

# Identify Genotype on Two Individuals Using SNPs

Jacqueline Amaya Hernandez and Kiley Clark  
Longwood University  
Biology 250



## Introduction

- Polymorphisms can influence traits, medical information, and rare mutations can lead to health problems.
- Single Nucleotide Polymorphisms, or SNPs, are a type of genetic variation representing a difference in one single nucleotide.
- Predictive genetic testing can screen for SNPs associated with a disease.
- The SNP for blue/brown eyes has been used to investigate a connection between iris pigments and the risk for melanoma (Laino, 2018).

### Specific Aim

In this experiment, sequences of DNA from human cheek cells were studied for the presence of SNPs for cilantro aversion, blue/brown eye, curly hair, and sneeze reflex.

### Hypothesis

It was hypothesized that the first subject would be homozygous for both sneeze reflex and curly hair. The second subject was predicted to be heterozygous for blue/brown eyes and cilantro aversion

## Methods

### Sample Collection

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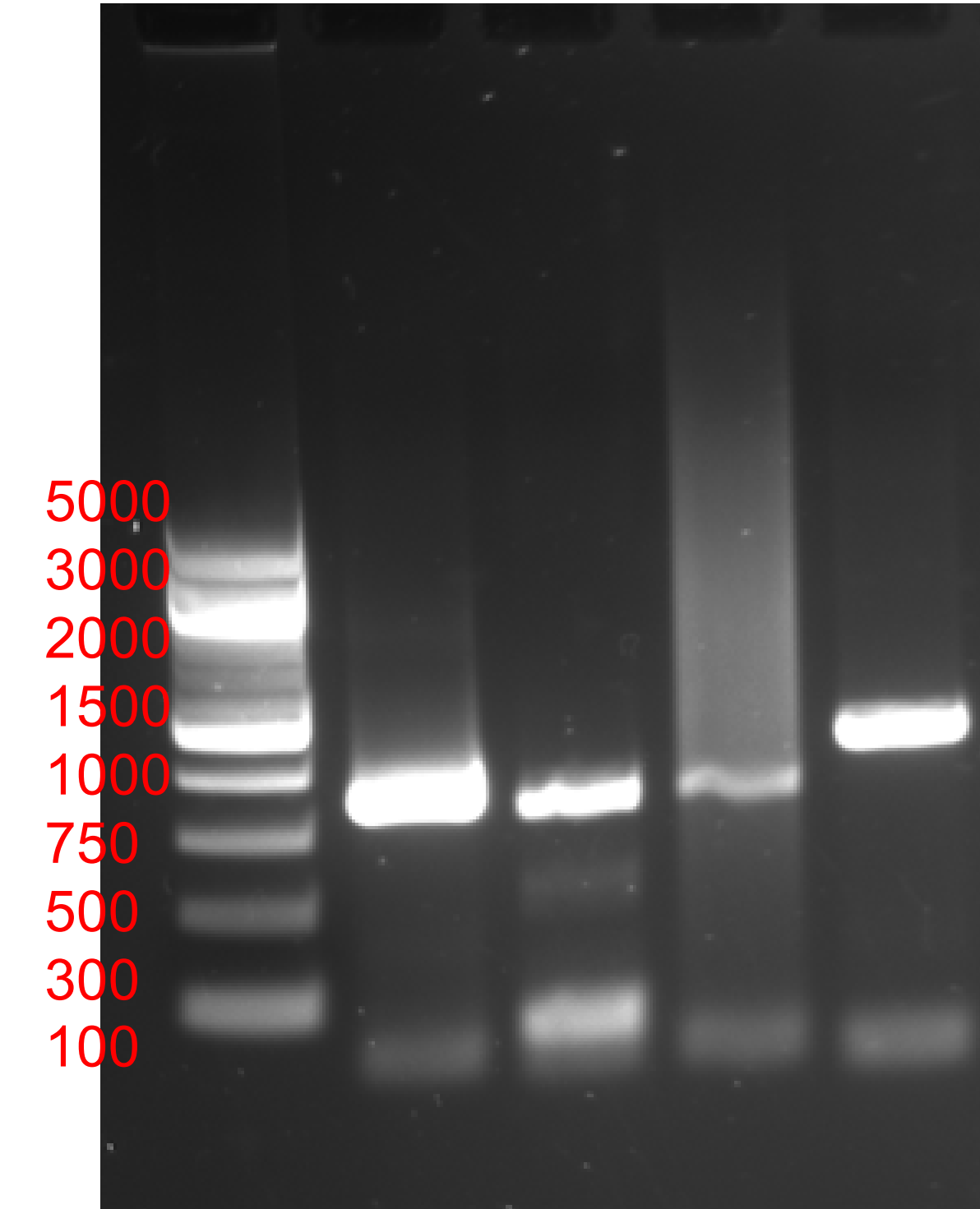
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**Table 1. Nucleic acid concentration and A260/A280 for 5C1, 5C2, 6C1, and 6C2.**

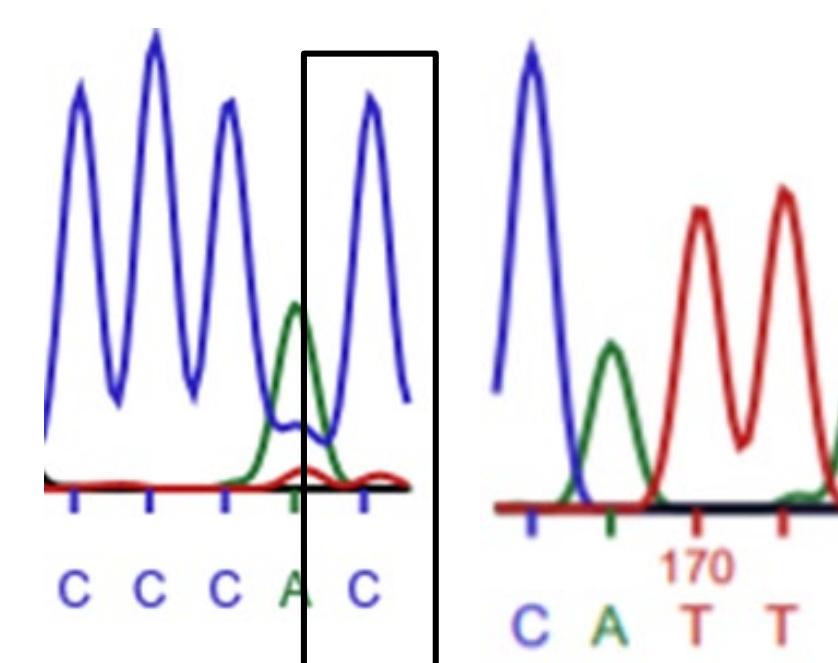
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LADDER 5C1 5C2 6C1 6C2

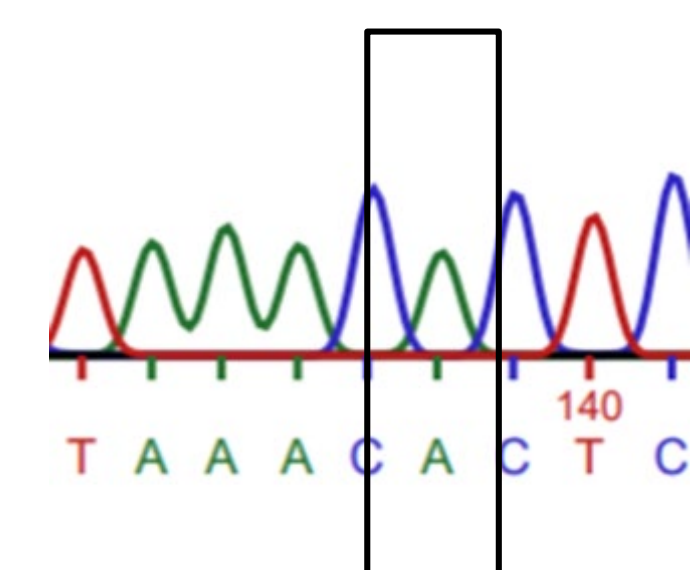


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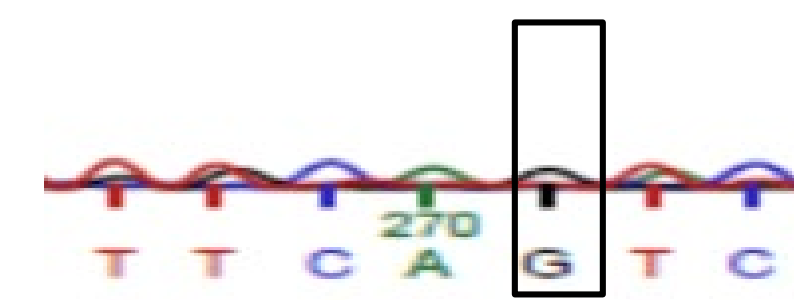


**Figure 2. SNP 1 Chromatogram.**

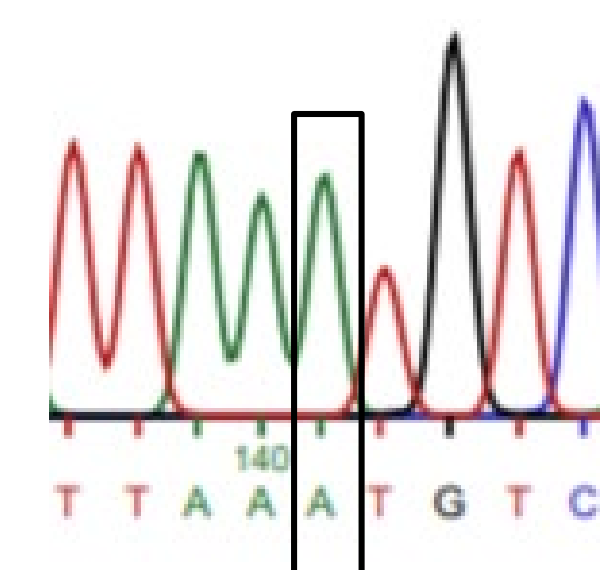
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**Figure 3. SNP 2 Chromatogram.** The image above demonstrated curly hair for PCR 5C2.



**Figure 4. SNP1 Chromatogram.** The image above demonstrates a sequence trace for cilantro aversion for PCR 6C1.



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Individual: PCR 5C1 and 5C2

- SNP1: Heterozygous
- SNP2: Homozygous

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## Conclusions

The first subject was found to be heterozygous for curly hair and homozygous for sneeze reflex and the second subject was homozygous for both cilantro aversion and blue/brown eyes, meaning that the hypothesis was not supported

- Research was conducted on a SNP that affects cilantro taste and preference. Women and those of European descent were more likely to have a cilantro aversion (Eriksson, 2012).
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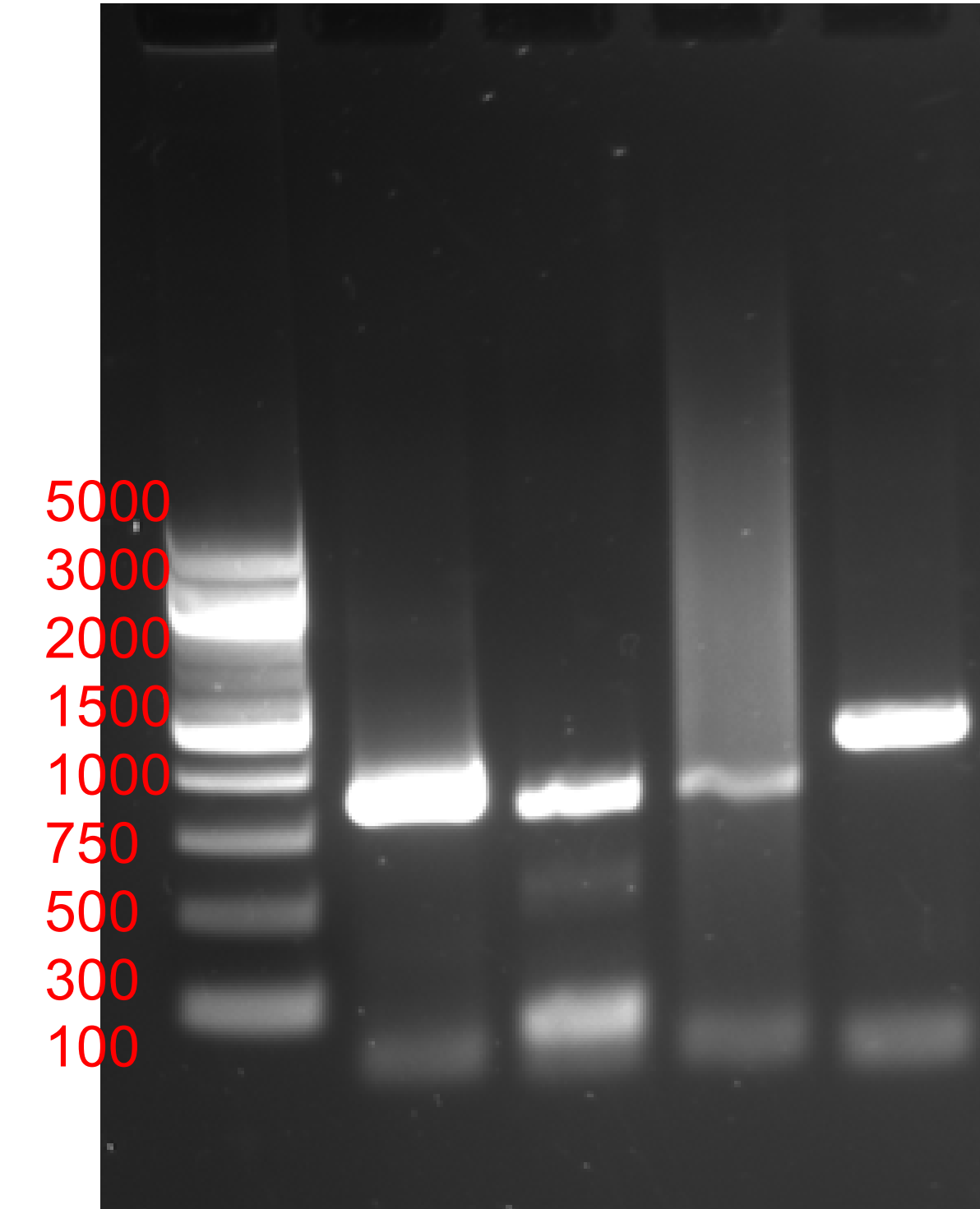
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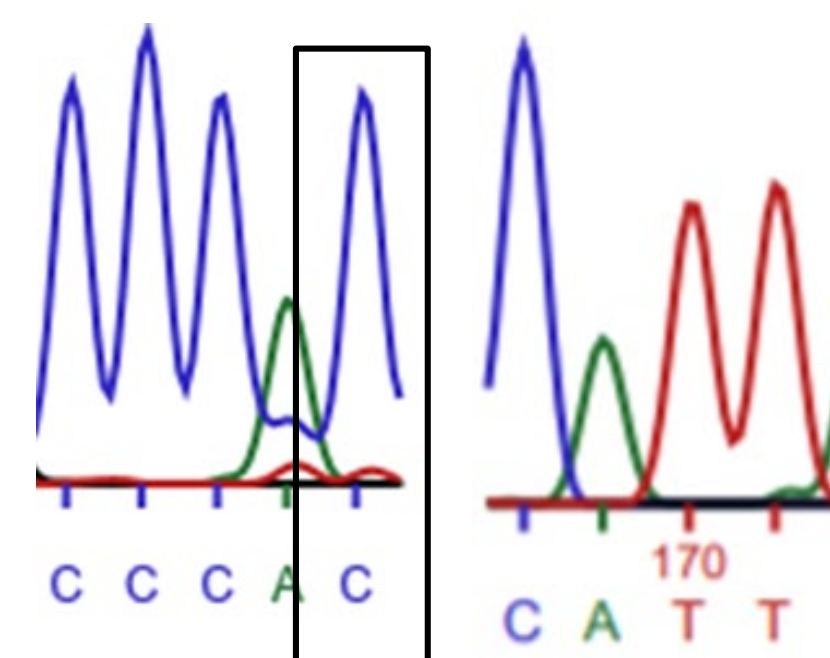
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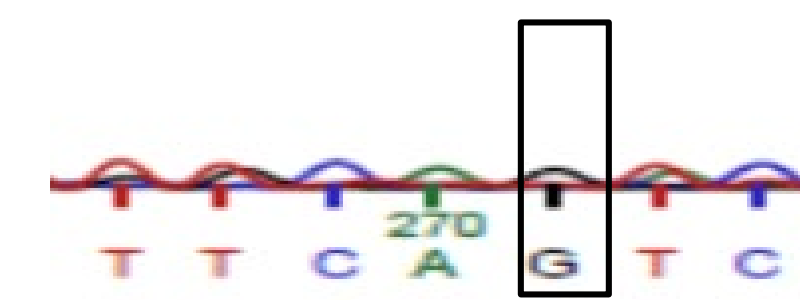


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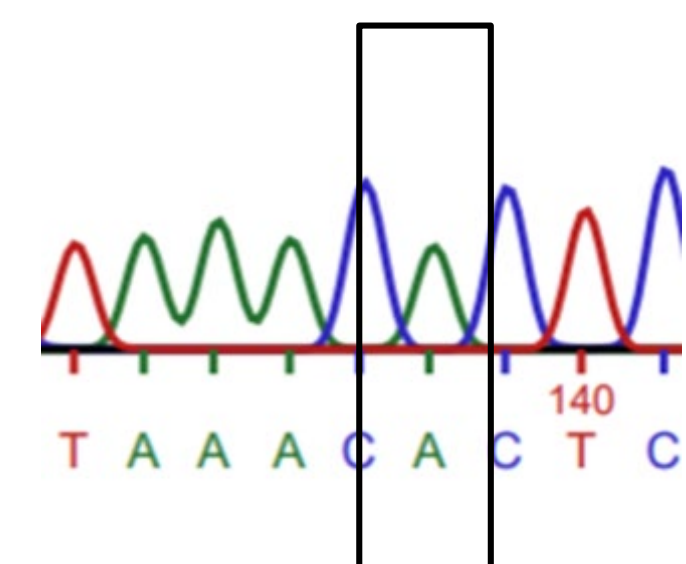


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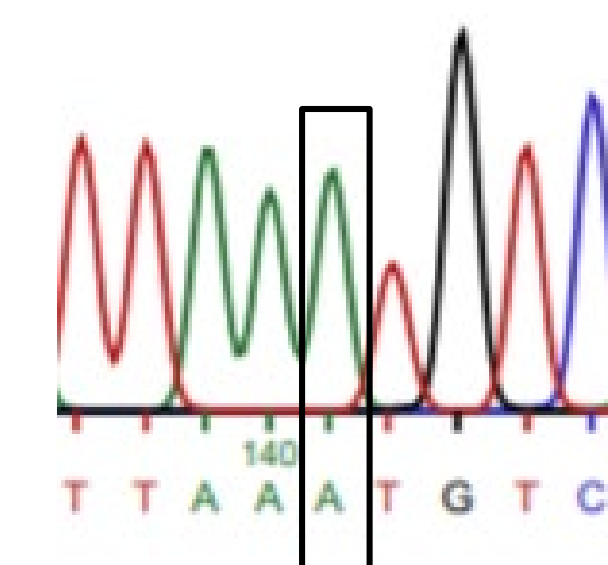
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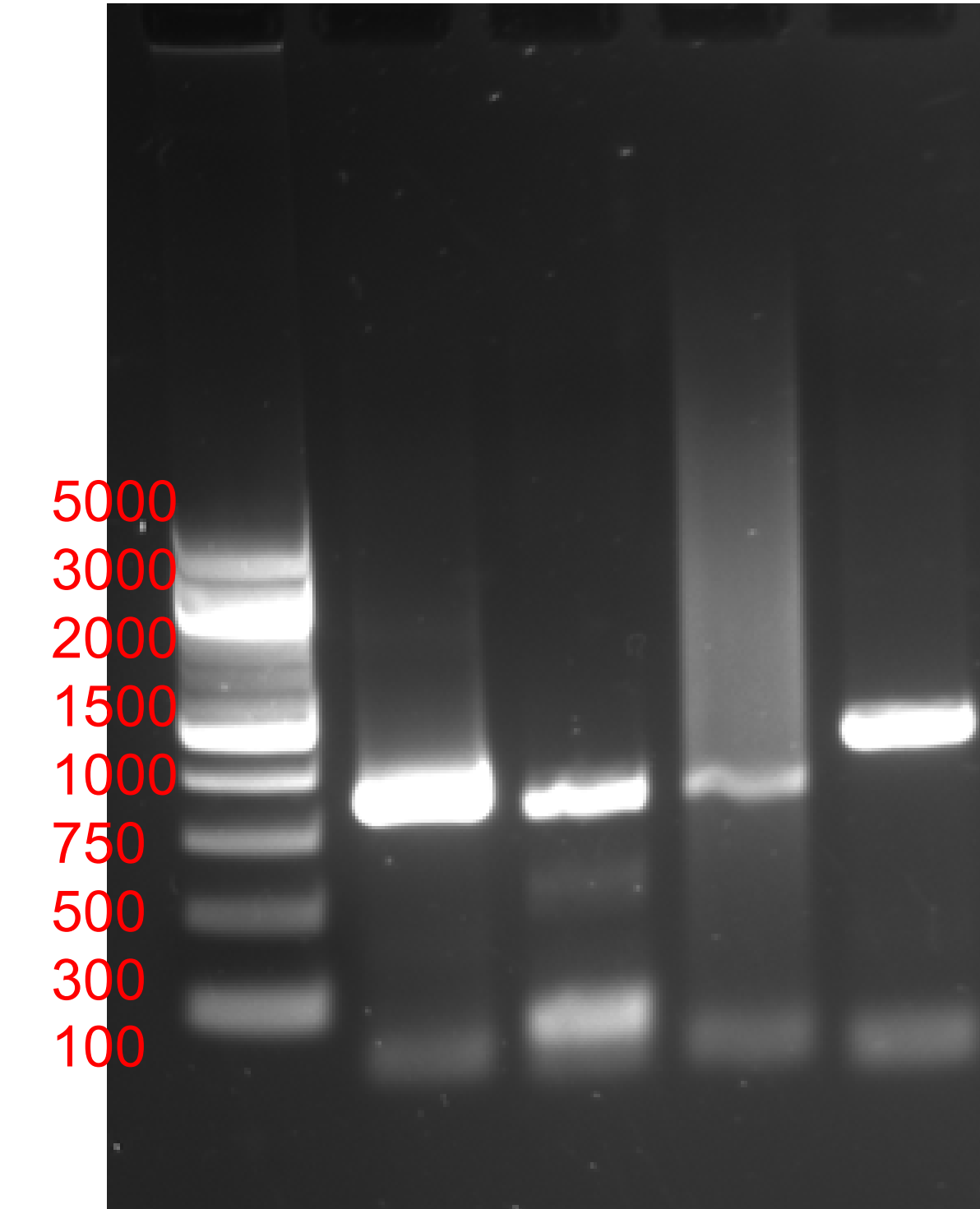
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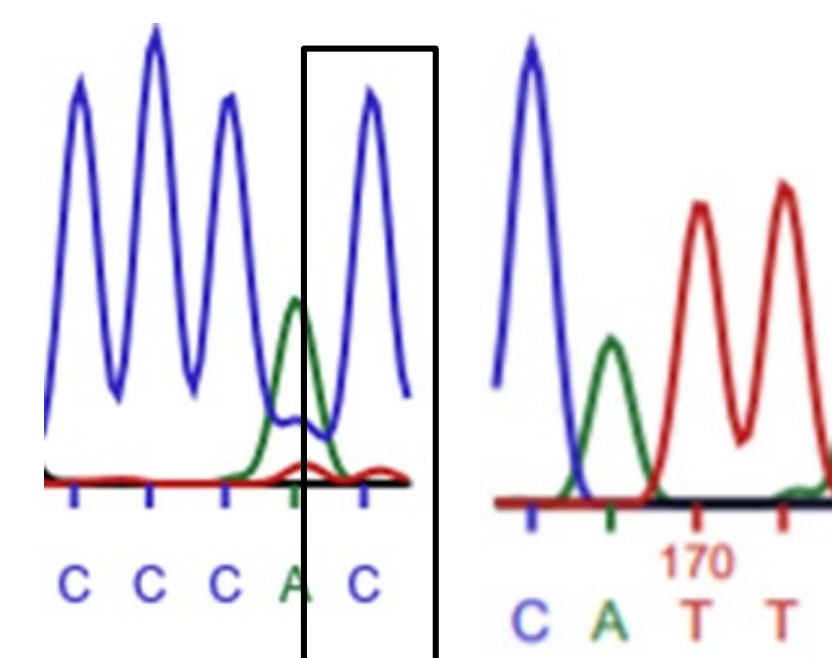
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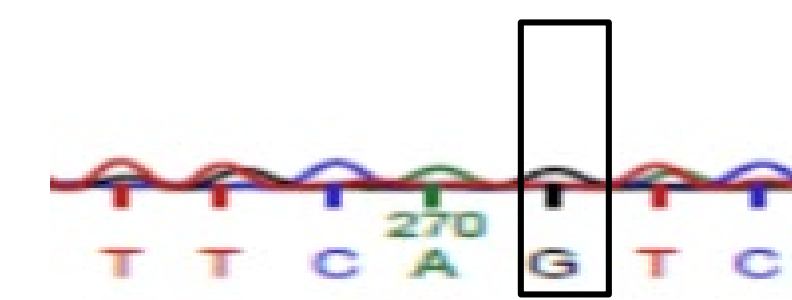


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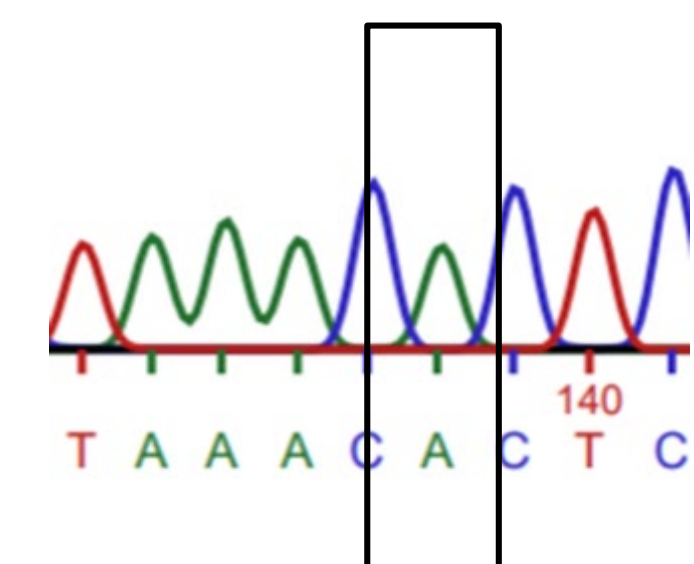


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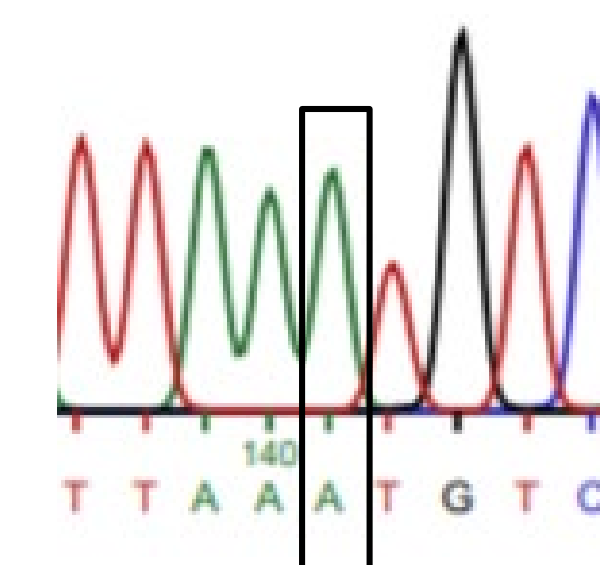
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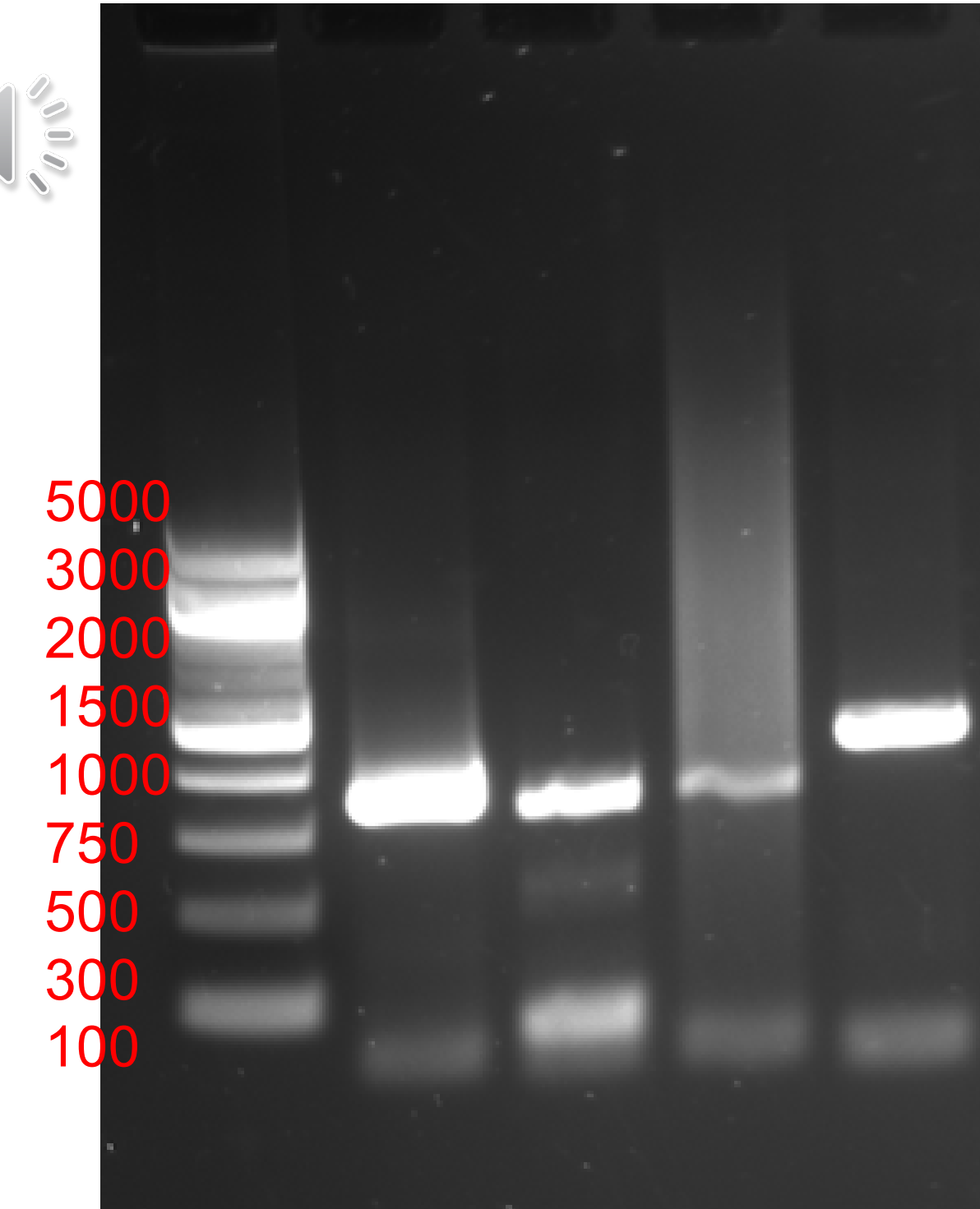
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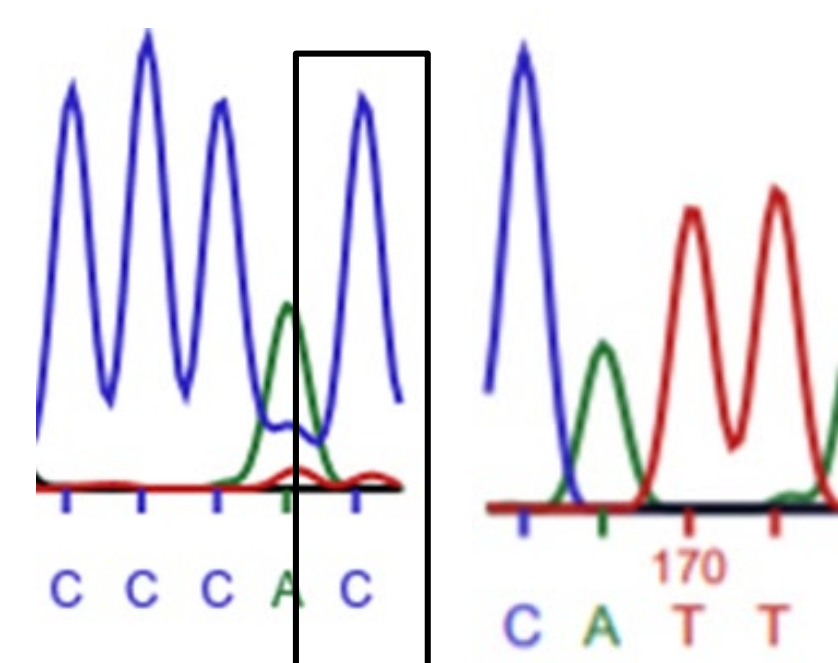
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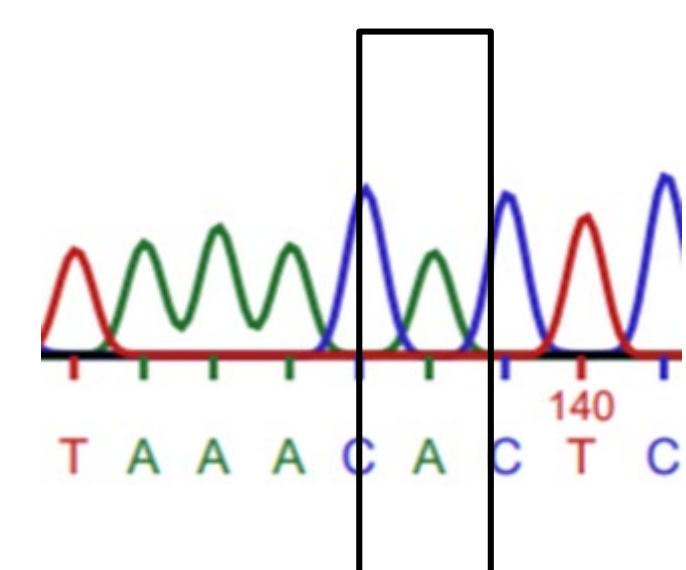


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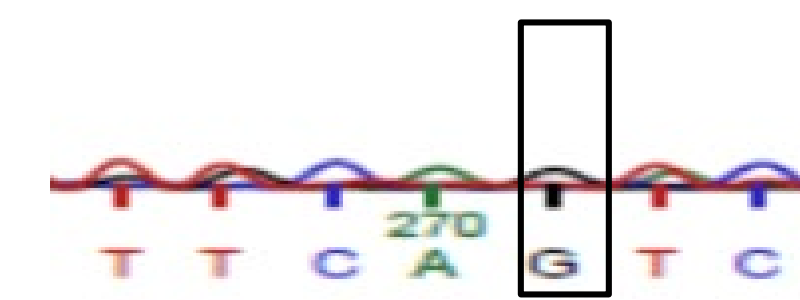


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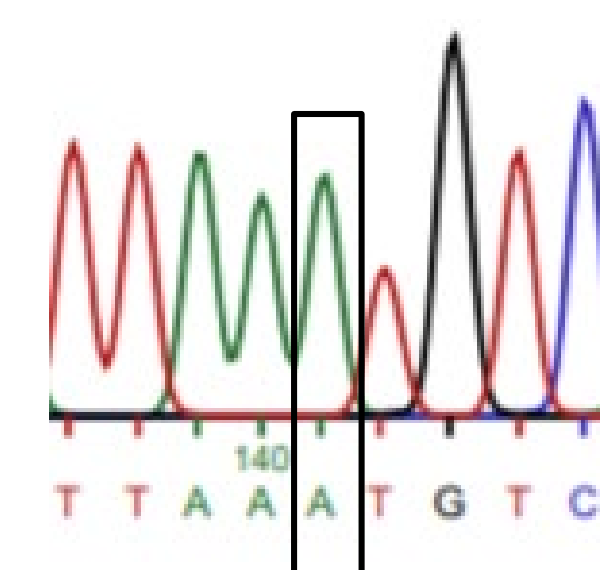
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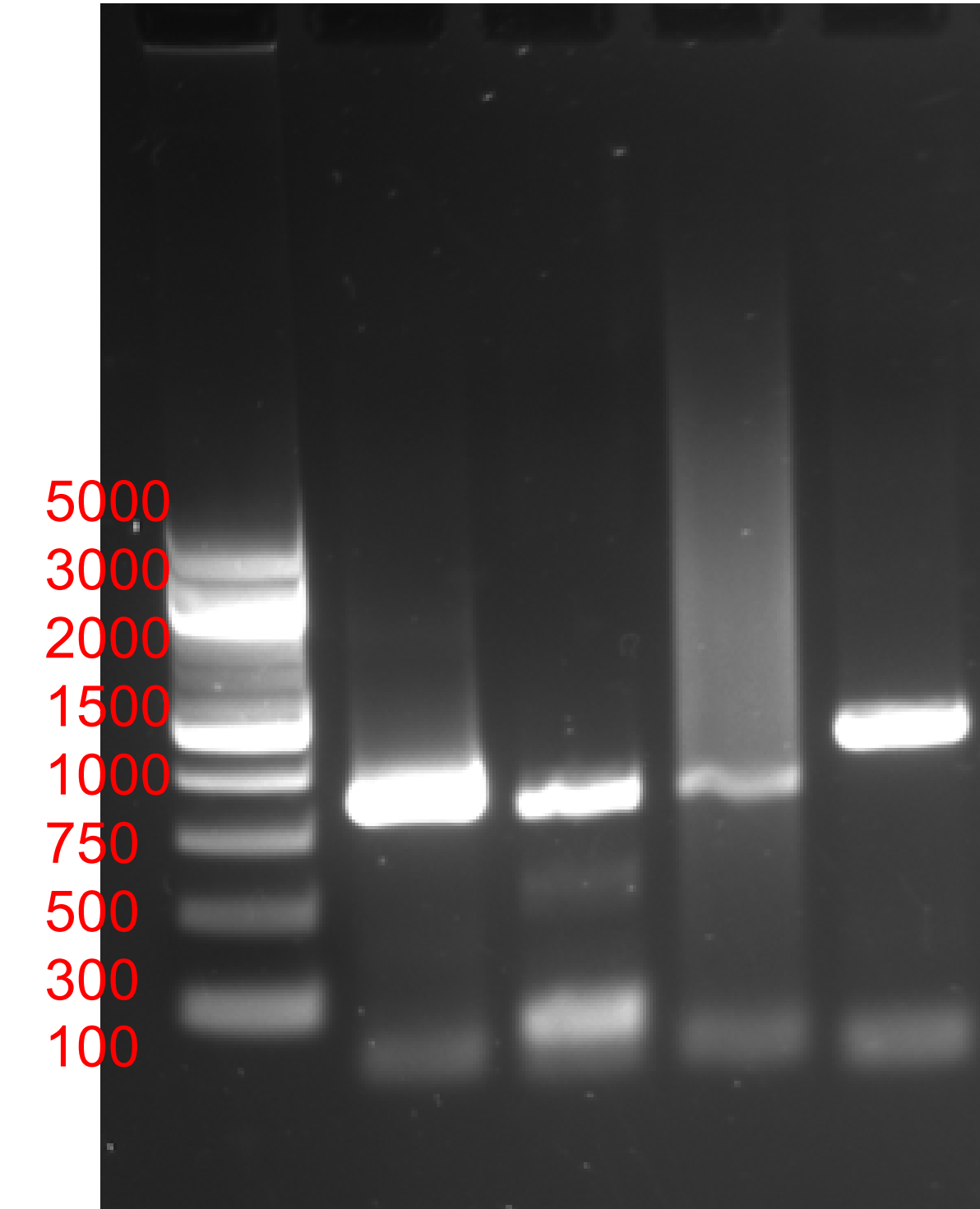
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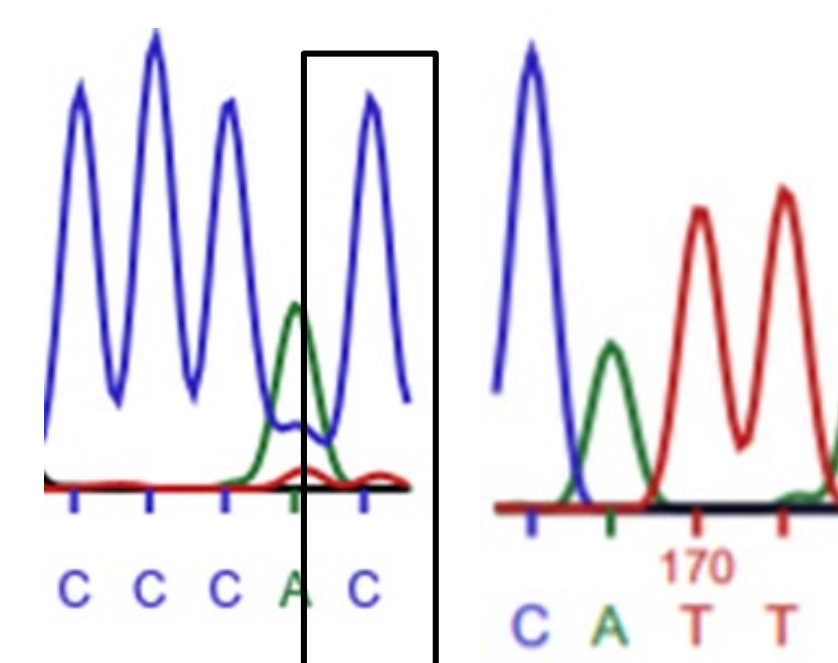
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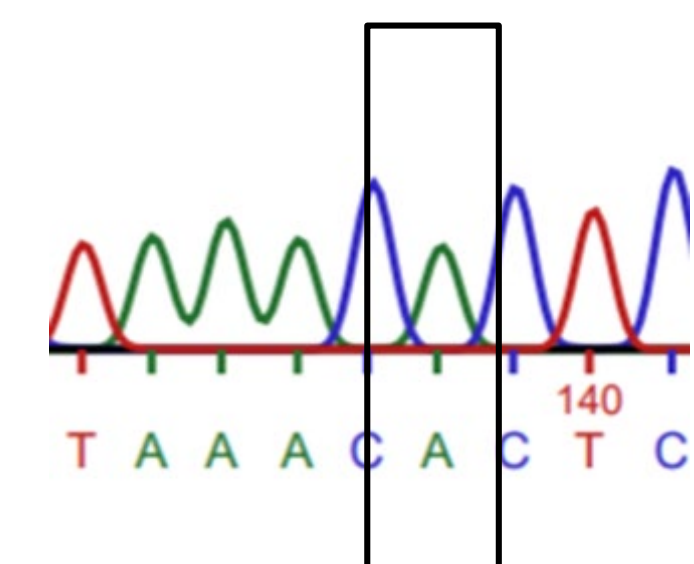


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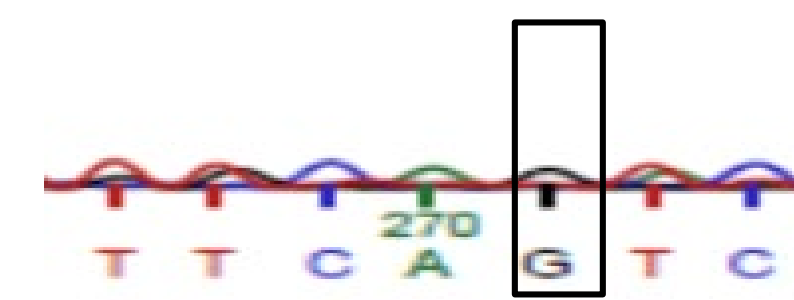


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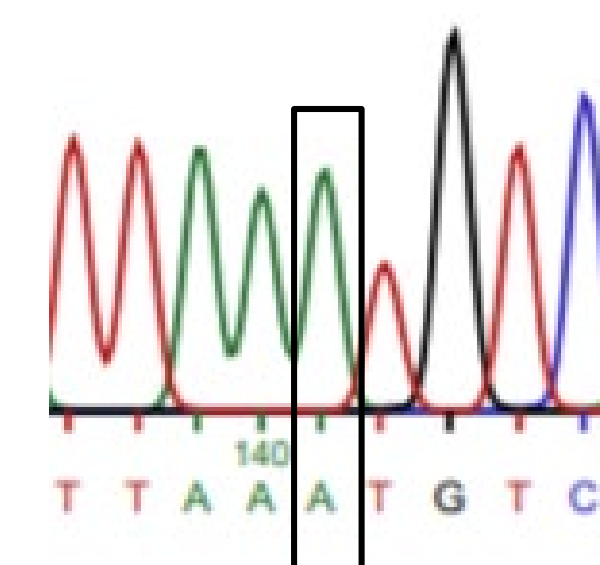
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- Research was conducted on a SNP that affects cilantro taste and preference. Women and those of European descent were more likely to have a cilantro aversion (Eriksson, 2012).
- Studies done on photic sneeze reflex (PSR) suggested that most individuals were homozygous for the SNP (Wang, 2018).

### Further Research

SNPs are variations in DNA that can be studied to understand traits. Sequencing can be done to track genetic history and inheritance.

- Further research can be done to investigate what genetic diseases are associated with certain variations and can track them.
- Genetic sequencing can improve testing for diseases in pregnancy or infancy to predict a person's predisposition to a disease early on.

### Limitations

- Accidentally piercing the gel during electrophoresis could affect the visibility of the amplicons

## References

- Bergtrom, Gerald. 2018. "ANNOTATED CELL AND MOLECULAR BIOLOGY 3e: WHAT WE KNOW AND HOW WE FOUND OUT." *Cell and Molecular Biology 3e: What We Know and How We Found Out - All Versions*. 8.
- Eriksson, N. Wu, S. et al. 2012. A genetic variant near olfactory receptor genes influences cilantro preference. *BioMed Central*.
- Laino, A.M. Berry, E.G. Jagirdar. K. et al. 2018. Iris pigmented lesions as a marker of cutaneous melanoma risk: an Australian case-control study. *US National Library of Medicine National Institutes of Health*.
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# Identify Genotype on Two Individuals Using SNPs

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Biology 250



## Introduction

- Polymorphisms can influence traits, medical information, and rare mutations can lead to health problems.
- Single Nucleotide Polymorphisms, or SNPs, are a type of genetic variation representing a difference in one single nucleotide.
- Predictive genetic testing can screen for SNPs associated with a disease.
- The SNP for blue/brown eyes has been used to investigate a connection between iris pigments and the risk for melanoma (Laino, 2018).

### Specific Aim

In this experiment, sequences of DNA from human cheek cells were studied for the presence of SNPs for cilantro aversion, blue/brown eye, curly hair, and sneeze reflex.

### Hypothesis

It was hypothesized that the first subject would be homozygous for both sneeze reflex and curly hair. The second subject was predicted to be heterozygous for blue/brown eyes and cilantro aversion

## Methods

### Sample Collection

Each individual cheek cell were swabbed and mixed in sterile water.

### PCR Reaction

Each SNP contained primers mix, sterile water, cheek cells, and master mix were added to PCR tube. They were then thermocycle.

### Gel Electrophoresis

Electrophoresis chamber with 2% agarose gel, 0.25X TAE buffer to cover the gel was added. DNA ladder and samples were loaded and ran at 300 V for 15 min.

### PCR Purification

DNA was purified with binding buffer and DNA wash buffer. Nanodrop was used to determine DNA concentration and A260/A280 values.

### DNA Sequencing

DNA was sent to Eurofins Genomics Company to be sequence. Text file and SNP chromatogram was obtained from the company to be analyze.

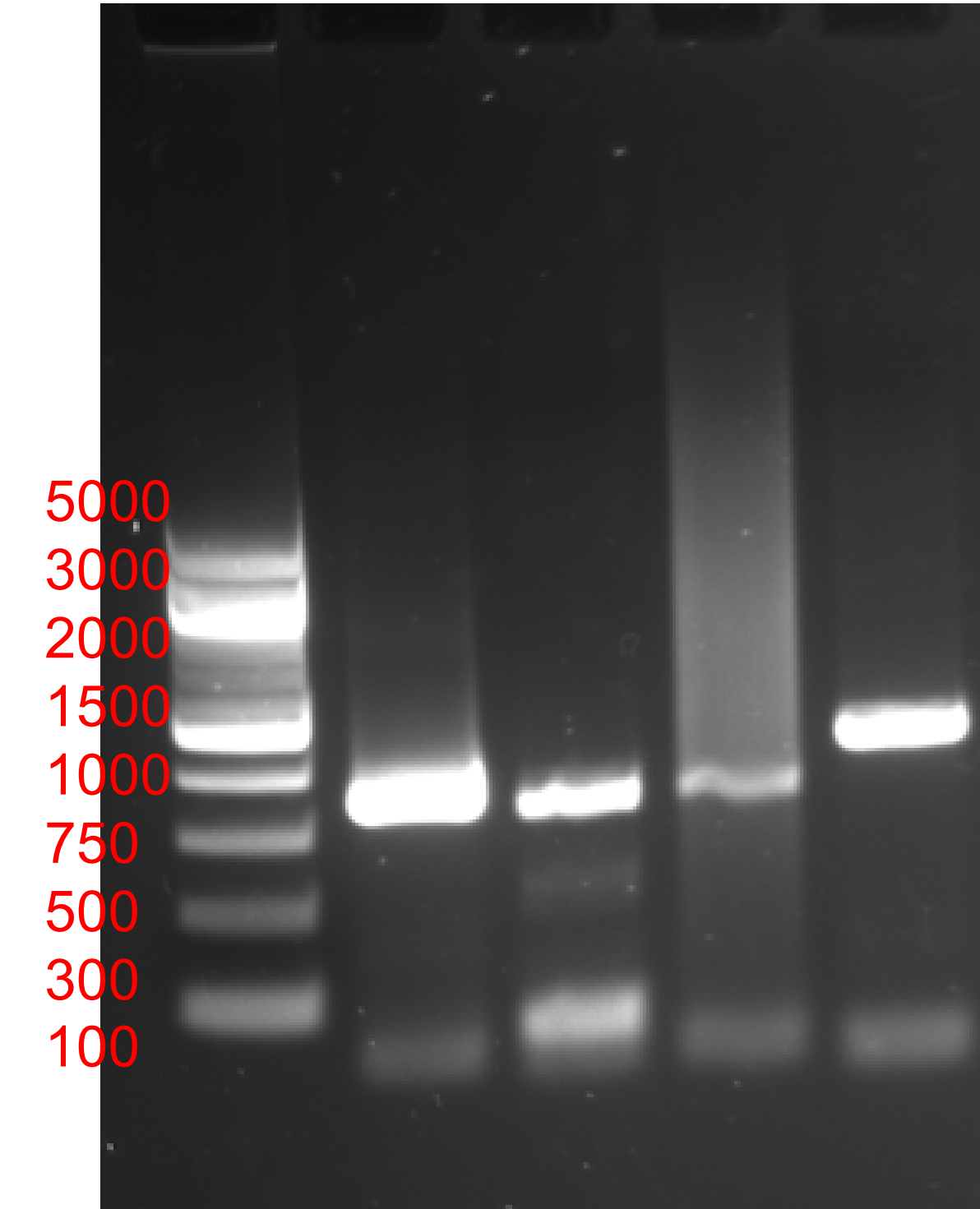
## Results

**Table 1. Nucleic acid concentration and A260/A280 for 5C1, 5C2, 6C1, and 6C2.**

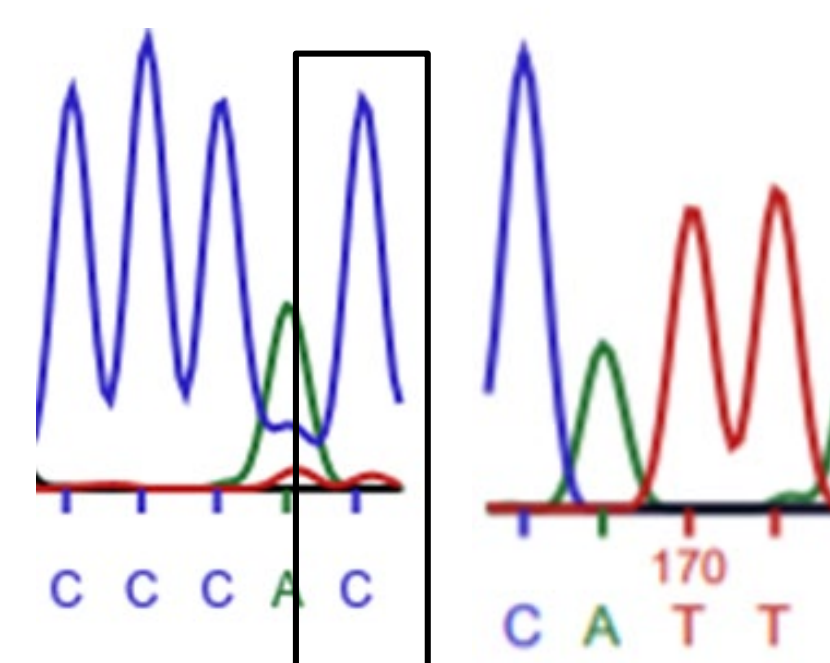
The data below demonstrates the nucleic acid and A260/A280 that was collected through nanodrop to measure the DNA concentration

Number	Nucleic Acid Concentration (ng/ul)	A260/A280
5c1 (Sneeze Reflex)	37.8 ng/ul	1.93
5c2 (Curly Hair)	19.1 ng/ul	2.06
6c1 (Cilantro Aversion)	29.6 ng/ul	1.84
6c2 (Blue/Brown Eyes)	28 ng/ul	1.86

LADDER 5C1 5C2 6C1 6C2

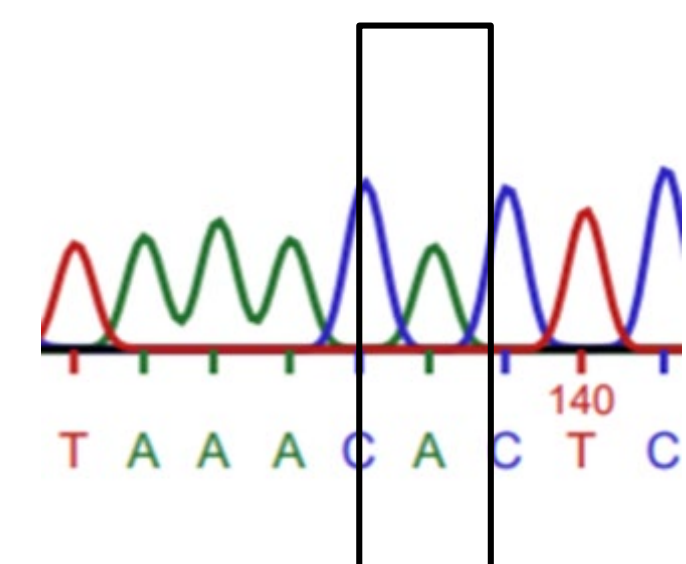


**Figure 1. Gel electrophoresis of the DNA amplicon.** The image above demonstrated a picture capturing DNA of the two individual. PCR 5C1 (SNP1), 5C2 (SNP2), 6C1 (SNP1), and 6C2 (SNP2). The number on the left demonstrates the base pairs.

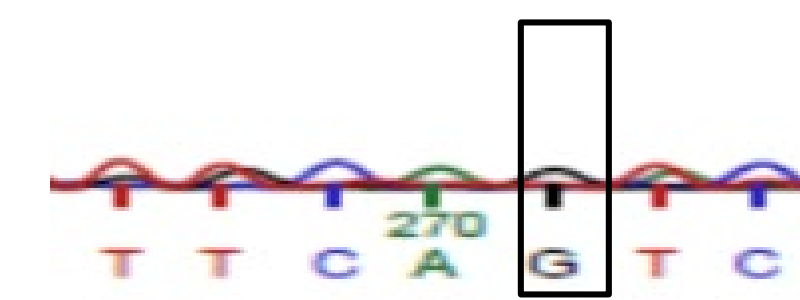


**Figure 2. SNP 1 Chromatogram.**

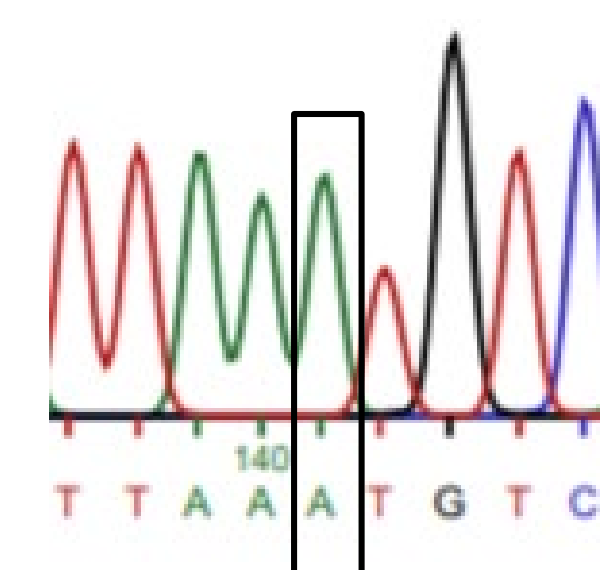
The image above demonstrated a high-quality sequence trace. Also, it demonstrates photic sneeze reflex for PCR 5C1.



**Figure 3. SNP 2 Chromatogram.** The image above demonstrated curly hair for PCR 5C2.



**Figure 4. SNP1 Chromatogram.** The image above demonstrates a sequence trace for cilantro aversion for PCR 6C1.



**Figure 5. SNP2 Chromatogram.** The image above demonstrates the sequence for blue/brown eyes for 6C2.

Individual: PCR 5C1 and 5C2

- SNP1: Heterozygous
- SNP2: Homozygous

Individual: PCR 6C1 and 6C2

- SNP1: Homozygous
- SNP2: Homozygous

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