



## Project ID: 633

### JR - Cellular and Molecular Biology

Mikaela Holmlin

Grade 8

The Children's School

Advisor: Diana Quincannon



#### *Evaluating the Use of Chromosomal Aberration and Structural Variation to Identify Sex, Ethnicity and Age from DNA Samples*

Genetic analysis has the ability to improve health and wellness, but it does have limitations. A method like Optical Genome Mapping (OGM) may be able to overcome these limitations. The purpose of this study was to determine if structural variants were a useful way to look at genetic differences. Fifty healthy donor samples were mapped using OGM. The mapping showed where individual samples are different from a reference standard. The differences that OGM detects are known as structural variations and generally represent hundreds or thousands or even millions of base pairs being rearranged or deleted. I compared the differences from sample to sample. Since I knew the sex and geographic origin of the donor, I determined if the patterns in each sample are the same or similar for donors with similar traits like sex, or geographic origin. I found that there was a difference in the average number of structural variants in people coming from different geographic origins, and a small difference between the genders. These results prove that differences in structural variants can be used to evaluate genetic traits. A structural variation is a sensitive tool for studying genetic traits. It is very helpful and can be used to benefit for the world one day. Its useful for scientists and doctors which can help towards the state of health of health of all people.