Stanford



Jeffrey Goldberg, MD, PhD

Blumenkranz Smead Professor

Ophthalmology

CLINICAL OFFICE (PRIMARY)

- **Stanford Byers Eye Institute**

  2452 Watson Ct

  Palo Alto, CA 94303

  Tel (650) 723-6995 **Fax** (650) 725-6619

ACADEMIC CONTACT INFORMATION

- **Administrative Contact**

  Email eye-chair-office@stanford.edu

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Bio

BIO

Dr. Jeffrey Goldberg is Professor and Chair of Ophthalmology at the Byers Eye Institute at Stanford University, and a member of the National Academy of Medicine. His clinical effort is focused on patients in need of medical or surgical intervention for glaucoma and other retinal and optic nerve diseases, as well as cataract. His research is directed at neuroprotection and regeneration of retinal ganglion cells and the optic nerve, a major unmet need in glaucoma and other optic neuropathies, and his laboratory is developing novel stem cell and nanotherapeutics approaches for eye repair.

Dr. Goldberg received his B.S. magna cum laude from Yale University, and his M.D. and Ph.D. from Stanford University where he made significant discoveries about the failure of optic nerve regeneration. He did his clinical training in ophthalmology and then in glaucoma at the Bascom Palmer Eye Institute, and was awarded a fellowship from the Heed Foundation. He was named the 2010 Scientist of the Year by the Hope For Vision foundation, and received the Cogan award from the Association for Research in Vision and Ophthalmology in 2012. He was elected in 2010 to the American Society of Clinical Investigation, an honorary society of physician scientists. He directs an NIH-funded research laboratory and has developed significant expertise with implementing FDA IND clinical trials for optic nerve neuroprotection and regeneration. His goal is to translate scientific discoveries to patient therapies. A partial list of clinical trials can be found on the department webpage, https://med.stanford.edu/ophthalmology/research/clinical_trials.html.

CLINICAL FOCUS

- Glaucoma Specialist

ACADEMIC APPOINTMENTS

- Professor, Ophthalmology
- Member, Bio-X
- Member, Wu Tsai Neurosciences Institute

ADMINISTRATIVE APPOINTMENTS

- Chair of Ophthalmology and Director of the Byers Eye Institute, Stanford University, (2015- present)
- Director, Spencer Center for Vision Research, (2017- present)

PROFESSIONAL EDUCATION

- Fellowship: Bascom Palmer Eye Institute (2010) FL
- Residency: Bascom Palmer Eye Institute (2008) FL
- Board Certification: Ophthalmology, American Board of Ophthalmology (2009)
- Internship: Santa Clara Valley Medical Center (2004) CA
- Medical Education: Stanford School of Medicine (2003) CA
- Fellowship, Bascom Palmer Eye Institute , Glaucoma (2010)
- PhD, Stanford University , Neurosciences (2003)
- MD, Stanford University , Medicine (2003)

LINKS

- Department Site: http://ophthalmology.stanford.edu

Research & Scholarship

CURRENT RESEARCH AND SCHOLARLY INTERESTS

Lab research on molecular mechanisms of survival and regeneration in the visual system; retinal development and stem cell biology; nanoparticles and tissue engineering. Clinical trials in imaging, biomarker development, and neuroprotection and vision restoration in glaucoma and other neurodegenerative diseases.

CLINICAL TRIALS

- Dual Intravitreal Implantation of NT-501 Encapsulated Cell Therapy for Glaucoma, Recruiting
- Electrical Stimulation for the Treatment of Optic Neuropathies, Recruiting
- Electrical Stimulation for Vision Neuroenhancement in Glaucoma, Recruiting
- Study of NT-501 Encapsulated Cell Therapy for Glaucoma Neuroprotection and Vision Restoration, Recruiting
- Topical Insulin for Glaucoma, Recruiting
- Topical Insulin for Glaucoma (TING2), Recruiting
- Electrical Stimulation for the Treatment of Glaucoma, Not Recruiting
- Retinal Effects of Balance Goggles System in Glaucoma Balance Goggles System (BGS) in Patients With Glaucoma, Not Recruiting

Teaching

STANFORD ADVISEES

Postdoctoral Faculty Sponsor

Sajad Besharati, Aniket Ramshekar, Mishal Rao, Carola Rutigliani, Charles Ryan, Aaran Vijayakumaran, Deborah Villafranca, Zheng Wu

GRADUATE AND FELLOWSHIP PROGRAM AFFILIATIONS

- Neurosciences (PhD Program)

Publications

PUBLICATIONS

- **Phase I NT-501 Ciliary Neurotrophic Factor Implant Trial for Primary Open-Angle Glaucoma: Safety, Neuroprotection, and Neuroenhancement.** *Ophthalmology science*
  Goldberg, J. L., Beykin, G., Satterfield, K. R., Nunez, M., Lam, B. L., Albini, T. A.

2023; 3 (3): 100298

- **Cellular and subcellular optogenetic approaches towards neuroprotection and vision restoration.** *Progress in retinal and eye research*
  Wood, E. H., Kreymerman, A., Kowal, T., Buickians, D., Sun, Y., Muscat, S., Mercola, M., Moshfeghi, D. M., Goldberg, J. L.
  2022: 101153
- **Longitudinal in vivo Ca2+ imaging reveals dynamic activity changes of diseased retinal ganglion cells at the single-cell level.** *Proceedings of the National Academy of Sciences of the United States of America*
  Li, L., Feng, X., Fang, F., Miller, D. A., Zhang, S., Zhuang, P., Huang, H., Liu, P., Liu, J., Sredar, N., Liu, L., Sun, Y., Duan, et al
  2022; 119 (48): e2206829119
- **Directly induced human retinal ganglion cells mimic fetal RGCs and are neuroprotective after transplantation invivo.** *Stem cell reports*
  Luo, Z., Chang, K., Wu, S., Sun, C., Xia, X., Nahmou, M., Bian, M., Wen, R. R., Zhu, Y., Shah, S., Tanasa, B., Wernig, M., Goldberg, et al
  2022
- **Quantitative BONCAT (QBONCAT) allows identification of newly synthesized proteins after optic nerve injury.** *The Journal of neuroscience : the official journal of the Society for Neuroscience*
  Shah, S. H., Schiapparelli, L. M., Yokota, S., Ma, Y., Xia, X., Shankar, S., Saturday, S., Nahmou, M., Sun, C., Yates, J. R., Cline, H. T., Goldberg, J. L.
  2022
- **Quantitative transportomics identifies Kif5a as a major regulator of neurodegeneration.** *eLife*
  Shah, S. H., Schiapparelli, L. M., Ma, Y., Yokota, S., Atkins, M., Xia, X., Cameron, E. G., Huang, T., Saturday, S., Sun, C. B., Knasel, C., Blackshaw, S., Yates Iii, et al
  2022; 11
- **Fusogenic liposome-enhanced cytosolic delivery of magnetic nanoparticles** *RSC ADVANCES*
  Chen, F., Bian, M., Nahmou, M., Myung, D., Goldberg, J. L.
  2021; 11 (57): 35796-35805
- **Implicit Bias and the Association of Redaction of Identifiers With Residency Application Screening Scores.** *JAMA ophthalmology*
  Pershing, S., Stell, L., Fisher, A. C., Goldberg, J. L.
  2021
- **Phase 1b randomized controlled study of short course topical recombinant human nerve growth factor (rhNGF) for neuroenhancement in glaucoma: safety, tolerability and efficacy measure outcomes.** *American journal of ophthalmology*
  Gala, B., Laurel, S., Sohail, H. M., Mariana, N., Lilia, P., Bac T, N., Sylvia L, G., Amy, D., Zhongqiu, L., Melissa, A., Tom, K., Sophia Y, W., Robert, et al
  2021
- **Dynamics of Contrast Decrement and Increment Responses in Human Visual Cortex.** *Translational vision science & technology*
  Norcia, A. M., Yakovleva, A., Hung, B., Goldberg, J. L.
  2020; 9 (10): 6
- **Discovery and clinical translation of novel glaucoma biomarkers.** *Progress in retinal and eye research*
  Beykin, G., Norcia, A. M., Srinivasan, V. J., Dubra, A., Goldberg, J. L.
  2020: 100875
- **Physiologic maturation is both extrinsically and intrinsically regulated in progenitor-derived neurons.** *Scientific reports*
  Venugopalan, P. n., Cameron, E. G., Zhang, X. n., Nahmou, M. n., Muller, K. J., Goldberg, J. L.
  2020; 10 (1): 2337
- **Regulation of Neuronal Survival and Axon Growth by a Perinuclear cAMP Compartment** *JOURNAL OF NEUROSCIENCE*
  Boczek, T., Cameron, E. G., Yu, W., Xia, X., Shah, S. H., Chabeco, B., Galvao, J., Nahmou, M., Li, J., Thakur, H., Goldberg, J. L., Kapiloff, M. S.
  2019; 39 (28): 5466–80
- **Opposing Effects of Growth and Differentiation Factors in Cell-Fate Specification.** *Current biology : CB*
  Chang, K. C., Sun, C. n., Cameron, E. G., Madaan, A. n., Wu, S. n., Xia, X. n., Zhang, X. n., Tenerelli, K. n., Nahmou, M. n., Knasel, C. M., Russano, K. R., Hertz, J. n., Goldberg, et al
  2019
- **SALT Trial: Steroids after Laser Trabeculoplasty: Impact of Short-Term Anti-inflammatory Treatment on Selective Laser Trabeculoplasty Efficacy.** *Ophthalmology*

Groth, S. L., Albeiruti, E. n., Nunez, M. n., Fajardo, R. n., Sharpsten, L. n., Loewen, N. n., Schuman, J. S., Goldberg, J. L.
2019

- **Magnetic Human Corneal Endothelial Cell Transplant: Delivery, Retention, and Short-Term Efficacy.** *Investigative ophthalmology & visual science*
  Xia, X. n., Atkins, M. n., Dalal, R. n., Kuzmenko, O. n., Chang, K. C., Sun, C. B., Benatti, C. A., Rak, D. J., Nahmou, M. n., Kunzevitzky, N. J., Goldberg, J. L.
  2019; 60 (7): 2438–48
- **Vision Loss after Intravitreal Injection of Autologous "Stem Cells" for AMD** *NEW ENGLAND JOURNAL OF MEDICINE*
  Kuriyan, A. E., Albini, T. A., Townsend, J. H., Rodriguez, M., Pandya, H. K., Leonard, R. E., Parrott, M. B., Rosenfeld, P. J., Flynn, H. W., Goldberg, J. L.
  2017; 376 (11): 1047-1053
- **Topical administration of a Rock/Net inhibitor promotes retinal ganglion cell survival and axon regeneration after optic nerve injury.** *Experimental eye research*
  Shaw, P. X., Sang, A., Wang, Y., Ho, D., Douglas, C., Dia, L., Goldberg, J. L.
  2016
- **NEUROREGENERATION. Promoting CNS repair.** *Science*
  Cameron, E. G., Goldberg, J. L.
  2016; 353 (6294): 30-31
- **Report on the National Eye Institute Audacious Goals Initiative: Regenerating the Optic Nerve.** *Investigative ophthalmology & visual science*
  Goldberg, J. L., Guido, W., For The Agi Workshop Participants
  2016; 57 (3): 1271-1275
- **Transplanted neurons integrate into adult retinas and respond to light.** *Nature communications*
  Venugopalan, P., Wang, Y., Nguyen, T., Huang, A., Muller, K. J., Goldberg, J. L.
  2016; 7: 10472-?
- **Transplanted neurons integrate into adult retinas and respond to light** *NATURE COMMUNICATIONS*
  Venugopalan, P., Wang, Y., Tu Nguyen, T., Huang, A., Muller, K. J., Goldberg, J. L.
  2016; 7
- **In vivo imaging of axonal transport of mitochondria in the diseased and aged mammalian CNS** *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA*
  Takihara, Y., Inatani, M., Eto, K., Inoue, T., Kreymerman, A., Miyake, S., Ueno, S., Nagaya, M., Nakanishi, A., Iwao, K., Takamura, Y., Sakamoto, H., Satoh, et al
  2015; 112 (33): 10515-10520
- **Promoting filopodial elongation in neurons by membrane-bound magnetic nanoparticles** *NANOMEDICINE-NANOTECHNOLOGY BIOLOGY AND MEDICINE*
  Pita-Thomas, W., Steketee, M. B., Moysidis, S. N., Thakor, K., Hampton, B., Goldberg, J. L.
  2015; 11 (3): 559-567
- **A Novel Rodent Model of Posterior Ischemic Optic Neuropathy** *JAMA OPHTHALMOLOGY*
  Wang, Y., Brown, D. P., Duan, Y., Kong, W., Watson, B. D., Goldberg, J. L.
  2013; 131 (2): 194-204
- **Glaucoma 2.0: Neuroprotection, Neuroregeneration, Neuroenhancement** *OPHTHALMOLOGY*
  Chang, E. E., Goldberg, J. L.
  2012; 119 (5): 979-986
- **KLF Family Members Regulate Intrinsic Axon Regeneration Ability** *SCIENCE*
  Moore, D. L., Blackmore, M. G., Hu, Y., Kaestner, K. H., Bixby, J. L., Lemmon, V. P., Goldberg, J. L.
  2009; 326 (5950): 298-301
- **Differential expression of PIEZO1 and PIEZO2 mechanosensitive channels in ocular tissues implicates diverse functional roles.** *Experimental eye research*
  Zhu, Y., Garcia-Sanchez, J., Dalal, R., Sun, Y., Kapiloff, M. S., Goldberg, J. L., Liu, W. W.

2023: 109675

- **Impact of Type 2 diabetes mellitus and insulin use on progression to glaucoma surgery in primary open angle glaucoma.** *Eye (London, England)*
  Sun, M. T., Pershing, S., Goldberg, J. L., Wang, S. Y.
  2023

- **Development of Anterior Segment Focused Biologic Therapies to Regenerate Corneal Tissue for the Treatment of Disease: Drug Development Experience.** *Journal of ocular pharmacology and therapeutics : the official journal of the Association for Ocular Pharmacology and Therapeutics*
  Rowe-Rendleman, C., Eveleth, D., Goldberg, J. L., Jurkunas, U., Okumura, N., Dawson, D., Sawant, O. B.
  2023

- **Retinal ganglion cell repopulation for vision restoration in optic neuropathy: a roadmap from the RReSTORe Consortium.** *Molecular neurodegeneration*
  Soucy, J. R., Aguzzi, E. A., Cho, J., Gilhooley, M. J., Keuthan, C., Luo, Z., Monavarfeshani, A., Saleem, M. A., Wang, X., Wohlschlegel, J., RReSTORe Consortium, Baranov, P., Di Polo, A., et al
  2023; 18 (1): 64

- **US Population Disparities in Ophthalmic Care: Blindness and Visual Impairment in the IRIS® Registry (Intelligent Research In Sight).** *Ophthalmology*
  Brant, A., Kolomeyer, N., Goldberg, J. L., Haller, J., Lee, C. S., Lee, A. Y., Lorch, A. C., Lum, F., Miller, J. W., Parke, D. W., Hyman, L., Pershing, S.
  2023

- **Intrinsic and induced neuronal regeneration in the mammalian retina.** *Antioxidants & redox signaling*
  Woodworth, M. B., Greig, L. C., Goldberg, J. L.
  2023

- **Safety and Target Engagement of Complement C1q Inhibitor ANX007 in Neurodegenerative Eye Disease: Results from Phase I Studies in Glaucoma.** *Ophthalmology science*
  Sun, Y., Wirta, D., Murahashi, W., Mathur, V., Sankaranarayanan, S., Taylor, L. K., Yednock, T., Fong, D. S., Goldberg, J. L.
  2023; 3 (2): 100290

- **The importance of unambiguous cell origin determination in neuronal repopulation studies.** *iScience*
  Johnson, T. V., Calkins, D. J., Fortune, B., Goldberg, J. L., La Torre, A., Lamba, D. A., Meyer, J. S., Reh, T. A., Wallace, V. A., Zack, D. J., Baranov, P.
  2023; 26 (4): 106361

- **Aldose reductase inhibition decelerates optic nerve degeneration by alleviating retinal microglia activation.** *Scientific reports*
  Rao, M., Huang, Y. K., Liu, C. C., Meadows, C., Cheng, H. C., Zhou, M., Chen, Y. C., Xia, X., Goldberg, J. L., Williams, A. M., Kuwajima, T., Chang, K. C.
  2023; 13 (1): 5592

- **Kif5a Regulates Mitochondrial Transport in Developing Retinal Ganglion Cells In Vitro.** *Investigative ophthalmology & visual science*
  Yokota, S., Shah, S. H., Huie, E. L., Wen, R. R., Luo, Z., Goldberg, J. L.
  2023; 64 (3): 4

- **Characterization of Primary Cilia Formation in Human ESC-Derived Retinal Organoids.** *Stem cells international*
  Ning, K., Luo, Z., Kowal, T. J., Tran, M., Majumder, R., Jarin, T. M., Wu, A. Y., Goldberg, J. L., Sun, Y.
  2023; 2023: 6494486

- **Elk-1 regulates retinal ganglion cell axon regeneration after injury.** *Scientific reports*
  Noro, T., Shah, S. H., Yin, Y., Kawaguchi, R., Yokota, S., Chang, K., Madaan, A., Sun, C., Coppola, G., Geschwind, D., Benowitz, L. I., Goldberg, J. L.
  2022; 12 (1): 17446

- **Preferential Loss of Contrast Decrement Responses in Human Glaucoma.** *Investigative ophthalmology & visual science*
  Norcia, A. M., Yakovleva, A., Jehangir, N., Goldberg, J. L.
  2022; 63 (11): 16

- **Nanomedicine and drug delivery to the retina: current status and implications for gene therapy.** *Naunyn-Schmiedeberg's archives of pharmacology*
  Tawfik, M., Chen, F., Goldberg, J. L., Sabel, B. A.

2022

- **Transcription factor network analysis identifies REST/NRSF as an intrinsic regulator of CNS regeneration in mice.** *Nature communications*
  Cheng, Y., Yin, Y., Zhang, A., Bernstein, A. M., Kawaguchi, R., Gao, K., Potter, K., Gilbert, H. Y., Ao, Y., Ou, J., Fricano-Kugler, C. J., Goldberg, J. L., He, et al
  2022; 13 (1): 4418

- **Structural and Metabolic Imaging after Short-term Use of the Balance Goggles System in Glaucoma Patients: A Pilot Study.** *Journal of glaucoma*
  Sun, M. T., Beykin, G., Lee, W. S., Sun, Y., Chang, R., Nunez, M., Li, K. Z., Knasel, C., Rich, C., Goldberg, J. L.
  2022

- **Investigating hyalocyte-like cells in epiretinal membranes using serially acquired optical coherence tomography**
  Soetikno, B., Miller, D., Zhang, H., Goldberg, J. L., Leng, T., Dubra, A.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Understanding RGC differentiation and development in retinal organoids by scRNA-seq**
  Luo, Z., Chang, K., Tanasa, B., Goldberg, J. L.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Nuclear localized HDAC4 increases retinal ganglion cell survival after optic nerve crush injury**
  Zhu, Y., Li, J., Bian, M., Xia, X., Nahmou, M., Sun, C., Goldberg, J. L., Kapiloff, M.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Automatic retinal layer segmentation of visible-light optical coherence tomography images using deep learning**
  Gopal, B., Zhang, T., Norcia, A., Goldberg, J. L., Dubra, A., Zhang, H., Soetikno, B.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Impact of Type 2 Diabetes Mellitus and Insulin Use on Progression to Glaucoma Surgery in Primary Open Angle Glaucoma**
  Sun, M. T., Pershing, S., Goldberg, J. L., Wang, S.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **In Vivo Evaluation of Naive and Diseased RGC Activities at Single-Cell Level**
  Li, L., Fang, F., Feng, X., Zhang, S., Miller, D., Zhuang, P., Huang, H., Liu, P., Liu, J., Sredar, N., Liu, L., Sun, Y., Duan, et al
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **State-level differences in duties permitted to be performed by medical assistants in the delivery of eye care**
  Reeves, M., Xue, J., Milstein, A., Tabin, G., Goldberg, J. L., Schulman, K.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Repeatability of swept-source optical coherence tomography angiography (SS-OCTA) metrics in healthy and glaucomatous eyes**
  Manivannan, N., Lee, G. C., Callan, T., Sandhoefner, B., Sung, K., Beykin, G., Trang, K., Lai, G., Wollstein, G., Ishikawa, H., Zambrano, R., Ede, E., Leung, et al
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **BDNF/TrkB activation and repolarization increase local translation of axonal targeting reporter mRNA in distal growth cones**
  Bian, M., Huie, E., Nahmou, M., Goldberg, J. L.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Multiscale imaging of mouse corneal endothelial cell damage induced by elevated intraocular pressure**
  Kweon, J., Zhang, Y., Brenner, B., Fang, R., Sun, C., Goldberg, J. L., Zhang, H.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Understanding RGC differentiation and development in retinal organoids by scRNA-seq**
  Luo, Z., Chang, K., Tanasa, B., Goldberg, J. L.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Nuclear localized HDAC4 increases retinal ganglion cell survival after optic nerve crush injury**
  Zhu, Y., Li, J., Bian, M., Xia, X., Nahmou, M., Sun, C., Goldberg, J. L., Kapiloff, M.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Automatic retinal layer segmentation of visible-light optical coherence tomography images using deep learning**
  Gopal, B., Zhang, T., Norcia, A., Goldberg, J. L., Dubra, A., Zhang, H., Soetikno, B.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Impact of Type 2 Diabetes Mellitus and Insulin Use on Progression to Glaucoma Surgery in Primary Open Angle Glaucoma**
  Sun, M. T., Pershing, S., Goldberg, J. L., Wang, S.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **In Vivo Evaluation of Naive and Diseased RGC Activities at Single-Cell Level**
  Li, L., Fang, F., Feng, X., Zhang, S., Miller, D., Zhuang, P., Huang, H., Liu, P., Liu, J., Sredar, N., Liu, L., Sun, Y., Duan, et al
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **State-level differences in duties permitted to be performed by medical assistants in the delivery of eye care**
  Reeves, M., Xue, J., Milstein, A., Tabin, G., Goldberg, J. L., Schulman, K.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2022

- **Solving neurodegeneration: common mechanisms and strategies for new treatments.** *Molecular neurodegeneration*
  Wareham, L. K., Liddelow, S. A., Temple, S., Benowitz, L. I., Di Polo, A., Wellington, C., Goldberg, J. L., He, Z., Duan, X., Bu, G., Davis, A. A., Shekhar, K., Torre, et al
  2022; 17 (1): 23

- **Proteomic screen reveals diverse protein transport between connected neurons in the visual system.** *Cell reports*
  Schiapparelli, L. M., Sharma, P., He, H., Li, J., Shah, S. H., McClatchy, D. B., Ma, Y., Liu, H., Goldberg, J. L., Yates, J. R., Cline, H. T.
  1800; 38 (4): 110287

- **Comparison of Iridocorneal Angle Assessments in Open-Angle Glaucoma and Ocular Hypertension Patients: Anterior Segment Optical Coherence Tomography and Gonioscopy.** *Clinical ophthalmology (Auckland, N.Z.)*
  Craven, E. R., Chopra, V., Goldberg, J. L., Marion, K. M., Chen, X., Chang, C., Chen, M. Y.
  2022; 16: 1301-1312

- **Neuroprotection in neurodegenerations of the brain and eye: Lessons from the past and directions for the future.** *Frontiers in neurology*
  Levin, L. A., Patrick, C., Choudry, N. B., Sharif, N. A., Goldberg, J. L.
  2022; 13: 964197

- **Fusogenic liposome-enhanced cytosolic delivery of magnetic nanoparticles.** *RSC advances*
  Chen, F., Bian, M., Nahmou, M., Myung, D., Goldberg, J. L.
  2021; 11 (57): 35796-35805

- **NF1 MUTATION DRIVES NEURONAL ACTIVITY-DEPENDENT OPTIC GLIOMA INITIATION**
  Pan, Y., Hysinger, J., Barron, T., Schindler, N., Cobb, O., Guo, X., Yalcin, B., Anastasaki, C., Mulinyawe, S., Ponnuswami, A., Scheaffer, S., Ma, Y., Chang, et al
  OXFORD UNIV PRESS INC.2021: 212

- **Deciphering the genetic architecture and ethnographic distribution of IRD in three ethnic populations by whole genome sequence analysis.** *PLoS genetics*
  Biswas, P., Villanueva, A. L., Soto-Hermida, A., Duncan, J. L., Matsui, H., Borooah, S., Kumarov, B., Richard, G., Khan, S. Y., Branham, K., Huang, B., Suk, J., Bakall, et al
  2021; 17 (10): e1009848

- **Nanoparticles as Cell Tracking Agents in Human Ocular Cell Transplantation Therapy** *CURRENT OPHTHALMOLOGY REPORTS*
  Mundy, D. C., Goldberg, J. L.
  2021

- **Repeatability of metrics from swept-source optical coherence tomography angiography (SS-OCTA) in normal and glaucomatous eyes**
  Durbin, M., Beykin, G., Callan, T., Trang, K., Michalec, G., Wollstein, G., Ishikawa, H., Sandhoefner, B., Zambrano, R., Lee, G., Ede, E., Leung, C., Goldberg, et al
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021

- **NF1 MUTATION DRIVES NEURONAL ACTIVITY-DEPENDENT OPTIC GLIOMA INITIATION**
  Pan, Y., Hysinger, J., Schindler, N., Cobb, O., Guo, X., Yalcin, B., Anastasaki, C., Mulinyawe, S., Ponnuswami, A., Scheaffer, S., Ma, Y., Chang, K., Xia, et al

OXFORD UNIV PRESS INC.2021: 31

- **Intravitreal delivery of AAV2 transduces porcine retinal ganglion cells**
  Heng, K., Li, B., Singh, A., Wen, R., Wu, A. Y., Goldberg, J. L.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- **Defining multiplicity of plasmid electroporation in the retina for high-throughput genetic screening**
  Woodworth, M., Wang, S., Goldberg, J. L., Greig, L.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- **Dynamic Transcriptional and Translational Profiling of Reactive Muller Glia Following Retinal Injury**
  Ashouri, M., Bhuckory, M., Nahmou, M., Hay, S., Knasel, C. M., Cameron, E. G., Wang, S., Palanker, D. V., Goldberg, J. L.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- **Examination of retrotransposon expression in optic neuropathies**
  Wen, R., Tanasa, B., Xia, X., Nahmou, M., Heng, K., Singh, A., Goldberg, J. L.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- **Single cell RNA sequencing of retinal ganglion cells with enhanced perinuclear cAMP signaling after optic nerve crush injury**
  Zhu, Y., Tanasa, B., Nahmou, M., Goldberg, J. L., Kapiloff, M.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- **Magnetic nanoparticles for subcellular organelle manipulation**
  Bian, M., Chen, F., Nahmou, M., Myung, D., Goldberg, J. L.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- **Rapid protocol for induced retinal ganglion cell differentiation from human stem cells**
  Luo, Z., Chang, K., Tanasa, B., Wernig, M., Goldberg, J. L.
  ASSOC RESEARCH VISION OPHTHALMOLOGY INC.2021
- **NF1 mutation drives neuronalactivity-dependent initiation of optic glioma.** *Nature*
  Pan, Y., Hysinger, J. D., Barron, T., Schindler, N. F., Cobb, O., Guo, X., Yalcin, B., Anastasaki, C., Mulinyawe, S. B., Ponnuswami, A., Scheaffer, S., Ma, Y., Chang, et al
  2021
- **Short-term Evaluation of Negative Pressure Applied by the Multi-Pressure Dial System to Lower Nocturnal IOP: A Prospective, Controlled, Intra-subject Study.** *Ophthalmology and therapy*
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