CORNEA and EYE BANKING FORUM 2024

CHICAGO, IL
FRIDAY, OCTOBER 18

EYE BANK ASSOCIATION OF AMERICA

Cornea Society
Advancing the treatment of corneal disease

FINAL PROGRAM

CorneaSociety.org | RestoreSight.org

MESSAGE FROM PROGRAM CHAIRS

October 2024

The Eye Bank Association of America (EBAA) and Cornea Society are pleased to welcome you to the Cornea and Eye Banking Forum. This year's program features the latest scientific research and innovation in cornea and eye banking through the presentation of scientific abstracts, a Spotlight Session on Clinical Trials, three industry awards, two award lectures, a Best Paper of Session Award, and an invited panel on Diversity, Equity and Inclusion in Cornea and Eye Banking. We are excited about the line-up of presenters and topics; we hope you enjoy this year's event!

On behalf of the joint planning committee, we would like to thank the following companies for their generous support of this year's program through unrestricted educational grants:

- **Lions Gift of Sight**
- **Moria**
- **Wolters Kluwer**

The R. Townley Paton Luncheon, takes place from 12:15 – 1:15 pm during the lunch break and features a plated lunch and a lively moderated discussion. All physician registrants, including medical students are invited to attend.

In addition to the Cornea and Eye Banking Forum, the EBAA and Cornea Society encourage you to attend the following events at the American Academy of Ophthalmology (AAO) Annual Meeting taking place at McCormick Place; separate registration is required.

- Cornea Subspecialty Day 2024, "Cornea 2024: A Layered Approach—Lessons from the Past and Treatments of the Future" on Saturday, October 19, hosted by AAO and Cornea Society.
- The Cornea Society Symposium on Monday, October 21 for "Highlights from This Past Year's Literature". These sessions will take place at McCormick Place and a separate registration is required for these events.

November is Eye Donation Month! The theme, We Can See Clearly Now, celebrates the new perspective on life that corneal transplant recipients experience after having their sight restored. Thank you to everyone in the cornea and eye banking community for the role that you serve in the facilitation of the gift of sight!

We hope you enjoy Chicago and the 2024 Cornea and Eye Banking Forum!

Sincerely,

M. Soledad Cortina, MD
EBAA Scientific Programs Committee Chair

Jessica Ciralsky, MD
Cornea Society Scientific Program Chair

CORNEA and EYE BANKING FORUM 2024

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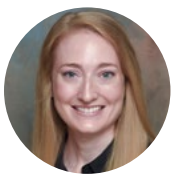

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SUPPORT

The Eye Bank Association of America and the Cornea Society gratefully acknowledge the unrestricted educational grants received in support of this program.

BEST PAPER OF SESSION AWARD

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Mentoring URiM Rising STars in Cornea Program (MUST)

Class of 2024

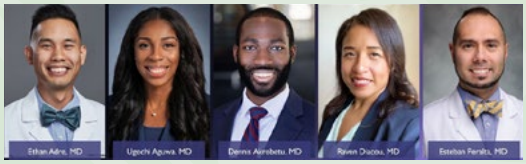
The **MUST Program** was started by the **Cornea Society** (CS) and the **Eye Bank Association of America** (EBAA) in 2022 to provide residents from underrepresented in medicine (URiM) backgrounds with exposure to the latest innovations in cornea and eye banking and opportunities to interact with leaders in the field.

The program sponsors **URiM residents** to attend the **Cornea and Eye Banking Forum** and **Cornea Subspecialty Day at the American Academy of Ophthalmology Meeting**, meet with EBAA and CS leaders, and have individual mentorship.

Six out of seven of the inaugural 2022 residents are cornea fellows and the seventh will be applying for a cornea fellowship this fall. We hope to continue this pathway program to improve diversity in the cornea workforce with the continued support of generous donors.

Class of 2022

Class of 2023



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CORNEA and EYE BANKING FORUM 2024

LEARNER NOTIFICATION AND FINANCIAL INTEREST DISCLOSURES

LEARNER NOTIFICATION

Eye Bank Association of America/ Cornea Society
2024 Cornea and Eye Banking Forum
October 18, 2024
Chicago, IL

ACKNOWLEDGEMENT OF FINANCIAL COMMERCIAL SUPPORT

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ACKNOWLEDGEMENT OF IN-KIND COMMERCIAL SUPPORT

No in-kind commercial support was received for this educational activity.

SATISFACTORY COMPLETION

Learners must complete an evaluation form to receive a certificate of completion. Your chosen sessions must be attended in their entirety. Partial credit of individual sessions is not available. If you are seeking continuing education credit for a specialty not listed below, it is your responsibility to contact your licensing/certification board to determine course eligibility for your licensing/ certification requirement.

ACCREDITATION STATEMENT

In support of improving patient care, this activity has been planned and implemented by Amedco LLC and Eye Bank Association of America. Amedco LLC is jointly accredited by the Accreditation Council for Continuing Medical Education (ACCME), the Accreditation Council for Pharmacy Education (ACPE), and the American Nurses Credentialing Center (ANCC), to provide continuing education for the healthcare team.

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Amedco LLC designates this live activity for a maximum of 7.50 AMA PRA Category 1 Credits™. Physicians should claim only the credit commensurate with the extent of their participation in the activity.

OBJECTIVES – AFTER ATTENDING THIS PROGRAM YOU SHOULD BE ABLE TO

1. Learn new developments, techniques, and therapies in sight restoration.
2. Analyze the efficacy of emerging technologies and innovative processes in corneal transplantation and eye banking that can improve patient outcomes.
3. Cite new research findings in cornea regarding disease, treatment, transplantation, preservation, preparation and processing.

HOW TO GET YOUR CERTIFICATE

1. Go to **http://EBAA.cmecertificateonline.com**
2. Click on the "**2024 Cornea & Eye Banking Forum**" link.
3. Evaluate the meeting and click the hyperlink provided on the last page to claim your credit certificate.
4. Save/Download/Print all pages of your certificate for your records.
5. If you lose your certificate, or need help, go to **help.cmecertificateonline.com**

CEBTs

Eye Bank Association of America approves this activity for a maximum of 7 CEUs. To claim CEUs for participating in this event, visit:
https://www.surveymonkey.com/r/2024EBAAForumCEU

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DISCLOSURE OF CONFLICT OF INTEREST

The following table of disclosure information is provided to learners and contains the relevant financial relationships that each individual in a position to control the content disclosed to Amedco. All of these relationships were treated as a conflict of interest, and have been resolved. (C7 SCS 6.1–6.2, 6.5)

All individuals in a position to control the content of CE are listed in the program book. If their name is not listed below, they disclosed that they had no relevant financial relationships with a commercial interest.

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CORNEA and EYE BANKING FORUM 2024

PROGRAM SCHEDULE

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EVENT SCHEDULE

7:00 am – 2:00 pm	**Registration** (Great Lakes Ballroom Foyer)
7:00 am – 8:00 am	**Breakfast** (Michigan Ballroom)
8:00 am – 5:00 pm	**Cornea and Eye Banking Forum** (Great Lakes Ballroom)
12:15 pm – 1:15 pm	**R. Townley Paton Luncheon & Moderated Discussion*** (Michigan Ballroom)

*Physician attendees are invited to attend.

8:00 am – 10:14 am SECTION I

8:00 am – 8:02 am	**Welcome and Introductions** M. Soledad Cortina, MD, and Jessica Ciralsky, MD W. Barry Lee, MD, and Jim Quirk, CEBT
8:03 am – 8:13 am	**Serological Testing Can Guide Comprehensive Treatment in Patients with Neuropathic Corneal Pain** Chloe Bogen[++], *Tufts Medical Center*
8:14 am – 8:24 am	**Outcomes of DMEK For Corneal Transplantation Failure** Angela Chen, MD[+], *Stein Eye Institute, UCLA*
8:25 am – 8:35 am	**Characteristics and Outcomes of DMEK for Failed Endothelial Keratoplasty** Marianne Price, PhD, MBA, *Cornea Research Foundation of America*
8:36 am – 8:46 am	**Scheimpflug Corneal Tomography Anterior Chamber Depth in DMEK Recipients: A Prognostic Factor for Secondary Graft Failure?** Andrea Santiago-Leon, MD, *Bascom Palmer Eye Institute, University of Miami*
8:47 am – 8:57am	**Late Graft Failure after Descemet Membrane Endothelial Keratoplasty (DMEK): Why is it So Difficult to Remove the Failed Graft?** Theofilos Tourtas, MD, *University of Erlangen-Nuremberg*

[+]Undergraduate Student [++]Medical Student *Resident [†]Cornea Fellow

Spotlight: Clinical Trials – Updates and Findings

8:58 am – 9:09 am	**Diabetes Endothelial Keratoplasty Study: Methods and Impact on the Use of Donor Corneas from Donors with Diabetes** Jonathan Lass, MD, *Case Western Reserve University/ University Hospitals Eye Institute*
9:10 am – 9:21 am	**In-Office Magnetic Cell Therapy Treatment for Corneal Endothelial Dysfunction** David Verdier, MD, *Verdier Eye Center*
9:22 am – 9:33 am	**Cultivated Autologous Limbal Epithelial Cell (CALEC) Transplantation for Limbal Stem Cell Deficiency** Ula Jurkunas, MD, *Massachusetts Eye and Ear, Harvard Medical School*
9:34 am – 9:45 am	**INTRA-KER Keratoprosthesis: Preliminary Results of First-In Human Trial of an Intracorneal Prosthesis** Massimo Busin, MD, *University of Ferrara*
9:46 am – 9:57 am	**Role of Suppressive Dose of Valacyclovir in Management of Herpes Zoster Ophthalmicus: Results of the Zoster Eye Disease Study (ZEDS)** Bennie H. Jeng, MD, *University of Pennsylvania Perelman School of Medicine*
9:58 am – 10:03 am	**Claes Dohlman Award Presentation** Recipient: Christopher J. Rapuano, MD Presented by Bennie H. Jeng, MD, and W. Barry Lee, MD
10:04 am – 10:05 am	**Session I Closing Remarks** M. Soledad Cortina, MD, and Jessica Ciralsky, MD
10:06 am – 10:14 am	**Cornea Society Business Meeting**
10:15 am – 10:29 am	**Break**

10:30 am – 12:00 pm SECTION II

10:30 am – 10:32 am	**Welcome Back** Jessica Ciralsky, MD, and M. Soledad Cortina, MD
10:33 am – 10:35 am	**EBAA High Impact Research Grant Announcement** Mark Greiner, MD, *EBAA Research Committee*
10:36 am – 10:44 am	**Association Between Corneal Densitometry and Night Driving Impairment in FECD using the National Advanced Driving Simulator Glare Protocol** Simran Sarin[++], *University of Iowa*

10:45 am – 10:53 am	**Scanning Specular Microscopy Reliably Images the Same Endothelial Location** Elias Kahan, MD,[+] *NYU Grossman School of Medicine*
10:54 am – 11:02 am	**Detection of Ocular Surface Squamous Neoplasia Using Deep Learning and Anterior-Segment OCT** Jason Greenfield, BA,[++] *Bascom Palmer Eye Institute, University of Miami*
11:03 am – 11:11 am	**Differentiation of Ocular Surface Squamous Neoplasia and Pterygia Using a Novel Tear Assay** Wisam Najdawi, BS,[++] *Bascom Palmer Eye Institute, University of Miami*
11:12 am – 11:20 am	**Complications of Epi-Off Crosslinking: A Historical Experience at Wills Eye Hospital** W. Violet Lin, MD,* *Wills Eye Hospital*
11:21 am – 11:29 am	**Small Fiber Neuropathy in Patients with Dry Eye Disease** Asmaa Zidan, MD, *Massachusetts Eye and Ear, Harvard Medical School*
11:30 am – 11:34 am	**R. Townley Paton Award Introduction** David Verdier, MD, *2023 R. Townley Paton Award Recipient*
11:35 am – 11:55 am	**R. Townley Paton Award Lecture: The Unsung Heroes of Eye Banking and Corneal Transplantation** Bennie H. Jeng, MD, *2024 R. Townley Paton Award Recipient*
11:56 am – 12:00 pm	**Session II Closing Remarks** Jessica Ciralsky, MD, and M. Soledad Cortina, MD

1:30 pm – 3:14 pm SECTION III

1:30 pm – 1:32 pm	**Welcome Back** M. Soledad Cortina, MD, and Jessica Ciralsky, MD
1:33 pm – 1:43 pm	**EBAA Update: Eye Banking Advancements and Challenges** Shahzad I. Mian, MD, *EBAA Medical Advisory Board*
1:44 pm – 1:54 pm	**Effects of Eye Bank Donor Age Expansion on Corneal Endothelial Cell Density and Surgeon Tissue Acceptance** Ayobami Adebayo,[++] Montefiore, *Albert Einstein College of Medicine*
1:55 pm – 2:05 pm	**Thinner, Flatter, Longer: Consistent Corneal Characteristics During Cold Storage Suggest Potential for Extending Storage Time for Donor Corneas** Mark Ellison, BS, BA, *VisionGift*
2:06 pm – 2:16 pm	**Feasibility of Manual Preparation of Bowman Layer Grafts in the Eye Bank Setting** Michael Szkarlat, BS, *Eversight*

[+]Undergraduate Student [++]Medical Student *Resident [†]Cornea Fellow

2:17 pm – 2:27 pm	**Clinical Outcomes of Therapeutic Penetrating Keratoplasty Using Gamma-irradiated Corneal Tissue** Huong Duong, MD, *University of Medicine and Pharmacy at Ho Chi Minh City*
2:28 pm – 2:38 pm	**Reducing Tissue Waste for Corneal Transplantation: Clinical Outcomes of DMEK Grafts Prepared from Failed DSAEK Preparation at an Eye Bank** Charles Reeder, MD,* *Devers Eye Institute*
2:39 pm – 2:49 pm	**A Novel Technique for Processing Keratolimbal Allografts for Treatment of Limbal Stem Cell Deficiency** Pauline Dmitriev, MD,* *University of Michigan Kellogg Eye Center*
2:50 pm – 3:00 pm	**Descemet's Membrane Anterior Keratoplasty (DMAK) for Treatment of Limbal Stem Cell Deficiency (LSCD) in Congenital Aniridia** Joshua Hou, MD, *Lions Gift of Sight/ University of Minnesota*
3:01 pm – 3:03 pm	**Richard Troutman Prize Award Introduction** Douglas R. Lazzaro, MD, *NYU Langone Health*
3:04 pm – 3:12 pm	**Richard Troutman Prize Lecture: Clinical Features of Sjögren Syndrome— Related Dry Eye Disease in Anterior Segment Photographs** Eisuke Shimizu, MD, PhD, *Keio University*
3:13 pm – 3:14 pm	**Session III Closing Remarks** M. Soledad Cortina, MD, and Jessica Ciralsky, MD
3:15 pm – 3:29 pm	**Break**

3:30 pm – 5:00 pm SECTION IV

3:30 pm – 3:32 pm	**Welcome Back** Jessica Ciralsky, MD, and M. Soledad Cortina, MD
3:33 pm – 3:43 pm	**Universal Cannula Compartment Design for Both Endo-In and Endo-Out DMEK Implantation** Mikhail Tsurkan, PhD, *Leibniz Institute of Polymer Research Dresden/ TissueGUARD Gmb*
3:44 pm – 3:54 pm	**Efficacy, Efficiency, and Viability of Pre-loaded DescePrep vs. SCUBA Prepared Tissue in a Diabetic Donor Population** Katie Solley, MSE, *Eyedea Medical*
3:55 pm – 4:05 pm	**The Use of Novel Injectable Tri-Folded Endothelium-In DMEK in Cases of Complex Anterior Chambers** Leonard Heydenrych, FRCOphth, *University of Cape Town, Port Elizabeth Provincial Hospital*

4:06 pm – 4:16 pm	**The Prognostic Significance of Biointegration at the Optic-Cornea Joint in Keratoprosthesis Implantation** Esen Akpek, MD, *The Johns Hopkins Wilmer Eye Institute*
4:17 pm – 4:50 pm	**Invited Session: Diversity, Equity and Inclusion in Cornea**
	Diversity in the Cornea Workforce Kathryn Colby, MD, PhD, *NYU Langone Health*
	Corneal Donation Bans in the US: Assessing the Evidence Michael A. Puente, Jr., MD, *University of Colorado School of Medicine*
	The Impact of Social Determinants of Health on Cornea Conditions Maria Woodward, MD, MSc, *University of Michigan Kellogg Eye Center*
	Disparities in Corneal Transplant Access and Outcomes Divya Srikumaran, MD, *The Johns Hopkins Wilmer Eye Institute*
4:51 pm – 4:54 pm	**Best Paper of Session Award** *Supported by an unrestricted educational grant from Lions Gift of Sight* Presented by W. Barry Lee, MD, and Jim Quirk, CEBT
4:55 pm – 5:00 pm	**Closing Remarks** Jessica Ciralsky, MD, and M. Soledad Cortina, MD

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CORNEA and EYE BANKING FORUM 2024

AWARD LECTURES

AWARD LECTURE

R. TOWNLEY PATON LECTURE

The Unsung Heroes of Eye Banking and Corneal Transplantation

Bennie H. Jeng, MD, 2024 Paton Award Recipient

When reflecting on advancements and progress in any field, it is important to realize that we stand on the shoulders of the giants who came before us. In eye banking and corneal transplantation, there have certainly been many, many giants who have come before us and paved the way for the innovations that we enjoy today: these giants are certainly our heroes. But let us not ever forget the unsung heroes, without whom even the giants would not have succeeded. Let us remember the contributions of the donors.

AWARD LECTURE

RICHARD TROUTMAN CORNEA PRIZE LECTURE

Clinical Features of Sjogren Syndrome – Related Dry Eye Disease in Anterior Segment Photographs

Eisuke Shimizu, MD, PhD, 2024 Troutman Cornea Prize Recipient

Co-Authors: Shinri Sato, MD, PhD; Kazuki Asai, MD; Yoko Ogawa, MD, PhD; Shigeto Shimmura, MD, PhD; and Kazuno Negishi, MD, PhD

Purpose: Dry eye disease (DED) is a major complication of autoimmune disorders, including Sjögren syndrome (SS), ocular graft-versus-host disease, and other rheumatic diseases. DED often affects patients' quality of life, necessitating early detection and treatment. However, no simple screening method for DED has yet been established in ophthalmologic practice. This retrospective study aimed to identify the characteristic features of SS-related DED from anterior segment images.

Methods: Five hundred two cases (SS, 68 cases; ocular graft versus- host disease, 50 cases; other conditions, 27 cases; simple DED, 72 cases; and no DED, 97 cases) were enrolled.

Results: The inferior corneal fluorescein staining score (CFS_I) was significantly higher in the SS group (P , 0.001). Moreover, the nasal lissamine green staining score (LG_N) was high in the SS group (P , 0.001). The sensitivity, specificity, and area under the curve of the receiver operating characteristic curve were calculated for the CFS_I plus LG_N in relation to the SS-positive and SS negative statuses; the sensitivity and specificity were 80.6% and 91.1%, respectively, with an area under the curve of 0.926.

Conclusions: A positive CFS_I combined with a positive LG_N correlates with a high risk for SS. A positive CFS_I and a positive LG_N are important signs for an immune-related DED, especially SS, and may be useful in the early detection of SS-related DED.

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CORNEA and EYE BANKING FORUM 2024

INVITED SESSION

INVITED SESSION

Invited Session: Diversity, Equity and Inclusion in Cornea

Recent studies have highlighted disparities in cornea and eye banking and the impact of social determinants of health on the presentation and management of corneal diseases. This symposium will provide an overview of pertinent topics including the current state of workforce diversity in cornea, the long-standing ban on corneal donation by gay and bisexual men in the U.S and Canada, the impact of social determinants of health on various corneal conditions such as microbial keratitis and keratoconus, as well as disparities in access to and outcomes following corneal transplantation. The session will focus on solutions towards increasing diversity in the cornea workforce and improving equitable care for all patients.

Diversity in the Cornea Workforce
Kathryn Colby, MD, PhD
NYU Langone Health

Corneal Donation Bans in the US: Assessing the Evidence
Michael A. Puente, Jr., MD, FAAP
University of Colorado School of Medicine

The Impact of Social Determinants of Health on Cornea Conditions
Maria Woodward, MD, MSc
University of Michigan Kellogg Eye Center

Disparities in Corneal Transplant Access and Outcomes
Divya Srikumaran, MD
The Johns Hopkins Wilmer Eye Institute

Discussion

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CORNEA and EYE BANKING FORUM 2024

SCIENTIFIC ABSTRACTS

SCIENTIFIC ABSTRACT

8:03 am – 8:13 am

Serological Testing Can Guide Comprehensive Treatment in Patients with Neuropathic Corneal Pain

Chloe Bogen[++]
Tufts Medical Center

Co-Authors: Betul N. Bayraktutar, MD; Leyla Yavuz Saricay, MD; Vanessa Atocha; and Pedram Hamrah, MD

Purpose: Neuropathic corneal pain (NCP) is a multifactorial disease with various etiologies, from systemic conditions to post-surgical causes. We aim to utilize a serological panel that can guide treatment of NCP patients by identifying potential underlying etiologies.

Methods: This retrospective study included patients seen at New England Eye Center between 2015 – 2022 who were diagnosed with NCP and had serological testing for markers associated with neuropathic conditions. These included markers for autoimmune, dysimmune, and inflammatory conditions, vitamin abnormalities, immunoglobulins (G, A, M, and E), hemoglobin A1C, ACE, folate and albumin.

Results: There were 193 subjects included for analysis (median age: 44.3 years). Overall, 74.1% of patients tested positive for at least one autoimmune, dysimmune, inflammatory marker (52.9%), or a vitamin abnormality (56.6%). The most common findings were high levels of positive ANA (45.8%), elevated anti-TS-HDS (23.1%), elevated ESR (16.1%), elevated Anti-FGFR3 (9.5%), and high vitamin B6 (37.5%).

Conclusion: These results can be used to guide comprehensive treatment. Positivity of auto-dysimmune or inflammatory markers can indicate the need for chronic anti-inflammatory therapy, while vitamin toxicity and abnormalities may indicate the need for dietary changes.

[++]Medical Student

SCIENTIFIC ABSTRACT

8:14 am – 8:24 am

Outcomes of DMEK For Corneal Transplantation Failure

Angela Chen, MD[+]
Stein Eye Institute, UCLA

Co-Authors: Erika M. Ellis, MD; Promporn Patarajierapun, MD; Anthony J. Aldave, MD; and Sophie Deng, MD, PhD

Purpose: To assess the outcomes of Descemet membrane endothelial keratoplasty (DMEK) in eyes with prior failed corneal transplantation.

Methods: A retrospective analysis of DMEK procedures performed in eyes with prior keratoplasty by 2 surgeons (AJA, SXD) between Feb 2014 and May 2023. Preoperative, intraoperative and postoperative data was collected for all procedures that were performed, although only eyes with postoperative follow-up of 6 months or more of follow-up were included in the analysis of the primary outcome measures of DMEK graft survival, corrected distance visual acuity (CDVA) and graft rejection. Secondary outcome measures included other postoperative complications, such as graft detachment, pupillary block, donor-related infection, and cystoid macular edema (CME).

Results: One hundred and ten DMEK procedures were performed in 89 eyes of 85 patients, including 101 procedures in eyes with prior endothelial keratoplasty (EK) and 19 in eyes with prior penetrating keratoplasty (PK) (10 procedures performed in eyes with prior EK and PK). Mean preoperative LogMAR CDVA was 1.15 and mean best CDVA after surgery (recorded at any time point) was 0.36 . Fifty-seven (51.8%) grafts failed during a mean follow-up of 2.9 (±1.9) years; 2 (1.8%) due to primary graft failure and 55 (50.0%) due to secondary graft failure. The DMEK survival rate, calculated with a Kaplan-Meier estimator, was 94% at 1 year, 70% at 2 years, and 45% at 3 years. Rebubbling was required following 24 (21.8%) DMEK procedures, similar to the percentage of DMEK grafts (25 (22.7%)) that developed rejection. While CME developed following 9 (8.2%) procedures, there were no cases of pupillary block or donor-related keratitis or endophthalmitis.

Conclusion: While DMEK for corneal transplant failure is associated with a significant improvement in CDVA, the incidence of postoperative complications such as graft detachment requiring rebubbling, endothelial rejection and CME are significantly higher than in eyes undergoing DMEK for other indications. Additionally, as approximately 50% of the DMEK procedures developed secondary graft failure by three years after surgery, alternative approaches to DMEK are needed for the management of corneal transplant failure.

[+]Resident

SCIENTIFIC ABSTRACT

8:25 am – 8:35 am

Characteristics and Outcomes of DMEK for Failed Endothelial Keratoplasty

Marianne Price, PhD, MBA
Cornea Research Foundation of America

Co-Authors: Francis W. Price, Jr., MD; Matthew Timothy Feng, MD; David A. Price, MD; and Anjulie Gang, MD

Purpose: To address a knowledge gap regarding outcomes of DMEK for failed endothelial keratoplasty (EK).

Methods: We assessed a consecutive series of 362 DMEK grafts for failed EK in 345 eyes (336 patients) without prior PK. Outcomes included endothelial cell loss, rejection rate, graft survival rate, and risk factors for graft failure. The rejection and graft survival rates were evaluated with Kaplan Meier survival analysis, and risk factors were assessed with multivariable proportional hazards modeling. The analyses took loss to follow up into consideration.

Results: Of 362 DMEK regrafts, 115 were for early EK failure and 247 for late failure. The prior EK was 95% DMEK/5% DSAEK in early failure cases and 41% DMEK/59% DSAEK in late failure cases reflecting our use of DSAEK for over 5 years before DMEK; 85% of cases had 1 prior EK and 15% had 2 to 5 prior EKs. The rate of medically or surgically managed glaucoma was 21% in eyes with 1 prior failed EK, 50% in eyes with 2, and 80% in eyes with 3 or more, $p< 0.0001$. The mean endothelial cell loss was 32% at 1 month and 49% at 5 years after DMEK regraft, and the 5-year rejection episode rate was 4%, with no significant differences between early and late regraft cases. The survival of DMEK regrafts for early failure of a first-time EK (n=99) was 99% at 1 year, 95% at 5 years and 91% at 10 years, whereas in eyes with 2 or more prior failed EK, regraft survival after early EK failure was 80% at 1 year and 33% at 5 years. Among eyes treated for late EK failure, the survival rates at 1 and 5 years respectively were 95% and 88% in eyes not being treated for glaucoma at baseline, 87% and 82% in eyes with medically managed glaucoma, and 89% and 38% in eyes with preoperative glaucoma filtration surgery.

Conclusion: The rejection rate remains low after DMEK regrafts. Medically and surgically managed glaucoma significantly impair graft survival and are common in eyes with 2 or more failed EK. Patients with early failure of an initial EK can be reassured that the risk of another early failure after a DMEK regraft is low and the long-term survival prognosis is good.

SCIENTIFIC ABSTRACT

8:36 am – 8:46 am

Scheimpflug Corneal Tomography Anterior Chamber Depth in DMEK Recipients: A Prognostic Factor for Secondary Graft Failure?

Andrea Santiago-Leon, MD
Bascom Palmer Eye Institute, University of Miami

Co-Authors: Sarah Pajek, MA; Ruiyang Huang, BS; Robert O'Brien, PhD; Benny Wong, MD; and Ellen Koo, MD

Purpose: To evaluate the association of pre and postoperative ACD measurement changes in DMEK recipients with risk of graft failure and need for regraft.

Methods: A retrospective review of patients who underwent primary or repeat DMEK between January 2015 and July 2023 at Bascom Palmer Eye Institute was conducted. Patients with anatomic narrow angle, chronic and primary angle closure glaucoma, angle recession, history of retinal detachment, herpes keratitis, uveitis, iridodyalisis, and ACIOL were excluded. We compared demographics, laterality, pre and post-operative ACD measured by scheimpflug imaging, pre and post-operative BCVA, length of follow up and time to graft failure between the single and repeat DMEK groups using independent sample T-tests with 95% confidence intervals, Chi-square test for categorical values and Cox Hazards regression to explore DMEK survival and continuous variables.

Results: Ultimately, 145 eyes were included, with 113 undergoing single DMEK and 12 undergoing repeat DMEKs for secondary graft failure (SGF). Mean preoperative ACD was 3.05±0.76mm and 2.94±0.53mm for the single and repeat groups, respectively (p=0.664). Mean postoperative ACD after first DMEK was 4.15±00.89mm and 2.53±1.13mm for the single and repeat DMEK groups, respectively (p<0.001). Mean postoperative ACD after repeat DMEK was 4.01±0.80mm. Preoperative and Postoperative ACD as time-varying covariate HR: 0.30 (95% CI 0.14 to 0.64; p0.002) per 1mm.

Conclusion: We found a significant protective effect of increasing ACD over time. Each 1 mm increase in ACD reduces the regraft risk by 70%. A smaller post-operative ACD was associated with SGF in DMEK patients.

SCIENTIFIC ABSTRACT

8:47 am – 8:57 am

Late Graft Failure after Descemet Membrane Endothelial Keratoplasty (DMEK): Why is it so Difficult to Remove the Failed Graft?

Theofilos Tourtas, MD
University of Erlangen-Nuremberg

Co-Authors: Julia M. Weller, MD; Ursula Schlötzer-Schrehardt, PhD; and Friedrich E. Kruse, MD

Purpose: The adhesion strength of a failed DMEK graft to the recipient stroma seems to be greater in eyes experiencing a late graft failure. The aim of this study was to analyze the structural and biochemical alterations of the explanted DMEK grafts after late failure.

Methods: A total of 121 repeat DMEK surgeries for graft failure after primary DMEK were performed between 2020 and 2023 at the Department of Ophthalmology of the University of Erlangen. In 29 of them, the graft failure occurred 5 or more years after the primary DMEK surgery. Transmission electron microscopy was used to analyze ultrastructural alterations in 15 explanted DMEK grafts. In addition, light microscopic immunohistochemistry was performed in 3 explanted DMEK grafts using a panel of antibodies against adhesive matrix glycoproteins. ImageJ was used to quantitate fluorescence intensity after correcting for negative control background.

Results: Transmission electron microscopy of explanted grafts showed a prominent interfacial matrix zone (0.6-1.2 µm thick) anteriorly, which frequently revealed surface irregularities and ruptures as well as focal adhesions of stromal collagen fibers or whole stromal collagen lamellae, indicating strong adhesion to the recipient stroma. By immunohistochemistry, adhesive glycoproteins including fibronectin, vitronectin, amyloid P and TGFBI (Transforming growth factor beta induced) were markedly increased along the anterior interfacial matrix zone of explanted grafts compared to normal Descemet membrane specimens ($p<0.01$; t-test).

Conclusion: These findings confirm the clinical observation of a greater adhesion strength of failed DMEK grafts after late failure. Further analysis of the ultrastructural alterations of failed grafts could also provide useful information about possible mechanism leading to graft failure.

SCIENTIFIC ABSTRACT

8:58 am – 9:09 am

Diabetes Endothelial Keratoplasty Study: Methods and Impact on the Use of Donor Corneas from Donors with Diabetes

Jonathan Lass, MD
Case Western Reserve University and University Hospitals Eye Institute

Co-Authors: Marianne Price, PhD, MBA; Loretta Szczotka-Flynn, OD, PhD; Colleen Bauza, PhD; Beth Ann Benetz, CRA, MA; Mark A. Greiner, MD; David D. Verdier, MD; Mark C. Soper, BS, CEBT; Michael S. Titus, CEBT; and Roy Beck, MD, PhD

Purpose: Describe the aims, methods, donor, donor tissue and recipient cohort characteristics, and potential impact of the Diabetes Endothelial Keratoplasty Study (DEKS).

Methods: The DEKS is a multi-center RCT assessing graft success and cell loss 1-year following 1,420 DMEKs for Fuchs endothelial corneal dystrophy (FECD), PBK, or failed EK using corneas from donors without diabetes vs. those with diabetes in a 2:1 minimization assignment. Donor diabetes severity is being assessed by a diabetes risk categorization score, post-mortem central lab HbA1c testing, and skin advanced glycation end (AGE) products testing. Data collection includes donor, donor tissue and recipient characteristics, prep parameters, recipient HbA1c, stroma clarity, CCT, IOP, complications, and 1-month and 1-year postoperative reading-center-determined central ECD.

Results: Preliminary baseline data on 1,344 tissues from 1,088 donors were: mean age [65 ± 7 years (50-76)], ECD (N=1227; 2707 ± 277 cells/mm^2), HbA1c [6.1% ± 1.3% (3.5% - 15.4%)] and median preservation time [6 days (5-7 days)]. 129 donor tissues (10%) were reclassified from non-diabetic to diabetic (≥ 6.5%) based on post-mortem HbA1c testing. 29 of 1,405 donor tissues (2%) failed lenticule prep. Preliminary baseline data on 1,043 recipients (256 bilateral cases) were: mean age (70 ± 9 years), 57% female, 21% diabetic, 95% FECD, 52% phakic and 48% PC IOL pseudophakic. The entire donor and recipient cohort baseline and operative data will be presented.

Conclusion: The DEKS will increase understanding of DMEK success factors and whether diabetes and/or diabetes severity in the donor does or does not adversely affect graft outcomes at one year impacting the donor pool for these cases.

SCIENTIFIC ABSTRACT

9:10 am – 9:21 am

In-Office Magnetic Cell Therapy Treatment for Corneal Endothelial Dysfunction

David Verdier, MD
Verdier Eye Center

Co-Authors: Noelia J. Kunzevitzky, PhD; Christy J. Fleming, CCRP; Heather Elliott, COT; Roger A. Goldberg, MD, MBA; Jeffrey L. Goldberg, MD, PhD; and William W. Culbertson, IV, MD

Purpose: Surgery is the current treatment for corneal endothelial dysfunction. We hypothesized that the injection of magnetic human corneal endothelial cells (EO2002) into the anterior chamber coupled with an external magnet will be safe and effective in improving vision and corneal edema.

Methods: A US multicenter trial enrolled 42 subjects with corneal endothelial dysfunction, best corrected visual acuity (BCVA) ≤20/40, and Central Corneal Thickness (CCT) of ≥600um, with a 6-month follow-up. Group 1 (n=21) had a dose-escalating design with and without endothelial brushing or Descemet stripping. Group 2 (n=21) were treated in the clinic with a single injection of EO2002 in a 1:1:1 randomized, double-masked fashion across three doses (150K, 500K, or 1M cells). The primary outcome was safety and secondary endpoints included the effect on BCVA and CCT.

Results: The treatment was well tolerated with no product-related SAEs or inflammation. The previous ex-US study resulted in a ≥3 line gain in BCVA in 9 of 21 subjects, and 14 of 21 had reduction in CCT. Updated US data, including group 2, will be presented.

Conclusion: In-office cell therapy for corneal endothelial dysfunction improves patient vision. Ongoing clinical trials will determine the ideal dose for this minimally invasive keratoplasty (MIK).

SCIENTIFIC ABSTRACT

9:22 am – 9:33 am

Cultivated Autologous Limbal Epithelial Cell (CALEC) Transplantation for Limbal Stem Cell Deficiency

Ula Jurkunas, MD
Massachusetts Eye and Ear, Harvard Medical School

Co-Authors: Aaron R. Kaufman, MD; Jia Yin, MD, PhD; Allison Ayala, MS; Maureen Maguire; Lassana Samarakoon, MPH; Lynette K. Johns, OD; Mohit Parekh, PhD; Sanming Li, PhD; Alex Gauthier, PhD; Diego E. Hernandez Rodriguez, PhD; Heather Daley, BS; Reza Dana, MD, MSc, MPH; Myriam Armant, PhD; and Jerome Ritz, MD

Purpose: We developed a two-stage manufacturing process utilizing cultivated autologous limbal epithelial cells (CALEC) to treat blindness caused by unilateral limbal stem cell deficiency (LSCD) and conducted a phase I/II clinical trial to evaluate its feasibility, safety, and preliminary efficacy.

Methods: Participants with unilateral LSCD were enrolled at a single clinical center. Starting with a limbal biopsy of the healthy eye, cellular grafts were produced in a two-stage manufacturing process following a GMP-compliant protocol with strict quality measures for product release. Efficacy outcomes were based on improvement in corneal epithelial surface integrity (complete success) or improvement in extent of corneal vascularization and/or participant symptomatology (partial success).

Results: CALEC grafts were successfully manufactured for 14 (93%) of 15 participants and 86%, 93%, and 92% of grafts resulted in complete or partial success at 3, 12, and 18 months, respectively. One bacterial infection occurred unrelated to treatment, with no other primary safety events. After first stage manufacturing, intracellular adenosine triphosphate levels correlated with colony forming efficiency (r=0.65, 95% CI [0.04, 0.89]), identifying potential product release criteria.

Conclusion: Our feasibility, safety, and efficacy results provide strong support for establishing autologous cellular therapy products as a viable option for patients with LSCD.

SCIENTIFIC ABSTRACT

9:34 am – 9:45 am

INTRA-KER Keratoprosthesis: Preliminary Results of First-In Human Trial of an Intracorneal Prosthesis

Massimo Busin, MD
University of Ferrara

Co-Authors: Angeli Christy Yu, MD, PhD; Alessandro Ruzza; and Diego Ponzin, MD

Purpose: To report the preliminary outcomes of implantation of a novel intracorneal prosthesis (INTRA-KER) in patients with corneal blindness not amenable to corneal transplantation.

Methods: INTRA-KER is a hybrid intracorneal prosthesis consisting of a central clear polymethyl methacrylate (PMMA) optic with 3 haptics assembled within 2 pre-Descemetic, acellular scaffolds sutured into the recipient, decompensated cornea. INTRA-KER was implanted in 3 eyes of 3 patients with multiple graft failure not amenable to corneal transplantation. All cases had a history of glaucoma with 2 patients previously undergoing glaucoma shunt surgery. Success of prosthesis integration, visual acuity and complication rates were evaluated.

Results: In all 3 eyes, the intracorneal prosthesis successfully integrated into the recipient cornea without signs of inflammation. Over a follow-up of 5-10 months, all devices remained stable in position, without occurrence of any of the complications reported after implantation of other keratoprosthesis e.g. tissue melting, infection, extrusion or intraocular inflammation. Visual acuity improved from light perception in all cases to 20/50, 20/100 and counting fingers at 1 foot. All patients report substantial subjective benefit in terms of visual-related quality of life.

Conclusion: Resulting in substantial visual rehabilitation without vision-threatening complications up to 10 months postoperatively, INTRA-KER represents a viable alternative to trans-corneal keratoprosthesis for the treatment of patients with corneal blindness not amenable to corneal transplantation

SCIENTIFIC ABSTRACT

9:46 am – 9:57 am

Role of Suppressive Dose of Valacyclovir in Management of Herpes Zoster Ophthalmicus: Results of the Zoster Eye Disease Study (ZEDS)

Bennie H. Jeng, MD
University of Pennsylvania Perelman School of Medicine

Co-Authors: Elisabeth Cohen, MD; Andrea Troxel, ScD; Keith H. Baratz, MD; Shahzad I. Mian, MD; David B. Warner, MD; Mazen Choulakian, MD; and Judith Hochman, MD

Purpose: To determine whether treatment for 12 months with oral valacyclovir 1 g daily reduces the rate of new or worsening dendriform epithelial keratitis (DEK), stromal keratitis (SK), endothelial keratitis (EK), or iritis (IR) compared to placebo in patients with Herpes Zoster Ophthalmicus (HZO).

Methods: Eligible HZO patients were randomized in a double-masked, placebo-controlled clinical trial to 1 year of oral valacyclovir 1 g daily or placebo, and followed prospectively every 3 months for 18 months. Eligibility requirements included: age 18 years or older, immunocompetency, history of a typical HZO rash, a record of keratitis or iritis within one year, estimated Glomerular Filtration Rate (eGFR) of > 45, and negative for pregnancy, if applicable. 527 participants were randomized in 4 strata according to age at HZO onset (less than 60 years, or 60 and older) and duration of HZO at enrollment (less than 6, or 6 or more months). Possible endpoints of new or worsening DEK, SK, EK, or IR were adjudicated by a masked clinical event review committee.

Results: The results will be publicly disclosed for the first time at the presentation, simultaneous with a publication.

Conclusion: ZEDS will guide use of suppressive valacyclovir to improve outcomes in HZO.

[+] Undergraduate Student

SCIENTIFIC ABSTRACT

10:36 am – 10:44 am

Association Between Corneal Densitometry and Night Driving Impairment in FECD Using The National Advanced Driving Simulator Glare Protocol

Simran Sarin[++]
University of Iowa Department of Ophthalmology and Visual Sciences, University of Iowa Driving Safety Research Institute

Co-Authors: Matthew Kigin, BS; Evan Balk, BS; Noah Healy, MS; Gregory Schmidt, MBA, CEBT; Jennifer Ling, MD; Ryan Diel, MD; Kanwal Matharu, MD; Timothy Brown, PhD, MS; Mark A. Greiner, MD; and Christopher S. Sales, MD, MPH

Purpose: To quantify and correlate FECD driving impairment with objective clinical metrics.

Methods: We conducted a prospective study between 6 FECD and 6 age-matched controls using the National Advanced Driving Simulator. Inclusion criteria were a driver's license, current refraction, and pseudophakia; exclusion criteria were vision-limiting comorbidities. Mars contrast sensitivity (CS), Snellen visual acuity (VA), and Scheimpflug tomography were obtained. Patients identified roadside hazards under variable and constant glare. Power was 80% to detect a 5% difference in hazard identification performance.

Results: Age, CS, and VA did not differ between groups (69.5±7.6 vs. 73.4±4.6; 1.7±.03 vs. 1.7±.14; 20/20 vs. 20/22; all p>.3). Posterior densitometry was worse in FECD (20.1±3.1 vs. 16.5±1.0; p=.02). FECD patients identified 14.6% fewer hazards under variable glare (81.8±12.1 vs. 95.8±4.7, p=.03). Controls detected hazards nearly twice as far as FECD patients under variable glare (137.7±51.9 vs. 76.5±38.8 ft; p=.04). Posterior densitometry was significantly correlated with variable and constant glare performance (r=-.67, p=.02; r=-.65, p=.02).

Conclusion: This study objectively supports FECD patient reports of night driving difficulties in the only validated driving simulator in the US; this impairment is correlated with widely available Scheimpflug densitometry measures.

[++]Medical Student

SCIENTIFIC ABSTRACT

10:45 am – 10:53 am

Scanning Specular Microscopy Reliably Images the Same Endothelial Location

Elias Kahan, MD[+]
NYU Grossman School of Medicine

Co-Author: Kathryn Colby, MD, PhD

Purpose: To assess whether slit scanning specular microscopy (SSM) (CellChek C; Konan Medical) could repeatedly image the same corneal location using anatomic landmarks (posterior corneal rings and corneal undulations) and unique cells identified during imaging.

Methods: Initial imaging of 20 healthy eyes identified unique cells adjacent to anatomic landmarks. Landmarks were then used to locate the same cells on repeat imaging approximately a week later. Endothelial cell density (ECD), coefficient of variation (CV), and percent hexagonality (HEX) were calculated. Intraclass correlation coefficient (ICC) and 95% limits of agreement (LoA) were used to assess repeatability of imaging.

Results: Unique cells adjacent to anatomic landmarks were present in 100% of eyes. The landmarks allowed re-imaging of the same unique cells in 75% of eyes. There was minimal variation in ECD, CV, and HEX; ICC and 95% confidence intervals were 0.891 [0.715 – 0.962], 0.612 [0.179 – 0.849], and 0.793 [0.499 – 0.925], respectively. The 95% LoA for ECD was -359.9 – 260.98; these mirrored other studies comparing images from the same endothelial location across multiple visits.

Conclusion: SSM-identified landmarks reliably allows repeated imaging of the same peripheral endothelial location, providing a powerful tool to track progression of endothelial diseases and responses to treatment.

[+]Resident

SCIENTIFIC ABSTRACT

10:54 am – 11:02 am

Detection of Ocular Surface Squamous Neoplasia Using Deep Learning and Anterior-Segment OCT

Jason Greenfield, BA[++]
Bascom Palmer Eye Institute, University of Miami

Co-Authors: Rafael Scherer, MD, PhD; Diego Alba, MD; Sofia De Arrigunaga, MD, MPH; Osmel Alvarez, BA; Sotiria Palioura, MD, PhD, CEBT; Afshan Nanji, MD; Ghada J. AlBayyat, MD; Douglas Rodrigues da Costa, MD; William Herskowitz, BA; Michael Antonietti, BS; Alessandro Jammal, MD, PhD; Anat Galor, MD, MSPH; Felipe Medeiros, MD, PhD; and Carol L. Karp, MD

Purpose: To develop and validate a deep learning (DL) model to differentiate ocular surface squamous neoplasia (OSSN) from pterygia and pinguecula using anterior segment optical coherence tomography (AS-OCT).

Methods: A DL model was developed using two methodologies: (1) a masked autoencoder was trained with 105,859 unlabeled AS-OCT images of 5,746 eyes and (2) a Vision Transformer coupled to the autoencoder used 2,022 AS-OCT images of 523 eyes labeled by expert graders for fine-tuning a binary classifier (OSSN vs. non-OSSN). The algorithm's diagnostic performance was evaluated in a separate test sample using 566 scans (62 eyes) with biopsy-proven OSSN and compared with expert clinicians.

Results: The DL model had an accuracy of 90.3% (95%CI: 87.5-92.6%), with sensitivity of 86.4% (95%CI: 81.4-90.4%) and specificity of 93.2% (95%CI: 89.9-95.7%) compared to the biopsy-proven diagnosis. Expert graders had a lower sensitivity 69.8% [95%CI: 63.6-75.5%]) and higher specificity 98.5% (95% CI: 96.4-99.5%) than the DL model. The area under the receiver operating characteristic curve (AUC) for the DL model was 0.945 (95%CI: 0.918-0.972) and significantly greater than expert graders (AUC=0.688, p<0.001).

Conclusion: A DL model using AS-OCT demonstrated strong performance in discriminating OSSN from pterygium and pinguecula. The model had comparable, and perhaps even better, diagnostic performance than expert clinicians in this study.

[++]Medical Student

SCIENTIFIC ABSTRACT

11:03 am – 11:11 am

Differentiation of Ocular Surface Squamous Neoplasia and Pterygia Using a Novel Tear Assay

Wisam Najdawi, BS[++]
Bascom Palmer Eye Institute, University of Miami

Co-Authors: Acadia Moeyersoms, PhD; Ryan Gallo, MD, PhD; Despoina Theotoka, MD; Qikai Wang, BS; Mike Zein, MD; Mona Amer; David Monroy; Sofia De Arrigunaga, MD, MPH; Stefan Kurtenbach, PhD; Daniel Palaez, PhD; and Carol L. Karp, MD

Purpose: Ocular surface squamous neoplasia (OSSN) is the most common non-pigmented tumor of the orbital surface. Clinically, it can be difficult to distinguish OSSN from pterygia. The definitive diagnosis of OSSN requires histopathologic evaluation; however, biopsies are invasive and may have false negative results. Novel diagnostic modalities are needed. Variations in tear fluid composition due to neoplastic tissue may provide valuable information for the evaluation of OSSN. The purpose of this study was to develop a novel molecular assay to differentiate OSSN and pterygia.

Methods: Nucleic acid preparations extracted from tear samples from patients with OSSN or pterygium underwent unbiased next generation sequencing (NGS). From the resulting differential signatures, miRNA panels were developed and tested in patients with ocular surface lesions. Assay results were compared to corresponding histopathologic results to assess the diagnostic power of the assay.

Results: Initial NGS identified statistically significant differential expression signatures between OSSN and pterygia. A subset of 6 differentially expressed miRNA probes was identified that, when normalized to 5 probes from the non-differential expression signature, provide sufficient diagnostic power to differentiate OSSN from pterygia.

Conclusion: The present study established the feasibility of a novel molecular diagnostic test utilizing tears for the differentiation of OSSN and pterygia.

[++]Medical Student

SCIENTIFIC ABSTRACT

11:12 am – 11:20 am

Complications of Epi-Off Crosslinking: A Historical Experience at Wills Eye Hospital

W. Violet Lin, MD*
Wills Eye Hospital

Co-Authors: Clark Chang, OD; Drew Monteleone-Haught; Brandon D. Ayres, MD; and Zeba Syed, MD

Purpose: Corneal crosslinking (CXL) reduces keratoconus progression, but it has a risk of complications. Large-scale U.S. studies are limited. We present our historical experience at Wills Eye Hospital (WEH).

Methods: We conducted a retrospective review of epi-off CXL performed by two practices at WEH between 01/2018 and 09/2023. Cases with less than 3 months of follow-up were excluded. Demographic characteristics, clinical factors, and complications were analyzed with T-test, Fisher exact test, or regression modelling.

Results: 833 CXL patient encounters were identified. Complication rates were 66.4% for haze, 3.3% for persistent epithelial defects (PED), and 3.3% for infiltrates. Multivariate analysis demonstrated that: 1) haze was associated with younger age and thinner baseline pachymetry (both $p<0.05$), and 2) PED was associated with pre-op scarring ($p<0.01$) and use of general anesthesia (GA) ($p<0.001$). Interestingly, no infiltrates developed in GA cases. Socioeconomic factors including gender, household income, and self-reported race/ethnicity were not associated with complications.

Conclusion: While CXL complication rates are low, associations exist with various clinical factors. These findings may guide post-CXL monitoring to further optimize outcomes.

*Cornea Fellow

SCIENTIFIC ABSTRACT

11:21 am – 11:29 am

Small Fiber Neuropathy in Patients with Dry Eye Disease

Asmaa Zidan, MD
Massachusetts Eye and Ear, Harvard Medical School

Co-Authors: Zhirong Lin, MD, PhD; Reza Dana, MD, MSc, MPH; Jae Young You, MD; and Jia Yin, MD, PhD

Purpose: Small-fiber neuropathy (SFN) refers to a range of peripheral neuropathic conditions affecting small-caliber sensory and/or autonomic nerve fibers. This study aims to determine the prevalence and characteristics of SFN symptoms in patients with dry eye disease (DED).

Methods: 31 patients with DED and an Ocular Surface Disease Index (OSDI) greater than 13 were included. SFN symptoms were determined using the Small-Fiber Symptom Survey (SSS), a validated questionnaire, and positive symptoms were defined as having a score of 15.7 or higher (two standard deviations from the mean of healthy individuals without SFN). DED symptoms and ocular pain were assessed using the OSDI and the Ocular Pain Assessment Survey (OPAS), respectively. DED signs were assessed clinically and patient response to standard DED treatment was evaluated 6-12 months after the administration of the questionnaires.

Results: The prevalence of SFN symptoms among DED patients was 77.4%. Positive correlations were found between SSS and OSDI (r=0.43, p=0.017), and between SSS and OPAS (r=0.62, p=0.0003). A negative correlation was observed between SFN symptoms and corneal fluorescein staining (CFS, r=-0.42, p=0.018) but not with tear break-up time or Schirmer's test results. Despite more intense topical treatment and stable clinical signs of DED, patients with severe SFN symptoms (high SSS scores) had a less favorable subjective response to DED treatment, compared to those with low and moderate SSS scores.

Conclusion: There is a high prevalence of SFN symptoms in patients with DED. SFN symptoms are strongly associated with ocular pain and DED symptoms and are negatively correlated with CFS. Patients with severe SFN symptoms have a less favorable subjective response to standard DED treatment, suggesting the presence of neuropathic conditions that warrant further neurological assessment.

SCIENTIFIC ABSTRACT

1:44 pm – 1:54 pm

Effects of Eye Bank Donor Age Expansion on Corneal Endothelial Cell Density and Surgeon Tissue Acceptance

Ayobami Adebayo[++]
Montefiore, Albert Einstein College of Medicine

Co-Authors: Roy S. Chuck, MD, PhD; Richard P. Gibralter, MD; Andrea Nortey, MD; Jee-Young Moon, PhD; Patrick Gore, RN, CEBT; Tina Livesay, CEBT; and Griffin Bortzfield, CEBT

Purpose: To investigate the effects of expansion in eye bank donor age from 75 to 80 years old on corneal endothelial cell density (ECD) and surgeon acceptance rate of donated tissues.

Methods: Conducted as a single-site retrospective analysis, the study examined 25,969 donor corneas from 2018 to 2022. Following the increase in the donor age limit in August 2022, the sample included donors aged 2 to 75 years (n=25,558) and 76 to 80 years (n=411). Donor characteristics, corneal ECD, and tissue acceptance rates were compared across age groups stratified by five-year intervals.

Results: Increasing the donor age upper limit produced 411 more corneal donations which resulted in 208 more surgeries. The average corneal ECD in donors between the ages of 71 - 75 was 2,349 cells/mm^2 (95% CI = 2,332 – 2,367), and in donors between the ages of 76 - 80 the average corneal ECD was 2,227 cells/mm^2 (95% CI = 2,159 – 2,296). Our results demonstrated a lower average corneal ECD in the 76-80 years old group in comparison to the 71-75 years old group by 122 cells/mm^2 (95% CI=51-193, p<0.001). Tissue from donors aged 71-75 had a 48% surgeon acceptance rate while tissue from those aged 76-80 had a significantly lower 38% acceptance rate (p=0.003).

Conclusion: Corneas from donors of older ages are viable and suitable for use in transplant surgery but are significantly less likely to be selected by surgeons. Age bias by surgeons against older corneas is a possible reason for this finding and warrants further exploration.

[++]Medical Student

SCIENTIFIC ABSTRACT

1:55 pm – 2:05 pm

Thinner, Flatter, Longer: Consistent Corneal Characteristics during Cold Storage Suggest Potential for Extending Storage Time for Donor Corneas

Mark Ellison, BS, BA
VisionGift

Co-Authors: Megan M.W. Straiko, PhD; Declan Chamberlain; and Khoa D. Tran, PhD

Purpose: To compare endothelial cell density and morphometry, thickness, and transparency of corneas stored in Extra4 vs. Optisol-GS for 28 days.

Methods: Mate corneas were recovered into Extra4 or Optisol-GS (12 pairs) and stored at 2-8°C for 28 days. ECD, HEX, and CV were evaluated by specular microscopy. Central stromal thickness (CST) was examined by OCT. Endothelium, stromal edema, and Descemet folds were examined by slit lamp using defined grading scales.

Results: Average ECD, CV, and HEX for the Extra4 (2358±338, 32±3, 62±5) and Optisol-GS (2328±313, 33±5, 61±6) groups were similar through day 21 ($P>0.05$ for all). On day 28, CV and HEX were significantly different between cohorts and as compared to the starting values ($P<0.05$). Stromal thickness measured at initial evaluation for corneas in Extra4 was 525±29; for those in Optisol-GS, 501±23 ($P<0.05$). The thickness of corneas stored in Extra4 remained the same for 28 days and was not significantly different to those stored in Optisol-GS on day 7 ($P>0.05$), but was significantly thinner on days 14, 21, and 28 ($P<0.05$). Overall endothelium quality assessed by slit lamp remained constant for all corneas. Stromal edema and Descemet folds for corneas stored in Extra4 remained constant, while mate corneas stored in Optisol-GS increased by two grades during storage.

Conclusion: Tissue characteristics of corneas stored in Extra4 remained consistent throughout the storage period and could help simplify tissue-surgery coordination. Our results support further studies aimed to extend cold storage beyond 14 days. Results from the complete study (16 pairs) will be presented during the forum.

SCIENTIFIC ABSTRACT

2:06 pm – 2:16 pm

Feasibility of Manual Preparation of Bowman Layer Grafts in the Eye Bank Setting

Michael Szkarlat, BS
Eversight

Co-Authors: Uri Soiberman, MD; Onkar B. Sawant, PhD; and Jessica Ludwig

Purpose: To determine the feasibility of manual preparation of corneal allografts intended for Bowman layer (BL) transplant in the eye bank setting by trained technicians.

Methods: Corneas (n=10) were dissected manually by a single technician to create thin anterior lamellar grafts including the BL and minimal underlying anterior stroma. The cornea was mounted on an artificial chamber and epithelium was removed. BL was stained with trypan blue. The cornea was scored inside the limbus with a needle and BL was dissected using forceps. The resultant grafts were punched to the largest diameter possible. Grafts were analyzed using optical coherence tomography and assessed for both thickness and uniformity across two perpendicular meridians, measured at center and ± 1.5 mm from center. Graft preparation time was recorded. Graft success was determined by central thickness <80 µm, uniformity of ± 50 µm between central and all peripheral measurements, and graft diameter >7.5 mm.

Results: 8/10 grafts were determined to be successful. The average preparation time for all grafts was 33 minutes (SD=7.2 min, range 22-46 min). The average central thickness for successful grafts was 51 µm (SD=16 µm, Range 26-77 µm). The average graft diameter for successful grafts was 7.7 mm (SD= 0.24 mm, range 7.5-8 mm).

Conclusion: Creation of BL grafts at the eye bank is possible and can be done with moderate success and in a reasonable amount of time. Success rate of graft preparation is anticipated to increase with experience. BL transplant also utilizes tissue not suitable for endothelial or penetrating procedures, potentially increasing tissue utilization rates.

SCIENTIFIC ABSTRACT

2:17 pm – 2:27 pm

Clinical Outcomes of Therapeutic Penetrating Keratoplasty Using Gamma-Irradiated Corneal Tissue

Huong Duong, MD, MSc
University of Medicine and Pharmacy at Ho Chi Minh City

Co-Authors: Mai Nguyen, MD, MS; Thao Huynh, MD, MS; Huy Tran, MD, MS; Vuong Nguyen, MD, PhD; Dat Nguyen, MD, MS; Vy Ly, MD, MS; Nhi Nguyen, MD, MS; Vinh Lam; Huan Pham; Simon Fung; Zhuang T. Fang, MD, MSPH, FASA; Thu Vu, MD; Lan Vo, MD, PhD; Minh Vo; and Anthony J. Aldave, MD

Purpose: To evaluate the effectiveness and safety of gamma-irradiated corneal tissue in therapeutic penetrating keratoplasty (TPK).

Methods: Retrospective case series analysis conducted on all eyes undergoing therapeutic penetrating keratoplasty (TPK) using gamma-irradiated corneal tissue (GCT) at Ho Chi Minh City Eye Hospital (2018 – 2023). Primary TPK was performed for perforated corneal ulcers, and secondary TPK in eyes with recurrent infection or repeat perforation of a patch graft.

Results: Thirty seven eyes underwent TPK with GCT; 18 eyes (48.6%) underwent primary and 19 eyes (51.4%) underwent secondary TPK. Mean time from diagnosis to surgery was 1.5±1.0 days and mean follow-up after surgery was 13.0±6.4 months. Mean GCT graft diameter was 7.5±1.5 mm, with 9 eyes (24.3%) ≥9 mm. At 1 year post-operative, globe preservation rate was 95%, with 89% in the primary TPK group and 100% in the secondary TPK group. Preoperatively, 97.3% of eyes had low vision or blindness, decreasing to 88.5% at 1 year. Common postoperative complications included persistent epithelial defects (75.7%), increased intraocular pressure requiring surgery (24.3%), and recurrent infection (18.9%). The majority of complications occurred within the first 3 months, and GCT grafts ≥ 9 mm were associated with a higher incidence of postoperative complications.

Conclusion: TPK using GCT demonstrates high efficacy in globe preservation for perforated corneas. Postoperative complications were significantly more common in eyes receiving larger grafts, indicating that earlier referral and surgical intervention (when the ulceration/infection is less extensive) may result in fewer postoperative complications.

†Cornea Fellow

SCIENTIFIC ABSTRACT

2:28 pm – 2:38 pm

Reducing Tissue Waste for Corneal Transplantation: Clinical Outcomes of DMEK Grafts Prepared from Failed DSAEK Preparation at an Eye Bank

Charles Reeder, MD*
Devers Eye Institute

Co-Authors: Philip Dye, CEBT; Megan M.W. Straiko, PhD; Alex J. Bauer; Paul M. Phillips, MD; Khoa D. Tran, PhD; and Michael Straiko, MD

Purpose: To determine the graft preparation success rate and clinical outcomes of DMEK grafts generated from 'failed' DSAEK preparation events.

Methods: A retrospective review for DSAEK grafts that failed processing and converted to DMEK grafts at one eye bank from 11/2012 - 5/2024. Success rate of graft preparation was examined. Postoperative clinical outcomes, from multiple surgical centers, examined for the DMEK recipients include 6-month and 1-year postoperative endothelial cell loss (ECL), rebubble rate, and rate of primary graft failure (PGF).

Results: All tissues were suitable for both DSAEK and DMEK. Mean donor age, pre-preparation ECD, donor diabetic status, and time from death-to-surgery was 59±11 years, 2849±286 cells/mm^2, 6 DM tissues, and 6 ± 2 days, respectively. Twenty-seven out of 30 corneas intended for DSAEK were successfully rescued for DMEK transplant after initial DSAEK processing failure. Common causes of DSAEK preparation 'failure' in this series were loss of pressure during cut, target thickness not met, and peripheral perforations. Mean 6-month ECL, 1-year ECL, rebubble rate, and PGF rate were 31%±18%, 32%±23%, 3/19 eyes, and 0/19 eyes, respectively.

Conclusion: If a graft fails preparation for intended DSAEK, the tissue does not need to be discarded and conversion to a DMEK graft is possible. During the rescue attempt, special attention needs to be paid to minimize movement in the anterior corneal cap, which can result in an incomplete punch and rescue failure.

*Cornea Fellow

SCIENTIFIC ABSTRACT

2:39 pm – 2:49 pm

A Novel Technique for Processing Keratolimbal Allografts for Treatment of Limbal Stem Cell Deficiency

Pauline Dmitriev, MD*
University of Michigan Kellogg Eye Center

Co-Authors: Jessica E. Ludwig; Nick Hicks, CEBT; Nambi Nallasamy, MD; Shahzad I. Mian, MD; and Onkar B. Sawant, PhD

Purpose: To develop and evaluate the efficacy of an eye bank prepared, surgery-ready limbal stem cell-enriched graft (KLAL-Pro).

Methods: KLAL-Pro grafts were created from donor corneas mounted on an artificial anterior chamber using the following sequence: 1) corneal trephination to 250 µm, 2) lamellar dissection carried out to include a 2-3 mm section of peripheral cornea, including the palisades of Vogt (PoV). After processing, tissues were frozen and cryosectioned to confirm the presence of p63α+ cells, PoV, and graft depth.

Results: PoV were identifiable before and after processing and palisade structure remained intact. Between the KLAL-Pro and full thickness mate cornea, the average depth of the PoV (141 µm ± 13 vs. 138 µm ± 10) and the density of p63α+ LSCs (59% vs. 61%) were similar, suggesting that our novel processing technique does not result in significant loss of LSCs. On further processing attempts, thinner KLAL-Pro grafts were prepared (288 µm ± 31) with an average graft of 1.8 mm (± 0.3 mm). Clinical results to follow.

Conclusion: Processing KLAL grafts at the eye bank may help reduce intraoperative time, standardize dissection technique, and increase utilization of KLAL to manage LSC deficiency (LSCD). KLAL-Pro grafts may enhance the success of KLAL due to the identification of PoV, controlled depth of dissection, and minimization of non-LSC tissue antigenic load compared to traditional KLAL. Additional clinical data from KLAL-Pro surgeries will be necessary to determine if this procedure offers equivalent or improved outcomes for patients suffering from LSCD.

*Cornea Fellow

SCIENTIFIC ABSTRACT

2:50 pm – 3:00 pm

Descemet's Membrane Anterior Keratoplasty (DMAK) for Treatment of Limbal Stem Cell Deficiency (LSCD) in Congenital Aniridia

Joshua H. Hou, MD
University of Minnesota/ Lions Gift of Sight

Co-Authors: Stephen C. Kaufman, MD, PhD; Wassef Chanbour, MD; Ching Yuan, PhD; and Victoria Sattarova, MD

Purpose: To evaluate the safety and efficacy of treating partial LSCD in congenital aniridia with DMAK.

Methods: Prospective, interventional pilot clinical trial. Patients age ≥18, with congenital aniridia, partial LSCD, VA ≤20/100, and no prior keratoplasty or lid/fornix abnormalities were enrolled. All patients underwent DMAK in one eye. Primary endpoints were VA, retention of DM graft, and adverse events (erosions, infections). Secondary endpoints were severity of LSCD and KNV on slit lamp exam.

Results: To date 13 patients have been enrolled and undergone DMAK. Overall, 77% (10/13) had nystagmus, 30% (4/13) had prior SK, and 15% (2/13) had prior KLAL. Eight eyes had follow-up out to 3 months; the rest had follow-up out to 1 month. VA improved from a mean pre-op LogMAR VA of 1.59 to 1.14 at last follow-up. DM graft dislodged in one eye and partial epi-ingrowth under the DM graft was noted in another. At month 3, two eyes had an area of graft wrinkling with an overlying epi defect. No cases of infectious keratitis were observed. Area of LSCD involvement remained stable at last follow-up; however, density of whorl-like keratopathy was reduced centrally, and the number of eyes with superficial KNV in the central 3mm of the cornea decreased from 8/13 (62%) to 1/13 (8%).

Conclusion: DMAK is a safe and potentially effective treatment for partial LSCD in congenital aniridia.

SCIENTIFIC ABSTRACT

3:33 pm – 3:43 pm

Universal Cannula Compartment Design for Both Endo-In and Endo-Out DMEK Implantation

Mikhail Tsurkan, PhD
Leibniz Institute of Polymer Research Dresden/ TissueGUARD GmbH

Co-Authors: Simone Arndt; Sarah Tsurkan; Staci Terrin, CEBT; and John Lohmeier, CEBT

Purpose: The latest advancement in preloaded Descemet membrane endothelial keratoplasty (DMEK) is delivering grafts with the endothelium inwards for faster operations, though naturally rolled DMEK remains the most common procedure. Endo-in and endo-out techniques require different cannula devices, limiting surgeons to one type of operation. This study validates asymmetrical injectors made of transparent hydrophobic plastic with geometrical features designed to facilitate both endo-in and endo-out DMEK transplantation without the need for a pull-through technique.

Methods: Made from hydrophobic transparent plastic, the injector allows microscopic tissue validation before injection. Its asymmetrical design controls graft orientation, which is essential for successful tri-folded DMEK graft application. Mates from two pairs were tested on each device type and loaded with folded endo-in and endo-out grafts. The tissue was prepared, loaded into the injector, and ejected to mimic tissue manipulation in DMEK operations.

Results: Graft delivery was achieved without pull-through. All tissues were delivered by injection without requiring a pull-through technique. Cell loss averaged similarly for both endo-in and endo-out DMEK folding. Higher viability loss was observed in grafts stored for over 20 days compared to those stored for less than two weeks.

Conclusion: The presented asymmetrical DMEK injectors from hydrophobic plastic with restricted compartments enable both endo-out (naturally rolled) DMEK and endo-in DMEK injection without pull-through. Average cell loss was comparable to or better than current best practices with naturally folded DMEK.

SCIENTIFIC ABSTRACT

3:44 pm – 3:54 pm

Efficacy, Efficiency, and Viability of Pre-loaded DescePrep vs. SCUBA Prepared Tissue in a Diabetic Donor Population

Katie Solley, MSE
Eyedea Medical

Co-Authors: Kendall Frank, CEBT; Megan M.W. Straiko, PhD; Priyanka Ramulu; Khoa D. Tran, PhD; and Kunal Parikh, PhD

Purpose: To compare graft preparation time, success rate, and cell loss of diabetic DMEK grafts prepared with DescePrep or SCUBA methods.

Methods: 10 pairs of diabetic donor corneas, with an average diabetic risk score of 3 ± 1.7 and mild-moderate cell loss, were processed for DMEK by one certified eye bank technician (CEBT), with one SCUBA-prepared cornea and one DescePrep-prepared cornea in each pair. Donor cornea characteristics, time of the preparation, graft touches, and success rate were recorded. All corneas were then loaded into a Straiko Modified Jones Tube and shipped from Dayton, Ohio to Portland, Oregon for cell viability analysis. All grafts were stained with Calcein AM for cell loss and analyzed using Fiji software by masked eye bank staff.

Results: 100% of corneas were prepared successfully with DescePrep compared to 90% with SCUBA. DescePrep significantly reduced the overall preparation time (including graft stripping and loading) to 15.8 ± 3.3 mins from 19.8 ± 1.2 mins ($p<0.01$). Notably, DescePrep significantly reduced stripping time to 7.5 ± 3.3 mins compared to 11.8 ± 1.0 mins for SCUBA ($p<0.005$). DescePrep's controlled hydrodissection technique also led to significantly reduced endothelial touches with 6 ± 2 in comparison to 38 ± 4 for SCUBA ($p<0.0001$). DescePrep and SCUBA showed comparable cell loss of 20.8 ± 6.0% and 19.9 ± 5.7%, respectively after preparation, loading, shipping, and injection.

Conclusion: DescePrep offers safe and reliable DMEK graft preparation with 100% success in diabetic tissue. DescePrep significantly reduces the number of times a CEBT needs to touch the endothelium and can be performed faster than conventional SCUBA.

SCIENTIFIC ABSTRACT

3:55 pm – 4:05 pm

The Use Of Novel Injectable Tri-Folded Endothelium-In DMEK In Cases Of Complex Anterior Chambers

Leonard Heydenrych, FRCOphth
University of Cape Town, Port Elizabeth Provincial Hospital

Co-Authors: Eric Abdullayev, MD, MBA, CEBT; Benjamin Lambright, MD; and Art Kurz

Purpose: A novel device and technique are reviewed when delivering a correctly oriented DMEK graft into complex anterior chambers without direct manipulation.

Methods: All grafts (n=10) were pre-loaded at the Lions World Vision Institute eye bank (Tampa, USA), S marked, stained and tri-folded with inverted endothelium in a glass cannula before being shipped to South Africa. Out of 10 patients – 5 had failed penetrating keratoplasties (PKP); during DMEK, 1 patient received an anterior vitrectomy; 2 patients required glaucoma shunt trimming; 2 patients had a floppy iris; 1 patient received a pars plana vitrectomy due to 'gas misdirection.' The size of the main incision, number of sutures used, average time to correct graft unfolding, regression of central corneal thickness (CCT) and post-operative endothelial cell densities (ECD) were assessed.

Results: The incision was 3.2-3.5mm. All grafts were delivered and unfolded independently into the anterior chamber through fluid insertion and were correctly orientated. 3-5 sutures were required to close the wound. The mean graft unfolding time was 30.86 seconds. Mean central corneal thickness reduced by 228.7µm (29.92%). All grafts cleared within 4 weeks post-transplant with 3 successful graft-re-bubblings required. Mean post-operative visual acuity at last visit improved to 0.69 (decimal) from 0.24 before surgery. Mean ECD at latest visit (3-12 months) post-operative was 1456.7 cells/mm^2 and mean CCT 535.6µm.

Conclusion: A novel glass carrier allows spontaneous opening of the DMEK graft in the correct orientation and makes unfolding of the DMEK graft predictable in complex anterior chambers.

SCIENTIFIC ABSTRACT

4:06 pm – 4:16 pm

The Prognostic Significance of Biointegration at the Optic-Cornea Joint in Keratoprosthesis Implantation

Esen Akpek, MD
The Johns Hopkins Wilmer Eye Institute

Co-Authors: Anthony J. Aldave, MD; Guillermo Amescua, MD; M. Soledad Cortina, MD; Kathryn Colby, MD, PhD; Jean-Marie Parel, PhD; and James Foster, PhD

Purpose: To characterize the morphological and immunological aspects of optic-cornea biointegration of a second-generation novel synthetic cornea device.

Methods: The initial synthetic device was made from compact perfluoroalkoxy alkane with porous expanded polytetrafluoroethylene (ePTFE) overlying the skirt to allow skirt-cornea biointegration. The second-generation version houses ePTFE around the optic stem to enhance biointegration at the optic-cornea joint. Initial and amended second-generation devices were implanted into healthy rabbit eyes. Clinical examination, anterior segment optical coherence tomography (OCT), light microscopy and immunofluorescence studies were performed to assess structural integrity and determine molecular signatures indicative of inflammation and tissue remodeling.

Results: Recipient eyes with both device versions showed no epithelial defects or tissue retraction at 3-months post-operatively. OCT images demonstrated no appreciable peri-optic space with either prototype. Histopathology of the initial device demonstrated lack of stromal adhesion at the optic-cornea joint and a peri-optic space filled with epithelium. Second-generation devices demonstrated full sealing of the recipient stroma along the optic stem. Although the routine histopathology did not demonstrate inflammatory cells in the recipient cornea with either device, quiescent phenotype of stromal and epithelial cells was only detected in the second-generation devices.

Conclusion: Biointegration at the optic-cornea joint provides essential structural support and stability for a synthetic device within the recipient cornea. Ability to bond to the recipient along the entire device-tissue joint may ameliorate post-operative inflammation and tissue retraction encountered with rigid keratoprostheses and increase retention rates.

R. TOWNLEY PATON LUNCHEON

12:15 – 1:15 PM

MICHIGAN BALLROOM

All physician attendees are invited to join for lunch and a lively moderated discussion.

Not a CME event.

EYE BANK ASSOCIATION OF AMERICA

CORNEA and EYE BANKING FORUM 2024

AWARDS

EYE BANK ASSOCIATION OF AMERICA

R. TOWNLEY PATON AWARD

Presented by the Eye Bank Association of America

Bennie H. Jeng, MD

2024 R. Townley Paton Award Recipient

PAST AWARDEES

2023	David D. Verdier, MD
2022	Anthony J. Aldave, MD
2021	Jennifer Y. Li, MD
2020	Stephen C. Kaufman, MD, PhD
2019	Shahzad I. Mian, MD
2018	W. Barry Lee, MD
2017	Michael L. Nordlund, MD, PhD
2016	Mark A. Terry, MD
2015	George O.D. Rosenwasser, MD, CEBT
2014	W. Craig Fowler, MD
2013	Naoshi Shinozaki
2012	Jonathan H. Lass, MD
2011	Allan Sugar, MD
2010	Woodford Van Meter, MD
2009	Thomas D. Lindquist, MD, PhD
2008	David Glasser, MD
2007	Henry Edelhauser, PhD
2006	Michael E. Hettinger, MD
2005	R. Doyle Stulting, MD, PhD
2004	Wing Chu, MD
2003	Marian S. Macsai, MD
2002	Edward J. Holland, MD
2001	Paul J. Dubord, MD, FRCS
2000	H. Dwight Cavanagh, MD, PhD
1999	Kirk R. Wilhelmus, MD, MPH
1998	William Reinhart, MD
1997	Joel Sugar, MD
1996	Mark J. Mannis, MD
1995	Richard Lindstrom, MD
1994	William Bourne, MD
1993	Arthur Boruchoff, MD
1992	Richard C. Troutman, MD
1991	Jay Harold Krachmer, MD
1990	Walter Mayer, MD
1989	Donald Doughman, MD
1988	Frederick Brightbill, MD
1987	Busharat Ahmad, MD
1986	Claes Dohlman, MD
1984	David A. Paton, MD
1983	Lawrence B. Holt, MD Herbert E. Kaufman, MD
1982	Alson E. Braley, MD

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Advancing the treatment of corneal disease

CASTROVIEJO AWARD

Presented by the Cornea Society

Michael W. Belin, MD

2024 Castroviejo Cornea Medalist

PAST MEDALISTS

2023	Theo Wolfgang Seiler, MD, PhD
2022	Carol L. Karp, MD
2020	Jayne S. Weiss, MD
2019	John K.G. Dart, MD
2018	Alan Sugar, MD
2017	Jonathan Lass, MD
2016	Dimitri Azar, MD
2015	Elizabeth J. Cohen, MD
2014	Mark Mannis, MD
2013	Edward Holland, MD
2012	James McCulley, MD
2011	Joel Sugar, MD
2010	Richard Lindstrom, MD
2009	Dwight Cavanagh, MD, PhD
2008	Shigeru Kinoshita, MD, PhD
2007	W. Bruce Jackson, MD, FACS
2006	Jay H. Krachmer, MD
2005	Gary Foulks, MD
2004	George 0. Waring III, MD
2003	Ronald Smith, MD
2002	David L. Easty, MD
2001	Teruo Nishida, MD
2000	William M. Bourne, MD
1999	Henry Edelhouser, PhD
1998	Michael Lemp, MD
1997	Jules Baum, MD
1996	Deborah Pavan-Langston, MD
1995	Richard Forster, MD
1994	Barrie R. Jones, MBCHB
1993	Anthony J. Bron, MD
1992	Richard A. Thoft, MD
1991	Peter R. Laibson, MD
1990	Richard C. Troutman, MD
1989	S. Arthur Boruchoff, MD
1988	Frank Polack, MD
1987	Herbert Kaufman, MD
1986	David Maurice, MD
1985	Phillips Thygeson, MD
1984	Yves I. Pouliquen, MD
1983	Alberto Urrets-Zavalia, MD
1982	Saiichi Mishima, MD
1981	Claes H. Dohlman, MD
1980	A. Edward Maumenee, MD
1979	Max Fine, MD
1978	David G. Cogan, MD
1977	Jose I. Barraquer, MD
1976	Ramon Castroviejo, MD
1975	A. Gerard Devoe, MD

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CLAES DOHLMAN AWARD

Presented by the Cornea Society

Christopher J. Rapuano, MD

2023 Claes Dohlman Award Recipient
Being presented in 2024

PAST AWARDEES

2022	Mark Terry, MD
2020	Eduardo Alfonso, MD
2019	Ivan Schwab, MD
2018	Ronald Smith, MD
2017	Mark J. Mannis, MD
2016	Deborah Pavan-Langston, MD
2015	Roger F. Steinert, MD
2014	Dan B. Jones, MD
2013	Richard K. Forster, MD
2012	Prof. Peter Watson
2011	S. Arthur Boruchoff, MD
2010	Herbert E. Kaufman, MD
2009	Jay H. Krachmer, MD
2008	Gilbert Smolin, MD
2007	Peter R. Laibson, MD
2006	Claes H. Dohlman, MD, PhD

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TROUTMAN CORNEA PRIZE

Presented by the Cornea Society

Eisuke Shimizu, MD, PhD

2024 Troutman Prize Recipient

PAST AWARDEES

2023	Marija Anticic-Eichwalder, PhD
2022	Jodi Hwang, MD
2021	Maria A. Henriquez, MD, MSc, PhD
2020	C. Drew Salisbury, MD
2019	Marina Bertolin, MSc
2018	Gregory Moloney, MBBS, BSc (Med), MMed, FRANZCO
2017	Khoa D. Tran, PhD
2016	Konstantinos T. Tsaousis, MD
2015	Mark A. Greiner, MD
2014	Fei-fei Huang, MM
2013	Rafael A. Oechsler, MD
2012	Kaevalin Lekhanont, MD
2011	Daniel Bohringer, MD
2010	Vanitha Ratnalingam, MSurg (Ophthal)
2009	Jay Bradley, MD
2008	Hui-Jung Yeh, MS

CORNEA and EYE BANKING FORUM 2025

ORLANDO, FLORIDA
FRIDAY, OCTOBER 17

EYE BANK ASSOCIATION OF AMERICA

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SAVE THE DATE!

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