Name(s)	**Project Number**
Steven M. Wang	**J0424**

Project Title

Male Pattern Baldness: The Hair Growth Cycle and Genetic Mutations

Abstract

Objectives/Goals

Male Pattern Baldness (MPB) is the most common form of hair loss in humans and affects more than 50% of men by age 50. No accurate method exists to predict who will get this condition and treatment options are limited. The goal of this project is to discover a method to better predict Male Pattern Baldness by performing a genetic study of potential risk alleles.

Methods/Materials

My hypothesis is that detecting mutations in the APCDD1, 20p11.22,and androgenic receptor (AR) genes will give a better indication for MPB than the AR gene alone. Human consent forms were obtained from all participants who were classified into control or variable groups based on the Norwood-Hamilton Scale for Male Pattern Baldness. Numerous genetic tests were performed on the buccal cells of each subject for DNA extraction, purification, and isolation, polymerase chain reaction (PCR) and gel electrophoresis. Data for the subjects in both the control (non-bald) and the variable (bald) groups were compared, analyzed, graphed, and recorded.

Results

My experiment found that mutations in both the 20p11.22 gene and AR gene served as an effective indicator of male pattern baldness. Subjects in the variable group with the phenotype for baldness were more likely than non-bald subjects of the control group to have the A allele of the 20p11.22 gene. Eight of the 10 subjects in the variable group had both A alleles and one subject had one A allele. The control group had six subjects with both GG alleles. Current testing is being performed on the APCDD1 gene discovered to be a novel inhibitor in the Wnt signaling pathway in human hair growth.

Conclusions/Discussion

Prior studies showed that AR gene mutation pointed to sensitivity to DHT which is believed to shorten the hair growth cycle. However, current treatments for blocking DHT production have not led to a permanent cure. My research supports that multi-genetic in addition to hormone approaches are needed to better understand Male Pattern Baldness. It also showed that MPB can be paternally or maternally inherited.

Summary Statement

This project is about genetic analysis of mutations in the APCDD1, 20p11.22 and AR genes for Male Pattern Baldness to better access risk for early detection and may someday lead to better treatment options.

Help Received

My advisor Sarah Perry gave me advice on how to operate the equipment and machines. Sarah Thaler offered encouragement. Belinda Schmahl offered suggestions on putting my board together.