

Exploring the Journey of Infertility

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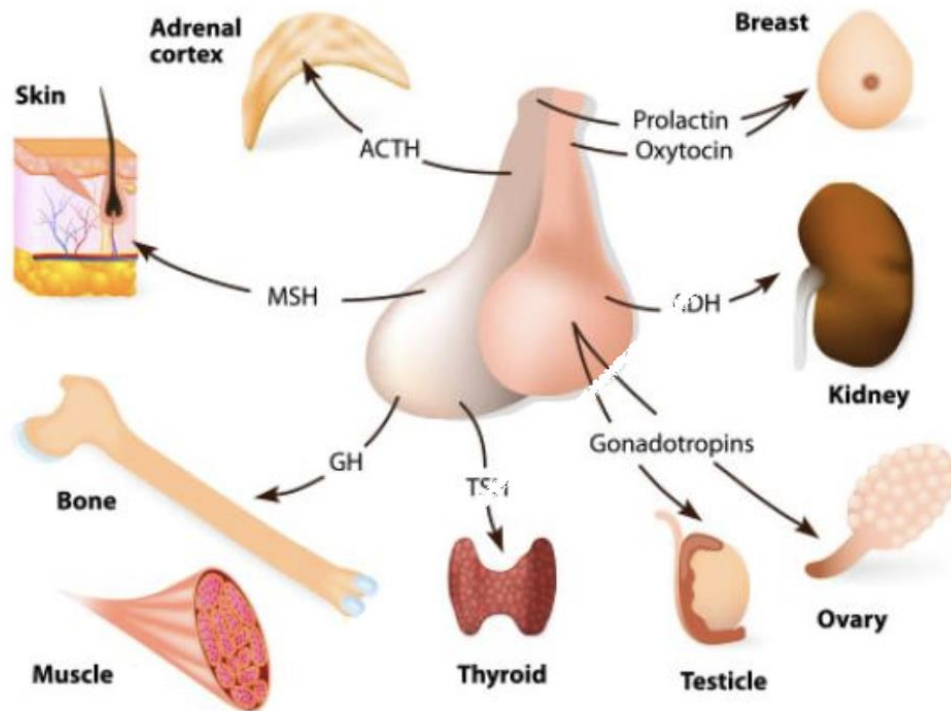
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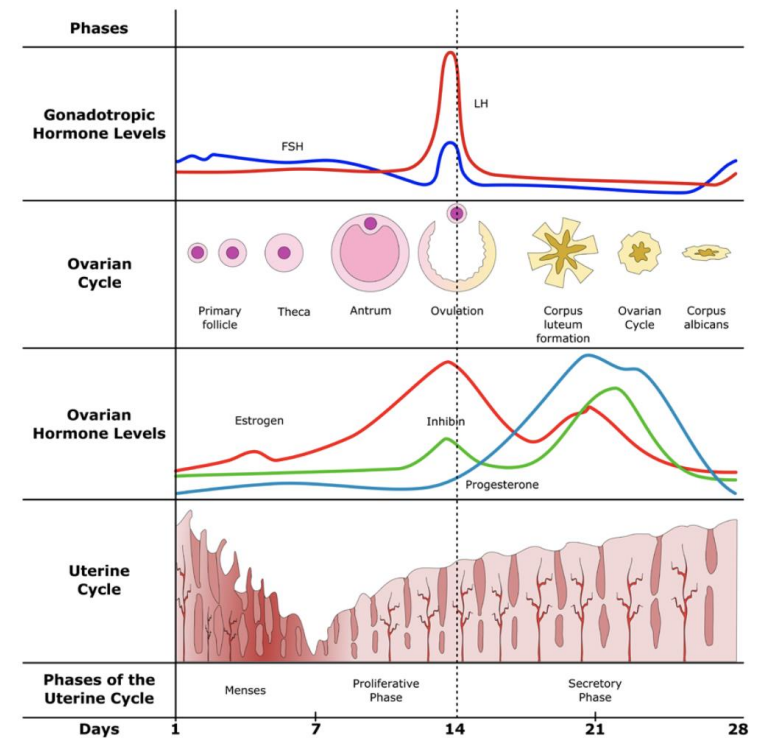
INTO Equality Conference 2023

Menstrual cycle

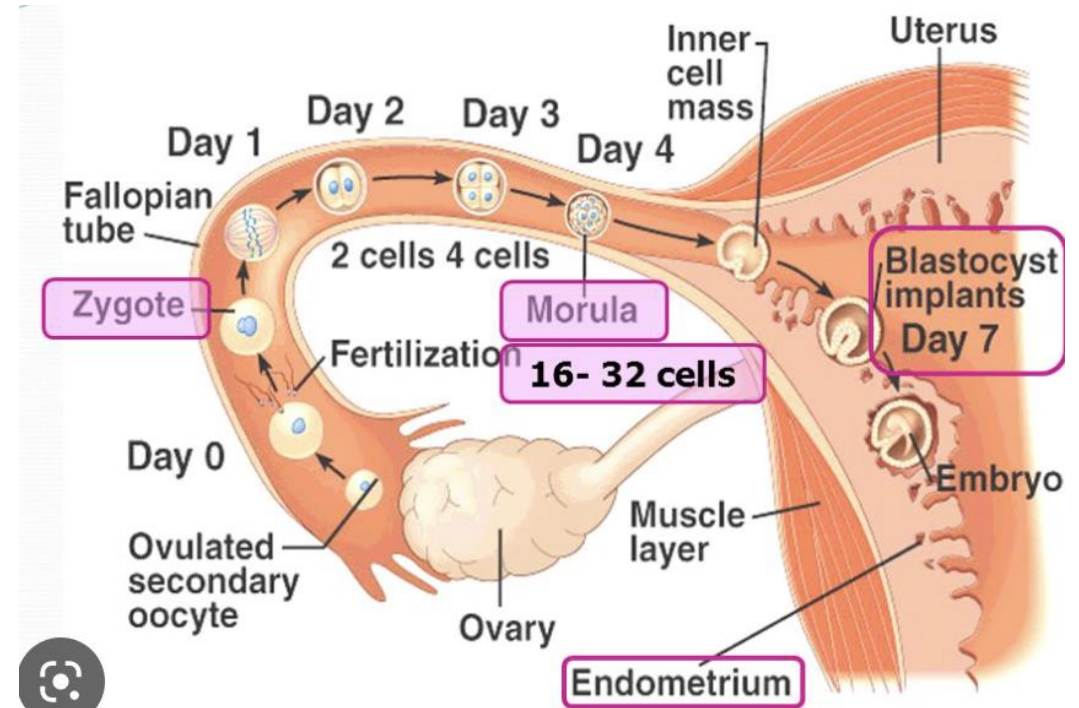
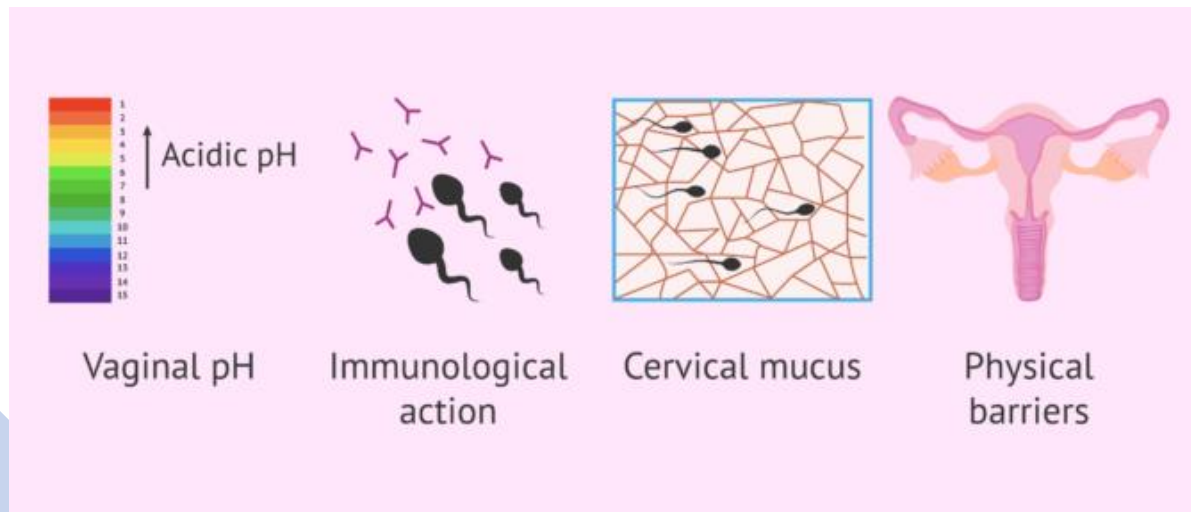
Pituitary Gland



FEMALE REPRODUCTIVE CYCLE



Fertilisation



'Normal' fertility in the general population

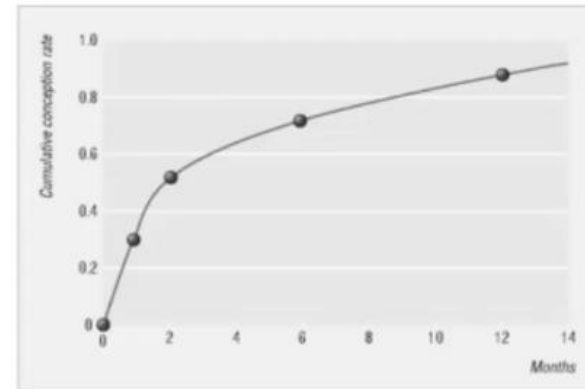
In the general population (including all ages and people with fertility problems) it is estimated that:

84% of women conceive within 1 year of regular unprotected intercourse

92% after 2 years and

93% after 3 years (te Velde et al 2000)

Fecundability is highest in the first 6 months



[From Taylor A \(2003\) BMJ 327\(7412\): 434–436.](#)

Infertility

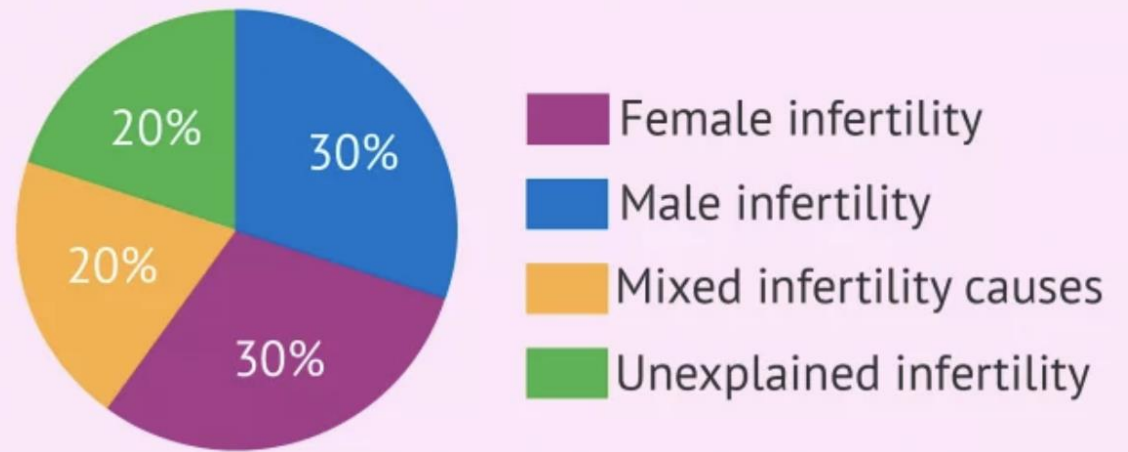
- Definition :

A disease of the male or female reproductive system defined by the failure to achieve a pregnancy after 12 months or more of regular unprotected sexual intercourse.

WHO

Prevalence : 1 in 6 couples

Causes of infertility



When to investigate in situations not covered by the standard definition of infertility

- **Known cause of subfertility, eg endometriosis, azoospermia**

Investigate without delay. Advising expectant management (or bland reassurance) without investigation is not rational

- **Patients facing cancer treatment, or other treatment that may harm fertility**

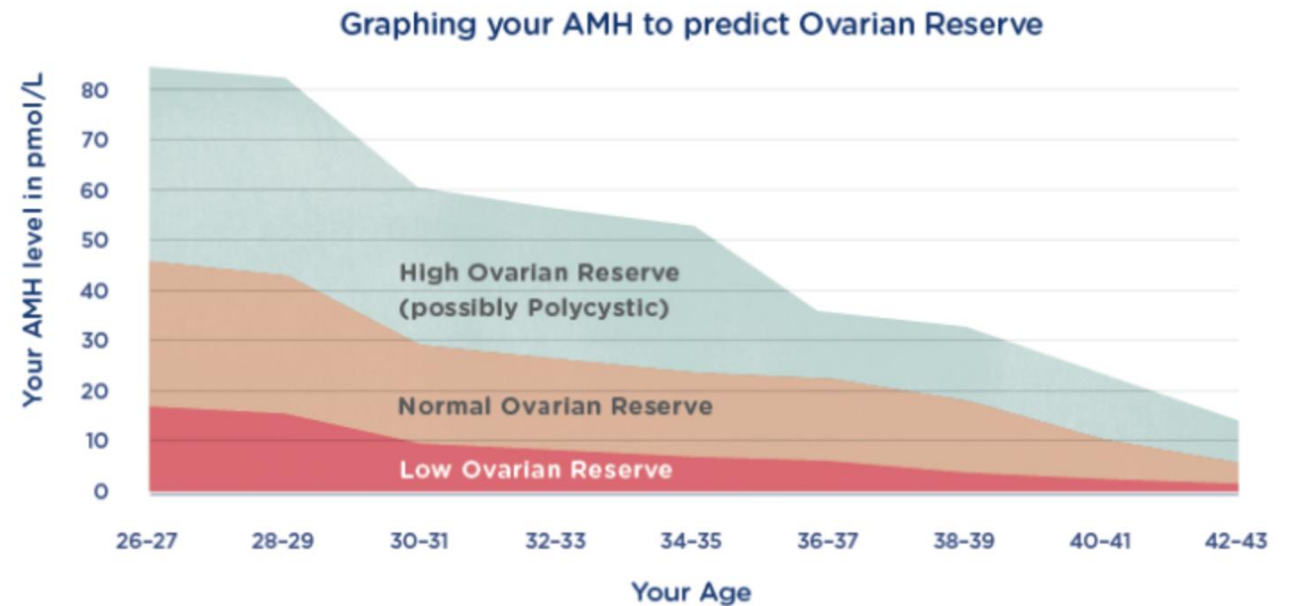
These patients should be seen without delay and treatment offered expeditiously, if it is clinically appropriate



Your Age and Egg Supply



Ovarian reserve : AMH , Antral follicle count



Quantity not quality .

Male: Semen Analysis (quantity)

Table I Cut-off values of sperm parameters according to the WHO 1999 and 2010 criteria and nomenclature.

	WHO 1999	WHO 2010	Nomenclature if below cut-off value
Volume	2 ml	1.5 ml	Hypospermia*
Sperm concentration	20×10^6 spermatozoa/ml	15×10^6 spermatozoa/ml	Oligozoospermia**
Motility (A + B)***	50%	32%	Asthenozoospermia
Morphology	30% normally formed	4% normally formed****	Teratozoospermia

*No ejaculate is aspermia.

**If there are no spermatozoa in the ejaculate it is called azoospermia.

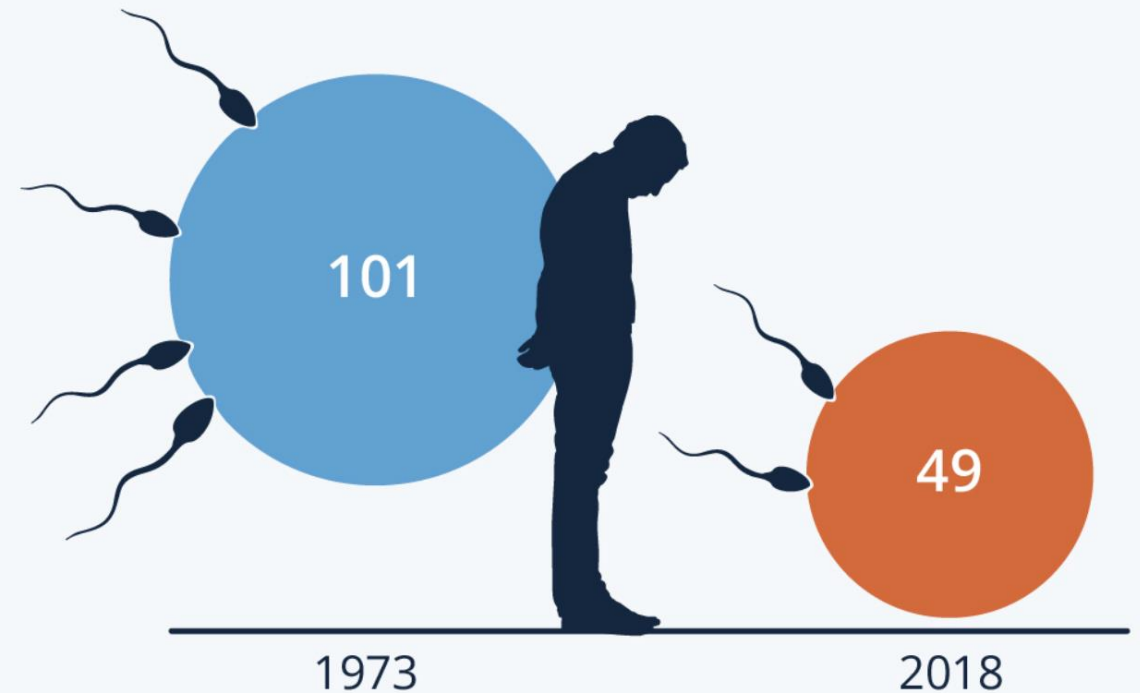
***A-motility is fast forward progressive, B-motility is slow progressive.

****According to the Tygerberg criteria ([Kurger et al., 1988](#)).

Low sperm count / poor quality

- undescended testes (testicles that haven't 'dropped' properly) as a baby
- enlarged veins in your testes (varicocoele)- increase the scrotal temperature given by pooling blood in the veins – can lead to Sperm DNA damage- tests available and Tx
- tumours of the testes
- STIs like gonorrhoea and chlamydia
- past infections (mumps can cause a drop in sperm count but this is rarely bad enough to cause infertility)
- smoking
- excessive alcohol use

Average sperm count of men worldwide in 1973 and 2018
(million sperm per milliliter of semen)



Low sperm count / poor quality

- being overweight
- taking drugs like cocaine or cannabis
- performance enhancing drugs like anabolic steroids
- certain prescribed medications
- genetic disorders
- hormonal problems such as hypogonadism
- reduced male hormone production
- Phthalates** (plastic, including water bottles, cosmetics,soaps, food) Recently banned in USA in food. Have been found even in breast milk.

Avoid: Often hot baths

Sauna – use Ice pack if planning to conceive

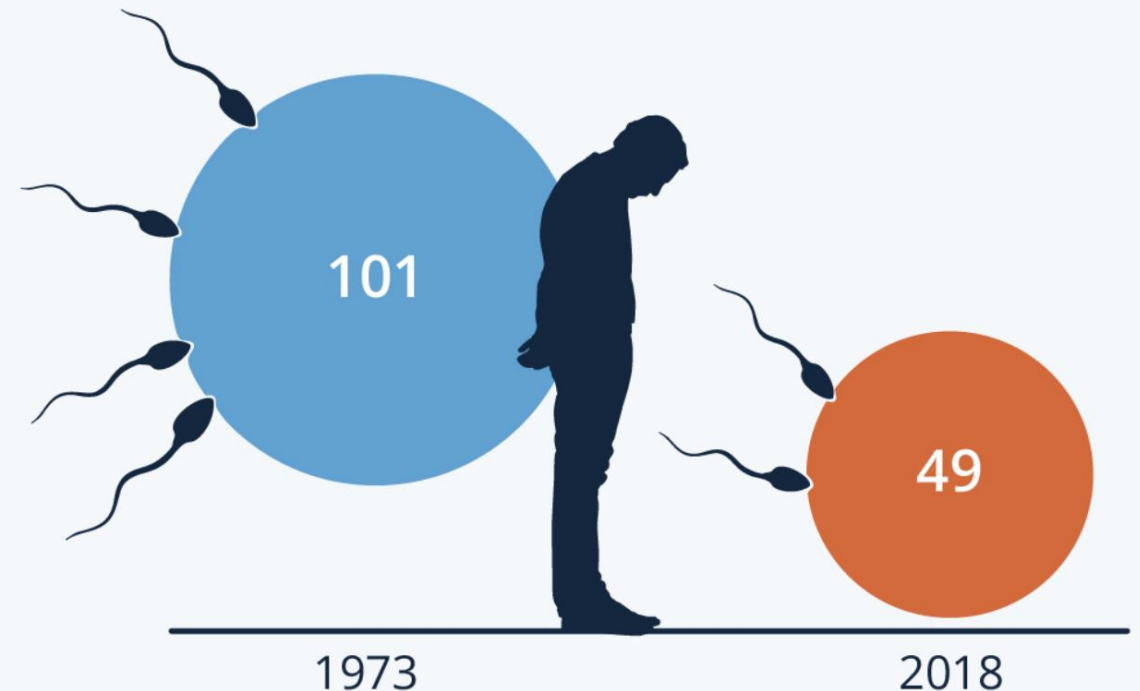
Laptop on Lap

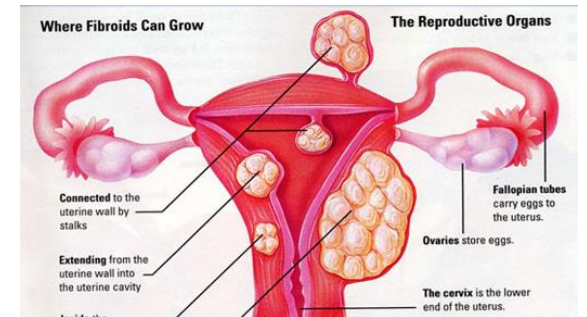
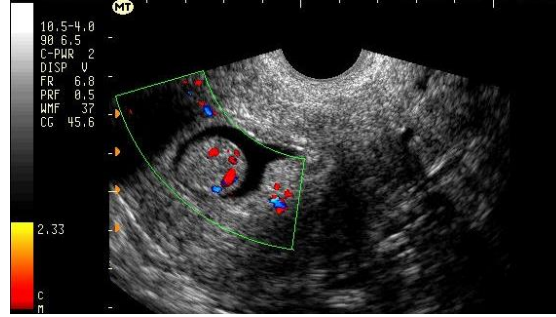
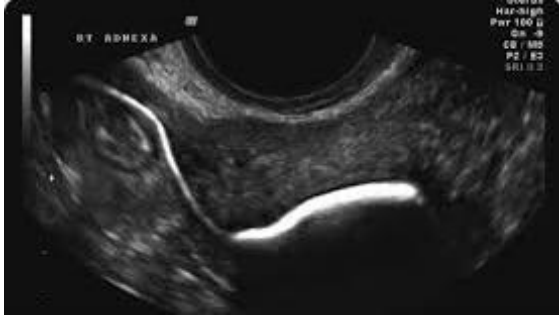
Mobile phone in front pocket – raises scrotal temp.
not caused by radiation.

Try to keep Scrotal area cool.

All these can lead to sperm DNA fragmentation
(alteration of the genetic material in the sperm)

Average sperm count of men worldwide in 1973 and 2018
(million sperm per milliliter of semen)





Uterus/ Tubes . HyCoSy, SIS, Hysteroscopy

Genetic abnormalities

- Some men and woman may carry genetic abnormalities that make it more difficult to become pregnant and more likely that a pregnancy ends as a miscarriage.

Ex: translocation/ rearrangement of genetic material

Testing available: This may be tested for, in appropriate circumstances, by blood testing of the couple. Male/Female Karyotype.

Immunological tests and treatments for fertility.



Red

The use of immunological tests and treatments as part of fertility treatment in healthy patients is rated red. This is because there is no evidence from randomised controlled trials (RCTs) to show that they are effective at improving the chances of having a baby for most fertility patients.

HFEA gives a red symbol for an add-on where there is **no evidence from RCTs** to show that it is effective at improving your chances of having a baby.

Steroids, Intralipid, Intravenous Immunoglobulin, TNF-alpha blocking agents – none of them proven to make a difference

Coagulation disorders and autoantibodies

- Factor V Leiden, factor II (prothrombin) gene mutation and protein S deficiency
- Antiphospholipid Syndrome (APS)

This blood clotting problem is the most important treatable cause of recurrent miscarriage. The immune system produces abnormal antibodies that attack fats called phospholipids in the blood. This makes the blood more likely to clot.

All the above can be responsible for recurrent pregnancy loss(>3) rather than failed implantation of the embryo.

Treated with blood thinners.

Endometrial analysys

- Endometrial receptivity analysys:

Diagnostic test that determines each woman's unique personalized embryo transfer timing, therefore synchronizing the embryo transfer with the individualized window of implantation.

Endometrial microbiome analysys :

Indicates the endometrial microbiome balance, providing information on the proportions of all endometrial bacteria, including those linked to higher pregnancy rates.

Analysis of Infectious Chronic Endometritis:

Detects pathogenic bacteria and recommends adequate treatment

Ovulation induction + Timed Sexual Intercourse (TSI)

- Often used in young couples / irregular ovulation/ anovulation.
- Pregnancy rate 20 – 25 % / cycle

Advantages:

Cheap

Non invasive

Closest to natural fertilization

Reduces stress of waiting for treatment

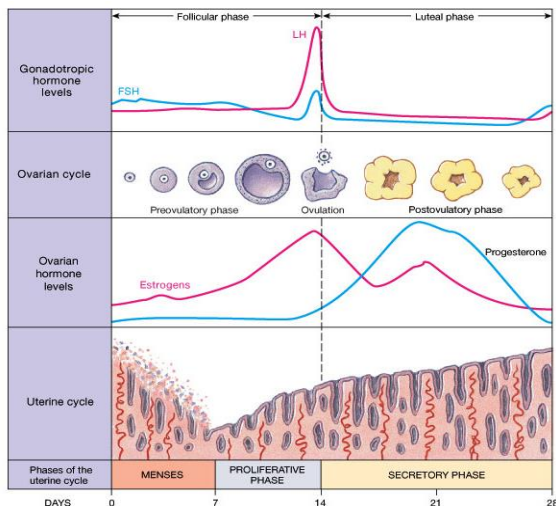
Disadvantages:

Good quality SemenA required

Permeable Fallopian tubes required

Not more than 6 cycles

Cycle cancellation if high response



Intrauterine Insemination (IUI)

Pregnancy rate: <35yo = 13% , <40yo= 9%, > 40yo = 2-3% / cycle

Indications : Ejaculatory dysfunctions, Unexplained infertility, male mild factor infertility, donor sperm, coital problems

IUI: uses a washed, centrifugated sample of semen where seminal fluid is removed

Advantages:

Less expensive than IVF

Enhances sperm quality through washing procedure

Bypass of the vagina, cervix, distal uterus

Disadvantages:

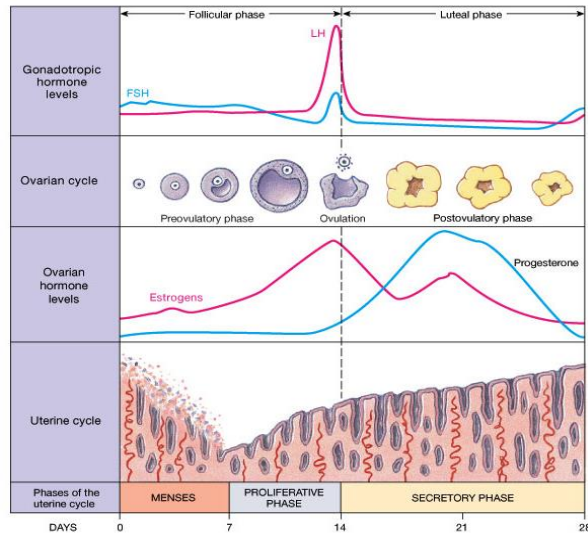
Patent fallopian tubes required

Ovulation required

Sperm motility at a certain level

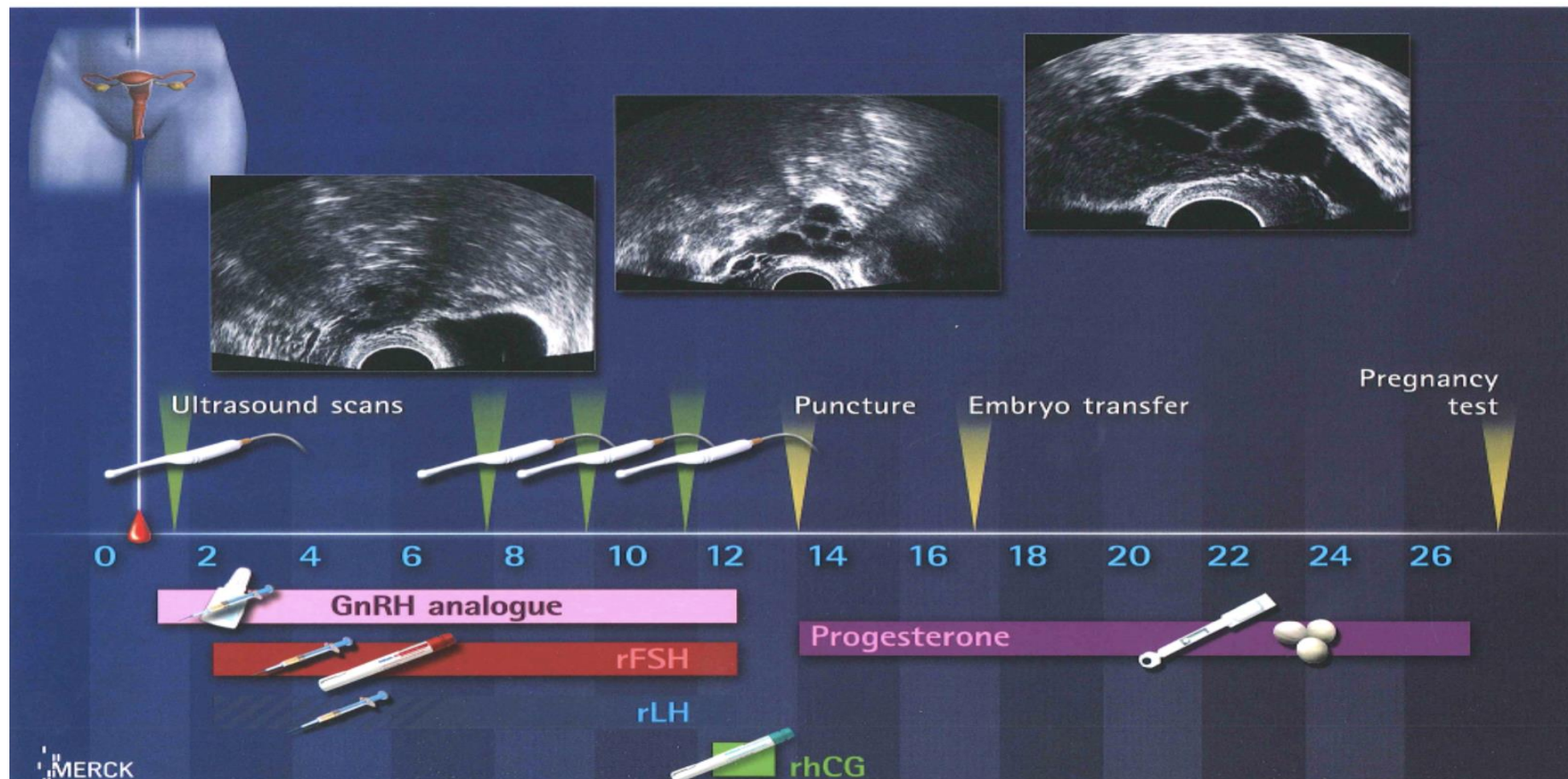
Attempts: <35 yo 3+/- cycles

Cycle Cancellation if high response

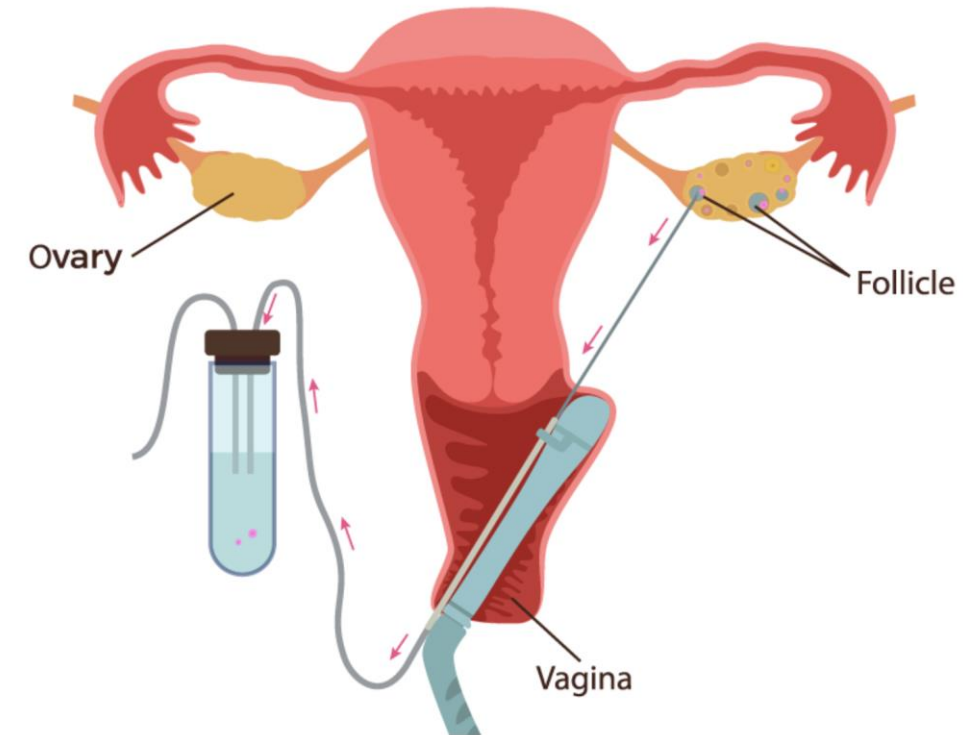


Ovarian Stimulation. IVF.ICSI.Egg banking

08. OVARIAN STIMULATION, SHORT PROTOCOL

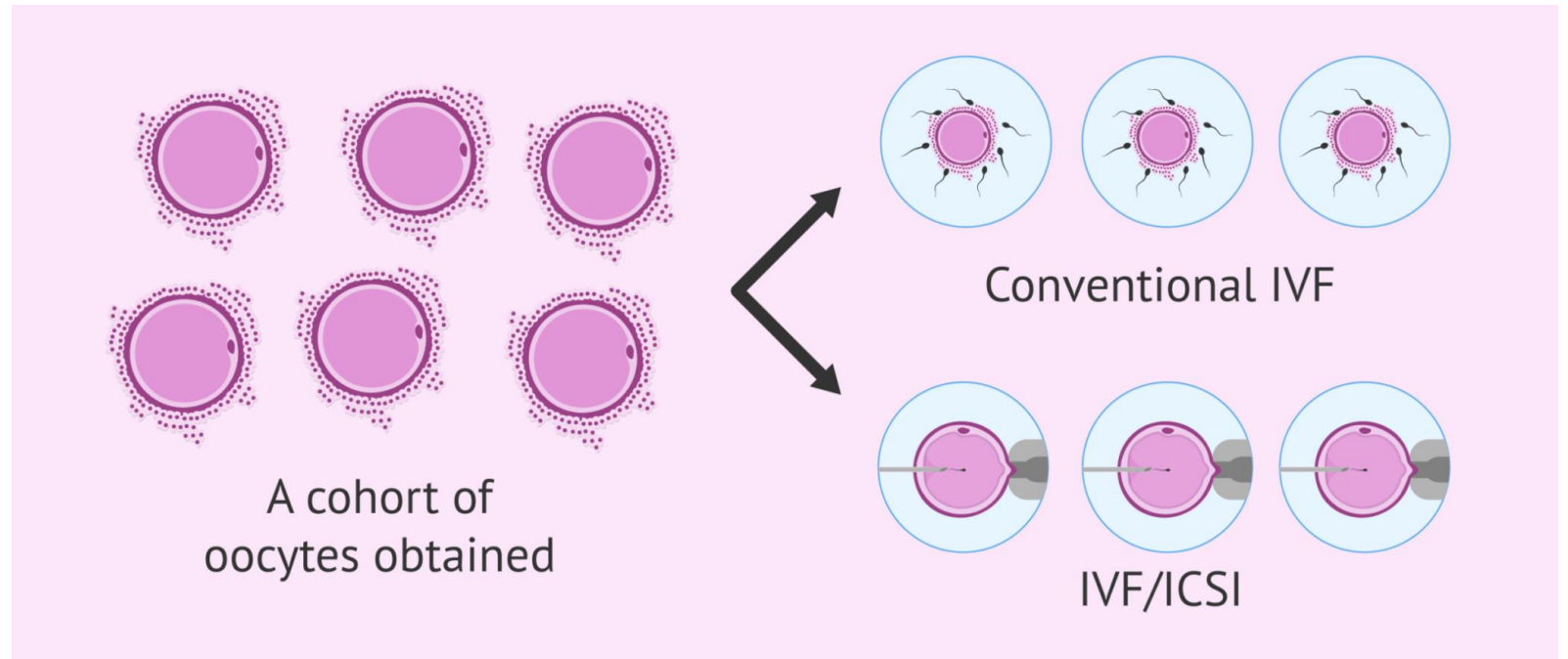
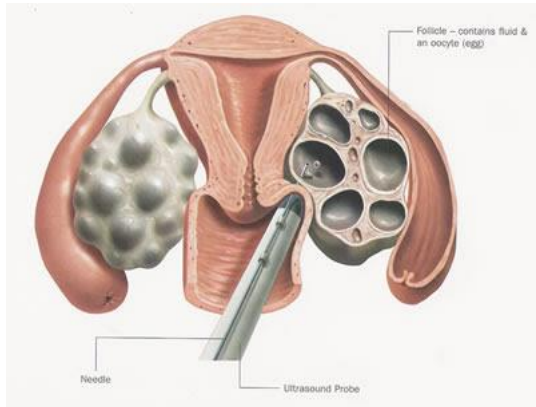


Egg Retrieval



IVF/ICSI

Indications: Male infertility , tubal disease, Endometriosis, Low ovarian reserve, unexplained infertility



IVF: requires good number of sperm > 3 million/ml, good motility

ICSI : low nr of eggs retrieved, men with very low sperm count/ motility, surgically retrieved sperm, poor quality eggs , low fertilization in a previous IVF, advanced age

Fertilised eggs. Timelapse

Pronuclear

Cleavage Stage

Morula

Blastocyst

Day 0

Day 1

Day 2

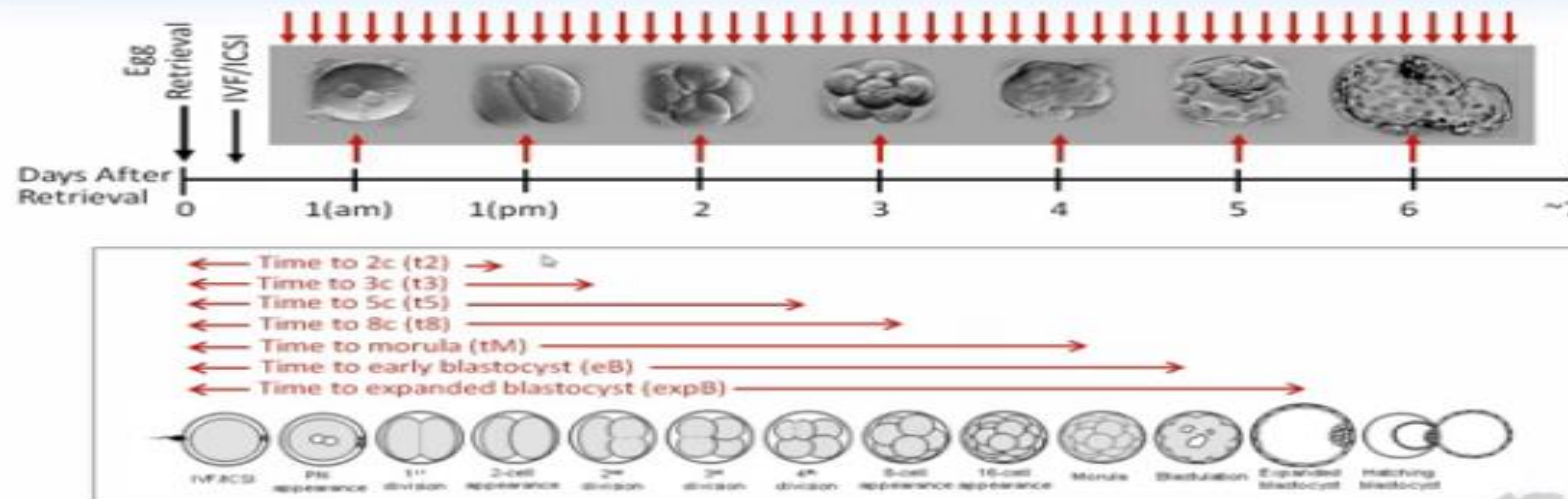
Day 3

Day 4

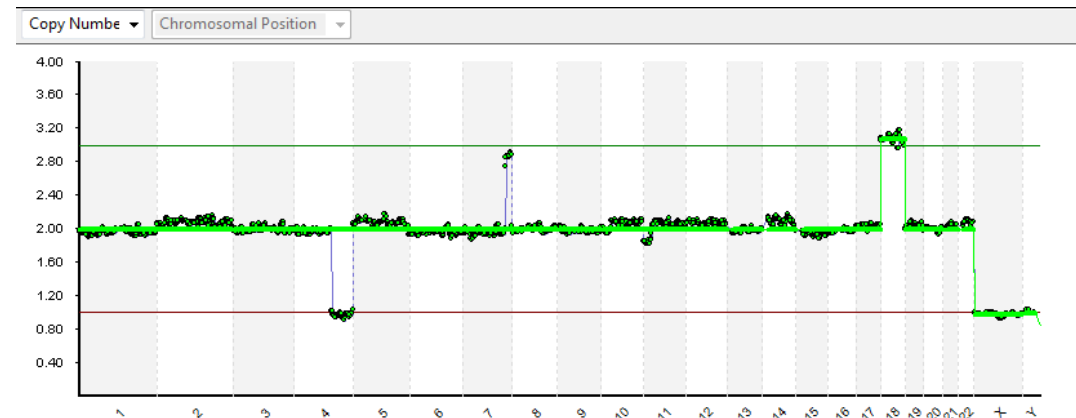
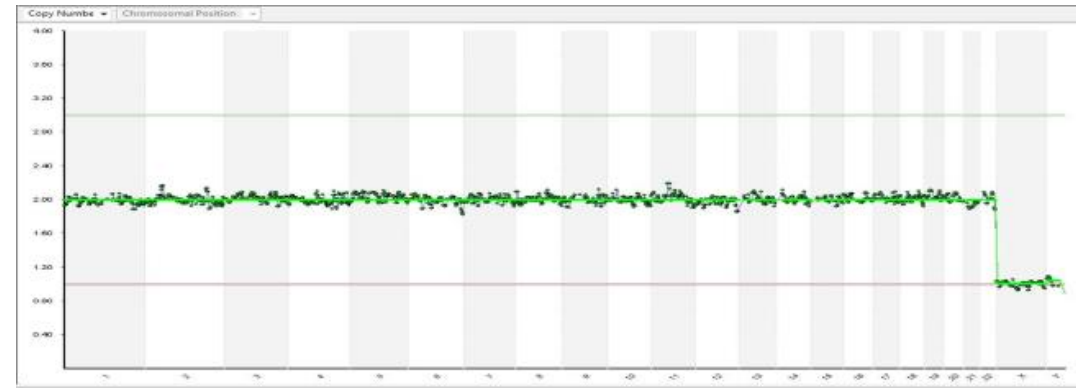
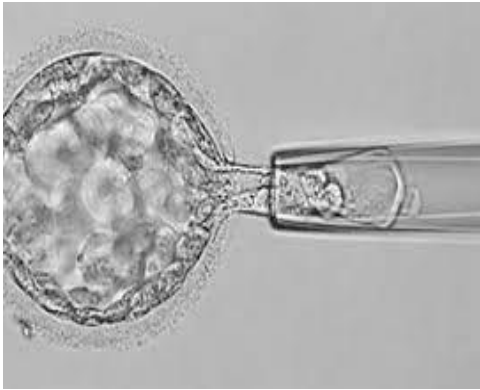
Day 5+



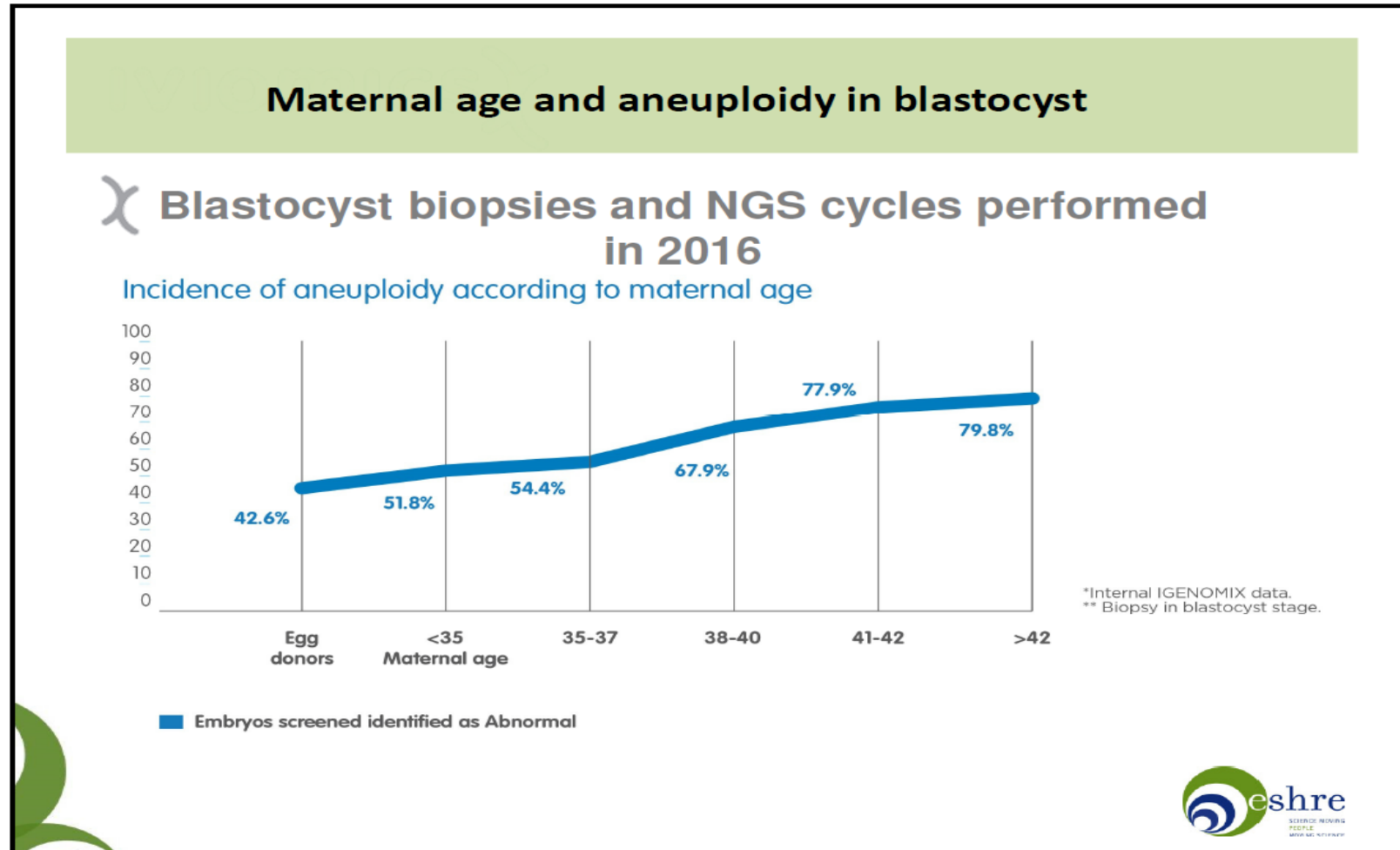
Time-lapse imaging (TLI) & embryo morphokinetics



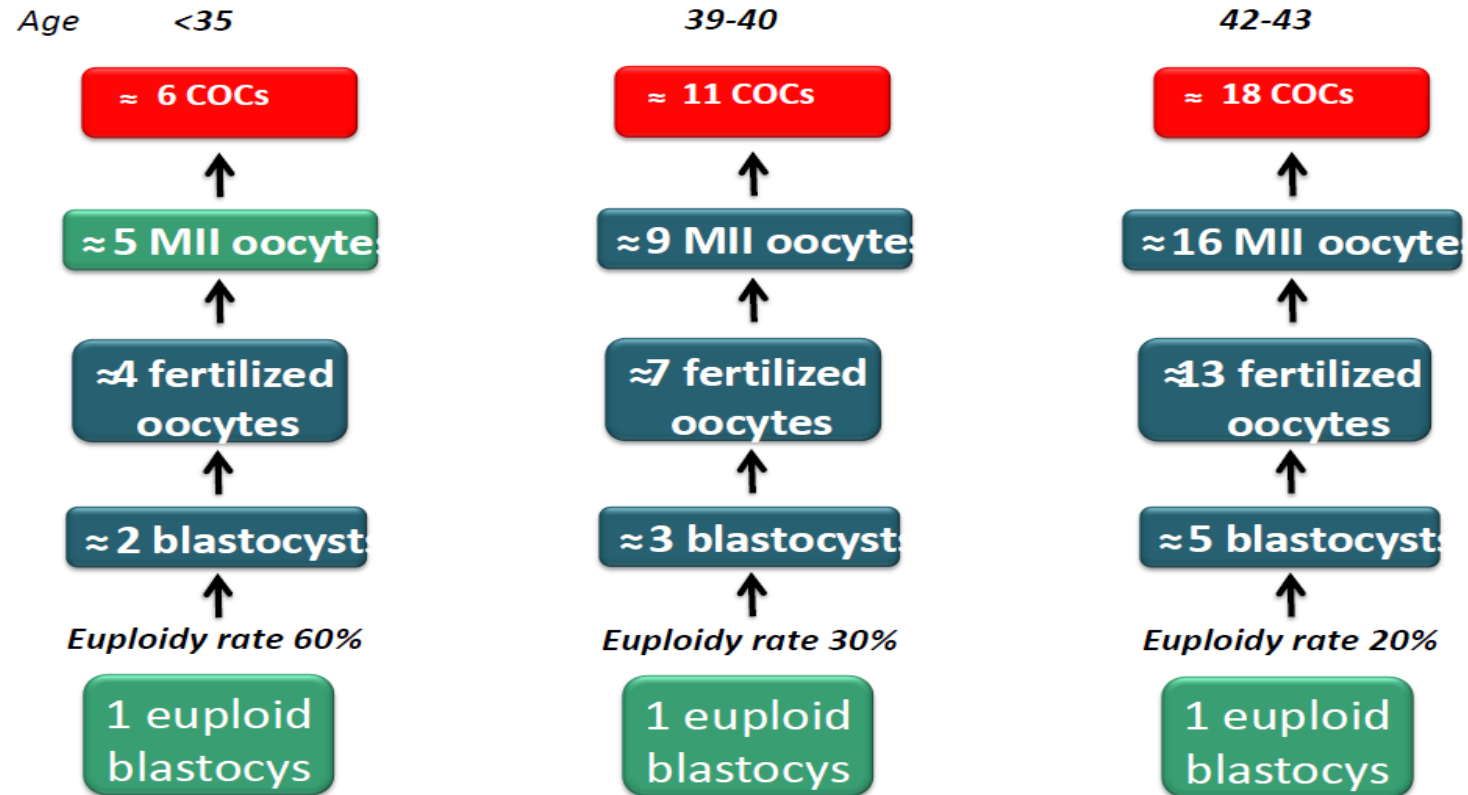
Preimplantation genetic testing / aneuploidies (PGT-A) PGT-M



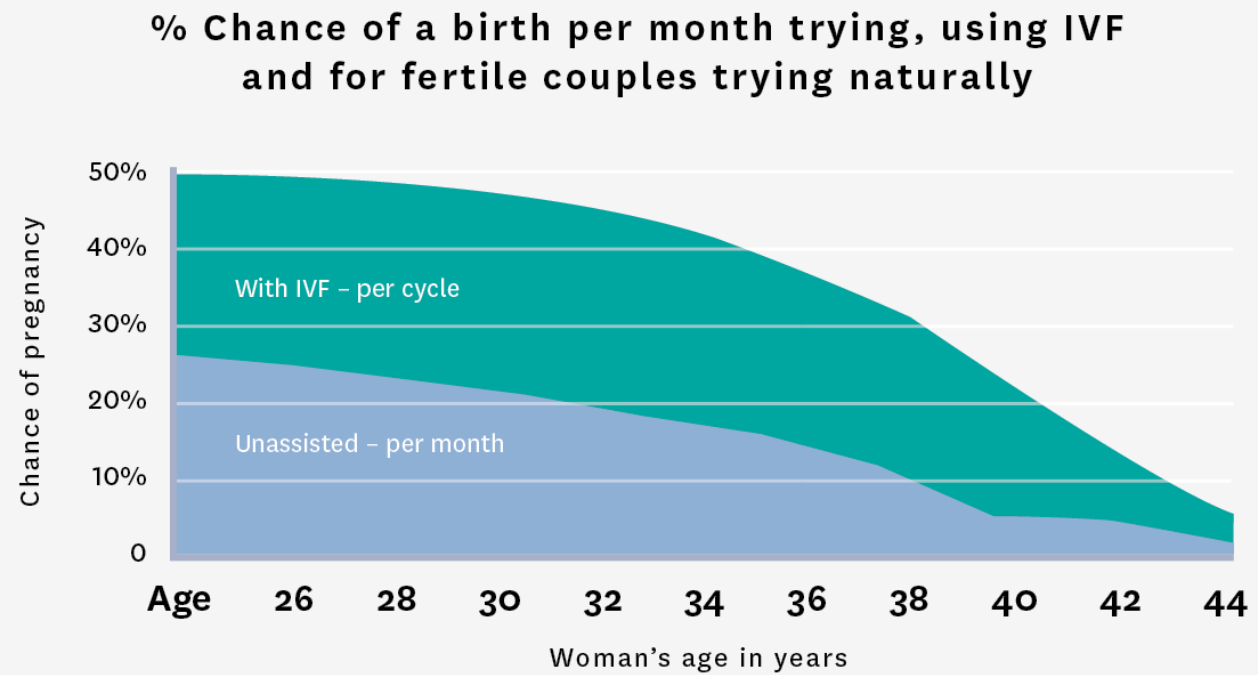
Incidence of Aneuploidy.



Mean number of oocytes needed and age



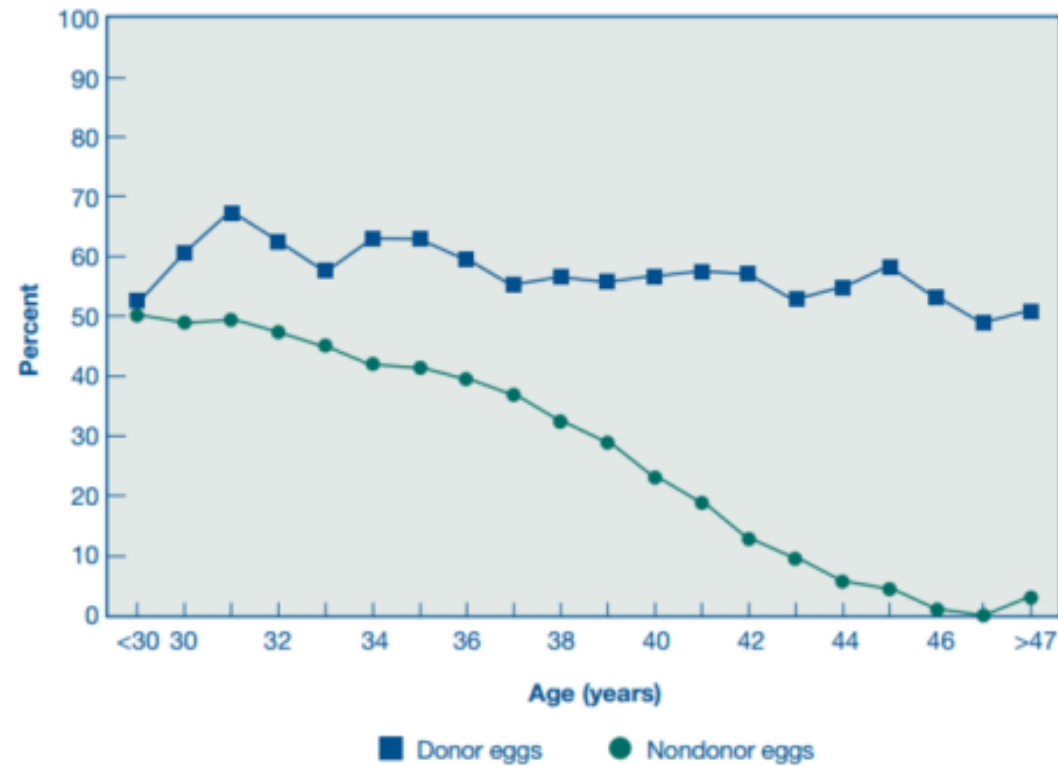
Age and fertility



Egg donation

Figure 40

Percentages of Transfers Using Fresh Embryos from Donor or Nondonor Eggs That Resulted in Live Births, by Age of Woman, 2013



Embryo transfer

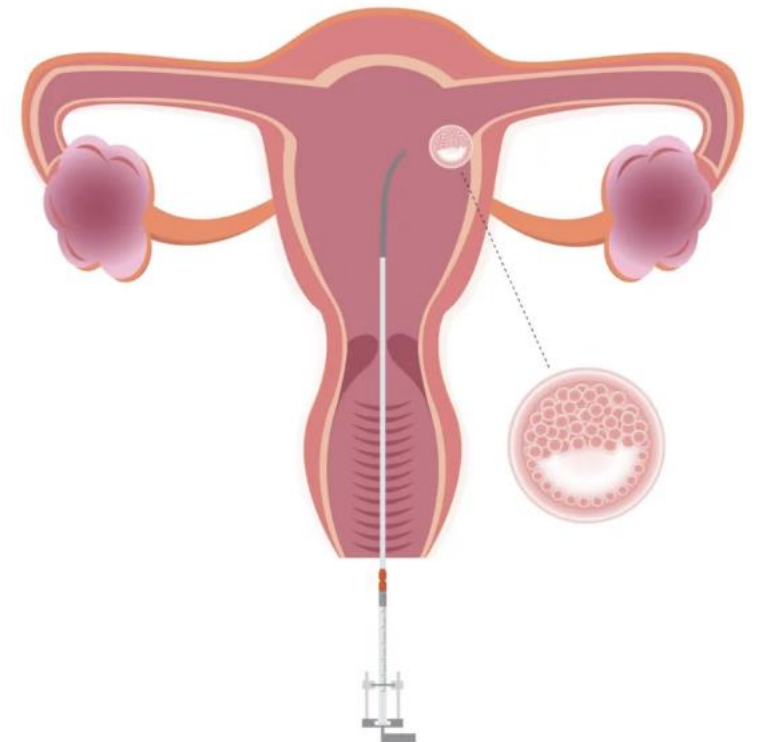
How many we transfer ?

Day 3 or day 5? Fresh or frozen ?

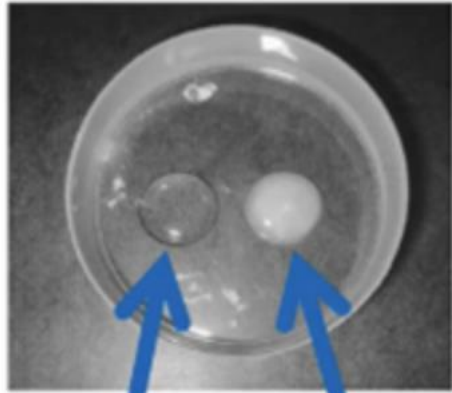
Transfer in the same cycle or new cycle ?

ART and perinatal outcomes

- Twins have 5-10 fold higher risks
- Singletons:
 - Preterm birth 2-3 fold increased
 - Small-for-gestational age 1.5-fold increased
 - Perinatal death 2-fold increased
 - Large-for-gestational 1.7-fold increased after frozen embryo transfer



Vitrification



Vitrified drop
(glass)

Frozen drop
(ice)

To convert (something into glass)

Vitrification is the rapid cooling of liquid medium in the absence of ice crystal formation.

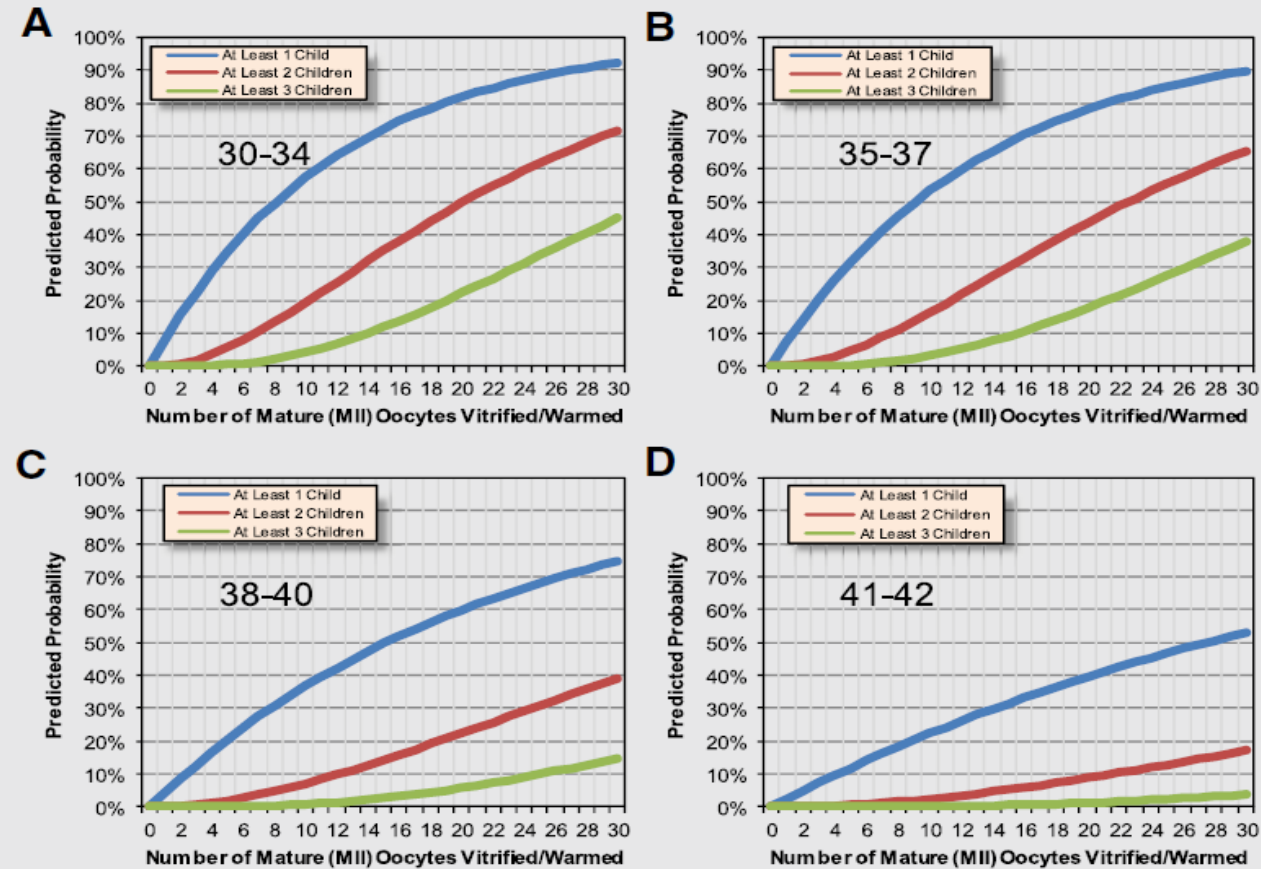
Embryo / Eggs – rapid cooling to -196 degrees without formation of crystals.

Survival rate post thawing is approx 95%

Can be stored indefinitely, until decision to thaw.

Social Egg Freezing / Fertility preservation

FIGURE 1



Predicted probabilities of having at least one, two, and three live-born children according to the number of mature oocytes cryopreserved for elective fertility preservation, according to age at oocyte retrieval and the associated oocyte to live-born child efficiency estimates: (A) 30–34 years, 8.2% efficiency; (B) 35–37 years, 7.3% efficiency; (C) 38–40 years, 4.5% efficiency; (D) 41–42 years, 2.5% efficiency.

Doyle. Autologous vitrified oocyte IVF outcomes. Fertil Steril 2016.

Thank you !



Image sources:

- <http://www.adelaideentspecialists.com.au/2016/01/pituitary-gland-tumours-and-surgery/>
- <https://www.bivfnewyork.com/getting-started/age-and-infertility/>
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- <https://fertility.coopersurgical.com/webinars/tips-and-tricks-for-successful-vitrification/>