Vancouver, Canada – In their own words, First Authors at the 2019 Annual Meeting of the Association for Research in Vision and Ophthalmology explain their findings. Their abstracts were designated as some of the newest and most innovative research being conducted in various specialties and are being presented on Sunday, April 28. To view abstracts, enter the program number or title in the “Search” field of the Online Planner or mobile app.

Anatomy and Pathology/Oncology

6443. In vivo assessment of novel intra-arterial and intravitreal chemotherapy compounds using a tumor-bearing rabbit model of intra-arterial chemotherapy: Efficacy without toxicity. 11:45am - 12:00pm

Delivery of chemotherapy directly to the eye via the intra-arterial and intravitreal routes has revolutionized treatment for babies with retinoblastoma, which is the most common eye cancer in children. Historically, there has been no way to test the efficacy and safety of new intra-arterial chemotherapy (IAC) compounds, as there was no tumor-bearing animal model in which IAC could be performed. We recently developed the first small animal (rabbit) model of IAC. We also developed a rabbit retinoblastoma tumor model to allow the efficacy of new compounds to be studied. We subsequently described an extensive toxicity assessment platform for this model, to allow for the preclinical assessment of drug safety. Now, combining these models and platforms, we have identified drugs that are much less toxic and very effective, compared to the chemotherapies currently used in clinical practice. Here, we describe the data on their use, efficacy, and toxicity in our rabbit model. Our discovery of drugs that are both effective and less toxic than currently-used drugs opens the door for upcoming clinical trials of these novel drugs.

Clinical/Epidemiologic Research


Myopia or shortsightedness is expected to affect half the world's population by 2050. To better manage myopia, we have developed an application that can be downloaded on phones and tablets by parents. The app will become available globally, providing us with a big opportunity to collect large amounts of data on myopia and smart device behaviour, such as device screen time in children to ultimately help in tackling this global epidemic of myopia. So far, the application is accessible in Singapore, India and
Malaysia and it has proven to be successful in data capture and the uptake from parents is exponentially growing on a daily basis.

**Cornea**

B0229. Conjunctival transcriptome profiling in vernal keratoconjunctivitis. 8:00 - 9:45am

Vernal keratoconjunctivitis (VKC) is a severe form of ocular allergy affecting mostly children and young adults living in warm climates. Its etiology and immune pathogenesis are still unknown and therefore treatment not standardized. Using a simple local sampling technique, gene expression can be studied. Understanding epigenetics of VKC may help the diagnosis and treatment of this severe disease.

**Immunology/Microbiology**

6414. Complement C3 and CD4 T cells coordinate corneal sensation loss in HSV-1 keratitis. 11:15 - 11:30am

Vision loss associated with age-related macular degeneration (AMD) is caused by improper control of a specialized inflammatory cascade in the retina called “complement.” Researchers have identified that complement can also coordinate nerve damage at the ocular surface. This is important, as nerves regulate tear production to maintain clarity of the cornea and visual acuity.

6416. Virus-specific T cell receptor transgenic mice vaccinated with HSV-1 0ΔNLS limit HSV--induced corneal neovascularization in the absence of antibody. 11:45am - 12:00pm

HSV-1 is a significant human pathogen that can induce significant pathology in the eye of infected patients. We have engineered a live-attenuated virus, termed HSV-1 0deltaNLS that has remarkable efficacy against subsequent ocular challenge with HSV-1 significantly enhancing resistance to virus replication and spread following challenge while preserving the visual axis. These results are unique in the development of a vaccine against ocular HSV-1 infection.

**Retina**

A0261. Cigarette smoke promotes epithelial-mesenchymal transition in retinal pigment epithelial cells. 8:00 - 9:45am

Studies have shown that cigarette smokers have higher rates of proliferative vitreoretinopathy (PVR) after retinal detachments. PVR is the most common cause of retinal detachment surgery failure and is associated with poor visual outcomes. The mechanism through which cigarette smoking leads to PVR is unknown. Our findings demonstrate that cigarette smoke induces retinal pigment epithelial cell epithelial mesenchymal transition, which is a key aspect of PVR pathogenesis

A0296. Clinical characteristics of proven acute intraocular toxicity by perfluorocarbon liquids (PFCL) used in retinal surgery. 10:15 - 12:00pm

Acute toxicity after retinal detachment surgery may be produced by perfluorocarbon liquids tested by procedures according to ISO norms but ineffective for detecting toxicity.
Three-dimensional (3D) printing is a relatively new technique of using graphical software to build objects from differential materials such as nylon, plastic, and metal. There are many applications for 3D-printed materials in the world of medicine, such as medical instruments, implants, and prosthetics. Scleral depressors are a unique tool used by eyecare providers in the diagnosis and treatment of problems of the retina, such as retinal detachment, but they are easily lost and expensive to replace. Our study 3D-printed a prototype was found to be equal in technical aspects when compared to a traditional instrument, yet its production costs were significantly lower. This work proves that 3D-printing is a feasible method to produce functional and affordable scleral depressors and serves as a baseline for how to evaluate other 3D-printed tools for integration into clinical use.