

EMPLOYEMENT HISTORY

11/24 – Present	Department of Medical Devices, NIPER, SAS Nagar (Mohali), India. <i>Assistant Professor</i>
07/22 – 11/24	Department of Biophysics, PGIMER, Chandigarh, India. <i>Assistant Professor (DHR-NRI)</i>
08/21 – 06/22	Department of Ophthalmology, Stanford University, Palo Alto, CA, USA. <i>Postdoctoral Research Fellow. Mentor: Dr. Y. Joyce Liao</i>
07/17 – 07/21	Department of Ophthalmology, University of Pittsburgh, PA, USA. <i>Postdoctoral Research Fellow. Mentor: Dr. Yiqin Du</i>
01/12 – 06/17	Department of Biophysics, PGIMER, Chandigarh, India. <i>Ph.D. Mentor: Dr. Shalmoli Bhattacharyya</i>

EDUCATION

2017	PhD	Stem Cell Biology	PGIMER, Chandigarh	India
2009	MSc	Zoology	Kurukshetra University	India
2007	BSc	Life Sciences	SD College, Panipat	India

PEER REVIEWED PUBLICATIONS

1. Ravi, **Ajay Kumar**, Shalmoli Bhattacharyya, Jogender Singh. Thiol reductive stress activates the hypoxia response pathway. **EMBO Journal**. 2023, 42: e114093
2. **Ajay Kumar***, Shalini Raik, Prakshi Sharma, Vidya Rattan, Shalmoli Bhattacharyya. Primary Culture of Dental pulp Stem Cells. *Corresponding author. **Journal of Visualized Experiments**.
3. Sara Ahadi, Kenneth A. Wilson, Boris Babenko, Cory Y. McLean, Drew Bryant, **Ajay Kumar**, Orion Pritchard, Enrique M. Carrera, Ricardo Lamy, Jay M. Stewart, Avinash Varadarajan, Marc Berndt, Pankaj Kapahi, Ali Bashir. Longitudinal fundus imaging and its genome-wide association analysis provide evidence for a human retinal aging clock. **ELife**, 2023;12:e82364. DOI: <https://doi.org/10.7554/eLife.82364>
4. **Ajay Kumar**, Aditi Mahajan, Puja Kumari, Jagjit Singh, Shalini Raik, Lekha Saha, Arnab Pal, Bikash Medhi, Vidya Rattan, Shalmoli Bhattacharyya. Dental Pulp Stem Cell Secretome Ameliorates D-Galactose Induced Accelerated Aging in Rat Model. **Cell Biochemistry & Function**, DOI: 10.1002/cbf.3723.
5. Colleen M. McDowell, Krishnakumar Kizhatil, Michael H. Elliott..... **Ajay Kumar** et al. Consensus Recommendation for Mouse Models of Ocular Hypertension to Study Aqueous Humor Outflow and Its Mechanisms. **Investigative Ophthalmology & Visual Science**, February 2022, Vol.63, 12.
6. Siqi Xiong, **Ajay Kumar**, Shenghe Tian, Eman Taher, Enzhi Yang, Paul R Kinchington, Xiaobo Xia, Yiqin Du (2021). Stem Cell Transplantation Rescued a Primary Open-Angle Glaucoma Mouse Model. **eLife**, 2021;10:e63677.
7. **Ajay Kumar**, Tianyu Cheng, Weitao Song, Brandon Cheuk, Enzhi Yang, Lei Yang, Yubing Xie, Yiqin Du (2020). Two-step induction of trabecular meshwork cells from induced pluripotent stem cells for glaucoma. **Biochemical and Biophysical Research Communications**. 529, 2, 411-417.
8. Siqi Xiong, Yi Xu, Enzhi Yang, **Ajay Kumar**, Donna Peters, Yiqin Du (2019). $\alpha 5\beta 1$ Integrin Promotes Anchoring and Integration of Transplanted Stem Cells to the Trabecular Meshwork in the Eye for Regeneration. **Stem Cells and Development**. DOI: 10.1089/scd.2019.0254.
9. Shalini Raik, **Ajay Kumar**, Vidya Rattan, Saurabh Seth, Anupriya Kaur, Shalmoli Bhattacharyya (2019). Assessment of Post-thaw Quality of Dental Mesenchymal Stromal Cells After Long-Term Cryopreservation by Uncontrolled Freezing. **Applied Biochemistry and Biotechnology**. 191, 728–743(2020).
10. **Ajay Kumar**, Yi Xu, E. Yang, Y. Du (2019). Fidelity of long-term cryopreserved adipose-derived stem cells for differentiation into cells of ocular and other lineages. **Experimental Eye Research**. DOI:10.1016/j.exer.2019.107860.
11. **Ajay Kumar**, Yi Xu, Y. Du (2019). Stem Cells from Human Trabecular Meshwork Hold the Potential to Develop into Ocular and Non-Ocular Lineages After Long-Term Storage. **Stem Cells and Development**. DOI:10.1089/scd.2019.0169.

12. Prateek Bhatia, Minu Singh, Madhulika Sharma, **Ajay Kumar**, Nandita Kakkar, S. Radhika, Amita Trehan, Deepak Bansal (2019). BRAF V600E mutation in childhood Langerhans cell histiocytosis correlates with multisystem disease and poor survival. **Blood Cells Molecules and Diseases**. DOI: 10.1016/j.bcmd.2019.102356.
13. Hongmin Yun, Yiwen Wang, Yi Zhou, **Ajay Kumar**, Ke Wang, Ming Sun, Donna B. Stolz, Xiabao Xia, C. Ross Ethier, Yiqin Du (2018). Human stem cells home to and repair laser-damaged trabecular meshwork in a mouse model. **Communications Biology**. DOI: 10.1038/s42003-018-0227-z.
14. **Ajay Kumar**, Vinod Kumar, Vidya Rattan, Vivekanand Jha, Shalmoli Bhattacharyya (2018). Secretome proteins regulate comparative osteogenic and adipogenic potential in bone marrow and dental stem cells. **Biochimie**. 155:129-139.
15. **Ajay Kumar**, Yi Xu, Enzhi Yang, Yiqin Du (2018). Stemness and Regenerative Potential of Corneal Stromal Stem Cells and Their Secretome after Long-term Storage - Implications for Ocular Regeneration. **Investigative Ophthalmology and Visual Sciences**. 59, 3728-3738.
16. **Ajay Kumar**, M. Singh, A. Singh, P. Bhatia (2018). Audit of Quality and Quantity of Nucleic Acid Yield from Pediatric Acute Leukemia Cases Following a Bio-banking Initiative. **Indian Journal of Hematology and Blood Transfusion**. DOI: 10.1007/s12288-018-0975-4.
17. Mamta Singla, **Ajay kumar**, Amanjit Bal, Shalmoli Bhattacharyya (2018). Epithelial to mesenchymal transition induces stem cell like phenotype in renal cell carcinoma cells. **Cancer Cell International**. 18: 57.
18. **Ajay Kumar**, Vinod Kumar, Vidya Rattan, Vivekanand Jha, Shalmoli Bhattacharyya (2017). Molecular spectrum of secretome regulates the relative hepatogenic potential of mesenchymal stem cells from bone marrow and dental tissue. **Nature-Scientific Reports**. 7:15015.
19. **Ajay Kumar**, Vinod Kumar, Vidya Rattan, Vivekanand Jha, Shalmoli Bhattacharyya (2017). Secretome cues modulate the neurogenic potential of bone marrow and dental stem cells. **Molecular Neurobiology**. 54(6):4672-4682.
20. Pankaj Gaur*, **Ajay Kumar***, Reena Dalal, Shalmoli Bhattacharyya, Subrata Ghosh (2017). Emergence through delicate balance between the molecular factor and the steric orientation: a highly bright and photostable DNA marker for real-time monitoring of cell growth dynamics. **Chemical Communications**. 53(17):2571-2574. ***Joint first author**.
21. Pankaj Gaur, **Ajay Kumar**, Reena Dalal, Rajendra Kumar, Shalmoli Bhattacharyya, Subrata Ghosh (2017). Selectivity advancement through chemical structure engineering: long-term intracellular DNA recognition, chromosomal staining and micronuclei detection. **Sensors & Actuators: B. Chemical**. 248:690-698.
22. Neera Raghav, Suman Jangra, **Ajay Kumar**, Shalmoli Bhattacharyya (2017). Quinazoline derivatives as cathepsin B, H and L inhibitors and cell proliferating agents. **International Journal of Biological Macromolecules**. 94(Pt A):719-727.
23. Pankaj Gaur*, **Ajay Kumar***, Gourab Dey, Rajendra Kumar, Shalmoli Bhattacharyya, Subrata Ghosh (2016). Selenium incorporated cationic organochalcogen: live cell compatible and highly photostable molecular stain for imaging and localization of intracellular DNA, **ACS Applied Materials & Interfaces**. 8,17:10690-10699. ***Joint first author**.
24. Pankaj Gaur, **Ajay Kumar**, Shalmoli Bhattacharyya, Subrata Ghosh. Biomolecular recognition at cellular level: geometrical and chemical functionality dependence of a low phototoxic cationic probe for DNA imaging. **Journal of Material Chemistry B**. 2016; 4:4895-4900.
25. Neera Raghav, Suman Jangra, **Ajay Kumar**, Shalmoli Bhattacharyya, Deepak Wadhwa, Jayant Sindhu. Cathepsin B, H and L inhibitors as cell proliferating agents: Designing, synthesis, computational and pharmacological studies of some novel 2-(2-naphthoyl)-6,6-dimethyl -3-aryl-2,3,6,7-tetrahydrobenzofuran-4(5H)-one. **RSC Advances**. 2016; 6:34588-34599.
26. **Ajay Kumar**, Shalmoli Bhattacharyya, Vidya Rattan. Effect of uncontrolled freezing on biological characteristics of human dental pulp stem cells, **Cell and Tissue Banking**. 2015; 16:513–522.

REVIEWS

1. Colleen M. McDowell, Krishnakumar Kizhatil, Michael H. Elliott..... **Ajay Kumar** et al. Consensus Recommendation for Mouse Models of Ocular Hypertension to Study Aqueous Humor Outflow and Its Mechanisms. **Investigative Ophthalmology & Visual Science**, February 2022, Vol.63, 12.
2. **Ajay Kumar**, Hongmin Yun, Martha L. Funderburgh, Yiqin Du. Regenerative therapy for the cornea. **Progress in Retinal and Eye Research**. 2021, DOI 10.1016/j.preteyeres.2021.101011.
3. Shayshadri Mallick, Malini Sharma, **Ajay Kumar**, and Yiqin Du. Cell-based therapies for trabecular meshwork regeneration for glaucoma. **Biomolecules**. 2021, DOI. 10.3390/biom11091258.

4. Shalini Raik, **Ajay Kumar**^{*}, Shalmoli Bhattacharyya. Insights into cell free therapeutic approach-role of Stem cell “soup-ernatant”. **Biotechnology & applied Biochemistry**. 2018; 65(2):104-118. ^{*}**Joint- first author**. Awarded as **top downloaded article of 2018 by Wiley**.
5. S Bhattacharyya, **Ajay Kumar**, Lal Khanduja K. The voyage of stem cell toward terminal differentiation: a brief overview. **Acta Biochim Biophys Sin.** (2012); 44(6):463-75. **Editor’s Choice**.

BOOK CHAPTERS

1. **Ajay Kumar**, Enzhi Yang, Yiqin Du. Trabecular Meshwork Regeneration for Glaucoma Treatment Using Stem Cell-Derived Trophic Factors. **Ocular Regeneration**, Sept. 2024.
2. Brandon Cheuk, **Ajay Kumar**, Yiqin Du. Induced pluripotent stem cells for modeling open-angle glaucoma. **Novel Concepts in iPSC Disease Modeling**, Volume 15. 2021.
3. **Ajay Kumar**, Kunal Gandhi, Yiqin Du. Stem cells for the regeneration of trabecular meshwork and glaucoma treatment. Volume 3 of **Glaucoma Research and Clinical Advances, 2020 to 2022**.
4. S Bhattacharyya, **Ajay Kumar**. Fine-Tuning the Stem Cell Fate by Autophagy. In: Turksen K. (eds) **Autophagy in Health and Disease**. Stem Cell Biology and Regenerative Medicine. Humana Press, Cham. 2018; 21-29.

PATENTS (MM/DD/YY)

1. Yiqin Du, **Ajay Kumar** (11/30/2023). **Compositions and Methods for Treating Corneal Scarring**. U.S. Patent no. WO2023230171A2 (published).
2. Yiqin Du, **Ajay Kumar** (09/10/2021). **Compositions and Methods for Treating Ocular Disorders**. U.S. Patent no. WO2021178977 (published).
3. Yaping Joyce Liao, Ru siou Hsu, **Ajay Kumar**, Shweta Modgill (09/05/2023). **Composition and Methods for Treatment of Vision Loss**. U.S. patent Application No. Stanford Docket S23-391 (pending).

ABSTRACTS IN JOURNAL SUPPLEMENTS

1. Yiqin Du, **Ajay Kumar**, Sridhar Bammidi, Enzhi Yang. Trabecular Meshwork Regeneration by Stem Cell-Derived Trophic Factors and Endogenous Stem Cell Activation. **Investigative Ophthalmology & Visual Science**. June 2023, Vol.64, 2431.
2. Sridhar Bammidi, **Ajay Kumar**, Enzhi Yang, Yiqin Du. Corneal stromal stem cell secretome promotes corneal wound healing by dampening immune response and rescuing sensory neurons. **Investigative Ophthalmology & Visual Science**. June 2023, Vol.64, 3137.
3. Hiren Kumar Patel, Joel Alan Imventarza, **Ajay Kumar**..., Yaping Joyce Liao. Development of human cellular model for ectopic calcification to study the physiopathological mechanism for Optic Disc Drusen (ODD). **Investigative Ophthalmology & Visual Science**. June 2023, Vol.64, 4118.
4. Yiqin Du, **Ajay Kumar**. Therapeutics of stem cell secretome in dexamethasone-induced ocular hypertension mice. **Investigative Ophthalmology & Visual Science**. 2022; 63:2646.
5. Joel Alan Imventarza, **Ajay Kumar**, Yaping Joyce Liao. Development of a Skin Biopsy-Based Calcification Assay for Detection of Optic Disc Drusen: A Pilot Study. **Investigative Ophthalmology & Visual Science**. June 2022, Vol.63, 1216- A0216.
6. Yiqin Du, Yiwen Wang, **Ajay Kumar**. Stem cells to regenerate trabecular meshwork with glaucoma treatment potential. **Molecular Biology of the Cell**, 2018; 29:26.
7. **Ajay Kumar**, Yiqin Du. Stemness and regenerative effects of trabecular meshwork stem cells/secretome after long-term storage. **Investigative Ophthalmology & Visual Science**. 2018; 59:4732.
8. Enzhi Yang, **Ajay Kumar**; Yiqin Du. Possible Autologous Stem Cell Resources for Trabecular Meshwork Regeneration. **Investigative Ophthalmology & Visual Science**. 2018; 59:4733.
9. **Ajay Kumar**, Vinod Kumar, Vidya Rattan, Vivekananda Jha, Shalmoli Bhattacharyya. Exploring dental tissue as a potential source of human stem cells in regenerative medicine. Shalmoli Bhattacharyya. **Hellenic Journal of Nuclear Medicine**. 2014; 17:86.

GRANT FUNDING

1. **ICMR DHR-NRI grant** (July 2022- June 2025), INR 1.01 CR (\$1,26,000). DHR, India. **Principal Investigator**.
2. **SPARK Translational Pilot Grant** (2021-22), \$50,000. Stanford University, USA. **Principal Investigator**.
3. **Weigand grant in Regenerative Ophthalmology** (2018-19). University of Pittsburgh, USA. **Principal Investigator**.

AWARDS AND RECOGNITION

- 2022: **ISER/BrightFocus Travel award** and **Oral Presentation award**, “Concepts and Breakthroughs in Glaucoma” symposium, Atlanta, Georgia, USA.
- 2021: **Stanford SPARK Scholar** by Spark @Stanford University, CA, USA
- 2021: **Amir Chand Gold medal** for Best Publication, PGIMER, Chandigarh, India.
- 2020: **Elevator pitch award in Startup idea competition** at McGowan Institute of Regenerative Medicine’s scientific retreat, PA, USA
- 2018: **Weigand Fellow in Regenerative Ophthalmology** by Weigand family at University of Pittsburgh, PA, USA
- 2018: **Amir Chand Silver medal** for Best Publication, PGIMER, Chandigarh, India.
- 2017: **R Srinivasan award**, annual meeting of Indian Biophysical Society at IISER Mohali, India.
- 2016: **Young Innovator Award** in medicine by ABMS PGIMER.
- 2012: **AIR 1st** in “PGIMER, Chandigarh Ph.D. entrance exam”.
- 2010-2015: Council of Scientific and Industrial Research (CSIR) fellowship from Govt. of India for Ph.D.
- 2007: **AIR 1st** in Kurukshetra University Post Graduation entrance exam.

PROFESSIONAL SERVICE ACTIVITIES

- Reviewer for Scientific Reports, Translational Vision Science & Technology, Journal of Tissue Engineering, BMC Ophthalmology.

PROFESSIONAL DEVELOPMENT ACTIVITIES

- Mentored 4 research fellows as PI and 3 PhD students and 3 research fellows in a co-mentor role.
- Mentored 3 undergraduate students and 1 junior postdoc in USA during postdoc.

LINKS TO SOCIAL ACADEMIC PROFILES

Research Gate: https://www.researchgate.net/profile/Ajay_Kumar224

Linkedin: <https://www.linkedin.com/in/ajay-kumar-4918381b/>

Google Scholar: <https://scholar.google.com/citations?user=HvWC2ZkAAAAJ&hl=en>

Stanford Profile: <https://profiles.stanford.edu/266860>

ORCID: <https://orcid.org/0000-0003-3412-1823>

