

**Harvard Medical School/Harvard School of Dental Medicine
Format for the Curriculum Vitae**

Date Prepared: May 7, 2018

Name: JOSEPH F. ARBOLEDA-VELASQUEZ

Education

Year	Degree (Honors)	Field of Study	Institution
2000	M.D. (Valedictorian)	General Medicine	University of Antioquia, Medellin, Colombia
2009	Ph.D.	Cell and Developmental Biology Advisor: Dr. Spyros Artavanis- Tsakonas	Harvard Medical School

Postdoctoral Training

Years	Title	Field of Study	Institution
12/2000 – 06/2002	Research Fellow	Neurology. Advisor: Dr. Kenneth Kosik	Brigham and Women's Hospital
07/2009 – 08/2010	Research Fellow	Cell Biology. Advisor: Dr. Spyros Artavanis- Tsakonas	Harvard Medical School
09/2010 – 12/2011	Research Fellow	Vision Research. Advisor: Dr. Patricia D'Amore	Schepens Eye Research Institute

Faculty Academic Appointments

Year	Position	Field of Study	Institution
2012 – 2015	Instructor	Ophthalmology	Harvard Medical School
2015 –	Assistant Professor	Ophthalmology	Harvard Medical School
2015 –	Faculty	Cell biology	Harvard Medical School Ph.D. Programs in Biological and Biomedical Sciences (BBS)
2015 -	Faculty Director of DMS Paths		Division of Medical Sciences, Harvard Medical School

Program

Appointments at Hospitals/Affiliated Institutions

Year	Position	Field of Study	Institution
01/2012 – 2015	Investigator	Vision Research	Schepens Eye Research Institute of Mass Eye and Ear
2015 –	Assistant Scientist	Vision Research	Schepens Eye Research Institute of Mass Eye and Ear

Other Professional Positions

2013 -	Scientific Advisory Board	cureCADASIL Association
2017 -	Chair, Scientific Advisory Board	cureCADASIL Association
2016 -	Member of Board of Directors and Co-founder	Vastora, Inc

Major Administrative Leadership Positions

National

06/2013	Scientific Director for the 2013 National CADASIL Family Conference	Boston, Massachusetts
---------	---	-----------------------

Committee Service

Local

2012 - 2013	Technology Transfer Review Committee	Schepens Eye Research Institute
	2012 -2013	Member
2013 -	Safety Review Committee	Schepens Eye Research Institute
	2013 -	Member
2014 -	Distinguished Lecture Series Committee	Schepens Eye Research Institute
	2014 - 2015	Member
	2015 -	Chairman
	2017 -	Member
2015 - 2017	Conduct of Science Med. Sci. 300 Steering Committee	Harvard Medical School
	2015 - 2017	Member
2017 -	Graduate Review, Career Development	Harvard Medical School

Subcommittee
2017 - 2018 Member

National

2014 Class Advisor for Neuroscience Scholars Program
2014 - 2018 Society for Neuroscience
Advisor

Professional Societies

2005 - American Society for Biochemistry and Molecular Biology, USA.
2005 -

Regular Member

2011 - Society of Neuroscience, USA.
2011 -
2014 -

Scholar
Class Advisor for the Neuroscience Scholars Program

2011 - Association for Research in Vision and Ophthalmology, USA.
2014 -

Member, ARVO Strategic Plan
Global Pillar Mentorship Working
Group Member

2014 - American Diabetes Association, USA.
2014 -

Member

2014 - American Society for Investigative Pathology, USA
2014 -
2015 -

Regular Member
ASIP Committee for Career
Development and Diversity

2015 - North American Vascular Biology Organization (NAVBO), USA
2015 -

Regular Member

Editorial Activities

American Journal of Pathology
Neuropathology and Applied Neurobiology
Diabetes
Acta Diabetologica
Journal of Neuroinflammation
Molecular Vision
Current Molecular Medicine
Journal of Cerebral Blood Flow & Metabolism

Human Molecular Genetics
 Microvascular Research
 FASEB Journal
 International Journal of Retina and Vitreous
 PLOS ONE
 Acta Neuropathologica
 Annals of Neurology
 Brain Pathology

Honors and Prizes

2000	Valedictorian	Academy of Medicine of Medellin and Faculty of Medicine, University of Antioquia	Academic achievement
2001	Young Minds in Central Nervous System Award for Research on Stroke (USD \$20,000)	AstraZeneca (International Competition)	Career development award
2002	Colombian National Academy of Sciences Award for Clinical Research (USD \$15,000)	Aventis – Colombian National Academy of Sciences (National Competition)	Scholarship publications
2005	Hauser Scholar	Harvard Medical School	Outstanding research work and promotion of educational activities
2007	Young Neuroscientist Workshop Participant	Children’s Neurobiological Solutions (CNS) Foundation	Early career achievement in the neuroscience field
2007	“The Game” Team Grant Writing Winner (USD \$2,500)	Children’s Neurobiological Solutions (CNS) Foundation	Grant writing competition
2011	Society of Neuroscience Scholars Fellow Award (USD \$10,000)	Society of Neuroscience	Career development award
2012	Carl Storm Underrepresented Minority Fellowship	Gordon Research Conference	Travel award
2015	Early Career Institute in Neuroscience	NINDS-University of Pittsburg	Travel and mentoring minority award
2015	Leadership Development for Physicians and Scientists Participant	Harvard Medical School	Development of early career faculty
2015-2016	Young Mentor Award	Harvard Medical School	Mentoring award

Report of Funded and Unfunded Projects

Funding Information

Completed

- 2000 “Characterization of Colombian families with inherited cerebrovascular disease”
Guillermo Velasquez Tangarife/HMS/Predocdoctoral Scholarship
Predocdoctoral Scholar (\$3,000)
Genetic characterization of Colombian families suffering from cerebrovascular disease
- 2001-2002 “From the Notch 3 mutations to the CADASIL phenotype”
American Heart Association/Postdoctoral Fellowship
Postdoctoral fellow (\$80,000)
The primary goal of this project was to examine the expression and function of Notch signaling related to genes in the adult vasculature. We focused on the analysis of Notch signaling modulation by the glycosyltransferase Fringe in vascular cells and tissues and determined how CADASIL mutations affect glycosylation of Notch 3.
- 2010-2011 “HtrA1/TGF- β in the control of retinal vascular integrity”
NIH/National Eye Institute/Institutional Training Grant T32EY007145
Postdoctoral Fellow (\$60,000)
The goal of this project was to examine the expression and function of HtrA1 during development and in the adult retina and to investigate how HtrA1 affects the behavior of vascular cells *in vitro* and *in vivo*.
- 2012 “Notch and TGF- β signaling in Cerebral Ischemic Small-Vessel Disease”
American Heart Association/Scientist Development Grant 12SDG8960025
PI (\$308,000)
The goal of this project was to examine the role of Notch signaling in small-vessel disease. This award was relinquished in March of 2012 in order to accept K99/R00 award.
- 2012-2014 Notch and TGF- β in the control of retinal vascular integrity
NIH/National Eye Institute/Transition to Independence Grant 1K99EY021624-01A1
PI (\$180,000)
The goal of this project was to test the hypothesis that Notch signaling plays a role in the development of diabetic retinopathy, which is a prevalent cause of vision loss. I proposed a training plan that allowed me to study this problem using cell culture systems and *in vivo* models of diabetes.
- 2014-2015 Charting the role of MUC16 in proliferative diabetic retinopathy
Lions Club
PI (\$61,000)
The goal of this project is to test whether manipulation of MUC16 expression through Transcription Activator-Like (TAL) effectors protein is a viable alternative to modulate the response of endothelial cells to angiogenic factors.
- 2014-2015 Role of amyloid beta in age-related macular degeneration in cognitively unimpaired PSEN1 E280A mutations carriers from the world’s largest autosomal dominant Alzheimer’s disease kindred
Grimshaw Foundation
PI (\$65,000)
The goal of this project is to test the role of amyloid in the pathogenesis of AMD in a

- 2014-2017 human population at risk of developing Alzheimer's disease
Notch and TGF- β in the control of retinal vascular integrity
NIH-National Eye Institute/Transition to Independence Grant R00EY021624
PI (\$750,000)
The goal of this project is to test the hypothesis that Notch signaling plays a role in the development of diabetic retinopathy, which is a prevalent cause of vision loss.
- 2016-2017 Alice J. Adler Fellowship of the Schepens Eye Research Institute
PI (\$30,000)
The goal of this project is to use bioengineering approaches for the development of a fully biomimetic model of the neurovascular unit.

Current

- 2016-2021 Exploring the Role of Aging in Cerebral Ischemic Small Vessel Disease Using Notch3 Mutant Mice
NIH/NEI UH2/UH3 (1-UH2-NS-100121-01)
PI (\$1,016,301)
The goal of the program is to test whether the ages of laboratory animals is an important consideration in experimental outcomes in the study of disease pathology, degenerative condition, response to therapy, intervention or environmental exposure.
- 2016-2019 Testing the preclinical efficacy of therapies for prolific vitreoretinopathy.
Department of Defense
PI (\$1,496,892)
The goal of this project is to test the efficacy of drugs for a blinding condition currently lacking specific treatments.
- 2018-2022 Role of Runx1 in pathological ocular angiogenesis
NIH/NEI R01
Co-Investigator (\$2,462,500)
The goal of the program is to examine the role of the Runx1 transcription factor in pathological ocular angiogenesis using in vitro and in vivo models.
- 2018-2022 Charting vascular contributions to white matter disease in familial Alzheimer's disease and CADASIL
NIH/NINDS RF1
PI (\$3,524,983)
The goal of this project is to examine genetic interactions between genes associated to small vessel disease and Alzheimer's disease using mouse models and postmortem human tissue
- 2018 Charting cell-cell interactions in the retinal vasculature using volume electron microscopy.
RPB
PI (\$38,000)
The goal of this program is to functionally characterize microdomains of vascular cell-cell interaction in the retina using volume transmission electron microscopy.

Projects Submitted for Funding

- 2019-2022 "Therapeutic development of an antibody targeting Notch3 signaling to prevent mural cell loss in diabetic retinopathy".

Department of Defense

PI (\$3,000,000)

The goal of this project is to test the efficacy of drugs for a blinding condition currently lacking specific treatments.

Training Grants and Mentored Trainee Grants

2018-2020 Role of Runx1 in proliferative diabetic retinopathy
Funded by Alfonso Martin Escudero Foundation Fellowship
Mentor of Dr. Santiago Delgado-Tirado
The major goal of this fellowship is to study the role of Runx1 in proliferative diabetic retinopathy

Report of Local Teaching and Training

Teaching of Students in Courses

2003	Molecular Biology (BCMP 200) Ph.D. students in Biological and Biomedical Sciences.	Harvard Medical School 2-hr sessions per wk for 7 wks
2009	Molecular and Cellular Biology (MCB54) Undergraduate sophomores	Harvard College 3-hr session and lab per wk for 8 wks
2009-2011	Life Sciences (LS1a) Undergraduate freshmen	Harvard College 3-hr session and lab per wk for 8 wks each year
2010-2012	Life Sciences (LS1b) Undergraduate freshmen	Harvard College 3-hr session and lab per wk for 8 wks each year
2011	Harvard Crimson Academy High school students attending Harvard summer school	Harvard College 4-hr session per wk for 4 wks
2014-2017	Conduct of Science Graduate students in the Division of Medical Sciences at HMS.	Harvard Medical School 1.5-hr session per wk for 5 wks.
2016	The Molecular pathology and Current Therapies for Retinal Diseases Notch signaling in ischemic stroke, CADASIL and diabetic retinopathy.	Harvard Medical School 4-hr session

2016	Blood Vessels and Endothelial Cell Phenotypes in Health and Disease Notch signaling in ischemic stroke, CADASIL and diabetic retinopathy.	Harvard Medical School 2-hr session
2017	BBS 330 Proposal writing, Section leader Graduate students in the Division of Medical Sciences at HMS	Harvard Medical School 2 hr session per week for 5 weeks
2016 - 2018	PhD Pathfinder Course, Director Graduate students in the Division of Medical Sciences at HMS	Harvard Medical School 15 hr session

Formal Teaching of Residents, Clinical Fellows and Research Fellows (post-docs)

2007	Linking Notch 3 signaling to stroke Graduate students and postdoctoral fellows	HMS, Nanocourse 1-hr lecture
2011-2012	Head Teaching Fellow in Life Sciences (LS1b) for Harvard College freshmen students. Teaching fellows	Harvard College 2-hr session per wk for 4 wks each year
2012-2018	The Hitchhiker's Guide to Diabetic Retinopathy Postdoctoral and Clinical Fellows	Molecular Bases of Eye Disease Course, SERI 2-hr lecture each year

Laboratory and Other Research Supervisory and Training Responsibilities

2002	Training in molecular biology to undergraduate student Manuel Navarro-Gonzalez, Kosik Lab/HMS. Currently Ph.D. Animal Research Coordinator, University of Australia. Co-authored one peer-reviewed manuscript.	Daily mentorship for 6-months
2008	Training in molecular biology to medical student Carolina Ospina, Artavanis Lab/HMS. Currently Research Fellow, Yale University School of Medicine. Co-	Daily mentorship for 3 months

authored one peer-reviewed manuscript.

2013	Training and mentoring in cell biology to undergraduate student Alexandra James from Peninsula College of Medicine and Dentistry, University of Exeter, UK., D'Amore Lab/SERI. American Heart Association Undergraduate Summer Fellowship.	Daily mentorship for 3 months
2011-2014	Training and mentoring in vision research to Dr. Cammi Valdez. HMS BBS Program, D'Amore Lab/SERI. Currently, Assistant Director of Undergraduate Research at Harvard College. Co-first authored one peer-reviewed manuscript in <i>American Journal of Pathology</i> and one review article in <i>Current Diabetes Report</i>	Daily mentorship for 3 yrs
2014	Training and mentoring in cell biology to undergraduate student Mark Graham from Peninsula College of Medicine and Dentistry, University of Exeter, UK., D'Amore Lab/SERI. CADASIL Association Undergraduate Fellowship.	Daily mentorship for 3 months
2012-2014	Training and mentoring in vision research to research assistant Vincent Primo, SERI. Co-first authored two peer-reviewed manuscripts in <i>IOVS</i> and <i>Brain Research</i> and one book chapter in <i>Methods Molecular Biology</i> . Currently a Ph.D. graduate student program at Boston College.	Daily mentorship for 2 yrs
2014-2016	Advisor to Ph.D. student Shang Gao, Jakobs Lab/SERI. Molecular Basis of Eye Diseases Program, SERI/HMS.	Advisory meetings every six month to date
2014-2016	Training and mentoring in vision research to Research assistant Alexander Bigger-Allen, SERI. Co-authored two peer-reviewed research articles in <i>Brain Research</i> and <i>Molecular Vision</i> and one book chapter in <i>Methods Molecular Biology</i>	Advisory meetings weekly for 2 years
2014- 2015	Training and mentoring in vision research and gene profiling to HMS medical student Daniel Oh, SERI, HHMI. Co-authored a	Advisory meetings weekly for one year

peer-reviewed research article in *Diabetes*

2015	Training and mentoring in vision research and validation of gene screens to undergraduate student Kahira Saez, SERI, Amgen Fellows Program, Harvard College	Daily mentorship for 3 months
2015	Training and mentoring in vision research and validation of gene screens to graduate student Carlos Restrepo, SERI, CES University. Co-authored a peer-reviewed research manuscript in <i>Vision Research</i>	Daily mentorship for 3 months
2015	Training and mentoring in neuroscience to undergraduate student Sam Scott, SERI, University of Massachusetts, Amherst	Daily mentorship for 3 months
2016	Training and mentoring to medical student Jonathan Cardona-Velez, SER, Universidad Pontificia Bolivariana. Co-authored a peer-reviewed research manuscript in <i>Diabetes</i>	Daily mentorship for 1 year
2016	Training and mentoring in Notch research to visiting fellow Ethan Stillman, SERI	Daily mentorship for 6 months
2016	Training and mentoring to undergraduate student Anissa Boutable, SERI, Université Grenoble Alps	Daily mentorship for 6 months
2016	Training and mentoring to undergraduate student Juan Rodriguez, SERI	Weekly mentorship for 2 months
2017	Training and mentoring to graduate student Said Arevalo, Sabana University, Santafe de Bogota, Colombia	Weekly mentorship for 6 months
2017	Training and mentoring to medical student Isabel Lopez, El Paso University, Boston Area Diabetes Research Center (BADERC) Summer Fellowship	Weekly mentorship for 2 months
2017	Training and mentoring to undergraduate student David Leyton, School of Engineering of Antioquia, Medellin, Colombia, School of Engineering of Antioquia Seed Fund Grant	Weekly mentorship for 12 months
2018	Training and mentoring to Graduate student Gido Gravesteijn, Department of Clinical Genetics, Leiden University Medical Center, Leiden, The Netherlands.	Weekly mentorship for 2 months

2018	Training and mentoring to Undergraduate student Natalia Chmielewska, Boston College	Weekly mentorship to date
2018	Training and mentoring to Undergraduate student Harper Gordon, Harvard College	Weekly mentorship to date
2018	Training and mentoring to Undergraduate student Olivia Lesiczka, Boston College	Weekly mentorship to date
2018	Training and mentoring to Undergraduate student Derrick Liu, University of Massachusetts, Amherst	Weekly mentorship for 2 months
2018	Training and mentoring to High School student Enzali Myint Eastchester High School	Weekly mentorship for 2 months

Other Mentored Trainees and Faculty

2011-2012	Training and mentoring in cell biology to undergraduate student Alexandra James. Internship Program, Peninsula College of Medicine and Dentistry, University of Exeter, UK. Co-authored one peer-reviewed manuscript. Currently enrolled in medical school in the UK.	Daily mentorship for 12 months
2012-2013 2014-2015	Training and mentoring in cell biology to undergraduate student Mark Graham. Internship Program, Peninsula College of Medicine and Dentistry, University of Exeter, UK. Co-authored one peer-reviewed manuscript. Currently in a Ph.D. graduate student program at University of Bristol, UK.	Daily mentorship for 12 months
2015- 2017	Training and mentoring in vision research and neuroscience to postdoctoral fellow Dr. Diana Sanchez, SERI. Co-authored a book chapter in <i>Methods Molecular Biology</i> . Currently Alliance Manager at Harvard Office of working with Harvard's Office of Technology Development	Advisory meetings weekly for 2 years
2014-2016	Training and mentoring in vision research and genetics of diabetic retinopathy to postdoctoral fellow Christina Marko, SERI. Co-authored a peer-reviewed research	Advisory meetings weekly for 2 years

manuscript published in *Molecular Vision* and a review article published in *Current Diabetes Reports*. Currently working as research assistant and science editor for Joan Miller, Chair of the Harvard Ophthalmology Department

2016	Training and mentoring in vision research and genetics of diabetic retinopathy to Harvard Medical School BBS Program Ph.D student Kwong Ee See	Advisory meetings weekly for 3 months
2016	Training and mentoring in vision research and genetics of CADASIL to Harvard Medical School BBS Program Ph.D. student Andrew Goldfarb	Advisory meetings weekly for 3 months
2015 - 2017	Training and mentoring in vision research and genetics of diabetic retinopathy to postdoctoral fellow Dr. Jonathan Lam, SERI. Co-first authored a peer-reviewed manuscript published in <i>Diabetes</i> . Currently student of Optometry at New England School of Optometry	Advisory meetings weekly to date
2015 - 2017	Training and mentoring in vision research and genetics of diabetic retinopathy to postdoctoral fellow Dr. Angie Sanchez, SERI. Co-first authored a peer-reviewed manuscript published in <i>Vision Research</i> and co-authored a peer-reviewed manuscript published in <i>Diabetes</i> . Currently a postdoctoral fellow in Leo Kim's lab at SERI.	Advisory meetings weekly to date
2014- 2017	Training and mentoring in vision research and molecular imaging to postdoctoral fellow Dr. Arturo Machuca, SERI, CONACYT fellow. Co-first authored two peer-reviewed manuscripts published in the <i>Journal of Experimental Medicine</i> and <i>IOVS</i> . Currently a postdoctoral fellow in the laboratory of Dr. Thierry Alquier, University of Montreal	Advisory meetings weekly to date

2017-	Training and mentoring in vision research to postdoctoral fellow Dr. Santiago Delgado-Tirado. Funded by Alfonso Martin Escudero Foundation Fellowship	Advisory meetings weekly to date
2018-	Training and mentoring in vision research to undergraduate student, Internship Program, Universidad de la Sabana, Santafe de Bogota, Colombia	Advisory meeting weekly to date
2018	Training and mentoring in vision research to postdoctoral fellow Dr. Hannah Whitmore in collaboration with Dr. Leo Kim	Advisory meeting weekly to date

Local Invited Presentations

No presentations below were sponsored by outside entities.

2008	Atypical Notch 3 Mutations in CADASIL/ New England Journal of Medicine CPC MGH
2011	Notch Signaling in Ischemic Stroke and CADASIL/ Vascular Biology Seminar Series Department of Pathology, BWH
2011	The Role of Notch Signaling in Diabetic Retinopathy/ 29 th Annual Vascular Program Retreat CHB
2011	Notch Signaling in the Pathobiology of Diabetic Retinopathy/ Trainee's Work in Progress Seminar Series SERI
2012	Notch Signaling in Diabetic Retinopathy/ Retina Workshop-Diabetic Retinopathy Joint Meeting SERI
2014	Notch Functions in Retinal Pericytes; Implications for the Pathobiology of Diabetic Retinopathy/ SERIEs Seminars SERI
2015	Constructing and Deconstructing the Neurovascular Unit/BBS Faculty Seminar HMS
2015	Integrating Genomics and Transcriptomics towards an Individualized Medicine Approach in Proliferative Diabetic Retinopathy/SERIEs Seminars SERI
2015	Mentor Mentee Relationships Responsible Conduct of Research/Trainee's Work in

Progress Seminar Series
SERI

- 2016 Update on AMD Research/Grimshaw-Gudewicz Charitable Foundation Visit
SERI
- 2016 Notch signaling in diabetic retinopathy/Presentation to LV Prasad Eye Institute Board
SERI
- 2016 Role of Amyloid in age-related macular degeneration/AMD Center of Excellence Interest Group
SERI
- 2017 Diabetic Retinopathy & Retinal Neovascularization /Molecular bases of eye disease Course
SERI
- 2017 Progress and Challenges Towards Precision Medicine in Diabetic Retinopathy/ Diabetic Eye Disease Center of Excellence
MEE
- 2018 Diabetic Retinopathy & Retinal Neovascularization /Molecular bases of eye disease Course
SERI
- 2018 Mural Cell Protection in small vessel disease/ Diabetic Eye Disease Center of Excellence
MEE
- 2018 Leveraging epiretinal membranes for discovery in diabetic retinopathy and proliferative vitreoretinopathy/ Ophthalmology Grand Rounds
MEE
- 2018 Leveraging epiretinal membranes for discovery in diabetic retinopathy and proliferative vitreoretinopathy/ Ophthalmology Grand Rounds
MEE

Report of Regional, National and International Invited Teaching and Presentations

Invited Presentations and Courses

Those presentations below sponsored by outside entities are so noted and the sponsor(s) are identified.

Regional

- 2017 Targeting Notch3 signaling in small vessel disease/ Plenary Talk
Stroke Center, Massachusetts General Hospital, Boston, MA

- 2010 Notch Signaling in Ischemic Stroke and CADASIL Pathophysiology/ Plenary Talk
The Angiogenesis Foundation, 8th International M. Judah Folkman Conference;
Cambridge, MA
- 2017 Preserving pericytes with Notch 3 agonists and curbing endothelial cells with Runx1
antagonists/Talk
Boston Angiogenesis Meeting, Boston, MA
- 2018 Keynote Lecture: Charting your Own Path Towards Career Development/Career
Development Series for Postdoctoral Fellows/New England Science Symposium at
Harvard Medical School
HMS
- National**
- 2012 Notch Signaling in Ischemic Stroke and CADASIL/ Seminar
Genentech, San Francisco, CA (Sponsored by Genentech)
- 2012 Notch Signaling in CADASIL/ Seminar
CADASIL Forum, Salt Lake City, UT (Sponsored by CADASIL Forum)
- 2012 Notch Signaling in the Pathobiology of Diabetic Retinopathy/ Plenary Talk (abstract)
Society for Neuroscience Meeting, New Orleans, LA
- 2013 Notch Signaling in CADASIL, Stroke, and Diabetic Retinopathy/ Grand Rounds
Methodist Hospital, Houston, TX (Sponsored by Methodist Hospital)
- 2014 Notch Functions in Retinal Pericytes; Implications for the Pathobiology of Diabetic
Retinopathy/ Seminar
Cerebral Microcirculation Unit, NIH Intramural, Bethesda, MD (Sponsored by NIH)
- 2015 Towards and individualized medicine approach in proliferative diabetic retinopathy/
Seminar
Department of Ophthalmology, Eugene and Marilyn Glick Eye Institute, Indiana
University School of Medicine, Indianapolis, IN (Sponsored by University of Indiana)
- 2015 Notch signaling control of neurovascular unit integrity: implications for the pathobiology
of diabetic retinopathy
ARVO Diabetic Retinopathy Conference, NIH, Bethesda, MD, USA (Sponsored by
ARVO)
- 2017 Preparing the Next Generation of Neuroscience Leaders (breakout sessions co-moderator)

Neuroscience Scholars Program, Washington D.C., USA (Sponsored by the Society for
Neuroscience)
- 2017 Patient-inspired modalities of treatment for diabetic retinopathy and vascular dementia
(Discovery Lecture Series)

Biodesign Institute, Tempe, Arizona (Sponsored by Biodesign Institute)

- 2017 Targeting Notch 3 Signaling in Cerebral Small Vessel Disease (Translational vascular medicine seminar)
Department of Health and Human Services, National Heart and Lung Institute, National Institutes of Health, Bethesda, Maryland
- 2017 Therapeutic Targeting of Notch 3 Signaling for Cerebral Small Vessel Disease (Plenary talk)
Antibody Engineering & Therapeutics Conference, San Diego, California (Sponsored by Knect365)
- 2017 Constructing and deconstructing the neurovascular unit (Seminar)
School of Biological and Health Systems Engineering, Ira A. Fulton Schools of Engineering, Arizona State University, Arizona
- 2017 Curbing aberrant angiogenesis with Runx1 antagonist and preserving pericytes with Notch 3 agonists (Vascular Biology Seminar Series)
University of California Los Angeles, Los Angeles, California
- 2018 Therapeutic Targeting of Notch 3 Signaling for Cerebral Small Vessel Disease (Webinar)
Antibody Engineering & Therapeutics Digital Week
- 2018 An in-vivo Model of Proliferative Vitreoretinopathy (PVR) by Intravitreal Injection of Cells from Human-derived PVR Membranes in Rabbits (plenary talk)
Military Health System Research Symposium, Orlando, Florida
- 2018 Notch 3 Signaling in Small Vessel Disease and CADASIL and failed attempts to get away from Notch (plenary talk)
Notch Gordon Conference in Developmental, Regeneration and Disease, Maine

International

- 2002 C455R Notch3 Mutation in a Colombian CADASIL Kindred with Early Onset of Stroke/
Plenary Talk
First International CADASIL Congress-Karolinska Institute; Stockholm, Sweden
- 2007 Molecular Genetics of Notch Diseases/ Plenary Talk
College de France Seminar Series; Paris, France
- 2007 CADASIL's Enigmas/ Hauser Scholar Lecture
Neuroscience Group of Antioquia; Medellin, Colombia
- 2007 CADASIL in a Notch-shell/ Plenary Talk
The Notch Meeting; Athens, Greece
- 2010 Cell Signaling in Small-Vessel Disease/ Neuroscience Seminar Series
University of Ottawa; Ottawa, Canada (Sponsored by University of Ottawa)

- 2017 Novel modality of treatment for small vessel disease, 9th Latin American Congress of Cell Biology/ Plenary Talk
University of Antioquia; Medellin, Colombia (Sponsored by the Latin American Society in Cell Biology)

Report of Technological and Other Scientific Innovation

- 2016 US Patent Application, No. 62/422,523, filed November 15, 2016: compositions and methods for the treatment of aberrant angiogenesis
- 2017 US Patent Application, No. 62/477,271, filed March 27, 2017: nucleic acid-based compositions and methods for treating small vessel diseases
- 2017 U.S. Patent Application, No. 62/477,289, filed March 27, 2017: Notch3 agonist compositions and methods for treating small vessel diseases
- 2017 U.S. Patent Application, No. 62/477,274, filed March 27, 2017: blood biomarkers and diagnostic methods for small vessel diseases
- 2017 U.S. Patent Application, No. 62/586,027, filed November 14, 2017: Nano-emulsion of CBF β -Runx1 inhibitor for ocular drug delivery
- 2017 U.S. Patent Application, No. 62/586,067, filed November 14, 2017: Compositions and methods for the treatment of proliferative vitreoretinopathy
- 2018 U.S. Patent Application, Methods for the treatment of Alzheimer's disease and other dementias

Report of Education of Patients and Service to the Community Activities

- 2014 Participant at Researchers Table for American Diabetes Association Step Out Kick Off
- 2014 Speaker at the American Diabetes Association Step Out Kick Off, American Diabetes Association, Boston Common.
- 2015 Speaker at the Massachusetts Lions District 33N Mid Winter Saturday Morning Business Meeting
- 2015 Organizer and Speaker at Update Event to the Board of the CADASIL Association, SERI

Educational Material for Patients and the Lay Community

Patient educational material

2013-2014 EMBRACE

Q&A Expert

Patient education pamphlet,
CADASIL Association

Report of Scholarship

Publications

Peer reviewed publications in print or other media

- 1) Lopera F, **Arboleda J**, Almeida N, Moreno S, Cuartas M, Arcos – Burgos M. Clinical Characterization of a Large Family with Hereditary Cerebro Vascular Disease in Colombia. Revista de Neurologia. 2000; 31 (10): 901 – 907. (Spanish)
- 2) Lopera F, **Arboleda J**, Rivera N, Restrepo T, Moreno S, Almeida N, Arcos-Burgos M. Segregation Analysis of a Large Family with Hereditary Cerebro Vascular Disease in Colombia. Revista de Neurologia. 2001; 32(3):222-5. (Spanish)
- 3) Arcos-Burgos M, Restrepo T, Rivera D, Palacio L, Castaneda M, Palacio O, **Arboleda J**, Lopera F. Vascular Dementia CADASIL in Colombia. III Linkage Analysis. Revista de Neurologia. 2001; 32(8):701-704. (Spanish)
- 4) **Arboleda-Velasquez JF**, Lopera F, Lopez E, Frosch MP, Sepulveda-Falla D, Gutierrez JE, Vargas S, Medina M, Martinez De Arrieta C, Lebo RV, Slaugenhaupt SA, Betensky RA, Villegas A, Arcos-Burgos M, Rivera D, Restrepo JC, Kosik KS. C455R Notch3 mutation in a Colombian CADASIL kindred with early onset of stroke. Neurology. 2002 Jul 23;59(2):277-9.
- 5) **Arboleda-Velasquez JF**, Rampal R, Fung E, Darland DC, Liu M, Martinez MC, Donahue CP, Navarro-Gonzalez MF, Libby P, D'Amore PA, Aikawa M, Haltiwanger RS, Kosik KS. CADASIL mutations impair Notch3 glycosylation by Fringe. Human Molecular Genetics. 2005 Jun 15;14(12):1631-9.
- 6) Rampal R, **Arboleda-Velasquez JF**, Nita-Lazar A, Kosik KS, Haltiwanger RS. Highly conserved O-fucose sites have distinct effects on Notch1 function. Journal of Biological Chemistry. 2005 Sep 16;280(37):32133-40.
- 7) Fung E, Tang SM, Canner JP, Morishige K, **Arboleda-Velasquez JF**, Cardoso AA, Carlesso N, Aster JC, Aikawa M. Delta-like 4 induces notch signaling in macrophages: implications for inflammation. Circulation. 2007 Jun 12;115(23):2948-56.

- 8) **Arboleda-Velasquez JF***, Zhou Z*, Shin HK, Louvi A, Kim H-H, Savitz S, Liao J, Salomone S, Ayata C, Moskowitz MA, Artavanis-Tsakonas S. Linking notch signaling to ischemic stroke. Proceedings of the National Academy of Sciences U S A. 2008 March 25; 105 (12):4856-61. (*contributed equally to this manuscript)

- 9) Brass SD, Smith EE, **Arboleda-Velasquez JF**, Copen WA, Frosch MP. Case records of the Massachusetts General Hospital. Case 12-2009. A 46-year-old man with migraine, aphasia, and hemiparesis and similarly affected family members. New England Journal of Medicine. 2009 Apr 16; 360(16):1656-65.

- 10) **Arboleda-Velasquez JF**, Manent J, Lee JH, Tikka S, Ospina C, Vanderburg CR, Frosch MP, Rodríguez-Falcón M, Villen J, Gygi S, Lopera F, Kalimo H, Moskowitz MA, Ayata C, Louvi A, Artavanis-Tsakonas S. Hypomorphic Notch 3 alleles link Notch signaling to ischemic cerebral small-vessel disease. Proceedings of the National Academy of Sciences U S A. 2011 May 24;108(21):E128-35. Epub 2011 May 9.

- 11) **Arboleda-Velasquez JF***, Primo V*, Graham M, James A, Manent J, D'Amore PA. Notch signaling functions in retinal pericyte survival. Investigative Ophthalmology & Visual Science. 2014 Jul 11;55(8):5191-9. (*contributed equally to this manuscript)

- 12) Valdez CN*, **Arboleda-Velasquez JF***, Amarnani DS, Kim LA, D'Amore PA. Retinal microangiopathy in a mouse model of inducible mural cell loss. American Journal of Pathology. 2014 Oct;184(10):2618-26. (*contributed equally to this manuscript)

- 13) Kim LA, Wong, LL, Amarnani DS, Bigger-Allen, AA, Hu Y, Marko CK, Elliott D, Shah VA, McGuone D, Stemmer-Rachamimov AO, D'Amore PA*, **Arboleda-Velasquez JF***. Characterization of cells from patient-derived fibrovascular membranes in proliferative diabetic retinopathy. Molecular Vision. 2015. Jun 12;21:673-87. (*co-corresponding authors)

- 14) Quiroz YT, Schultz A, Chen K, Protas H, Brickhouse M, Fleisher AS, Langbaum JB, Thiyyagura P, Fagan AM, Shah AR, Muniz M, **Arboleda-Velasquez JF**, Munoz C, Garcia G, Acosta-Baena N, Giraldo M, Tirado V, Ramirez D, Tariot PN, Dickerson BC, Sperling RA, Lopera F, Reiman EM. Brain imaging and blood biomarker abnormalities in children with autosomal-dominant Alzheimer's disease: A cross-sectional Study. JAMA Neurology. 2015. Aug 1;72(8):912-9.

- 15) Primo VA, Graham M, Bigger-Allen A, Chick JM, Ospina C, Quiroz YT, Manent J, Gygi SP, Lopera F, D'Amore PA, **Arboleda-Velasquez, JF**. Blood Biomarkers in a Mouse Model of CADASIL, Brain Research, 2016; 1644:118-26.

- 16) Ung C, Sanchez AV, Shen L, Davoudi S, Ahmadi T, Gomez DN, Chen CJ, Hancock H, Penman A, Hoadley S, Consugar M, Restrepo C, Shah VA, **Arboleda-Velasquez JF***, Sobrin L*, Gai X*,

Kim, LA*. Whole Exome Sequencing Identification of Novel Candidate Genes in Patients with Proliferative Diabetic Retinopathy. Vision Research, 2017 May 9. pii: S0042-6989(17)30054-8. PMID: 28431867 (*co-corresponding authors)

- 17) Amarnani D, Machuca-Parra AI, Wong LL, Marko CK, Stefater JA, Stryjewski TP, Elliott D, Arboleda-Velasquez JF, Kim LA. Effect of Methotrexate on an In Vitro Patient-Derived Model of Proliferative Vitreoretinopathy. Invest Ophthalmol Vis Sci. 2017 Aug 1;58(10):3940-3949. PMID: 28777835
- 18) Jonathan D. Lam JD, Oh DJ, Wong LL, Amarnani D, Park-Windhol C, Sanchez AV, Cardona-Velez J, McGuone D, Stemmer-Rachamimov AO, Elliott D, Bielenberg DR, van Zyl T, Shen L, Gai X, D'Amore PA, Kim LA, **Arboleda-Velasquez JF**. Identification of RUNX1 as a mediator of aberrant retinal angiogenesis, Diabetes, 2017, *In Press*
- 19) Machuca-Parra AI, Bigger-Allen AA, Sanchez AV, Boutabla A, Cardona-Vélez J, Amarnani D, Saint-Geniez M, Siebel CW, Kim LA, D'Amore PA, **Arboleda-Velasquez JF**. Therapeutic antibody targeting of Notch 3 signaling prevents mural cell loss in CADASIL. Journal of Experimental Medicine, 2017, Aug 7;214(8):2271-2282. PMID: 28698285
- 20) Quiroz YT, Sperling RA, Norton DJ, Baena A, **Arboleda-Velasquez JF**, Cosio D, Schultz A, Lapoint M, Guzman-Velez E, Miller JB, Kim LA, Chen K, Tariot PN, Lopera F, Reiman EM, Johnson KA. Association Between Amyloid and Tau Accumulation in Young Adults With Autosomal Dominant Alzheimer Disease. JAMA Neurol. 2018 May 1;75(5):548-556. PMID: 29435558

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

Reviews and Chapters

- 1) CADASIL: a critical look at a Notch disease. Authors: Louvi A, **Arboleda-Velasquez JF**, Artavanis-Tsakonas S. Developmental Neuroscience. 2006;28(1-2):5-12.
- 2) Vasculogenesis and Angiogenesis. Authors: **Arboleda-Velasquez JF** and D'Amore PA. Chapter in Cellular and Molecular Pathobiology of Cardiovascular Disease, Elsevier, February, 2014.
- 3) Isolation and Transfection of Primary Culture Bovine Retinal Pericytes. Authors: Primo, VA and **Arboleda-Velasquez JF**. Chapter in Methods Mol Biol. 2016;1430:107-17.
- 4) From pathobiology to the targeting of pericytes for the treatment of diabetic retinopathy. Authors: **Arboleda-Velasquez JF**, Valdez C, Marko CK, D'Amore PA. Review in Current Diabetes Reports. 2015 Feb;15(2):573.
- 5) Coculture Assays for Endothelial Cells-Mural Cells Interactions. Sánchez-Palencia DM, Bigger-Allen A, Saint-Geniez M, **Arboleda-Velásquez JF**, D'Amore PA. Chapter in Methods Mol Biol. 2016;1464:35-47.

Thesis

Notch signaling in ischemic stroke and in CADASIL. Advisor: Dr. Spyros Artavanis-Tsakonas. Biological and Biomedical Sciences Program at Harvard Medical School.

Abstracts, Poster Presentations and Exhibits Presented at Professional Meetings

- 2012 ARVO Conference, “Notch-mediated cell-cell interactions in the pathophysiology of diabetic retinopathy” (poster), Fort Lauderdale, Florida, USA.
- 2013 ARVO Conference, “Notch signaling misregulation in retinal pericytes exposed to high glucose” (poster), Seattle, WA, USA.
- 2013 Society for Neuroscience Meeting, “Notch signaling functions in retinal pericytes” (poster), San Diego, CA, USA.
- 2014 ARVO Conference, “Notch signaling functions in retinal pericytes survival” (poster), Orlando, FL, USA.
- 2014 Society for Neuroscience Meeting, “Retinal Microangiopathy in a Mouse Model of Inducible Mural Cell Loss” (poster), Washington D.C.
- 2015 ARVO Conference, “Adult Notch 3 deficient mice exhibit extensive mural cell loss in the retinal vasculature” (poster), Denver, CO, USA.
- 2015 MHSRS, “Development of a Bioreactor to Model Proliferative Vitreoretinopathy using Human Cells Derived from Vitrectomy Surgical Specimens” (poster), Fort Lauderdale, FL, USA.
- 2015 Society of Neuroscience Meeting, “Design of a neurovascular unit device using tissue engineering techniques for the study of cerebral microvascular permeability in stroke” (poster), Chicago, IL, USA.
- 2015 “Tau and amyloid imaging in a Colombian kindred with autosomal-dominant Alzheimer’s disease” (poster), Miami, FL
- 2016 Society of Neuroscience Meeting, “Transcriptomic analysis of retinal pericytes exposed to high glucose and Notch signaling” (poster), San Diego, CA.
- 2017 ARVO Conference, “Runx1 is a mediator of aberrant angiogenesis in vitro”, (talk), Baltimore, MD.
- 2017 ARVO Conference, “Inhibition of aberrant angiogenesis by the benzodiazepine Ro5-3335 targeting Runx1” (poster), Baltimore, MD.
- 2017 Retina Society Meeting, “Intravitreal Inhibition of RUNX1 Reduces Pathologic Retinal Angiogenesis” (talk), Boston, MA.
- 2018 ARVO Conference, “Role of PIM3 kinase/Runx1 modulation in retinal neovascularization” (poster), Honolulu, HI

Narrative Report

• My academic career has focused on the pathobiology underlying small-vessel diseases (SVDs). SVDs are prevalent systemic conditions affecting multiple organs including the retina, brain, kidney, and other richly perfused tissues. My most significant achievements to date include demonstration of: 1) a role for Notch signaling, a fundamental cell signaling mechanism that regulates cell fate decisions, in the pathophysiology of CADASIL (cerebral autosomal dominant arteriopathy with subcortical infarcts and leukoencephalopathy), a SVD in the brain, and more generally, in ischemic stroke; 2) a role for pericytes, the vascular cells that, with endothelial cells, form the wall of capillaries, in retinal microvasculature stability in the adult, a finding relevant to a retinal SVD called diabetic retinal microangiopathy; and 3) the discovery of a role for the transcription factor Runx1 in aberrant angiogenesis. Nearly seventy-five percent of my effort is devoted to research and scholarship, with the rest allocated to the teaching and mentoring of trainees.

My early career work on CADASIL, a neurological condition characterized by stroke and vascular dementia, took me from the clinical characterization of two families from my home country of Colombia to Harvard Medical School, where I conducted molecular studies of mutant Notch 3 receptors in culture systems, and generated novel knock-in mouse models that replicated a genotype-phenotype correlation first observed in my patients. I recently took my CADASIL work towards translational applications by characterizing blood biomarkers linked to the pathobiology of the disease and by establishing the preclinical feasibility of a modality of treatment based on Notch 3 signaling normalization. My current research program also encompasses diabetic retinopathy (DR), the most common cause of permanent blindness in working adults in the US. Consistent with my long-standing interest in small-vessels, I am focused on microvascular pathology changes associated with early and late stage DR. I recently published three manuscripts relevant to this condition. In one manuscript, we used inducible cell ablation studies in mice to provide evidence for a role of pericytes in retinal microvascular stability in adult tissues; in the second manuscript, we identified Notch signaling as a crucial cell signaling mechanism regulating retinal pericyte survival using *in vitro* gene expression profiling, in the third manuscript, we report on the role of Runx1 in aberrant retinal angiogenesis.

More recently, I have initiated a research program addressing late stage DR using translational approaches. To this end, I am leading a collaborative project to create research protocols for the establishment of a precision medicine approach for proliferative DR through the integration of clinical, genetic, and biological data. In this project, I am exploring the possible role of rare/novel mutations of large effect in severe proliferative DR. To do so, I am using a recent methodological innovation in my laboratory, now published, allowing for the isolation and culture of cells from patient-derived fibrovascular membranes, which are surgically removed from patients carrying the mutations. This work may provide the conceptual basis for translational approaches under a precision medicine paradigm wherein patients are treated with drugs matching their genetic makeup.

The physiology I am exploring, combined with the molecular, human, and cellular studies I propose, ensure the development of novel and uniquely useful models to study SVDs with a focus on DR. In this regard, I recently began an effort in my lab to complement these standard models with newly developed three-dimensional culture systems resembling the neurovascular unit using biomimetic scaffolds. This is not only significant in the context of DR, but also because such models may prove valuable in our quest to understand the cellular and molecular mechanisms underlying vascular integrity, in general.