CURRRICULUM VITAE

Shivalingappa (Shiva) K. Swamynathan

Department of Ophthalmology
Morsani College of Medicine
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BIOGRAPHICAL

Name: Shivalingappa (Shiva) Kottur Swamynathan

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Tampa, FL 33612. U.S.A.
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EDUCATION and TRAINING

UNDERGRADUATE					
1983-1987	University of Agricultural Sciences Bangalore, India	B.Sc.	1987	Agriculture (Genetics)	
GRADUATE					
1988-1990	Indian Agricultural Research Institute, New Delhi, India	M.Sc.	1990	Mol. Biol & Biotechnology	Mentor: Aqbal Singh
1990-1996	Center for Cellular and Molecular Biology, Hyderabad, India	Ph.D.	1996	Life Sciences	Mentor: Usha Srinivas
POSTGRADUATE					
1996-2000	Dept. Mol. Microbiol. & Immunol., University of Missouri-Columbia, MO	Post-Doc Fellow	2000	Functions of Y-Box Proteins	Mentor: Ram Guntaka
2000-2005	Lab. Mol. Dev. Biol., National Eye Institute, NIH. Bethesda, MD	Post-Doc Fellow	2005	Eye Development	Mentor: Joram Piatigorsky

APPOINTMENTS and POSITIONS

2005-2007	Lab. Mol. Dev. Biol, National Eye Institute, NIH, Bethesda MD	Staff Scientist
8/2007-12/2007	Department of Ophthalmology, University of Pittsburgh School of Medicine, Pittsburgh, PA	Visiting Assistant Professor of Ophthalmology
12/2007-7/2015	Department of Ophthalmology, University of Pittsburgh School of Medicine, Pittsburgh, PA	Tenure-track Assistant Professor (Primary)
12/2007-7/2015	Department of Cell Biology, University of Pittsburgh School of Medicine, Pittsburgh, PA	Tenure-track Assistant Professor (Secondary)
8/2008-12/2022	Department of Cell Biology, University of Pittsburgh School of Medicine, Pittsburgh, PA	Member, Graduate Faculty
9/2009-12/2022	McGowan Institute for Regenerative Medicine, University of Pittsburgh	Member Faculty

08/2015-12/2022	Department of Ophthalmology, University of Pittsburgh School of Medicine, Pittsburgh, PA	Tenured Associate Professor (Primary Appointment)
08/2015-12/2022	Department of Cell Biology, University of Pittsburgh School of Medicine, Pittsburgh, PA	Tenured Associate Professor (Secondary Appointment)
01/2020-12/2022	Tissue Culture and Histology Core Module, Department of Ophthalmology, University of Pittsburgh School of Medicine	Director
01/2023-Present	Department of Ophthalmology, University of South Florida Morsani College of Medicine,	Tenured Professor (Primary Appointment)

CERTIFICATION and LICENSURE

Controlled Substances License	Drug Enforcement Administration, U.S. Department of Justice	2009-2022

MEMBERSHIP IN PROFESSIONAL SOCIETIES

1. Association for Research in Vision and Ophthalmology	2001-Current
2. Tear Film and Ocular Surface Society (TFOS)	2013-Current
3. International Society for Eye Research (ISER)	2013-Current
4. American Association for the Advancement of Science	2015-Current
5. American Society for Cell Biology	2003-2005

HONORS

1. Indian National Merit Fellowship	1981 to 1987
2. Junior Research Fellowship, Indian Agricultural Research Institute	1988 to 1990
3. Senior Research Fellowship, University Grants Commission, India	1990 to 1995
4. Best Abstract Award, 2003 NEI Intramural Research Day, NIH.	2003
5. Best Scientific Paper, 2009 Asia-ARVO Meeting	2009
6. National Eye Institute (NIH) Career Development (K22) Award	2005-2011
7. Received Tenure from the University of Pittsburgh School of Medicine	2015
8. Silver Fellow, Association for Research in Vision and Ophthalmology	2022

PUBLICATIONS

Peer Reviewed Original Research Articles

1. **Swamynathan, S.K.** and Singh, A. 1992. Rhizobium meliloti purine auxotrophs are nod+ but defective in nitrogen fixation. J. Genetics. 71: 11 - 21. PMID: Not Available
2. **Swamynathan, S.K.** and Singh, 1995. A. Pleiotropic effects of purine auxotrophy in Rhizobium meliloti on cell surface molecules. J. Biosci. 20: 17 - 28. PMID: Not Available
3. **Swamynathan, S.K.**, Revathi, C.J. and Srinivas, U.K. 1996. Identification and characterization of promoter elements responsible for the induction of albumin gene by heat shock in early embryonic rat liver. DNA and Cell Biol. 15: 897 - 905. PMID: 8892761.
4. Cleavinger, P.J., Shin, B.S., Kandala, J.C., Nambiar, A., **Swamynathan, S.K.** and Guntaka, R.V. 1996. Cloning of Rous Sarcoma virus enhancer factor genes. II. RSV EF-II, abundantly expressed in fibroblasts and muscle tissue, binds to an octamer sequence 5'GTACCACC3' in the non-coding strand of RSV enhancer. Virology 222: 133 - 143. PMID: 8806494.
5. **Swamynathan, S.K.**, Nambiar, A. and Guntaka, R.V. 1997. Chicken YB-2, a Y-box protein, is a potent

activator of Rous Sarcoma Virus long terminal repeat driven transcription in avian fibroblasts. J. Virol. 71: 2873 - 2880. PMID: 9060644.

6. Nambiar, A., **Swamynathan**, **S.K**., Kandala, J.C. and Guntaka, R.V. 1998. Characterization of the DNA binding domain of the avian Y-box protein, chk YB-2 and mutational analysis of its single-strand binding motif in the RSV enhancer. J. Virol. 72: 900 - 909. PMID: 9444981.
7. Srinivas, U.K., **Swamynathan, S.K.,** Revathi, C.J. 1998. Mechanism of heat induction of albumin in early embryonic rat liver. J. Biosci. 23: 387- 398. PMID: Not Available
8. Dhalla, A., Ririe, S., **Swamynathan, S.K.,** Weber, K. and Guntaka, R.V. 1998. Involvement of chk-YB1b in the regulation of expression of collagen type I genes. Biochem. J. 336: 373 - 379. PMID: 9820814.
9. **Swamynathan, S.K.,** Nambiar A. and Guntaka, R.V. 2000. Chicken Y-box proteins chk-YB-1b and chk-YB-2 repress translation by sequence-specific interaction with single-stranded RNA. Biochem. J. 348: 297-305. PMID: 10816422.
10. **Swamynathan, S.K.,** Varma, B.R., Weber, K.T. and Guntaka, R.V. 2002. Targeted disruption of one allele of the Y-box protein gene, Chk-YB-1b, in DT40 cells results in major defects in cell cycle. Biochem Biophys Res Commun. 296(2):451-7. PMID: 12163040.
11. **Swamynathan, S.K.** and Piatigorsky, J. 2002. Orientation-dependent influence of an intergenic enhancer on the regulation of transcription of the divergently transcribed mouse shsp/αB-crystallin and MKBP/HSPB2 genes. J. Biol. Chem. 277: 49700-49706. PMID: 12403771.
12. Kanungo, J., Kozmik, Z, **Swamynathan, S.K.,** and Piatigorsky, J. 2003. Gelsolin is a dorsalizing factor in zebrafish. Proc. Natl. Acad. Sci. USA. 100: 3287-3292. PMID: 12629212.
13. **Swamynathan, S.K.,** Crawford, M.A., Robison Jr, W.G., Kanungo, J and Piatigorsky, J. 2003. Adaptive differences in the structure and macromolecular compositions of the air and water corneas of the four-eyed fish (Anableps anableps). FASEB Journal 17: 1996-2005. PMID: 14597669
14. Kanungo, J., **Swamynathan, S.K**., and Piatigorsky, J. 2004. Abundant corneal gelsolin in Zebrafish and the 'Four-Eyed' fish, Anableps anableps: Possible analogy with multifunctional lens crystallins. Experimental Eye Res. 79: 949-956. PMID: 15642334.
15. **Swamynathan, S.K**. *, Katz, J.P., Kaestner, K.H., Ashery-Padan, R., Crawford, M.A. and Piatigorsky, J. 2007. Conditional deletion of the mouse *Klf4* gene results in corneal epithelial fragility, stromal edema, and loss of conjunctival goblet cells. Mol. Cell. Biol. 27: 182-194. PMID: 17060454.
16. **Swamynathan, S.K**. and Piatigorsky, J. 2007. Regulation of the mouse αB-Crystallin and MKBP/HspB2 Promoter activities by shared and gene specific intergenic elements: The importance of context dependency. Int. J. Dev. Biol. 51: 689-700. PMID: 17939115.
17. Kozmik, Z., **Swamynathan, S.K**., Ruzickova, J., Jonasova, K., Paces, C., Vlcek, C., and Piatigorsky, J. 2008. Cubozoan crystallins: Evidence for convergent evolution of Pax regulatory sequences. Evol. Dev. 10: 52-61. PMID: 18184357.
18. **Swamynathan, S.K*.,** Davis, J. and Piatigorsky, J. 2008. Identification of candidate KLF4 target genes reveals the molecular basis of the diverse regulatory roles of KLF4 in the mouse cornea. Invest. Ophthalmol. Vis. Sci. 49: 3360-3370. PMID: 18469187.
19. Young, R.D., **Swamynathan, S.K.*,** Boote, C., Mann, M., Quantock, A.J., Piatigorsky, J., Funderburgh, J.L., and Meek, K.M. 2009. Stromal edema in *Klf*4 conditional null mouse cornea is associated with altered collagen fibril organization and reduced proteoglycans. Invest. Ophthalmol. Vis. Sci. 50:4155-4161. PMID: 19387067.
20. Swamynathan, S., Kenchegowda, D., Piatigorsky, J. and **Swamynathan, S.K. *** 2011. Regulation of the corneal epithelial barrier function by Krüppel-like transcription factor 4. Invest. Ophthalmol. Vis. Sci. 52:1762-1769. PMID: 21051695.
21. Gupta, D., Harvey, S.A., Kaminski, N. and **Swamynathan, S.K. *** 2011. Mouse conjunctival forniceal gene expression during postnatal development and its regulation by Krüppel-like factor 4. Invest. Ophthalmol. Vis. Sci. 52:4951-4962. PMID: 21398290.
22. Kenchegowda, D, Swamynathan, S, Gupta, D, Wan, H, Whitsett, J, and **Swamynathan S.K*.** 2011. Conditional disruption of mouse Klf5 results in defective eyelids with malformed meibomian glands, abnormal cornea and loss of conjunctival goblet cells. Dev. Biol. 356:5-18. PMID: 21600198.

23. Kenchegowda, D., Harvey, S.A.K., Swamynathan, S., Lathrop, K.L. and **Swamynathan, S.K.*** 2012. Critical Role of Klf5 in Regulating Gene Expression during Post-Eyelid Opening Maturation of Mouse Corneas. PLoS ONE 7(9): e44771. doi:10.1371/journal.pone.0044771. PMID: 23024760.
24. Swamynathan, S., Buela, K.A, Kinchington, P., Misawa, H., Lathrop, K.L., Hendricks, R.L. and **Swamynathan, S.K.*** 2012. Klf4 regulates the expression of Slurp1, which functions as an immunomodulatory peptide in the mouse cornea. Invest. Ophthalmol. Vis. Sci. 53:8433-8446. PMID: 23139280.
25. Gupta, D., Harvey, S.A., Kenchegowda, D., Swamynathan, S., and **Swamynathan, S.K. *** 2013. Regulation of mouse lens maturation and gene expression by Krüppel-like factor 4. Exp. Eye Res. 116: 205-218. PMID: 24076321.
26. Swamynathan, S. and **Swamynathan, S.K.*** 2014. SLURP-1 modulates corneal homeostasis by serving as a soluble scavenger of urokinase-type plasminogen activator uPA. Invest. Ophthalmol. Vis. Sci. 55:6251-6261. PMID: 25168896.
27. Delp, E.E., Swamynathan, S., Kao, W.W. and **Swamynathan, S.K.*** 2015. Spatiotemporally regulated ablation of Klf4 in adult mouse corneal epithelial cells results in altered epithelial cell identity and disrupted homeostasis. Invest. Ophthalmol. Vis. Sci. 56:3549-3558. PMID: 26047041
28. Swamynathan, S., Delp, E.E., Harvey, S.A.K., Loughner, C.L., Raju, L. and **Swamynathan, S.K.*** 2015. Corneal expression of SLURP-1 by age, sex, genetic strain and ocular surface health. Invest. Ophthalmol. Vis. Sci. 56:7888-7896. PMID: 26670825.
29. Swamynathan, S., Loughner, C.L. and **Swamynathan, S.K.*** 2017. Inhibition of HUVEC tube formation via suppression of NFκB suggests an anti-angiogenic role for SLURP1 in the transparent cornea. Exp. Eye Res. 164:118-128. PMID: 28803936.
30. Tiwari, A., Loughner, C.L., Swamynathan, S. and **Swamynathan, S.K.*** 2017. KLF4 plays an essential role in corneal epithelial homeostasis by promoting epithelial cell fate and suppressing epithelial–mesenchymal transition. Invest. Ophthalmol. Vis. Sci. 58: 2785-2795. PMID: 28549095.
31. Loughner, C.L., Tiwari, A., Kenchegowda, D., Swamynathan, S. and **Swamynathan, S.K.*** 2017. Spatiotemporally controlled ablation of Klf5 results in dysregulated epithelial homeostasis in adult mouse corneas. Invest. Ophthalmol. Vis. Sci. 58(11):4683-4693. PMID: 28910443.
32. Tiwari, A., Swamynathan, S., Alexander, N., Gnalian, J., Tian, S., Kinchington, P.R. and **Swamynathan, S.K.*** 2019. KLF4 regulates corneal epithelial cell cycle progression by suppressing canonical TGF-β signaling and upregulating CDK inhibitors P16 and P27. Invest. Ophthalmol. Vis. Sci. 60(2):731-740. PMID: 30786277.
33. Swamynathan, S., Tiwari, A., Loughner, C.L., Gnalian, J., Alexander, N., Jhanji, V., **Swamynathan, S.K.*** 2019. The secreted Ly6/uPAR-related protein-1 suppresses neutrophil binding, chemotaxis, and transmigration through human umbilical vein endothelial cells. Sci. Rep. 11;9(1):5898. doi: 10.1038/s41598-019-42437-x. PMID: 30976100.
34. Campbell, G., Swamynathan, S., Tiwari, A., and **Swamynathan, S.K.*** 2019. The secreted Ly-6/uPAR related protein-1 (SLURP1) stabilizes epithelial cell junctions and suppresses TNF-α-induced cytokine production. Biochem Biophys Res Commun. 517(4):729-734. PMID: 31387745.
35. Tiwari, A., Swamynathan, S., Jhanji, V. and **Swamynathan, S.K.*** 2020. KLF4 coordinates corneal epithelial apical-basal polarity and plane of cell division, and is downregulated in ocular surface squamous neoplasia. Invest. Ophthalmol. Vis. Sci. 61(5):15. doi: 10.1167/iovs.61.5.15. PMID: 32396634.
36. Tiwari, A., Swamynathan, S., Campbell, G., Jhanji, V., and **Swamynathan, S.K.*** 2020. BMP6 regulates corneal epithelial cell stratification by coordinating their proliferation and differentiation and Is upregulated in pterygium. Invest Ophthalmol Vis Sci. 61(10):46. doi: 10.1167/iovs.61.10.46. PMID:32845956
37. Swamynathan, S., Campbell. G., Tiwari, A., and **Swamynathan, S.K.*** 2022. Secreted Ly-6/uPAR-related protein-1 (SLURP1) is a pro-differentiation factor that stalls G1-S transition during corneal epithelial cell cycle progression. Ocul Surf. 24:1-11. doi: 10.1016/j.jtos.2021.12.006. PMID: 34923162

Other Peer Reviewed Publications (Reviews)

38. Srinivas, U.K. and **Swamynathan, S.K.** 1996. Role of heat shock transcription factors in stress response and during development. J. Biosci. 21: 103 - 121. PMID: Not Available.

39. Guntaka, R.V. and **Swamynathan, S.K.** Retroviral vectors for gene therapy. 1998. Indian J. Exp. Biol. 36: 539 - 545. PMID: Not Available.
40. **Swamynathan**, **S.K.,** Nambiar, A. and Guntaka, R.V. 1998. Role of single-stranded DNA regions and Y-box proteins in transcriptional regulation of viral and cellular genes. FASEB J. 12:515 - 522. PMID: 9576478.
41. Weber, K., **Swamynathan, S.K.,** Guntaka, R.V., and Sun, Y. 1999. Angiotensin II. International Journal of Biochemistry and Cell Biology. 31: 395 - 403. PMID: 10224666.
42. **Swamynathan, S.K**.* 2010. Krüppel-Like Factors: Three fingers in control. Human Genomics. 4(4): 1-8. PMID: 20511139.
43. **Swamynathan, S.K**.* 2013. Ocular surface development and gene expression. J Ophthalmol. 2013: 103947. doi: 10.1155/2013/103947. PMID: 23533700.
44. Loughner, C.L., Bruford, E.A., McAndrews, M.S., Delp, E.E., Swamynathan, S. and **Swamynathan, S.K.*** 2016. Organization, evolution and functions of the human and mouse Ly6/uPAR family genes. Human Genomics. doi: 10.1186/s40246-016-0074-2. PMID: 27098205.
45. **Swamynathan, S.K.*,** and Wells, A. 2019. Conjunctival goblet cells: Ocular surface functions, disorders that affect them, and the potential for their regeneration. Ocul. Surf. Nov 14. pii: S1542-0124(19)30330-1. doi: 10.1016/j.jtos.2019.11.005. PMID: 31734511.
46. **Swamynathan, S.K.*** and Swamynathan, S. 2023. Corneal epithelial development and homeostasis. Differentiation. S0301-4681(23)00012-9. PMID: 36870804
47. Kaur S, Sohnen P, Swamynathan S, Du Y, Espana EM, **Swamynathan S.K.*** 2023. Molecular nature of ocular surface barrier function, diseases that affect it, and its relevance for ocular drug delivery. Ocul. Surf. 30:3-13. doi: 10.1016/j.jtos.2023.08.001. PMID: 37543173

Other Peer Reviewed Publications (Book Chapters)

1. **Swamynathan, S.K.** and Piatigorsky, J. 2008. Gene expression in cornea and lens. In Eye, Retina, and Visual System of the Mouse. Ed: Chalupa, L.M. and Williams, R. W. MIT Press.

***** Corresponding Author.

4. PUBLISHED ABSTRACTS (in Scientific Journals)

1. Kanungo, J, **Swamynathan, S.K.,** Kozmik, Z. and Piatigorsky, J. 2002.Genomic analysis and relative expression patterns of the genes for cornea/lens specific and ubiquitous gelsolin in zebrafish. Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting.
2. **Swamynathan, S.K.** and Piatigorsky, J. 2002.Orientation-dependency and silencing of an inter-genic enhancer in the divergently transcribed mouse αB-crystallin and MKBP/HSPB2 genes. ARVO Annual Meeting.
3. **Swamynathan, S.K.,** Robison, G. W., Crawford, M.A. and Piatigorsky, J. 2003. Gelsolin is the most abundant water-soluble protein in the corneal epithelia of Anableps anableps, the four-eyed fish. ARVO Annual Meeting.
4. **Swamynathan, S.K.** and Piatigorsky, J. 2004. An insulator-like sequence acts as a negative regulatory element in between the mouse *Shsp/*αB-crystallin enhancer and *Mkbp/HspB2* promoter. ARVO Annual Meeting.
5. **Swamynathan, S.K.,** Kaestner K., Ashery-Padan, R. and Piatigorsky, J. 2006. Regulation of Murine Eye Development by Krüppel-Like Transcription Factor KLF4. ARVO Annual Meeting.
6. **Swamynathan, S.K.** and Piatigorsky, J. 2007. Mechanistic Insight into the Diverse Regulatory Roles of Krüppel-Like Transcription Factor KLF4 in the Mouse Cornea. ARVO Annual Meeting.
7. **Swamynathan, S.K.** and Piatigorsky, J. 2008. Slurp-1 promoter activity is regulated by KLF4 in the corneal epithelial cells and skin keratinocytes. ARVO Annual Meeting.
8. Young, R., Boote, C., **Swamynathan, S.K.,** Quantock, A., Piatigorsky, J. and Meek, K.M. 2008. Ultrastructural basis for the stromal edema in *Klf4*CN mouse corneas. ARVO Annual Meeting.
9. **Swamynathan S.K.** Kenchegowda, D., and Swamynathan, S. 2009. Krüppel-Like Factor 4 contributes to

corneal epithelial and epidermal barrier functions by upregulating Dsp, Dsg1a and Dsg1b promoter activities. ARVO Annual Meeting.

10. Gupta, D., Kenchegowda, D., Piatigorsky, J. and **Swamynathan, S.K.** 2010. Role of Krüppel-Like Factor 4 in Mouse Lens Gene Expression, Development and Function. ARVO Annual Meeting.
11. Kenchegowda, D., Swamynathan, S., and **Swamynathan, S.K.** 2010. Regulation of Gastrokine-1, Uroplakin-1B and Uroplakin-3B Promoter Activities by KLF4, KLF5 and Oct1. ARVO Annual Meeting.
12. **Swamynathan, S.K.,** Kenchegowda, D., Harvey, S.A.K., and Swamynathan, S. 2011.Disruption of mouse Klf5 results in defective eyelids with malformed meibomian glands, abnormal cornea and loss of conjunctival goblet cells. ARVO Annual Meeting.
13. **Swamynathan, S.K.,** Kenchegowda, D., Harvey, S.A.K., Swamynathan, S., and Lathrop, K.L. 2012. Dynamic changes in Klf5 functions during corneal maturation and maintenance. ARVO Annual Meeting.
14. **Swamynathan, S.K.,** and Swamynathan, S. 2013. Influence of Secreted Ly6/uPAR-Related Protein-1 (Slurp1) on corneal stromal fibroblast proliferation, interaction with the extracellular matrix, and migration. ARVO Annual Meeting.
15. Swamynathan, S. and **Swamynathan, S.K.** 2014. SLURP1 modulates corneal homeostasis by scavenging the uPAR ligand uPA. ARVO Annual Meeting.
16. Delp, E.E., Swamynathan, S., Kao, W.W. and **Swamynathan, S.K.** 2015. Spatiotemporally regulated disruption of Krüppel-like factor-4 (Klf4) results in loss of mature corneal epithelial cell identity. ARVO Annual Meeting.
17. Swamynathan, S., Delp, E.E., Harvey, S.A.K., Raju, L. and **Swamynathan, S.K.** 2015. Secreted Ly6/urokinase-type plasminogen activator receptor related protein-1 (Slurp1) expression by strain, age, gender and ocular surface health. ARVO Annual Meeting.
18. Swamynathan, S. and **Swamynathan, S.K.** 2016. Secreted Ly6/Urokinase-type Plasminogen activator Receptor-Related Protein-1 (SLURP1) Suppresses Angiogenic Inflammation through a Pathway that Involves Src, RhoA and NFκB. ARVO Annual Meeting.
19. Swamynathan, S., Loughner, C.L., Roy, C.N. and **Swamynathan, S.K**. 2017. SLURP1 suppresses neutrophil docking on endothelial cells- a key step in neutrophil extravasation. ARVO Annual Meeting.
20. Loughner, C.L., Kenchegowda, D., Swamynathan, S. and **Swamynathan, S.K**. 2017. Spatiotemporally regulated ablation of *Klf5* results in dysregulated epithelial homeostasis in mature mouse corneas. ARVO Annual Meeting.
21. Tiwari, A, Loughner, C.L., Swamynathan, S. and **Swamynathan, S.K**. 2017. KLF4 promotes corneal epithelial cell fate by suppressing epithelial-mesenchymal transition. Annual ARVO Meeting.
22. Tiwari, A., Swamynathan, S., Loughner, C.L., Alexander, N., Gnalian, J. and **Swamynathan, S.K.** 2018. KLF4 Controls Corneal Epithelial Stratification by Regulating Cell Polarity and Plane of Cell Division. ARVO Annual Meeting.
23. Swamynathan, S., Tiwari, A., Loughner, C.L., Alexander, N., Gnalian, J. and **Swamynathan, S.K.** 2018. SLURP1 modulates inflammation by influencing both neutrophils and endothelial cells. ARVO Annual Meeting.
24. Tiwari, A., Swamynathan, S., Alexander, N., Gnalian, J. Tian, S., Kinchington, P.R., and **Swamynathan, S.K.** 2019. KLF4 regulates corneal epithelial cell cycle progression by suppressing canonical TGF-β signaling, and upregulating CDK inhibitors P16 and P27. ARVO Annual Meeting.
25. Swamynathan, S., Campbell, G., Tiwari, A., Gnalian, J. and **Swamynathan, S.K.** 2019. SLURP1 modulates inflammation by influencing both neutrophils and endothelial cells. Secreted Ly-6/uPAR Related Protein-1 (SLURP1) modulates inflammation by moderating epithelial cells response to inflammatory agents. ARVO Annual Meeting.
26. Tiwari, A., Swamynathan, S., Campbell, G., and **Swamynathan, S.K.** 2021. Expression of Apical-Basal Polarity Determinants during Corneal Epithelial Stratification and Maturation. ARVO Annual Meeting.
27. Swamynathan, S., Campbell, G., Tiwari, A., and **Swamynathan, S.K.** 2021. Secreted Ly-6/uPAR Related Protein-1 (SLURP1) suppresses epithelial cell proliferation by upregulating cell cycle inhibitors and downregulating cyclins and cyclin-dependent kinases. ARVO Annual Meeting.

28. Swamynathan, S. and **Swamynathan, S.K.** 2022. Secreted Ly-6/uPAR Related Protein-1 (SLURP1) Suppresses Canonical TGF-β Signaling in Corneal Epithelial Cells. ARVO Annual Meeting.
29. Swamynathan, S., Sohnen, P., Kaur, S., and **Swamynathan, S.K.** 2023. Secreted Ly-6/uPAR Related Protein-1 (SLURP1) Suppresses TGF-b Induced Epithelial to Mesenchymal Transition in Corneal Epithelial Cells. ARVO Annual Meeting.
30. Kaur, S., Vohra, M., Mondal, M., Sohnen, P., Swamynathan, S., Tiwari, A., and **Swamynathan, S.K.** 2023. KLF4 promotes genomic stability and suppresses ferroptosis in corneal epithelial cells exposed to genotoxic conditions. ARVO Annual Meeting.
31. Sohnen, P., Shang, P., Kaur, S., Swamynathan, S., Hirose, T., Sinha, D., **Swamynathan, S.K.** 2023. Role of apicobasal polarity in retinal pigmented epithelial cells evaluated by ablation of Pard3. ARVO Annual Meeting.

5. ABSTRACTS (Not Published in Scientific Journals)

1. **Swamynathan, S.K.,** Revathi, C.J. and Srinivas, U.K. 1992.Regulation of heat induced expression of albumin in rat liver during embryonic development. All India Cell Biology Conference, New Delhi, India.
2. Revathi, C.J., **Swamynathan, S.K.** and Srinivas, U.K. 1993. Cloning and characterization of heat shock transcription factor from rat liver. Annual meeting, Society of Biological Chemists of India, Madurai, India.
3. **Swamynathan, S.K**., Revathi, C.J. and Srinivas, U.K. 1993.Interaction between heat shock transcription factors and heat shock elements in the rat albumin promoter confers heat inducibility to the albumin promoter. 62nd annual meeting of Society of Biological Chemists of India, Madurai, India.
4. **Swamynathan, S.K.,** Revathi, C.J. and Srinivas, U.K. 1994. Cloning of rat heat shock factor 1 and its role in heat inducibility of rat albumin promoter. 16th International congress of Biochemistry and Molecular Biology, New Delhi, India**.**
5. **Swamynathan, S.K.,** Nambiar, A., Kandala, J.C. and Guntaka, R.V. 1997**.**Characterization of chicken YB-2, a potent activator of transcription from Rous Sarcoma Virus long terminal repeats. 1997. Cold Spring Harbor symposium on retroviruses, Cold Spring Harbor, New York, May 26-30,
6. **Swamynathan, S.K.** and Piatigorsky, J. 2001. Orientation-specific role of an inter-genic enhancer in the divergently transcribed mouse αB-Crystallin and MKBP/HSPB2 genes. Third NEI Research day Symposium, NEI, Bethesda, MD.
7. **Swamynathan, S.K.** and Piatigorsky, J. 2004. An insulator/NRE is present between the mouse αB-crystallin enhancer and MKBP/HspB2 promoter. XVI International Congress on Eye Research. Sydney, Australia.
8. **Swamynathan, S.K.** and Piatigorsky, J. 2006. Role of Krüppel -like transcription factor Klf4 in development of mouse lens and cornea. XVII International Congress of Eye Research, Buenos Aires, Argentina.
9. Swamynathan, S., Buela, K., Hendricks, R., and **Swamynathan, S.K.** 2009. Regulation of expression of Slurp-1 by KLF4 and the role of Slurp-1 in the mouse ocular surface. Asia-ARVO meeting, Hyderabad, India. (Won the "Best Scientific Paper" Award)
10. Tiwari, A., Swamynathan, S., Alexander, N., Gnalian, J. and **Swamynathan, S.K.** 2018. Krüppel-Like Factor 4 (KLF4) Regulates Corneal Epithelial Stratification by Controlling Cell Polarity and Plane of Cell Division. Gordon Research Conference on 'Cornea and Ocular Surface Biology and Pathology', Ventura, CA.
11. **Swamynathan, S.K.,** Swamynathan, S., Alexander, N., Gnalian, J. Jhanji, V. and Tiwari, A. 2018. KLF4 and TGF-β Superfamily Crosstalk in Corneal Epithelial Homeostasis. Biennial meeting of the International Society of Eye Research. Belfast, Northern Ireland.
12. Tiwari, A., Swamynathan, S., Jhanji, V., and **Swamynathan, S.K.** 2020. Bone morphogenetic protein-6 (BMP6) coordinates corneal epithelial stratification by regulating proliferation and differentiation, and is upregulated in pterygium. ARVO Annual Meeting, Baltimore, MD. (Invited and scheduled, however canceled secondary to COVID19)
13. Swamynathan, S., Campbell, G., Tiwari, A., Lathrop, K., and **Swamynathan, S.K.** 2020. Secreted Ly6/uPAR-related protein-1 (Slurp1)-null mouse corneas display pro-inflammatory properties. ARVO Annual Meeting, Baltimore, MD. (Invited and scheduled, however canceled secondary to COVID19)

14. Swamynathan, S., Campbell, G., Tiwari, A., St Leger, A and Swamynathan, S.K. 2023. Elevated angiogenic inflammation and activation of TGF-b1, NFκB and IκBKB-pathways in *Slurp1X*-/- corneas. Biennial meeting of the International Society for Eye Research. Gold Coast, Australia.

PROFESSIONAL ACTIVITIES

Teaching

Medical Student Teaching - Facilitator

2016-2022 Facilitated 'Workshops', 'Team-Based Learning' and 'Problem-Based Learning' for 'Human Genetics' (MS-1) course for the first-year medical students University of Pittsburgh School of Medicine. ~ 12-15 hours of contact each year, 8-12 students

Graduate Student Teaching

1998-1999 'Retrovirology' part of Medical Virology (MMI303), a graduate and senior undergraduate course, Department of Molecular Microbiology and Immunology, University of Missouri-Columbia, MO. ~ 8 hours of contact per year, ~15 graduate students

2008 and 2014 'Transcriptional Regulation of Gene Expression' part of the interdisciplinary biomedical graduate program course 'Foundations of Biomedical Sciences' (INTBP-2000). University of Pittsburgh. ~ 12 hours of contact per year, ~40 graduate students

2008-2020 'Emerging roles of Krüppel-like factors' in 'Advanced Topics in Gene Expression' course (MSBMG3510), University of Pittsburgh School of Medicine. ~ 5 hours of contact per year, ~ 4-8 graduate students

2009-2017 'Evolution of the Eye', 'Eye Development and Gene Expression' as well as 'Biochemistry of the Iris and the Lens', as a part of 'Scientific Basis of Vision' (INTBP2100) course. About 6 hours of contact each year, 2-4 graduate students, and 2-4 post-doc fellows

2016-2022 'Eye Development and Function' in 'Molecular Mechanisms of Tissue Growth & Differentiation' course (MSCMP2730), University of Pittsburgh School of Medicine. About 3 hours of contact, 8-10 graduate students.

Resident Teaching

2007 & 2008 'Anatomy and Physiology of the Ocular Surface' part of the 'Lecture series in cornea and external diseases', presented to the residents and fellows of the Department of Ophthalmology, University of Pittsburgh. One lecture, about 15 residents

Curriculum Development/Teaching Products/Media Products

2009-2017 Course Director, 'Scientific Basis of Vision' (INTBP2100) course. This course played a major role in our department receiving an NEI T32 grant in 2014. About 26 hours of contact each year, 2-4 graduate students, and 2-4 post-doc fellows

2014-2017 Coordinator, 'Clinical Trials in Ophthalmology' journal club for the T32 grant-supported trainees in the Dept Ophthalmology, Univ. Pittsburgh. About 12 hours of contact each year, 2-4 graduate students, and 2-4 post-doctoral fellows

Mentoring

a). Ph.D. Thesis Committee Memberships

i. 2008-2009 Michelle wood- Graduated Ph.D. in Cell biology and physiology program of the University of Pittsburgh School of Medicine Interdisciplinary Biomedical Program

ii. 2014-2015 Andrew Hertsenberg, Graduated Ph.D. in Molecular Genetics and Development program of the University of Pittsburgh School of Medicine Interdisciplinary Biomedical Program

b). Post-doctoral Trainees

i. 2008-2011. Dr. Divya Gupta. Currently Associate Professor, SRMU, Lucknow, India
ii. 2008-2011. Dr. Doreswamy Kenchegowda. Currently a Research fellow, Armed Forces Radiobiology Research Institute, Uniformed Services University of the Health Sciences, Bethesda, MD
iii. 2008. Dr. Ganesh Diwakar. Currently a Sr. Scientist, Alticor, Inc. Grand Rapids, MI.
iv. 2016-2017. Dr. ChandraNath Roy. Currently a Post-Doctoral fellow, Univ. Pittsburgh, PA.
v. 2016-2020. Dr. Anil Tiwari. Currently a Scientist, Schroff Charitable Eye Hospital, New Delhi, India.
vi. 2022-Present Dr. Satinder Kaur

c). Undergraduate Student Researchers

i. 1996-2000 Two summer students in the Department of Molecular Microbiology and Immunology, University of Missouri-Columbia, MO.
ii. 2003-2006 Two summer students in the Laboratory of Molecular and Developmental Biology, National Eye Institute, NIH.
iii. 2008 Angela Han, supported by the University of Pittsburgh 'Work-Study Program'
iv. 2013 Catherine Nguyen, supported by the University of Pittsburgh 'Work-Study Program'
v. 2013-2014 Emili Delp, supported by Brackenridge scholarship (Winter 2013), and a Fight for Sight Summer Research Fellowship (Summer 2014). Current position: Resident at Georgetown University.
vi. 2015-2017 Chelsea Loughner, who obtained a DO from Lake Erie College of Osteopathic Medicine in 2021 and is currently a resident in Delaware.
vii. 2017-2018 Nicholas Alexander. Currently working for a pharmaceutical company in Philadelphia.
viii. 2017-2019 John Gnalian, an undergraduate student supported by Brackenridge scholarship. Currently studying at a medical school in Connecticut.
iX. 2018-2020 Gregory Campbell, University of Pittsburgh. Currently preparing for graduate school.

RESEARCH

Current Grant Support

Grant Number, Funding Institute	Title	Year	Role, % Effort	Direct Costs/yr	Indirect Costs/yr	Total/year
R01 EY026533-05 NEI, NIH.	Ocular Surface Functions of KLF4 and KLF5	2016-2026	PI, 40% Effort	$ 261,981	$ 148,019	$ 410,000
R01 EY031684-01, NEI, NIH	Ocular surface functions of SLURP1	2021-2026	PI, 40% Effort	$ 261,981	$ 148,019	$ 410,000

Prior Grant Support

Grant Number, Funding Institute	Title	Year	Role, % Effort	Total Direct Costs	Total Indirect Costs	Total

K22 EY016875 NEI, NIH.	Role of KLF4 and KLF5 in mouse cornea development	2009-2011	PI, 80% Effort	$ 336,752	$ 29,283	$ 366,035
K22 EY016875-01S1 NEI, NIH.	American Recovery and reinvestment act (ARRA) Admin. Supplement.	2010	PI 80% Effort	$ 70,000.00	$ 1,600	$ 71,600
R01 EY022898 NEI, NIH.	Corneal Expression and Function of Slurp1	2013-2018	PI 40% Effort	$ 1,000,000	$ 536,563	$ 1,536,563
PA Lions Sight Conservation & Eye Research	SLURP1- A Diagnostic Marker and Therapeutic Target for Ocular Surface Disorders	2014-2015	PI	$ 25,000	None	$ 25,000
University of Pittsburgh PreMIC (Precision Medicine Initiative for Commercialization)	ProTeara- a peptide biologic to cure dry eye	2020-2021	Co-PI, 5% effort (PI: Dr. Wells, Pathology)	$ 100,000	None	$ 100,000
Sun Pharma Global FZE	Tear film markers in Dry Eye: Impact of Immunomodulatory Therapy	2020-2021	Co-PI, 5% effort (PI: Dr. Jhanji, Ophthalmol)	$ 62,000	$ 24,800	$ 86,800
5P30EY008098-33, NEI, NIH	Core grant for Vision Research, Tissue Culture and Histology Module	1997-2023	Histology Module Director, 5% Effort	$ 83,208	$ 47,013	$ 130,221

Other Research-Related Activities

Invention Disclosures to the University of Pittsburgh

1. Use of Slurp1 as an immunomodulatory molecule in the ocular surface. Pitt Ref No.: 02728.
2. Identification of candidate KLF4 target genes reveals the molecular basis of the diverse regulatory roles of KLF4 in the mouse cornea. Pitt Ref No.: 01740.
3. Potential for developing gamma-secretase inhibitors and glucocorticoids for treatment of ocular surface disorders associated with the absence of conjunctival goblet cells. Pitt Ref No.: 01950.
4. Novel formulation of CXCR-activating peptides with a coacervate formulation for slow drug release in ophthalmic and topical treatments. Pitt Ref No.: 05610. Innovators: Wells, Swamynathan, Wang. Feb 2021

Patents

1. US Patent # 9,132,193 Issued 15 Sep 2015. Title: Use of Slurp1 as an immunomodulatory molecule in the ocular surface. Named Inventors: Shivalingappa Swamynathan, Sudha Swamynathan, K Ann Buela, and Robert Hendricks
2. US Patent Application # 63/385,588, filed November 30, 2022 Coacervate formulations of CXCR-activating peptides for controlled release in ophthalmic and topical treatments. Named Inventors: Alan Wells, Shivalingappa Swamynathan, Yadong Wang

Journal Editorial Board Memberships/Reviewing

1. 2012- Present Member, Editorial Board, 'Journal of Ophthalmology'.
2. 2003-Present Ad hoc reviewer for several journals. On average, I review 10-15 manuscripts a year.

Study-Section Memberships

1. Ad hoc Member, 'Biology of Visual Systems' (BVS) Study Section, CSR, NIH. Oct 2012.
2. Ad hoc Member, 'Biology of Visual Systems' (BVS) Study Section, CSR, NIH. June 2014.
3. Ad hoc Member, 'Biology of Visual Systems' (BVS) Study Section, CSR, NIH. Feb 2016.
4. Ad hoc Member, 'Ocular Surface, Cornea, & Refractive Error Special Emphasis Panel', NIH. Feb 2017.
5. Ad hoc Member, 'Ocular Surface, Cornea, & Refractive Error Special Emphasis Panel', NIH. June 2017.
6. Ad hoc Reviewer, 'Netherlands Organization for Scientific Research', Earth & Life Sci. Division. Oct 2017.
7. Ad hoc Member, 'Ocular Surface, Cornea, & Refractive Error Special Emphasis Panel', NIH. June 2018.
8. Ad hoc Member, 'Special Emphasis Panel/Scientific Review Group 2019/01 ZRG1 ETTN-G (12) B on SBIR and STTR grant applications. NIH. Nov 2018.
9. Ad hoc Member, 'Special Emphasis Panel/Scientific Review Group 2019/01 ZRG1 ETTN-G (12) B on SBIR and STTR grant applications. NIH. Feb 2020.
10. Ad hoc Member, FWF Austrian Science Fund-Biological and Medical Sciences, Vienna, Austria. Jun 2020.
11. Ad hoc Reviewer, Career Development Grants, Medical Research Council, U.K. Research and Innovation, London. Nov-Dec 2020.
12. Ad hoc member, Scientific Review Group for the U.S. Department of Defense Vision Research Program Anterior Segment Initiative 2020-21.
13. Ad hoc member, Physiological Mechanisms and Biomechanics Program, Division of Integrative Organismal Systems, National Science Foundation (NSF). Feb 2021.
14. Ad hoc member, 'Biology and Development of the Eye' (BDE) Study Section, CSR, NIH, Feb 2021.
15. Ad hoc Reviewer, Molecular & Cellular Medicine Board, Medical Research Council, London. March 2022.
16. Ad hoc member, 'Pathophysiology of Eye Disease 1' (PED1) Study Section, CSR, NIH, Oct 2023.

CURRENT RESEARCH INTERESTS

i. Ocular Surface Functions of KLF4 and KLF5: The adult corneal epithelium (CE) is continually renewed throughout life. The most superficial cells lost by desquamation are replaced by the underlying cells derived from the basal cells which differentiate as they migrate upwards, and in turn are replaced by the peripheral limbal stem cell-derived transient amplifying cells that migrate centripetally. We are interested in understanding the functions of Krüppel-like factors KLF4 and KLF5 that are among the most abundant transcription factors in the adult mouse cornea, in this process. As germline ablation of *Klf4* or *Klf5* results in premature lethality before mature cornea is formed, we resorted to Cre-Lox-mediated conditional ablation of *Klf4* or *Klf5* in the ocular surface from embryonic day-9 to study their role in CE maturation, or specifically within the normally formed adult CE in a spatiotemporally regulated manner to study their role in homeostasis. Our studies revealed that KLF4 and KLF5 have profound influence on the ocular surface by regulating CE cell proliferation, differentiation, structural stability, and barrier function, and conjunctival goblet cell formation. We are pursuing this work further to understand the molecular basis for diverse functions of KLF4 and KLF5 in maturation and maintenance of the ocular surface.

ii. Ocular Surface Functions of SLURP1: We are also investigating the ocular surface functions of the secreted Ly6/uPAR-related protein-1 (SLURP1), associated with the hyperkeratotic disorder *Mal-de-Meleda*. Slurp1 is one of the most abundantly expressed peptides in the mouse cornea and is secreted into the tear film. Our work demonstrated that Slurp1 expression is *(i)* increased upon mouse eyelid opening when the cornea is first exposed to the environment, *(ii)* dependent on the transcription factor KLF4, *(iii)* abrogated within 24 h of bacterial lipopolysaccharide injection or Herpes-Simplex-Virus (HSV) infection concurrent with neutrophil infiltration, *(iv)* decreased in inflamed *Klf4*CN corneas, *(v)* suppressed by pro-inflammatory cytokines

IL-4, IL-13 and TNF-α and (*vi*) decreased in adenoviral keratitis, restoration of which restricted the neutrophilic infiltrate, providing evidence in favor of an immunomodulatory role for Slurp1. We also discovered that Slurp1 serves as a soluble scavenger of the urokinase receptor (uPAR) ligands such as urokinase (uPA), and that SLURP1 has an anti-angiogenic role in the transparent cornea. We are pursuing this work further to determine the value of SLURP1 as a target for developing novel therapeutic approaches for managing inflammatory disorders of the ocular surface.

Invited Seminars and Lectures

1. June 13, 2003. Adaptive changes in the structure and macromolecular compositions of the air and water corneas in the four-eyed fish *Anableps*. Centre for Cellular and Molecular Biology, Hyderabad, India.
2. June 12, 2003. Regulation of expression of bidirectionally transcribed genes encoding the shsps αB-crystallin/HspB5 and MKBP/HspB2. Centre for Cellular and Molecular Biology, Hyderabad, India.
3. April 27, 2004. An insulator-like sequence acts as a negative regulatory element in between the mouse αB-crystallin enhancer and Mkbp/HspB2 promoter. ARVO Annual Meeting, Ft. Lauderdale, FL
4. Sep 3, 2004. An insulator/NRE is present between the mouse αB-crystallin enhancer and MKBP/HspB2 promoter. XVI International Congress on Eye Research. Sydney, Australia.
5. Jan 6, 2005. Gene Expression and Specializations in the Lens and Cornea: shsp αB-crystallin, Gelsolin, and KLF4. Dept. Ophthalmology, Medical College of Wisconsin, University of Wisconsin, Milwaukee, WI.
6. Jan 12, 2005. Gene Expression and Specializations in the Lens and Cornea: shsp αB-crystallin, Gelsolin, and KLF4. Department of Ophthalmology, University of Missouri-Columbia, Columbia MO.
7. July 13, 2005. Adaptive changes in gene expression during eye development. University of Agricultural Sciences, Bangalore, India.
8. Oct 12, 2005. Specializations and Adaptive Changes in Gene Expression in the Lens and Cornea. Department of Ophthalmology, Case Western Reserve University, Cleveland, OH.
9. June 06, 2006. Krüppel-Like Transcription Factor *Klf4* is a Critical Component of the Genetic Network Regulating the Ocular Surface Development and Maintenance. Department of Ophthalmology, University of Pittsburgh Medical Center.
10. June 15, 2006. Role of Krüppel-Like Transcription Factors in Ocular Surface Development. Department of Ophthalmology, Bascom Palmer Eye Institute, University of Miami, Miami, FL April 16, 2018. KLF4, KLF5, and ocular surface homeostasis. University of Missouri-Columbia. Columbia MO.
11. June 26, 2006. Regulation of Ocular Surface Development by Krüppel-like Transcription Factors. Department of Ophthalmology, Duke University, Durham, NC.
12. Oct 31, 2006. Role of Krüppel -like transcription factor Klf4 in development of mouse lens and cornea. XVII International Congress of Eye Research, Buenos Aires, Argentina.
13. May 31, 2007. Function of Krüppel-like factors in ocular surface development. GangaGen (A Biotech Company), Bangalore, India.
14. Sep 25, 2007. Role of Krüppel-like factors KLF4 and KLF5 in ocular surface development. Department of Cell Biology, University of Pittsburgh School of Medicine, Pittsburgh.
15. Jan 17, 2009. Regulation of expression of Slurp-1 by KLF4 and the role of Slurp-1 in the mouse ocular surface. 2009 Asia-ARVO meeting, Hyderabad, India. (Won the "Best Scientific Paper" Award)
16. Jan 19, 2009. Regulation of gene expression during maturation and maintenance of the ocular surface. Centre for Cellular and Molecular Biology, Hyderabad, India.
17. March 6, 2009. Regulation of gene expression during maturation and maintenance of the ocular surface. Senior Vice Chancellor's Research Seminar, University of Pittsburgh School of Medicine, Pittsburgh, PA.
18. March 10, 2009. Regulation of Gene Expression during Development and Maintenance of the Ocular Surface. Presented in the session on "Ocular Regeneration: Applied Fundamentals" in McGowan Institute for Regenerative Medicine retreat, University of Pittsburgh.
19. May 07, 2009. Krüppel-Like Factor 4 contributes to corneal epithelial and epidermal barrier functions by upregulating Dsp, Dsg1a and Dsg1b promoter activities. ARVO 2009 Annual Meeting, Ft. Lauderdale, FL.
20. March 6, 2009. Regulation of Gene Expression during Maturation and Maintenance of the Ocular Surface. Senior Vice Chancellor's Research Seminar Series, University of Pittsburgh.

21. May 22, 2009. Role of Krüppel-Like Factors KLF4 and KLF5 in Ocular Surface Gene Expression. Department of Ophthalmology, University of Pittsburgh School of Medicine Grand Rounds
22. May 2, 2010. Role of Krüppel-Like Factors KLF4 and KLF5 in maturation and maintenance of ocular surface. ARVO 2010 Annual Meeting, Ft. Lauderdale, FL.
23. May 3, 2011. Disruption of mouse Klf5 results in defective eyelids with malformed meibomian glands, abnormal cornea and loss of conjunctival goblet cells. ARVO 2011 Annual Meeting, Ft. Lauderdale, FL.
24. April 25, 2012. Ocular surface expression & functions of Slurp1, a novel immunomodulatory peptide abundantly expressed in the cornea & secreted into the tear film. L.V. Prasad Eye Instt., Hyderabad, India.
25. March 26, 2012. Regulation of ocular surface maturation and maintenance by Krüppel-like factors Klf4 and Klf5. Gordon Research Conference on 'Biology and Pathobiology of Cornea', Ventura, CA.
26. April 2, 2013. Slurp1-A Novel Immunomodulatory Peptide in the Ocular Surface. Massachusetts Eye and Ear Institute, Harvard University, Boston MA.
27. October 11, 2013. Slurp1-A Novel Immunomodulatory Peptide in the Ocular Surface. Jules Stein Eye Institute, University of California, Los Angeles.
28. Sep 2014. SLURP1- An Immunomodulatory Molecule at the Ocular Surface. PA Lions Sight Conservation & Eye Research Society, Philadelphia, PA.
29. May 5, 2015. Regulation of Corneal Gene Expression by Krüppel-Like Factors. Mini-symposium on 'Integrated Genomic Networks in Eye Development & Pathogenesis'. ARVO Annual Meeting, Denver, CO.
30. Sep 16, 2016. Regulation of Ocular Surface Gene Expression and Homeostasis by KLF4 and KLF5. Department of Ophthalmology, University of Colorado School of Medicine, Denver CO.
31. Aug 22, 2017. Regulation of Ocular Surface Homeostasis by Krüppel-Like Factors KLF4 and KLF5. Department of Ophthalmology, Baylor College of Medicine, Houston, TX.
32. Feb 21, 2018. SLURP1 Stabilizes HUVEC Barrier Function, Suppressing dHL-60 Neutrophil Binding, Transmigration and Chemotaxis. Gordon Research Conference on 'Cornea and Ocular Surface Biology and Pathology', Ventura, CA.
33. March 30, 2018. Regulation of ocular surface homeostasis by KLF4 and KLF5. Indiana University School of Optometry, Bloomington, IN.
34. May 5, 2020. KLF4 coordinates corneal epithelial apicobasal polarity and plane of division. ARVO 2020 Annual Meeting, Baltimore, MD. Invited and scheduled, however canceled secondary to the COVID19 Pandemic
35. May 21, 2021. KLF4, KLF5, and Corneal Epithelial Homeostasis. Department of Ophthalmology and Visual Sciences, Illinois Eye and Ear Infirmary, University of Illinois at Chicago, Chicago, IL.
36. Sep 24, 2021. Dry eye: The problem, the solutions, the future. Webinar for the Eye and Ear Foundation of Pittsburgh, Pittsburgh PA.
37. Nov 9, 2021. Role of KLF4 and KLF5 in Corneal Epithelial Homeostasis. Department of Ophthalmology, University of Florida, Gainesville FL.
38. May 3, 2022. Regulation of ocular surface homeostasis by Krüppel-like factors KLF4 and KLF5. Mini-symposium on 'Ocular Surface Disorders: Biology, Pathology, and Mechanism. ARVO Annual Meeting, Denver, CO.
39. Feb 21, 2023. Krüppel-like factors KLF4 and KLF5 orchestrate corneal epithelial homeostasis. Biennial meeting of the International Society for Eye Research. Gold Coast, Australia.
40. Aug 24, 2023. Science for Society. Plenary Talk for the University of Agricultural Sciences Bengaluru India Post-Graduate Science Week 2023.

SERVICE

Service to the University of Pittsburgh

2008-2017 **Member, University of Pittsburgh IACUC Animal Care and Use Committee**.

As a member, I deliberated in the monthly meetings of the committee, voted on relevant issues, evaluated animal protocol applications by fellow University of Pittsburgh researchers, and participated in periodic inspections of animal use areas of the University of Pittsburgh.

Overall, IACUC-related work accounted for about 210-220 hours per year.

2017 **Member, University of Pittsburgh DLAR Operations Committee for review of excluded pathogens.** As a member, I was responsible for reviewing and revamping the University's rodent excluded pathogen list (which was in place for many years), to be consistent with the current needs of our animal-based research programs.

2016-2022 Review and critique pre-grant applications from my colleagues within the Department of Ophthalmology, providing constructive criticisms to help them develop better grant applications. Many of them succeeded in obtaining grant support.

2018-2022 Organize Department of Ophthalmology faculty tea meetings that provide a forum for the faculty members to present their new ideas and receive feedback from colleagues.

National/International Service

2009 Moderator, "Epithelium: Cell Biology & Functions" session in ARVO Annual Meeting, Fort Lauderdale, FL.

2010 Moderator, "Ocular Development / Stem cells, biochemistry and molecular biology" session in ARVO Annual Meeting, Fort Lauderdale, FL.

2015 Moderator, "Dry Eye Disease" session in the ARVO Annual Meeting, Denver, CO.

2017-2020 Elected Member, 'Cornea' section of the Association for Research in Vision and Ophthalmology (ARVO) Annual Meeting Program Committee. In this role, I organized the scientific content of the 'Cornea' section of the ARVO annual meeting, usually attended by over 10,000 members. I reviewed the submitted abstracts and scheduled the accepted ones in different thematic sessions minimizing overlaps and conflicts in scheduling.

2018 Moderator, "Epithelium: Cell Biology & Functions" session in the ARVO Annual Meeting, Honolulu, HI.

2019 Moderator, 'Corneal Epithelium in Health and Disease' session in the ARVO Annual Meeting, Vancouver, Canada.

2020 Moderator, Mini symposium on 'Corneal Epithelial homeostasis' in the ARVO Annual Meeting, Baltimore, MD (Invited and scheduled, however canceled secondary to the COVID19 Pandemic).

2022 Moderator/Discussion Leader, 'Genomics and Gene Regulation' session in Gordon Research Conference on Cornea (Invited and scheduled, however canceled secondary to the COVID19 Pandemic).

2023 Moderator, Session on 'Corneal Epithelial Homeostasis' in the Biennial meeting of the International Society for Eye Research. Gold Coast, Australia.

Local / Community Service

2011-2022 Member, Oakland-Shadyside Lions Club.

2012-2022 Secretary, Oakland-Shadyside Lions Club.