A Pharmacogenomic and Protein Analysis of Human Lacrimal Fluid in Varying Age Groups

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A Pharmacogenomic and Protein Analysis of Human Lacrimal Fluid in Varying Age Groups

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Statement of the Problem

Background

- Proteins are large biological molecules located within all cells. They are considered the basic functional components of cells that allow them to operate appropriately. Genes consist of both DNA and RNA, and are the cellular components that code for the proteins. A biomarker is any cellular component that is an indication of a biological state. Therefore, genetic and protein biomarkers are specific genes and proteins, respectively, present in cells that indicate a specific biological state of a cell. Identification of proteins and genetic biomarkers in relative quantities has been found to reflect various disease states and age groups in humans.
- MicroRNAs were found not only intracellularly but also in many of the body’s fluids (plasma, saliva, tears, urine). MicroRNAs can act as informative biomarkers due to the correlation in the amount and type of these microRNAs with disease.
- A reference list of 1543 proteins that they discovered in lacrimal fluids.

Significance of the Problem

- The exploratory nature of this project could follow many different avenues and has many potential uses, all of which depend on the findings. By looking at the variation of proteins and genetic biomarkers in the lacrimal fluids of patients in different age groups, we hope to identify any variations that would link a patient with a particular age group and possibly a specific disease. The differences in these lacrimal fluid components may also correlate with the individual’s eye health. We hope to identify links between variations in biomarkers (protein and genetic) and specific age groups that could potentially contribute to future research in their correlation with disease states.

Objectives

- To gather and analyze proteins and genetic biomarkers in human lacrimal fluid in varying age groups.

Hypothesis

- There will be a significant difference in the amount and type of protein and genetic biomarkers in the lacrimal fluid of individuals in different age groups.

Project Timeline

- The IRB will be submitted in December 2012 and, pending IRB approval, subject recruitment will take place between January 2013 and April 2013. In August 2013, the researchers will receive training from Dr. Florkey on how to correctly utilize the capillary method in collecting lacrimal fluid from the subjects. Collection of subject information and lacrimal fluid samples and the analysis of the samples will occur between September 2013 and April 2014.

Limitations

- The limitations of this study include the unknown time that will be required to recruit the needed number of subjects, the potential for human error in the analysis of the samples, and the potential for a lack of generalizability with the results.

References