Lab Script: Readying Karyotypes (online)

Mrs. Côté **Biology 12**

Problem:

How are karyotypes organized and what are some genetic conditions that can be identified from a karyotype?

Introduction:

A **Karyotype chart** shows a complete set of chromosomes that make up all the genes in a specie. The human karyotype has 46 chromosomes, 23 coming from each parent. These chromosomes are found in the nucleus of almost every cell in the body. A Karyotype chart organizes the chromosomes in homologous pairs (the male and female chromosome that share the same alleles, shape and size). The first 22 chromosomes are autosomal and the 23rd set determines the sex of the individual. If the individual receives an X from their mother and a Y from their father, they will be a male. If an individual receives an X from both their mother and father, they will be a female.

However; individuals do not always receive the correct amount of chromosomes, errors can happen and either cause a person to have less more (aneuploidy) than 46 chromosomes. This happens when there is a failure of the chromosomes to separate properly during anaphase of cell division. When this occurs in gametes that are conceived, it causes a nondisjunction disorder, and can happen in older women.

Pre-Lab Questions: Please see handout or online classroom.

Materials:

- human chromosomes karyotype chart (online classroom)
- key to gene symbols page (online classroom)
- data collection (forms survey)
- male and female chromosome power point

Procedure:

A. Open the male and female chromosome power point and match the male and female chromosomes to each other. They are paired up according to similar size, shape and genes (bands running across the chromosomes) . Use the human chromosome karyotype chart found on the online classroom to help you. Each power point page has 5 to 6 chromosomes on it, and they will match with one on that page (chromosomes will not have to switch from page to page for matching).

B. Order the chromosomes 1 through 23 by remembering that chromosomes become smaller from 1 to 22 and the sex chromosomes will always be at the end. Save this to your device as you will have to pass it in at the end of the lab.

C. Using the key to genes symbol sheet indicate your baby's number and the following data:
    - if it is male or female
    - how many chromosomes it has (remember what it means if there are missing chromosomes)
    - what genetic disease it has
    - what your baby is a carrier for
    - What your baby's blood type is
    - What the Rh factor is for your baby's blood (note: positive Rh is dominant over negative)
    - Hair colour
    - Eye colour (note: if no eye colour is given, assume brown eye colour is expressed. When the activity was made, the location for brown eyes was unknown.

Essential Outcome Requirement:

Complete the forms information correctly showing your understanding of reading karyotypes.

Extension Option:

Complete a proper lab report using the information provided on how to correctly write a lab report. Make sure to ask any questions you have as well collect and complete the analysis questions.