

KARYOTYPING LAB

PURPOSE

This lab will give students the opportunity to study amniocentesis and karyotype procedures.

MATERIALS

activity sheets
glue or tape
pen or pencil
scissors

PROCEDURE

1. In this lab activity you will pretend you have been hired by a genetics testing laboratory. A lab report comes to you with amniotic fluid sample taken from a pregnant woman. The physician suspects the fetus may have a birth defect for the following reasons:
 - a. The father's family has a history of children born with defects.
 - b. The mother is 39 years old.
 - c. The mother is known to have used the medication Accutane during this pregnancy.

If the karyotype analysis from the amniotic fluid is normal, then the physician may prescribe a sonogram to detect any physical deformities in the fetus. While it may not be possible to detect physical defects caused by Accutane, the mother's use of this drug puts the child at risk for birth disorder. This is the first time you have performed the amniocentesis.

2. You now have received the chromosome scatter sheet, and you prepare to make the karyotype. **Record the letter on the scatter sheet for future reference.**
3. Carefully cut out each of the chromosomes in the scatter worksheet you have been given. Save the large capital letter in the bottom right-hand corner. Rearrange the chromosomes into matched pairs, using your karyotype reference sheet as a guide. When searching for a mate for each chromosome, remember to consider the length of the "arms" and the placement of the CENTROMERE, the point where the two CHROMATIDS (halves) of the chromosome are joined.

Karyotyping Lab (cont.)

4. Copy the large letter that you found on the lower right-hand corner of your scatter sheet. Write it at the top of your Karyotype Layout Sheet.
5. After all the chromosomes pairs are matched, glue the matched pairs onto the karyotype layout worksheet, arranging the pairs in order from longest to shortest.

LABORATORY QUESTIONS

Answer the following questions, using complete sentences.

1. What is the name of the fluid in which a developing embryo or fetus floats?
2. What is the name of the procedure that removes and tests amniotic fluid?
3. What type of fetal cells are shed into the surrounding fluid?
4. What is the name of the machine that spins the removed fluid to compact the fetal cells?
5. What will happen to the compacted cells?
6. How many pairs of chromosomes were present in the karyotype you completed?
7. What was the sex of the child who donated these chromosomes?
8. Did you find the fetal chromosomes to be (apparently) normal or abnormal?
9. On the bottom of your karyotype – write the sex of the individual and the chromosomal abnormality.

CONCLUSION

Write a letter to the parents of this individual. Describe the processes involved in creating the karyotype. Use the information in the chart “Human Birth Defects Resulting from Chromosomal Disorders” to identify the condition, list the genetic characteristics of the condition and offer advice as to care of the baby.

Use the link below or the link on the Biology Lab Page to find

Human Chromosomal Disorders

<http://www.biology.iupui.edu/biocourses/N100/2k2humancsomaldisorders.html>

Karyotype Reference Sheet

