Curriculum Vitae
Rajendra S. Apte, MD, PhD
January 27, 2016

Personal Information:

a. Sex: Male
b. Date of Birth: April 26, 1969
c. Place of Birth: Mumbai, India

Citizenship:

USA

Address:

Office: Department of Ophthalmology & Visual Sciences
Washington University School of Medicine
660 South Euclid Avenue, Campus Box 8096
St. Louis, Missouri 63110
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Present Position:

Paul A. Cibis Distinguished Professor, Department of Ophthalmology & Visual Sciences
Professor, Department of Developmental Biology and Neurosciences
Professor, Department of Medicine
Professor, Neuroscience Graduate Program
Director, Translational Research
Director, Jeffrey Fort Innovation Fund
Washington University School of Medicine, St. Louis, Missouri

Education:

Undergraduate:

1984 – 1986 University of Bombay
Pre-Med
HSC Pre-Med Certification

Medical School:

1986 – 1992 M.D., University of Bombay

Graduate:

1992 – 1997	Ph.D., Division of Cellular and Molecular Biology Graduate Program in Immunology, University of Texas, Southwestern Medical Center, Dallas, Texas Director: Jerry Y. Niederkorn, Ph.D. Ph.D. Dissertation: *"The Role of Aqueous Humor in Maintaining Immune Privilege in the Anterior Chamber of the Eye"*

Postgraduate:

1997 – 1998	Transitional Internship Parkland Memorial Hospital, Dallas, Texas
1998 – 2001	Ophthalmology Residency University of Texas, Southwestern Medical Center, Dallas, Texas
2001 – 2002	Clinical Associate, Retinal Vascular Center Clinical Fellow, Wilmer Ophthalmological Institute The Johns Hopkins University School of Medicine, Baltimore, Maryland
2002 – 2003	Clinical Associate, Vitreoretinal Division Clinical Fellow, Wilmer Ophthalmological Institute The Johns Hopkins University School of Medicine, Baltimore, Maryland

Academic Positions/Employment:

2003 – 2009	Assistant Professor, Ophthalmology & Visual Sciences Department of Developmental Biology Washington University School of Medicine, St. Louis, Missouri
2010 – 2012	Associate Professor *with Tenure*, Ophthalmology & Visual Sciences Department of Developmental Biology Washington University School of Medicine, St. Louis, Missouri
2013 – Present	Paul A. Cibis Distinguished Professor, Department of Ophthalmology & Visual Sciences Professor, Department of Developmental Biology Professor, Neuroscience Graduate Program Director of Education Washington University School of Medicine, St. Louis, Missouri
2015 – Present	Paul A. Cibis Distinguished Professor, Department of Ophthalmology & Visual Sciences Professor, Department of Developmental Biology

	Professor, Neuroscience Graduate Program Professor of Medicine Director of Translational Research Washington University School of Medicine, St. Louis, Missouri
2015 – Present	Global Guest Professor Keio University Tokyo, Japan

University and Hospital Appointments and Committees:

2005 – 2007	Human Studies Committee Member Human Research Protection Office Washington University School of Medicine, St. Louis, Missouri
2008 – 2009	Lacey Research Chair Advisory Committee Department of Ophthalmology & Visual Sciences Washington University School of Medicine, St. Louis, Missouri
2008 – 2011	Management Committee Member Barnes Retina Institute, St. Louis, Missouri
2012 – Present	Research Advisory Council Department of Ophthalmology & Visual Sciences Washington University School of Medicine, St. Louis, Missouri
2013 – 2015	Clinical Representative Executive Committee of the Faculty Council Washington University School of Medicine, St. Louis, Missouri
2015 – Present	Diabetic Cardiovascular Disease Center Member Department of Diabetic Cardiovascular Disease Washington University School of Medicine, St. Louis, Missouri

National and International Committees:

2009 – 2011	Ad hoc Task Group Member ASTRO Evaluation Subcommittee Evaluation of Radiotherapy Wet Macular Degeneration
2010 – 2012	Annual Meeting Program Committee Member American Academy of Ophthalmology
2012 – 2014	Executive Committee Member The Macula Society

2015 – Present	Ad hoc Member NEI Study Section ZEY1 VSN(02) NEI Career Development Award
2016 – 2018	ASCRS Retina Clinical Committee Member

Medical Licensure and Board Certification:

1996	USMLE Certification
2001 - 2003	Maryland Medical License Number D0057066 (expired)
2003 – Current	American Board of Ophthalmology
2003 – Current	Missouri Medical License Number 2003010758 (active)
2003 – Current	Illinois Medical License Number 36102090 (active)

Military Service:

None

Honors and Awards:

Medical College:

1992	State Board Distinction in Ophthalmology
1992	State Board Distinction in Otolaryngology

Graduate School:

1994	Sigma Xi Research Grant
1995	Sigma Xi Graduate Student Research Forum
1995	Western Associate for Research in Vision and Ophthalmology (ARVO) Travel Fellowship
1997	Immunology Program Nominee for the Nominata Award University of Texas, Southwestern Medical Center, Dallas, Texas
1997	Graduate School Dean's Discretionary Award University of Texas, Southwestern Medical Center, Dallas, Texas

Ophthalmology Residency:

1998	AAPI Resident Award
1999	Association for University Professors of Ophthalmology (AUPO)

1999	Alumni Day Best Resident Research Award University of Texas, Southwestern Medical Center, Dallas, Texas
2001	AUPO Resident and Fellow Research Forum Award
2001	Charles L. Schepens International Retina Society Research Award
2001	Top Program OKAP Score
2001	Alumni Day Best Resident Research Award University of Texas, Southwestern Medical Center, Dallas, Texas

Retinal Vascular and Vitreoretinal Fellowship:

2002	W. Richard Green House Staff Medical Student Teaching Award
2002	ARVO/National Eye Institute Travel Fellowship Grant
2002	National Medical Association Ophthalmology Research Award

Faculty:

2003	Fellow, American Academy of Ophthalmology
2004	Research to Prevent Blindness Career Development Award
2005	Washington University Nominee for the Ellison Foundation New Scholars Award in Aging
2008	American Retina Foundation Research Award
2009	Elected to the Retina Society and Macula Society
2010	Macula Society Retina Research Foundation Cox Research Award
2011	American Academy of Ophthalmology Senior Achievement Award
2012	Elected to Club Jules Gonin
2013	Macula Society Young Investigator Award
2013	Research Teacher of the Year Award Washington University School of Medicine, St. Louis, Missouri
2014	Carl Camras Translational Research Award

2014	ASRS Presidents' Young Investigator Award
2014	Senior Honor Award – ASRS
2014	Research to Prevent Blindness Sybil B. Harrington Physician-Scientist Award for Macular Degeneration
2014	Alpha Omega Alpha Honor Medical Society Washington University School of Medicine, St. Louis, Missouri

Editorial Responsibilities:

Academic Editor:

Plos One

Ad-Hoc Reviewer:

American Journal of Ophthalmology
American Journal of Pathology
Archives of Ophthalmology
British Journal of Ophthalmology
Clinical Ophthalmology
Current Eye Research
Developmental Dynamics
Eye
Experimental Eye Research
Foundation Fighting Blindness – UK
Graefe's Archives for Clinical and Experimental Ophthalmology
Investigative Ophthalmology
Journal of Clinical Investigation
Journal of Immunology
Journal of Leukocyte Biology
Medical Science Monitor
Nature Gene Therapy
Ocular Immunology and Information
Ophthalmology
Rejuvenation Research
Retina
Retrovirology
Science Translational Medicine

Professional Societies and Organizations:

American Academy of Ophthalmology

American Society for Clinical Investigation
American Society of Retina Specialists
Association for Research in Vision and Ophthalmology
Club Jules Gonin
Macula Society
Retina Society
St. Louis Metropolitan Medical Society
St. Louis Ophthalmological Society

Major Invited Professorships and Lectureships:

1. *"Aqueous humor inhibits natural killer cell activity in vitro through a factor other than TGF beta."* AAPI; Atlanta, Georgia, 1994.

2. *"Role of aqueous humor in maintaining ocular immune privilege."* AAPI; Dallas, Texas, 1998.

3. *"Etiology of blindness in an urban community hospital setting and implications for public health policy."* AAO/PAAO Joint Meeting; Orlando, Florida, 1999.

4. *"Angiostatin produced by certain primary uveal melanomas impedes the development of distant metastases in vivo."* AUPO; Dallas, Texas, 2001.

5. *"Angiostatin produced by certain primary uveal melanomas impedes the development of liver metastases."* Schepens International Society; Las Vegas, Nevada, 2001.

6. *"Angiostatin and human uveal melanoma metastases in vivo."* International Congress of Ocular Oncology; Amsterdam, the Netherlands, 2001.

7. *"Etiology of blindness in an urban, racially diverse community hospital setting."* National Medical Association; Honolulu, Hawaii, 2002.

8. *"Current treatments in age-related macular degeneration."* Department of Ophthalmology – University of Texas, Southwestern Medical School; Dallas, Texas, 2004.

9. *"Current and future treatments in AMD."* Anheuser Bush Eye Institute, Saint Louis University; St. Louis, Missouri, December 2004.

10. *"Diabetic retinopathy: Harbinger of end-organ damage."* Washington University School of Medicine Diabetes P20 Forum; St. Louis, Missouri, December 2004.

11. *"Management of AMD."* Washington University Ophthalmic Technician Update; St. Louis, Missouri, December 2004.

12. *"Combination therapy in the treatment of AMD."* Alexandra Hospital – Singapore Eye Institute; Singapore, February 2005.

13. *"Immune mechanisms in ocular angiogenesis."* Department of Ophthalmology – Case Western Reserve University; Cleveland, Ohio, June 2005.

14. *"AMD: Rationale for combination therapy."* Department of Ophthalmology – University of Chicago; Chicago, Illinois, June 2005.

15. *"Eyeballing the immune system: Implications for angiogenesis."* Cellular and Molecular Biology Program; Penn State University, Hershey, Pennsylvania, November 2005.

16. *"Diabetes: Yesterday, today, and tomorrow."* Department of Ophthalmology – Penn State University; Hershey, Pennsylvania, November 2005.

17. *"Immune mechanisms in choroidal neovascularization."* Washington University School of Medicine Center for Aging; St. Louis, Missouri, January 2006.

18. *"Innate immunity and angiogenesis: Implications for disease processes."* Department of Molecular Biology and Pharmacology – Washington University School of Medicine; St. Louis, Missouri, December 2006.

19. *"Management of AMD in the United States."* Department of Ophthalmology – Kyushu University; Fukuoka, Japan, April 2007.

20. *"How to study inflammation in patients in the lab."* Summer 2007 ARVO Meeting; Warwick, Rhode Island, July 2007.

21. *"Preventing vision loss in diabetic retinopathy."* Summer 2007 ARVO Meeting; Warwick, Rhode Island, July 2007.

22. *"Small gauge vitreous surgery."* South East Regional Eye Conference; San Destin, Florida, July 2007.

23. *"Management of retained lens fragments."* South East Regional Eye Conference; San Destin, Florida, July 2007.

24. *"Senescence: Innate immunity and angiogenesis."* European Macrophage and Dendritic Society Meeting; Innsbruck, Austria, September 2007.

25. *"Macrophages and ocular angiogenesis: Friend or foe?"* Department of Ophthalmology – University of Texas, Southwestern Medical School; Dallas, Texas, November 2007.

26. *"Angiogenic eye disease."* Kresge Eye Institute – Wayne State University; Detroit, Michigan, January 2008.

27. *Of wine and vision: Role of Resveratrol in regulating angiogenesis."* National Eye Institute; Washington, District of Columbia, November 2008.

28. *"Inflammatory mediators in the pathogenesis of AMD."* Fifth Annual Ophthalmic Drug Development and Delivery Summit Meeting; Hilton San Diego/Del Mar, California, September 2009.

29. *"Retinal venous occlusive disease."* Aditya Jyot Eye Institute; Mumbai, India, January 2010.

30. *"Sickle cell retinopathy with tangential traction and a full thickness macular hole."* Macula Society Meeting; Tucson, Arizona, February 2010.

31. *"What causes PR death after retinal detachments and how can we prevent it."* Retinal Physicians Symposium; Nassau, Bahamas, April 2010.

32. *"Treatment algorithm for diabetic macular edema."* Retinal Physicians Symposium; Nassau, Bahamas, April 2010.

33. *"Clinical trial results in the medical and surgical management of diabetic retinopathy."* World Ophthalmologic Congress; Berlin, Germany, June 2010.

34. *"Targeting complement factor 5 and vascular endothelial growth factor (VEGF) for neovascular age-related macular degeneration (AMD): A phase 1 study."* The American Society of Retina Specialists; Vancouver, Canada, August 2010.

35. *"Pattern electroretinography after Ranibizumab in naïve age-related macular degeneration."* Retina Society Meeting; San Francisco, California, September 2010.

36. *"Treatment algorithms in diabetic macular edema: Current concepts and shifting paradigms."* Department of Ophthalmology & Visual Sciences – Washington University School of Medicine; St. Louis, Missouri, October 2010.

37. *"The immune vascular synapse in ocular neovascularization."* Department of Ophthalmology & Visual Sciences – Washington University School of Medicine; St. Louis, Missouri, October 2010.

38. *"Choroidal neovascularization assessment by pattern electroretinography after Ranibizumab in naïve age-related macular degeneration patients."* American Academy of Ophthalmology Meeting; Chicago, Illinois, October 2010.

39. *"Resveratrol inhibits choroidal neovascularization by a eukaryotic elongation factor-2 regulated pathway."* Club Jules Gonin Meeting; Kyoto, Japan, November 2010.

40. *"Treatment algorithms in management of diabetic macular edema."* University of Rochester – Flaum Eye Institute; Rochester, New York, November 2010.

41. *"Intraocular steroids: Current and emerging applications in DME and RVO."* 2011 Hawaiian Eye Meeting; Maui, Hawaii, January 2011.

42. *"Eyeballing the immune system: Implications for angiogenesis and cell survival."* Department of Developmental Biology – Washington University School of Medicine; St. Louis, Missouri, January 2011.

43. *"Of wine and vision: Role of Resveratrol in regulating inflammation and angiogenesis in the retina."* Angiogenesis, Exudation, and Degeneration Meeting; University of Miami, Miami, Florida, February 2011.

44. *"Cost effectiveness analysis of the DRCR network protocol 1 evaluating Ranibizumab plus prompt or deferred laser or Triamcinolone plus prompt laser for diabetic macular edema."* Macula Society Annual Meeting; Boca Raton, Florida, March 2011.

45. *"A radical approach to aging eye disease: The aging macrophage and its role in regulating ocular neovascularization."* The Association for Research in Vision and Ophthalmology Annual Meeting; Fort Lauderdale, Florida, May 2011.

46. *"Eyeballing the innate immune system: Implications for pathological angiogenesis."* Scholars in Vision Series – University of Pittsburgh Medical Center; Pittsburgh, Pennsylvania, May 2011.

47. *"Regulation of cholesterol efflux in senescent macrophages."* Special AMD WIPS Meeting – University of Texas, Southwestern Medical Center; Dallas, Texas, June 2011.

48. *"Paradigm shifts in treatment of DME."* Resident Lecture Series – University of Texas, Southwestern Medical Center; Dallas, Texas, June 2011.

49. *"Efficacy and safety results of participants receiving ILUVIEN (Fluocinolone Acetonide) insert in the FAME Program."* Retina Society Meeting; Rome, Italy, September 2011.

50. *"Role of Drusen in activating monocytic inflammation."* Macula of Paris Meeting; Paris, France, January 2012.

51. *"The role of laser in the treatment of CSDME in the pharmaceutical age."* World Ophthalmology Congress Meeting; Abu Dhabi, United Arab Emirates, February 2012.

52. *"Age-associated impairment of cholesterol efflux in macrophages promotes AMD."* 116th Annual Meeting of the Japanese Ophthalmological Society; Tokyo, Japan, April 2012.

53. *"Current paradigms in management of diabetic retinopathy."* Department of Ophthalmology & Visual Sciences Spring Update – Washington University School of Medicine; St. Louis, Missouri, April 2012.

54. *"Treatment paradigms in management of diabetic macular edema and retinopathy."* Department of Ophthalmology & Visual Sciences Spring Update – Washington University School of Medicine; St. Louis, Missouri, April 2012.

55. *"A cost-effective analysis of the randomized trial evaluating Ranibizumab plus prompt or deferred laser or Triamcinolone plus prompt laser for diabetic macular edema."* Macula Society Meeting; Jerusalem, Israel, June 2012.

56. *"Macrophages and AMD."* Department of Ophthalmology Grand Rounds Lecture – Hadassah Hebrew University; Jerusalem, Israel, June 2012.

57. *"Cellular advances in treatment of retinal disease."* EURetina Meeting; Milan, Italy, September 2012.

58. *"Panelist – Inflammation section: Second biennial symposium on age-related macular degeneration."* Harvard Medical School; Boston, Massachusetts, September 2012.

59. *"Current paradigms in treatment of DME."* 21st Vitreo Retina Society – India Annual Meeting; Guwahati, India, December 2012.

60. *"Neovascular AMD in the post CATT era."* 21st Vitreo Retina Society – India Annual Meeting; Guwahati, India, December 2012.

61. *"Inflamm-aging and neovascular AMD."* Angiogenesis, Exudation, and Degeneration 2013 Meeting, Bascom Palmer Eye Institute – University of Miami Miller School of Medicine; Miami, Florida, January 2013.

62. *"Current paradigms in treatment of diabetic retinopathy."* Department of Ophthalmology Invited Guest Speaker – University of Alabama at Birmingham; Birmingham, Alabama, March 2013.

63. *"Macrophage-mediated inflammation and the aging eye."* Department of Ophthalmology Invited Guest Speaker – University of Alabama at Birmingham; Birmingham, Alabama, March 2013.

64. *"Current paradigms in treatment of diabetic retinopathy."* Invited Guest Speaker – Israel Ophthalmology Society Annual Conference; Tel Aviv, Israel, May 2013.

65. *"Panelist – Current treatment of retinal vascular diseases."* Israel Ophthalmology Society Annual Conference; Tel Aviv, Israel, May 2013.

66. *"Dilemmas and directions for surgeon scientists."* Department of Ophthalmology Invited Guest Speaker – University of Kentucky; Lexington, Kentucky, May 2013.

67. *"NAMPT in the retina."* Department of Developmental Biology – Tri-University NAD Workshop – Washington University School of Medicine; St. Louis, Missouri, July 2013.

68. *"Current Paradigms in Treatment of Diabetic Retinopathy."* Invited Guest Speaker – 7th Indian Retinal Congress Meeting; Bangalore, India, August 2013.

69. *"Current Paradigms in U.S. AMD Treatment."* Invited Keynote Guest Speaker – wet AMD Update Seminar; Nagasaki, Japan, October 2013.

70. *"Current Paradigms in U.S. AMD Treatment."* Invited Keynote Guest Speaker – wet AMD Update Seminar; Hokkaido, Japan, October 2013.

71. *"Current Paradigms in U.S. AMD Treatment."* Invited Keynote Guest Speaker – wet AMD Update Seminar; Kita-ku, Japan, October 2013.

72. *"Surgical Considerations in the Management of Diabetic Macular Edema."* Invited Guest Speaker – 8th APVRS Congress Meeting; Nagoya, Japan, December 2013.

73. *"What We Learn From HARBOR Study."* Invited Keynote Speaker – 8th APVRS Congress Meeting, Nagoya; Japan, December 2013.

74. *"Eye on Cholesterol."* Invited Guest Speaker – 32nd Annual Midwinter Retina Symposium; Milwaukee, WI, January 2014.

75. *"Pathogenesis and Management of Macular Holes."* Invited Guest Speaker – 32nd Annual Midwinter Retina Symposium; Milwaukee, WI, January 2014.

76. *"Management of Central Serous Chorioretinopathy."* Invited Guest Speaker – 32nd Annual Midwinter Retina Symposium; Milwaukee, WI, January 2014.

77. *"Light: Applications and Advances in Illumination."* Invited Guest Speaker – Hawaiian Eye 2014 Retina Meeting; Kauai, HI, January 2014.

78. *"Role of Inflammation in AMD Progression."* Invited Guest Speaker – Hawaiian Eye 2014 Retina Meeting; Kauai, HI, January 2014.

79. *"Treatment Strategies for Neovascular AMD to Improve Immediate Patient Outcomes."* Invited Guest Speaker – Hawaiian Eye 2014 Retina Meeting; Kauai, HI, January 2014.

80. *"Central Serous Chorioretinopathy."* Invited Guest Speaker – Hawaiian Eye 2014 Retina Meeting; Kauai, HI, January 2014.

81. *"Visual Cycle Suppression via Patching in Central Serous Retinopathy."* Invited Guest Speaker – 37th Annual Macula Society Meeting; Key Largo, FL, February 2014.

82. *"Pathogenesis and Management of Macular Holes."* Invited Guest Speaker – Eye Care Services, Visiting Professor System-Wide Grand Rounds Lecture; Henry Ford Health System, Detroit, MI, March 2014.

83. *"Surgical Considerations in Management of DME."* Invited Guest Speaker – Eye Care Services, Visiting Professor System-Wide Grand Rounds Lecture; Henry Ford Health System, Detroit, MI, March 2014.

84. *"Five Things a Cataract Surgeon Needs to Know About the Retina."* Department of Ophthalmology & Visual Sciences Spring Update – Washington University School of Medicine; St. Louis, Missouri, March 2014.

85. *"Pathogenesis of Diabetic Retinopathy."* Invited Guest Speaker – World Ophthalmology Congress Meeting; Tokyo, Japan, April 2014.

86. *"Metabolic Networks and Photoreceptor Survival."* The Association for Research in Vision and Ophthalmology Annual Meeting; Fort Lauderdale, Florida, May 2014.

87. *"Metabolism in the Aging Retina and Vision."* The Association for Research in Vision and Ophthalmology Annual Meeting; Fort Lauderdale, Florida, May 2014.

88. *"Management of Diabetic Retinopathy."* Invited Guest Speaker – Robert J. Netzel, MD Named Lectureship, Kresge Eye Institute; Detroit, MI, June 2014.

89. *"Panelist – Dry AMD: Current and Future Management Strategies in the Treatment of Dry AMD."* – ASRS 31st Annual Meeting; San Diego, CA, August 2014.

90. *"Microstructural Retinal Findings by Spectral Domain OCT after Vitrectomy Repair of Rhegmatogenous Retinal Detachments."* – Invited Guest Speaker – Club Jules Gonin Annual Meeting; Zurich, Switzerland, September 2014.

91. *"Metabolic Networks in the Aging Eye*." – Invited Guest Speaker – Aging Forum 2014: Metabolism, Aging, and NAD Sirtuin Biology, Keio University; Tokyo, Japan, November 2014.

92. *"Choroidal Injury Response*." – Invited Guest Speaker – Macula of Paris Meeting; Paris, France, January 2015.

93. *"Seeing through the Retina*." – Invited Guest Speaker – Harrington Discovery Institute; Case Western Reserve University, Cleveland, OH, March 2015.

94. *"IOFB Removal Pearls*." – Invited Faculty Speaker – Duke University; Durham, NC, April 2015.

95. *"Air Exchange through Trocar with the Extrusion Cannula."* – Invited Faculty Speaker – Duke University; Durham, NC, April 2015.

96. *"Updates on AMD Pathogenesis – Towards Novel Therapies."* – Distinguished Faculty Speaker – Singapore National Eye Institute; May 2015.

97. *"Macular Atrophy and Choroidal Thinning in Patients with AMD and Anti-VEGF."* – Distinguished Faculty Speaker – Singapore National Eye Institute; May 2015.

98. *"DME Debate: Vitrectomy for DME."* – Distinguished Faculty Speaker – Singapore National Eye Institute; May 2015.

99. *"Debate on Phaco Vitrectomy for DME."* – Distinguished Faculty Speaker – Singapore National Eye Institute; May 2015.

100. *"Surgical Management of Diabetic Retinopathy."* – Invited Faculty Speaker – Frontiers in Vision Science, Bascom Palmer Eye Institute; Miami, FL – May 2015.

101. *"Inflammation and Retinal Disease."* – Invited Faculty Speaker – Frontiers in Vision Science, Bascom Palmer Eye Institute; Miami, FL – May 2015.

102. *"Seeing Through the Retina: Molecular Pathways that Regulate Cell Proliferation and Death."* – Invited Faculty Speaker – Frontiers in Vision Science, Bascom Palmer Eye Institute; Miami, FL – May 2015.

103. *"Eyeballing Inflammation, Angiogenesis and Cell Survival."* – Invited Guest Speaker, Wilmer Eye Institute; Baltimore, MD, June 2015.

104. *"Metabolic Networks in the Aging Eye."* – Invited Guest Speaker – 36th Annual Meeting of the Japanese Society of Inflammation and Regeneration; Keio University School of Medicine, Tokyo, Japan, July 2015.

105. *"Role of Autophagy in Inflammatory Eye Disease."* – Invited Guest Speaker – 36th Annual Meeting of the Japanese Society of Inflammation and Regeneration; Keio University School of Medicine Tokyo, Japan, July 2015.

106. *"Diabetic Retinopathy."* – Distinguished Diabetes Seminar Speaker – Harvard University, Massachusetts Eye and Ear Infirmary, Boston, MA, October 2015.

107. *"Seeing through the Retina-Inflammation, Neurodegeneration and Vision."* – Distinguished Frontiers in Vision Speaker Series, Tufts University, Boston, MA – December 2015.

108. *"Surgical Management of Diabetic Retinopathy."* – Keynote Speaker – Iranian Society of Ophthalmology, Tehran, Iran – December 2015.

Research Support:

Governmental:

1. Diabetes Research & Training Center Pilot Study and Feasibility Grant NIH 5 P60 DK 20579; Immune Mechanisms in Diabetic Retinopathy – 12/01/2003 – 11/31/2005.

2. Principal Investigator – National Institutes of Health Grant NIH K08 EY016139; Immune Mechanisms in Ocular Angiogenesis – 09/30/2005 – 09/30/2010.

3. Principal Investigator – National Institutes of Health Grant NIH R01 EY019287; The Importance of Macrophage Senescence in Regulating Angiogenesis in the Eye – 09/30/2010 – 09/30/2015.

4. Principal Investigator – United States Civilian Research and Development Foundation; Assessment of Genetic Risk Factors and Macrophage Polarization in Israeli Jews and Palestinian Arabs – 01/01/2011 – 12/31/2012.

Non-Governmental:

1. Carl Marshall Reeves and Mildred Almen Reeves Foundation Inc. Research Award, 10/01/2004 – 08/31/2012.

2. Research to Prevent Blindness Career Development Award, 01/01/2005 – Present.

3. American Federation for Aging Research Grant, 07/01/2005 – 06/30/2006.

4. Genentech IST Grant Protocol #FVF3799S; Captain: Choroidal Neovascularization Assessment by Pattern Electroretinography after Ranibizumab in Naïve Age-Related Macular Degeneration, 02/12/2007 – Present.

5. American Retina Foundation Research Award, 01/01/2008 – 12/31/2009.

6. International Retinal Research Foundation Research Award, 01/01/2009 – 12/31/2009.

7. Thome Foundation Research Award, 12/15/2009 – 12/14/2012.

8. American Health Assistance Foundation Research Award, 04/01/2011 – 03/31/2012.

9. American Federation for Aging Research Julie Martin Mid-Career Award, 07/01/2012 – 06/30/2016.

10. Research to Prevent Blindness Sybil B. Harrington Physician-Scientist Award, 06/01/2014 – 05/31/2019.

Ongoing Support:

R01EY019287 NIH/NEI (Apte)
NIH/NEI
09/01/2010 – 08/31/2015 7.2 cal mos (60%) $1,250,000
"The importance of macrophage senescence in regulating angiogenesis in the eye"

Major Goal(s): Help elucidate the mechanisms by which senescence induces a functional drift in macrophages towards a deleterious pro-angiogenic phenotype. Test how altering macrophage polarization determines angiogenic fate in the eye.

American Federation for Aging Research (Apte)
Research Award
07/01/2012 – 06/30/2016 $ 548,500
"Role of MicroRNA 146b in Regulating Macrophage Senescence"

Major Goal(s): Evaluate the role of non-coding RNA in regulating macrophage aging using non-biased deep sequencing and loss of function approaches.

Research to Prevent Blindness (Apte) $100,000
Physician Scientist Award
01/01/14 – 12/31/17
"Dysregulation of macrophage cholesterol metabolism in AMD pathogenesis"

Major Goal(s): Determine how aging regulates molecular pathways for coordinated cholesterol homeostasis and explore impact of chronic dysregulation of macrophage cholesterol metabolism on drusen biogenesis and AMD.

Carl Marshall & Mildred Almen Reeves Foundation (Apte) $81,000
Research Award
01/01/15 – 12/31/15
"Role of chronic dysregulation of macrophage cholesterol metabolism in AMD pathogenesis"

Major Goal(s): Determine whether chronic dysregulation of ABCA1 expression in macrophages and subsequent impairment of cholesterol transport induce accelerated drusen initiation program and CNV formation.

Hope Center Grant (Apte, co-PI) $50,000/$30,000
Research Award
01/01/15 – 12/31/15
"Role of nicotinamide adenine dinucleotide (NAD+) metabolism in regulating retinal neurodegeneration"

Major Goal(s): Demonstrate critical role of cell specific NAD biosynthesis in mammalian rod and cone survival using cell specific conditional knockout mice; assess the therapeutic effects of NAD supplementation (pharmacotherapy) on photoreceptor rescue.

Pending Support:

None

Completed Support:

5 K08 EY16139-04 NIH/NEI (Apte)
NIH/NEI
09/30/2005 – 08/31/2010 9.0 cal mos (75%) $ 184,879
"Immune Mechanisms in Choroidal Neovascularization"

Major Goal(s): To study the role of the immune system and associated cytokine polarization in ocular angiogenesis, to identify and characterize host ocular tissue factors modulated by effector cytokines in a murine laser-induced model of CNV, and to define the signaling pathways that promote vascular endothelial cell proliferation in the sub-retinal space during the development of CNV.

C.M. Reeves & M.A. Reeves Foundation (Apte)
Research Award
11/01/2007 – 08/31/2011 .60 cal mos (5%) $ 125,168
(No Salary Support)
"Role of the Aging Immune System and Senescent Ocular Tissues in AMD"

Major Goal(s): This proposal will address all elements underlying the development of abnormal blood vessels in age-related eye disease such as pathogenesis, therapeutic possibilities including prophylaxis and the feasibility of targeted drug delivery using nanomedicine, and the diagnosis and monitoring of angiogenic disease by utilizing non-invasive imagining.

C.M. Reeves & M.A. Reeves Foundation (Apte)
Research Award
11/01/2008 – 08/31/2010 .60 cal mos (5%) $ 100,000
(No Salary Support)
"Role of the Resveratrol in Regulating Angiogenesis and the Immune System in AMD"

Major Goal(s): To identify and characterize alterations in the host immune system and RPE that predispose to neo-angiogenesis in the eye and to create a transgenic mouse that is a model for geographic atrophy in age-related macular degeneration.

C.M. Reeves & M.A. Reeves Foundation (Apte)
Research Award
11/01/2009 – 10/31/2010 $ 100,000
(No Salary Support)
"Effect of Aging on Macrophage Function in Macular Degeneration"

Major Goal(s): This project will demonstrate that abnormal processing of cholesterol causes old macrophages to become pro-angiogenic.

Thome Foundation (Apte)
Research Award
12/15/2009 – 12/14/2012 1.81 cal mos (15%) $ 667,548
"Role of Cholesterol in Regulating the Pro-angiogenic Properties of Senescent Macrophages in Age-Related Macular Degeneration"

Major Goal(s): This proposal will help elucidate the mechanisms by which senescence induces a functional drift in macrophages towards a deleterious pro-angiogenic phenotype. We will also test how altering macrophage polarization determines angiogenic fate in the eye.

Macula Society (Apte)
Research Award
01/01/2010 – 12/31/2010 $ 20,000
(No Salary Support)
"Wnt Signaling in Choroidal Neovascularization"

Major Goal(s): Wnt signaling is activated in pathologic neovascularization of the choroid, which would provide a potential new target for the treatment of blinding diseases.

American Health Assistance Foundation (Apte)
Research Award
04/01/2010 – 03/31/2012 0.12 cal mos (1%) $ 100,000
"Importance of Macrophage Senescence in Regulating Angiogenesis in Macular Degeneration"

Major Goal(s): Based on our preliminary data, we hypothesize that cholesterol, the dominant ingredient of drusen selectively triggers pro-angiogenic M2 polarization of old macrophages. We will test these hypotheses by assaying cholesterol processing within old macrophages and identify the effects of abnormal processing on angiogenesis *in vitro* and *in vivo*.

Knights Templar (Nudleman)
Pediatric Ophthalmology Research Award
07/01/2010 – 06/30/2011 $ 40,000
(No Salary Support)
"Wnt Signaling in Retinopathy of Prematurity"

Major Goal(s): We will examine the hypothesis that Wnt signaling is activated in pathologic neovascularization of the retina which would provide a potential new target for the treatment of retinopathy of prematurity (ROP).

C.M. Reeves & M.A. Reeves Foundation (Apte) $ 95,659
Research Award
12/01/2011 – 08/31/2012
"Quantitative Transcriptome Profiling of Macrophages and Implications for Age-Related Macular Degeneration"

Major Goal(s): We hypothesize that altered transcriptional regulation is critical to these processes, and propose to analyze these changes by evaluating coding and non-coding RNA expression within macrophages by deep RNA sequencing (RNA-seq). This novel approach overcomes the inability of microarrays to measure low copy genes, circumvents the poor throughput capabilities of traditional sequencing, and enhances our capacity to quantify age-associated changes in gene expression within macrophages on a genome-wide scale.

Knights Templar (Sene)
Research Award
07/01/2012 – 06/30/2013 $ 60,000
(No Salary Support)
"Role of Macrophage-Mediated Autophagy in Ischemia-Induced Retinal Neovascularization"

Major Goal(s): Using the oxygen-induced retinopathy (OIR) model, we will determine whether loss of a functional autophagy pathway from circulating macrophages affects the onset of ischemia-induced retinal neovascularization. To do this we will use conditional knockout mice in which the autophagy

pathway is specifically deleted from macrophages. We will also investigate how loss of autophagy from endothelial cells will alter the onset of retinal neovascularization using endothelial cell-specific conditional knockout mice. Discovering a novel role of the autophagy pathway in retinal neovascularization could lead to new avenues of therapeutic opportunity in the blinding neonatal eye disease, retinopathy of prematurity.

C.M. Reeves & M.A. Reeves Foundation (Apte)
Research Award
12/01/2012 – 08/31/2013 $ 94,138
"Role of SIRT1 in Age-Related Macular Degeneration"

Major Goal(s): This study will evaluate the role of sirtuins rod and cone photoreceptor survival in an animal model of dry age-related macular degeneration.

The Robert Machemer Foundation (Kubota)
Research Award
07/01/2013 – 06/30/2014 $ 30,000
"Role of SIRT1 in Age-Related Macular Degeneration"

Major Goal(s): This study will evaluate the role of sirtuins rod and cone photoreceptor survival in an animal model of dry age-related macular degeneration.

Siteman Cancer Center (Apte)
HRPO #201209108 Early Phase Clinical Research Support Grant
07/01/2013 – 06/30/2014 $ 12,500
"Treatment of Radiation Retinopathy with Intravitreal Aflibercept Injection 2.0 mg"

Major Goal(s): To evaluate the effect of anti-VEGF therapy with Aflibercept on macular edema associated with radiation retinopathy following therapy for uveal melanomas.

C.M. Reeves & M.A. Reeves Foundation (Apte) $ 60,000
Research Award
12/01/2013 – 08/31/2014
"Role of Nicotinamide Adenine Dinucleotide (NAD) Metabolism in Regulating Photoreceptor Degeneration"

Major Goal(s): The proposed research will examine the role of NAD biosynthesis in regulating photoreceptor survival and retinal degeneration in a novel, highly specific animal model. We will address how loss of function, using conditional gene deletion approaches, affects degeneration of photoreceptors.

Clinical Trials – Principal or Sub-Investigator:

Protocol Development Committee:

DRCR.net Metabolic Control Protocol Development

Principal Investigator:

1. A pilot study of laser photocoagulation for diabetic macular edema (DRCR #1A).

2. Diabetic retinopathy clinical research network: A randomized trial comparing intravitreal Triamcinolone Acetonide and laser photocoagulation for diabetic macular edema.

3. Evaluation of vitrectomy for diabetic macular edema study (DRCR).

4. CAPTAIN: Genentech FVF3799S; Choroidal neovascularization assessment by pattern electroretinography after Ranibizumab in naïve age-related macular degeneration patients.

5. Age-Related Eye Disease Study 2 (AREDS2): A multi-center, randomized trial of Lutein, Zeaxanthin, and Omega-3 long-chain polyunsaturated fatty acids (Docosahexaenoic Acid [DHA] and Eicosapentaenoic [EPA]) in age-related macular degeneration.

6. DCRC Protocol L: Evaluation of visual acuity measurements in the eyes with diabetic macular edema.

7. DRCR Protocol N: An evaluation of intravitreal Ranibizumab for vitreous hemorrhage due to proliferative diabetic retinopathy.

8. Regeneron IST: Treatment of radiation retinopathy with intravitreal Aflibercept injection 2.0 mg.

9. DRCR Protocol T: Intravitreal Bevacizumab compared with intravitreal Ranibizumab for diabetic macular edema.

10. Assessment of genetic risk factors and macrophage polarization in AMD among Palestinian Arabs and Israeli Jews.

11. Genes in diabetic retinopathy project.

12. Retinal anatomy after vitrectomy repair of retinal detachment.

13. Regulation of photoreceptor function by macrophages following macula-involving rhegmatogenous retinal detachment.

14. DRCR Protocol M: Effects of diabetes education during retinal ophthalmology visits on diabetes control.

15. Treatment of radiation retinopathy with intravitreal Aflibercept injection 2.0 mg.

16. Eye patching as a potential treatment modality for central serous retinopathy.

17. Vitreous biopsy analysis.

18. Assessment of genetic risk factors and macrophage polarization in Caucasian males and females over 50 years of age.

19. DRCR: A comparative effectiveness study of intravitreal Aflibercept, Bevacizumab and Ranibizumab for diabetic macular edema.

Sub-Investigator:

1. AART: An evaluation of efficacy and safety of posterior juxtascleral administration of Anecortave Acetate for depot suspension (15 mg or 30 mg) versus sham administration in patients (Enrolled in study "A" or study "B") at risk for developing sight-threatening choroidal neovascularization (CNV) due to exudative age-related macular degeneration (AMD); Protocol Number: C-02-60.

2. DENALI-BPD952A2308: A 24-month randomized, double-masked, controlled, multicenter, phase IIIB study assessing safety and efficacy of verteporfin (Visudyne®) photodynamic therapy administered in conjunction with Ranibizumab (Lucentis®) versus Ranibizumab (Lucentis®) monotherapy in patients with subfoveal choroidal neovascularization secondary to age-related macular degeneration. Novartis.

3. FAME: A randomized, double-masked, parallel group, multicenter, dose-finding comparison of the safety and efficacy of ASI-001A 0.5 µg/day and ASI-001B 0.2 µg/day Fluocinolone Acetonide intravitreal inserts to sham injection in subjects with diabetic macular edema; Protocol Number:C-01-05-001 – Alimera.

4. RIDE-Genentech Protocol FVF4168g: A phase III, double-masked, multicenter, randomized, sham-controlled study of the efficacy and safety of Ranibizumab injection in subjects with clinically significant macular edema with center involvement secondary to diabetes mellitus.

5. VIO-BPD OCR 013: A randomized, placebo-controlled, double-masked, multicenter phase III study of the effect of Visudyne therapy in occult no classic subfoveal choroidal neovascularization (CNV) secondary to age-related macular degeneration (AMD). Visudyne in Occult (VIO).

6. EOP1012: A phase 3B/4, randomized, active controlled, double-masked, single dummy, multicenter comparative trial, in parallel groups, to compare the safety and efficacy of intravitreous injections of Macugen given every 6 weeks for up to 102 weeks, plus sham photodynamic therapy (PDT), to Macugen plus PDT with Visudyne in subjects with predominantly classic subfoveal choroidal neovascularization (CNV) secondary to age-related macular degeneration (AMD) with the addition of an open label treatment arm dosing PDT with Visudyne on the same day with Macugen.

7. Pfizer-Protocol A4321001: A phase 1 / 2 randomized, masked, single and multiple-dose, sequential dose-escalation study of the safety and efficacy of AG-013958 in subjects with subfoveal choroidal neovascularization associated with age-related macular degeneration.

8. Regeneron-VGFT-OD-0307: An exploratory study of the safety, tolerability and biological activity of intravenously administered VEGF trap in patients with diabetic macular edema.

9. Histo-Ranibizumab versus PDT for presumed ocular histoplasmosis.

10. HORIZON: An open-label, multicenter extension study to evaluate the safety and tolerability of Ranibizumab in subjects with choroidal neovascularization (CNV) secondary to age-related macular degeneration (AMD) or macular edema secondary to retinal vein occlusion (RVO) who have completed a Genentech sponsored Ranibizumab study.

11. PADDLE: Posterior vitreous detachment (PVD) assessment during dual RVO Lucentis evaluations.

12. VIEW – 1: A randomized, double masked, active controlled phase III study of the efficacy, safety, and tolerability of repeated doses of intravitreal VEGF trap in subjects with neovascular age-related macular degeneration.

Teaching Title and Responsibility:

Director of Education, Department of Ophthalmology & Visual Sciences
Director and Group Leader, Washington University Resident and Fellow Journal Club
Instructor, Washington University Fluorescein Angiography Conference
Washington University School of Medicine, St. Louis, Missouri

Fellows Trained:

2002 – 2004	Brett Rosenblatt, M.D.
2003 – 2004	Michael D. Mills, M.D.
2003 – 2005	Seenu M. Hariprasad, M.D.
2003 – 2005	Henry C. Lee, M.D.
2004 – 2006	Leonard Feiner, M.D.
2004 – 2006	Jason C. Wickens, M.D.
2005 – 2007	Mandeep S. Dhalla, M.D.
2005 – 2007	Asheesh Tewari, M.D.
2006 – 2008	Ramin Schadlu, M.D.
2006 – 2008	Bradley T. Smith, M.D.
2007 – 2009	John B. Davies, M.D.
2007 – 2009	David R. Fintak, M.D.
2008 – 2010	Raymond Wee, M.D.
2008 – 2010	Arghavan Almony, M.D.
2009 – 2011	Jonathan Jonisch, M.D.
2009 – 2011	Kamalesh Ramaiya, M.D.
2010 – 2012	Mathew W. Aschbrenner, M.D.
2010 – 2012	Bryan M. Kim, M.D.
2011 – 2013	Rithwick Rajagopal, M.D., Ph.D.
2011 – 2013	Rajesh Rao, M.D.
2012 – 2014	Mouhammed Abuattieh, M.D., Ph.D.
2012 – 2014	James Earl, M.D., Ph.D.
2013 – 2015	David Chin Yee, M.D.

2014 – 2016	Mark Kaehr, M.D.
2014 – 2016	Manthan Shah, M.D.
2015 – 2017	Frank Hrisomalos, M.D.

Post-Doctoral Research Fellows Trained:

2006 – 2010	Aslam Ali Khan, Ph.D.
2006 – 2010	Andrew Schimel, Ph.D.
2007 – 2009	Dru Samuel Dace, Ph.D.
2009 – 2013	Abdoulaye Sene, Ph.D.
2010 – 2011	Arsham Sheybani, Ph.D.
2010 – 2012	Eric Nudleman, M.D., Ph.D.
2010 – 2012	Luke Wiley, Ph.D.
2010 – 2014	Rei Nakamura, Ph.D.
2011 – 2014	Shunsuke Kubota, Ph.D.
2013 – 2014	Abdelaziz Gdoura, Ph.D.

Graduate Students:

2007 – 2010	Yat Tang – Member, Dissertation Committee
2010 – 2013	Nick Tran – Member, Dissertation Committee
2013 –	Jonathan Lin – MSTP Student, Thesis Advisor
2014 – 2015	Dong Lee – MSTP Student, Thesis Advisor
2015 –	Mitsukuni Yoshida – MSTP Student, Thesis Advisor

Teaching Courses:

Association for Research in Vision and Ophthalmology (ARVO)

2006	Special Interest Group: New Treatments and Assessments of Ocular Neovascularization and Macular Edema: Lessons from Early Clinical Experiences
2006	Special Interest Group: New Directions in Ocular Angiogenesis
2007	Special Interest Group – Course Director: Aging Immunity and the Eye: Implications for Disease Processes
2010	Course Director: Age-Related Macular Degeneration: Fundamental Discovery and Translation in Clinical Paradigms
2011	Course Director: Cell Death and Inflammation in Dry Age-Related Macular Degeneration
2012	Course Director: Autophagy and AMD
2014	Course Director: Metabolic Networks in the Aging Eye: Implications for Pathophysiology of Disease
2014	Special Interest Group: The Aging Eye
2014	Course Director: Polypoidal Choroidal Vasculopathy
2015	Special Interest Group: Blue Light Matters as a Camera and a Clock!

SN-Association for Research in Vision and Ophthalmology (SN-ARVO)

2010	Session Chair: Diabetic Retinopathy: From Bench to Population Chennai, India

American Academy of Ophthalmology (AAO)

2006 – 2007	Senior Course Director: Intravitreal Pharmacotherapy: Applications in Retinal Disease
2006 – 2007	Senior Course Director: Navigating the Complexities of AMD Diagnosis and Management: The Central Role of the Comprehensive Ophthalmologist
2009	Reviewer: Retina, Vitreous Subcommittee of the Annual Meeting Program Committee (AMPC)

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Fundamental Research (*Corresponding Author)

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2. **Apte RS**, Niederkorn JY. Isolation and characterization of a unique natural killer cell inhibitory factor present in the anterior chamber of the eye. *J Immunol* 1996; 156(8):2667-73. [PMID:8609381]

3. Blom DJ, DeWaard-Siebing I, **Apte RS**, Luyten GP, Niederkorn JY, Jager MJ. Effect of hyperthermia on expression of histocompatibility antigens and heat-shock protein molecules on three human ocular melanoma cell lines. *Melanoma Res* 1997; 7(2):103-9. [PMID:9167175]

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6. Clark AF, Mellon J, Li X-Y, Ma D, Leher H, **Apte R**, Alizadeh H, Hedge S, McLenaghan A, Mayhew E, D'Orazio TJ, Niederkorn JY. Inhibition of intraocular tumor growth by topical application of the angiostatic steroid Anecortave acetate. *Inv Ophthalmol Vis Sci* 1999; 40(9):2158-62. [PMID:10440274]

7. **Apte RS,** Niederkorn JY, Mayhew E, Alizadeh H. Angiostatin produced by certain primary uveal melanoma cell lines impedes the development of liver metastases. *Arch Ophthalmol* 2001; 119(12):1805-9. [PMID:11735791]

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9. Oshima Y, Oshima S, Nambu H, Kachi S, Takahashi K, Umeda N, Shen J, **Apte RS**, et al. Different effects of angiopoietin-2 in different vascular beds: New vessels are more sensitive. *FASEB Journal* 2005; 19(8):963-5. [PMID:15802489]

10. **Apte RS***, Richter J, Herndon J, Ferguson TA. Macrophages inhibit choroidal neovascularization in age-related macular degeneration. *PloS Med* 2006; 3(8):1371-81. [PMID:16903779] [PMCID:PMC1539093]

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Translational Research:

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