TWINS

B.Sc. Part-II, Paper IV
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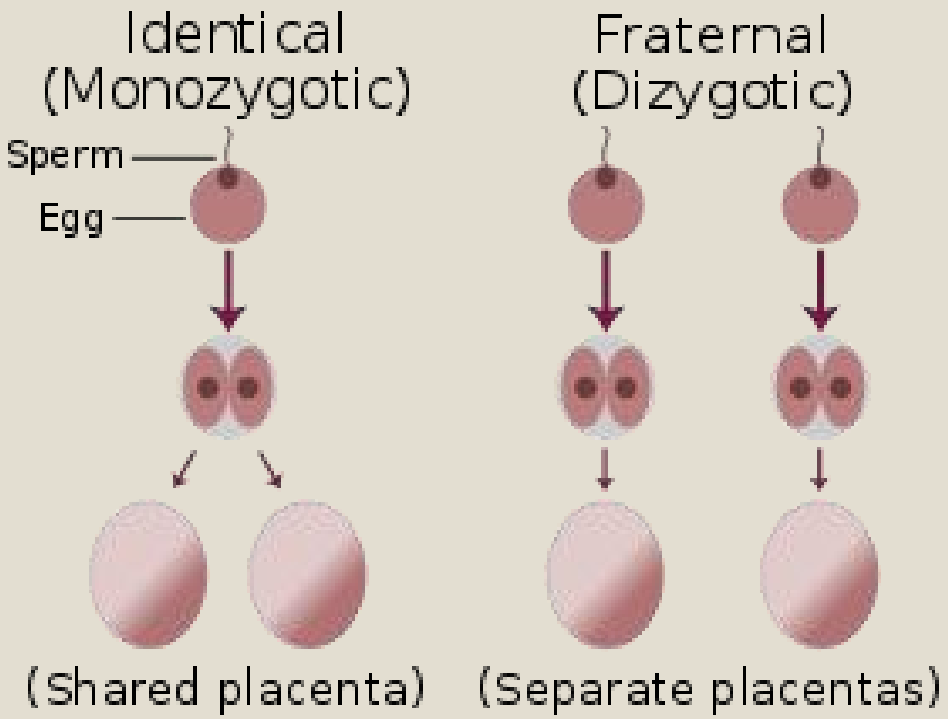
Introduction

- Twins are two offspring produced by the same pregnancy. Twins can be produced due to two separate fertilization events or as an abnormality of a single fertilization event during the early weeks of development.
- Two types of twins have been recognised, one in which the egg is fertilized by one sperm and its splits occur after the conception –monozygotic, and another in which two eggs are fertilized by two separate sperms ,dizygotic.
- Twins provides valuable source of information by observing environmental influences and varying genetic make-up.

Type of twins

- Basically twins are of two types:
- Monozygotic or Identical twins
- Dizygotic or Fraternal or Non-identical twins



Monozygotic twins

Monozygotic twins or identical twins are produced from a single fertilization event

One fertilized egg and a single spermatozoa, form a single zygote

These twins posses identical genes, posses same genetic makeup and have same sex.

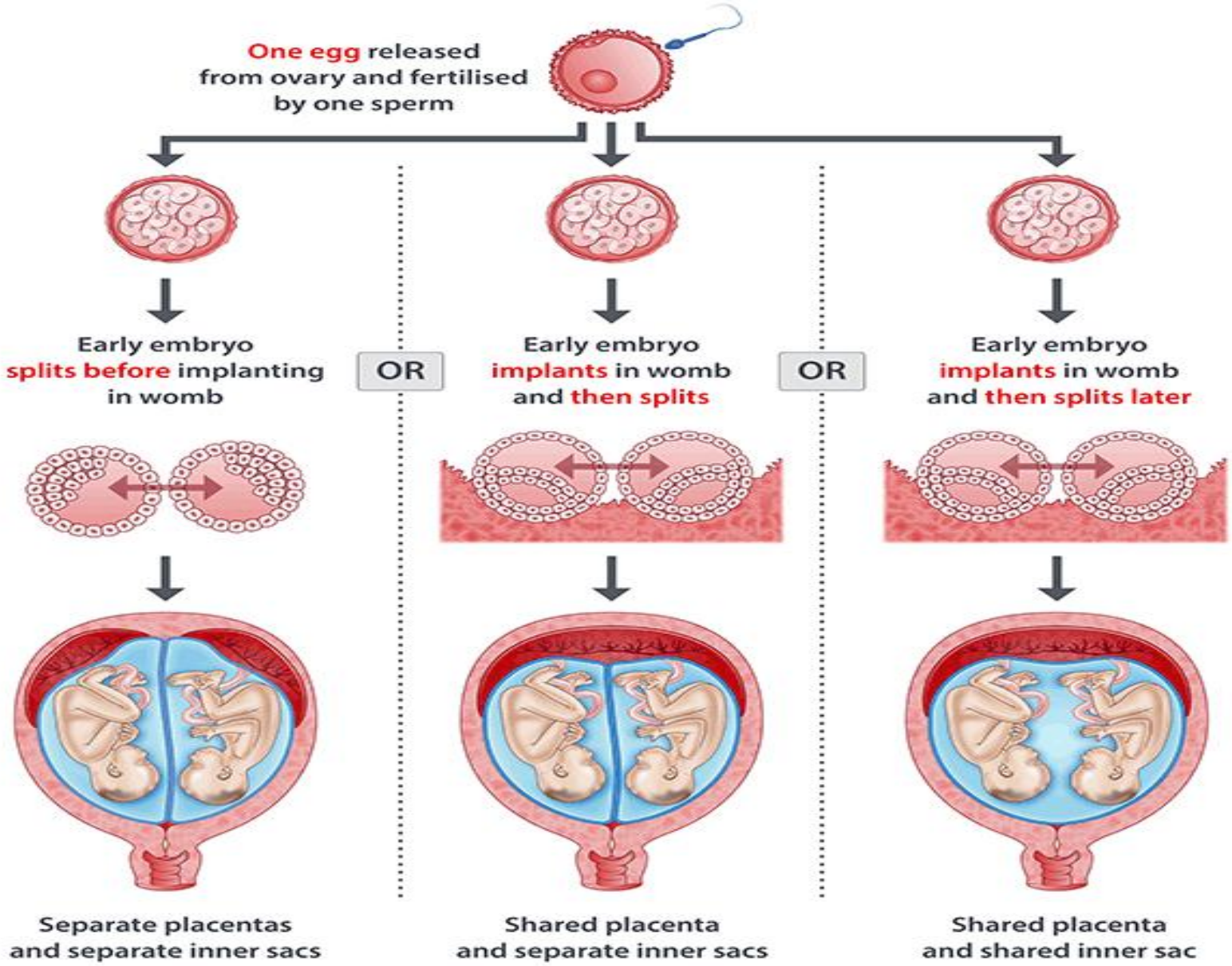
Occurs in approximately 3-5 per 1000 pregnancies.

More common in aged mothers.

Monozygotic twins are unique research resource for comparing environmental effect on development and health.

In monozygotic twinning the genetic material is initially identical and degree of twinning will depend upon the timing

Identical (monozygotic) twins

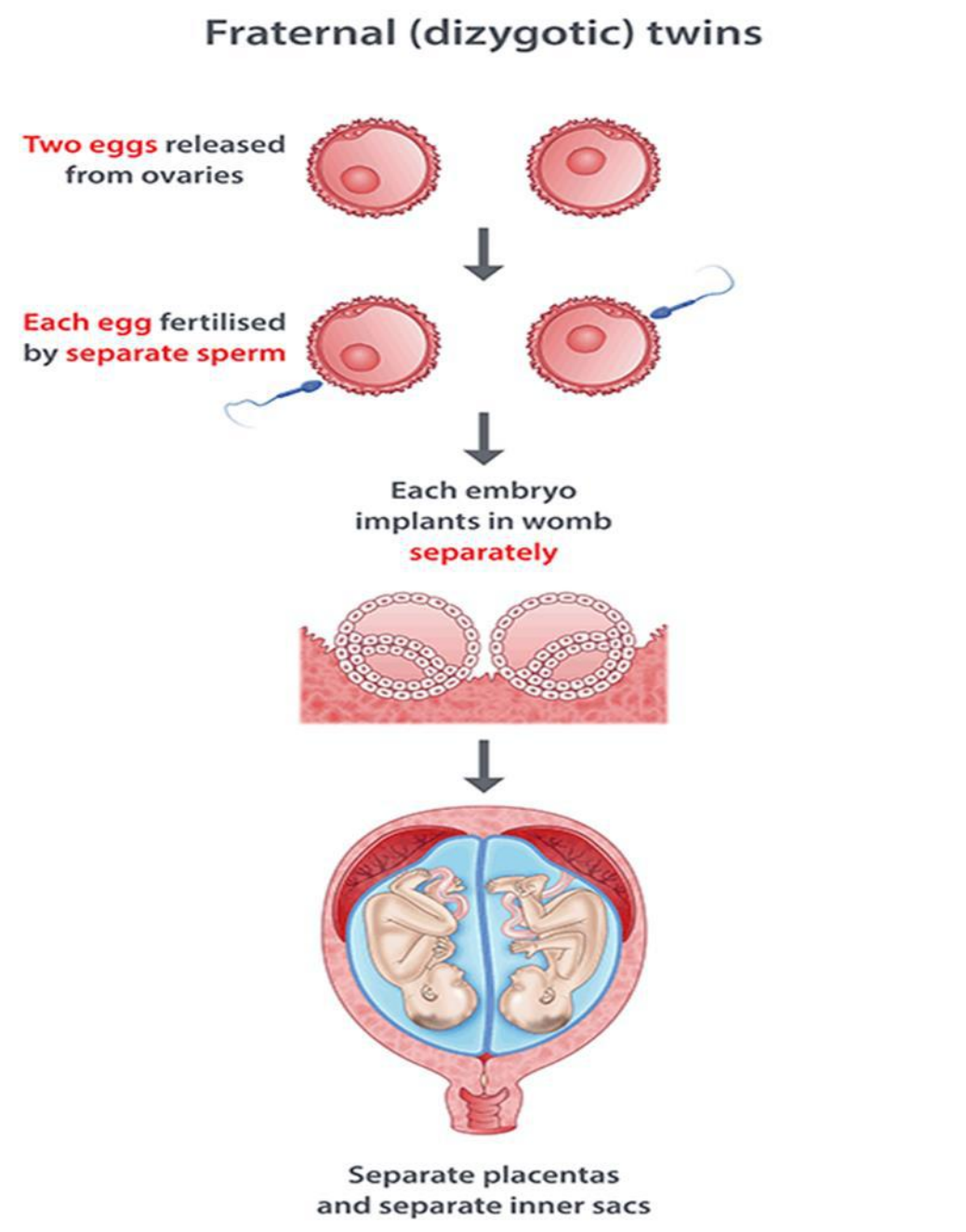


Causes of monozygotic twinning

- Identical twins are produced from a single fertilized ovum. The two blastomeres resulting from the first cleavage (mitosis) of the fertilized egg or zygote separate from each other and develop into independent embryos.
- Since, the two embryos have arisen by mitosis; they have the same chromosome sets in their body cells.
- The situation is the same for identical triplets and other multiples', but they are quite rare in human beings.
- Sometimes, identical twins fail to separate completely from each other, they are called **Siamese twins**.

Dizygotic twins

- Non-identical twins contain different sets of genes and are like any other brothers and sisters, but just happen to grow simultaneously in the same uterus.
- Fraternal twins thus differ from each other in their traits, development and often even sex.



Causes of dizygotic twinning

- Non-identical or fraternal twins are produced by simultaneous fertilization of two separate ova by two separate sperms.
- Two foetuses so obtained from two zygotes are thus called dizygotic twins.
- The genetic material is different and implantation and placentation is also different.

Factors which increases the chances of twin formation

Some women are more likely than others to give birth to twins. The factors include:

1. **Advancing age of the mother**– women in their 30s and 40s have higher levels of the sex hormone oestrogen than younger women, which means that their ovaries are stimulated to produce more than one egg at a time.

2. **Number of previous pregnancies**– the greater the number of pregnancies a woman has already had, the higher her odds of conceiving twins.

3. **Heredity –** a woman is more likely to conceive fraternal twins if she is a fraternal twin, has already had fraternal twins, or has siblings who are fraternal twins.

4. **Race –** Black African women have the highest incidence of twins, while Asian women have the lowest.

5. **Assisted reproductive techniques**– many procedures rely on stimulating the ovaries with fertility drugs to produce eggs and, often, several eggs are released per ovulation.

Significance of twin studies

- Twins are useful in detecting the relative effectiveness of heredity and environment upon the expression of a disease or trait.
- If a particular trait is shown by only one member of the identical twins, then it can be inferred that the environmental factor is playing the major role since both possess the same genes.
- Twins are used to study about the role genes play in shaping all types of human behaviour.
- Studies of identical twins separated since birth and not raised together have revealed that they exhibited many similar behavioural traits which in turn lead to conclusion that genes have at least 50 per cent influence on a particular trait.