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Application Essay

Fuchs' endothelial dystrophy (FED) is the most prevalent corneal dystrophy, affecting around 4% of the US population over the age of 40 years. Mechanisms of disease often lead to endothelial decompensation and edema, reducing corneal transparency and visual acuity. For this reason, this disease is one of the main indications for endothelial keratoplasty. The main posterior lamellar procedures for endothelial disease are Descemet membrane endothelial keratoplasty (DMEK) and Descemet stripping automated endothelial keratoplasty (DSAEK). DMEK uses a manually prepared partial-thickness donor cornea containing only endothelium and Descemet membrane; in DSAEK, preparation with an automated microkeratome also includes a variable amount of stroma, causing the graft to be inevitably thicker. Currently, DSAEK is the most frequently performed technique, mainly due to the larger technical difficulties associated with DMEK: longer surgical learning curve, complex graft preparation and handling, higher susceptibility to endothelial surgical trauma, longer intraoperative time, and frequent graft detachment requiring air reinjection (rebubbling; 2%–20% in DMEK comparing to under 5% in DSAEK). However, superior visual outcomes seem to be achieved with DMEK: 75% of patients reach a best-corrected visual acuity (BCVA) of at least 0.8 within 6 months of surgery, rising further to 81% 1 year after the procedure. Recent work on DMEK has also suggested its superiority regarding visual rehabilitation period, hyperopic shift, induction of visual distortions and high-order aberrations, and risk of graft rejection. In this review article, I

compare the two techniques regarding safety and efficacy in the setting of corneal endothelium dysfunction. Intrigued by this topic, I decided to further explore these surgical techniques for my research review assignment. I have been performing clinical research with an ophthalmologist at Johns Hopkins Hospital on the various techniques of graft insertion in DMEK. My mentor, Dr. Allen Eghrari, has guided me through writing IRB protocols, scientific manuscripts, consent forms, etc. Based on my learnings from my mentor, I wanted to write a review article comparing DMEK and DSAEK to evaluate clinical outcomes of both procedures. My English professor, Nicole A. Cuffy, guided me and other students on the course through the UMD library resources. We learned to search for the appropriate databases and cite in various formats (AMA, APA, MLA, etc.). I began to find peer-reviewed articles utilizing the UMD library homepage and the many databases to which we have access. I also took advantage of several books which pertained to the topic. Many of the books could be found in McKeldin Library while some were conveniently available as e-books online. Because I wanted to gain a full understanding of the research that was relevant, I utilized almost any sources which I deemed to be legitimate, making that determination on the basis of whether it was peer-reviewed, had been previously replicated and had been cited by other articles. I used older articles in order to gain an understanding of the constructs and newer findings to help formulate and support my hypotheses and reasoning. In addition, throughout my experience, I realized that a large part of the research process requires that one be able to accurately and efficiently utilize the multiple resources that have been put at our disposal. I also utilized PubMed to further investigate about the differences in DMEK and DSEK surgeries.

My commitment to become a compassionate physician developed over the path of many years, with my desire to be a positive force in society leading me. My mother has had low blood

pressure and hypothyroidism for the past eleven years. My family, extremely anxious as to how it would affect her life, looked towards her endocrinologist for help. The way the physician guided and comforted us through our crisis made me realize that I would like to similarly help others and my heart hasn't changed course since. Physicians are an important part of a community and I want to learn the required set of skills to treat the human health problems with utmost gravity. Curious even as a child, the concept of my mother's hypothyroidism confused me; What causes her hair loss and low blood pressure? What causes her having fatigue and why is she more prone to developing depressive symptoms? I asked many questions as a child, questions were always either left unanswered or received answers much too vague, and I found myself constantly hunting for answers. At school, I found the answer to my questions: science. Intrigued by the many aspects of science and the ways by which our bodies and everything around us work, science became my favorite subject. Einstein's much heard of, but less understood theory of relativity; the combination of two monosaccharides through the process of dehydration synthesis, science knows no limits. Within the subject of science, there is always something new you can learn.

Later on when my family and I moved to Turkey from Iran due to religious persecution towards Baha'is and eventually to the U.S., we experienced cultural and language barriers which posed challenges to receiving high quality healthcare. I learned Turkish and English which resulted in me becoming a certified medical interpreter and helping refugees and immigrants.

My passion for medicine, developing medical care programs, and analyzing disease trends led to choosing behavioral and community health as my major. I have been involved in a few public health research projects with a focus on primary care physician workforce shortages in Mid-Shore Maryland and understanding moderation effects of demographic variables on colorectal

cancer screening and clinical research projects with a focus on the relationship between leptomeningeal enhancement and cortical lesions in multiple sclerosis patients. Research not only assists you to obtain knowledge, but it provides clarity on your academic and career interests. I have also had the opportunity to initiate a branch of AIM at Melanoma Foundation in Maryland coordinating melanoma educational events and skin cancer screenings to increase melanoma awareness and raise funds for melanoma research.

I see myself as a future public health physician focusing on the prevention of disease within communities, assessing public health problems, and conducting research related to those problems to implement programs that will promote health. My passion lies in creating health equity within communities by developing prevention programs, increasing disease awareness through educational programs, and conducting research.

This research experience made me not only to learn about the many aspects of scientific research but also helped me refine my approach to conducting medical research. For one, I learned that staying organized is extremely important given the vast amount of information that one must analyze. For a research project, one must come up with a clear outline of their project, develop a thesis, collect resources, and write persuasively. Research can be exhaustive, and one must be willing to improve their work and be open to constructive criticism. It took me six drafts to complete this assignment and I used the UMD English Writing Center to receive feedback on my work. Additionally, my professor provided feedback on the organization and cohesiveness of this assignment which improved my writing skills. The skills that I have learned throughout this process can be applied for future assignments in my career as I plan to develop my own research studies. I believe that every undergraduate must learn about the research process to improve their writing skills and develop research analytical skills.