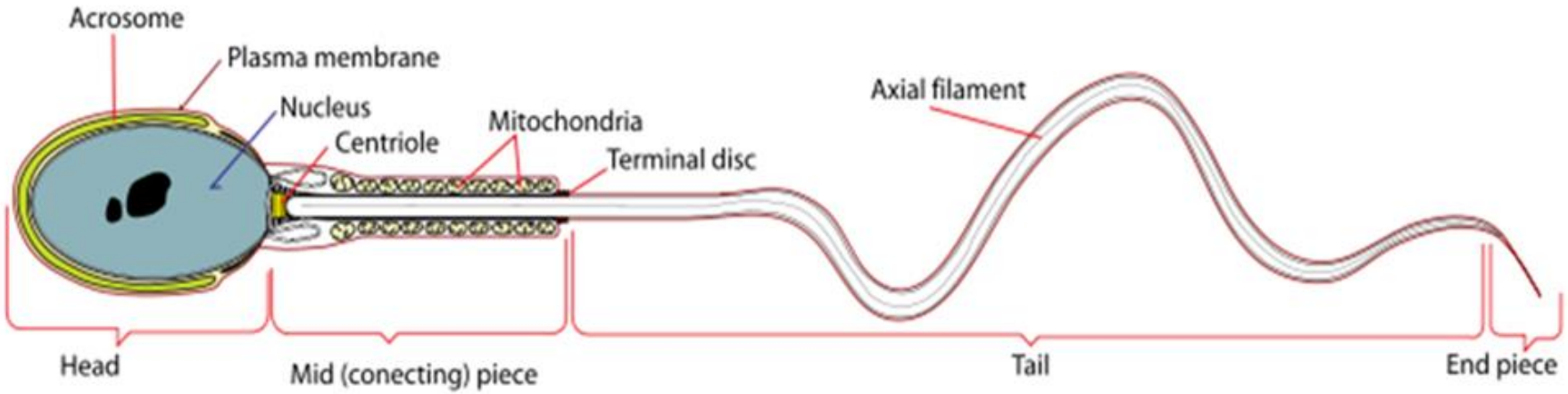
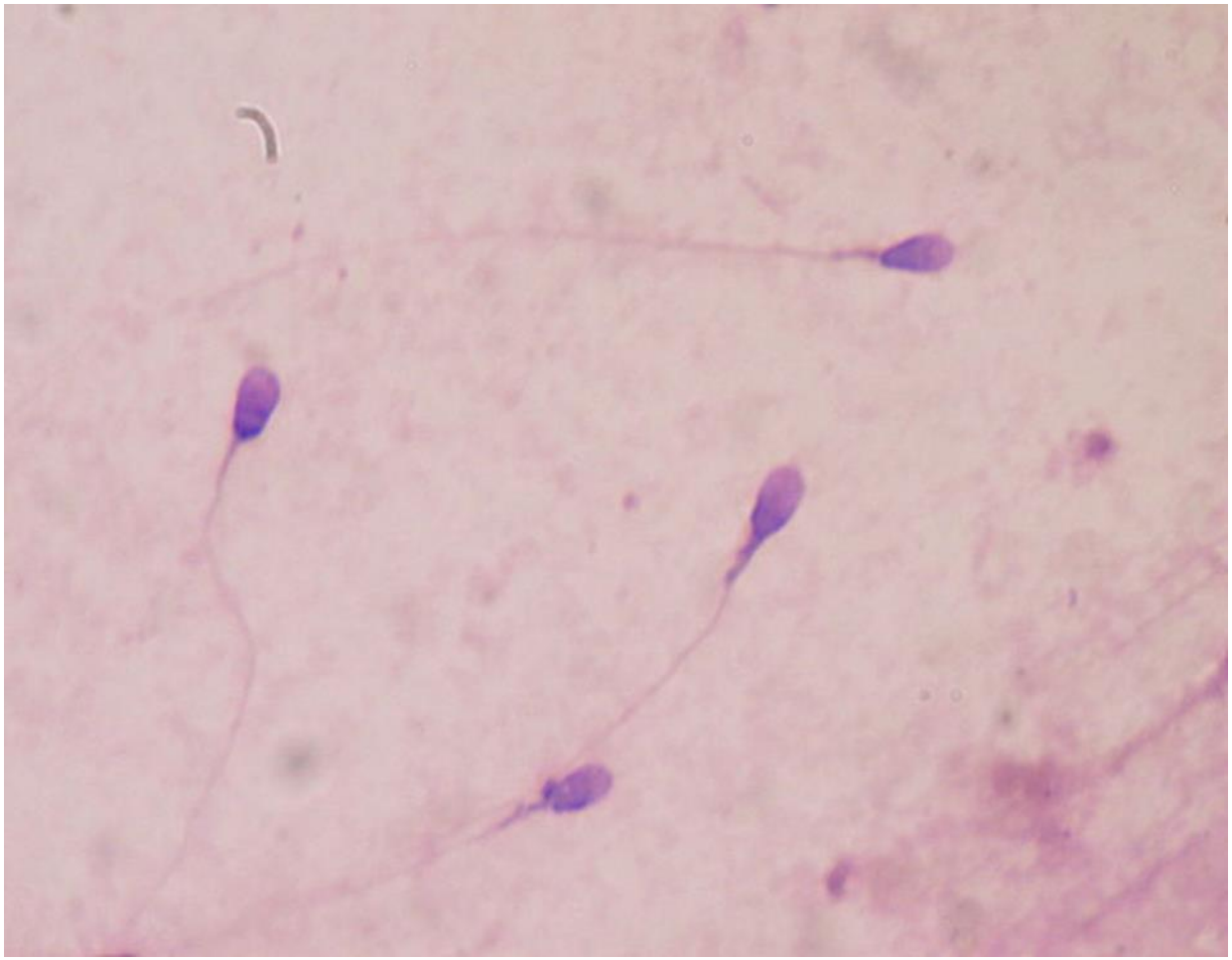
Female and Male Reproductive Systems

BIOLOGICAL GOAL:
PRODUCTION OF THE NEXT GENERATION OF THE SPECIES
PART 4

Structure of a Spermatozoan



Human Sperm Cells, Stained



Rhesus Monkey Sperm
White = Alive Pink = Dead

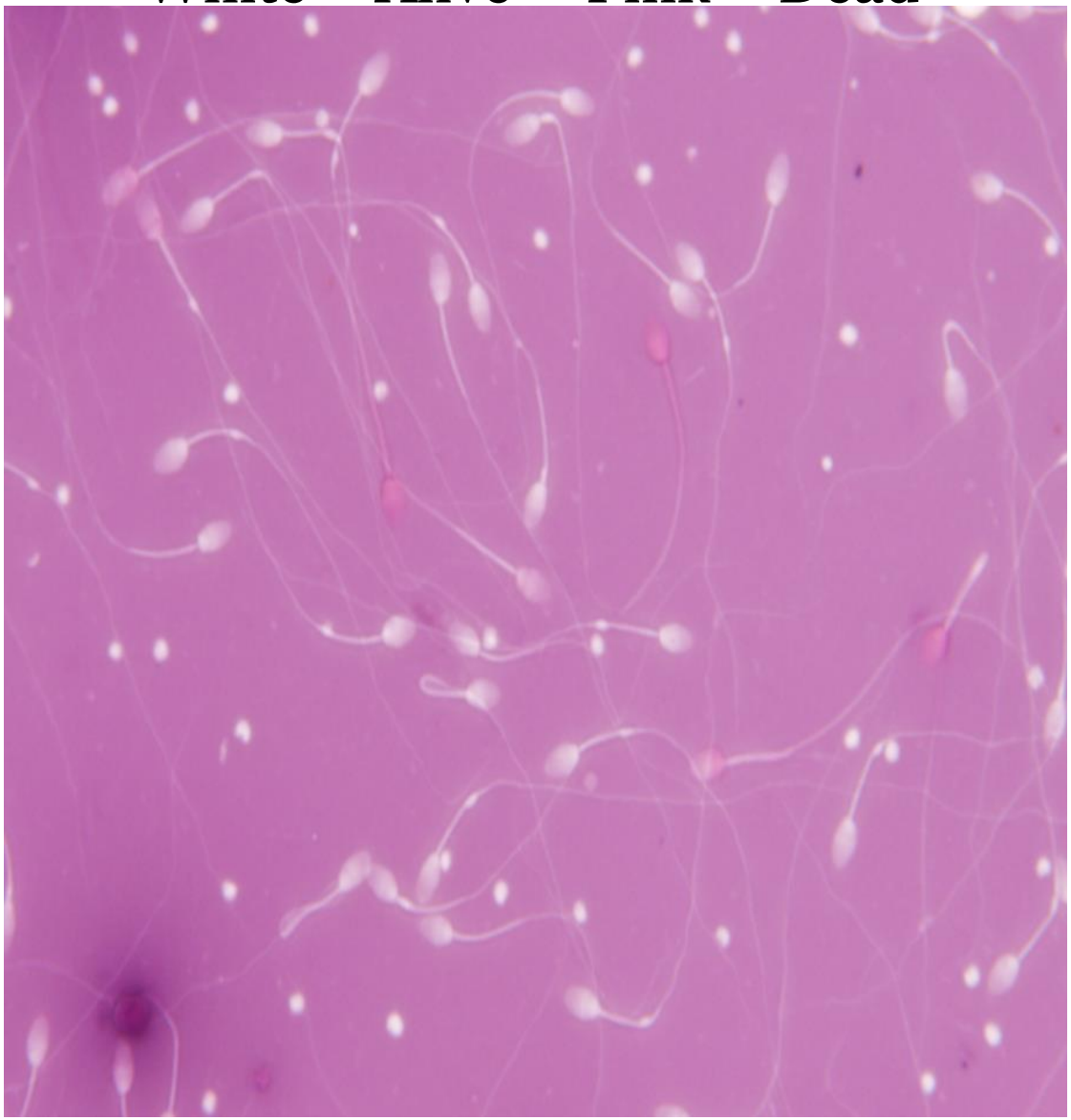
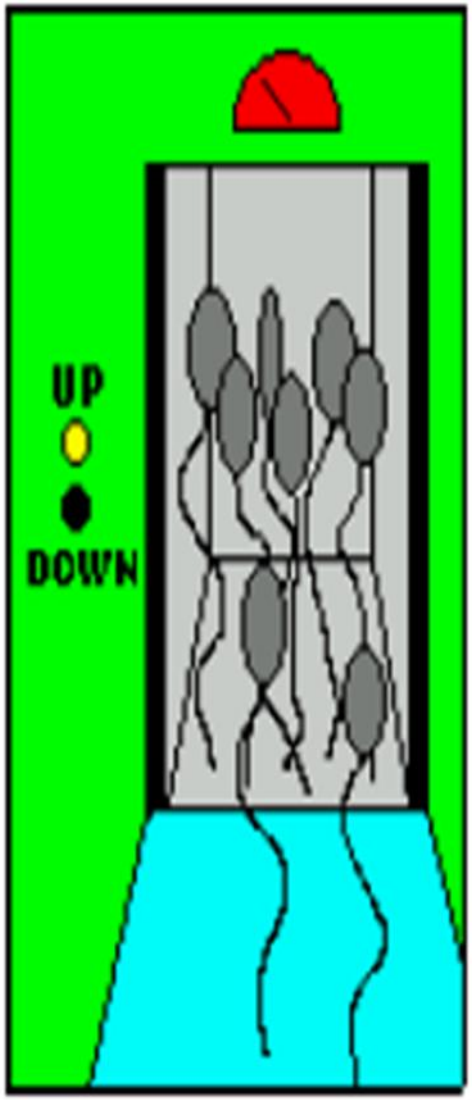


Photo: Mary Zelinski, PhD, ONPRC

Sperm Transport in Female Reproductive Tract



Sperm Capacitation

Sperm acquire the ability to fertilize the oocyte inside the female reproductive tract *in vivo*.

In vitro, capacitation occurs by incubating sperm in a defined medium for several hours.

Drawing: John Parrish, PhD, University of Wisconsin

The Fertilizable Lifespan of Gametes

A human sperm can live 72 hours.

A human oocyte can live 24 hours.

In most species, both sperm and oocyte have a short fertilizable lifespan.

Once they are delivered into the female tract, the clock starts ticking.

Mating or insemination must coincide closely with ovulation.

If sperm are deposited many days before the oocyte reaches the oviduct, there is little chance that they will survive to fertilize. Why?

Conversely, if sperm reach the oviduct several days after ovulation, they will encounter an oocyte that has degenerated. Why?

Possibility of Fertilization If Sperm is Present

5 days before ovulation = 4% chance of conception

4 days before ovulation = 15% chance of conception

3 days before ovulation = 4 % chance of conception

2 days before ovulation = 35% chance of conception

1 day before ovulation = 32 % chance of conception

Day of ovulation = 35% chance of conception

Day after ovulation = <1% chance of conception

A human sperm can live 72 hours.
A human oocyte can live 24 hours

Explain the above data table.

Oncofertility

- When a female or male has radiation therapy and some chemotherapy treatments for cancer, all of the primordial oocytes in the ovaries and all of the stem cells in the testes can be destroyed.
- Oncofertility is a new discipline that makes connections between oncology (cancer therapy) and reproductive medicine, providing viable fertility preservation options for people with cancer and other fertility threatening diseases.