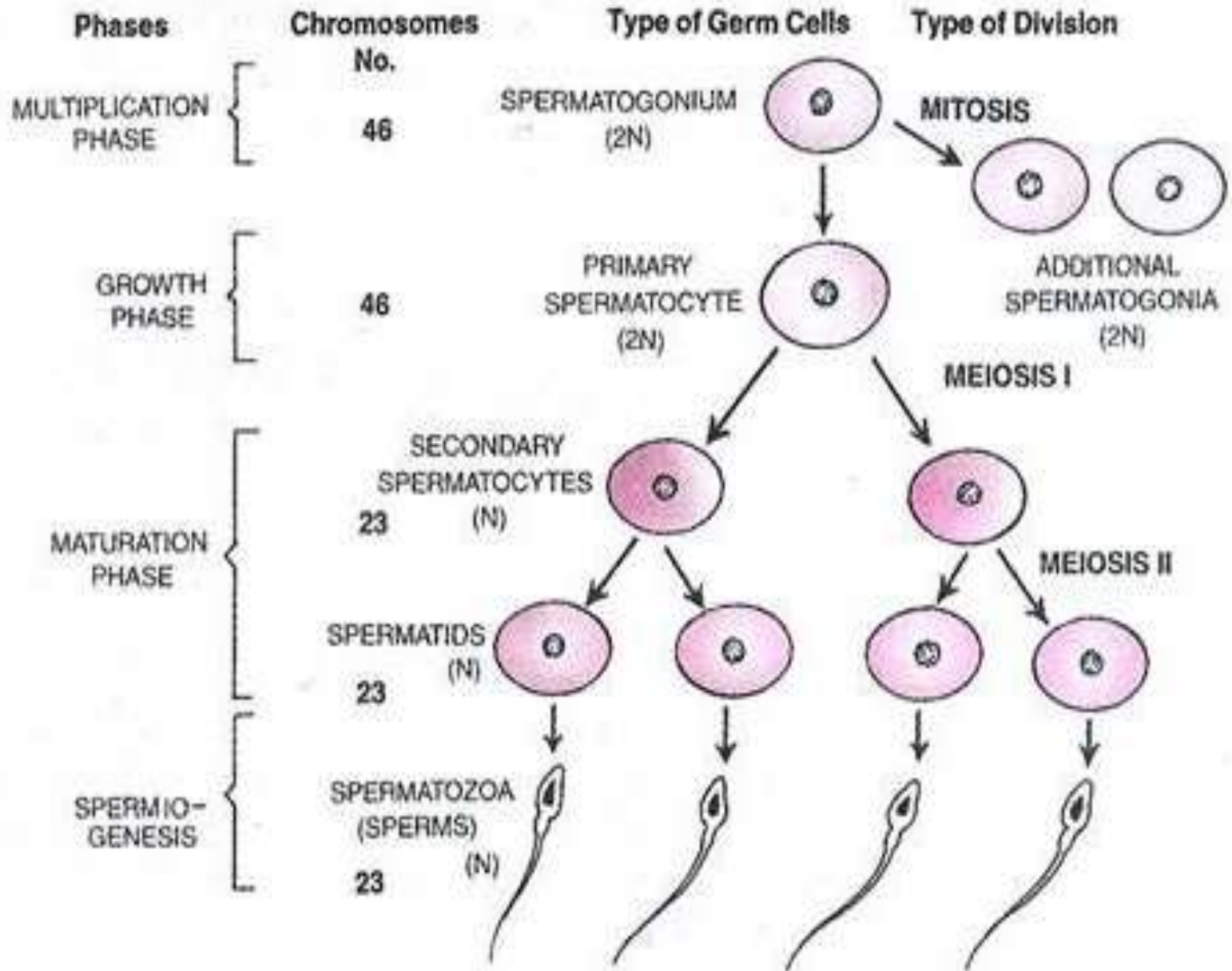


# Gametogenesis-2

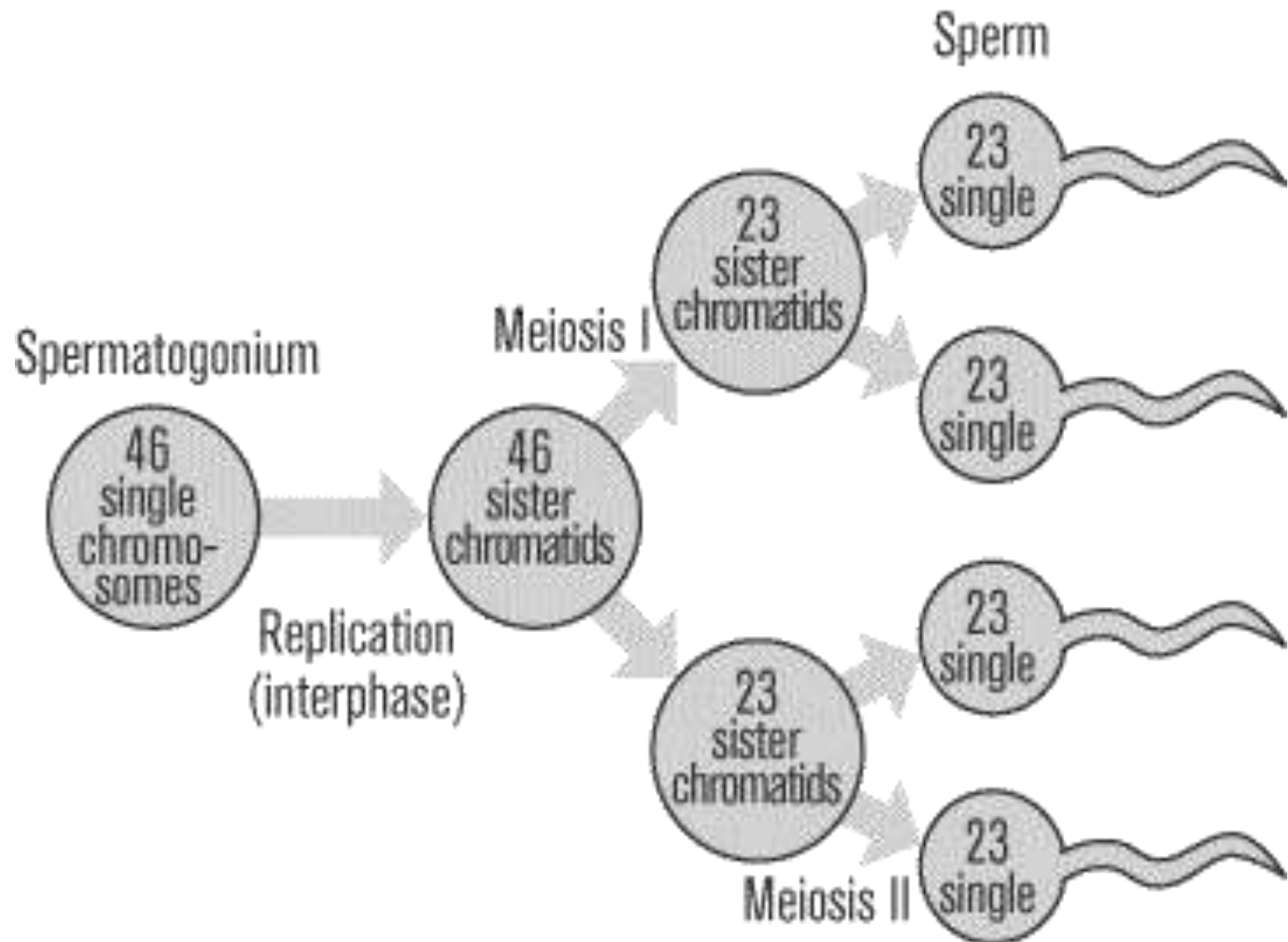
spermatogenesis

# spermatogenesis

- development of spermatozoa from spermatogonia (primitive germ cell)
- in human whole process takes **64** days to 74 days ( including spermatogenesis)



Stages in spermatogenesis (diagrammatic).



- **spermatogonia(46 chr)-----primary spermatocyte (46 chr),being largest germ cell in seminiferous tubules.—meiosis -1-----secondary spermatocyte ( 23 chr)-----meiosis-2-----spermatids( 23 chr)-----spermatozoa(23) by process of spermatogenesis.**

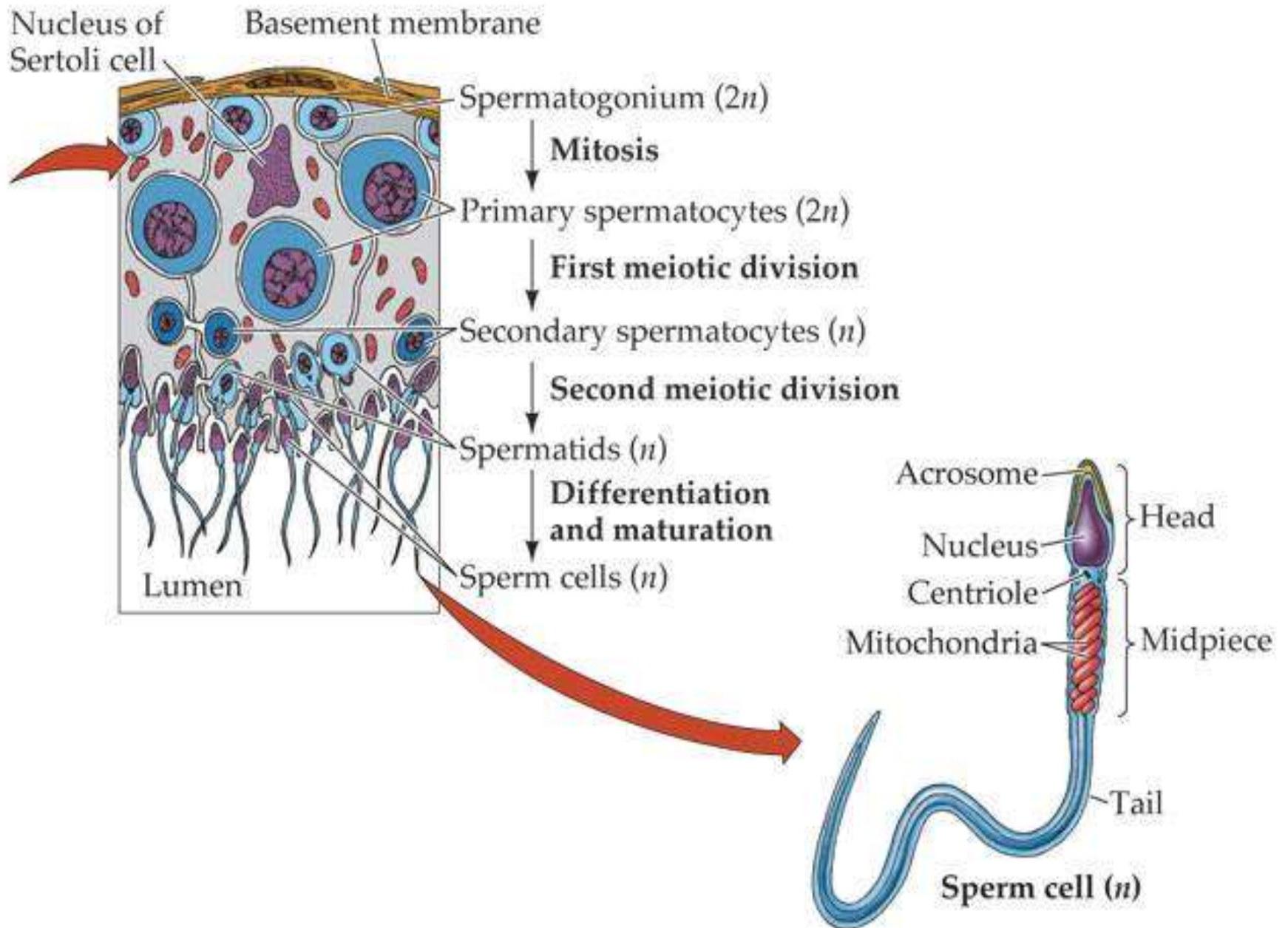
- Spermatogonia which remains dormant in seminiferous tubules of testies since fetal period begin to increase in number at puberty & transform into primary spermatocyte.
- single spermatogonia forms approx. 512 spermatids.
- Sertoli cells lining seminiferous tubules support & nurture germ cells.
- **sertoli cells secrete** –ABP ( androgen binding protein), inhibin, MIS.
- .

- **Sertoli cells secrete** –ABP ( androgen binding protein), inhibin, MIS.
- they do not synthesise androgen but contain ( CYP19)the enzyme responsible for conversion of androgens to estrogens & they can produce estrogen ,
- ABP maintain a high & stable supply of androgen in tubular fluid,
- inhibin inhibits FSH secretion
- MIS causes regression of Mullerian ducts in males during fetal life.

# spermiogenesis

- transform spermatids into mature spermatozoa,
- includes formation of acrosome, neck, middle piece and tail, shedding of most cytoplasm & condensation of nucleus,
- when spermiogenesis is complete the sperm enters the lumina of seminiferous tubules.
- sperms are passively transported from seminiferous tubules -----to ----epididymis.



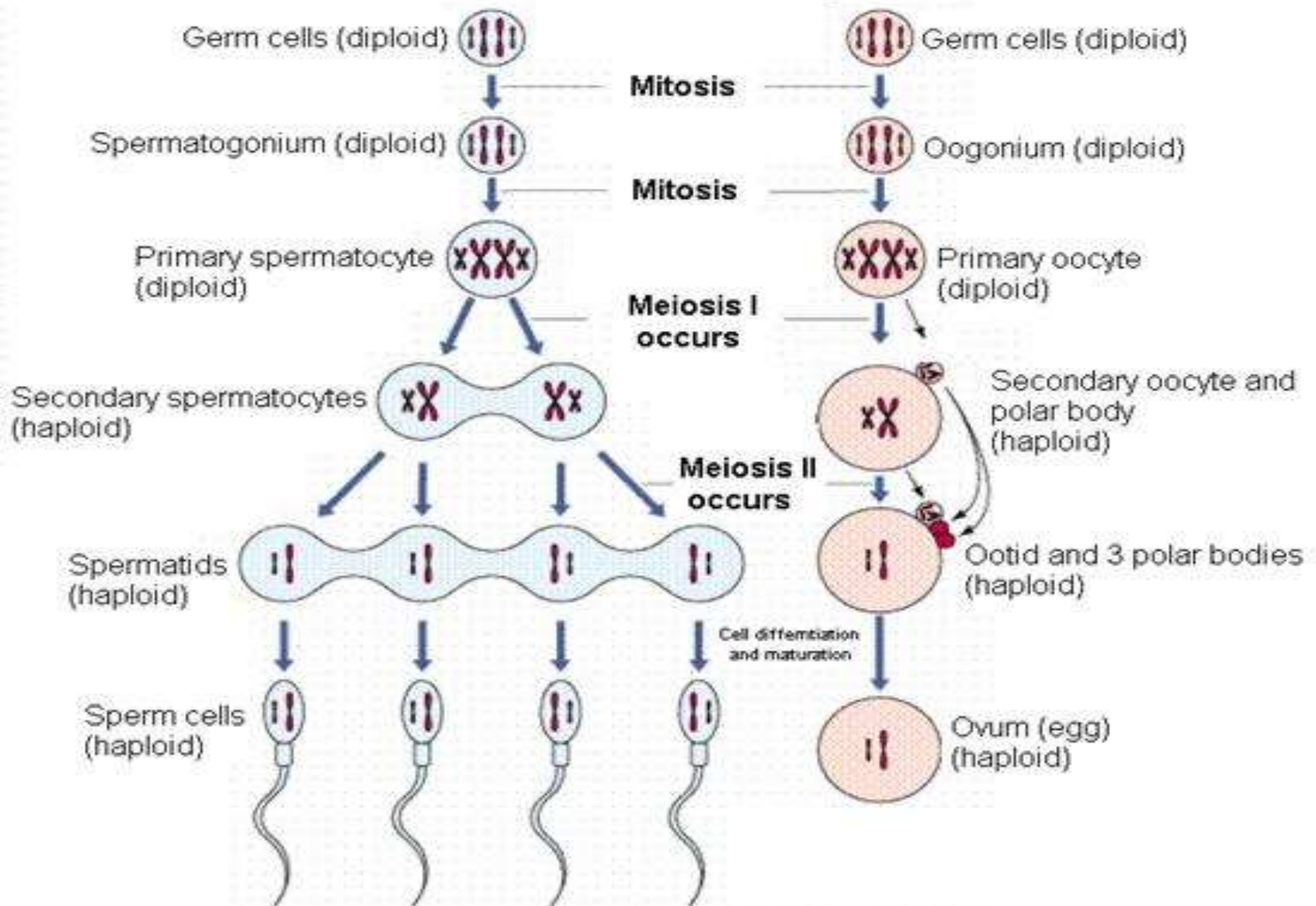


- in epididymis—they are stored , become functional & gain motility.
- progressive mobility is acquired in epididymis which involve activation of a protein called CATSPER, found in principal piece of sperm tail. ( CATSPER—this protein

Appears to be a calcium ion channel that permits CAMP GENERALISED CALCIUM influx.)

## Spermatogenesis

## Oogenesis



- in female genital tract , near isthmus of uterine tubes , spermatozoa undergo **capacitation** ( 7 hrs) i.e removal of acrosomal cap of sperm.
- length of spermatozoa is 65 microns.
- semen has --< 10% sperms,
- 60% seminal vesicle fluid
- 30% prostatic fluid
- 10% bulbourethral fluid.

- has 100 million sperms/ml of semen.
- 50% of men with 20-40 millions /ml and all with counts < 20 million /ml are sterile.
- germinal angiotensin converting enzyme (ACE) present in acrosome of sperm is involved in acrosomal reaction.

# function of male internal genital organs

- ducts of seminal vesicle and ductus deferens unite to form an ejaculatory duct which opens in prostatic urethra.
- function of ---
- **Testies**—form sperms,  
secrete testosterone /androgen  
(leydig or interstitial cell)  
seroli cell help in maturation of spermatozoa.

- **epididymis**—store sperm, progressive motility to sperms is attained,
- **ductus deferens** –ligated in vasectomy ( male sterlization)
- **seminal vesicle** –secrete thick alkaline fluid
- **prostrate**– largest accessory gland of reproductive system , secrete thin milky fluid.

# Effect of temperature on spermatogenesis

- require a temperature which is approx. 2degree below core body temperature.
- as for this **testies are normally maintained @ 32 degree** by following mechanism—air circulating around hanging scrotum,
- --heat exchange in a counter current fashion b/w spermatic arteries & veins.



- factors which raise scrotal temperature & impair spermatogenesis—( leading in infertility are)
- intraabdominal/undescended or ectopic testies
- tight scrotal support
- hot baths (43-45 degree for 30 minutes) per day
- wearing insulated athletic supporters
- occupation involving exposure to excessive heat e.g working in blast furnaces.
- varicocoel.