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OCTOBER 24-25, 2024

INTERNATIONAL CONFERENCE ON

OPHTHALMOLOGY & VISION SCIENCE

MONTREAL, CANADA

Contact Us:

info@scitechseries.com

+44 2045874848

https://www.scitechseries.com/

+44 2045250803

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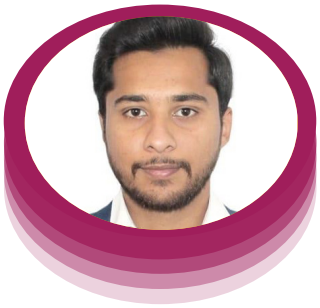

Ali Humza Shafiq
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Thank You All

WELCOME MESSAGE

Fritz Hengerer
University of Heidelberg,
Germany

It is a great pleasure and honour for me to welcome all of you to Ophthalmology and Vision Science 2024 in Montreal. As a committee member I am very much excited about all your scientific work and contributions to our sessions and hope to have fruitful discussions and knowledge transfers during our meeting either in person or online, respectively.

Happy to meet with you there!

Safe travels and best regards

Fritz Hengerer

IN PERSON

KEYNOTE PRESENTATIONS

OCTOBER 24-25, 2024

Roduit Raphael

Lausanne University
Switzerland

Hypoglycemia induces in vivo autophagy in mouse retinal ganglion cells

Abstract:

We studied the role of acute hypoglycemia in the mouse retina and we previously showed, that hypoglycemia induced ER stress and retinal cell death in mice. In addition, we showed that low glucose conditions are associated with autophagy defects in 661W photoreceptor cells and retinal explants, which led us to study autophagy in vivo. We used GFP-LC3+/- and C57BL/6 mice to assess and decipher the mechanism of hypoglycemia-induced autophagy in vivo. Retinal explants cultured at low glucose condition showed LC3-II accumulation (GFP fluorescence dots) characteristic of autophagy activation; a similar pattern was observed with autophagy modulators (Chloroquine, Rapamycin). Intra-ocular injection of Rapamycin, as well as 5-hour hypoglycemia, gave similar results, namely a high level of fluorescence specifically to the ganglion cell layer (GCL). We co-localized GFP fluorescence with two markers of GCL. We then isolated retinal ganglion cells (RGCs) and showed an increase of p62 protein expression and GFP dots when they were cultured at 1mM or 25mM in the presence of Rapamycin, while no sign of autophagy was detected at 5mM or 25mM glucose. We then assess autophagosome/lysosome fusion on C57BL/6 isolated RGCs infected with RFP-GPF-LC3 lentivirus and cultured at different conditions. We observed a defect in the fusion process only at 1mM and 25mM in the presence of Chloroquine, but a normal fusion at 5 and 25mM glucose. We showed that hypoglycemia induces autophagy in mouse RGCs. The modulation of this pathway, as well as apoptotic pathways, might be important to avoid complications in diabetes, especially diabetic retinopathy.

Biography

After a PhD thesis performed in the laboratory of Prof. Bernard Thorens at Lausanne University, Switzerland, Dr Roduit spent five years in Montreal for a prolific post-doc in the laboratory of Prof. Marc Prentki, "centre de recherche CHUM". After his return to Switzerland and spending five years as co-responsible of the laboratory of Dr Bonny (CHUV), he moved to the Institute for Research in Ophthalmology in Sion, Switzerland, where he rapidly created his proper research group focus on Diabetic Retinopathy (DR) and age-related macular degeneresecnce (AMD). He joined the Jules-Gonin Eye Hospital, in 2015 where he pursue his research.

IN PERSON

ORAL PRESENTATIONS

OCTOBER 24-25, 2024

Murthy Chavali

Ocugen Inc
USA

Evaluation of safety and efficacy of OCU400 gene therapy for retinitis Pigmentosa: Phase 1/2 study results

Abstract:

Retinitis pigmentosa (RP) is a group of rare genetic disorders that causes retinal degeneration, leading to vision loss and blindness. Mutations in over 100 different genes can lead to RP, and the only FDA- approved gene therapy addresses merely 2% of cases, leaving most patients without therapeutic options. Gene-agnostic treatment approaches are viable alternatives to traditional gene-specific therapies. Nuclear hormone receptor (NHR)-based novel modifier gene therapy utilizes NR2E3 overexpression as a gene- agnostic approach to modulate retinal cell homeostasis through the regulation of multiple transcriptional networks. A total of 18 adult RP subjects with autosomal dominant or biallelic autosomal recessive NR2E3 mutations or autosomal dominant RHO mutations enrolled in the Phase 1/2, open-label clinical trial (NCT05203939). Subjects received a unilateral, single subretinal injection of OCU400 (AAV5- hNR2E3) with a low (5 x 109 vg/eye), medium (1 x 1010 vg/eye), or high (5 x 1010 vg/eye) dose in the eye with poorer vision. The primary safety endpoints included identifying study-related adverse events and ophthalmological changes. Efficacy endpoints included changes from baseline in Best Corrected Visual Acuity (BCVA), Low-Luminance Visual Acuity (LLVA), and the Multi-Luminance Mobility Test (MLMT). After 12 months post-OCU400 dosing, analysis demonstrated that OCU400 treatment was safe and well tolerated. Efficacy results demonstrated stabilization or improvement in 89% (16/18) of subjects in the treated eye as assessed through BCVA or LLVA or MLMT compared to baseline. Importantly, 78% (14/18) of subjects displayed stabilization or improvement in MLMT scores. A Phase 3 clinical trial for OCU400 is ongoing (NCT06388200).

Biography

Murthy Chavali brings over 20 years of experience in the biotechnology sector and academia, with a focus on innovation, discovery, drug development, and clinical research. Currently, he oversees the clinical development of various ophthalmological therapies at Ocugen, concentrating on conditions such as inherited retinal disorders, diabetic macular edema, and age-related macular degeneration. He has extensive experience in drug development, including expertise across a range of therapeutic modalities such as cell and gene therapies, small molecules, biologics, and stem cell therapies. His clinical development skills include creating Phase I-III clinical protocols, executing clinical trial studies, regulatory interactions and managing medical affairs teams.

Milena Raffi

University of Bologna
Italy

Effect of physical exercise on microsaccades in diabetic people

Abstract:

During locomotion the eyes scan the environment so the gaze is not always directed to the focus of expansion of the optic flow field. Diabetic retinopathy is a principal cause of visual damage. Such progressive degeneration of the retina is believed to cause postural instability. The regular practice of physical exercise is beneficial in diabetes management, thus, we sought to study the eye-movement characteristics produced during the view of optic flow stimuli in two groups of diabetic people. The active group included 15 subjects who followed a 6 months exercise program (age 57,3±9,9, BMI 28,9±5,7), while the inactive group included 25 sedentary participants (age 62,4±11,5, BMI 31,7±6,4). The experiments were performed in the dark at month 0 (baseline) and month 6. The participants stood in front of a screen covering 135 x 107° of visual field and were instructed to fixate a central fixation point while expanding optic flow stimuli were presented full field, in the foveal and in the peripheral field. Fixation in the dark was used as control stimulus. Oculomotor data have been recorded by EyeLink II (SR research). Eye-movement orientations have been analyzed by circular statistics and mean vector uniformities were assessed by Rayleigh Test ($p<0,05$). The active group showed significant non-uniform distributions in microsaccade orientation in all visual stimulations in both baseline and month 6, while the inactive group always show uniform distributions. No difference has been observed for saccade orientation. These results indicate that physical exercise modulates microsaccade activity suggesting beneficial effects in heading perception processes.

Biography

Milena Raffi is associate professor of Human Physiology at University of Bologna, Italy. She has published more than 50 papers in peer-review journals with IF and has been serving as an editorial board member of repute. The research activity focuses on various aspects of cognitive functions: role of visual perception on postural and motor control, functional characterization of eye movement neurons, cellular mechanisms involved in the analysis of visual perception, role of spatial attention and oculomotor functions. She is Principal Investigator of several national and international projects.

Au Wei Yung

Lee Kong Chian School of Medicine
Singapore

Knowledge, attitude, and practice towards corneal donation among deceased's family in Singapore

Abstract:

This study aims to assess the motivations of patients' next-of-kin (NOK) in deciding to donate their NOK's cornea, their knowledge, and attitudes on corneal donation (CD) practices in Singapore, and recommendations for public education on CD. 100 NOK of deceased patients in a tertiary hospital in Singapore were invited to complete a cross-sectional questionnaire-based study. Demographical data collected include age, religion, and educational qualifications, as well as their decision to donate. 22 participants (45.5% female) were willing to donate their NOK's cornea. 77 (53.2% female) were unwilling. 1 did not answer. The top cited reason for willingness to donate was "wanting to perform a good deed" (n=20) while the "desire to keep their NOK's body intact" (n=42) was the most cited reason for being unwilling. Knowledge (range, 0–12) on CD (4.48 ±2.83) and Human Organ Transplant Act (HOTA) (0.495 ±1.02 respectively) was poor across most participants. Older participants were more willing to donate (34.21% vs 15.25%), despite similar understanding on CD (4.89 ±2.09 vs 4.19 ±1.92, p=0.093). Hindus (n=3, 25%) and Muslims (n=0) were most and least willing to donate respectively. Recommended educational platforms for CD included public forms (n=98) and social media awareness programmes (n=98). In conclusion, age and religion are strong factors affecting decisions to donate, even with similar knowledge levels. Understanding how such factors interact can assist in curating educational platform for CD.

Biography

Au Wei Yung is embarking on his MBBS degree at the age of 23 years from Lee Kong Chian School of Medicine, Nanyang Technological University Singapore. As an aspiring ophthalmologist, he has assumed multiple portfolios to expose himself to clinical ophthalmology and research. He is the Chairperson of the Ophthalmology Student Interest Group and has worked on papers ranging from Glaucoma AI App and LLM Chatbots to KAP studies on corneal donation.

Abdelilah Majdoubi

Yale University
USA

Immune cells of aqueous Humour: Role in homeostasis and disease

Abstract:

The immune environment of the eye is unique due to its immune-privileged status, where immune responses are tightly regulated to maintain visual function. The aqueous humour, a clear fluid filling the anterior chamber of the eye, plays a key role in this regulation. While the presence of immune cells in inflamed or diseased eyes is well-documented, their composition in the healthy eye remains unclear. To characterize the immune cell populations in the aqueous humour under non-pathological conditions, we first performed flow cytometry analysis. We identified both CD45+ immune cells and CD45– non-immune cells. We utilized single-cell RNA sequencing on aqueous humour samples from postmortem donors. We found nine distinct clusters, including two T cell clusters, a monocyte/macrophage cluster, dendritic cells, microglia, B cells, and two unknown clusters. T cells were the most abundant, followed by microglia and monocyte/macrophages. T cells Cluster # 1 expressed markers of activation and tissue residency (CD44, CD69, JUND), along with transcription factors associated with less terminal differentiation (TCF7, GATA3). In contrast, T cells Cluster #2 displayed high expression of cytotoxicity markers (GNLY, GZMB, PRF1) and exhaustion molecules (HAVCR2, CD38), indicating a more differentiated, potentially exhausted phenotype. Pseudotime analysis confirmed that both T cells Cluster # 1 and Cluster # 2 formed a continuum of T cells differentiation from early stage of activation to cytotoxicity and exhaustion. CellChat analysis showed interaction between T cells and Monocytes/Macrophages and Microglia, that was mediated mainly by the CD44-SSP1 which is known to have a regulatory effect on T cells. Our results highlight the immune heterogeneity within the aqueous humour of the healthy eye, providing new insights into the immune landscape of this immune-privileged site. The detection of microglia and other tissue-resident immune cells indicates that the aqueous humour harbours a specialized immune environment.

Biography

Abdelilah Majdoubi has completed his PhD in Microbiology and Immunology from the University of Montreal and postdoctoral studies from British Columbia University and Yale University.

Lokeshwari Aruljyothi

Aravind Eye Hospital
India

Family screening of keratoconus for studying prevalence in 1st-Degree relatives with corneal topography

Abstract:

The prevalence of Keratoconus among family members of diagnosed Keratoconus patients is unknown. Screening first-degree relatives helps to identify the prevalence and subclinical cases of Keratoconus. Identifying subclinical cases aids in preventing the progression of Keratoconus. Thereby, preventing the environmental factors which cause the progression of the disease. This prospective case-control study conducted at a tertiary eye care center in South India from July to September 2024 aimed to investigate the prevalence of keratoconus among first-degree relatives of diagnosed patients using corneal topography and explore familial aggregation. First-degree family members of 29 keratoconus-diagnosed patients were invited, with 22 families consenting, resulting in 59 topographies compared with 82 controls. The topographical parameters assessed were Kmax (>47D), 3mm zone (>1.5D), 5mm zone (>2.5D), Thinnest corneal thickness (<470µm), and Posterior float (>55D). The findings revealed that 54% of relatives exhibited either topographical features of keratoconus (15%) or two or more keratoconus traits (39%). Mann-Whitney test analysis showed a significant difference ($p<0.001$) in all parameters between relatives and controls, with no significant gender-based distinctions. This study not only contributes to understanding keratoconus but also emphasizes the importance of family screening, early detection, and preventive measures, empowering families to manage and mitigate the impact of keratoconus. This pioneering study in India highlights the need for multicenter studies across diverse populations to deepen our knowledge and facilitate targeted interventions.

Biography

Lokeshwari Aruljyothi, with 15+ years in India's ophthalmology sector and a decade focused on cornea and refractive surgeries at a WHO-affiliated hospital, brings extensive expertise. Having performed 5000+ ocular procedures, including Phacoemulsification, LASIK, and corneal repairs, she holds an MS in Health Informatics from the University of Kansas, USA, emphasizing clinical informatics. With papers in national/international journals, she pursues a Clinical Research Fellowship at the University of Michigan. Her compassionate care and specialized skills make her a valuable asset in eye care, blending surgical proficiency with a deep understanding of health informatics and research.

Meziane Hind

Mohammed First University
Morocco

Artificial intelligence in ophthalmology: Applications and opportunities

Abstract:

The COVID-19 pandemic has impacted everyday life, the global economy, travel, commerce and healthcare, which has demonstrated the weakness of current medical systems. Hence, technologies can be useful in reducing the severity of the impact of the coronavirus pandemic on individuals, organizations and society. Nowadays, about 420 million people have some of eye disease according to the World Health Organization (WHO). This problem grows really quickly due the aging of our population. Specialist thinks that we need much more ophthalmologists. Therefore, Artificial Intelligence (AI) has made significant advancements in ophthalmology by analyzing data and medical images. AI shows promise in improving diagnosis and access to eye care. For instance, AI algorithms can detect eye diseases like diabetic retinopathy and macular degeneration from retinal images, predict disease risk and progression, and provide treatment recommendations to augment doctors, etc. In this conference, we present an overview analysis of literature in the field of ophthalmology and AI. The study employs a comprehensive approach; combining advanced machine learning and deep learning (ML & DL) techniques to enhance new developments relevant to ophthalmology.

Biography

Hind MEZIANE is a Ph.D. candidate in Computer Science at Arithmetic, Scientific Computing and their Applications Laboratory (LACSA), Faculty of Sciences, Mohammed First University in Oujda, Morocco. She has a Master's degree in Computer Engineering from Faculty of Sciences, Mohammed First University in Oujda, Morocco (2019). Additionally, she holds several certifications in networking, artificial intelligence, and cybersecurity. Also, she is an active reviewer for more than 10 international journals listed in the Web of Science and Scopus. In addition to her academic experience, she's a Keynote Speaker of many international conferences and webinars.

Kaori Yamada

The University of Illinois at Chicago
USA

KIF13B mediates VEGFR2 recycling to modulate vascular permeability in neovascular age-related macular degeneration

Abstract:

Choroidal neovascularization (CNV) leads to irreversible blindness in age-related macular degeneration (AMD). CNV is triggered by elevated levels of vascular endothelial growth factor (VEGF). Current anti-VEGF therapies need repeated intravitreal injections of anti-VEGF drugs, which is a burden for old patients with impaired vision. We have developed a peptide-based inhibitor that can be used as an eyedrop and showed efficacy in mouse models of neovascular AMD (nAMD). The strategy is based on our finding that VEGFR2 trafficking to the cell surface is mediated by the kinesin-3 family protein KIF13B, and it is essential to respond to VEGF-A when inducing angiogenesis. However, the precise mechanism of how KIF13B regulates VEGF-induced signaling and its effects on endothelial permeability is largely unknown. Here, we show that KIF13B-mediated recycling of internalized VEGFR2 through Rab11-positive recycling vesicle regulates endothelial permeability. Phosphorylated VEGFR2 at the cell-cell junction was internalized and associated with KIF13B in Rab5-positive early endosomes. KIF13B mediated VEGFR2 recycling through Rab11-positive recycling vesicle. Inhibition of the function of KIF13B attenuated phosphorylation of VEGFR2 at Y951, SRC at Y416, and VE-cadherin at Y685, which are necessary for endothelial permeability. Failure of VEGFR2 trafficking to the cell surface induced accumulation and degradation of VEGFR2 in lysosomes. Furthermore, in the animal model of nAMD, inhibition of KIF13B-mediated VEGFR2 trafficking also mitigated vascular leakage. Thus, the present results identify the fundamental role of VEGFR2 recycling to the cell surface in mediating vascular permeability, which suggests a promising strategy for mitigating vascular leakage associated with inflammatory diseases.

Biography

Kaori Yamada has completed her PhD from the University of Tokyo in Japan and postdoctoral studies at the University of Illinois at Chicago, College of Medicine. She is an Assistant Professor of Pharmacology and Ophthalmology at UIC. She has published more than 15 papers in reputed journals.

Ali Humza Shafiq

University of Gujrat
Pakistan

Advancements in Ophthalmology & Vision Science: Innovations and Challenges

Abstract:

The International Conference on Ophthalmology & Vision Science provides a platform for researchers, clinicians, and industry professionals to discuss recent advancements in the field. This paper explores the latest innovations and challenges in ophthalmic research, diagnosis, and treatment. Topics of interest include new technologies, surgical techniques, diagnostic tools, and therapeutic interventions. Additionally, the paper examines emerging trends in vision science, such as regenerative medicine, gene therapy, and artificial intelligence applications. By addressing these topics, the paper aims to contribute to the ongoing dialogue surrounding vision health and the future of eye care.

Biography

Ali Humza Shafiq is based in Lahore, Pakistan, and is affiliated with the University of Gujrat. He is actively involved in academic and research pursuits, contributing to advancements in his field. With a focus on innovation and scholarly excellence, Ali plays a key role in furthering the institution's mission and vision.

IN PERSON

POSTER PRESENTATIONS

OCTOBER 24-25, 2024

Shabraiz Shahid

Numbor1 Luxury Transport LLC
UAE

Encyclopedia of bioanalytical methods for bioavailability and bioequivalence studies of pharmaceuticals

Abstract:

Vision Beyond Borders: Bridging Business and Ophthalmology at the International Conference on Ophthalmology & Vision Science

The International Conference on Ophthalmology & Vision Science, slated for October 24- 25, 2024, in Montreal, Canada, transcends geographical boundaries to unite business leaders and ophthalmic experts in a collaborative pursuit of innovative solutions for vision health. As a Business Director based in Dubai, your expertise and insights are invaluable in driving strategic partnerships and fostering synergies between the corporate sector and the ophthalmology community. This conference offers a unique opportunity to explore the intersection of business acumen and medical advancements, with a focus on leveraging technology, optimizing healthcare delivery, and addressing the evolving needs of patients worldwide. Join us in Montreal as we chart a course towards a brighter future for global eye care, where vision knows no limits.

Biography

Shabraiz Shahid is based in Dubai, United Arab Emirates, and is associated with NUMBOR1 Luxury Transport LLC, a leading provider of luxury transportation services in the UAE.

VIRTUAL EVENT

KEYNOTE PRESENTATIONS

OCTOBER 24-25, 2024

Fritz Hengerer

University of Heidelberg
Germany

7-Year outcomes after Second-Generation trabecular Micro-Bypass in eyes with or without prior glaucoma surgery

Abstract:

Purpose: In Germany, 2nd-generation trabecular micro-bypass (iStent inject) can be implanted with cataract surgery or as a standalone procedure. The current study evaluated combined and standalone outcomes in a single longitudinal cohort, stratified by whether eyes had undergone prior glaucoma surgery (No-Surg and Prior-Surg groups, respectively).

Methods: This prospective, non-randomized, unmasked study included 125 consecutive iStent inject cases of one surgeon at a large German academic hospital. There were 48 eyes (38% of cohort) with a total of 66 prior glaucoma surgeries, including predominantly trabeculectomies (18), cyclophotocoagulation (27), surgical iridectomy (6), and laser trabeculoplasty (7). Intraocular pressure (IOP), medications, adverse events, and secondary surgeries were assessed through 7 years in All-Eyes and in No-Surg (n=77) and Surg (n=48) subgroups.

Results: Preoperative mean IOP in All-Eyes was 23.5±6.2mmHg on 2.68±1.02 medications, reducing to 14.1±1.4mmHg on 1.09±0.66 medications at 7 years (40% and 59% reductions, respectively; both $p<0.001$). In No-Surg eyes, mean IOP decreased by 29% (22.2 to 15.8 mmHg, $p<0.001$) and medications by 61% (2.52 to 0.99, $p<0.001$). In Prior-Surg eyes, mean IOP decreased by 46% (25.6 to 13.9 mmHg, $p<0.001$) and medications by 65% (2.92 to 1.02, $p<0.001$). At last follow-up, all eyes had the same or lower IOP and the same or lower medications vs preoperative. Seven eyes had a secondary glaucoma procedure (CPC or Xen); no eyes had filtering surgery.

Conclusions: iStent inject implantation with/without cataract surgery yielded significant, sustained, and safe 7-year IOP and medication reductions in eyes regardless of whether they had undergone prior glaucoma surgery.

Biography

Fritz Hengerer completed his MD from Buerger hospital University and his PhD from University of Heidelberg. He is a professor and attending surgeon at the University Eye Hospital at the University of Heidelberg in Germany. He has published numerous papers in reputed journals and has been a guest presenter at over conferences.

Kishore Balasubramanian

Mahalingam College of Engineering and Technology
India

Transforming Ophthalmology: The Impact of Artificial Intelligence and Machine Learning

Abstract:

Artificial intelligence (AI) and machine learning (ML) are revolutionizing ophthalmology by enhancing diagnostic accuracy, treatment personalization, and patient management. These technologies facilitate the analysis of complex data sets from imaging modalities such as OCT, fundus photography, and visual field testing, enabling early detection of conditions like diabetic retinopathy, glaucoma, and age-related macular degeneration. AI algorithms can automate image interpretation, significantly reducing the burden on clinicians and improving efficiency in clinical workflows. Additionally, ML models assist in predicting disease progression and tailoring interventions based on individual patient profiles. The integration of AI and ML in ophthalmology not only optimizes clinical decision-making but also holds the potential to expand access to eye care, particularly in underserved populations. This abstract reviews the current applications, challenges, and future prospects of AI and ML in ophthalmology, underscoring their transformative potential in improving visual health outcomes

Biography

Kishore Balasubramanian has more than 21 years of academic experience in imparting Engineering Education. He had his Bachelor's Degree from Bharathiar University, India, Master's Degree and Ph.D from Anna University, India. His research interests include Medical Image Processing and Soft Computing Techniques.He has authored books in Analog Electronics and AI for medical diagnosis and book chapters. He has published 70 papers in International and National journals (Springer, Elsevier, Taylor and Francis, Wiley, Sage etc.). He has been granted 6 Indian patents and has published 3 patents. He has been nominated as a "Bentham Ambassador" – Bentham Science Publications for year 2022-23, 2023-24 and active reviewer award from Betham Publishers. He is serving as an Academic Editor in PLOS ONE journal, Trails (BMC Springer), MODA(Wiley), Societal Impacts(Elsevier), European Journal of Artificial Intelligence and Machine Learning, Exploration (Wiley).Presently he is working as an Associate Professor in the Department of EEE and Heading Career Planning and Guidance Cell at Dr. Mahalingam College of Engineering & Technology, India.

VIRTUAL EVENT

ORAL PRESENTATIONS

OCTOBER 24-25, 2024

Yanying Miao

Fudan University, Shanghai
China

Multiple targets of a single molecule: A new strategy for glaucoma treatment

Abstract:

Glaucoma is an important cause of irreversible blindness, which is characterized by the loss of retinal ganglion cells and their axons. The current treatment methods cannot cure glaucoma and can only delay the course of the disease. Therefore, there is an urgent need to understand the pathogenesis of glaucoma and search for potential therapeutic targets. Rho small G protein Rac1 is an important intracellular signal transduction molecule that functions in a cell-type specific manner during physiological and pathological processes. Our work has revealed that Rac1 knockout in RGC can inhibit RGC apoptosis and alleviate axonal dysfunction in an experimental glaucoma model; Rac1 knockout in astrocytes increases the survival of RGCs; Inhibition of Rac1 activity promotes ATP release from astrocytes through connexin 43 and protects RGCs from injury by adenosine receptor 3 in glaucoma. Moreover, the specific inhibition of Rac1 in microglial cells also contributes to block the damage of glaucomatous RGCs. The combined inhibition of Rac1 in glial cells and RGCs showed a more effective neuroprotection in glaucoma. Our work suggests that Rac1, as signal hub molecule with multiple targets, may be a new potential neuroprotective candidate molecule for glaucoma treatment.

Biography

Yanying Miao received her Ph.D. degree from Peking University in 2007. She visited the University of Chicago as a scholar from 2012 to 2013. She serves as a director member of Shanghai Physiological Society. She has published more than 40 papers in reputed journals.

Magali Taiel

GenSight Biologics
France

Lumevoq gene therapy in leber hereditary optic neuropathy

Abstract:

Leber hereditary optic neuropathy (LHON) is a rare, maternally inherited mitochondrial genetic disease with a high unmet medical need. Three primary point mutations in the mtDNA are responsible for LHON in 90% of subjects: G3460A, G11778A and T14484C, located respectively in the ND1, ND4 and ND6 genes. The m.11778G>A ND4 mutation causes the most severe clinical form of LHON, and is also the most frequent mutation (75% of LHON). Lenadogene nolparvovec (Lumevoq) is a recombinant adeno-associated viral vector, serotype 2 (rAAV2/2), containing a cDNA coding the human wild-type mitochondrial NADH dehydrogenase 4 protein (ND4), which has been specifically developed to treat ND4 LHON subjects, and is targeting the root cause of the disease. Restoring the expression of the ND4 protein could correct the deficiency due to the m.11778G>A ND4 mutation, leading to the improved activity and assembly of Complex I of the mitochondrial respiratory chain, helping to protect retinal ganglion cells, eventually halting and reversing the disease. The three Phase-3 multi-center clinical trials RESCUE, REVERSE and REFLECT showed sustained bilateral improvement of best-corrected visual acuity (BCVA) following unilateral or bilateral intravitreal injection of lenadogene nolparvovec gene therapy for the treatment of LHON caused by the m.11778G>A mitochondrial DNA mutation in the MT-ND4 gene. Overall, 189 ND4 patients were treated with lenadogene nolparvovec in clinical trials. Early expanded access programs have been granted in the US and Europe. Lenadogene nolparvovec brings a novel and efficacious treatment option, fulfilling an ongoing unmet medical need whilst restoring visual function in ND4 LHON patients.

Biography

Taiel completed her doctorate in Medicine with board certified in Ophthalmology from Lariboisiere Saint Louis University, Paris, France, and her Associate Professor degree. Dr Taiel has been engaged in the Pharma Industry for 25 years. She hold international and management positions in various therapeutic areas at Servier, Pfizer and Eli Lilly. Then, she led the development of antisense oligonucleotides in Inherited Retinal diseases at ProQR Therapeutics. Since 2018, she leads Gene Therapy programs in Inherited Retinal diseases, as the CMO of GenSight Biologics. Dr. Taiel brings extensive years of experience from both academic medicine and pharma industry.

Jaafar Manal

Chu Souss Massa
Morocco

Visual acuity recovery after vitreoretinal surgery

Abstract:

Posterior segment pathologies are a frequent cause of visual impairment and blindness. Their management relies on vitreoretinal surgery. This surgery can be performed either urgently or electively depending on the circumstances. The aim of our study was to highlight the contribution of vitreoretinal surgery and its impact on visual prognosis across different pathologies.

To achieve our objective, we conducted:

- A retrospective exploratory study spanning eight months, involving 64 patients who underwent vitreoretinal surgery and whose medical records were analyzable regarding various clinical, paraclinical, and therapeutic aspects.
- The study period covered eight months: January 2023 to August 2023.

Our study was conducted with an analytical aim to evaluate the functional visual prognosis following vitreoretinal surgery for different underlying pathologies.

- Visual recovery generally took several months after surgery but varied significantly depending on the pathology involved.
- Visual recovery following macular hole surgery was often satisfactory but partial, being better in patients with smaller macular holes (<200 microns).
- Visual recovery was slow after epiretinal membrane surgery. Vision typically improved substantially within the first month, followed by slow improvement over the next 2 to 3 months.
- Recovery after vitreous hemorrhage surgery and improvement in visual acuity were related to the cause of bleeding.
- Regarding retinal detachments, visual recoveries varied. They were better for macula-sparing, recent detachments managed early, but prognosis was poor for tractional retinal detachments, old detachments, macula-off cases.

Biography

Manal Jaafar is a third year resident in CHU Souss Massa Agadir. She has completed her PhD at the age of 24 years from Rabat University School of Medicine and pharmacy. She is now completing her specialization in ophthalmology in Agadir and has multiple submitting to local congresses in Morocco sush as SAMIR, SMO, RESO

Adriana Agnese Amaro

IRCCS Ospedale Policlinico San Martino
Italy

Molecular evidence for blue light as an etiological factor for uveal melanoma

Abstract:

Uveal melanoma (UM) is more prevalent in individuals with pale skin and light eyes, with welding being a significant risk factor. UV-light, which is filtered by the eye, is not a risk factor for UM, but blue light has been suggested as a potential cause based on mutational signatures in cutaneous melanoma (CM). Blue light, the most energetic part of visible light, has been proposed as an etiological factor. We report here on molecular evidence for mutagenic activity of blue light and the corresponding mutational signature. Spontaneously immortalized murine embryonic melanocytes, Melan-A, were exposed to blue light (66.5W/m2) for 72 hours, then analyzed for effects on cell behavior and gene expression. Surviving cells were cultivated and analyzed by whole genome sequencing. Mutational signatures were derived from sequences as analyzed using Sigprofiler and compared to signatures present in uveal melanoma. Melan-A cells exposed to blue light for 72 hours exhibited a mutational signature similar to human uveal melanoma (UM) but not cutaneous melanoma (CM). Surviving cells showed resistance to further blue light exposure, suggesting a selection for apoptosis-resistant, potentially tumor-initiating cells. Functional assays and transcriptomic studies revealed a statistically significant pro-apoptotic and anti-proliferative effects of blue light, along with DNA damage and oxidative stress. Re-exposed cells show apoptosis-resistant features like potentially tumor-initiating cells. The blue light exposure molecular effects on melanocytes are consistent with a mutagenic, potentially tumor-initiating effect of blue light. The mutational signature prevalent in UM is induced by blue light exposure. Blue light likely contributes to UM tumorigenesis.

Biography

Adriana Agnese Amaro Education 2022: Health-based Specialisation Schools Clinical Pathology and Biochemistry, University of Eastern Piedmont, UPO, Novara, Italy. 2010: PhD in Biophysics Roma, University La Sapienza, Italy. 2008. Agnese Amaro has completed his PhD at the age of 27 years from University La Sapienza, Italy and postdoctoral studies from IRCCS Ospedale Policlinico San Martino, Genoa, Italy whit a researcher fellowship. She is PI and Coordinator of a project on uveal melanoma molecular carcinogenesis at IRCCS Ospedale Policlinico San Martino, Genoa, Italy. She has published more than 35 papers in reputed journals.

Nida Amin

The University of Faisalabad
Pakistan

Pyschiatric Symptoms In Keratoconus: Analyzing Anxiety and Depression in Affected Patients

Abstract:

Background: Gradual progression of the corneal disorder significantly impairs eyesight and quality of life, increasing the likelihood of depression in affected individuals.

Objective: The purpose of this study was to evaluate the occurrence of depression and anxiety symptoms in patients having keratoconus and suggest better treatment by identifying the ways to overcome depression.

Methodology: A descriptive analytical study was conducted at the Al –Ibrahim eye hospital Karachi, in March to April 2022, and patients diagnosed with symptomatic keratoconus were recruited through a non-probability convenient sampling technique. After written informed consent from patients, the severity of keratoconus was assessed using Visual acuity and corneal topography. Symptoms of anxiety and depression were assessed through Hospital Anxiety and Depression scale.

Results: A total of 108 participants, of which 60 (56%) were female and 48 (44%) were male. By employing the Hospital Anxiety Depression scale (HADS), 44 (40.7%) patients were classified as normal with a HADS score of (0-7), 23 (21.3%) as borderline with a HADS score of (8-10) and 41 (38%) patients were diagnosed with anxiety and depression with a HADS score of (11-21). Conclusion: Depression and anxiety are very highly prevalent among keratoconus patients, especially in the advanced stages of the disease.

Biography

Nida Amin is an Assistant Professor and Head of the Department of Optometry at Green International University Lahore. She holds a Ph.D. in Optometry from The University of Faisalabad. With over five years of teaching experience and one year of clinical practice, Dr. Amin has contributed to peer-reviewed journals as a reviewer and presented at both national and international conferences. She is actively involved in the MPhil Optometry program, with a focus on research methodology and biostatistics.

Tehreem Najam

University of Sialkot
Pakistan

Retinal diseases and treatment modalities

Abstract:

Retinal diseases encompass a broad spectrum of conditions affecting the delicate neural tissue lining the back of the eye, leading to vision impairment and blindness if left untreated. With the aging global population, the prevalence of retinal diseases such as age-related macular degeneration (AMD), diabetic retinopathy, and retinal vein occlusion is on the rise, posing significant public health challenges.

Recent advancements in diagnostic tools, including optical coherence tomography (OCT) and fundus fluorescein angiography (FFA), have revolutionized our understanding of retinal diseases, allowing for early detection and precise monitoring of disease progression. These technological breakthroughs have been instrumental in facilitating targeted and personalized treatment approaches.

Treatment modalities for retinal diseases have also seen remarkable progress over the past decade. Anti-vascular endothelial growth factor (anti-VEGF) therapies have become the cornerstone in the management of neovascular AMD and diabetic macular edema, demonstrating significant improvements in visual outcomes and quality of life for patients.

Additionally, innovations in retinal laser therapy, intravitreal injections, and surgical interventions such as vitrectomy and retinal detachment repair have expanded the therapeutic arsenal available to ophthalmologists, offering new hope to patients with previously untreatable conditions.

Despite these advancements, challenges remain in optimizing treatment regimens, minimizing side effects, and ensuring equitable access to care. Ongoing research efforts are focused on developing novel therapeutic agents, refining drug delivery systems, and exploring the potential of gene therapy and regenerative medicine approaches to further enhance treatment outcomes.

These abstract aims to provide an overview of the current landscape of retinal diseases, highlighting the latest advancements in treatment modalities and outlining future directions in research and clinical practice. By fostering collaboration between researchers, clinicians, and industry stakeholders, we can continue to drive innovation and improve the lives of patients affected by retinal diseases worldwide.

Biography

Tehreem Najam is affiliated with the University of Gujrat, Pakistan

VIRTUAL EVENT

POSTER PRESENTATIONS

OCTOBER 24-25, 2024

David Diaz

Penn State College of Medicine
USA

Influence of Short-Term topical naltrexone treatment on the lacrimal functional unit in diabetic rats

Abstract:

Dry eye syndrome (DES) often correlates with the prevalence of diabetes. One underlying factor is a dysfunctional lacrimal functional unit (LFU) consisting of lacrimal glands, conjunctiva, and corneal epithelium, that are responsible for tear production and tear homeostasis. Naltrexone (NTX) is an opioid receptor antagonist that blocks the Opioid Growth Factor receptor (OGFr), and when used topically to treat dry eye in Type 1 diabetic (T1D) rats, restores corneal epithelial sensitivity and tear production to normal levels within days of the initiation of therapy. The mechanism of this action is not known. One hypothesis is that elevated OGF levels in diabetes alter the morphology and function of the LFU, and that topical NTX blocks OGF-OGFr interaction thereby reversing LFU complications. Adult male and female rats were rendered hyperglycemic and considered T1D after 6 weeks. Ocular complications of dry eye and reduced sensitivity were recorded prior to treatment. Cohorts of each sex were randomized to receive topical NTX (5 x 10-5 M) twice daily for ten days. The next day, dry eye and corneal sensitivity in T1D+NTX rats were comparable to normal animals. OGFr levels remained elevated in plasma and ocular tissue of all T1D animals. LFU tissue was harvested for morphology and had decreases in number and size of lacrimal gland acini ($p<0.001$) and Meibomian glands ($p<0.001$) in T1D rats relative to normal animals. Ten days of NTX did not reverse these deficits suggesting that NTX-mediated reversal of dry eye may involve neuronal mechanisms.

Biography

David Diaz has completed his Master of Science degree in Anatomy in 2021 from Case Western Reserve University and is currently in the PhD program in Anatomy at Penn State College of Medicine. His research interests involve understanding mechanisms related to dysregulation of the OGF-OGFr regulatory axis and ocular complications in diabetes. David is also an active teacher of human gross anatomy to medical students, physician assistant students, and undergraduates.

KEYNOTE PRESENTATIONS

OCTOBER 24-25, 2024

Thorbjorn Swenberg

Dalarna University, Sweden

The experience of continuity, and Eye-tracking research on visual behavior and cognitive load

Abstract:

Our surrounding world is continuous. Human vision is not. Still our experience of the world is that it goes on consistently. Audiovisual perception is key in the construction of continuity; it is what we rely on. Film and other media, contrary, is fundamentally discontinuous, providing fragmental impressions for our perception. Particularly, the sense of continuity is often at stake in situations that involves interaction with screen media. My research focuses the experience of continuity and how discontinuity affects cognitive load when people interact with 2D imagery, aiming to unravel the nuanced ways visual search strategies play a role in overcoming the potentially disruptive effects of discontinuity. Cognitive load, defined as the mental effort required for task completion, has long been recognized as a critical factor in cognitive psychology. However, how it is affected by discontinuity and visual search behavior remain a dynamic area of exploration. Eye-Tracking as a scientific method, can provide valuable insights into the effects of cognitive load on visual attention and information processing. It allows researchers to analyze participants' gaze patterns and pupil dilation during cognitive tasks as well as film events. This method also illuminates how cognitive load can influence allocation of attention, revealing whether cognitive load leads to shifts in attention, and how stimuli is processed in event segments, as chunks. The results of my ET-research, so far, reveals that cognitive load increases when people unknowingly experience discontinuity. However, changes in pupil size, that indicate cognitive load, do not necessarily correlate with specific gaze behaviors.

Biography

Thorbjörn Swenberg has a background in TV production as a Video Editor at the Swedish Television, and completed his PhD in 2017 at Mälardalen University and is Associate Professor in Audiovisual Studies at Dalarna University since 2021. He is the Vice Head of the School of Culture and Society, heading the Dalarna Audiovisual Academy (DAVA). He has published more than 30 papers, journal articles and book chapters on topics of audiovisual perception, design and media production.

ACCEPTED PRESENTATIONS

OCTOBER 24-25, 2024

Betelhem Temesgen Yibekal

Australian National University
Australia

Prevalence of refractive error among adults in Gondar Town, Northwest Ethiopia

Abstract:

Purpose: This study aimed to assess the prevalence of refractive errors and associated factors among adults in Gondar Town, Northwest Ethiopia.

Methods: A community-based cross-sectional study was conducted among 881 adults from April 28 to May 28, 2023, in Gondar Town. Optometrists used a questionnaire and ocular examination to collect data. Presenting and pinhole visual acuities were used to diagnose the refractive errors. Data were entered into EPI-INFO version 7 and analysed using STATA 14. Binary logistic regression was used to determine the factors associated with refractive error. An adjusted odds ratio with 95% confidence level was used to assess the strength of the association. Variables with a p-value <0.05, were considered statistically significant determinants of refractive errors.

Result: In total, 881 adults participated in this study, with a response rate of 94.83%. The median age of the participants was 35 years (interquartile range: 21 years). Among the study participants, 18.84% (95% CI, 16.39% – 21.57%) had refractive errors. Age greater than 48 years (AOR=3.12, 95% CI:1.61 – 6.07) and 36 – 48 years (AOR=4.13, 95% CI:2.29 – 7.46), non-ocular comorbidities (AOR=3.21, 95% CI:2.04 – 5.06), history of intraocular surgery (AOR=2.05, 95% CI:1.11 – 3.79), and cataract (AOR=2.00, 95% CI:1.06 – 3.77) were significantly associated with refractive error.

Conclusion: There was a high prevalence of refractive error among adults in Gondar town. Older age, non-ocular comorbidities, a history of intraocular surgery, and cataracts were significantly associated with refractive error.

Biography

Betelhem Yibekal has completed her BSc and MSc degrees in Optometry at the University of Gondar in 2013 and 2017 respectively. She has also completed her MPH in epidemiology at the University of Gondar in 2023. She was a lecturer at University of Gondar department of optometry for about 10 years. She practices optometry in both clinical settings and community service activities. She has done more than 10 research articles and published in peer-reviewed journals. Now she is doing her PhD at Australian National University.

Brandon Garten

Medical College of Georgia
USA

Eyes across America: Distribution ttrends in US ophthalmology training

Abstract:

Our study investigates geographic distributions of Ophthalmology Residency Graduates (ORGs) across transitions from medical school to residency (T1), residency to fellowship (T2), and residency to their first role as attendings (T3).

Using publicly available alumni data on 800 US ORGs, we analyzed geographical trends and socioeconomic factors influencing trainee mobility. Average distances were compared using Welch Two-sample t-tests, differentiating between Top 50 NIH-funded medical school alumni (T50NIH) and others (nonT50NIH). We determined factors affecting travel distances using a linear regression model with US census data.

The South had the greatest retention of trainees in T1(70.9%), whereas the West had the greatest retention in T2(55.0%) and T3(68.75%). More ORGs traveled >500mi in T2(54%) compared to T1(39%) and T3(41%)($p<0.001$). T50NIH alumni traveled further on average than nonT50NIH in T1&T2($p<0.05$). In all transitions, ORGs moved to counties with lower smoking and obesity rates, higher median household incomes, and increased high school completion rates. ORGs traveled further if moving from counties with increased household incomes during T1&T2($p<0.01$) and rural residents during T2($p<0.05$). Conversely, ORGs travelled shorter distances if moving from counties with more college-educated residents during T2($p<0.05$) and elderly residents during T3($p<0.01$).

Overall, we see trainees gravitating toward affluent areas, while moving away from areas that contain populations with increased health risks. Aging demographics may be influencing ORGs to remain closer, while affordable housing within rural settings and higher household incomes may enable them to travel longer distances. These findings offer insight for administrators in Ophthalmology education and workforce planning to address regional disparities.

Biography

Brandon Garten completed his Bachelor of Science in Biology and a Minor in Nutritional Sciences at the University of Georgia. He is currently a 3rd year student at the Medical College of Georgia and is expected to graduate with an MD degree in 2026. He is interested in how nutrition influences disease development and has published research on the clinical applications of gut microbiome manipulation. He has served in various leadership positions for local youth organizations including Resilient Teens, a program designed to address adverse childhood experiences in Georgia's Central Savannah River Area.ss

Cheng-Yi Li

National Yang Ming Chiao Tung University
Taiwan

Age-related Macular Degeneration (AMD) neovascular activity prediction using OCT-Angiography based on entropy and machine learning

Abstract:

Purpose: The study aims to explore the potential of incorporating the information science concept of entropy in the classification of eyes with active and inactive age-related macular degeneration (AMD).

Methods: A total of 35 reactive events and 59 treatment events from 97 follow-ups with AMD were analyzed using OCTA vascular density maps, centerline maps, and foveal avascular zone (FAZ) masks at the superficial capillary plexus (SCP) level. We assessed OCTA metrics, including entropy, vessel density, vessel caliber, vessel tortuosity, FAZ area, and FAZ circularity. Additionally, a supervised machine learning algorithm called the eXtreme Gradient Boost (XGBoost) classifier was developed to categorize images into inactive and active AMD groups. All code used for experiments in this study can be found in a GitHub repository (https://github.com/charlierabea/Entropy)

Results: Our analysis revealed that the entropy and vessel density of central vessels increased significantly in reactive events. In treatment events, entropy, vessel density, vessel caliber, and vessel tortuosity primarily showed high significance increases. FAZ area and circularity, however, did not reach statistical significance in either event type. The XGBoost classifier demonstrated excellent performance, achieving an accuracy of 0.967, AUROC of 0.967, sensitivity of 0.93, and specificity of 1.00. When the model was constructed without entropy inputs, its performance declined, with an accuracy of 0.867, AUROC of 0.837, sensitivity of 0.95, and specificity of 0.72.

Conclusions: Our study indicates that incorporating entropy into the evaluation of OCTA metrics may enhance the classification of active and inactive AMD. This improvement could contribute to more accurate diagnoses and better management of the condition.

Biography

Cheng-Yi Li is an incoming BME MSE student at the Johns Hopkins University, as part of the MD-MSc program at National Yang Ming Chiao Tung University (NYCU). He is the multimodal medical large language model (LLM) researcher at UCLA Natural Language Processing Lab and the undergraduate research fellow at Big Data Center, Taipei Veterans General Hospital (TPEVGH). He has published 3 papers in reputed journals (Journal of Advanced Research/ IEEE Computational Magazine) and has two arXiv preprints under review at the Nature Portifolio and the ACL conference. s

Ching Yun Wang

Taichung Veterans General Hospital, Taichung
Taiwan

Instrumenting carotid sonography biomarkers and polygenic risk score as a novel screening approach for retinal detachment

Abstract:

Background: Retinal detachment (RD) is a blind-threatening disease without effective screening protocols. Thus, current medical practice deployed RD surveillance only after the first attack.

Aim: To foster a risk stratification framework attributing RD risk before disease onset, we instrumented the hemodynamic biomarkers of the carotid ultrasonography (CUS) and the RD polygenic risk score (PRSRD) from single nucleotide polymorphism (SNP) profiling.

Methods: For 21,441 Taiwan biobank participants, a backpropagation logistic regression model was built and visualized by nomogram to identify RD-associated CUS biomarkers. A PRSRD model was built by charting the expression of SNP functional genes from retina scRNA datasets. Last, a two-component RD prediction model (CUS and PRSRD) was assembled by logistic cumulative analysis.

Results: Hypertension (HTN) status was significantly associated with RD risk (OR=1.32). The CUS model (AUCHTN+=0.632, AUCHTN-=0.630) showed RD risk increased with the minimum flow of the right internal carotid artery and the timed average max velocity of the right common carotid artery (ICA-Qmin OR=1.04 and CCA-TAMAX OR=1.03 with p-value<0.05). The genome-wide association study (GWAS) identified three outstanding RD SNPs (IGFBPL1 rs117248428 OR=1.63, CELF2 rs56168975 OR=1.72, and PAX6 rs11825821 OR=1.61 with p-value<5.00x10-6) with coded genes highly-expressed in retinal pigment epithelium (RPE) and choroid. Notably, the two-component model achieved state-of-the-art prediction (AUCHTN+=0.95, AUCHTN-=0.93).

Conclusions: Through instrumenting CUS images and genetic PRSRD, we proposed a screening method for RD at-risk patients.

Francisco Roberto Sanchez Moreno

Neuro-ophthalmology of Texas
USA

Convergence insufficiency after traumatic brain injury, A case series

Abstract:

Convergence insufficiency, a syndrome characterized by decreased ability to converge the eyes and maintain binocular fusion while focusing on a near target, is a common finding in subjects after traumatic brain injury. However, despite of the availability of several studies suggesting an involvement of the midbrain reticular formation in the control of velocity and amplitude of convergence, the nucleus raphe interpositus with fast vergence movements, and the nucleus reticularis tegmenti pontis during slow vergence movements; our theory is that areas of cognitive association could be involved, specifically, in convergence insufficiency secondary to traumatic brain injury. We present a case series of 45 patients that suffered mild to moderate traumatic brain injury and presented with isolated symptomatic (headaches, difficulty reading, maintaining focus) convergence insufficiency. Occasionally, these were also found when focusing on distant objects. Ten of these patients had follow-up and close to half of these had functional brain imaging that elucidated involvement of areas in frontal and parietal white matter. We noticed a statistically significant difference of the exophoria at near, near point of accommodation and accommodation amplitudes when comparing subjects that had evaluation within a year of the brain injury and subjects that had their evaluation done after one year of the brain injury regardless of the magnitude of the traumatic brain injury. Our goal is to prove the existence of pathways within the white matter of the frontal and parietal lobe and that their involvement possesses a better predictive value in establishing a prognosis in the affected patients.

Biography

Francisco R Sanchez Moreno has completed his M.D. at the age of 24 years-old from Universidad Autonoma de Tamaulipas, his ophthalmology residency was completed at Fundación Hospital Nuestra Señora de La Luz in 2018 and a neuro-ophthalmology fellowship was completed at the Mayo Clinic School of Graduate Medical Education in 2021. He currently is the leading investigator at Neuroeye Clinical Trials in Houston, Texas. He has published more than 10 papers in reputed journals and, in 2024, he was awarded the prestigious J. Lawton Smith award for the most viewed manuscript in the Journal of Neuro-ophthalmology.

Po Jen Shih

National Taiwan University
Taiwan

Biomechanical analysis of symmetric and antisymmetric modes in corneal deformation profiles

Abstract:

The recorded deformation profiles of the cornea under new non-contact tonometry with a high-speed camera provide valuable insights into identifying corneal diseases through biomechanical alterations. Previous researches, driven by the importance of distinguishing keratoconus through the integration of corneal apex deformation and tomographic severity, have proposed several indices for diagnosis. However, prior studies have overlooked characteristics of the entire corneal profiles during deformation, leading to a gap in understanding the mechanical properties and their application. To analyze these corneal profiles, we used mathematical decomposition techniques to break down the geometric shapes of corneas into several modes with modal coefficients. Then we recorded these modal coefficients as time-sequential curves. By analyzing these time-sequential curves from 500 normal, 200 keratoconus, 250 post-reflective surgery, and 100 glaucoma subjects, we identified several features from these modal coefficients, which could be categorized into symmetric and antisymmetric categories. These findings suggest that features in the symmetric category are associated with major deformations, such as intraocular pressure measurements and eyeball movement. High-order modes in the symmetric category are linked to characteristics following reflective surgeries (PRK, LASIK, and SMILE) and the bowtie patterns of keratoconus (AB/IS and AB/SS). Conversely, features in the antisymmetric category are associated with misalignment during testing, primary angle closure glaucoma, and lateral behaviors of forme fruste keratoconus. In conclusion, our method emphasizes the importance of considering the entire corneal profiles, as their categories reveal distinct behaviors. These insights offer potential for improved diagnosis by providing greater details on corneal biomechanics.

Biography

Po-Jen Shih completed his PhD in the Civil Engineering Department at National Taiwan University (NTU), focusing on computational mechanical analysis. He then pursued postdoctoral studies in Mechanical Engineering at NTU, specializing in the fabrication of MEMs. Currently, he serves as an associate professor in the Biomedical Engineering Department at NTU. He applies mechanical analysis technology to address interdisciplinary challenges in the field of biomechanics, particularly focusing on dynamic analysis of corneal biomechanics. He has authored 51 papers in reputable journals.

Shumei Tan

Peking University Third Hospital
China

Thelaziasis callipaeda infection in an urban woman in Beijing a case report

Abstract:

Background: Thelaziasis is a zoonotic disease mainly caused by Thelazia callipaeda (Spirurida, Thelaziidae, Thelazia), which can cause mild to severe signs and lesions, such as foreign body sensation, itching, tearing, eye pain, conjunctival bleeding, conjunctivitis, corneal ulcers, and even blindness. Besides, thelaziasis is mainly prevalent in areas with poor economic and health conditions and a large number of local domestic or wild animals infected, especially in summer and autumn.

Case presentation: A 41-year-old office lady presented to the hospital and reported itching in her right eye for one month in Beijing. This patient had a history of seasonal allergy and owned a cat and once found cat fur on her contact lens before the itching onset. Four worms were observed in the superior conjunctival sac of her right eye. The worms were removed and identified as Thelazia callipaeda. The symptoms resolved after the removal of the worms. Then, The patient received gatifloxacin ointment for one week. There were no recurrences at the 2-month follow-up.

Conclusions: We report a case of human thelaziasis in Beijing. Though most previous cases were from rural areas with poor sanitation, doctors should be aware of the possibility of this disease in the city. In our report, several clinical signs were discussed as indications for the diagnosis, which may lead to faster identification of thelaziasis and earlier treatment initiation.

Biography

Shumei Tan, born in 2000, entered Clinical Medicine (Eight-year program) at Peking University Health Science Center in 2018. In 2023, she entered the Department of Ophthalmology of Peking University Third Hospital to study for Doctor of Medicine. At present, she has published an ophthalmological SCI article as the first co-author (IF=2.1).

Youngchae Yoon

Kim's Eye Hospital
Korea

A case of lid margin hemorrhage following intense pulsed light therapy and meibomian gland expression

Abstract:

This case reports lid margin hemorrhage in a 51-year-old woman with chronic meibomian gland dysfunction (MGD) and pre-existing telangiectasia following a series of Intense Pulsed Light (IPL) treatments and meibomian gland expression (MGE). Over eight IPL sessions, combined with MGE using a stainless steel meibomian gland expressor, improvements were noted in gland secretions and tear break-up time (tBUT). However, after the final session, the patient experienced lid marginal hemorrhage, which resolved spontaneously. Although there were no systemic coagulation issues or anticoagulant use, the hemorrhage likely resulted from mechanical stress during gland expression and IPL's impact on fragile vessels. While ocular surface health improved, clinicians should monitor patients closely for such complications, possibly adjusting MGE techniques or frequency to enhance safety.

Biography

Youngchae Yoon graduated from Dongguk University School of Medicine at 25 and completed residency in ophthalmology at Seoul St. Mary's Hospital, Catholic University of Korea. Following that, she pursued a 2-year fellowship in cornea at Catholic University of Korea, where specialization in the field was honed. Currently, she practices as a cornea specialist at Kim's Eye Hospital. She has published more than 8 papers in reputed journals contributing to advancements in eye care.

Liya Xu

University of Southern California
USA

A diagnostic aqueous humor protein signature predicts metastatic potential in uveal melanoma

Abstract:

Purpose: Gene expression profiling (GEP) has been clinically validated for stratifying uveal melanoma (UM) patients into two prognostic classes: class 1 (low metastatic risk) and class 2 (high metastatic risk). However, performing GEP analysis requires an intraocular tumor biopsy, which may be limited by tumor heterogeneity and accessibility of the tumor tissue. As a less invasive alternative, specifically the eye-specific aqueous humor (AH) liquid biopsy, has emerged. Previous research in our lab has identified UM-specific differentially expressed proteins (DEPs) from AH that could be used to differentiate GEP classes. In this study, we aim to verify these results and develop a scoring system using a UM-specific DEP signature for predicting metastatic potential.

Methods: The validation set consisted of thirty treatment-naive UM AH samples collected before plaque brachytherapy. Patients were subgrouped into GEP 1 (n=20) and GEP 2 (n=10) based on their GEP classes. Eighty microliters of AH samples were analyzed using the proximity extension assay-derived multiplexed Olink platform. Protein expression levels from the Olink® Explore 3,072 panel were assessed, and a UM- specific protein signature was compared between the GEP classes. Multiple logistic regression was used to calculate the predicted probability of the observation, and Youden's index was utilized to determine the optimal cut-off value.

Results: Through a stepwise selection, we identified 15 the most significant proteins that could serve as potential biomarkers for GEP 2 UM. The combination of 6 DEPs as a panel demonstrated the best performance in differentiating GEP classes. The area under the curve from a receiver operating characteristic (ROC) curve is 0.935 and under an optimal cut-off, the sensitivity and the specificity for discriminating GEP class 2 is 100% and 80%, respectively. Pathway analysis indicated that these DEPs regulate metastatic-related processes.

Conclusions: This study identified a unique AH UM protein signature that can differentiate between GEP class 1 and class 2 at the diagnostic stage, even when the tumor is too small to biopsy. Further verification will be necessary using a larger UM cohort.

Biography

Liya Xu received her PhD in Neuroscience from University of Southern California 2010. Subsequently, she joined Biomedical Pioneering Innovation Center (BIOPIC) of Peking University to lead the development of one-step next generation sequencing (NGS) based Preimplantation Genetic Diagnosis (PGD) for simultaneous avoidance of monogenic disease and chromosome abnormality. Since 2017, her collaboration with Dr. Jesse Berry has been focusing on developing aqueous humor (AH) as a surrogate tumor biopsy for retinoblastoma (RB). It holds the potential to unlock a new era of precision medicine that will transform the way to detect RB, guide the management and prognosis for RB and lead to alternative treatment regimens that offer a personalized approach to medicine for these children with a greater chance of saving the eye.

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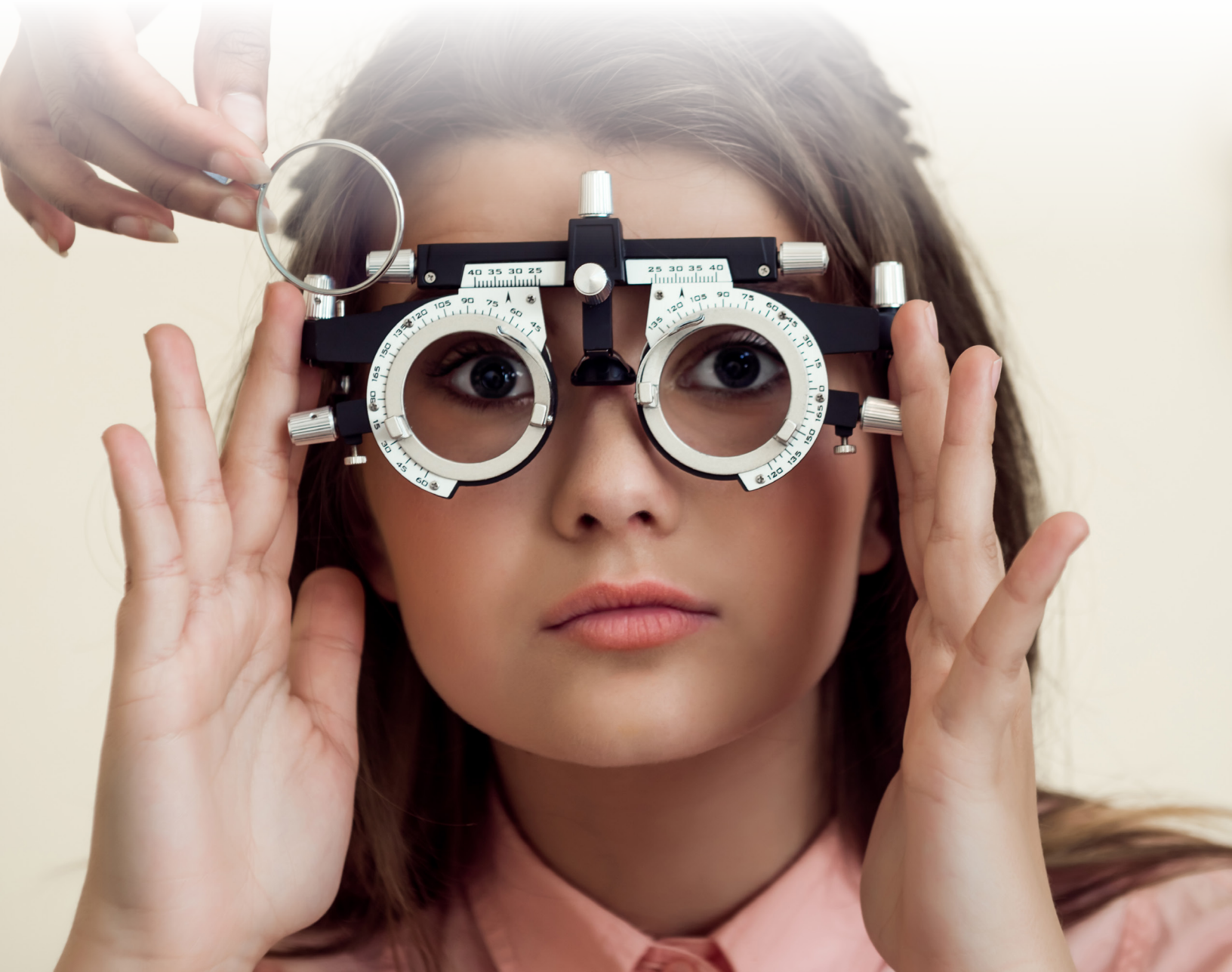

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