FERTILIZATION

- fusion → ampulla of fallopian tube
- within 24 hrs after ovulation

MECHANISM

- Approximation of gametes
- contact & fusion
- effects of fert.

- Approximation of gametes
  ⇒ transport of ova & sperm → ampulla

Transport of spermatozoa → 200–300 million

a) prostaglandin of semen → induce contraction of uterine muscles
b) in females, coital reflex release oxytocin → uterine contraction
c) vacuum created in cut uterine cavity – allow aspiration of sperm into cavity.

- most sperms → die within 24 hrs of ejaculation
- during the ascent through → decrease in no 300–500.

Transport of oocyte

a) ciliary movement
b) rhythmical contraction of musculature of uterine-tubes

- Contact & Fusion
  - spermatozoa undergo some process of maturation inside the female genital tract.
    - Capacitation
    - Acrosome reaction

Capacitation :-
- sperm process by which sperm attains the capacity to fertilize the egg.
- final step of maturation of sperm in female genital t.
- requires 7 hrs.
- immunological role btw fertilized (by oocyte) & anti-fertilized spermatozoa
- sperm tail moves vigorously

• during this glycoprotein coat of seminal plasma proteins are removed by detergent action from the plasma membr of the sperm.

• species specific interaction

• Only capacitated sperm undergoes acrosomal reaction

Acrosome Reaction

• Head of spermatozoa contains a nucleus with 22 x/y

• The nucleus is covered within outwards by;

⇒ nuclear envelope

⇒

• capacitated sperm head → multiple contact btw the P.M of outer membrane of acrosomal cap

• The female gamete → 3 layers

- corona radiata
- zona pellucida
- vitelline membrane (ovum)

⇒ Disintegration of CR → by a hormone - hyaluronidase from the acrosomal cap

⇒ zona pellucida → thickest of the 3. ZP_1 ZP_2 & ZP_3 → bind to sperm

sperm head attaches to → ZP_3 →

⇒ acrosin.

⇒ Vitelline membrane ~~Dig of~~

• Disintegrin part from sperm head, frees the gate for the entry of sperm

• Gate is closed by integrin peptide released → by vitelline membrane

• sperm enters oocyte ⇒ calcium ions wave set in the ooplasm.

• act as signal for 2 imp events of fertilization

1) initiates the completion of 2nd meiotic division of 2° oocyte before ovum.

2) fusion of cortical granules in the periplasm hydrolyse the ZP_3 layer of zona pellucida &

modifies the vitelline membrane (vitelline block) - prevents polyspermy.

- Effect of Fertilisation
  1) completion of 2nd meiotic div
  2) restoration of diploid no of chromosomes in the zygote
     male (23) + female (23) → 46
  3) determination of chromosomal sex
     22X + 22X → female 44 XX
     22X + 22Y → male
  4) initiation of cleavage division
     16 - called stage of embryo - morula
  5) prevents polyspermy
     → producing vitelline block & hydrolysing ZP_3 receptor

Contraception
- Barrier
- Hormonal

Embryonic Period
1st - 8 week

Germinal
first 3 weeks
↓
fert → implantation

Embryonic
fourth - 8th week

- cleavage division of zy
- formation of morula & blastocyst
- implantation

Cleavage division
↓
- each cell - blastomere
- holoblastic division
  ↓
  in mammals

Morula 12-16 cells - 72 hrs after fertilization

- Blastomeres get closely packed by tight junction - E cadherin
  - process of compaction
  - periphery - outer cell mass
  - cells at the centre of morula - inner cell mass

Blastocyst

- morula with fluid.
- 5th day of fert., 32-64 cells
- outer cell mass - trophoblast - covering of embryo
- inner cell mass - embryoblast - future embryo

Implantation

- As blastocyst is formed → endometrium → decidua
- Zona pellucida disappears at the end of 5th day of fertilization
- The implantation of blastocyst - 6th - 7th day of fertilization
  - Implantation is interstitial.
  - Site of implantation - at the junction of fundus & posterior wall of body uterus.

Abnormal Implantation

- extrauterine - ectopic pregnancy → fallopian tube → tubal pregnancy (most common)
- intrauterine