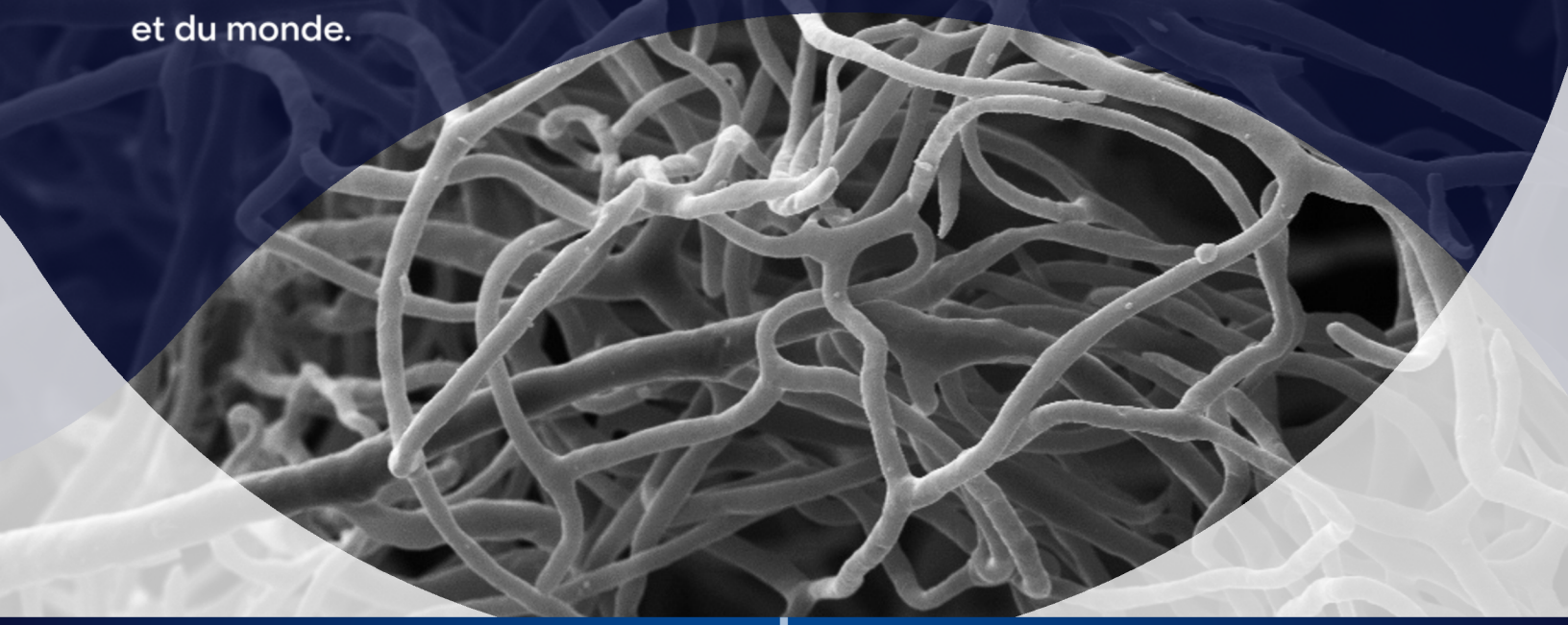
Université de Montréal
et du monde.

10 octobre 2025
October 10th 2025

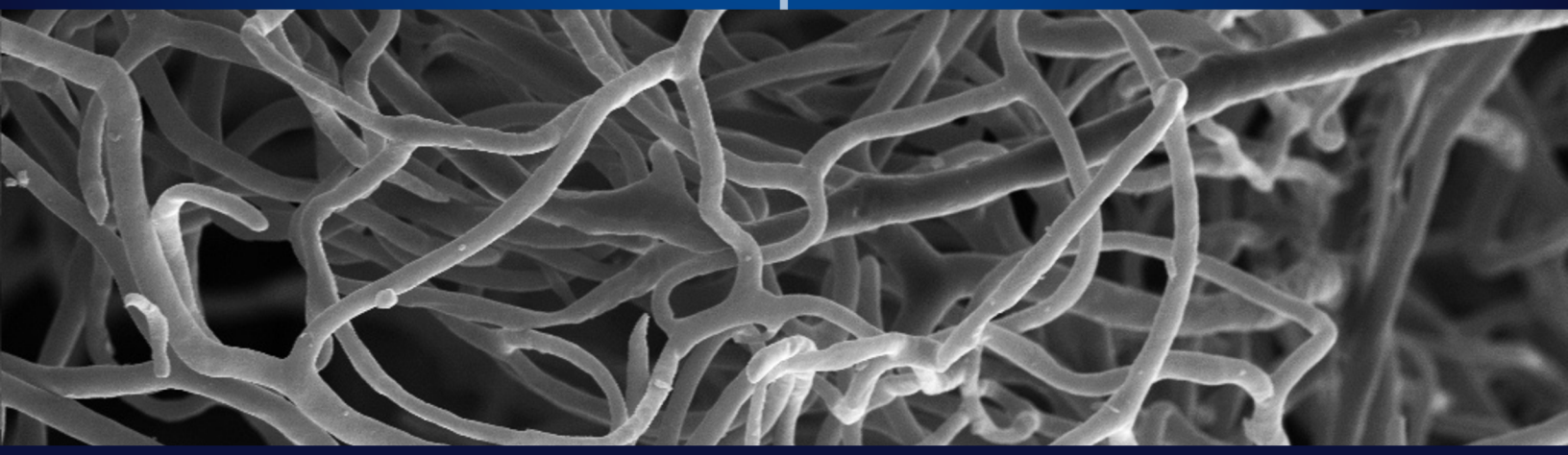


Programme du 4e **Symposium international sur l'angiogenèse rétinienne et choroïdienne**

De la recherche fondamentale à l'application clinique

Program of the 4th **International Symposium on Retinal and Choroidal Angiogenesis**

From basic research to clinical application



Centre de recherche du CHUM
CHUM Research Center

Amphithéâtre A / Amphitheater A
900, rue Saint-Denis
Montréal, QC H2X 0A9

RRSV
Réseau de recherche en sciences de la vision

Département d'ophtalmologie
Faculté de médecine
Université de Montréal

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Faculté de médecine
Département d'ophtalmologie

RRSV
Réseau de recherche
en sciences de la vision

4e Symposium international sur l'angiogenèse rétinienne et choroïdienne

Université de Montréal
Réseau de recherche en sciences de la vision
10 octobre 2025

4th International Symposium on Retinal and Choroidal Angiogenesis

University of Montreal
Vision Sciences Research Network
October 10th, 2025

PROGRAMME / *PROGRAM*

Événement en présentiel et par vidéoconférence /
Onsite and Online Event

Amphithéâtre A du Centre de recherche du CHUM
900, rue Saint-Denis, 5e étage
Montréal (QC) H2X 0A9

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COMITÉ SCIENTIFIQUE ET ORGANISATEUR

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Professeur affilié au Département de pharmacologie de l'Université McGill
Pédiatre et chercheur au Centre hospitalier universitaire Sainte-Justine
Chercheur au Centre de recherche de l'Hôpital Maisonneuve-Rosemont
Directeur de la recherche du Département d'ophtalmologie
Titulaire de la Chaire Léopoldine A. Wolfe de recherche clinique/translationnelle en prévention de la cécité causée par la dégénérescence maculaire liée à l'âge de l'Université de Montréal

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Ophtalmologiste au Centre hospitalier universitaire Sainte-Justine
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Ophtalmologiste au Centre universitaire d'ophtalmologie
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Flavio Rezende, M.D., Ph. D.

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Ophtalmologiste, chirurgien rétinologue au Centre universitaire d'ophtalmologie de l'Hôpital Maisonneuve-Rosemont

Przemyslaw (Mike) Sapieha, Ph. D.

Professeur titulaire au Département d'ophtalmologie de l'Université de Montréal

Professeur accrédité au Département de biochimie et médecine moléculaire de l'Université de Montréal

Directeur de l'unité de recherche des maladies neurovasculaires oculaires au Centre de Recherche de l'Hôpital Maisonneuve-Rosemont

Titulaire de la Chaire de Recherche du Canada en biologie cellulaire de la rétine

Titulaire de la Chaire du Fonds de recherche en ophtalmologie de l'Université de Montréal (FROUM)

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Directeur de l'unité de recherche sur l'angiogenèse développementale et pathologique au Centre de recherche de l'Hôpital Maisonneuve-Rosemont

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Benjamin Pellacani, B.A.A.
Coordonnateur aux activités enseignement et développement au Département d'ophtalmologie de l'Université de Montréal

SCIENTIFIC AND ORGANIZING COMMITTEE

Sylvain Chemtob, MD, PhD, FRCPC, FCAHS, FRSC

Tenured Professor, Departments of Pediatrics, Ophthalmology and Pharmacology, University of Montreal

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Paediatrician and Researcher, Centre hospitalier universitaire Sainte-Justine

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Holder of Léopoldine A. Wolfe Chair in Clinical/Translational Research for the Prevention of Blindness Caused by Age-Related Macular Degeneration of University of Montreal

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Holder of a Canada Research Chair in Retinal Cell Biology

Holder of the Ophthalmology Research Fund of the University of Montreal (FROUM) Chair

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Director of the Developmental and Pathological Angiogenisis Research Unit, Centre de recherche de l'Hôpital Maisonneuve-Rosemont

Alexandre Dubrac, PhD

Associate Professor, Department of Pathology and Cell Biology and

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Annie Blais, BA

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Benjamin Pellacani, BAA

Coordinator, Teaching and Development Activities, Department of Ophthalmology, University of Montreal

OBJECTIFS PÉDAGOGIQUES PRINCIPAUX

Le public cible de cet événement est les étudiants et professionnels en santé vasculaire.

L'objectif principal du 4e Symposium international sur l'angiogenèse rétinienne et choroïdienne est de donner l'occasion aux étudiants, résidents, professeurs, cliniciens et personnel paramédical l'opportunité de se familiariser avec les plus récentes avancées dans des domaines précis de l'ophtalmologie qui s'appliquent non seulement à la dégénérescence maculaire liée à l'âge, mais également aux rétinopathies ischémiques, telles dans le diabète et la prématurité.

Plus précisément, les objectifs pédagogiques de cet événement sont les suivants :

- Expliquer aux étudiants, résidents, professeurs, chercheurs et cliniciens les concepts en émergence dans le domaine de l'angiogenèse rétinienne et choroïdienne et les implications pour la pratique clinique.
- Identifier et souligner différentes études cliniques et applications cliniques contemporaines d'envergures en angiogenèse de la rétine et de la choroïde.
- Déterminer le rôle des mutations endothéliales et de l'intégrité anatomo-moléculaire de la vasculature dans les anomalies de vasculogénèse.
- Découvrir les processus de vieillissement et de régénérescence, y compris les enjeux immunologiques, dans la dégénérescence maculaire.
- Explorer le rôle du système nerveux autonome choroïdien dans les pathologies oculaires.
- S'inspirer du rôle de sénescence et de la mort cellulaire dans le cancer pour mieux comprendre les dégénérescences ischémiques de l'œil.
- Utilisation de superordinateurs et d'intelligence artificielle en biologie appliquée.
- Identifier de nouvelles cibles thérapeutiques dans la dégénérescence maculaire liée à l'âge.
- Se familiariser avec les dernières avancées dans la rétinopathie du prématuré.

OBJECTIFS PÉDAGOGIQUES PRINCIPAUX (suite)

- Découvrir l'exploration *in silico* et le potentiel de nouveaux candidats thérapeutiques et d'approches de livraison de médicaments dans les rétinopathies.
- Favoriser les échanges d'idées sur les recherches récentes portant sur l'angiogenèse rétinienne et choroïdienne entre étudiants de tous les niveaux (stagiaires, étudiants de premier cycle, M. Sc., Ph. D., SPD, étudiants en médecine, résidents, fellows), professeurs, chercheurs et cliniciens. Ceci inclut les interactions et discussions approfondies des sujets présentés.
- Établir de nouvelles collaborations dans le but d'améliorer la compréhension des pathologies oculaires vasoprolifératives et en conséquence les soins donnés.

Les objectifs pédagogiques spécifiques à chacune des présentations se retrouvent à la page du résumé pour cette présentation.

MAIN EDUCATIONAL GOALS

The target audience for this event is students and professionals in vascular health.

The main objective of the 4th International Symposium on Retinal and Choroidal Angiogenesis is to provide students, residents, professors, clinicians, and paramedical staff with the opportunity to familiarize themselves with the latest advances in specific areas of ophthalmology that apply not only to age-related macular degeneration but also to ischemic retinopathies, such as those in diabetes and prematurity.

More specifically, the educational goals of this event are as follows:

- *Explain to students, residents, professors, researchers, and clinicians emerging concepts in the field of retinal and choroidal angiogenesis and their implications for clinical practice.*
- *Identify and highlight various clinical studies and major clinical applications in retinal and choroidal angiogenesis.*
- *Determine the role of endothelial mutations and the anatomo-molecular integrity of the vasculature in vasculogenesis abnormalities.*
- *Discover the processes of aging and regeneration, including immunological issues, in macular degeneration.*
- *Exploring the role of the choroidal autonomic nervous system in ocular pathologies.*
- *Drawing inspiration from the role of senescence and cell death in cancer to better understand ischemic degeneration of the eye.*
- *The use of supercomputers and artificial intelligence in applied biology.*
- *Identify new therapeutic targets in age-related macular degeneration.*
- *Become familiar with the latest advances in retinopathy of prematurity.*

MAIN EDUCATIONAL GOALS (continued)

- *Discover in silico exploration and the potential of new therapeutic candidates and drug delivery approaches in retinopathies.*
- *Promote the exchange of ideas on recent research on retinal and choroidal angiogenesis among students of all levels (trainees, undergraduates, M.Sc., Ph.D., Post-Doc, medical students, residents, fellows), professors, researchers, and clinicians. This includes in-depth interactions and discussions of the topics presented.*
- *Establish new collaborations with the aim of improving understanding of vasoproliferative ocular pathologies and, consequently, the care provided.*

The specific educational goals for each presentation can be found on the abstract page of that presentation.

CONFÉRENCIERS / *GUEST SPEAKERS*

Jason Fish, PhD

Senior Scientist, Toronto General Hospital Research Institute, University Health Network
Full Professor, Laboratory Medicine & Pathobiology, University of Toronto
Toronto, Ontario CANADA

Dr. Jason Fish completed his PhD at the University of Toronto under the supervision of Dr. Philip Marsden. Here he uncovered a role for epigenetics in gene regulation in blood vessels. This was followed by a postdoctoral fellowship at the Gladstone Institute of Cardiovascular Disease and the University of California San Francisco under the supervision of Dr. Deepak Srivastava. Here, Dr. Fish uncovered a role for microRNAs in regulating the development of the cardiovascular system. Since moving back to Toronto in 2010, Dr. Fish and his team explore the mechanisms of gene regulation in the endothelium in health and disease. His recent work has uncovered how somatic mutations in the endothelium lead to sporadic brain arteriovenous malformations, a leading cause of stroke in young people. His laboratory is uncovering the mechanisms involved and is using this information to design new therapies. Dr. Fish's laboratory is also determining how chemotherapy affects the vascular system and how altered endothelial cell identity contributes to atherosclerosis.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Jean-Philippe Gratton, PhD
Full Professor and Chair
Department of Pharmacology and Physiology
Biomedical Innovation Center (CIB)
Faculty of medicine, Université de Montréal
Montreal, Quebec, CANADA

Dr. Jean-Philippe Gratton earned his Ph.D. in Pharmacology from the University of Sherbrooke, followed by a postdoctoral fellowship at Yale University School of Medicine with Dr. William Sessa. In 2002, he joined the Université de Montréal and the Institut de recherches cliniques de Montréal (IRCM) where he held a Tier 2 Canada Research Chair in endothelial cell biology and angiogenesis, during which he and his team advanced the understanding of pathophysiological mechanisms driving blood vessel formation.

In 2013, Dr. Gratton became a full professor and director of the Department of Pharmacology, and since 2017, he has been leading the Department of Pharmacology and Physiology at the Faculty of Medicine of Université de Montréal.

Dr. Gratton's research program focuses on identifying factors that control endothelial cell proliferation, differentiation, migration, and survival. Specifically, his laboratory investigates the intracellular signaling pathways leading to nitric oxide (NO) production by VEGF and the regulation of endothelial cell-cell junctions that modulate vascular permeability and angiogenic sprouting during neovessel formation.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Katie Bentley, PhD
Group Leader, The Francis Crick Institute
and Senior Lecturer, King's College
London, UNITED KINGDOM

Katie Bentley earned a PhD in Computer Science from University College London in 2006, investigating morphological plasticity in biological and robotic systems. During a Cancer Research UK postdoctoral fellowship, she developed highly predictive vascular computational models working with Holger Gerhardt and Paul Bates at the CRUK London Research Institute (LRI), 2006-2012. Katie was appointed Assistant Professor of Pathology, Harvard Medical School, running an experimental and computational lab at the Center for Vascular Biology Research, Beth Israel Deaconess Medical Center, Boston USA in 2013. She opened satellite vascular modelling labs at Uppsala University and Boston University to work on collaborative, grant funded projects.

In 2018, she moved back to the UK to establish the Cellular Adaptive Behaviour Lab at the Francis Crick Institute with a joint position as Senior Lecturer, King's College London. Her integrated experimental and computational lab investigates mechanisms of individual to collective cell behaviour driving tissue changes in development and disease, in the vasculature and beyond.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Joanne Matsubara, PhD
Professor. Dept of Ophthalmology and Visual Sciences
Faculty Lead, UBC Research Excellence Cluster in Vision
Eye Care Centre, University of British Columbia
Vancouver, British Columbia, CANADA

Dr. Matsubara is a Professor in Ophthalmology and Visual Sciences with over 25 years of experience in basic and translational research on neurodegenerative diseases of the eye and brain. Using cell culture and animal models, her work focuses on understanding the early cellular and molecular triggers of neuroinflammation and retinal degeneration, particularly in the wet and dry forms of age-related macular degeneration (AMD). Her translational, collaborative, and interdisciplinary work focuses on developing novel small-molecule drugs, advanced ocular drug delivery methods, and next-generation in vivo retina imaging for preclinical drug therapy assessment. Her team also develops fluorescent probes for in vivo visualization of retinal amyloid beta deposits to understand the ocular manifestations of Alzheimer's disease in mouse models.

As the Lead Investigator of UBC's Vision Sciences Research Excellence Cluster and a former department Director of Research, she has fostered cross-disciplinary collaborations across fields such as molecular and cellular biology, chemistry, computer sciences, biomedical engineering and entrepreneurship.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Jan Van Deursen, PhD
Founder and Principal Investigator at Cavalry Biosciences
Principal Investigator at Persistence Therapeutics
San Francisco, California, UNITED STATES

As a Principal Investigator in academia, I combined biochemical and cell biological approaches with genetic experiments in mice to address how cell cycle-related abnormalities contribute to tumorigenesis, with emphasis on processes that carry out faithful chromosome segregation.

In the early 2000s, we developed a BubR1 preclinical model for Mosaic Variegated Aneuploidy Progeria Syndrome (MVAPS). This led to the discovery that senescent cells drive aging and age-related diseases and established the novel therapeutic concept of senolysis (the selective elimination of pathological senescent cells) for the treatment of age-related diseases and the extension of healthy lifespans.

In 2011, I co-founded Unity Biotechnology with Nathaniel David, Judy Campisi, and Daohong Zhou to develop senolytic drugs that eliminate disease-causing senescent cells, which led to the identification of a potent Bcl-xL inhibitor, UBX1325, as a candidate for clinical development.

Focusing on the molecular mechanisms by which senescent cells drive atherosclerosis, we identified the SASP factor IGFBP3 as a key determinant of myocardial infarction, in that it drives degeneration of the plaque's fibrous cap structure that prevents its rupture. In 2020, I co-founded Cavalry Biosciences, to develop tissue-targeted forms of IGF1 that overcome senescent cell-derived pathology in atherosclerosis and several other age-related diseases.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Christina Ruhrberg, PhD
Professor of Neuronal and Vascular Biology
UCL Institute of Ophthalmology
London, UNITED KINGDOM

Christiana conducted her PhD research with Fiona Watt at the Imperial Cancer Research Fund (ICRF) and was named Young Cell Biologist of the Year by the British Society for Cell Biology for her work on epidermal barrier function.

Christiana carried out postdoctoral training with Robb Krumlauf at the National Institute for Medical Research (NIMR) to learn about brain development and with David Shima at the ICRF to study blood vessel growth, receiving the Werner Risau Prize for outstanding contributions to endothelial cell biology from the German Society for Cell Biology.

In 2003, she joined the UCL Institute of Ophthalmology at University College London, supported by a Medical Research Council Career Development Award to study neurovascular co-patterning. She has become a tenured member of staff at UCL, where she is Professor of Neuronal and Vascular Biology and Wellcome Investigator since 2011.

In 2018, Christiana received the Cheryll Tickle Medal from the British Society for Developmental Biology and the Judah Folkman Award from the North American Vascular Biology Organisation for her research on neurovascular development.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Francine Behar-Cohen, MD, PhD
Ophthalmology Professor at the University Paris Cité
Retina Specialist at the Cochin Hospital, Paris - Public Assistance for Paris Hospitals
Director of the research team Physiopathology of Ocular Diseases: Therapeutic Innovations,
Inserm UMR1138, Centre de Recherche des Cordeliers, Paris
Founder and Chief Scientific Officer of Eyevensys, SAS, FRANCE
Co-Founder of EarlySight, SWITZERLAND

I am full professor in ophthalmology at Université de Paris and a medical and surgical retina specialist, at Cochin hospital AP-HP in Paris since 2006. I have been medical and scientific director of the Jules-Gonin Eye Hospital in Lausanne, Switzerland from 2013 to 2017, where I have built a research translational program. I am as well the director of the 'Physiopathology of ocular diseases: Therapeutic innovations' team at the French National Institute of Health and Medical Research at the Cordeliers Campus in Paris. I head this group of researchers since 2001, dedicated to the study of mechanisms of eye diseases and development of therapeutic innovations. I am the founder of Eyevensys for which I serve as Chief Innovation Officer. I have founded other start-up companies to valorize research from my academic lab (Eyegate Pharma, EarlySight). In addition to my medical degree, I obtained a diploma of advanced studies in cell biology, a diploma of specialized studies in ophthalmology, and a PhD in biology at the Paris Descartes University. I also have accreditation to conduct clinical research in France and in Switzerland.

Since more than 12 years, I serve as expert for the National French Agency for Sanitary Security, food, environment and work (ANSES) and since 2020, I have been promoted as a member of the scientific council of ANSES.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Eva Kaufman, DVM, PhD
Assistant Professor
Meakins-Christie Laboratories, Research Institute of the McGill University Health Centre
Faculty of Dental Medicine and Oral Health Sciences
McGill University
Montreal, Quebec, CANADA

Dr. Eva Kaufmann is an Immunologist and Assistant Professor at McGill University and the RI-MUHC. Dr. Kaufmann's research is focused on trained immunity, an epigenetic memory mechanism in the innate immune system. Dr. Kaufmann discovered the long-term conservation of this reprogramming mechanism in long-lived hematopoietic stem and progenitor cells. Her lab's current research program investigates the role of trained immunity in allergic airway diseases using both murine and human model systems. Enhancing the understanding of allergic disease pathogeneses will ultimately improve its therapeutic and preventive targeting. Thereby, Dr. Kaufmann's work bridges basic and clinical research, enabling translation in the emerging field of innate immune memory.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Andreas Stahl, MD
Professor, Chair and Head of the Department of Ophthalmology
University Medicine Greifswald
Greifswald, GERMANY

Andreas Stahl studied Medicine at the University of Freiburg and Imperial College London. He was Research Fellow at Harvard Medical School from 2008 – 2010 and received his European Board Certificate in Ophthalmology in 2012. Since 2019, he is Chair and Head of the Department of Ophthalmology at University Medicine Greifswald, Germany. His main research interests are retinal disease, particularly retinopathy of prematurity (ROP), and AI-assisted diagnosis and prediction of retinal disease.

For details see http://www2.medizin.uni-greifswald.de/augen/
and https://scholar.google.com/citations?hl=en&user=2MDXEmkAAAAJ

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Deniz Meneksedag Erol, PhD
Assistant Professor, Department of Chemical and Materials Engineering, Department of Chemistry and Biochemistry
Concordia University
Montreal, Quebec, CANADA

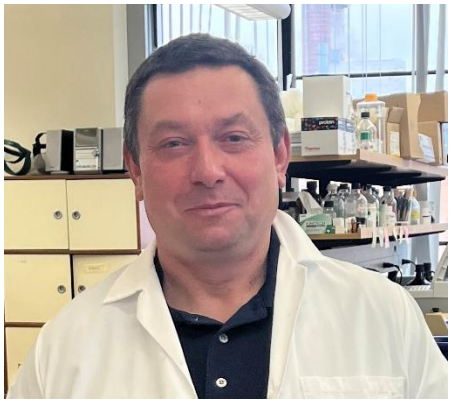
Deniz Meneksedag Erol is an Assistant Professor and Graduate Program Director for course-based programs in the Department of Chemical and Materials Engineering at Concordia University. She completed her postdoctoral training at the University of Toronto specializing in the molecular simulations of proteins, following her PhD degree in Biomedical Engineering and Chemical and Materials Engineering from University of Alberta. She joined Concordia University in January 2021 as junior faculty. Her group uses molecular simulations to study protein conformations and peptide drug interactions for AMD therapy and to develop protein-based ocular drug delivery systems.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*

Frank Gu, PhD
Director of Institute for Water Innovation
Co-director Self-Driving Lab Formulation, Acceleration Consortium
Professor and NSERC Senior Industrial Research Chair in Nanotechnology Engineering
Department of Chemical Engineering and Applied Chemistry
University of Toronto
Toronto, Ontario, CANADA

Frank Gu is the Institute for Water Innovation Director at the University of Toronto, NSERC Senior Industrial Research Chair in Nanotechnology Engineering, and Professor in the Department of Chemical Engineering and Applied Chemistry. A leading expert in nanotechnology engineering, his research has driven advancements in functional nanomaterials for healthcare and environmental applications. Gu's research applies nanoscience to industrial challenges, including ocular drug delivery, medical devices, catalysis, and water treatment. His lab pioneered buoyant photocatalysts powered by sunlight for treating industrial wastewater and founded H2nanO Inc. to commercialize eco-friendly water treatment solutions. He has also developed nanomaterials for anterior ocular disease treatment, leading to long-lasting medicated eye drops and collaborations with medical device companies. His current research spans AI-powered nanomedicine formulation, climate-resilient water treatment technologies, and critical mineral recovery from waste. He is also the co-recipient of the 2023 NSERC Brockhouse Prize for Interdisciplinary Research for his work in developing innovative drug delivery vehicles in collaboration with clinicians.

CONFÉRENCIERS (suite) / *GUEST SPEAKERS (continued)*



Alexei Degterev, PhD

Associate Professor at the Department of Developmental, Molecular and Chemical Biology
Tufts University
Boston, Massachusetts, UNITED STATES

Dr. Degterev is an Associate Professor at the Department of Developmental, Molecular and Chemical Biology at Tufts University. His work focuses on the analysis of the mechanisms and development of the small molecule modulators of cell death processes that contribute to human pathologies. Dr. Degterev pursues multidisciplinary studies combining cell and chemical biology, and animal pharmacology. Dr. Alexei Degterev earned M.S. in Chemistry from Moscow State University, Russia and Ph.D. in Biochemistry from Boston University School of Medicine, MA.

Upon graduation, he joined the laboratory of Dr. Junying Yuan in the Department of Biology of Harvard Medical School as a post-doctoral fellow and, subsequently, as Instructor in Cell Biology. Since November 2005, Dr. Degterev is an Assistant Professor of Biochemistry at Tufts University. He was promoted to the rank of tenured Associate Professor in 2013. Dr. Degterev is a recipient of the Mentored Career Development Award from the National Institute on Aging, Alzheimer's Research Pilot Award from the American Health Assistance Foundation and Smith Family Award for Excellence in Biomedical Research from the Massachusetts Medical Foundation. Dr. Degterev is the author of multiple patents and more than 90 scientific publications. Dr. Degterev is also a scientific co-founder of Contego Therapeutics, Incro Pharmaceuticals and Vaayu Therapeutics.

HORAIRE DE L'ÉVÉNEMENT

7 h 30	Inscription et accueil des participants
8 h 00	**Mot d'ouverture** **Vincent Poitout, Ph. D.**, Vice-recteur à la recherche, à la découverte, à la création et à l'innovation, **Ian M. MacDonald, M. Sc., M.D. C.M.,** Directeur du Département d'ophtalmologie Université de Montréal
	Modérateur : **Bruno Larrivée, Ph. D.**
8 h 10	Les mutations oncogènes somatiques dans les cellules endothéliales provoquent des malformations vasculaires **Jason Fish, Ph. D.,** University of Toronto Toronto, Canada
8 h 50	L'oxyde nitrique endothélial et les jonctions cellulaires dans la régulation de l'angiogenèse normale et pathologique **Jean-Philippe Gratton, Ph. D.**, Université de Montréal Montréal, Canada
9 h 30	Démêler les vaisseaux rétiniens anormaux dans le temps et l'espace à l'aide d'outils informatiques **Katie Bentley, Ph. D.**, Francis Crick Institute Londres, Royaume-Uni
10 h 10 – 10 h 25	Pause
	Modérateur : **Przemyslaw (Mike) Sapieha, Ph. D.**
10 h 25	La dégradation de la matrice extracellulaire par une nouvelle sérine protéase, la granzyme B, favorise une angiogenèse anormale dans la DMLA **Joanne Matsubara, Ph. D.**, University of British Columbia Vancouver, Canada
11 h 05	Décoder la spécificité des pathologies associées aux cellules sénescentes **Jan van Deursen, Ph. D.**, Cavalry Inc Novato, États-Unis
11 h 45	Lésions endothéliales et réparation après activation du CreER - implications pour la recherche sur l'angiogenèse rétinienne **Christiana Ruhrberg, Ph. D.**, University College London Londres, Royaume-Uni
12 h 25 – 13 h 45	Diner

HORAIRE DE L'ÉVÉNEMENT (suite)

	Modérateur : **Sylvain Chemtob, M.D., Ph. D.**
13 h 45	Le système nerveux choroïdien : une cible thérapeutique négligée **Francine Behar-Cohen, M.D., Ph. D.**, Université Paris-Descartes Paris, France
14 h 25	Mémoire innée - Un lien entre les réponses immunitaires périphériques et centrales **Eva Kaufman, DVM, Ph. D.**, McGill University Montréal, Canada
15 h 05	Traitement de la rétinopathie du prématuré : un changement de paradigme **Andreas Stahl, M.D., Ph. D.**, University Medicine Greifswald Greifswald, Allemagne
15 h 45 – 16 h 00	Pause
	Modérateur: **Alexandre Dubrac, Ph. D.**
16 h 00	La phosphorylation du CD36 en tant que commutateur moléculaire de la signalisation antiangiogénique : aperçus structurels et dynamiques issues de simulations moléculaires **Deniz Erol, Ph. D.**, Concordia University Montréal, Canada
16 h 40	Systèmes d'administration de médicaments guidés par l'IA pour les maladies rétiniennes : de la caractérisation moléculaire à la découverte autonome **Frank Gu, Ph. D.**, University of Toronto Toronto, Canada
17 h 20	Frapper au cœur de la nécroptose : développement de nouveaux inhibiteurs de la kinase RIPK3 pour cibler les lésions pulmonaires pathologiques **Alexei Degterev, Ph. D.**, Tufts University Boston, États-Unis
18 h 00	**Mot de la fin** **Patrick Cossette, M.D., Ph. D.,** Doyen de la Faculté de médecine **Ekat Kritikou, Ph. D.,** Vice-doyenne à la recherche et au développement **Sylvain Chemtob, M.D., Ph. D**. Université de Montréal
18h10	Cocktail

EVENT SCHEDULE

7:30 am	Registration and welcome of participants
8:00 am	**Opening remarks** **Vincent Poitout, PhD.**, Vice-Rector, Research, Discovery, Creation and Innovation **Ian M. MacDonald, MSc, MDCM,** Chair of the Ophthalmology Department Université de Montréal
	Moderator: **Bruno Larrivée, PhD**
8:10 am	Somatic oncogenic mutations in endothelial cells cause vascular malformations **Jason Fish, PhD,** University of Toronto Toronto, Canada
8:50 am	Endothelial nitric oxide and cell junctions in the regulation of normal and pathological angiogenesis **Jean-Philippe Gratton, PhD**, Université de Montréal Montreal, Canada
9:30 am	Untangling abnormal retinal vessels in time and space using computers **Katie Bentley, PhD**, Francis Crick Institute London, United Kingdom
10:10 – 10:25 am	Break
	Moderator: **Przemyslaw (Mike) Sapieha, PhD**
10:25 am	Degradation of the Extracellular Matrix by a Novel Serine Protease, Granzyme B, Promotes abnormal Angiogenesis in Age-Related Macular Degeneration **Joanne Matsubara, PhD**, University of British Columbia Vancouver, Canada
11:05 am	Decoding the Specificity of Senescent Cell–Associated Pathologies **Jan van Deursen, PhD**, Cavalry Inc Novato, United States
11:45 am	Endothelial damage and repair after CreER activation - implications for retinal angiogenesis research **Christiana Ruhrberg, PhD**, University College London London, United Kingdom
12:25 – 1:45 pm	Lunch

EVENT SCHEDULE (continued)

	Moderator: **Sylvain Chemtob, MD, PhD**
1:45 pm	The Choroidal Nervous System: An Overlooked Therapeutic Target **Francine Behar-Cohen, MD, PhD**, Université Paris-Descartes Paris, France
2:25 pm	Innate Memory - A connection between peripheral and central immune responses **Eva Kaufman, DVM, PhD**, McGill University Montreal, Canada
3:05 pm	Treatment of Retinopathy of Prematurity: a paradigm shift **Andreas Stahl, MD, PhD**, University Medicine Greifswald Greifswald, Germany
3:45 – 4:00 pm	Break
	Moderator: **Alexandre Dubrac, PhD**
4:00 pm	CD36 Phosphorylation as a Molecular Switch of Antiangiogenic Signaling: Structural and Dynamic Insights from Molecular Simulations **Deniz Erol, PhD**, Concordia University Montreal, Canada
4:40 pm	AI-Guided Drug Delivery Systems for Retinal Disease: From Molecular characterization to Self-Driving Discovery **Frank Gu, PhD**, University of Toronto Toronto, Canada
5:20 pm	Striking at the core of necroptosis: development of new small molecule RIPK3 kinase inhibitors **Alexei Degterev, PhD**, Tufts University Boston, United States
6:00 pm	**Closing Remarks** **Patrick Cossette, MD, PhD,** Dean of the Faculty of Medicine **Ekat Kritikou, PhD,** Vice-Dean of Research and Development **Sylvain Chemtob, MD, PhD**, Université de Montréal
6:10 pm	Cocktail

FONDS DE RECHERCHE EN OPHTALMOLOGIE DE L'UNIVERSITÉ DE MONTRÉAL (FROUM)

Le FROUM a été créé en 1998 à partir d'un don généreux de la Fondation J.-Louis Lévesque. À ce don se sont ajoutées d'autres contributions de la part d'entreprises, notamment Alcon Canada, Allergan Inc. et Novartis Ophtalmics, de même que celles de donateurs individuels incluant plusieurs professeurs du département.

Le Département d'ophtalmologie bénéficie aujourd'hui du plus important fonds de dotation de la Faculté de médecine.

L'objectif de ce fonds est d'appuyer la recherche en ophtalmologie. De façon concrète, les revenus du fonds permettent d'offrir un appui financier aux activités de recherche des professeurs et chercheurs M.D. et Ph. D. des milieux à vocation académique affiliés au Département d'ophtalmologie de l'Université de Montréal (CHUM, CUO-HMR, CHU Sainte-Justine et Hôpital Sacré-Cœur).

Le fonds permet de développer de nouvelles approches diagnostiques et thérapeutiques au service des patients. Il permet aussi d'accroître le rayonnement de la Faculté de médecine et du Département d'ophtalmologie de l'Université au niveau international.

Chaire du Fonds de recherche en ophtalmologie de l'Université de Montréal

La création de la **Chaire du FROUM** est le résultat d'un projet ambitieux et structurant à l'égard d'un des plus importants Fonds philanthropiques de l'Université de Montréal.

Les statuts de la Chaire ont été déposés et approuvés par le Comité exécutif de l'Université de Montréal le 5 avril 2022.

L'objectif global de ce projet fut d'élever une part du FROUM à un statut de Chaire et de consolider ainsi le leadership international de l'Université de Montréal dans le domaine de la recherche en ophtalmologie. La Chaire sert d'incubateur de talents pour les prochaines générations de scientifiques dans le domaine des maladies de l'œil. Elle permet le développement de thérapies innovatrices grâce à l'approche intégrée d'analyse des cibles thérapeutiques et du développement de médicaments. Le thème choisi pour le premier lancement de la Chaire du FROUM fut la biologie moléculaire du vieillissement de l'œil.

THE OPHTHALMOLOGY RESEARCH FUND OF UNIVERSITÉ DE MONTRÉAL (FROUM)

The FROUM was created in 1998 from a generous donation from the J.-Louis Lévesque Foundation. Other donations from companies such as Alcon Canada, Allergan Inc. and Novartis Ophthalmics, as well as individual donators including several professors from the department, were added to this donation.

The Department of Ophthalmology now has the largest endowment fund of the Faculty of Medicine.

The objective of this fund is to support research in ophthalmology. In concrete terms, the fund's revenues provide financial support for the research activities of MD and PhD professors and researchers from academic circles affiliated with the Department of Ophthalmology at the University of Montreal (CHUM, CUO-HMR, CHU Saint-Justine and Hôpital Sacré-Coeur).

The fund enables the development of new diagnostic and therapeutic approaches for patients. It also increases the reach of the Faculty of Medicine and the Department of Ophthalmology at the international level.

Fonds de recherche en ophtalmologie de l'Université de Montréal Chair

The creation of the FROUM Chair is the result of an ambitious and structuring project for one of the most important philanthropic funds of the University of Montreal.

The statutes of the Chair were deposited and approved by the Executive Committee of the University de Montreal on April 5, 2022.

The overall objective of this project was to elevate part of the FROUM to the status of a Chair and thus consolidate the international leadership of the University of Montreal in the field of ophthalmology research. The Chair serves as a talent incubator for the next generations of scientists in the field of eye diseases. It enables the development of innovative therapies through an integrated approach of therapeutic target analysis and drug development. The theme chosen for the launch of the FROUM Chair was the molecular biology of aging of the eye.

CHAIRE LÉOPOLDINE A. WOLFE ET BOURSE PROFESSORALE WOLFE

Chaire Léopoldine A. Wolfe de recherche clinique/translationnelle en prévention de la cécité causée par la dégénérescence maculaire liée à l'âge de l'Université de Montréal

Créée en 2007, la Chaire a pour objectif principal de soutenir la recherche en prévention de la cécité causée par la dégénérescence maculaire liée à l'âge (DMLA).

Son but est de faire progresser les connaissances sur le sujet afin de prévenir l'apparition de la DMLA ou du moins, d'identifier des interventions environnementales et thérapeutiques qui soient bénéfiques pour les individus atteints de DMLA. Les apprentissages et découvertes issus des laboratoires de recherche fondamentale bénéficient aux patients atteints de DMLA.

Bourse professorale Wolfe en recherche translationnelle en prévention de la cécité liée aux maladies uvéales et de la rétine

Créée en 2016, la bourse a pour objectif général de soutenir la recherche translationnelle dans ce secteur de l'ophtalmologie.

Son but est d'appuyer le développement de nouveaux traitements thérapeutiques qui permettront de réduire les impacts de la rétinopathie et de la dégénérescence maculaire liée à l'âge (DMLA) chez les personnes atteintes ainsi qu'à long terme la réduction des impacts sur le système de soins de santé.

LEOPOLDINE A. WOLFE CHAIR AND WOLFE PROFESSORSHIP

Leopoldine A. Wolfe Chair in Clinical/Tanslational Research for the Prevention of Blindness Caused by Age-Related Macular Degeneration of the University of Montreal

Created in 2007, the main objective of the Chair is to support research for the prevention of blindness caused by age-related macular degeneration (AMD).

Its goal is to advance knowledge on the subject in order to prevent the onset of AMD or at least to identify environmental and therapeutic interventions that are beneficial for individuals with AMD. Learning and discoveries from fundamental research laboratories benefit patients with AMD.

Wolfe Professorship in Translational Research on the Prevention of Retinal/Uveal Related Causes of Blindness

Created in 2016, the professorship has for general objective the support of translational research in this sector of ophthalmology.

Its goal is to support the development of new therapeutic treatments that will reduce the impacts of retinopathy and age-related macular degeneration (AMD) on people with the disease as well as in the long term reducing the impacts on the health care system.

RÉSUMÉS PRÉSENTATIONS ORALES / *PRESENTATION ABSTRACTS*

8:10 am

Les mutations oncogènes somatiques dans les cellules endothéliales provoquent des malformations vasculaires

Somatic oncogenic mutations in endothelial cells cause vascular malformations

Jason Fish, PhD

Objectifs pédagogiques

- Reconnaître que des mutations somatiques peuvent se produire dans l'endothélium dans les malformations vasculaires.
- Comprendre les conséquences au niveau cellulaires des mutations somatiques activatrices dans le système vasculaire

Educational goals

- *Recognize that somatic mutations can occur in the endothelium in vascular malformations.*
- *Understand the cellular consequences of somatic activating mutations in the vasculature.*

The vascular system is an exquisitely ordered network of connecting vessels. Abnormal connections can result in vascular malformations. For example, direct connections between arteries and veins without an intervening capillary bed can occur in brain arteriovenous malformations (bAVMs). These malformations can remodel over time and are prone to rupture. The majority of bAVMs are sporadic. We found that most patients with sporadic bAVMs have somatic activating mutations in the KRAS oncogene in the endothelial cells of these abnormal vessels. Several other oncogenic somatic mutations have also been linked to various vascular malformations. In this presentation, we will explore the molecular and cellular consequences of altered oncogenic signaling on endothelial cell behaviour, including altered angiogenesis and compromised vascular stability. By understanding the pathways involved, our goal is to develop new therapies to block the progression or regression of vascular malformations.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

8:50 am

L'oxyde nitrique endothélial et les jonctions cellulaires dans la régulation de l'angiogenèse normale et pathologique

Endothelial nitric oxide and cell junctions in the regulation of normal and pathological angiogenesis

Jean-Philippe Gratton, PhD

Objectifs pédagogiques

- Expliquer les effets modulateurs du monoxyde d'azote (NO) sur les protéines des jonctions endothéliales.
- Identifier le rôle de la NO synthase endothéliale (eNOS) dans l'angiogenèse rétinienne normale et pathologique.

Educational goals

- *Explain the modulatory effects of nitric oxide (NO) on endothelial cell junction proteins.*
- *Identify the function of endothelial nitric oxide synthase (eNOS) in normal and pathological angiogenesis of the retina.*

A primary event for the induction of angiogenesis is the increase in permeability of the endothelium. Opening of intercellular contacts between endothelial cells (ECs) is essential for their detachment to allow their migration and form a new vascular network. Endothelial NO synthase (eNOS)-derived NO regulates many aspects of angiogenesis such as endothelial permeability, cell migration and sprouting. It is well established that NO is central to the pro-permeability and angiogenic properties of VEGF, and we have uncovered that eNOS-derived NO modifies, via cysteine S-nitrosylation (S-NO), the function of beta-catenin, including its transcriptional activity. Furthermore, eNOS expression influences the transcriptional profile of ECs, which has consequences on cell polarization, migration and ultimately angiogenic sprouting in normal and pathological conditions. In retinas of eNOS knockout mice, vascular development is retarded with decreased vessel density and vascular branching. However, in a model of oxygen-induced retinopathy (OIR), eNOS deficient mice have reduced pathological neovascularization, and retinal endothelial tip cells

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

8:50 am (suite/continued)

have fewer filopodia. These results indicate that inhibition of eNOS alters the polarity program of endothelial cells, which increases cell polarization, regulates sprouting angiogenesis and normalizes pathological neovascularization during retinopathy.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

9:30 am

Démêler les vaisseaux rétiniens anormaux dans le temps et l'espace à l'aide d'outils informatiques

Untangling Abnormal Retinal Vessels in Time and Space Using Computers

Katie Bentley, PhD
(with Markus Koerbel, Andreia Pena, Daniela Ramalho and Claudio Franco)

Objectifs pédagogiques

- Comprendre comment les outils informatiques peuvent aider à quantifier les anomalies des vaisseaux rétiniens en 3D.
- Développer une compréhension de la manière dont les simulations informatiques peuvent aider à explorer la dynamique des vaisseaux rétiniens dans différentes conditions.

Educational goals

- *Understand how computational tools can help quantify abnormal 3D retinal vessels.*
- *Develop a comprehension of how computer simulations can help explore the dynamics of retinal vessels under different conditions.*

Abnormal vessels and neovascular (NV) tufts are hallmarks of retinopathy of prematurity or diabetic retinopathy and can lead to impaired vision or blindness. Our computational cell based simulations predicted that the enlarged poorly branched abnormal vessels arising in high vegf pathologies (such as retinopathy) are driven by a shift in collective cell Notch signalling and behaviour. These predictions were validated in mouse retinal studies and inspired us to establish the first 3D lightsheet fluorescent microscopy (LSFM) study of mouse retinas to better study the cell mechanisms driving tuft formation to help inform new therapeutics.

LSFM imaging of the in the Oxygen Induced Retinopathy mouse model (OIR) revealed that NV tufts have a previously unappreciated complex, entangled 3D structure, which we have recently confirmed is also present in human diabetic retinopathy NV tuft.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

9:30 am (suite/continued)

This led us to develop a new user-friendly 3D computational image analysis workflow (in Python) to quantify and analyze abnormal retinal vessel topologies and cellular-composition, which works across multiple imaging modalities. I will present our latest findings with this user-friendly and extendable image analysis tool, providing new insights into the collective cell interactions driving tuft formation.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

10:25 am

La dégradation de la matrice extracellulaire par une nouvelle sérine protéase, la granzyme B, favorise une angiogenèse anormale dans la dégénérescence maculaire liée à l'âge

Degradation of the Extracellular Matrix by a Novel Serine Protease, Granzyme B, Promotes Abnormal Angiogenesis in Age-Related Macular Degeneration

Joanne Matsubara, PhD

Objectifs pédagogiques

- Identifier les mécanismes en aval associés à l'activité extracellulaire de la granzyme B qui contribuent à la néovascularisation choroïdienne.
- Comprendre les nouvelles stratégies thérapeutiques visant à supprimer la néovascularisation choroïdienne et la dégradation de la matrice extracellulaire dans la membrane de Bruch et les couches choroïdiennes de l'œil.

Educational goals

- *Identify the downstream mechanisms associated with extracellular Granzyme B activity that contribute to choroidal neovascularization (CNV).*
- *Understand novel treatment strategies to suppress CNV and the degradation of the extracellular matrix in the Bruch's membrane and the choroidal layers of the eye.*

Age-related macular degeneration (AMD) is a common retinal neurodegenerative disease among the elderly. Neovascular AMD (nAMD), a leading cause of AMD-related blindness, involves choroidal neovascularization (CNV), which anti-angiogenic treatments can suppress. However, current CNV treatments do not work in all nAMD patients. Here we investigate a novel target for AMD. Granzyme B (GzmB) is a serine protease that promotes aging, chronic inflammation and vascular permeability through the degradation of the

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

10:25 am (suite/continued)

extracellular matrix (ECM) and tight junctions. Extracellular GzmB is increased in retina pigment epithelium (RPE) and mast cells in the choroid of the healthy aging outer retina. It is further increased in donor eyes exhibiting features of nAMD and CNV. Here, we show in RPE-choroidal explant cultures that exogenous GzmB degrades the RPE-choroid ECM, promotes retinal/choroidal inflammation and angiogenesis, while diminishing anti-angiogenic factor, thrombospondin-1 (TSP-1). The pharmacological inhibition of either GzmB or mast-cell degranulation significantly reduces choroidal angiogenesis. In line with our in vitro data, GzmB-deficiency minimizes the extent of laser-induced CNV lesions and the age-related deterioration of electroretinogram (ERG) responses in mice. These findings suggest that targeting GzmB, a serine protease with no known endogenous inhibitors, may be a potential novel therapeutic approach to suppress CNV in nAMD.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

11:05 am

Décoder la spécificité des pathologies associées aux cellules sénescentes

Decoding the Specificity of Senescent Cell–Associated Pathologies

Jan Van Deursen, PhD

Objectifs pédagogiques

- Identifier de nouveaux processus cellulaires liés à la sénéscence.
- Application potentielle de nouveaux marqueurs de sénéscence.

Educational goals

- *Identify new cellular pathways linked to senescence.*
- *Potential application of new markers of senescence.*

Senescent cells have been strongly implicated in aging and disease in preclinical models, and the therapeutic benefits of their elimination (senolysis) have been elegantly demonstrated in patients with Diabetic Macular Edema (DME). The senescence-associated secretory phenotype (SASP) is highly complex, comprising hundreds of secreted factors—including cytokines, chemokines, growth factors, proteases, and exosomes—that collectively drive chronic, tissue-altering, pro-inflammatory effects, disrupting normal tissue function and contributing to disease. In this seminar, we present evidence supporting an alternative perspective: that senescent cells may drive pathology through highly specific mechanisms, in which individual SASP components play dominant, disease-specific roles.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

11:45 am

Lésions endothéliales et réparation après activation du CreER - implications pour la recherche sur l'angiogenèse rétinienne

Endothelial damage and repair after CreER activation - implications for retinal angiogenesis research

Christina Ruhrberg, PhD

Objectifs pédagogiques

- Apprendre à utiliser efficacement la rétine de souris comme modèle pour étudier les mécanismes de croissance des vaisseaux sanguins dans la santé et les maladies rétiniennes.
- Comprendre deux nouveaux mécanismes moléculaires liés à la santé et aux maladies de la rétine.

Educational goals

- *Learn how to effectively use the mouse retina as a model to investigate the mechanisms of blood vessel growth in retinal health and disease.*
- *Understand two novel molecular mechanisms relevant to retinal health and disease.*

Tamoxifen-inducible gene targeting in mice with estrogen receptor-dependent Cre (CreER) recombinase has greatly advanced vascular biology research. We found that CreER activation under the control of vascular endothelial or ubiquitous promoters causes off-target effects that impair retinal angiogenesis and have investigated the time windows and cellular processes affected by CreER-induced endothelial toxicity. Our studies provide recommendations to minimise the CreER-induced off target effects when studying endothelial genes, flag the need for re-investigation a subset of molecular targets identified in prior studies, and offer new insights into the role of sempahorin signallig in retinal angiogenesis.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

1:45 pm

Le système nerveux choroïdien : une cible thérapeutique négligée

The Choroidal Nervous System: An Overlooked Therapeutic Target

Francine Behar-Cohen, MD, PhD

Objectifs pédagogiques

- Décrire le système nerveux autonome choroïdien.
- Comprendre le rôle du système nerveux choroïdien dans la pathologie vasculaire choroïdienne.

Educational goals

- *Describe the choroidal autonomic nervous system.*
- *Understand the role of the choroidal nervous system in choroidal vascular pathology.*

The choroid is critically involved in ocular homeostasis and represents an early and sometimes primary site of pathology in diseases such as diabetic retinopathy, age-related macular degeneration (AMD), inflammatory conditions, and pachychoroid spectrum disorders. While advances in multimodal imaging have considerably improved our understanding of choroidal vasculature, the neural regulation of this vascular bed remains largely unexplored. Choroidal innervation governs vascular tone, blood flow, permeability, and interacts with epithelial functions at the retinal pigment epithelium–Bruch's membrane–choriocapillaris complex. Disruption of this control may contribute to vascular instability, chronic hypoxia, maladaptive angiogenesis, and disease progression. Revisiting the anatomy and physiology of choroidal innervation is therefore essential for understanding its contribution to vascular pathology. Recognizing the choroidal nervous system as a critical regulator opens new perspectives for therapeutic strategies, not only targeting vessels themselves but also their neural control, with implications across a spectrum of retinal and choroidal disease.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

2:25 pm

Mémoire innée - Un lien entre les réponses immunitaires périphériques et centrales

Innate Memory - A connection between peripheral and central immune responses

Eva Kaufman, DVM, PhD

Objectifs pédagogiques

- Reconnaître la mémoire innée comme une nouvelle caractéristique définie en immunologie
- Identifier les effets des changements épigénétiques durables.

Educational goals

- *Recognize innate memory as a newly described feature in immunology.*
- *Identify the effects of long-lasting epigenetic changes.*

While adaptive immunity is defined by its antigen-specific memory function, over 95% of species rely solely on innate immunity for host defense. These species are better protected against pathogen re-exposures through an epigenetically driven process known as "innate immune memory" or "trained immunity". Remarkably, the innate memory function is conserved through vertebrate evolution. Its recent discovery in mammals offers new insights into non-specific vaccine effects and disease pathogeneses.

Innate memory can be induced centrally, via direct or cytokine-mediated stimulation of long-lived hematopoietic stem and progenitor cells, or peripherally, in tissue-resident long-lived cells. As frontline responders, innate immune cells play key roles in defending against pathogens and allergens. Recent studies have illuminated how infections and vaccines induce innate memory. However, its role in sterile inflammation, such as in allergies, remains poorly understood.

Defining the signatures of innate memory will collectively enable us to develop novel targeted immunotherapies against infectious, allergic, and potentially autoimmune diseases.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

3:05 pm

Traitement de la rétinopathie du prématuré : un changement de paradigme

Treatment of Retinopathy of Prematurity: a paradigm shift

Andreas Stahl, MD

Objectifs pédagogiques

- Décrire la physiopathologie de la ROP et expliquer en quoi la croissance anormale des vaisseaux est le facteur responsable de la ROP menaçant la vue.
- Comprendre les approches thérapeutiques actuelles ainsi que leurs avantages et inconvénients distinctifs sur la base des essais cliniques actuels et des données réelles.

Educational goals

- *Describe the pathophysiology of ROP and how aberrant vessel growth is the driver behind sight-threatening ROP.*
- *Understand the current treatment approaches and their distinctive advantages and disadvantages based on current clinical trials and real-world data.*

Retinopathy of prematurity (ROP) is a leading cause of childhood blindness and is characterized by aberrant proliferation of retinal vessels into the vitreous, ultimately resulting in complex tractional retinal detachments if left untreated. With the increasing survival rates of extremely premature infants, the number of infants at risk of developing ROP has increased despite improved neonatal care in industrialized countries. The therapeutic focus in eyes with treatment-requiring ROP remains the inhibition or regression of pathological neovascularization. To this end, two principal treatment modalities are employed: retinal laser photocoagulation, established as the standard of care since the 1990s, and intravitreal administration of anti-vascular endothelial growth factor (anti-VEGF) agents, which emerged as a viable alternative following initial clinical reports in 2007. Each modality presents distinct advantages and limitations regarding efficacy, recurrence risk, and systemic exposure, necessitating individualized treatment decisions. This percentage will describe the pathophysiology behind treatment-requiring ROP, highlight the current treatment alternatives with their distinctive pros and cons, and will report novel long-term clinical trial and real-life data from infants treated for ROP.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

4:00 pm

La phosphorylation du CD36 en tant que commutateur moléculaire de la signalisation antiangiogénique : aperçus structurels et dynamiques issus de simulations moléculaires

CD36 Phosphorylation as a Molecular Switch of Antiangiogenic Signaling: Structural and Dynamic Insights from Molecular Simulations

Deniz Meneksedag Erol, PhD

Objectifs pédagogiques

- Comprendre le rôle de la dynamique des protéines dans la régulation des interactions protéine-protéine et ses implications plus larges pour la conception de médicaments.
- Déterminer comment les simulations moléculaires et les analyses computationnelles peuvent caractériser, au niveau atomique, l'impact des perturbations (par exemple, la phosphorylation) sur la structure et la dynamique des protéines en l'absence de données expérimentales.

Educational goals

- *Understand the role of protein dynamics in the regulation of protein–protein interactions and its broader implications for drug design.*
- *Identify how molecular simulations and computational analyses can characterize, at atomic detail, the impact of perturbations (e.g., phosphorylation) on protein structure and dynamics in the absence of experimental data.*

Age-related macular degeneration (AMD) is a leading cause of vision loss in the elderly and a growing global health burden, projected to affect 288 million people by 2040. Its progression is driven by oxidative stress and inflammation that damage retinal cells. CD36 (cluster of differentiation 36 receptor) plays a central role in AMD by mediating pathways of lipid accumulation, inflammation, oxidative stress, and angiogenesis. CD36 has two phosphorylation sites, residues threonine 92 (Thr92) and serine 237 (Ser237), in its extracellular domain.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

4:00 pm (suite/continued)

Experimental evidence indicates that phosphorylation of Thr92 reduces CD36's affinity for thrombospondin-1 (TSP-1), binding of which initiates antiangiogenic signaling, while phosphorylation of Ser237 decreases CD36-mediated fatty acid uptake, with implications in energy metabolism. The structural basis for such functional changes remains largely unexplored.

In this talk, I will present an atomically detailed computational characterization of CD36 in unphosphorylated and bis-phosphorylated states, using molecular dynamics simulations in combination with Markov state models. I will explain the molecular mechanisms behind the phosphorylation-mediated functional changes in CD36, specifically how phosphorylation can switch off the TSP-1 mediated antiangiogenic signal, and discuss the broader implications for drug design and therapeutic resistance.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

4:40 pm

Systèmes d'administration de médicaments guidés par l'IA pour les maladies rétiniennes : de la caractérisation moléculaire à la découverte autonome

AI-Guided Drug Delivery Systems for Retinal Disease: From Molecular Characterization to Self-Driving Discovery

Frank Gu, PhD

Objectifs pédagogiques

- Utilisation de l'intelligence artificielle pour guider à optimiser la distribution de médicaments pour les rétinopathies.

Educational goals

- *Use of AI to optimize drug delivery systems for retinal diseases.*

Retinal therapeutics face significant challenges in drug penetration, retention, and targeted delivery. Our research addresses these limitations through systematic molecular-level characterization and computational design approaches. Using DISCO, Direct Saturation Compensated Nuclear Magnetic Resonance methodologies, we have characterized protein-polymer interactions governing therapeutic carrier behavior in biological environments. Our mucoadhesive nanoparticle platforms demonstrate sustained ocular drug delivery, achieving weekly dosing regimens in experimental models through phenylboronic acid functionalization and optimized polymer architectures. We are now implementing Self-Driving Labs (SDL) and Robotic Autonomous Imaging Surface Evaluation (RAISE) for retinal therapeutic development. SDL automates formulation screening and optimization workflows, while RAISE applies machine learning framework and computer vision to predict carrier tissue interactions for retinal microenvironments. Current work focuses on engineering platforms that achieve sustained therapeutic concentrations in posterior eye segments while minimizing systemic exposure. This integrated framework has the potential to accelerate therapeutic discovery timelines while providing systematic approaches to optimize drug delivery across diverse ocular conditions.

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

5:20 pm

Frapper au cœur de la nécroptose : développement de nouveaux inhibiteurs de la kinase RIPK3 pour cibler les lésions pulmonaires pathologiques

Striking at the core of necroptosis: development of new small molecule RIPK3 kinase inhibitors to target pathologic lung injury

Alexei Degterev, PhD

Objectifs pédagogiques

- Découvrir comment une seule forme de mort cellulaire inflammatoire (nécroptose) peut influencer spécifiquement la physiopathologie d'une infection grave par le virus de la grippe A (IAV).
- Comprendre la nouvelle stratégie visant à cibler un centre névralgique de la nécroptose : la protéine kinase RIPK3.

Educational goals

- *Discover how a single form of inflammatory cell death (necroptosis) can specifically shape the pathophysiology of severe IAV infection.*
- *Understand the new strategy to target a central hub of necroptosis – protein kinase RIPK3.*

RIPK3 is a central mediator of necroptosis, a highly inflammatory form of cell death that we have identified as a major driver of lung injury and inflammation during influenza A virus (IAV) infection. Both seasonal and pandemic strains of IAV induce RIPK3-dependent necrotic lung damage that underlies Acute Respiratory Distress Syndrome (ARDS), a leading cause of morbidity and mortality in severe influenza. Previous attempts to inhibit RIPK3 in vivo have largely failed due to on-target toxicity, raising doubts about the feasibility of developing safe, clinically viable RIPK3 inhibitors. To address this challenge, we developed a novel structural class of small-molecule RIPK3 inhibitors, the UH15 series, based on a pyrido[2,3-d]pyrimidine scaffold. These compounds engage RIPK3 through an extensive interaction network spanning the hinge, DFG motif, and αC-helix regions. The series lead, UH15-38, is substantially more potent than prior RIPK3 inhibitors in both human and murine cells and demonstrates exceptional tolerability in vivo. Importantly, UH15-38

RÉSUMÉS PRÉSENTATIONS ORALES (suite)/ *PRESENTATION ABSTRACTS (continued)*

5:20 pm (suite/continued)

selectively blocks IAV-induced necroptosis in vitro and in infected lungs, and it provides remarkable protection against IAV-induced lethality—even when administered at the peak of disease. These results highlight the strong translational potential of the UH15 series for treating necrotic lung injury and consequent ARDS or pneumonia caused by seasonal and highly virulent IAV strains. More broadly, they establish the feasibility of targeting RIPK3 as a therapeutic strategy in lung inflammatory disease and other human degenerative disorders.

REMERCIEMENTS / *ACKNOWLEDGEMENTS*

L'angiogenèse joue un rôle crucial au développement, à la régénération tissulaire et à plusieurs pathologies. Ce 4e Symposium international sur l'angiogenèse rétinienne et choroïdienne présente une occasion de créer des discussions visant à élucider les lacunes liées aux domaines connexes de la biologie et de ses applications aux pathologies humaines. Les objectifs généraux visent à consolider les efforts de collaboration et à en développer de nouveaux, à mesure qu'émerge un réseau international d'experts. Nous remercions les conférenciers et le comité organisateur d'avoir mis en place cette réunion et ainsi facilité les futures collaborations. Nous remercions également la Fondation WOCO pour leur soutien. Enfin, un remerciement spécial à Valérie Lavastre, Annie Blais et Benjamin Pellacani pour leur aide précieuse à la préparation de cet événement.

❖

Angiogenesis applies to development, restoration and pathology. This 4th International Symposium on Retinal and Choroidal Angiogenesis provides a forum for presentations and discussions to elucidate voids in related areas in biology and application to human afflictions. Broad objectives aim to solidify collaborative efforts and develop new ones, as an international network of experts emerges. We thank the speakers, and the organizing committee for putting this meeting in place, and thus facilitating future collaborative endeavors. We want also to thank the WOCO Foundation for their support. Finally, a special thanks to Valérie Lavastre, Annie Blais and Benjamin Pellacani for assisting with details needed in putting together this event.

Université de Montréal

Faculté de médecine
Département d'ophtalmologie

RRSV
Réseau de recherche en sciences de la vision

Formulaire d'évaluation

4e SYMPOSIUM INTERNATIONAL SUR L'ANGIOGENÈSE RÉTINIENNE ET CHOROÏDIENNE

10 octobre 2025

J'ai assisté au « 4**e Symposium** » en tout ou en partie:

Je confirme

Nom :
Prénom :
Numéro de pratique :
Courriel :

Titre:

Cliquez ici / Click here

Pour les cliniciens (éducation médicale continue):

- Cette activité respectait-elle le Code d'éthique du Conseil québécois de développement professionnel continu des médecins? www.cqdpcm.ca
  Oui ( ) Non ( )

  Si non, précisez?

- Avez-vous l'impression qu'il y a eu un biais commercial durant cette activité de formation?
  Oui ( ) Non ( )

  Si oui, précisez?

- La divulgation des conflits d'intérêts par les responsables de l'activité était-elle adéquate?
  Oui ( ) Non ( )

  Si non, précisez?

Formulaire d'évaluation (suite)

4e SYMPOSIUM INTERNATIONAL SUR L'ANGIOGENÈSE RÉTINIENNE ET CHOROÏDIENNE

10 octobre 2025

Les objectifs de l'événement: Voir page suivante

- Veuillez choisir la réponse qui s'applique le mieux.

	Excellent	Bon	Moyen	Médiocre
Quel est votre niveau de satisfaction des présentations?				
Le mode présentiel / virtuel convenait-il à ce type d'événement? Précisez le mode :				
Les objectifs ont-ils été atteints?				
J'ai identifié des messages clés qui vont m'aider à modifier ma pratique.				

- Vos activités professionnelles sont-elles reliées à la compréhension et/ou au traitement de la dégénérescence maculaire liée à l'âge?
  Oui ( ) Non ( )

- Commentaires ou recommandations :

- Par la présente, je confirme avoir participé à la conférence pour la durée suivante:

Durée :_____ (indiquez si en heures ou minutes)
Maximum possible: 8 h

- Signature

Formulaire d'évaluation (suite)

4e SYMPOSIUM INTERNATIONAL SUR L'ANGIOGENÈSE RÉTINIENNE ET CHOROÏDIENNE

10 octobre 2025

Les objectifs pédagogiques principaux de l'événement:

Le public cible de cet événement est les étudiants et professionnels en santé vasculaire.

L'objectif principal du 4e Symposium international sur l'angiogenèse rétinienne et choroïdienne est de donner l'occasion aux étudiants, résidents, professeurs, cliniciens et personnel paramédical l'opportunité de se familiariser avec les plus récentes avancées dans des domaines précis de l'ophtalmologie qui s'appliquent non seulement à la dégénérescence maculaire liée à l'âge, mais également aux rétinopathies ischémiques, telles dans le diabète et la prématurité.

Plus précisément, les objectifs pédagogiques de cet événement sont les suivants :

- Expliquer aux étudiants, résidents, professeurs, chercheurs et cliniciens les concepts en émergence dans le domaine de l'angiogenèse rétinienne et choroïdienne et les implications pour la pratique clinique.
- Identifier et souligner différentes études cliniques et applications cliniques contemporaines d'envergures en angiogenèse de la rétine et de la choroïde.
- Déterminer le rôle des mutations endothéliales et de l'intégrité anatomo-moléculaire de la vasculature dans les anomalies de vasculogénèse.
- Découvrir les processus de vieillissement et de régénérescence, y compris les enjeux immunologiques, dans la dégénérescence maculaire.
- Explorer le rôle du système nerveux autonome choroïdien dans les pathologies oculaires.
- S'inspirer du rôle de sénescence et de la mort cellulaire dans le cancer pour mieux comprendre les dégénérescences ischémiques de l'œil.
- Utilisation de superordinateurs et d'intelligence artificielle en biologie appliquée.
- Identifier de nouvelles cibles thérapeutiques dans la dégénérescence maculaire liée à l'âge.
- Se familiariser avec les dernières avancées dans la rétinopathie du prématuré.
- Découvrir l'exploration *in silico* et le potentiel de nouveaux candidats thérapeutiques et d'approches de livraison de médicaments dans les rétinopathies.

Formulaire d'évaluation (suite)

4e SYMPOSIUM INTERNATIONAL SUR L'ANGIOGENÈSE RÉTINIENNE ET CHOROÏDIENNE

10 octobre 2025

Les objectifs pédagogiques principaux de l'événement (suite):

- Favoriser les échanges d'idées sur les recherches récentes portant sur l'angiogenèse rétinienne et choroïdienne entre étudiants de tous les niveaux (stagiaires, étudiants de premier cycle, M. Sc., Ph. D., SPD, étudiants en médecine, résidents, fellows), professeurs, chercheurs et cliniciens. Ceci inclut les interactions et discussions approfondies des sujets présentés.
- Établir de nouvelles collaborations dans le but d'améliorer la compréhension des pathologies oculaires vasoproliférantes et en conséquence les soins donnés.

Les objectifs pédagogiques spécifiques à chacune des présentations se retrouvent à la page du résumé pour cette présentation.

Evaluation Form

4th INTERNATIONAL SYMPOSIUM ON RETINAL AND CHOROIDAL ANGIOGENESIS

October 10th, 2025

I attended the "4th Symposium" in whole or in part: *

I confirm

Last name :
First name :
Practice Number :
Email :

Status:

Click here

For clinicians (continuing medical education):

- Did the activity respect the Code of ethics of the *Conseil Québécois de développement professionnel continu des médecins*? www.cqdpcm.ca

Yes ( ) No ( )

If no, please comment?

- Do you feel there were commercial biases during this training activity?

Yes ( ) No ( )

If yes, please comment?

- Was the disclosure of conflicts of interest by those responsible of the activity adequate?

Yes ( ) No ( )

If no, please comment?

Evaluation Form (continued)

4th INTERNATIONAL SYMPOSIUM ON RETINAL AND CHOROIDAL ANGIOGENESIS

October 10th, 2025

The educational goals of the event: Listed on the following page

- Please choose the answer that best applies.

	Excellent	Good	Middle	Poor
How satisfied are you with the presentations?				
Was the onsite / online mode suitable for this type of event? Please indicate the mode used:				
Have the objectives been met?				
I have identified key messages that will help me to modify my practice.				

- Are your professional activities related to understanding and / or treating age-related macular degeneration?
  Yes ( ) No ( )

- Comments or recommandations:

- I hereby confirm that I have attended the conference for the following duration:

Duration: _____ (please indicate if hours or minutes)
Maximum possible: 8 hours

- Signature

Evaluation Form (continued)

4th INTERNATIONAL SYMPOSIUM ON RETINAL AND CHOROIDAL ANGIOGENESIS

October 10th, 2025

The main educational goals of the event:

The target audience for this event is students and professionals in vascular health.

The main objective of the 4th International Symposium on Retinal and Choroidal Angiogenesis is to provide students, residents, professors, clinicians, and paramedical staff with the opportunity to familiarize themselves with the latest advances in specific areas of ophthalmology that apply not only to age-related macular degeneration but also to ischemic retinopathies, such as those in diabetes and prematurity.

More specifically, the educational goals of this event are as follows:

- Explain to students, residents, professors, researchers, and clinicians emerging concepts in the field of retinal and choroidal angiogenesis and their implications for clinical practice.
- Identify and highlight various clinical studies and major clinical applications in retinal and choroidal angiogenesis.
- Determine the role of endothelial mutations and the anatomo-molecular integrity of the vasculature in vasculogenesis abnormalities.
- Discover the processes of aging and regeneration, including immunological issues, in macular degeneration.
- Exploring the role of the choroidal autonomic nervous system in ocular pathologies.
- Drawing inspiration from the role of senescence and cell death in cancer to better understand ischemic degeneration of the eye.
- The use of supercomputers and artificial intelligence in applied biology.
- Identify new therapeutic targets in age-related macular degeneration.
- Become familiar with the latest advances in retinopathy of prematurity.

Evaluation Form (continued)

4th INTERNATIONAL SYMPOSIUM
ON RETINAL AND CHOROIDAL ANGIOGENESIS
October 10th, 2025

The main educational goals of the event (continued)**:**

- *Discover in silico exploration and the potential of new therapeutic candidates and drug delivery approaches in retinopathies.*
- *Promote the exchange of ideas on recent research on retinal and choroidal angiogenesis among students of all levels (trainees, undergraduates, M.Sc., Ph.D., Post-Doc, medical students, residents, fellows), professors, researchers, and clinicians. This includes in-depth interactions and discussions of the topics presented.*
- *Establish new collaborations with the aim of improving understanding of vasoproliferative ocular pathologies and, consequently, the care provided.*

The specific educational goals for each presentation can be found on the abstract page of that presentation.

Ce programme bénéficie d'une subvention à visée éducative de :

This program is supported by an educational grant from:

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Notes

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Notes

La Direction du développement professionnel continu de la Faculté de médecine de l'Université de Montréal est pleinement agréée par l'Association des facultés de médecine du Canada (AFMC) et par le Collège des médecins du Québec (CMQ).

Déclaration de formation continue au Collège des médecins du Québec : Les médecins qui participent à cette activité peuvent déclarer 8 heures de développement professionnel reconnu dans la catégorie A, sous l'onglet « Activité reconnue par un organisme québécois agréé en formation continue ».

La présente activité est une activité d'apprentissage collectif agréée (section 1), au sens que lui donne le programme de Maintien du certificat du Collège royal des médecins et chirurgiens du Canada; elle a été approuvée par la Direction du DPC de la Faculté de médecine de l'Université de Montréal pour un maximum de 8 heures.

Pour tout autre professionnel participant, ce programme donne une attestation de participation pour un maximum de 8 heures.

Les participants doivent réclamer à leur ordre professionnel respectif un nombre d'heures conforme à leur participation.

The Continuing Professional Development Office (CPD) of the Faculty of Medicine of the University of Montreal is fully accredited by the Association of Faculties of Medicine of Canada (AFMC) and by the Collège des médecins du Québec (CMQ).

Declaration of continuing education of the Collège des médecins du Québec: Physicians who participate in this activity may declare 8 hours of recognized professional development in category A, under the section "Activity recognized by an accredited Quebec continuing education organization".

This activity is an accredited group learning activity (section 1) as defined by the Maintenance of Certification program of the Royal College of Physicians and Surgeons of Canada; it has been approved by the CPD Office of the Faculty of Medicine of the University of Montreal for a maximum of 8 hours.

For any other participating professional, this program provides a certificate of participation for a maximum of 8 hours.

Participants must claim from their respective professional order a number of hours in accordance with their participation.

Université de Montréal et du monde.