The purpose of this study was to evaluate whether there is a genetic link to Non-Celiac Gluten Sensitivity. We screened for the HLA DQA1 alleles among individuals with and without gluten sensitivity. So far, 14 participants have been genotyped and results showed a wide amount of allelic variation of this locus. Our analyses show no outstanding genetic patterns in the HLA DQA1 allele group between gluten sensitive and non-gluten sensitive cohorts. More participants are being screened at this time for genotype identification.

In nineteen other samples were tested but results showed more than three possible alleles for each and, therefore, could not assigned a genotype. A way to include all types of alleles in the analysis, DNA fingerprints were generated by assigning PCR products as either present or absent for each reaction. A 0/1 matrix was generated and phylogenetic tree was constructed. The tree reveals no distinct clades separating the two cohorts. This shows no correlation between gluten sensitivity and HLA DQA1 type. However, one cluster of 3 gluten sensitive individuals was identified. A larger sample size may reveal any significance to this finding.

When viewing the family tree, it is possible that there may be a genetic component to gluten sensitivity. Having a combination of DQ2 alleles (a heterozygous condition) revealed in this family may have some significance. Furthermore, since many of Generation II did not show symptoms until after age 30, Generation III is more likely to show gluten sensitive traits once they are older.

The allele HLA DQA1 subunit binds with HLA DQB1 subunit to form the protein as seen in the top left corner. The binding between these two subunits may be the cause of gluten sensitivity. To continue this research, it would be beneficial to test the individuals for their beta subunit alleles. The combined of alleles for the alpha and beta portions can provide a label for the DQ locus. For example, DQ2/DQ2 can describe individual I.2. This can be deduced because HLA DQA1 allele 05:01 is only seen in the DQ2 loci. The information provided by this testing would be beneficial to identifying any genetic patterns between gluten sensitive and non-gluten sensitive individuals.

This study would benefit greatly from a more reliable testing kit. Unfortunately, the SSP UniTray from Life Technologies had many errors with binding. These errors resulted in no data being collected for family members I.1 and II.7, these family members were crucial to identifying any patterns in genetics associated with gluten sensitivity. The SSP UniTray is also discontinued as Life Technologies updates their product line. The new product may produce more reliable and distinct results.

The Wallin Family

DISCUSSION

The INVESTIGATION OF GENETIC MARKERS ASSOCIATED WITH NON-CELIAC GLUTEN SENSITIVITY

Mentor: Dr. Diane A. Caporale, Department of Biology

The purpose of this study was to evaluate whether there is a genetic link to Non-Celiac Gluten Sensitivity. We screened for the HLA DQA1 alleles among individuals with and without gluten sensitivity. So far, 14 participants have been genotyped and results showed a wide amount of allelic variation of this locus. Our analyses show no outstanding genetic patterns in the HLA DQA1 allele group between gluten sensitive and non-gluten sensitive cohorts. More participants are being screened at this time for genotype identification.

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I would like to thank Ben Piesch for his help in the lab.

LITERATURE CITED


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