A microscopic view of sperm cells, showing their heads and tails, swimming in a fluid medium. The image is in color, with the sperm heads appearing as small, rounded structures and their tails as long, thin, wavy lines. The background is a dark, textured blue.

Introduction to the Male Half of Reproductive Biology

Genevieve Griffiths
University Of Delaware

About Me

- Attended Wilmington HS (2 yrs) and graduated from Charter School of Wilmington in 1998 (yes, I am OLD!!!)
- University of Delaware, B.S. in Biology (2003)
- University of Delaware, Ph.D. Candidate Reproductive Biology (Expected graduation May 2007)

Words that may make you snicker

sperm, sexual,
testes, scrotum,
egg, penetration,
reproduction

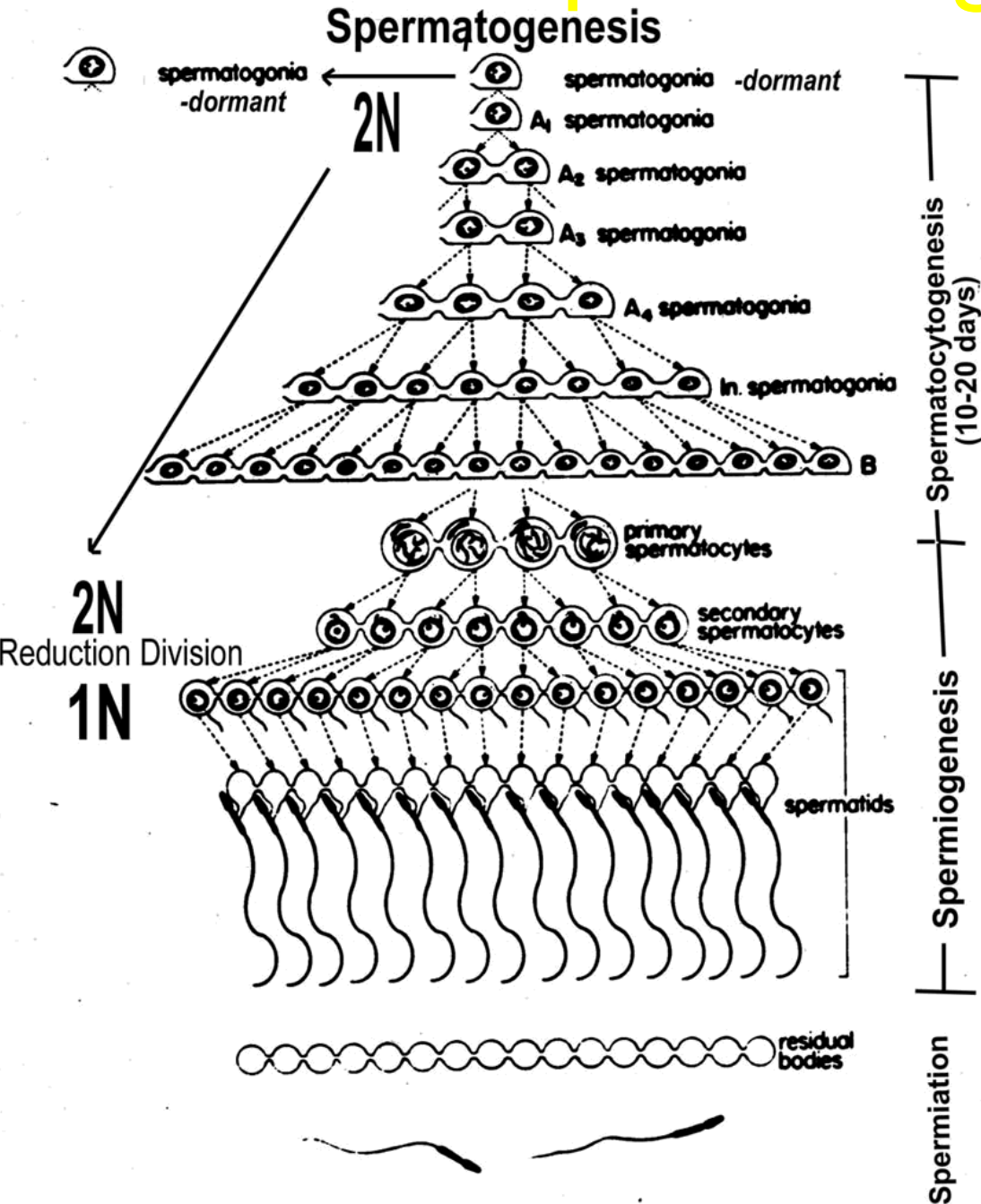
Why Study Sperm Biology?

- One in six couples are infertile.
- In 40 per cent of cases the problem lies exclusively with the male, known as Male Factor Infertility.
- One in 25 males have a low sperm count, and one in 35 are sterile.
- With appropriate treatment, many couples struggling with male factor infertility are able to conceive.

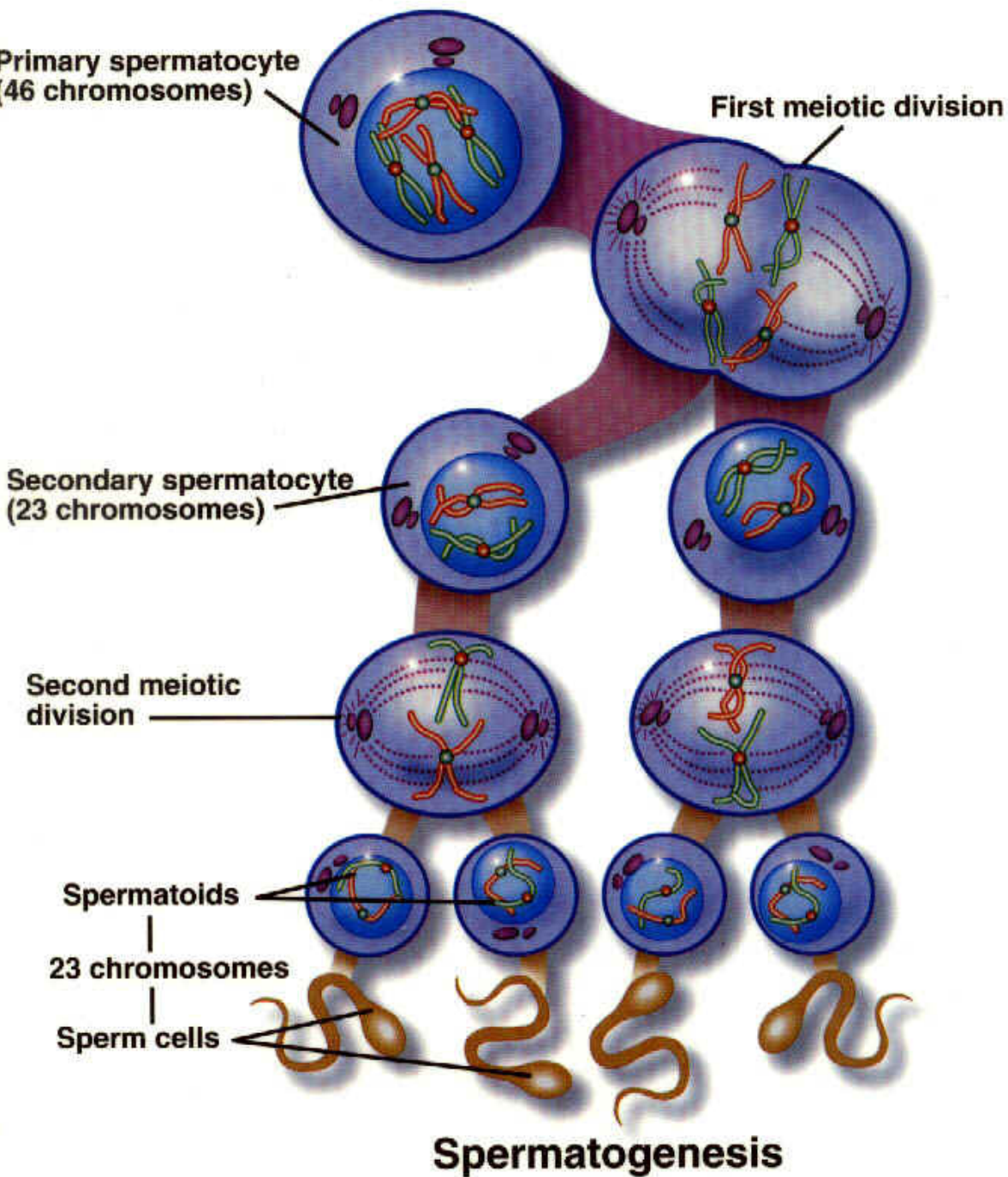
Sexual Reproduction

- Occurs when two gametes (sperm + egg, 1N or $\frac{1}{2}$ genome) combine genetic material (DNA) to form a zygote (embryo, 2N or 1 genome)
- Recombination permits genetic flexibility within a population (can lead to evolution)
- Offspring have characteristics from both parents as well as those unique from parents

Spermatogenesis

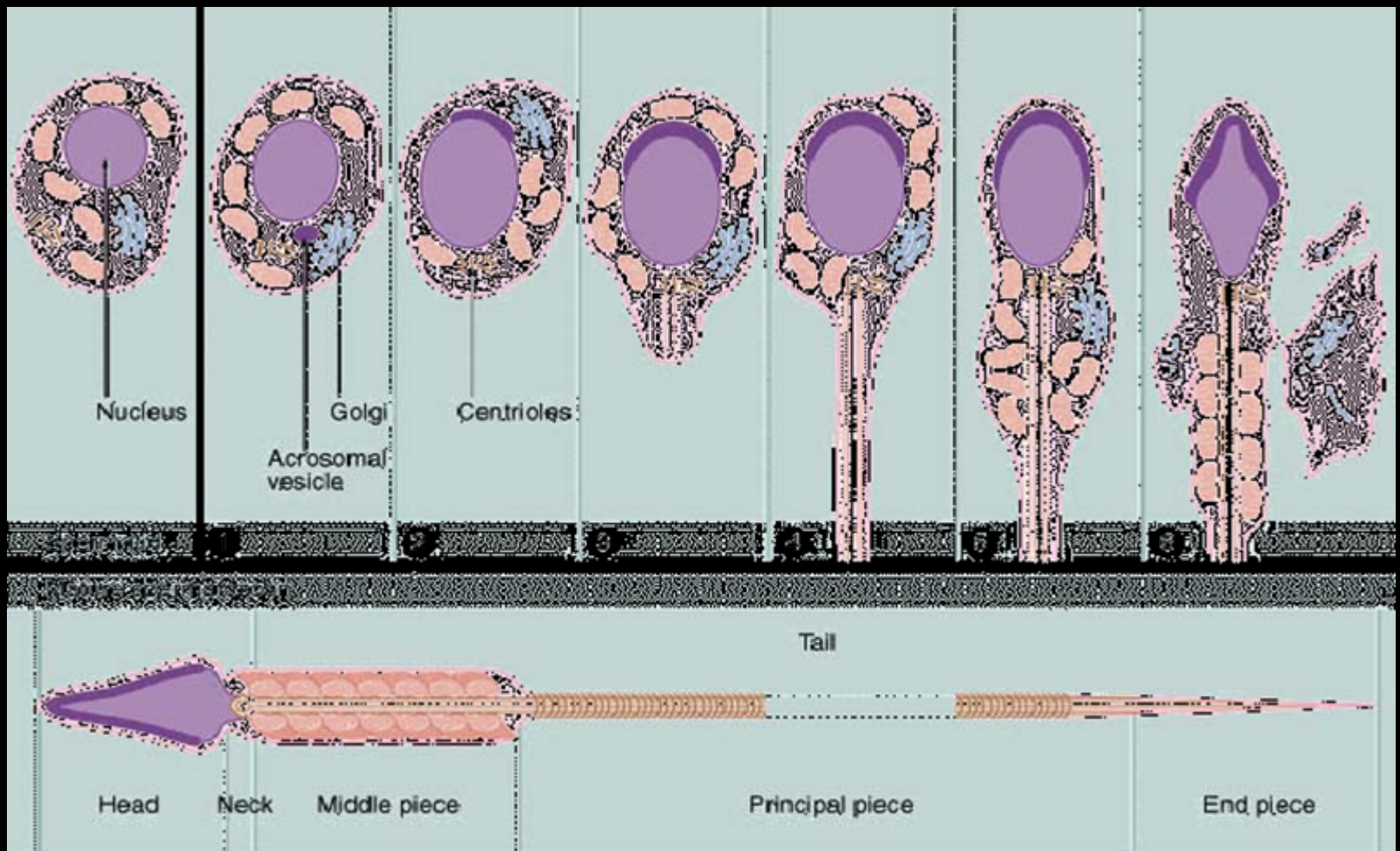


- Sperm production is known as spermatogenesis
- Five mitotic divisions produce 16 primary spermatocytes from a single cell
- Two meiotic divisions produce 64 spermatids



Mitosis ($2N$ (46 chromosomes) to $2N$) must occur to create many cells from a single cell

Meiosis ($2N$ to $1N$ (23 chromosomes)) must occur to divide DNA in half

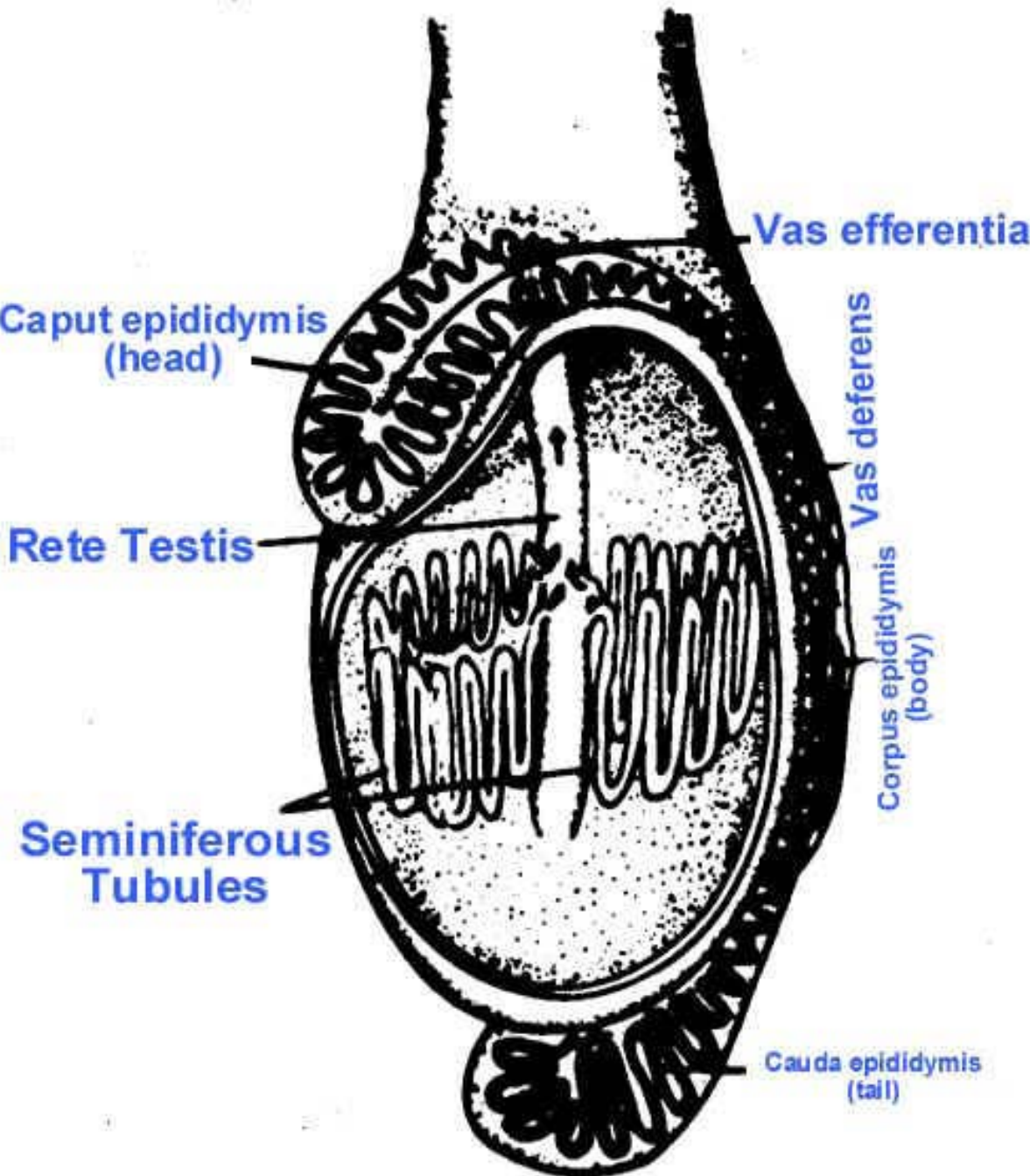


Spermiogenesis

From Wheater's Functional Histology, 4th edition, 2000.

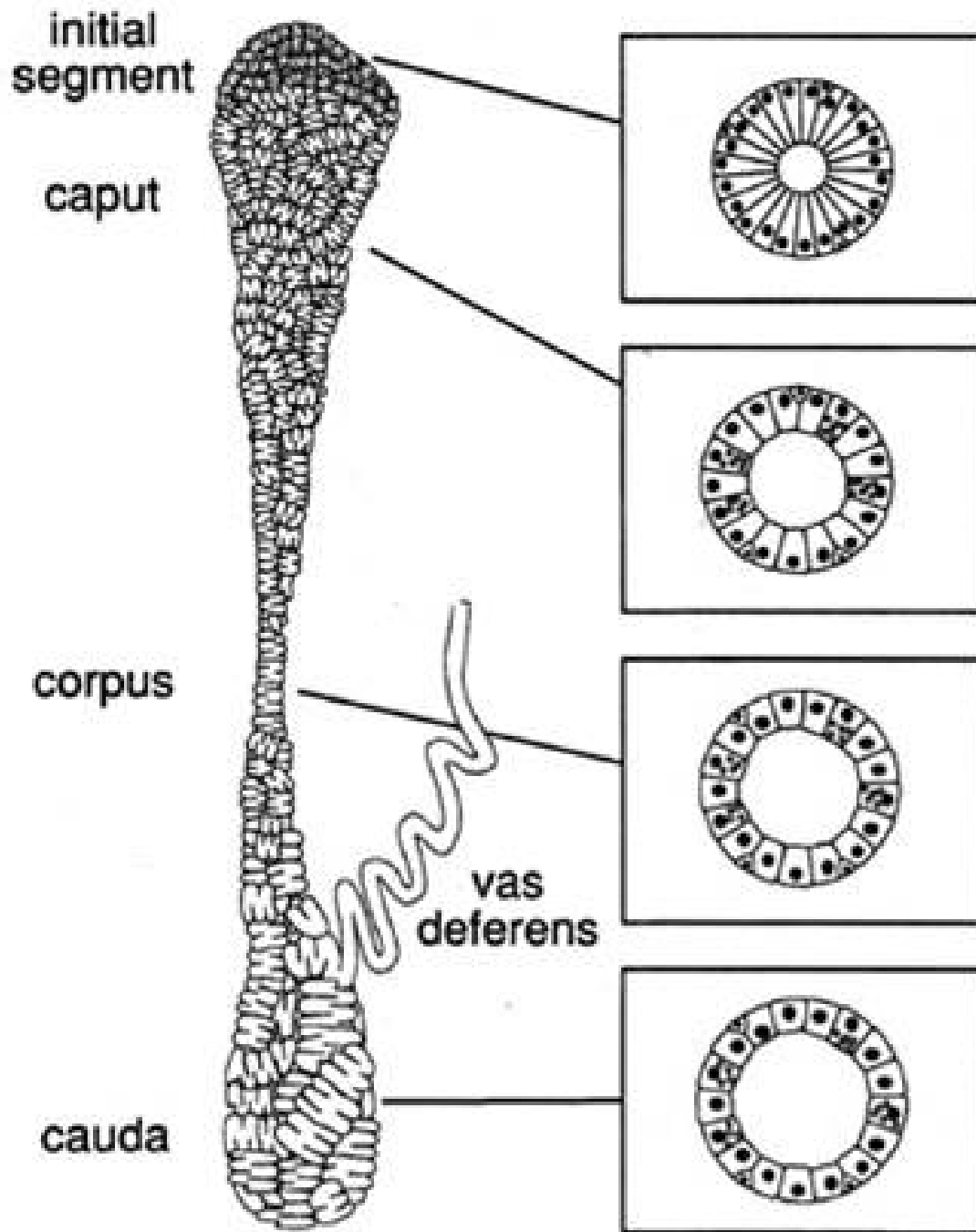
After meiosis, sperm dramatically change shape

Testes and Epididymis



Spermatogenesis occurs in the seminiferous tubules of the testes

Sperm maturation occurs in the epididymis



Immature Sperm

← (Immobile, lack important proteins)

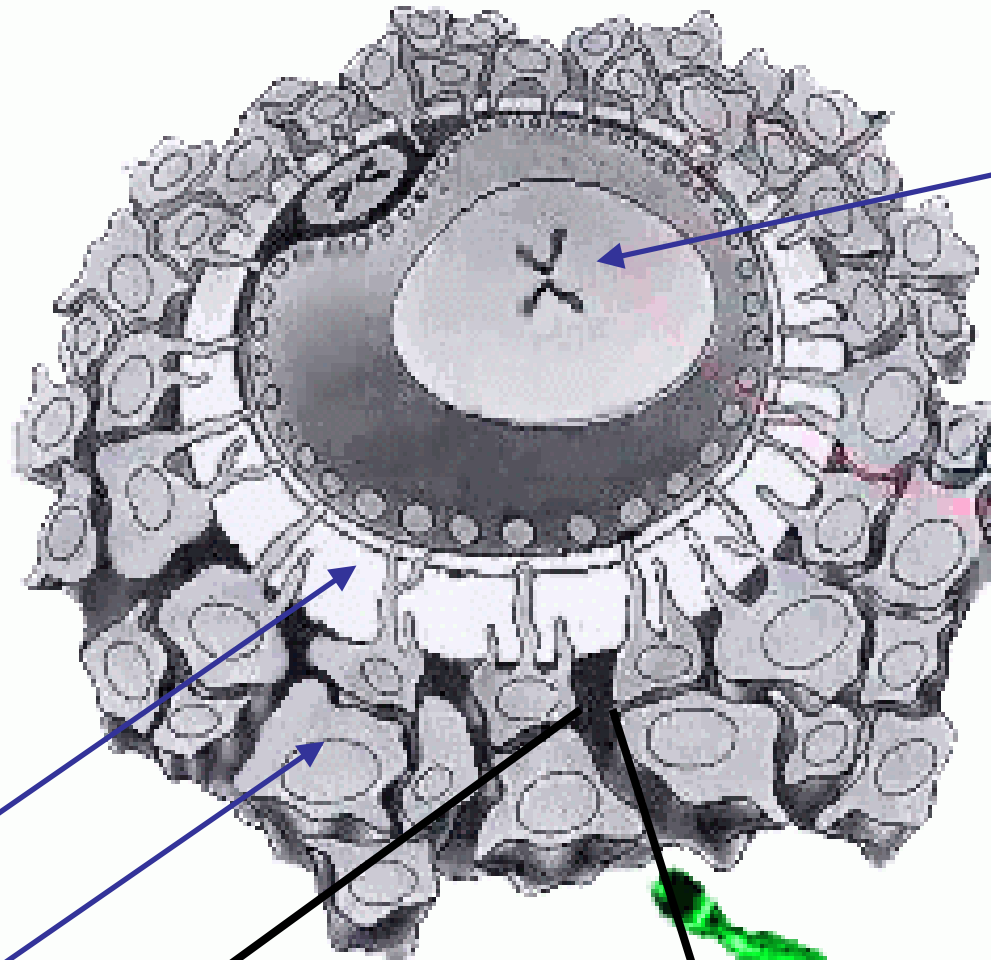
Mature Sperm

(Mobile, gained important proteins)



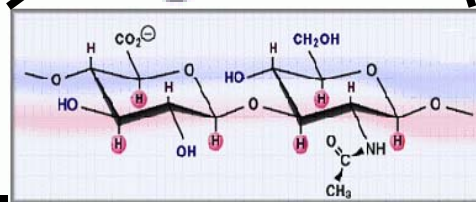
Mammalian Fertilization

Egg

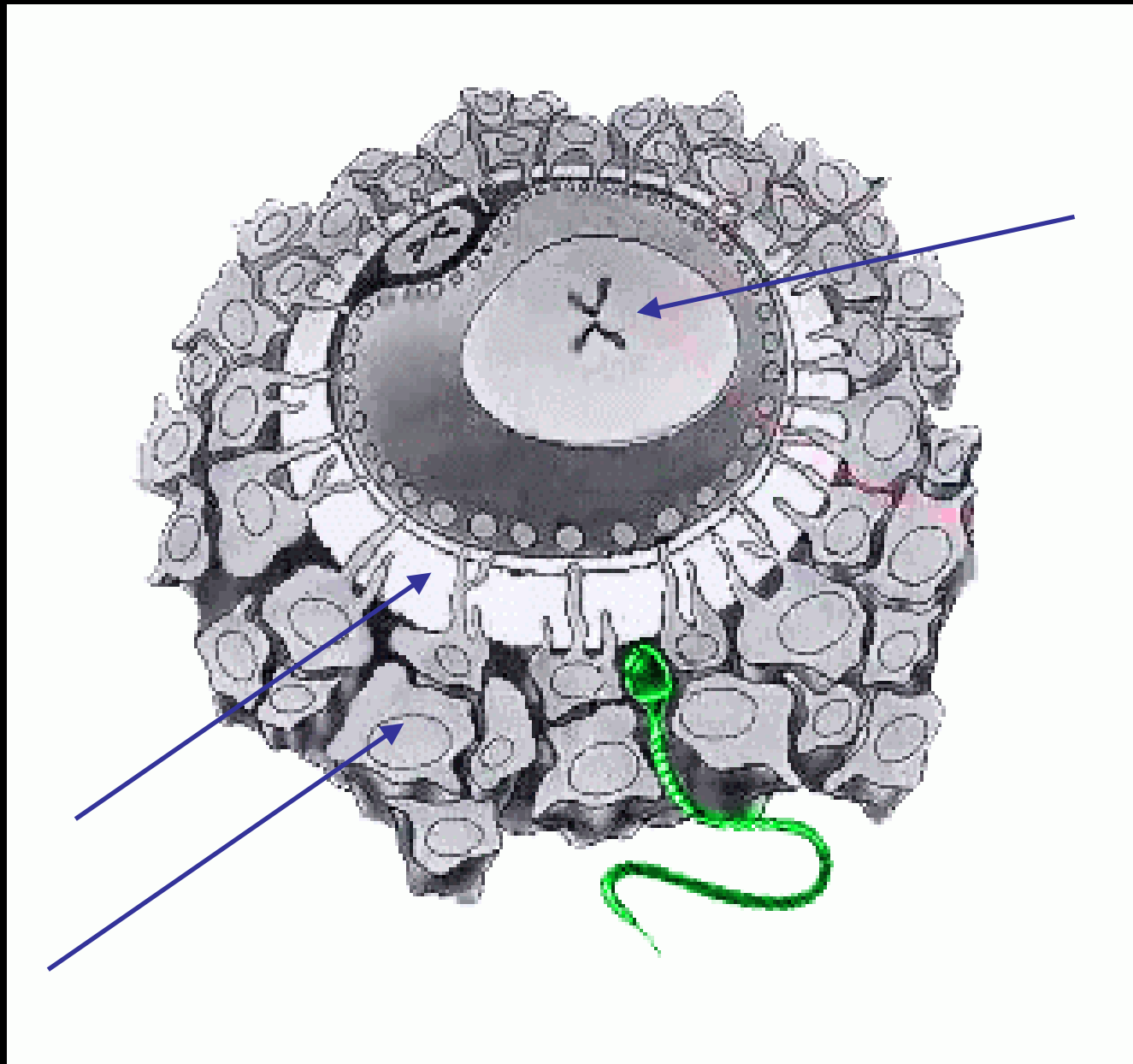


zona
pellucida

cumulus
cells



Mammalian Fertilization

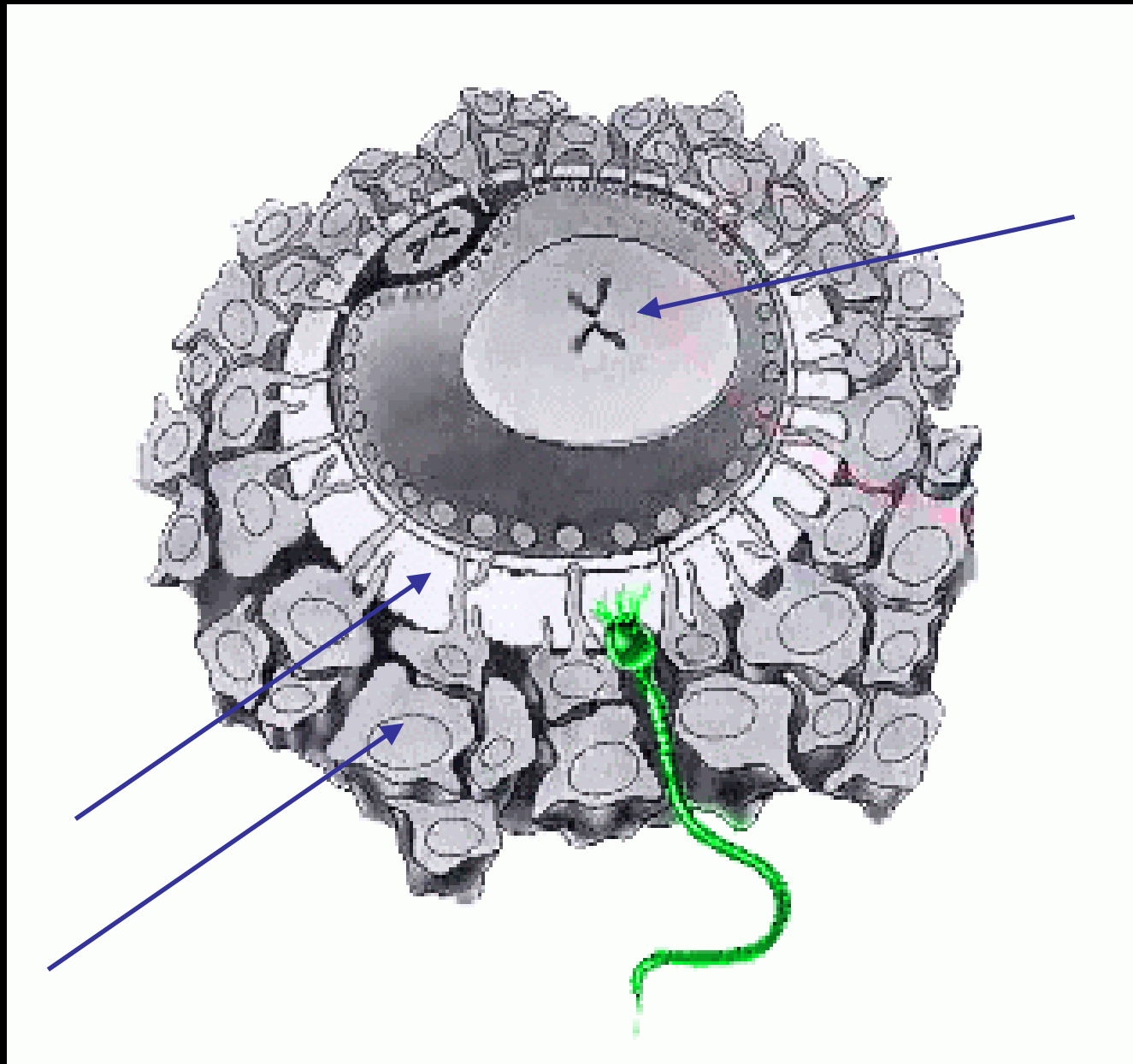


Oocyte

zona
pellucida

cumulus
cells

Mammalian Fertilization

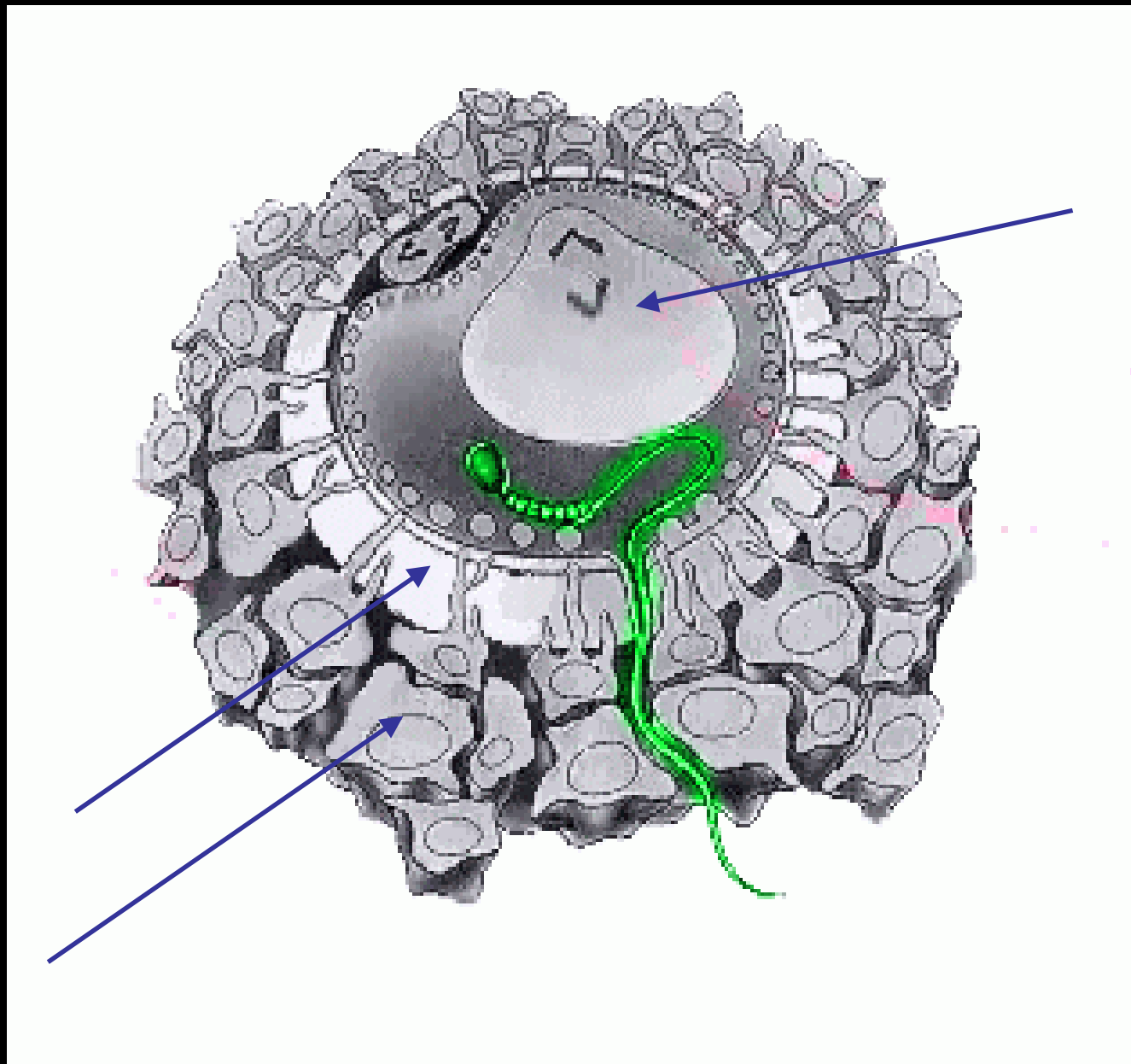


Oocyte

zona
pellucida

cumulus
cells

Mammalian Fertilization



Oocyte

zona
pellucida

cumulus
cells

Thank You!