

Date Prepared: October 15, 2018

Name: Yin-Shan Eric Ng

Education

1991	B.A.	Biology	Boston University
1992	M.A.	Biotechnology	Boston University
2000	Ph.D.	Cell & Development Biology	Harvard Medical School

Postdoctoral Training

2000-2003	Post-doctorate Fellow	Vascular Biology	Schepens Eye Research Institute
2000-2003	Research Fellow	Department of Ophthalmology	Harvard Medical School

Additional Training

2004	Participant	The Laboratory Mouse in Vision Research Workshop	The Jackson Laboratory
2005	Participant	Management and Leadership Skills for Supervisors and Managers	National Seminars Group, Rock Hurst University Continuing Education Center, Inc.
2005	Participant	Bioinformatics for Biologists Mini-courses	Whitehead Institute for Biomedical Research
2008	Participant	Basic Training Course in Drug Development	Pharmaceutical Education & Research Institute, Inc.

Faculty Academic Appointments

2009-2013	Lecturer/Asst. Professor	ORBIT	UCL Institute of Ophthalmology
2013-	Assistant Professor	Ophthalmology	Harvard Medical School

Appointments at Hospitals/Affiliated Institutions:

2013-	Assistant Scientist	Ophthalmology	Schepens Eye Research Institute
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Other Professional Positions

2003-2004	Senior Research Scientist	(OSI) Eyetech
2004-2006	Senior Research Scientist, Group Leader	(OSI) Eyetech

Major Administrative Leadership Positions

Local

2006	Associate Director of Research	(OSI) Eyetech
2006-2009	Associate Director and Director of R&D	Pervasis Therapeutics

Committee Service

Local

2013-	Molecular Bases of Eye Diseases Training Program	Schepens Eye Research Institute Faculty Member
2013-	AMD Center of Excellence	Harvard Medical School Member
2016-	SERI Training Committee	Schepens Eye Research Institute Faculty Member
2016-	Intellectual Property & Commercial Ventures	Schepens Eye Research Institute Faculty Member

Professional Societies

2013-	Member	North American Vascular Biology Organization
2003-	Member	Association for Research in Vision and Ophthalmology

Editorial Activities

1999-	Reviewer	American Journal of Pathology and Microvascular Research
2009-	Reviewer	PLoS One Journal, Investigative Ophthalmology & Vision Science and Journal of Cell Transplantation
2013-	Reviewer	Experimental Eye Research, Cell Death & Disease -Nature

Honors and Prizes

1991	Selected Member	Golden Key National Honor Society
1991	Elected Member	Phi Beta Kappa Society
1991	Graduation With Distinction, summa cum laude	Boston University
1993-4	Cancer Research Award Fellowship	Cutaneous Biology Research Center, MGH
1995-6	John Stauffer Fellow	Harvard Medical School
1998	Student Prize	X th International Vascular Biology Meeting
2003	Business and Science Award	Eyetech Pharmaceuticals
2004	Inventor Achievement Award,	Eyetech Pharmaceuticals
2017	2017 HMS Leadership Development for Physicians and Scientists	Harvard Medical School
2018	2018 Young Mentor Award at Harvard Medical School	Harvard Medical School

Report of Funded and Unfunded Projects

Funding Information

Past

- 2010-2012 VEGF Mediated Retinal Neuroprotection: mechanistic studies and implications for the clinical use of VEGF antagonists.
MCR Project Grant
Principle Investigator
- 2010-2013 Anti-inflammatory and anti-thrombotic activities of a novel EC/matrix formulation.
Impact Studentship
Principle Investigator
- 2013-2013* The role of VEGF-A in retinal neuron survival in diabetic retinopathy: functional assessment and potential neuroprotection solutions
Diabetes UK Project Grant
Co-Principal Investigator
*Funding stopped upon completion of moving the Ng lab to the USA.
- 2014-2015 Developing a Novel Therapeutic for ROP by Targeting the Heparin-binding Domain of VEGF: Anti-inflammation and Normalization of the Hypoxic Retina
Curing Kids Research Grant
Principle Investigator
- 2014-2015 Developing a rodent model of PDR
Juvenile Diabetes Research Foundation
Principle Investigator
- 2015-2016 PPAR agonist protects RPE from degeneration—a potential therapy for dry AMD.
Principle Investigator
Grimshaw Foundation AMD Research Grant
Principle Investigator
- 2015-2017 TLR2 as a novel therapeutic target for CNV pathogenesis
Bright Focus Foundation AMD Research Grant
Principle Investigator
The objective of this proposal is to validate the functional role of toll-like receptor 2 (TLR2), a component of the innate immune system, in CNV pathogenesis, and to evaluate TLR2 as a novel, effective and safe therapeutic target for the treatment of CNV.
- 2016-2017 Developing a novel therapeutic for diabetic retinopathy by targeting the heparin-binding domain of VEGF: anti-inflammation and protection of the diabetic retina
Department of Defense PRMRP Discovery Award
Principle Investigator
The major goal is to determine the therapeutic potential of targeting the heparin-binding domain of VEGF for treating vascular inflammation associated with diabetic retinopathy.

Current

- 2017-2018 Microbial activation of TLR2 and oxidized lipids: a potential mechanism for CNV pathogenesis
Grimshaw Foundation AMD Research Grant
Principle Investigator
The major aim for this study is to validate a functional role of chronic TLR2 activation by oxidized lipids and bacterial infection in CNV pathogenesis.
- 2017-2018 Using the FDA-approved drug troglitazone to develop a novel pharmacotherapy for AMD
Edwin S. Webster Foundation
Principle Investigator
The major goal for this project is to determine the therapeutic potential of troglitazone and its analogs for dry AMD
- 2016-2021 Investigation of endomucin as a novel regulator of angiogenesis
NIH/NEI: 1R01EY028112-01A1 (D'Amore, PI)
Co-Investigator
The studies in the application aim to determine if endomucin also plays a role in pathologic angiogenesis and at understanding the mechanism by which endomucin regulates angiogenesis

Current Unfunded Projects

Mechanistic and translational research for neuro-vascular eye diseases including AMD, diabetic retinopathy, glaucoma, and retinopathy of prematurity: targeting inflammation, oxidative stress and the role of neuroprotection.

Report of Local Teaching and Training

Teaching of Students in Courses:

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| 2016- | Responsible Conduct of Research Discussion Group
HMS Graduate Students | Harvard Medical School
1.5 hr per wk for 5 wks |
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Formally Supervised Trainees:

Graduate Students:

- 2000-2002 Robyn Loureiro, Ph.D., Research Scientist, Shire Pharmaceuticals
Co-mentor, VEGF in endothelial cell morphogenesis
- 2003-2006 Dominik Krilleke, Ph.D., Post-doc Research Associate, UCL Institute of Ophthalmology
Co-mentor, The role of heparin-binding domain in VEGF biology
- 2003-2006 Sofia Ioannidou, Ph.D, Investment Associate, Edmond de Rothschild Investment Partners
Co-mentor, Endothelial cell fenestra biogenesis
- 2010-2014 Laura Paneghetti, Ph.D., UCL Institute of Ophthalmology
Supervisor, Study of the anti-inflammatory effects of a novel Endothelial Cell-matrix

2016-2018 Junhui Shen, M.D.
Supervisor, Neuroprotection for glaucoma using engineered VEGF
formulation: Identification, mechanism of action and therapeutic potential.

Medical Students:

1998-1999 Louis Ngyuen, MD, Associate Professor, Brigham's and Women's Hospital
Regulation of VEGF expression in development and disease.

Ph.D. Scientist:

2004-2006 Vladimir Mastuyugin, Ph.D.
Role of PDGF in vascular pathogenesis and new therapeutic target discovery platform development

2004-2006 Tracy Mitchell, Ph.D., Principal Scientist, Discovery Pharmacokinetics, Adnexus Therapeutics, a Bristol-Myers Squibb R&D Company
PDGF and TGF-beta target validation and novel markers discovery studies for ocular pathologies

2003-2006 Lichun Zhong, M.D., Ph.D., Study Director, Toxikon
Retinal neuroprotection by erythropoietin and neuroprotective function of endogenous and exogenous VEGF in OHT glaucoma

2006-2009 Robert Tijin, Ph.D., Senior Scientist, Celgene
New diseases target discovery and validation for Vascugel and development of a novel Vascugel formulation for long-term storage

2007-2008 Shai Schubert, Ph.D., CEO at Cellora LLC, Boston MA
Determination of Vascugel therapeutic potential for nerve repair and to establish an in vitro nerve repair assay

Postdoctoral Fellows:

2003-2006 Kazuaki Nishijima, M.D., Ph.D., Department of Ophthalmology, Kyoto University Graduate School of Medicine
Retinal neuroprotective role of VEGF in ischemia reperfusion injury and the pro-inflammatory activity of VEGF heparin-binding domain

2013-2015 Zhang Yong, M.D., Department of Ophthalmology Center, Shiyan Taihe hospital, Hubei University of Medicine, Hubei Province, China
TLR2 signaling in RPE inflammation: functional role in AMD pathogenesis

2014-2016 Lili Feng, M.D., Ph.D., Department of Ophthalmology, EYE and ENT Hospital of Fudan University, Shanghai, China
The functional role of toll-like receptor 2 (TLR2) in the pathogenesis of choroidal neovascularization (CNV)

2014-2017 Ashley Mackey, Ph.D., Senior Scientist at NightStar Therapeutics, Boston, MA
To develop a novel protein-based therapeutic for proliferative retinopathy and retinopathy of prematurity using the purified heparin-binding domain (HBD) of vascular endothelial growth factor A (VEGF-A)

2016- Franco Rossato, Ph.D.

2017- The role of fibrosis in CNV pathogenesis.
Yu Su, M.D., Ph.D.
To investigate the role of microbial activation of TLR2 and oxidized lipids as a potential mechanism for CNV pathogenesis.

Postdoctoral Associates:

2009-2013 Richard Foxton, Ph.D., UCL Institute of Ophthalmology
VEGF-A mediated retinal neuroprotection: mechanistic studies and implications for the clinical use of VEGF antagonists

2009-2012 Nori Nagai, M.D., Ph.D., Keio university
Characterization of a novel spontaneous choroidal neovascularization (CNV) mouse model and the role of CCR3 in CNV development and progression.

2009-2013 Peter Lundh, Ph.D., UCL Institute of Ophthalmology
Novel uveal depot dosing of receptor tyrosine kinase inhibitors (RTKI) for choroidal neovascularization and the therapeutic potential of anti-amyloid beta antibody for dry AMD.

2011-2013 Daiju Iwata, M.D., Ph.D., UCL Institute of Ophthalmology
Toll-like receptors (TLR) in modulating inflammatory cells in choroidal neovascularization, and functional and mechanistic study for novel therapeutics for uveitis.

2013-2013 Meihua Ju, Ph.D., UCL Institute of Ophthalmology
The role of Toll-like receptors in choroidal neovascularization (CNV) and the therapeutic potential of anti-CCR3 in CNV

Report of Regional, National and International Invited Teaching and Presentations

Invited Presentations and Courses

Regional

***Those presentations below sponsored by outside entities through an honorarium are so noted and the sponsor is identified.**

2008 “RGS5: A quantitative marker of vascular stability and validation of a combination therapy strategy for anti-angiogenesis”
The Antiangiogenesis Foundation’s 6th Annual International Conference, Cambridge, MA

*2012 “We are still developing an understanding of the roles of VEGF-A in DME and DR”
VISIONGAIN 6th Annual Diabetes Conference, London, United Kingdom
“VEGF and beyond”, Scientific Symposium, Novartis Pharma, Berlin, Germany

2016 “Target validation for anti-inflammation for choroidal neovascularization”
AMD CoE Seminar, Schepens Eye Research Institute and Mass Eye and Ear

2016 “Studying the inflammatory role of VEGF in retinal vascular pathology”
Department of Ophthalmology Annual Meeting/Alumni Reunion, Harvard Medical School

2016 “Studying the inflammatory role of VEGF in retinal vascular pathology”

Boston Angiogenesis Meeting

- 2016 “Anti-inflammation for choroidal neovascularization: TLR2 as a potential therapeutic target”
AMD CoE Seminar, Schepens Eye Research Institute of Mass Eye and Ear
- 2017 “The role of endothelial-to-mesenchymal transition in neovascular AMD: Implications for anti-VEGF therapies”
Departmental Seminar, Schepens Eye Research Institute of Mass Eye and Ear

National

- 2005 “Nerve-Vessel Interactions in Vascular Patterning”
American Heart Association Scientific Sessions, Dallas, Texas

International

- 2012 “Model Systems for Studying Vascular Growth and Barrier Function”
Keystone Symposium *Angiogenesis: Advances in Basic Science and Therapeutic Applications*, Snowbird, Utah
- 2012 “Probing the neuroprotective function of VEGF-A for retinal neurons”
XX Biennial Meeting of the International Society for Eye Research, Berlin, Germany
- 2015 “The Vascular landscape in macular disease”
Advanced Retinal Therapy, Vienna, Austria
- 2015 “Investigating the diverse functional roles of VEGF-A in the retina: implication for anti-VEGF-A therapeutics for diabetic retinopathy”
Biology of Ophthalmology 2015, The Chinese University Hong Kong, Hong Kong
- 2016 Moderator for the section entitled “Inflammation”
International Biennial Symposium on AMD 2016, Boston, MA.

Report of Technological and Other Scientific Innovations

Sterically Enhanced Antagonist Aptamer Conjugates (Shrubbery)	Patent Application, 60/561,601, filed on April 13, 2005
Sequencing of Modified Nucleic Acid Molecules	Patent Application, 60/590,601, filed July 19, 2005 (Enzymatic Sequencing of a Pegylated Modified RNA Aptamer)
VEGF Variants	Patent Application, 60/676,355, filed on April 28, 2006
Materials and Methods for Managing Bone Healing	Patent Application, 61/066,933, filed on August 8, 2008
Materials and Methods for Treating and Managing Wounds and the Effects of Trauma	Patent Application, 61/067,013, filed on August 8, 2008
Materials and Methods for Treating and Managing Angiogenesis-Mediated Diseases	Patent Application, 60/967,029, filed on November 7, 2007
Materials and Methods for Treating Nerve Damage	Patent Application, PCT/US08/4073, filed on March

and Promoting Nerve Repair and Regeneration	28, 2008
Methods and devices for minimally-invasive delivery of cell-containing flowable compositions.	Patent Application, 20100185156, filed on June 13, 2008
Materials and methods for treating skeletal system damage and promoting skeletal system repair.	Patent Application, 2009/020651, filed on August 8, 2008
Methods for treatment and/or prevention of eye diseases and disorders by inhibition of CCR3	Patent Application, PU65058, filed on November 20, 2012
PPAR-gamma Selective Agonists for Inhibition of Retinal Pigment Epithelium Degeneration or Geographic Atrophy	Patent Application, Provisional, Docket Number 36770-551P01US, filed on April 4, 2016
Compounds and compositions for inhibiting retinal pigment epithelium degeneration and methods using the same	Patent Application, Provisional, Docket Number 36770-652P01US, filed on October 4, 2017
Engineered VEGF variants for retinal neuroprotection, promotion of axon growth and axon regeneration	Patent Application, Provisional, Docket Number 036770-573P01US, filed on March 5, 2018

Report of Scholarship

Peer reviewed publications in print or other media

1. Frebourg T, Barbier N, Kassel J, Ng **YS**, Romero P, Friend SH: A functional screen for germ line p53 mutations based on transcriptional activation. *Cancer research* 1992, 52:6976-8. PMID: 1458490
2. Frebourg T, Sadelain M, Ng **YS**, Kassel J, Friend SH: Equal transcription of wild-type and mutant p53 using bicistronic vectors results in the wild-type phenotype. *Cancer research* 1994, 54:878-81. PMID: 8313374
3. Shima DT, Kuroki M, Deutsch U, Ng **YS**, Adamis AP, D'Amore PA: The mouse gene for vascular endothelial growth factor. Genomic structure, definition of the transcriptional unit, and characterization of transcriptional and post-transcriptional regulatory sequences. *The Journal of biological chemistry* 1996, 271:3877-83. PMID: 8632007
4. Carmeliet P, Ng **YS**, Nuyens D, Theilmeier G, Brusselmans K, Cornelissen I, Ehler E, Kakkar VV, Stalmans I, Mattot V, Perriard JC, Dewerchin M, Flameng W, Nagy A, Lupu F, Moons L, Collen D, D'Amore PA, Shima DT: Impaired myocardial angiogenesis and ischemic cardiomyopathy in mice lacking the vascular endothelial growth factor isoforms VEGF164 and VEGF188. *Nature medicine* 1999, 5:495-502. PMID: 10229225
5. D'Amore, P., Ng, **Y.-S.**, and Darland, D. (1999). Angiogenesis. (invited review) *Science & Medicine* May/June, 44-53.
6. Ng **YS**, D'Amore PA: Therapeutic angiogenesis for cardiovascular disease. *Current controlled trials in cardiovascular medicine* 2001, 2:278-85. PMID: 11806814

7. **Ng YS**, Rohan R, Sunday ME, Demello DE, D'Amore PA: Differential expression of VEGF isoforms in mouse during development and in the adult. *Developmental dynamics : an official publication of the American Association of Anatomists* 2001, 220:112-21. PMID: 11169844
8. D'Amore PA, **Ng YS**: Tales of the cryptic: unveiling more angiogenesis inhibitors. *Trends in molecular medicine* 2002, 8:313-5. PMID: 12114105
9. D'Amore PA, **Ng YS**: Won't you be my neighbor? Local induction of arteriogenesis. *Cell* 2002, 110:289-92. PMID: 12176316
10. Galambos C, **Ng YS**, Ali A, Noguchi A, Lovejoy S, D'Amore PA, DeMello DE: Defective pulmonary development in the absence of heparin-binding vascular endothelial growth factor isoforms. *American journal of respiratory cell and molecular biology* 2002, 27:194-203. PMID: 12151311
11. Stalmans I, **Ng YS**, Rohan R, Fruttiger M, Bouche A, Yuce A, Fujisawa H, Hermans B, Shani M, Jansen S, Hicklin D, Anderson DJ, Gardiner T, Hammes HP, Moons L, Dewerchin M, Collen D, Carmeliet P, D'Amore PA: Arteriolar and venular patterning in retinas of mice selectively expressing VEGF isoforms. *The Journal of clinical investigation* 2002, 109:327-36. PMID: 11934855
12. Zelzer E, McLean W, **Ng YS**, Fukai N, Reginato AM, Lovejoy S, D'Amore PA, Olsen BR: Skeletal defects in VEGF(120/120) mice reveal multiple roles for VEGF in skeletogenesis. *Development* 2002, 129:1893-904. PMID: 11934855
13. Ishida S, Usui T, Yamashiro K, Kaji Y, Amano S, Ogura Y, Hida T, Oguchi Y, Ambati J, Miller JW, Gragoudas ES, **Ng YS**, D'Amore PA, Shima DT, Adamis AP: VEGF164-mediated inflammation is required for pathological, but not physiological, ischemia-induced retinal neovascularization. *The Journal of experimental medicine* 2003, 198:483-9. PMID: 12900522
14. Chang R, Andreoli S, **Ng YS**, Truong T, Smith SR, Wilson J, D'Amore PA: VEGF expression is downregulated in nitrofen-induced congenital diaphragmatic hernia. *Journal of pediatric surgery* 2004, 39:825-8. PMID: 15185205
15. **Ng YS**, Ramsauer M, Loureiro RM, D'Amore PA: Identification of genes involved in VEGF-mediated vascular morphogenesis using embryonic stem cell-derived cystic embryoid bodies. *Laboratory investigation; a journal of technical methods and pathology* 2004, 84:1209-18. PMID: 15220937
16. Lee JH, Canny MD, De Erkenez A, Krilleke D, **Ng YS**, Shima DT, Pardi A, Jucker F: A therapeutic aptamer inhibits angiogenesis by specifically targeting the heparin binding domain of VEGF165. *Proceedings of the National Academy of Sciences of the United States of America* 2005, 102:18902-7. PMID: 16357200
17. Ioannidou S, Deinhardt K, Miotla J, Bradley J, Cheung E, Samuelsson S, **Ng YS**, Shima DT: An in vitro assay reveals a role for the diaphragm protein PV-1 in endothelial fenestra morphogenesis. *Proceedings of the National Academy of Sciences of the United States of America* 2006, 103:16770-5. PMID: 17075074
18. **Ng YS**, Krilleke D, Shima DT: VEGF function in vascular pathogenesis. *Experimental cell research* 2006, 312:527-37. PMID: 16330026

19. Krilleke D, DeErkenez A, Schubert W, Giri I, Robinson GS, **Ng YS**, Shima DT: Molecular mapping and functional characterization of the VEGF164 heparin-binding domain. *The Journal of biological chemistry* 2007, 282:28045-56. PMID: 17626017
20. Nishijima* K, **Ng* YS**, Zhong L, Bradley J, Schubert W, Jo N, Akita J, Samuelsson SJ, Robinson GS, Adamis AP, Shima DT (*equal contributors): Vascular endothelial growth factor-A is a survival factor for retinal neurons and a critical neuroprotectant during the adaptive response to ischemic injury. *The American journal of pathology* 2007, 171:53-67. PMID: 17591953
21. Zhong L, Bradley J, Schubert W, Ahmed E, Adamis AP, Shima DT, Robinson GS, **Ng YS**: Erythropoietin promotes survival of retinal ganglion cells in DBA/2J glaucoma mice. *Investigative ophthalmology & visual science* 2007, 48:1212-8. PMID: 17325165
22. Mitchell TS, Bradley J, Robinson GS, Shima DT, **Ng YS**: RGS5 expression is a quantitative measure of pericyte coverage of blood vessels. *Angiogenesis* 2008, 11:141-51. PMID: 18038251
23. Krilleke D, **Ng YS**, Shima DT: The heparin-binding domain confers diverse functions of VEGF-A in development and disease: a structure-function study. *Biochemical Society transactions* 2009, 37:1201-6. PMID: 19909247
24. Nugent HM, **Ng YS**, White D, Groothuis A, Kanner G, Edelman ER: Delivery site of perivascular endothelial cell matrices determines control of stenosis in a porcine femoral stent model. *Journal of vascular and interventional radiology : JVIR* 2009, 20:1617-24. Epub 2009 Oct 24. PMC2788031
25. Nugent HM, **Ng YS**, White D, Groothuis A, Kanner G, Edelman ER: Ultrasound-guided percutaneous delivery of tissue-engineered endothelial cells to the adventitia of stented arteries controls the response to vascular injury in a porcine model. *Journal of vascular surgery* 2012, 56:1078-88. PMC3762489
26. Foxton RH, Finkelstein A, Vijay S, Dahlmann-Noor A, Khaw PT, Morgan JE, Shima DT, **Ng YS**: VEGF-A is necessary and sufficient for retinal neuroprotection in models of experimental glaucoma. *The American journal of pathology* 2013, 182:1379-90. PMC3608027
27. Catchpole I, Germaschewski V, Hoh Kam J, Lundh von Leithner P, Ford S, Gough G, Adamson P, Overend P, Hilpert J, Lopez FJ, **Ng YS**, Coffey P, Jeffery G: Systemic administration of Abeta mAb reduces retinal deposition of Abeta and activated complement C3 in age-related macular degeneration mouse model. *PloS one* 2013, 8:e65518. PMC3682980
28. Robbie SJ, Lundh von Leithner P, Ju M, Lange CA, King AG, Adamson P, Lee D, Sychterz C, Coffey P, **Ng YS**, Bainbridge JW, Shima DT: Assessing a novel depot delivery strategy for noninvasive administration of VEGF/PDGF RTK inhibitors for ocular neovascular disease. *Investigative ophthalmology & visual science* 2013, 54:1490-500. PMID: 23385800
29. Nagai N, Lundh von Leithner P, Izumi-Nagai K, Hosking B, Chang B, Hurd R, Adamson P, Adamis AP, Foxton RH, **Ng YS**, Shima DT: Spontaneous CNV in a novel mutant mouse is associated with early VEGF-A-driven angiogenesis and late-stage focal edema, neural cell loss, and dysfunction. *Investigative ophthalmology & visual science* 2014, 55:3709-19. PMID: 24845632

30. Bunker S, Holeniewska J, Vijay S, Dahlmann-Noor A, Khaw P, **Ng YS**, Shima D, Foxton R: Experimental glaucoma induced by ocular injection of magnetic microspheres. *Journal of visualized experiments* : JoVE 2015.
31. Nagai N, Ju M, Izumi-Nagai K, Robbie SJ, Bainbridge JW, Gale DC, Pierre E, Krauss AH, Adamson P, Shima DT, **Ng YS**: Novel CCR3 Antagonists Are Effective Mono- and Combination Inhibitors of Choroidal Neovascular Growth and Vascular Permeability. *The American journal of pathology* 2015, 185:2534-49. PMID: 26188133
32. Foxton R, Osborne A, Martin KR, **Ng YS**, Shima DT: Distal retinal ganglion cell axon transport loss and activation of p38 MAPK stress pathway following VEGF-A antagonism. *Cell death & disease* 2016, 7:e2212. PMC4917649
33. Paneghetti L, **Ng YS**: A novel endothelial-derived anti-inflammatory activity significantly inhibits spontaneous choroidal neovascularisation in a mouse model. *Vascular cell* 2016, 8:2. PMC4864930.
34. Feng L, Ju M, Lee KYV, Mackey A, Evangelista M, Iwata D, Adamson P, Lashkari K, Foxton R, Shima D, **Ng YS**: A pro-inflammatory function of toll-like receptor 2 in the retinal pigment epithelium as a novel target for reducing choroidal neovascularization in age-related macular degeneration. *The American journal of pathology* 2017, 187:2208-21. PMID: 28739342
35. Park-Windhol C, **Ng YS**, Yang J, Primo V, Saint-Geniez M, D'Amore PA: Endomucin inhibits VEGF-induced endothelial cell migration, growth, and morphogenesis by modulating VEGFR2 signaling. *Scientific Reports*. 2017 Dec 7;7(1):17138. PMCID: [PMC5719432](https://pubmed.ncbi.nlm.nih.gov/28739342/)
36. Shen J, Xiao R, Bair J, Wang F, Vandenberghe LH, Dartt D, Baranov P, **Ng YS**: Novel engineered, membrane-localized variants of vascular endothelial growth factor (VEGF) protect retinal ganglion cells: a proof-of-concept study. *Cell Death and Disease* (2018)9:1018. DOI 10.1038/s41419-018-1049-0

Non-peer reviewed scientific or medical publications/materials in print or other media

Ng, Y-S, The biology of VEGF isoforms. *VEGF and Development*, Chapter eds. Ruhrberg C, Landes Biosciences, Inc. London, England, 2008.

Thesis

Ng, Y-S, “Differential Roles of Vascular Endothelial Growth Factor (VEGF) Isoforms in Vascular Development”

Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings (Since 2011)

International

2011 “Spontaneous CNV In A Novel Mutant Mouse Is Associated With Early Chorio-retinal

- Para-inflammation And VEGF Driven Angiogenesis”
 “Assessing delivery strategies for non-invasive administration of VEGF/PDGF RTK inhibitors for ocular neovascular disease”
 “Direct VEGF-A Mediated Neuroprotection: Mechanistic Studies in RGCs”
 Association for Research in Vision and Ophthalmology (ARVO) Conference, Poster presentations, Fort Lauderdale, Florida
- 2012 “Anti-inflammatory effects of a novel endothelial cell/matrix formulation-conditioned media”
 17th International Vascular Biology Meeting, Poster presentation, Wiesbaden, Germany
- 2012 “Direct Neuroprotection by Exogenous and Endogenous VEGF-A in in vivo Models of Glaucoma”
 “CCR3 Antagonists Are Effective Mono- And Combination Inhibitors Of CNV Growth And Vascular Permeability”
 Association for Research in Vision and Ophthalmology (ARVO) Conference, Poster presentations, Fort Lauderdale, Florida
- 2013 “Towards live assessment of human leukocyte dynamics in retinal disease with fluorescein-labelled peripheral blood mononuclear cells”
 “Development of the Rodent Inner Blood-Retinal-Barrier”
 Association for Research in Vision and Ophthalmology (ARVO) Conference, Poster presentations, Seattle, Washington
- 2014 “VEGF antagonism accelerates RGC apoptosis in diabetic mice, and also inhibits axonal transport in normal retina”
 “Functional role of TLR in choroidal neovascularization”
 Association for Research in Vision and Ophthalmology (ARVO) Conference, Poster presentations, Orlando, Florida
- 2015 “Novel CCR3 antagonists are effective mono- and combination inhibitors of CNV growth and vascular permeability”
 Endomucin Plays a Role in Developmental Retinal Vascularization and in VEGF-Induced Endothelial Cell Migration, Growth, and Morphogenesis In Vitro
 Association for Research in Vision and Ophthalmology (ARVO) Conference, Poster presentations, Denver, CO
- 2016 “Characterization of VEGF165 induced retinal inflammation in vitro”
 “Endomucin inhibits VEGF-induced endothelial cell migration, growth, and morphogenesis by suppressing VEGFR2 signaling”
 Association for Research in Vision and Ophthalmology (ARVO) Conference, Poster presentations, Seattle, WA
- 2016 “Endomucin controls retinal vascular development by modulating VEGFR2 signaling”
 “A new insight to VEGF induced retinal inflammation”
 19th International Vascular Biology Meeting, Poster presentations, Boston, MA
- 2017 “The role of fibrosis and endothelial mesenchymal transition in choroidal neovascularization pathogenesis”
 “The PPAR- γ agonist troglitazone protects RPE cells from oxidized LDL induced NLRP3-

inflammasome-mediated cell death”

Association for Research in Vision and Ophthalmology (ARVO) Conference, Poster presentations, Baltimore, MD

2018

“Targeting endothelial-to-mesenchymal transition (EndMT) driven fibrosis for choroidal neovascularization (CNV) in age-related macular degeneration (AMD)”

“Systematic treatment with trimethoprim/sulfamethoxazole (Ditrim) significantly inhibits spontaneous choroidal neovascularization (sCNV) in a mouse model”

“Novel engineered VEGF variant for glaucoma”

Association for Research in Vision and Ophthalmology (ARVO) Conference, Poster presentations, Honolulu, HI

Narrative Report (limit to 500 words)

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For more than fifteen years, my research has focused on understanding the molecular regulation of neovascularization both in normal development and pathological conditions. For nearly seven of those years I was directly involved in the development of novel therapeutics in the biotech industry. Upon my return to academia at UCL Institute of Ophthalmology in London in 2009 as a Lecturer, I worked on therapeutic targets discovery and drug development research for age-related macular degeneration (AMD) with an industrial partner, GSK. Since I joined the Schepens Eye Research of Mass Eye and Ear in 2013 as an Assistant Professor of Ophthalmology, I have expanded my research effort to study the pathogenesis of AMD with a particular focus on the role of RPE dysfunction. My current research projects include investigating the neuroprotective function of endogenous VEGF-A in glaucoma; identifying novel targets for anti-inflammation in neovascular AMD, diabetic retinopathy and retinopathy of prematurity; and, characterizing FDA-approved drugs as potential therapeutics for dry AMD.

In addition to my research efforts, my academic goal is to mentor the next generation of research scientists. I have successfully mentored and trained nearly twenty graduate and medical students, postdoctoral fellows and associates. Some of these trainees have moved on to successful positions such as Associate Professor of Surgery at Brigham & Women’s Hospital, Principal Scientist at Bristol-Myers Squibb, Senior Scientist at Cegene, and CEO of Cellora. Since returning to academia, I have been awarded research grants from the UK government, the US Department of Defense, as well as non-profit research foundations such as the BrightFocus Foundation to support my translational ophthalmology research, and my efforts in mentoring young scientists.

I have received recognition for my work both here and abroad. The VEGF isoform-specific mouse lines that I created are being used worldwide for VEGF research. While at OSI Eyetech, I established a novel method to verify the base sequence of modified RNA-based aptamer for QC/QA purposes. I also pioneered an injectable formulation of Vascugel™, the first key product of Pervasis Therapeutics, to prevent arteriovenous grafts and fistulae failure for patients undergoing hemodialysis. My contributions include publications in high impact journals such as *Nature Medicine*, *Cell*, *Journal of Clinical Investigation*, and *Journal of Experimental Medicine*. My first-author paper entitled, “Differential expression of VEGF isoforms in mouse during development and in the adult,” which appeared in *Developmental Dynamics* in 2001, has received 288 citations. Another first author paper published in the *American Journal of Pathology* in 2007 entitled, “Vascular endothelial growth factor-A is a survival factor for retinal neurons and a critical neuroprotectant during the adaptive response to ischemic injury,” has 316 citations. My invited presentations include the Annual Diabetes Conference, the American Heart

Association Scientific Sessions, and international conferences such as the Keystone Symposium and the XX Biennial Meeting of the International Society for Eye Research. As a reflection of my standing, I am a Reviewer for *Microvascular Research*, *American Journal of Pathology*, *PLoS One Journal*, and *Investigative Ophthalmology & Vision Science*.