



## ARVO 2017 Annual Meeting Emerging Trends and Hot Topics

The following abstracts have been identified by members of the Annual Meeting Program Committee as representing the newest and most innovative research being conducted in the various specialties. To view abstracts, enter the program number below in the "Search" field of the Online Planner.

### Sunday, May 7

#### **Anatomy and Pathology/Oncology**

#161 - 1107 - B0527. Choroidal Structure and Relation to Responses to Imposed Defocus in Young Guinea Pigs. 3:15pm.

#161 - 1116 - B0536. Culture of Guinea Pig Limbal Epithelial Stem Cells in Three Different Media. 3:15pm.

#161 - 1097 - B0517. Towards elucidation of the myopia signaling cascade: association of human cone system electrophysiological response parameters with a myopia susceptibility polymorphism. 3:15pm.

#161 - 1115 - B0535. Morphological changes of scleral fibroblasts in a murine lens-induced myopia model. 3:15pm.

#### **Clinical/Epidemiologic Research**

#148 - 839. Mediterranean diet and risk of visual impairment: The CONSTANCES study. 4:30pm.

#108 - 181 - B0125. Newly identified genes for refractive error and risk of myopia. 8:30am

#### **Eye Movements/Strabismus/Amblyopia/Neuro-Ophthalmology**

#140 - 762 - B0601. Stepping into the virtual unknown: feasibility study of a virtual reality-based test of ocular misalignment. 1:30pm.

#152 - 861. Comparison of retinal development in idiopathic infantile nystagmus and nystagmus associated with albinism, PAX6 mutations and achromatopsia. 3:30pm.

#152 - 865. Optimising visual attention in children with autism spectrum disorder: a comparison of fixation distributions viewing singing and speech. 4:30pm.

#152 - 866. Out of the blue: Effects of blue-filtering lenses on EEG and eye movements during reading. 4:45pm.

## **Retina**

#104 - 13 - A0001. Effect of Sildenafil Citrate on Choroidal Thickness in Age-Related Macular Degeneration. 8:30am.

#104 - 15 - A0003. Personalized Prognosis in Early/Intermediate Age-Related Macular Degeneration based on Drusen Regression. 8:30am.

#153 - 871 - A0050. The Real World Effect of Anti-VEGF Injections on IOP Using the IRIS Registry. 3:15pm.

#104 - 18 - A0006. Comparison of Optical Coherence Tomography Angiography and Indocyanine Green Angiography in Type 1 and 2 Neovascular Age-related Macular Degeneration. 8:30am.

#104 - 19 - A0007. Automated 3D Choroidal Segmentation Using Multimodal Complementary Information. 8:30am.

#153 - 873 - A0052. Long term effects of repetitive administration of VEGF-antagonists on primary RPE cells – comparison between Ranibizumab, Bevacizumab and Aflibercept. 3:15pm.

#145 – 817. Flow Void Analysis: Multiscale Quantitation and Visualization of Choriocapillaris Alterations in Age-Related Macular Degeneration Using OCT Angiography. 3:30pm.

#145 – 818. Visualizing Relative Blood Flow Speeds in Choroidal Neovascularization Using Variable Interscan Time Analysis (VISTA-) Optical Coherence Tomography Angiography (OCTA). 3:45pm.

#104 - 55 - A0043. Prevalence of Quiescent Neovascularization in Intermediate and Late Non-Exudative Age-Related Macular Degeneration and the Incidence of Subsequent Exudation using Swept-Source Optical Coherence Tomography Angiography. 8:30am.

#104 - 57 - A0045. Correlation of Vascular Impairment with Geographic Atrophy Progression Analyzed with Swept Source OCT Angiography and Variable Interscan Time Analysis. 8:30am.

#104 - 29 - A0017. Effect of Human Central Nervous System Stem Cells Subretinal Transplantation on Progression of Geographic Atrophy Secondary to Non Neovascular Age-Related Macular Degeneration. 8:30am.

#104 - 32 - A0020. Imaging Hydroxyapatite in sub-RPE Deposits by Fluorescence Lifetime Imaging Microscopy (FLIM). 8:30am.

#104 - 42 - A0030. Expeditious bilateral murine fundus fluorescein angiography (FFA): Maximizing optical imagery with a transportable digital camera. 8:30am.

#131 - 372 - A0238. Automated Case-Adaptive Slab Configuration for Visualization of Choroidal Neovascularization in Swept-Source OCT Angiography. 1:30pm.

#145 – 820. Early detection of choroidal neovascularization with OCT Angiography. 4:15pm.

## **Retinal Cell Biology**

#130 - 361 - A0203. NESPRIN1 is a novel component of ciliary rootlets. 1:30pm.

#130 - 356 - A0198. Utilization of Super Resolution Nanoscopy to Localize CEP290 within the Connecting Cilium of Rod Photoreceptor Cells. 3:15pm.

#111 - 291 - B0344. Intravitreal transduction profile of recombinant adeno-associated virus in murine and human retina. 8:30am.

#111 - 271 - B0324. Lasting effects of prenatal marijuana exposure on the retina: an experimental study in mice. 8:30am.

#143 – 804. The insulin receptor substrate-1 (IRS-1) regulates Kir4.1 expression in retinal Müller cells. 3:40pm.

#130 - 363 - A0205. Nanoparticle based transfection of hard-to-transfect primary photoreceptor cells. 1:30pm.

#130 - 358 - A0200. CIC-2 chloride channel localizes to the apical surface and primary cilium of RPE cells and regulates ciliogenesis. 1:30pm.

#158 - 1045 - B0301. Connexin 43 translocation in retinal pigment epithelium during phagocytosis of photoreceptor outer segments. 3:15pm.

## **Monday, May 8**

### **Anatomy and Pathology/Oncology**

#239 - 1735 - A0213. A CRISPR/Cas9-mediated Screen of Candidate Genes in the Regulation of Optic Fissure Closure. 11am.

#239 - 1724 - A0202. Glutathione is required for ocular surface development. 11am.

#240 - 1739 - A0217. Modifying chondroitin sulfate proteoglycans enhances retinal ganglion cell axon regeneration in the mouse optic nerve. 11am.

### **Biochemistry/Molecular Biology**

#226 – 1573. Codon optimized RPGR leads to improved stability and rescue with AAV8 gene therapy in X-linked retinitis pigmentosa. 11:45am.

#213 – 1243. Mutations in the X-linked gene PRPS1 cause retinal degeneration in females. 10am.

### **Clinical/Epidemiologic Research**

#278 - 2209 - A0347. The potential of cardiovascular risk factors for reducing visual impairment: a pooled analysis of European epidemiological studies. 3:45pm.

#278 - 2206 - A0344. Validation of the Total Visual acuity extraction Algorithm (TOVA) for automated extraction of visual acuity and intraocular pressure data from free text clinical records. 3:45pm.

#218 - 1342 - A0311. Prevalence and risk factors of depressive disorders in an urban, ophthalmic population. 8:30am.

#286 - 2393 - B0542. Evaluation of a handheld, smartphone-based autorefractor in an elderly population. 3:45pm.

#287 - 2410 - B0559. Student adherence and satisfaction with eyeglass usage in the Baltimore Reading and Eye Disease Study (BREDS). 3:45pm.

### **Cornea**

#221 - 1463 - B0113. Utility of magnetic nanoparticles for targeted endothelial transplantation in an ex vivo model. 8:30am.

### **Eye Movements/Strabismus/Amblyopia/Neuro-Ophthalmology**

#285 - 2355 - B0504. A shutter glasses controller for visual stimulation. 3:45pm.

#285 - 2366 - B0515. Visual exploration in Amblyopic patients. 3:45pm.

#285 - 2367 - B0516. Visual acuity and early literacy at 6 - 7 years: A reduction in visual acuity is associated with decreased reading efficiency in school children. 3:45pm.

#285 - 2364 - B0513. Analysis of a Novel Method for Detection of Vision Disorders in Children Birth to Three Years of Age. 3:45pm.

### **Glaucoma**

#266 – 2023. Optic Nerve Head Astrocyte Response to Elevated Intraocular Pressure does not Require Viable Retinal Ganglion Cell Axons. 5:15pm.

#274 - 2094 - A0155. Anterior segment growth from infancy to early adulthood using ultrasound biomicroscopy. 3:45pm.

#274 - 2097 - A0158. In vivo imaging of human aqueous outflow and calculation of aqueous column diameter. 3:45pm.

### **Physiology/Pharmacology**

#249 - 1977 - B0481. Therapeutic Potential of Sustained Delivery of AR-13154(S) in an Animal Model of Proliferative Diabetic Retinopathy. 11am.

### **Retina**

#267 – 2024. A Clinico-Pathological Study of the Structural and Functional Changes to the Retina and Optic Nerve following anti-VEGF Treatments for Diabetic Macular Edema. 3:45pm.

#205 – 1185. Results from the first use of a robot to operate inside the human eye. 8:30am.

#246 - 1870 - B0342. Downgaze-Induced Vitreous Chamber Elongation in Highly Myopic Eyes with Staphyloma as Gauged by Magnetic Resonance Imaging. 11am.

### **Retinal Cell Biology**

#219 - 1361 - A0382. Exploring mouse retinal ganglion cell diversity within iPSC derived optic cups. 8:30am.

#282 - 2273 - B0227. Outcome measures for BEST1 gene augmentation therapy: restoration of RPE-photoreceptor interface homeostasis. 3:45pm.

#241 - 1752 - A0363. AAV2-GRP78-mediated gene therapy prevents retinal neuronal injury via downregulation of Tau oligomers. 11am.

#241 - 1753 - A0364. Neuroprotective efficacy of topical ocular delivery of trabodendoson in a rodent model of anterior ischemic optic neuropathy. 11am.

#219 - 1363 - A0384. Modeling of autosomal dominant optic atrophy with human embryonic stem cell derived retinal ganglion cells by CRISPR-Cas9 mediated editing of OPA1. 8:30am.

#241 - 1765 - A0376. Single molecule fluorescent in situ hybridization in the mouse retina. 11am.

#219 - 1369 - A0390. Analysis of Retinal Ganglion Cell Development and Maturation from Human Pluripotent Stem Cells. 8:30am.

## **Tuesday, May 9, 2017**

### **Anatomy and Pathology/Oncology**

#317 - 2741 - A0445. Attention-Related-Functional Changes Induced By Imposed Myopia Defocus from Spectacle Lens. 8:30am.

#317 - 2733 - A0437. The effects of brief periods of hyperopic defocus or form deprivation on eye growth in chicks depend on time of day. 8:30am.

#317 - 2744 - A0448. Wavelength Cues Are Essential to Maintain Emmetropia in Tree Shrews. 8:30am.

#334 – 3002. The Presence of Accommodative Tissues Influences the Shape of the Developing Eye. 11:45am.

#317 - 2747 - A0451. Changes in forward light scatter parameters correlate with refractive error in young adults. 8:30am.

#334 – 2999. Ocular motor nerve development in the presence and absence of extraocular muscle. 11am.

### **Biochemistry/Molecular Biology**

#337 - 3576 - B0135. Pyruvate Kinase M2: Function, Regulation and Role in Rod Photoreceptor cells. 3:45pm.

### **Clinical/Epidemiologic Research**

#321 - 2909 - B0555. Variation in the use of bevacizumab and ranibizumab for diabetic macular edema. 8:30am.

### **Cornea**

#315 - 2650 - A0240. AUTOMATED NON-INVASIVE METHOD FOR DRY EYE PREDICTION. 8:30am.

### **Eye Movements/Strabismus/Amblyopia/Neuro-Ophthalmology**

#322 - 2931 - B0577. A method for rapid objective strabismus angle measurement. 8:30am.

#322 - 2932 - B0578. Validation of StrabisPIX, a mobile application for home measurement of ocular alignment. 8:30am.

### **Immunology/Microbiology**

#332 – 2991. Longitudinal Changes of Geographic Retinal Darkening in a Cohort of Ebola Survivors. 12:15pm.

#380 - 3622 - B0181. Binding of HSV-1 UL20 to Golgi-specific Zinc-finger protein affect virus infectivity and latency-reactivation. 3:45pm.

#332 – 2992. Zika Virus Causes Chorioretinal Atrophy in Mouse Eyes and Infects Primary Human Cells Lining the Blood-Retinal Barrier. 12:30pm.

#379 - 3606 - B0165. Prevalence and Diversity of Giant Viruses Among Contaminated Contact Lens Cases. 3:45pm.

### **Lens**

#341 - 3188 - B0219. EGFR signaling promotes TGF $\beta$ -dependent epithelial-mesenchymal transition (EMT) in the lens. 11am.

### **Retina**

#383 - 3695 - B0320. Gli1 expression in human epiretinal membranes. 3:45pm.

#343 - 3218 - B0351. Course of visual field changes in retinitis pigmentosa patients followed by Humphrey Field Analyzer 10-2 program. 11am.

#326 – 2949. Continuous submicrogram fluocinolone acetonide (FAc) therapy for the treatment of diabetic retinopathy. 11:45am.

#364 – 3387. Gene Therapy with the Caspase Activation and Recruitment Domain (CARD) Slows the Retina Degeneration of the Sod2 Knock-Out Mouse Model of Geographic Atrophy. 4:15pm.

#383 - 3693 - B0318. Does intravitreal Ocriplasmin degrade intraretinal extracellular matrix molecules? 3:45pm.

#328 – 2961. Focal breakdown of the blood retinal barrier is associated with fatal brain swelling in paediatric cerebral malaria. 11:30am.

#319 - 2800 - B0237. Sub-Tenon's capsule 0.1% adrenaline versus placebo in maintenance of mydriasis during vitrectomy. 8:30am.

### **Retinal Cell Biology**

#373 - 3447 - A0070. Inhibition of micro RNA-21 (miR-21) halts retinal neovascularization by rescuing expression and function of tissue inhibitor of matrix metalloproteinase 3 (TIMP3). 3:45am.

#373 - 3450 - A0073. Analysis of Wnt pathway components during combined intrauterine growth restriction and oxygen-induced retinopathy. 3:45pm.

#373 - 3451 - A0074. Interleukin 1 Beta reduces hypoxia, prevents neovascularisation and promotes healthy vascular regeneration in oxygen induced retinopathy. 3:45pm.

#308 – 2490. Antisense Oligonucleotide-induced Skipping of USH2A exon13 Restores Visual Function in Zebrafish. 9:45am.

## Wednesday, May 10, 2017

### **Anatomy and Pathology/Oncology**

#443 - 4427 - A0405. Time course of axial length changes in response to competing episodes of myopic and hyperopic defocus. 11am.

#443 - 4429 - A0407. A 3D MRI study of the relationship between eye dimensions, retinal shape and myopia. 11am.

#443 - 4439 - A0417. Quantitative 3-D OCT ocular geometry of lens-treated myopic and hyperopic guinea pig eyes. 11am.

### **Biochemistry/Molecular Biology**

#445 - 4487 - B0142. Fundus Autofluorescence Analysis of the Transition Zone in Choroideremia: Outcomes Following Gene Therapy. 11am.

#445 - 4493 - B0148. Structural Modelling Predicts Variability in Efficacy of Lead Candidate Hammerhead Ribozyme Between Different Species Rhodopsin mRNA. 11am.

### **Eye Movements/Strabismus/Amblyopia/Neuro-Ophthalmology**

#489 - 5090 - B0700. Development of an open-source pupilometer for testing melanopsin responses. 3:45pm.

#416 - 3867 - A0038. Analysis of retinal nerve fiber layer microvasculature in non-glaucomatous optic neuropathy using optical coherence tomography angiography (OCTA). 8:30am.

#414 – 3829. A dichoptic augmented-reality paradigm as a treatment for adult amblyopes. 10am.

#416 - 3860 - A0031. A New Model of Rat NAION. 8:30am.

#415 - 3838 - A0009. 3D Printing for Low-cost Rapid Prototyping of Eyelid Crutches. 8:30am.

#414 – 3827. Binocular outcomes following binocular treatment for childhood amblyopia. 9:30am.

### **Glaucoma**

#405 – 3771. Contractile features of the distal aqueous drainage tract. 9:15am.

### **Immunology/Microbiology**

#437 – 4291. Evaluation of predatory bacteria on corneal wound healing, ocular safety, and clearance of fluoroquinolone resistant *Pseudomonas aeruginosa* from the ocular surface. 11:15am.

#437 – 4293. Corneal infections: targeted eradication through antibiotic functionalized polymers. 11:45am.

### **Low Vision Group**

#474 – 4764. eQUEST: The eSight Quality of life and Efficacy Study. 4:30pm.

#474 – 4766. First results from the EFFECT Trial, an RCT of eccentric viewing training for patients with AMD. 5pm.

### **Retina**

#426 - 4160 - B0455. Repeated subretinal surgery and removal of subretinal decaline is well tolerated —evidence from a porcine model. 8:30am.

#426 - 4164 - B0459. The association between the frequency of rhegmatogenous retinal detachment and the atmospheric temperature. 8:30am.

#404 – 3767. Controlled and Extended Release of Bioactive Aflibercept from a Biodegradable Microsphere-Hydrogel Ocular Drug Delivery System. 9:45am.

#472 – 4754. An explanation for why choroidal blood vessels appear dark on clinical OCT images. 5:15pm.

#433 – 4270. Behavioral and electrophysiological characterization of photovoltaic subretinal implants in non-human primates. 12:30pm.

#433 – 4268. Sub-retinal implantation of the Retinal Implant Alpha AMS chip using integrated intra-operative optical coherence tomography. 12pm.

#431 – 4253. Subconjunctival Exposure to Carbopol 980 Stimulates Chronic Inflammation Characterized by Histiocytic Infiltration. 11:15am.

### **Retinal Cell Biology**

#422 - 4044 - B0017. NFAT-dependency of IL-1 $\beta$ -induced diabetes-relevant behaviors in human retinal microvascular endothelial cells and Müller cells. 8:30am.

## **Thursday, May 11, 2017**

### **Anatomy and Pathology/Oncology**

#535 – 5639. Inter-Layer Differences in Elastic Properties of Guinea Pig Sclera at the Micrometer Scale with Acoustic Microscopy. 12:45pm.

#518 - 5466 - B0623. The Effects of Atropine on the Development of Binocular and Monocular Lens-Induced Myopia in Marmosets. 8:30am.

#518 - 5468 - B0625. Attenuation of myopia progression by aripiprazole is dependent on form deprivation. 8:30am.

#518 - 5469 - B0626. Effect of Topical Latanoprost on Myopia Progression in Guinea Pigs. 8:30am.

#535 – 5640. Egr-1 mRNA Expression in Response to Myopic Defocus. 1pm.

#535 – 5636. Dynamic noise promotes myopic eye growth. 12pm.

#519 - 5480 - B0637. Novel Myopia Genes and Pathways identified from Syndromic Forms of Myopia. 8:30am.

#519 - 5495 - B0652. Flexible optical waveguides for uniform periscleral crosslinking. 8:30am.

#535 – 5638. Differences in INL/ONL Ratios for Myopes and Emmetropes/Hyperopes. 12:30pm.

#519 - 5487 - B0644. Pseudo-PED in high-myopia. 8:30am.



#518 - 5464 - B0621. Subconjunctival injection of gap junction antagonist (18- $\beta$ -glycyrrhetic acid) induces myopia in guinea pigs. 8:30am.

#535 – 5635. Persistent activity of Muller glia-derived PRSS56 is required for refractive development. 11:45am.

### **Biochemistry/Molecular Biology**

#508 - 5235 - B0122. Accumulation of damaged nDNA promotes RPE cellular senescence and pro-inflammation. 8:30am.

#508 - 5245 - B0132. Measurements of 11-cis retinal deficiency in human autopsy eyes with macular degeneration. 8:30am.

#508 - 5255 - B0142. Effect of High Energy Visible Light on A2E-loaded Retinal Pigmented Epithelium in Age-Related Macular Degeneration. 8:30am.

#508 - 5263 - B0150. Mitochondrial regulation of microRNA and implications for macular degeneration. 8:30am.

### **Clinical/Epidemiologic Research**

#539 - 5719 - B0257. Associations between the gut microbiome, a healthy diet, and age-related nuclear cataract. 11:30am.

### **Eye Movements/Strabismus/Amblyopia/Neuro-Ophthalmology**

#504 - 5139 - B0026. Retrospective review of ocular pain management with eye removal surgery at Yale New Haven Hospital. 8:30am.

#504 - 5138 - B0025. Personalized 3D-printed conformers for the treatment of severe microphthalmia/anophthalmia. 8:30am.

### **Glaucoma**

#543 - 5837 - B0389. Specificity and sensitivity of optical coherence tomography (OCT) parameters to detect glaucomatous visual field progression. 11:30am.

544 - 5852 - B0404. Neuro-Vascular changes associated with the Water Drinking Stress Test. 11:30am.

### **Immunology/Microbiology**

#540 - 5736 - B0288. Conditional, genetically-encoded, small molecule-regulated inhibition of NF- $\kappa$ B signaling in RPE cells. 11:30am.

#540 - 5745 - B0297. Evidence of melanoma immunoreactivity in patients with Birdshot retinochoroidopathy. 11:30am.

### **Multidisciplinary Ophthalmic Imaging Group**

#516 - 5432 - B0589. Motion-free en face OCT Angiography and Pigment Imaging based on Modified Lissajous Scan. 8:30am.

### **Physiology/Pharmacology**

#528 – 5592. First-in-man pancreatic islet transplantation in the anterior chamber of the human eye. 12:45pm.

### **Retina**

#550 - 5989 - B0789. The 'halo' and 'inverted fovea'; Novel three-dimensional signs of vitreomacular traction on optical coherence topography. 11:30am.

#550 - 5996 - B0796. Assessing the Henle Fiber Layer in Albinism Using Directional OCT. 11:30am.

#547 - 5923 - B0659. Systemic complement activation in central serous chorioretinopathy. 11:30am.

#547 - 5925 - B0661. Association between CFH variants and choroidal thickness in central serous chorioretinopathy. 11:30am.

#521 - 5537 - B0737. Peripapillary Pigmentation and Optic Disc Morphology in Newborns with Treatment-Warranted Retinopathy of Prematurity. 8:30am.

### **Retinal Cell Biology**

#514 - 5377 - B0534. Novel Characterization of Resident Plasmacytoid Dendritic Cells in the Retina and Choroid. 8:30am.

#546 - 5905 - B0497. An Avian Adeno-Associated Viral Vector for Visualization of Post-Natal Chick Retinal Circuitry. 11:30am.