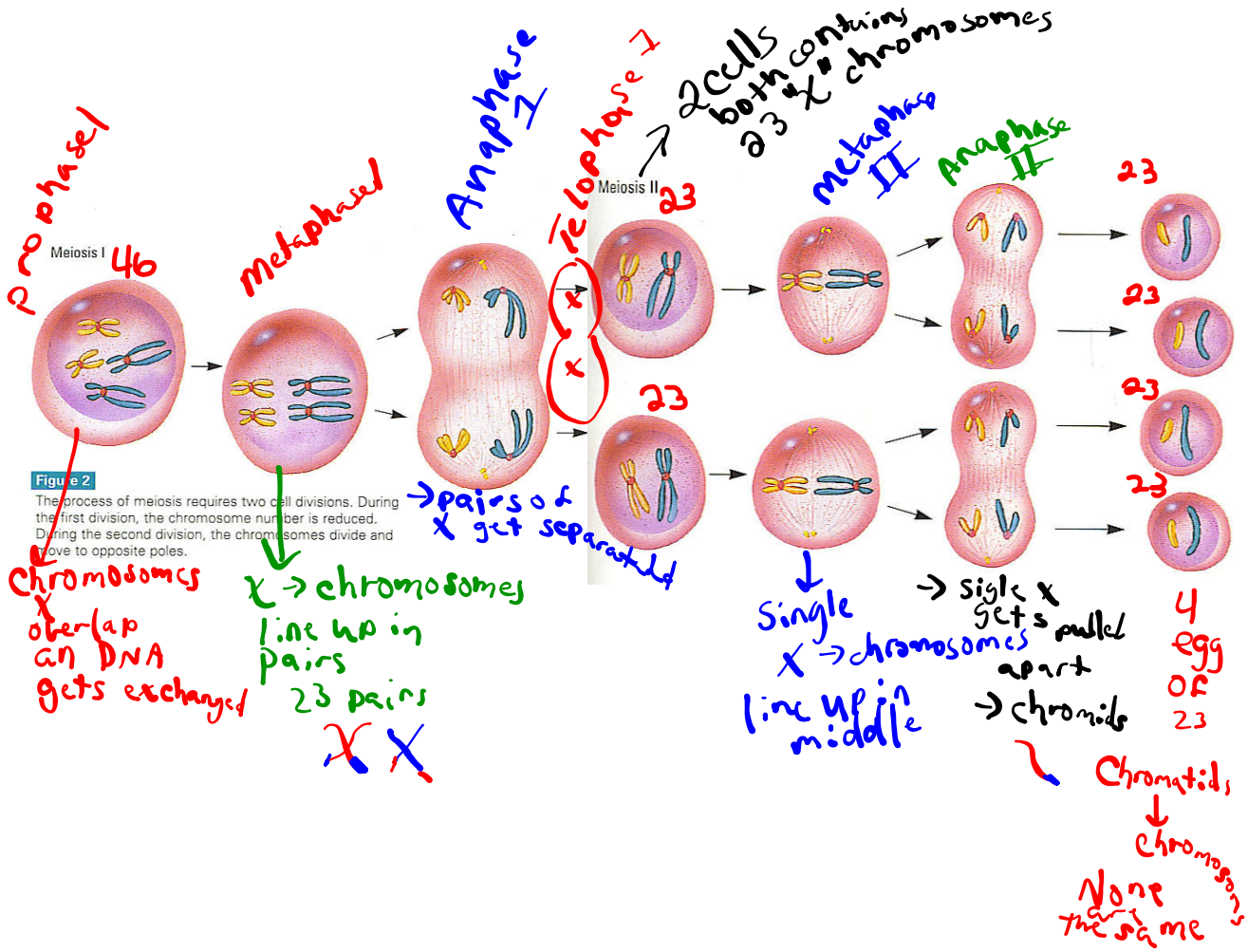


Figure 2
The process of meiosis requires two cell divisions. During the first division, the chromosome number is reduced. During the second division, the chromosomes divide and move to opposite poles.

Curriculum Outcomes

304-11 illustrate and describe the basic process of cell division, including what happens to the cell membrane and the contents of the nucleus

- illustrate and describe the basic processes of mitosis and meiosis

305-5 discuss factors that may lead to changes in cell's genetic information.

- compare factors that may lead to changes in a cell's genetic information:
  - mutations caused by nature
  - mutations caused by human activities (305-5)

Student Friendly:

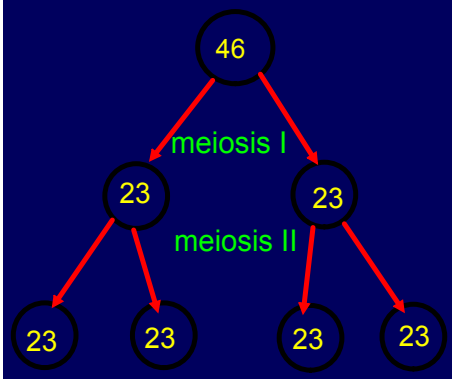
- What happens if a sperm or an egg gets too much, or too little material.
- How can genetic disorders be detected prior to birth by genetic screening

Making a Baby

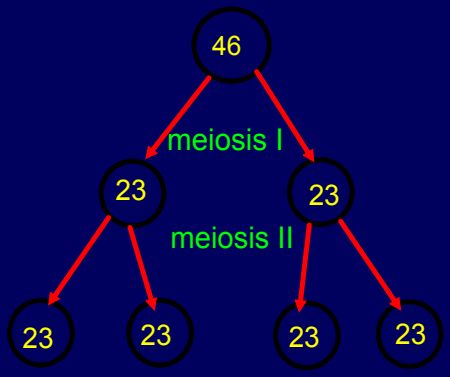
Please copy down

When a reproduction occures correctly:

Male



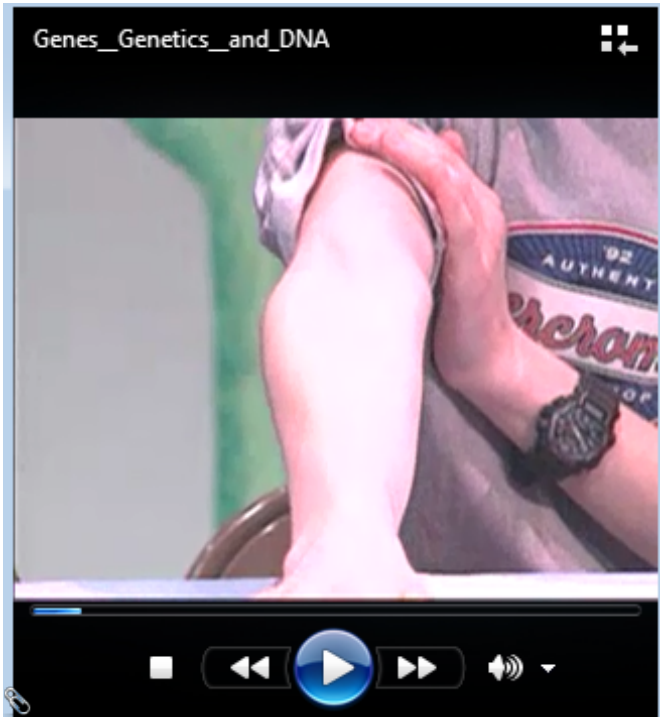
Female



So when parents reproduce only one egg and one sperm is required

Baby

46


Genes_Genetics_and_DNA

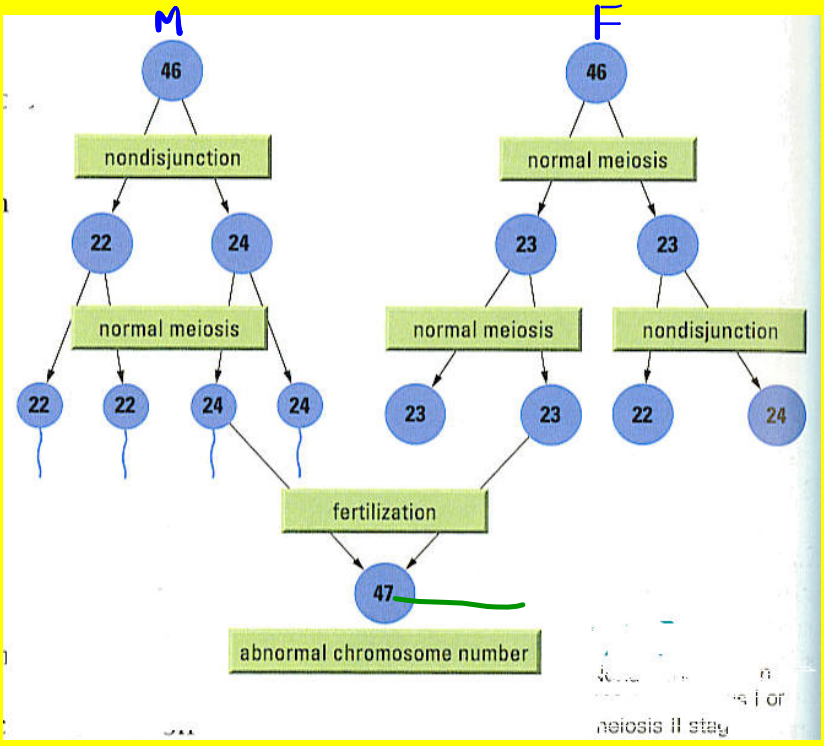
Atypical Meiosis

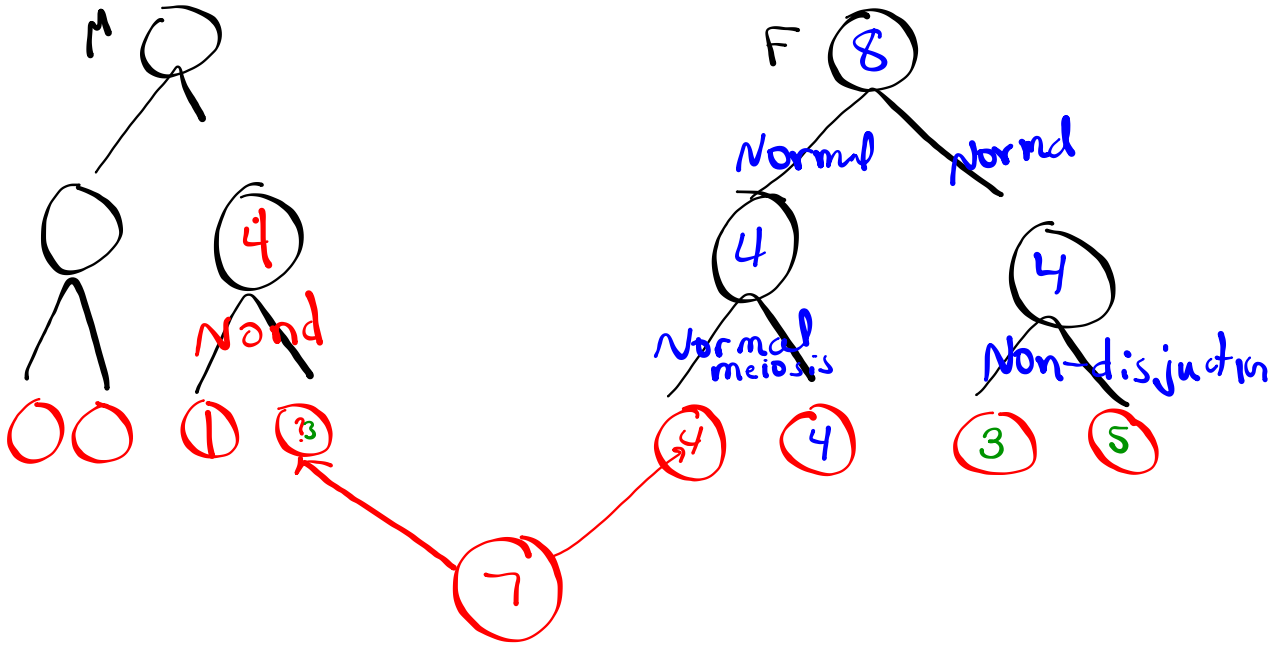
Most processes of the body can go wrong, including cell division. If errors occur during division of somatic cells, such as a skin cell or liver cell, it may not harm the organism, which has many other cells.

However, if something goes wrong during meiosis in a reproductive cell, the resulting embryo is in serious trouble: all of its cells will be affected.

Sometimes during meiosis, a mistake happens, in which chromosomes get stuck and do not separate. As a result the reproductive cells don't get the right number of chromosomes. This is called nondisjunction.

As a result one daughter cell will have too many chromosomes while the other has too little

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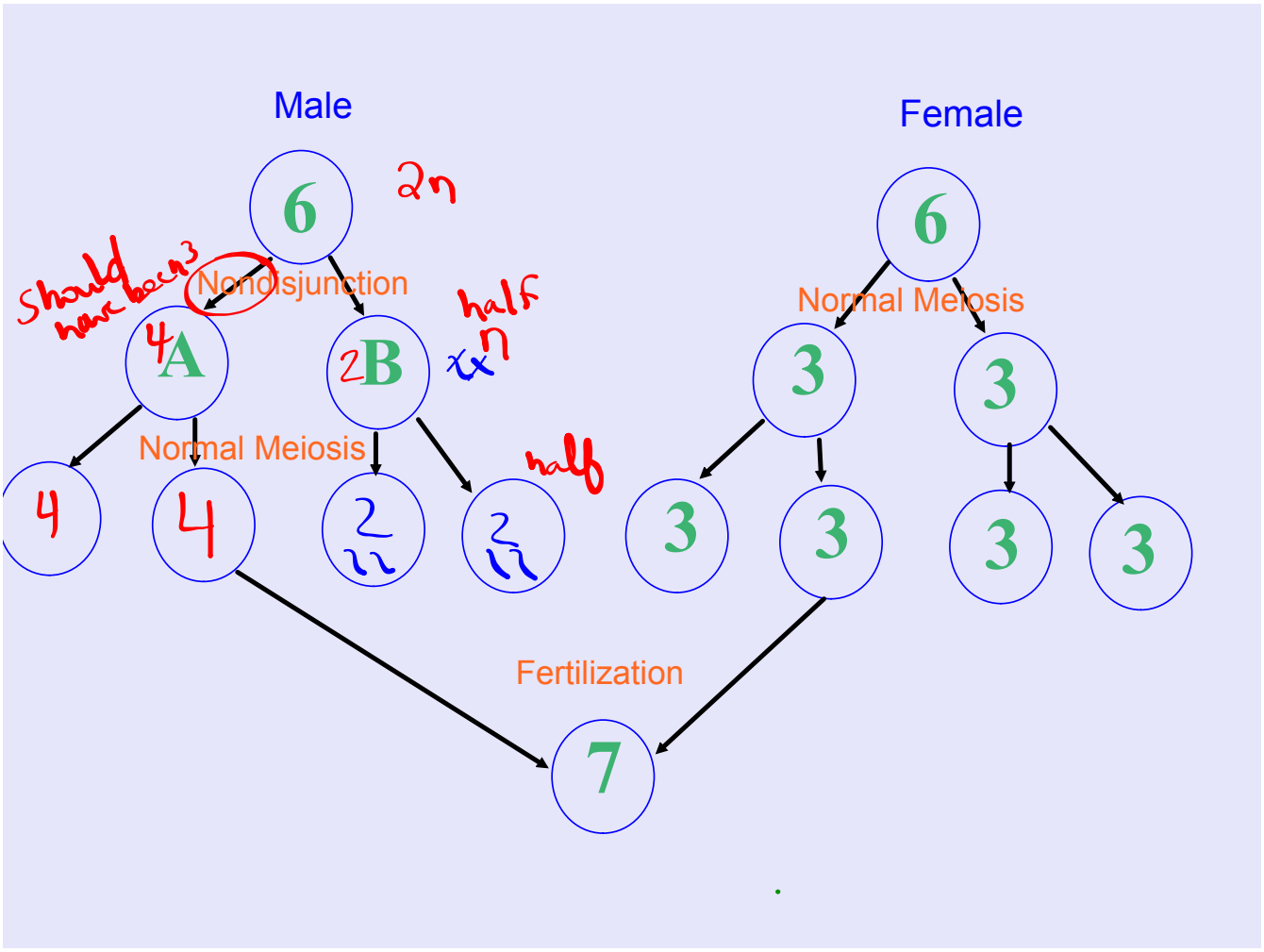
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Nondisjunction
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Normal Meiosis
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4
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half
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3
3
Fertilization
7

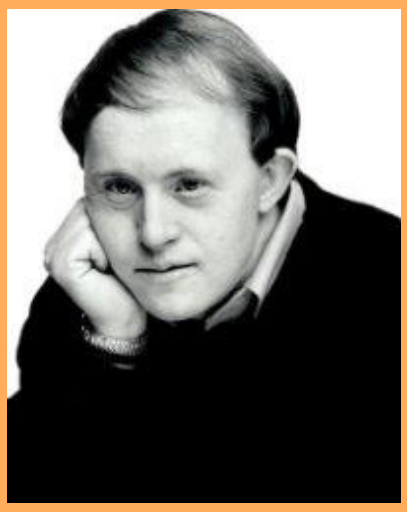
Note:
Cells that lack genetic information or have too much information will not function properly

In humans, PG 222

This type of problem can come from either the mother or the father. The resulting imbalance of genetic material gives the fertilized egg too little or too much genetic information.

Examples of nondisjunction include

DOWN SYNDROME: an extra 21st chromosome, a trisomic disorder where a person has too much genetic information. Many varying traits such as full face, short, large forehead. Affects 1 in 600 babies. Mothers over 40 years of age have a 1 in 40 chance of having a Down Syndrome baby.




21
STAY
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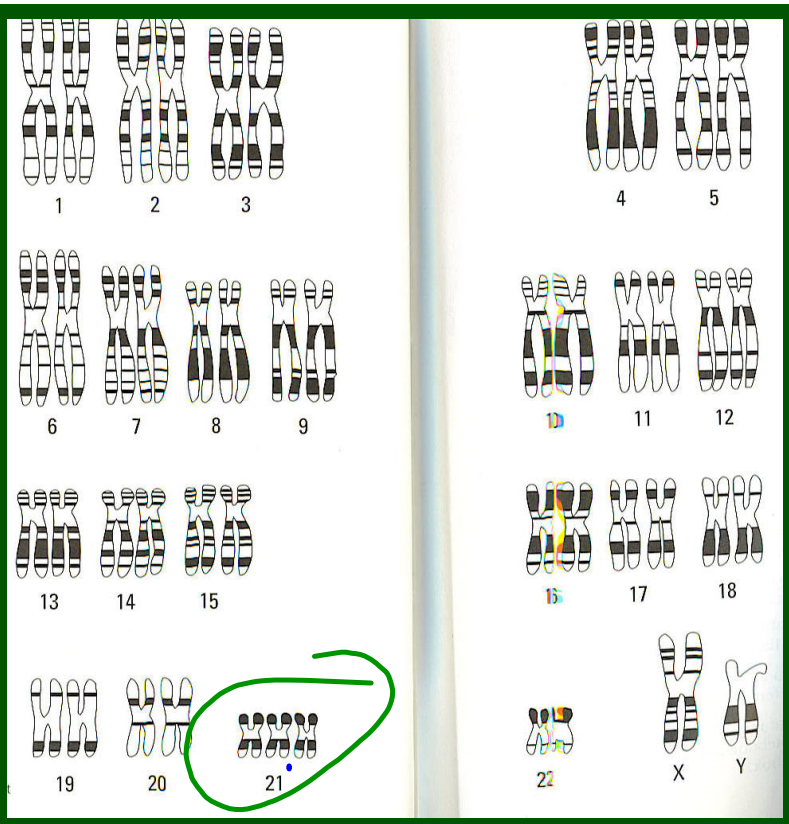
IT'S ONLY
AN EXTRA
CHROMOSOME

h

Just Like You-Down Syndrome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The chances of having a child with a chromosomal inheritance error become greater as women grow older .

Down Syndrome Occurrence and Mother's Age

- **Women in their 20s who become pregnant have about a one-in-1,230 chance of having a pregnancy affected with Down syndrome.**
- **At age 30, it's one in 690.**
- **By age 35, the chances increase to one in 270.**
- **At age 40, the risk in one in 78.**
- **At age 45, chances are one in 22.**

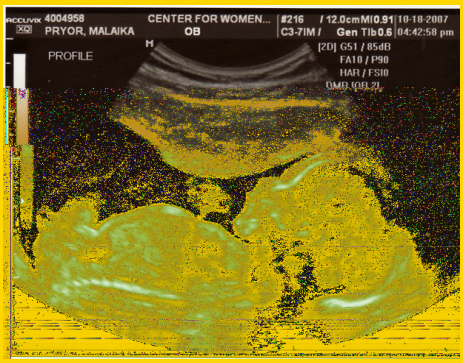
Genetic Screening

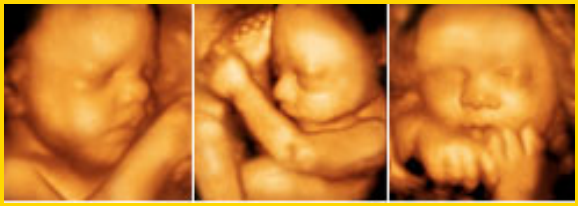
Many genetic disorders, such as Down Syndrome, can be detected before the baby is born.

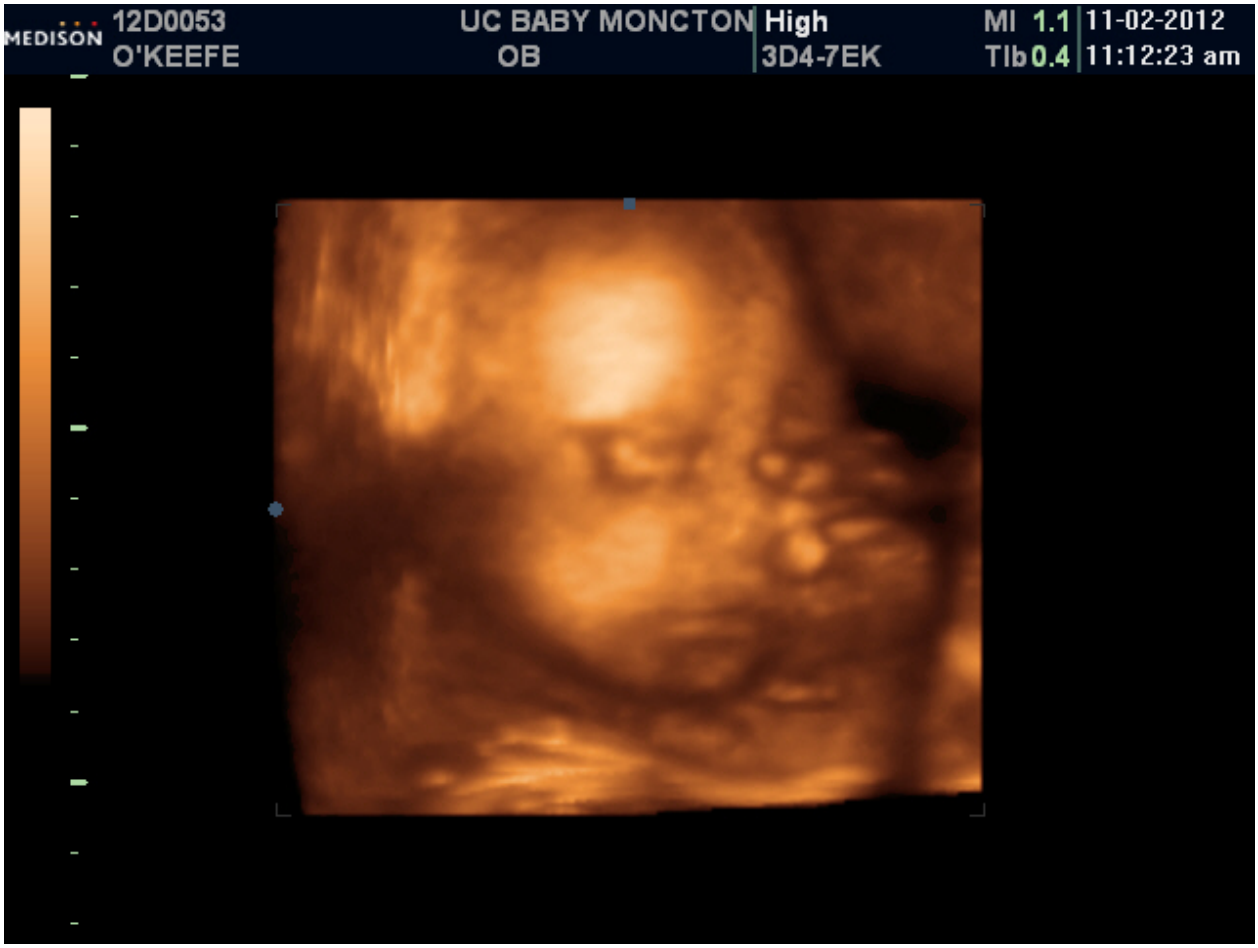
Prenatal tests such as ultra sounds and amniocentesis can help rule out the presence of a chromosomal error with a high degree of certainty in pregnancy.

Ultra sound

Ultra sounds are used to locate the position of the developing fetus in the uterus of the mother. A ultra sound release high frequence sound waves, that cannot be hear with the naked ear, are released and outline the shape of the baby.



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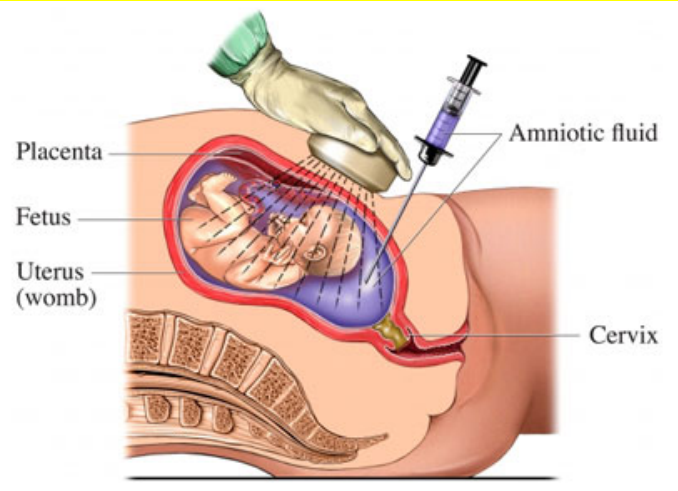
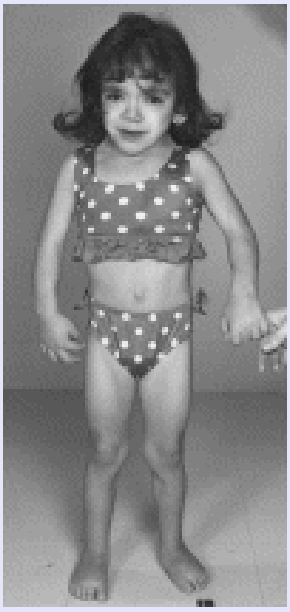
amniocentesis

A doctor incerts a needle into the mothers stomach to draw fluid from a sac that surrounds the fetus. The fluid, called amniotic fluid, contains the DNA of the fetus.



TURNER SYNDROME: when the sex chromosomes, pair 23, undergo nondisjunction to form a female with a single "X" chromosome. The zygote has 45 chromosomes, monosomic. Females are short, thick necks, sexually underdeveloped. Affects 1 in 10000 births (more miscarried).



http://learn.genetics.utah.edu/content/disorders/whataregd/turner/index.html

http://www.biology.iupui.edu/biocourses/N100/2K2humancsomaldisorders.html

Attachments

Genes__Genetics__and_DNA.mp4