Vision is an opportunity that not all people can say they’ve had a chance to receive and experience. It is an ability that a majority of the western world takes for granted given their privileged state of living in a society of wealth and advanced technology. Though it may seem simple, these people don’t come to understand the complexity of the processes happening within this microscopic space and how much they are truly benefitting from them. Maintaining a homeostatic environment within the eye relies on a constant flow of aqueous humor fluid through its designated drainage system. Fluid is manufactured in the ciliary body through active and passive secretion; the humor starts in the posterior chamber heading to the anterior chamber, passing through the iris and cornea via sympathetic innervation of the pupillary dilator muscle. Aqueous humor has reached a vital checkpoint, the iridocorneal angle; this angle must maintain a persistent degree in order to allow fluid to be taken outward. A balance of intraocular pressures (IOPs) creates a pressure gradient that allows for the humor to move forward to the trabecular meshwork and to Schlemm’s canal. An increase in IOP opens up multiple one-way valves to increase the efficiency of flow within the canal (Goel 2010); a rise in IOP also initiates an increase in contractility of the ciliary body by innervation of cholinergic nerves which increases more flow through the previously named structures (Uttio 2015). The resistance of osmotic gradients must be present in order to equalize the pressure gradients heading outward in order to keep the process moving.
Deviation from this normal physiology of the eye drainage system is due to an imbalance of intraocular pressures. This situation often occurs in places of poor conditions and lack of substantial economies, or in places where there is less knowledge on the field of optometry. This lack of education and healthcare leads to a disease of the eye known as glaucoma, a blockage of the aqueous humor drainage system. Acquiring this disease is rarely reversible, but if noticed and cared for early in its course, future symptoms can be prevented by the victim and his/her optometrist. This truly is the eye’s worst nightmare, able to take over vision in a flash and leave an individual without sight.

There are two types of glaucoma that relate to the iridocorneal angle and the magnitude of the degree within it: primary open angle glaucoma and angle-closure glaucoma. Primary open angle glaucoma (POAG) can be misconstrued because people may think that the angle may be too wide, but it actually is relatively normal. Aqueous humor uses pressure gradients to go from the posterior to the anterior chamber until a situation occurs; however, the problem in POAG is not the iridocorneal angle itself but the blockage of the meshwork in front of it. Where fluid once was supposed to flow is now blocked, trapping the humor in the anterior chamber (Sharts-Hopko 2009). This buildup of aqueous humor at the meshwork site doesn’t allow Schlemm’s canal nor the meshwork to complete their working in contracting the fluid out to the episcleral veins; so at this point, anything past the iridocorneal angle remains useless. Meshwork blockage proceeds to create massive amounts of resistance back into the eye, causing IOP pressures to rapidly rise to extreme levels in order to try to force the humor past this impossible obstacle. Increased IOPs within the eye partnered with no way out for these pressure gradients leads to compaction of internal structures within the eye. This squeezing is detrimental to the most important structure in
the human eye, the optic nerve. Innervation of the optic nerve and death of retinal ganglion cells proves fatal to vision in both eyes. Primary angle closure glaucoma (PACG) occurs when the iris shifts forward, causing the iridocorneal angle to be decreased greatly, to a point where it’s blocked and not allowing aqueous humor to leave the anterior chamber to enter the meshwork (King 2013). Blockage of the meshwork is a direct cause of peripheral anterior synechiae (PAS), described as connections that develop as between the iris and meshwork, causing yet another obstacle for fluid to pass through (Sun 2017). Angle-closure can also occur as an “attack”, where sympathetic innervation of the pupils via the pupillary dilator muscle is activated too much at a rapid rate. Again, because aqueous humor is forcefully trying to get past this angle in both situations, IOP levels rise along with intraocular tensions. The same results occur as POAG, where the piling on of these pressures within the eyeball causes a squeezing force upon vital anatomical structures such as the optic nerve, sclera, and retina, over time killing off retinal ganglion cells necessary for accurate vision.

Though glaucoma is irreversible, there are ways to prevent an onset of further extreme conditions; these ways usually include pharmaceutical, laser, or surgical methods as they all work toward the same goal in lowering IOP. Drugs (usually in the form of drops) such as Topical $\beta$-adrenergic antagonists work to block $\beta$-receptors within the ciliary body, causing a decrease in humor production. Cholinergic agonists work in the opposite way to instead increase humor production by increasing sympathetic innervation at the ciliary body. The epithelium contracts abruptly to break the barrier at the blocked meshwork in order to increase flow outward and decrease overall IOP to normal levels. (Sharts-Hopko 2009). Laser iridotomy creates a minuscule hole within the iris, allowing fluid to slowly drain through the pore and release tension
and the pressure that this obstacle was creating. Laser iridoplasty physically moves the iris away from the canal instead of piercing it directly; again, this is used to increase flow into the meshwork and to decrease IOP as a result. Lastly, a surgical procedure called trabeculectomy is done by the hands of a doctor where dissection is made from the sclera down to the cornea. A square piece of scleral tissue is dissected, containing both part of the trabecular meshwork and Schlemm’s canal. By removing these obstacles that created the disease in the first place, this procedure proves to be efficient in returning aqueous humor flow almost instantly and stabilizing IOP levels. The stabilization of IOP levels in all treatment methods reduces inflammation and compaction of ocular structures, leading to the homeostatic environment the healthy eye needs to survive.

Overall, glaucoma is seen as the most detrimental disease known to the human eye, for its symptoms often go undetected and prove to not only be irreversible but at most times also fatal to your vision. Blockage of the pathway of aqueous humor from the anterior chamber out to the meshwork is blocked, which causes an imbalance of inward resistance and outward IOP. This imbalance causes gradual to rapid increases in intraocular pressures that are trying to force fluid past the obstacle, leading to compression of the inner eyeball that severely damages vital anatomical visual structures. The only way to stop this disease is to diagnose it early in its course and use these ophthalmologic procedures to stabilize these crucial pressures and prevent extreme symptoms from arising in the future.