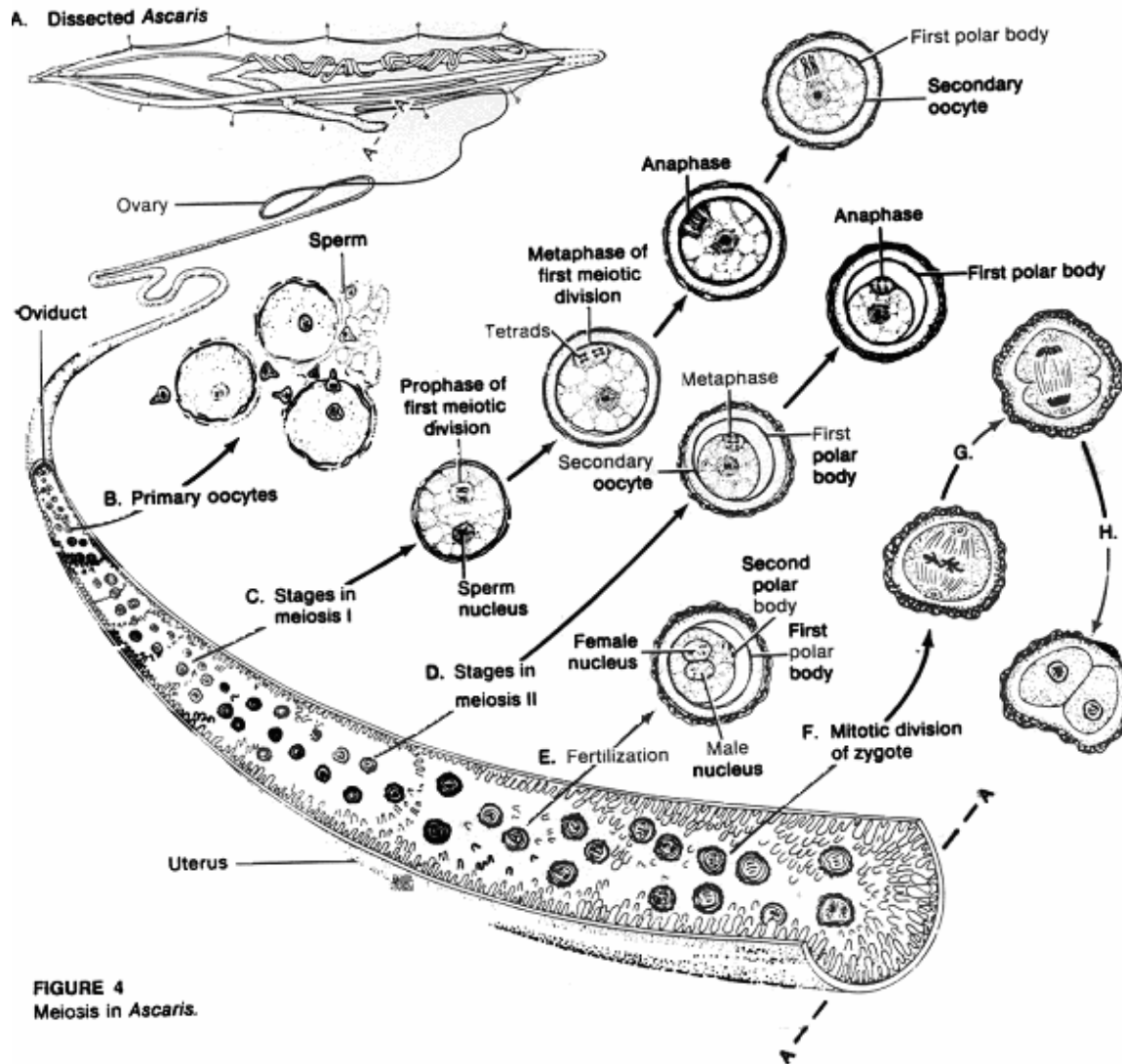


FIGURE 4
Meiosis in *Ascaris*.