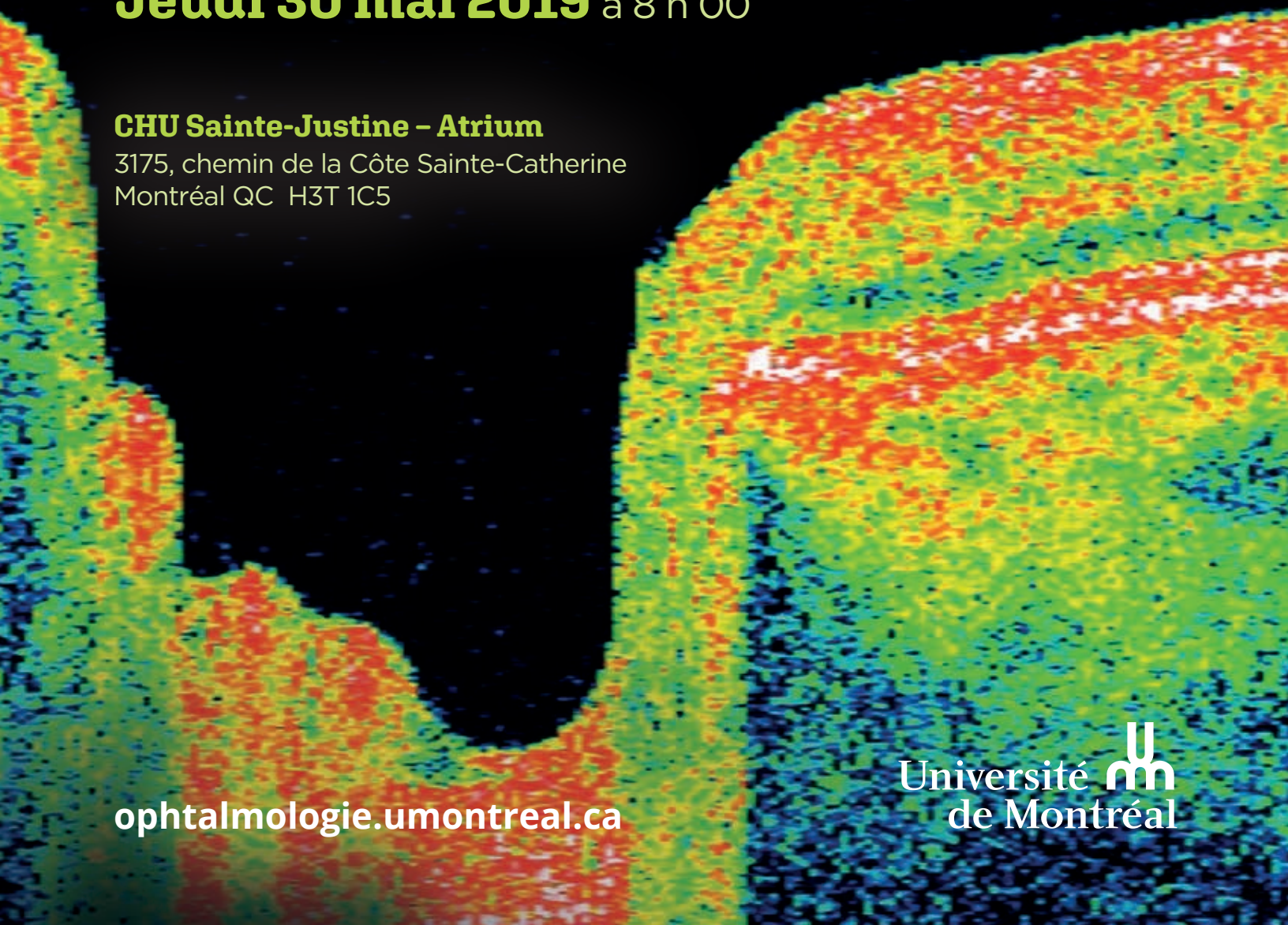
# 31e Journée de la RECHERCHE en OPHTALMOLOGIE

## Programme de la journée

**Jeudi 30 mai 2019** à 8 h 00

**CHU Sainte-Justine – Atrium**
3175, chemin de la Côte Sainte-Catherine
Montréal QC  H3T 1C5



ophtalmologie.umontreal.ca

Université de Montréal

Université de Montréal

**Faculté de médecine**
Département d'ophtalmologie

# 31e Journée de la recherche
# Département d'ophtalmologie
# Université de Montréal
# 30 mai 2019

## PROGRAMME DE LA JOURNÉE

### Comité organisateur

Isabelle Hardy, M.D., FRCS(C)
Directrice et titulaire de la Chaire Suzanne Véronneau-Troutman M.D., FRCS(C), FACS
Département d'ophtalmologie de l'Université de Montréal

Sylvain Chemtob, M.D., PhD
Directeur de la recherche du département d'ophtalmologie
Titulaire de la Chaire Leopoldine 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

Marie-Andrée Lorange, BSc, M.Ing.
Coordonnatrice activités de recherche et développement
Département d'ophtalmologie de l'Université de Montréal

**Atrium du Centre Hospitalier Universitaire Sainte-Justine**
**3175, chemin de la Côte Sainte-Catherine**
**Montréal, Québec H3T 1C5**

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**Faculté de médecine**
Département d'ophtalmologie

# COLLABORATEURS

## Modérateurs

Mark Lesk, M.D., MSc
Qian Qian Wang, M.D.

## Membres du jury présentations orales

Paul Thompson, M.D.
Ali Hafez, M.D.
Jacqueline Orquin, M.D.

## Membres du jury présentations par affiche

Cynthia Qian, M.D.
Christos Boutopoulos, PhD
Bruno Larrivée, PhD

## Collaboratrice à la préparation du programme

Isabelle Lahaie, MSc
Assistante de recherche laboratoire du Dr Chemtob, HMR

**L'organisation de cet événement bénéficie d'une subvention à visée éducative provenant de :**

AMOQ
Allergan Canada
Bausch and Lomb
Bayer Canada
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## OBJECTIFS PÉDAGOGIQUES

L'objectif principal de la journée de la recherche est de donner l'occasion aux résidents du programme d'ophtalmologie de présenter leur projet de recherche, les résultats préliminaires ou les résultats finaux selon l'avancement de leurs travaux. Le second objectif est de donner une opportunité aux étudiants gradués (MSc et PhD), aux fellows et aux stagiaires de présenter les résultats de leurs recherches. Cette journée est aussi l'occasion pour les professeurs, chercheurs ainsi que pour le personnel paramédical de présenter et de s'informer sur les travaux de recherche réalisés au sein du département. Enfin, la journée de la recherche permet à tous d'entendre et de rencontrer des conférenciers invités reconnus internationalement.

Les objectifs pour les participants à la journée sont de :

- connaître les différentes études cliniques contemporaines d'envergure en glaucome; dans cette perspective découvrir de nouvelles stratégies thérapeutiques;
- connaître les avancements en angiogenèse;
- connaître les avancées des différents travaux au sein de notre département.

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# CONFÉRENCE HÉLÈNE BOISJOLY

## Invité d'honneur du Département d'ophtalmologie

***Doctor Ian A. Sigal, PhD***

Doctor Sigal received a B.Sc. in Physics from the Universidad Nacional Autónoma de México, México City (1999), an MSc in Aerospace Engineering from the University of Toronto, Canada (2001), and a PhD in Mechanical Engineering (Collaborative program in Biomedical Engineering) also from the University of Toronto, Canada (2006). Doctor Sigal has dedicated his scientific career to the study of biomechanics-related diseases of the eye, and to glaucoma in particular. During his PhD he pioneered methods for computational modeling of the eye to understand why some individuals develop glaucoma while others do not. He continued to refine these techniques as a post-doc and then as a research associate at the Devers Eye Institute in Portland Oregon. In October 2010 he joined the University of Pittsburgh and founded the Laboratory of Ocular Biomechanics. The laboratory receives support from the National Institutes of Health, the Canadian Institutes of Health Research, The Glaucoma Research Foundation and others. Current projects in the laboratory include the development of novel techniques to characterize connective tissue architecture and biomechanics, and the study of in-vivo effects of intraocular and intracranial pressures.

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# CHERCHEUR INVITÉ

## Chercheur invité du Département d'ophtalmologie

**Dr Alexandre Dubrac, PhD**

Le Dr Alexandre Dubrac a obtenu son doctorat à l'Université de Bordeaux, où il a travaillé avec le Professeur Andreas Bikfalvi sur les chimiokines et l'angiogenèse tumorale. Il s'est ensuite joint comme chercheur postdoctoral au groupe du Professeur Anne Eichmann à la Yale School of Medicine, où il a exploré la fonction des régulateurs de guidance axonale lors du bourgeonnement des vaisseaux sanguins. Ses travaux ont démontré que Slit2 et Robo1&2 sont essentiels pour la néovascularisation de la rétine. Il a été chercheur associé à l'Université Yale, où ses travaux ont porté sur l'interaction cellule entothéliale-péricyte au cours du développement vasculaire et de la rétinopathie ischémique.

Il a récemment été nommé au rang de professeur-chercheur adjoint au Département de pathologie et biologie cellulaire de l'Université de Montréal. Docteur Dubrac travaille aussi au centre de recherche du CHU Sainte-Justine.

RECONNAISSANCE

**Le département d'ophtalmologie reconnaît le travail de ses prédécesseurs et de ses bâtisseurs.**

# Conférence Hélène Boisjoly

**Docteure Hélène Boisjoly, C.M. M.D. MPH**

Médecin ophtalmologiste diplômée de l'Université de Sherbrooke (1981), Hélène Boisjoly se spécialise en cornée au Massachusetts Eye and Ear Infirmary ainsi qu'au Schepens Eye Research Institute affiliés à l'Université Harvard (1981-1983). En 1992, elle obtient un diplôme de maitrise en santé publique de la Bloomberg School of Public Health de l'Université Johns Hopkins. Chercheure-boursière du Fonds de recherche du Québec-Santé (FRQ-S) de 1986 à 2001, elle œuvre à l'Université Laval avant d'être recrutée comme clinicienne-chercheure à l'Université de Montréal en 1993 et chef du département d'ophtalmologie de l'Hôpital Maisonneuve-Rosemont (1993-1998). Parmi ses champs d'intérêt en recherche figurent l'immunologie de la transplantation cornéenne et les facteurs de risque liés au rejet, les maladies virales dont l'herpès oculaire, la cicatrisation des plaies ainsi que les résultats visuels et fonctionnels des patients atteints de maladies oculaires chroniques et des patients ayant été opérés de la cataracte et à la cornée. Elle est la première directrice scientifique du Réseau provincial FRQ-S en santé de la vision (1996-2002). Professeure titulaire depuis 1998, elle occupe la fonction de directrice du

# RECONNAISSANCE

Département universitaire d'ophtalmologie de l'Université de Montréal (2000-2008). Financée sans interruption jusqu'en 2013, elle publie plus de 80 articles scientifiques originaux. Elle a formé 120 résidents et 50 étudiants aux cycles supérieurs dont plusieurs fellows. À l'Université de Montréal, Dre Boisjoly a mis sur pied plusieurs fonds destinés à la recherche et à l'enseignement, notamment le Fonds de recherche en ophtalmologie de l'UdeM et trois importantes Chaires, la Chaire Léopoldine A. Wolfe, la Chaire Charles-Albert Poissant en transplantation cornéenne et la Chaire Suzanne Véronneau-Troutman M.D., FRCS(C), FACS du Département d'ophtalmologie de l'Université de Montréal.

Depuis 2011, elle occupe les fonctions de doyenne de la Faculté de médecine, la première femme dans l'histoire des facultés de médecine du Québec à occuper cette fonction. Comme citoyenne exemplaire qui s'est démarquée par ses réalisations, Dre Boisjoly fut nommée membre de l'Ordre du Canada en décembre 2018. En juin prochain, elle recevra le prix Reconnaissance pour l'ensemble d'une carrière de la Société Canadienne d'ophtalmologie.

Le Département d'ophtalmologie de l'Université de Montréal est fier de compter Dre Hélène Boisjoly parmi ses professeurs et souhaite reconnaître son importante contribution à la recherche et au rayonnement qu'il connaît aujourd'hui. La conférence du professeur invité à la Journée annuelle de la recherche du département portera dorénavant le nom de Conférence Hélène Boisjoly.

# BOURSE SUZANNE VÉRONNEAU-TROUTMAN, M.D.

Diplômée en 1957 de l'Université de Montréal, Docteure Suzanne Véronneau-Troutman a poursuivi ses études à Montréal, à Lyon, en Angleterre et par la suite aux États-Unis. Elle détient quatre diplômes en ophtalmologie. Une pratique de neuf mois au Ghandi Eye Hospital, en Inde, a eu un profond impact sur ses vues professionnelles et personnelles.

Elle est l'auteure de deux livres, de 36 articles dans des journaux scientifiques ainsi que de 32 chapitres et revues. Elle a donné plus de 300 cours et conférences sur le traitement médical et microchirurgical des anomalies oculomotrices. Active dans de nombreuses associations nationales et internationales, elle a été la 8$^{e}$ femme élue à « The American Ophthalmological Society » depuis sa fondation en 1864.

Depuis son mariage en 1967, avec feu Richard Troutman, M.D., elle a continué à pratiquer sa profession d'ophtalmologiste à temps plein à New York jusqu'à ce qu'elle prenne sa retraite en 2001.

Grande philanthrope, les fondations qu'elle encourage la captivent toujours. Les organismes suivants bénéficient de son soutien depuis plusieurs années : Pan-American Association of Ophthalmology - 1991, Women in Ophthalmology - 1997, UQAM - 1999, Université de Montréal - 2006.

À l'Université de Montréal, le Fonds de bourses Suzanne Véronneau-Troutman M.D. soutient les étudiant(e)s à la maîtrise et au doctorat qui sont inscrits à temps plein dans les programmes de recherche en ophtalmologie. Depuis 2012, la Chaire Suzanne Véronneau-Troutman M.D., FRCS(C), FACS promouvoit et développe le potentiel en enseignement et en recherche du Département. Ce soutien financier assure que le Département d'ophtalmologie de l'Université de Montréal, se classe parmi les meilleurs en Amérique du Nord et dans le monde. Lors de sa création, cette chaire départementale était la première chaire de Département en ophtalmologie au Canada.

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# RÉCIPIENDAIRES DES BOURSES SUZANNE VÉRONNEAU-TROUTMAN, M.D.

2019 Kevin Lanthier, MSc
La sénescence lors des rétinopathies diabétiques.
Directeur: Mike Sepieha, PhD.

Elisabeth Prairie, MSc
Rétinopathie du prématuré : pourquoi investiguer le rôle de l'IL-6 et une nouvelle avenue thérapeutique utilisant un antagoniste de son récepteur.
Directeur : Sylvain Chemtob, M.D. PhD.

2018 Elizabeth Andriessen
L'influence de la microflore sur le développement de la dégénérescence maculaire liée à l'âge.
Directeur: Mike Sepieha, PhD.

Mohammad Nezhady
Rôle inattendu du récepteur au lactate, le GPR81, dans un modèle de dégénérescence maculaire.
Directeur : Sylvain Chemtob, M.D. PhD.

2017 Antoine Sylvestre-Bouchard
Titre du projet : Une nouvelle génération de substituts cornées biosynthétiques : Fonctionnalité in vivo dans l'oeil enflammé.
Directrice: Isabelle Brunette, M.D., co-directrice: May Griffith. PhD, MBA.

Alexandra Beaudry-Richard
Titre du projet : Le rôle de l'inflammation anté-natale, particulièrement celui de l'interleukine-1, dans la vasculopathie rétinienne et sous-rétinienne de la progéniture.
Directeur : Sylvain Chemtob, M.D., PhD.

2016 Natalija Popovic
Titre du projet : Évaluation du potentiel thérapeutique de la protéine AAP1 pour la prévention de l'angiogenèse associée à la DMLA.
Directeurs : Bruno Larrivée, PhD et Mike Sapieha, PhD.

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# RÉCIPIENDAIRES DES BOURSES SUZANNE VÉRONNEAU-TROUTMAN, M.D.

| | |
|---|---|
| 2015 | Gauri Patel |
| 2014 | Marie-Claude Robert et Mathieu Nadeau-Vallée. |
| 2013 | Naoufal Akla |
| 2012 | Ellen Zhou et Jeb A. Ong |
| 2011 | Wesley Chan |
| 2010 | Giulia Dormal |
| 2009 | Anahid Aminian et Mihaela-Luminita Popescu |
| 2008 | Wassim Chatoo |

# FONDS DRE CHRISTINE CORRIVEAU DE RECHERCHE EN ONCOLOGIE OCULAIRE

Le Fonds Dre Christine Corriveau est dédié à soutenir un candidat dans la recherche en oncologie oculaire et, par conséquent permettre de développer de nouvelles approches diagnostiques et thérapeutiques au service des patients de notre société.

Après sa formation médicale à la Faculté de médecine de l'Université de Montréal de 1974 à 1979, Dre Corriveau a poursuivi avec une résidence en ophtalmologie à l'Université McGill puis a complété un fellowship en oncologie oculaire à l'Université de Toronto.

Après avoir occupé le poste de directrice de Programme de résidence en ophtalmologie de l'Université de Montréal de 1996 à 2002, elle a effectué un mandat de quatre ans à titre de chef du Département d'ophtalmologie du Centre hospitalier de l'Université de Montréal (CHUM). Par la suite, de 2006 à 2018, elle fut la directrice des études pré-doctorales du Département d'ophtalmologie de l'Université de Montréal.

C'est surtout grâce à sa grande expertise et sa volonté de créer une équipe multidisciplinaire et ultraspécialisée en oncologie oculaire que Dre Corriveau s'est démarquée dans le monde ophtalmologique québécois. En effet, de 1989 à 2004, soit pendant 15 ans, elle a participé comme investigatrice dans le projet internationalement reconnu : le Collaborative Ocular Melanoma Study (COMS), une étude multicentrique randomisée prospective.

Investigatrice principale pour le centre de recrutement de Montréal composé des départements d'ophtalmologie de l'Hôpital Notre-Dame et de l'Hôpital Royal Victoria, elle supervisa une équipe multidisciplinaire de 20 personnes composée d'ophtalmologistes, de radiooncologues, de médecins de famille, d'oncologues, de physiciens, de pathologistes, de techniciens en photographie, en ultrason et en réfraction pour recruter, suivre et traiter des patients avec mélanomes choroïdiens sous l'égide du National Eye Institute, division du NIH.

En 2009, grâce à son travail acharné, son équipe du CHUM obtenait la désignation (seule au Québec) de centre suprarégional en tumeurs oculaires. Dès l'obtention de cette désignation jusqu'à sa retraite en 2018, elle fut responsable médical pour l'équipe interdisciplinaire d'oncologie oculaire du CHUM.

## 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 PhD des milieux à vocation académique affiliés au Département d'ophtalmologie de l'Université de Montréal (CHUM, CHU mère-enfant et HMR).

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.

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# RECONNAISSANCE ENVERS LES DONATEURS

Le Département d'ophtalmologie de l'Université de Montréal remercie chaleureusement tous ses donateurs.

## INDIVIDUS

### DON de 3M $ et plus

Suzanne Véronneau-Troutman

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Succession Anne-Marie-Valois-Besner

### DONS de 50 000 $ à 999 999 $

Line Chevrette
Succession Liette-Languérand

### DONS de 1000 $ à 49 999 $

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# RECONNAISSANCE ENVERS LES DONATEURS

Les projets philanthropiques suivants permettent au Département d'ophtalmologie de soutenir ses étudiants ainsi que l'enseignement et la recherche :

- Chaire Charles-Albert-Poissant de transplantation cornéenne de l'Université de Montréal (2007-2016)

- 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

- Chaire Suzanne Véronneau-Troutman M.D., FRCS(C), FACS du Département d'ophtalmologie de l'Université de Montréal

- Chaire Fondation Caroline Durand en thérapie cellulaire des maladies de l'œil de l'Université de Montréal à l'Hôpital Maisonneuve-Rosemont

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

- Fonds recherche en ophtalmologie (Fonds Besner-Valois)
- Fonds de recherche en ophtalmologie de l'Université de Montréal (FROUM)

- Fonds Succession Liette-Languérand
- Fonds Suzanne Véronneau-Troutman
- Fonds pour le laboratoire d'ophtalmologie chirurgicale de l'Université de Montréal (LOCUM)

- Fonds Line Chevrette pour la recherche en ophtalmologie pédiatrique
- Fonds Mission médicale en Haïti
- Fonds Dre Christine Corriveau de recherche en oncologie oculaire

Pour faire un don à l'un de ces projets : medecine.umontreal.ca/don

# HORAIRE DE LA JOURNÉE

## SÉANCE DE L'AVANT-MIDI

MODÉRATEUR : MARK LESK, M.D., MSC

| | |
|---|---|
| 8 h 00 | OUVERTURE OFFICIELLE ET MOT DE BIENVENUE PAR DOCTEURE **ISABELLE HARDY, DIRECTRICE** DU DÉPARTEMENT D'OPHTALMOLOGIE DE L'UNIVERSITÉ DE MONTRÉAL. |
| 8 h 15 | POST-OPERATIVE OUTCOMES OF THE AB-INTERNO GELATIN MICROSTENT WITH AND WITHOUT PHACOEMULSIFICATION.<br>AUTEURS : ANDREI-ALEXANDRU SZIGIATO M.D.; SAMIR TOUMA; SAMIR JABBOUR M.D.; YOUNES AGOUMI M.D.; HARMANJIT SINGH M.D. |
| 8 h 30 | ÉVALUATION DE L'ASTIGMATISME POST-KÉRATOPLASTIE PÉNÉTRANTE ET KÉRATOPLASTIE LAMELLAIRE ANTÉRIEURE PROFONDE SUITE À L'ABLATION SÉLECTIVE DE SUTURES GUIDÉE PAR TOPOGRAPHIE CORNÉENNE SÉQUENTIELLE RAPIDE.<br>AUTEURS : ANNIE HO, MILAD MODABBER, JEHAN BISTA, HUSSEIN MORFEQ, LOUIS RACINE, LAURA SEGAL ARDMAN, PAUL THOMPSON, MARIE-CLAUDE ROBERT, SAMIR MELKI, MONA HARISSI-DAGHER. |
| 8 h 45 | FIBRIN FORMATION IN THE ANTERIOR CHAMBER DURING DMEK SURGERY.<br>AUTEURS : CRISTINA BOSTAN, ELISE SLIM, TANGUY BOUTIN, MICHÈLE MABON, ISABELLE BRUNETTE, JOHANNA CHOREMIS, JULIA TALAJIC. |
| 9 h 00 | INTRAVITREAL AFLIBERCEPT FOR THE TREATMENT OF BEVACIZUMAB-RESISTANT DIABETIC MACULAR EDEMA: A PROSPECTIVE STUDY.<br>AUTEURS : CHORFI SARAH, SAPIEHA PRZEMYSLAW, REZENDE FLAVIO. |
| 9 h 15 | OUTCOMES OF DESCEMET MEMBRANE ENDOTHELIAL KERATOPLASTY (DMEK) AT A CANADIAN UNIVERSITY HOSPITAL CENTER.<br>AUTEURS : MICHAEL MARCHAND, MONA HARISSI-DAGHER, MARIE-CLAUDE ROBERT. |
| 9 h 30 | NEW PERICYTE FUNCTION IN RETINOPATHY.<br>AUTEUR : ALEXANDRE DUBRAC, PHD., CRCHUSJ. |
| 10 h 00 | PAUSE ET PRÉSENTATIONS DES AFFICHES (45 MINUTES) (AFFICHES 1 À 8).<br>JURY<br>DOCTEUR BRUNO LARRIVÉE, PHD<br>DOCTEURE CYNTHIA QIAN, M.D.<br>DOCTEUR CHRISTOS BOUTOPOULOS, PHD |

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| 10 h 45 | CLINICAL OUTCOMES OF CYANOACRYLATE ADHESIVE APPLICATION FOR CORNEAL PERFORATIONS: A RETROSPECTIVE CASE SERIES.<br>AUTEURS : SONIA ANCHOUCHE, MONA HARISSI-DAGHER, LAURA SEGAL, LOUIS RACINE, MARIE-CLAUDE ROBERT. |
| 11 h 00 | COMPARATIVE OUTCOMES AND COMPLICATIONS OF BOSTON KERATOPROSTHESIS TYPE 1 IMPLANTATION BASED ON VISUAL ACUITY IN THE CONTRALATERAL EYE.<br>AUTEURS : SAMIR TOUMA; MONA HARISSI-DAGHER M.D. |
| 11 h 15 | CONFÉRENCE HÉLÈNE BOISJOLY<br>OCULAR BIOMECHANICS FROM THE BOTTOM UP.<br>AUTEURS: DOCTEUR IAN A. SIGAL, PHD, UNIVERSITY OF PITTSBURGH SCHOOL OF MEDICINE. |
| 12 h 00 | REMISES DE BOURSES AUX ÉTUDES SUPÉRIEURES PAR DOCTEURE ISABELLE HARDY<br>REMISE DES BOURSES SUZANNE VÉRONNEAU-TROUTMAN M.D.: KEVIN LANTHIER (MSC) ET ELISABETH PRAIRIE (MSC).<br>REMISE DES BOURSES DU FONDS DE RECHERCHE EN OPHTALMOLOGIE DE L'UNIVERSITÉ DE MONTRÉAL (FROUM) : ALEXANDRE ABIB (DOCTORAT), ROBERTO DIAZ MARIN (DOCTORAT), SARAH-ÈVE LOISELLE (MSC). |
| 12 h 15 | DÎNER ATRIUM (75 MINUTES). |

## SÉANCE DE L'APRÈS-MIDI

MODÉRATRICE : QIAN QIAN WANG, M.D.

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| 13 h 30 | PEDIATRIC INTERMEDIATE UVEITIS ASSOCIATED WITH PROGRESSIVE CNS DEMYELINATING LESIONS.<br>AUTEURS : AL NAJJAR M. IBRAHIM; É. FORTIN. |
| 14 h 00 | OUR EXPERIENCE WITH RETINOPATHY OF PREMATURITY: A RETROSPECTIVE COMPUTERIZED DATABASE REVIEW.<br>AUTEURS : CHORFI SARAH, BÉLANGER CAROLINE, FALLAHA NICOLE, OSPINA LUIS, SUPERSTEIN ROSANNE, HAMEL PATRICK. |
| 14 h 15 | IMPLANTATION OF SECOND GENERATION TRABECULAR MICRO-BYPASS STENTS (ISTENT INJECT) WITH CONCOMITANT CATARACT SURGERY IN NORMAL TENSION GLAUCOMA: ONE YEAR OUTCOMES.<br>AUTEURS : ALI SALIMI, COLIN I CLEMENT, FRANK HOWES, PAUL J HARASYMOWYCZ. |

| | |
|---|---|
| 14 h 30 | ANALYSE COMPARATIVE DE 4 FORMULES DE CALCUL BIOMETRIQUE SUR LA PRÉVISIBILITÉ DE LA REFRACTION POST-OPÉRATOIRE DANS LA CHIRURGIE DE LA CATARACTE.<br>AUTEURE : MARIE-ÈVE POIRIER. |
| 14 h 45 | CYCLOPHOTOCOAGULATION TRANS-SCLÉRALE MICROPULSÉE (MTSCPC) POUR LE TRAITEMENT DU GLAUCOME AU CENTRE HOSPITALIER DE L'UNIVERSITÉ DE MONTRÉAL (CHUM).<br>AUTEURS : MICHAEL MARCHAND, YOUNES AGOUMI, HARMANJIT SINGH. |
| 15 h 00 | PAUSE ET PRÉSENTATIONS DES AFFICHES (45 MIN) (AFFICHES 9 À 15)<br>JURY<br>DOCTEUR BRUNO LARRIVÉE, PHD<br>DOCTEURE CYNTHIA QIAN, M.D.<br>DOCTEUR CHRISTOS BOUTOPOULOS, PHD |
| 15 h 45 | RECOMBINANT COLLAGEN LIKE PEPTIDE FOR BIOENGINEERING IMPLANTS.<br>AUTEURS : YASMINA-MIA EL KHOURY. |
| 16 h 00 | EXPLORING THE ADIPOSE TISSUE-RETINA AXIS IN CHOROIDAL NEOVASCULARIZATION.<br>AUTEURS : DIAZ MARIN ROBERTO; CRESPO-GARCIA SERGIO; FOURNIER FRÉDÉRIK; DE GUIRE VINCENT; SAPIEHA PRZEMYSLAW. |
| 16 h 15 | TERMINAL ELECTRON BEAM STERILIZATION FOR RECOMBINANT HUMAN COLLAGEN-PHOSPHORYLCHOLINE CORNEAL IMPLANTS.<br>AUTEURS: F SIMPSON, E EDIN, MM ISLAM, O BUZNYK, M KOZAK LJUNGGREN, A LISZKA, K MERRETT, P FAGERHOLM, M GRIFFITH. |
| 16 h 30 | DOSE ET TEMPS D'ADMINISTRATION OPTIMAUX DE RYTVELA POUR LA PRÉVENTION DE LA RÉTINOPATHIE DU PRÉMATURÉ.<br>AUTEURS : SARAH-EVE LOISELLE, ALEXANDRA BEAUDRY-RICHARD, NADÈGE ZANRÉ, MATHIEU NADEAU-VALLÉE, XIN HOU, CHRISTIANE QUINIOU, SYLVAIN CHEMTOB. |
| 16 h 45 | TABLE RONDE SUR LES PRÉSENTATIONS ORALES ET PAR AFFICHES (15 MIN)<br>DÉLIBÉRATION DU JURY |

| | |
|---|---|
| 17 h 00 | REMISE DES PRIX ET MOT DE LA FIN PAR DOCTEURE **ISABELLE HARDY ET DOCTEUR SYLVAIN CHEMTOB**.<br>• PRIX ROCH GAGNON / MEILLEURE PRÉSENTATION ORALE CHEZ LES RÉSIDENT(E)S ET FELLOWS.<br>• MEILLEURE PRÉSENTATION ORALE CHEZ LES ÉTUDIANT(E)S GRADUÉ(E)S ET POST-GRADUÉ(E)S.<br>• MEILLEURE PRÉSENTATION PAR AFFICHE CHEZ LES RÉSIDENTS.<br>• MEILLEURE PRÉSENTATION PAR AFFICHE CHEZ LES ÉTUDIANTS AUX ÉTUDES SUPÉRIEURES. |
| 17 h 15 | VIN D'HONNEUR. |

## RÉSUMÉS DES PRÉSENTATIONS ORALES

**MEMBRES DU JURY : PAUL THOMPSON, M.D., ALI HAFEZ, M.D., JACQUELINE ORQUIN, M.D.**

**8 h 15**

### Post-Operative Outcomes of the Ab-Interno Gelatin Microstent with and without Phacoemulsification.

**Andrei-Alexandru Szigiato M.D.**, Samir Touma, Samir Jabbour M.D., Younes Agoumi M.D., Harmanjit Singh M.D..

Introduction: The ab-interno gelatin microstent is currently the only minimally invasive glaucoma surgery that allows subconjunctival filtration. Preliminary studies suggest it effectively lowers IOP with a more secure safety profile than traditional glaucoma surgery. However, current literature is limited and follow-up periods are suboptimal. Purpose: To compare the outcomes of ab-interno gelatin microstent implantation with mitomycin C (MMC) with and without phacoemulsification. Methods: Single-center retrospective study of 164 consecutive eyes in 150 patients who underwent gelatin microstent implantation with MMC. Sixty seven eyes were combined with phacoemulsification (40.9%). Data on pre- and post-operative intraocular pressure (IOP), number of glaucoma medications, visual acuity, intraoperative and postoperative complications as well as further interventions or surgeries were collected. The primary outcome was surgical success defined as IOP 6-17 mmHg allowing for medications on at least 2 consecutive visits including in-clinic maneuvers (including needling) with no vision threatening complications or need for repeated surgery. Surgical success was compared between eyes that received solo microstent implantation and those with combined phacoemulsification. Secondary outcomes were IOP of 6-14mmHg allowing for medications, as well as any post-operative interventions, complications, and reoperations. Results: From 20-month survival analysis estimates, 77.5% of eyes with the gelatin stent alone had an IOP of 6-17 mmHg allowing for medications vs 68.9% of eyes with combined phacoemulsification (p=0.4); 52.7% vs 34.2% had an IOP of 6-14 mmHg (p=0.09). There was no difference in hazard ratio of failure when combined with phacoemulsification (HR=1.4 (0.7-2.9), p=0.4). There was no difference in failure with previous glaucoma surgery (HR=1.2 (0.4-4.1), p=0.7), older age (HR=0.7 (0.3-1.5), p=0.3), or improved surgeon experience (40 cases vs first 10 cases, HR=0.5 (0.2-1.8), p=3). Needling occurred 21 times in 19 solo-stented eyes (19.6%) and 28 times in 21 phaco-stented eyes (21.6%). The most frequently occurring complications were hyphema (n=7, 7.2%) and hypotony (n=7, 6.2%) which resolved within 1 month. There were 3 stent exposures in the solo-stent group (7.2%) vs 1 in the phaco-stent group

(1.5%). There were 19 reoperations in both groups (11.6%), including 15 tube shunt procedures (9.1%), 2 trabeculectomies (1.2%), and 2 CPC G-probe lasers (1.2%). Conclusions: Ab-interno microstent implantation effectively lowered IOP in over 70% of eyes at 20 months postoperatively. It appeared to be equally effective when combined with phacoemulsification, in eyes with previous glaucoma surgery, older age, and different glaucoma subtypes. A low rate (11%) of reoperation was seen during the early-mid post-operative period. A larger sample size and longer follow-up is required to further determine the long term safety and efficacy of this device.

**8 h 30**

**Évaluation de l'astigmatisme post-kératoplastie pénétrante et kératoplastie lamellaire antérieure profonde suite à l'ablation sélective de sutures guidée par topographie cornéenne séquentielle rapide.**

**Annie Ho M.D.**, Milad Modabber, Jehan Bista, Hussein Morfeq, Louis Racine M.D., Laura Segal Ardman M.D., Paul Thompson M.D., Marie-Claude Robert M.D., Samir Melki, Mona Harissi-Dagher, M.D.

Introduction: Les greffes cornéennes, comprenant la keratoplastie pénétrante (KP) ou la kératoplastie lamellaire antérieure profonde (KLAP), peuvent induire un astigmatisme post-opératoire très important. L'utilisation de sutures interrompues pour sécuriser la jonction de la greffe-hôte dans la KP et la KLAP permet le retrait sélectif de suture dans le méridien cornéen le plus cambré, dans le but de réduire l'astigmatisme post-opératoire. Il n'existe actuellement que très peu d'études démontrant que les topographies cornéennes réalisées le même jour que le retrait des sutures initiales permettraient d'identifier de manière adéquate la prochaine paire de sutures à retirer (Sarhan, 2010). Toutefois, ce processus de retrait demeure controversé. L'objectif de cette étude est de déterminer si la topographie effectuée 15 à 30 minutes après le retrait de sutures cornéennes est comparable à la topographie obtenue 4 semaines plus tard chez les patients avec KP ou KLAP. Design de l'étude : Étude clinique prospective, non-randomisée et multicentrique Méthode : Un total de 20 patients ayant eu une chirurgie KP ou KLAP nécessitant une ablation de suture sélective pour la gestion de l'astigmatisme de haut degré post-kératoplastie (plus de 3 dioptries d'astigmatisme topographique) seront inclus dans l'étude. Les résultats primaires évalueront l'astigmatisme réfractif (en utilisant la réfraction

manifeste et automatisée) et topographique (en utilisant la topographie cornéenne via Pentacam) à 15-30 minutes après le retrait de sutures et 4 semaines plus tard. La différence sera considérée non significative si l'axe de suture requérant une ablation est inférieur à 22.5 degrés (considérant les 16 points de sutures interrompus). Les résultats secondaires évalueront aussi la meilleure acuité visuelle corrigée (MAVC). Le taux de complications et les effets délétères seront documentés. Résultats et impact attendus : Si l'on observe que le changement de l'astigmatisme après l'ablation des sutures est minime entre les visites, les futurs patients recevant une greffe cornéenne pourraient réduire le temps d'intervalle entre chaque cycle d'ablation de suture. On pourrait aussi permettre un plus grand nombre de sutures retirées à chaque visite de suivi, comparativement à la méthode conventionnelle actuelle où l'on retire seulement de 1 à 2 sutures par visite. Ultimement, cette étude démontrerait la possibilité d'accélérer la récupération visuelle, réduire le nombre de visites de suivi en postopératoire, ce qui constituerait des bénéfices significatifs tant pour le patient que pour le système de santé.

**8 h 45**

**Fibrin formation in the anterior chamber during DMEK surgery.**

**Cristina Bostan M.D.**, Elise Slim, Tanguy Boutin, Michèle Mabon M.D., Isabelle Brunette M.D., Johanna Choremis M.D., Julia Talajic M.D.

Purpose: To report a case series of patients with fibrin formation in the anterior chamber during DMEK surgery. Methods: A retrospective chart review of consecutive DMEK cases performed between March 2015 to October 2018 at the University Eye Center of Maisonneuve-Rosemont Hospital was done. The series included the learning curve of three different surgeons and the learning curve of their inexperienced fellows. We identified the cases with fibrin formation in the anterior chamber during DMEK surgery, their management, their outcomes and the level of experience of their surgeon at the time of surgery. Results: Eight eyes out of 262 had fibrin formation in the anterior chamber during DMEK, which was associated with primary graft failure in 7 of them. Most cases occurred during the learning curve of the surgeon or the fellow. Factors associated with fibrin formation were tight scroll, long un-scrolling time, and bleeding in the anterior chamber (from iris trauma, anterior chamber collapse, wound formation or suturing). When suspected, staining with vision blue was performed and fibrin threads were cut using two

30 Gauge Cannulas or micro scissors. In one case, in which the fibrinous graft could not be un-scrolled, recombinant tissue plasminogen activator was injected intracamerally on postoperative day 1 and fibrinolysis was achieved. However, the graft was unsuccessful. Conclusion: Fibrin formation is a devastating complication that leads to primary graft failure. Its prevention is key for DMEK surgery success. Surgeons should avoid even minimal iris trauma, perform cautery in case of bleeding at the wound level, favor small incisions avoiding any pannus, and perform shallow suturing to avoid anterior chamber collapse and bleeding.

**9 h 00**

**Intravitreal Aflibercept for the treatment of bevacizumab-resistant diabetic macular edema: a prospective study.**

**Sarah Chorfi,** Mike Sapieha Przemyslaw, Flavio Rezende.

Purpose: To evaluate visual and anatomical outcomes of intravitreal aflibercept (2.0 mg) in eyes with persistent center-involving diabetic macular edema despite intravitreal bevacizumab therapy. Methods: Twenty-six eyes of 26 patients were included in this prospective, consecutive, non-randomized study. Selected patients had to have persistent diabetic macular edema despite at least 6 consecutive monthly intravitreal injections of bevacizumab. Patients received intravitreal injections of aflibercept (2 mg) every 4 weeks for the first 5 treatment sessions. The interval was then extended to 8 weeks for the next 4 intravitreal injections. The patients were followed for a total of 52 weeks with periodic OCTs and clinical evaluations. Results: Our cohort of patients had a mean age of 66±10.65 years old and had received on average 25.42±11.57 bevacizumab injections prior to the study. Three patients were lost to follow-up before completing the study. The mean improvement of best-corrected visual acuity (BCVA) compared to baseline was 3.15±5.75 EDTRS letters at 20 weeks and 3.31±7.04 letters at 52 weeks. The mean change in central retinal thickness (CRT) was -95.23±172.76 µm at 20 weeks and -105.13±151.32 µm at 52 weeks. Mean CRT fluctuated following a see-saw pattern with increasing CRT in between treatment intervals. Six patients had a decrease of CRT ≥ 20% compared to baseline at 20 weeks compared to 11 patients at 52 weeks. Eight patients had a BCVA ≥ 5 EDTRS letters at 20 weeks compared to 11 patients at 52 weeks. Conclusion: Aflibercept significantly improved BCVA and CRT in a substantial subset of

patients with bevacizumab-resistant diabetic macular edema. The variation in response to treatment between patients highlights the need for research towards predictive biomarkers in the future.

**9 h 15**

**Outcomes of Descemet Membrane Endothelial Keratoplasty (DMEK) at a Canadian University Hospital Center.**

**Michael Marchand M.D.**, Mona Harissi-Dagher, M.D., Marie-Claude Robert M.D.

Introduction: Posterior lamellar keratoplasty has become the standard of care for endothelial pathologies, such as Fuchs endothelial corneal dystrophy (FECD) and pseudophakic bullous keratopathy (PBK), leading to faster recovery, fewer complications, and better vision outcomes compared with traditional penetrating keratoplasty. Descemet membrane endothelial keratoplasty (DMEK), in which only the Descemet membrane and endothelium are transplanted, has the potential to further improve visual acuity outcomes and decrease rejection rates. However, DMEK is technically challenging, and difficulty with donor preparation, graft attachment, and primary graft failure has been described. The purpose of this study is to report and analyse the clinical outcomes and complications of the first eyes that underwent DMEK surgery in our university-based center. Methods: In this retrospective observational case series, 85 eyes of 73 consecutive patients who underwent DMEK between March 2016 and July 2018 were included. DMEKs (n=91) were performed by five surgeons and included all their first cases. Outcome measures examined included pre- and postoperative best corrected visual acuity (BCVA), endothelial cell count (ECC), central corneal thickness (CCT), intraocular pressure (IOP), and intraoperative and postoperative complications (rejection, graft detachment, rebubbling rate, graft failure, need for reoperation). This study was conducted in compliance with the Declaration of Helsinki and approved by the CHUM Research Ethics Committee. Results: The median BCVA increased from 0.40 [mean 0.59±0.50] logMAR (Snellen equivalent,

## RÉSUMÉS DES PRÉSENTATIONS ORALES

**9 h 30**

**New pericyte function in retinopathy.**

**Alexandre Dubrac PhD, CRCHUSJ**

**10 h 45**

**Clinical Outcomes of Cyanoacrylate Adhesive Application for Corneal Perforations: A Retrospective Case Series.**

**Sonia Anchouche**, Mona Harissi-Dagher, M.D., Laura Segal M.D., Louis Racine M.D., Marie-Claude Robert M.D.

Purpose: Cyanoacrylate adhesive is routinely used in the treatment of corneal melting and perforations. Despite its widespread use, the literature on its effectiveness remains largely insufficient. The purpose of this study is to examine the outcomes of cyanoacrylate adhesive application in patients with corneal perforation and assess for predictors of treatment response. Study Design: Retrospective case series. Methods: A single-center retrospective analysis was conducted for the clinical outcomes of patients over the age of 18 who underwent cyanoacrylate adhesive gluing for corneal perforations between 2013 and 2018. The research protocol was approved by the Centre hospitalier de l'Université de Montréal institutional review board. The primary outcome was the proportion of successful glue applications, defined as tectonic stability of the globe without subsequent keratoplasty (KP). Secondary outcomes included visual acuity, success of subsequent interventions as well as complications after glue application. Results: 40 patients (40 eyes) were included in this study. The mean age of presentation was 68 ± 13 (58% women) with a median length of follow-up of 317 days ((interquartile range (IQR): 91- 578). The two most common etiologies for corneal perforations were infections (45%; 18/40), and degenerative corneal diseases (18%; 7/40). Thirty percent (12/40) of subjects required more than one application of cyanoacrylate adhesive. Eighteen percent (7/40) of patients experienced a resolution of their corneal perforation with cyanoacrylate gluing alone and 53% (21/40) required subsequent KP. Median duration of cyanoacrylate treatment for patients who did not undergo KP, defined as time between first application of adhesive and first appointment following its dislodgement, was 48 days (IQR: 23 - 85). For the patients

requiring KP, the median delay to graft, defined as time between first application of adhesive and date of surgery, was 22 days (IQR: 4 – 49). Of these cases, 67% (14/21) were successful and 33% (7/21) failed. KP success was defined as the presence of a clear graft at last visit. For successful treatment, the median time delay between glue application and KP was 22 days (IQR: 2 – 38). The median time delay for unsuccessful KPs was 27 days (IQR: 13 – 65). There is no significant difference in median time delay between the two categories (p=0.54). Documented complications arising from treatment of corneal perforation with glue included most notably 4 repeat corneal melts and 4 cases of ocular evisceration. Conclusions: Cyanoacrylate gluing may be considered as a stand alone treatment modality for corneal perforations for some patients. In cases requiring KP, our preliminary data do not reveal any difference in delay to treatment for patients with successful KP and failed KP.

**11 h 00**

**Comparative Outcomes and Complications of Boston Keratoprosthesis Type 1 Implantation Based on Visual Acuity in the Contralateral Eye.**

**Samir Touma**; Mona Harissi-Dagher, M.D.

Background Information: The Boston Keratoprosthesis type 1 (KPro) is a corneal prosthesis developed at the Massachusetts Eye and Ear Infirmary and the most widely used artificial cornea for corneal blindness. Recent improvements in medical technologies and surgical techniques resulted in improved outcomes and retention of this device. Given the risks of chronic complications and need for long term follow-up, its use in patients with good contralateral vision is controversial. - Purpose: To compare the outcomes of KPro implantation between patients who are legally blind versus sighted in the contralateral eye. - Methods: We conducted a single-centre retrospective comparative case series of Boston KPro implantations performed between 2008 and 2017. Patients were divided in two groups based on the preoperative best-corrected visual acuity (BCVA) in the contralateral eye: group I (≥20/200) and group II (< 20/200). Preoperative diagnoses and visual acuity as well as postoperative visual acuity, device retention and complications were collected and compared. - Results: Group I (56 eyes) and group II (53 eyes) had similar demographics, median preoperative BCVA (hand movements) in the operated eye, and median duration of postoperative follow-up (76.92 vs. 85.6 months, respectively). Final

postoperative BCVA of the operated eye was statistically better in group 1 compared to group 2 (20/400 and hand movements respectively, P = 0.02). There was no statistical significance in device retention mean survival time. Most common complication in both groups was retroprosthetic membrane. Cystoid macular edema occurred more frequently in group 1 (P = 0.004) whereas retinal detachment was more common in group 2 (P = 0.052) - Conclusion: Most patients who received a Boston KPro type I experienced improved vision. Device retention and complication rates were similar in both groups. Because the prognosis after KPro implantation is tied to the underlying etiology, it is important to recognize that some diagnoses are easier to treat and may predispose to better outcomes.

**11 h 15**

**Ocular Biomechanics From the Bottom Up.**

**Doctor Ian A. Sigal, PhD, University of Pittsburgh School of Medicine.**

**13 h 30**

**Pediatric intermediate uveitis associated with progressive CNS demyelinating lesions.**

**Maryam Ibrahim AL Najjar M.D.**, E Fortin M.D.

Purpose: To report a younger child presented with symptoms and signs of chronic bilateral intermediate uveitis associated with progressive demyelinating lesions on brain MRI. Observations A five year old healthy child presented to our clinic complaining of symptoms of blurry of vision and floaters. Full ophthalmological examination as well as ocular imaging was performed. He was diagnosed to have bilateral intermediate uveitis as defined by the SUN criteria.Complete work-up was initiated to exclude the infectious and non-infectious causes. Brain MRI was obtained prior to initiate anti-TNF-alpha therapy and revealed multiple non enhancing foci of hyperintense signal within subcortical and periventricular white matter at the supratentorial level. The patient was neurologically asymptomatic. A follow-up brain MRI was done one year later which revealed new demyelinating lesions.

The patient was considered to have radiologically isolated syndrome and he did not receive anti-TNF-alpha agents. Conclusions A quarter of pediatric uveitis cases are intermediate uveitis (IU) and are mostly idiopathic. In comparison with intermediate uveitis in adults, pediatric IU has a worse visual prognosis.Some of the diseases associated with adult intermediate uveitis, such as multiple sclerosis(MS) and intra-ocular lymphoma, are rare in children but the association between intermediate uveitis in childhood and an increased risk of developing MS as an adult has been reported. However, there are no reports in the literature of patients with intermediate uveitis developing MS or Radiologically isolated syndrome (RIS) during childhood. The case that we are reporting has an important clinical implications in the present era of increased use of anti-TNF agents to treat pediatric uveitis. Anti-TNF agents are contraindicated in patients with MS as the early studies show worsening of neurological signs and symptoms in these patients. Although pediatric MS is an uncommon condition, thought should be given to CNS MRI screening of patients with IU if anti-TNF therapy is considered. To our knowledge, this is the first case report of a child with intermediate uveitis associated with CNS demyelinating lesions. However, it is highly probable that this association is under estimated because clinicians do not routinely obtain CNS MRIs in pediatric patients with intermediate uveitis.

**13 h 45**

**Our experience with retinopathy of prematurity: a retrospective computerized database review.**

**Sarah Chorfi M.D.**, Caroline Bélanger, Nicole Fallaha, Luis Ospina M.D., Rosanne Superstein M.D., Patrick Hamel M.D.

Purpose: Analyzing the practices at our institution for screening, treatment and follow-up of patients with retinopathy of prematurity during their hospitalization at the neonatal intensive care unit. Study design Retrospective review of all patients examined in the neonatal intensive care unit of our institution for retinopathy of prematurity between August 2009 and November 2018. Methods Data was extracted from a computerized database in which information about all patients seen in the neonatal intensive care unit of our institution has been continuously updated since 2008. Results We computed a total of 1493 patients and 6648 exams in our database. A proportion of 15.26% of our patients had 20 to 26 weeks of gestation age, 71.08% had 26 to 32 weeks, 13.25% had 32 to 38

weeks and 0.40% had 38 to 44 weeks. None of our patients developed disease severity of stage 4 or 5 during their follow-up. The average follow-up interval for stage 1, 2 and 3 respectively was 10.28 +/- 7.34 days, 6.58 +/- 2.44 and 3.97 +/- 2.39. The average follow-up interval in a subgroup of patients for whom disease progression was noted between two visits was 9.48 +/- 4.20 days. There was no statistical difference between the average follow-up intervals among our team of attending physicians in this subgroup of patients. Disease progression occurred between 2 and 8 weeks of age in 21.19% of cases, between 8 and 16 weeks of age in 66.38% of cases and between 16 and 24 weeks in 11.33% of cases. Patients for whom laser treatment was indicated had 23 to 27 weeks of gestation age. Conclusions Progression was recorded between follow-up intervals of less than two weeks on average which highlights the importance of periodic follow-up. The fact none of our patients developed stage 4 or 5 disease is an encouraging finding.

**14 h 00**

**Ab-interno Suture Canaloplasty Revision with Suture Trabeculotomy.**

**Salim Korban M.D.**, Roland Seif M.D., Paul Harasymowycz M.D.

Purpose: Canaloplasty is a surgical technique that involves dilation of Schlemm's canal using an injection of viscoelastic. After most canaloplasty surgeries an intraluminal 10-0 prolene suture is left inside the canal. The purpose of this suture is to exert tension on the inside wall of the canal stenting it open. We describe the effect of an ab-interno canaloplasty revision with 360 degrees suture trabeculotomy technique on intraocular pressure (IOP) reduction and number of glaucoma medications (NGM) in patients who had a failed canaloplasty. Methods: This is a retrospective chart review of all patients who had a failed canaloplasty (IOP uncontrolled) followed by a canaloplasty revision with 360 degrees suture trabeculotomy pulling the previously placed 10-0 prolene suture, tearing the trabecular meshwork. Data analysis was performed looking at NGM and reduction in IOP at 1, 6, 12 and 24 months. All patients who required > 1 glaucoma surgery following this revision were considered failures and excluded from our analysis. Significant reduction in IOP was defined as IOP < 18mmHg with a 20% reduction in IOP from pre-operative measurements. Results: A total of 23 eyes of 21 patients were included in the study. Visual acuity varied between 20/20 and counting finger prior to the procedure and remained the same in all patients at 24 months followup. There were 11 female and 10

male patients included. At 1 month after canaloplasty revision, 1/23 eyes required another procedure to control IOP, 14/23 eyes failed to show significant reduction in IOP with borderline statistically significant reduction in NGM needed (p=0.047). At 6 months, of the remaining 22 eyes, 9 required at least one additional surgery to control IOP and were thus excluded from further analysis. Of the 13 remaining eyes, 6 eyes failed to show significant reduction in IOP and there was no reduction in NGM (p=0.6) when compared to preoperative numbers. At 12 months, 2 of the remaining eyes required more surgery to control IOP, 5/11 patients failed to show IOP reduction and there was no statistically significant difference in NGM (p=0.3). At 24 months, 9/23 eyes didn't require any additional glaucoma procedures, 3 of which failed to show reduction in IOP and in NGM (p=0.4). No complications were identified following the procedure. Discussion: In this small retrospective study, we defined the effect of using a previously implanted prolene suture in schlemm's canal during canaloplasty and converting it to an ab-interno canaloplasty revision with 360 degrees suture trabeculotomy technique resembling a gonioscopy assisted transluminal trabeculotomy. Our results show that this technique failed to improve IOP control and failed to decrease NGM required after the procedure. Most patients needed additional glaucoma procedures. Conclusion: We believe that conversion of a canaloplasty into a trabeculotomy using the pre-existing prolene suture is not successful in lowering IOP and reducing the NGM and that the size of the suture placed in Schlemm's canal could be important in determining the success of the trabeculotomy.

**14 h 15**

**Implantation of second generation trabecular micro-bypass stents (iStent inject) with concomitant cataract surgery in normal tension glaucoma: One year outcomes.**

**Ali Salimi MSc**, Colin I Clement, Frank Howes, Paul J Harasymowycz M.D.

Purpose: Trabecular micro-bypass stents have allowed improved multidirectional flow with good efficacy and safety profile in primary open-angle glaucoma. The efficacy of these devices in normal tension glaucoma has been understudied. We aimed to assess the one-year postoperative outcomes following implantation of two second-generation trabecular micro-bypass stents (iStent-inject) with concomitant cataract surgery in normal tension glaucoma. Methods: In this retrospective, single surgeon, case series, we evaluated the baseline clinical characteristics and the 12-month outcomes of patients with mild to severe

normal tension glaucoma who underwent cataract surgery with implantation of two iStent-inject. The primary outcomes included intraocular pressure (IOP) and anti-glaucoma medication use. The secondary outcomes were success rate (defined by IOP between 5-15 mmHg and a minimum reduction of 20%) and visual acuity. One year changes were assessed using repeated-measure ANOVA with significance set at p<0.05. Results: Twenty eyes were included with an average age of 74.3±5.7. All eyes had mild to severe normal tension glaucoma. At one-year follow-up, success rate was 60%, the IOP decreased by 22% from 14.7±2.9 to 11.5±2.6 mmHg (p<0.001), and the medication burden dropped by 58% from 1.6±1.4 to 0.6±1.2 (p<0.001). At 12 months post-operative, 70% of the eyes were medication free and on average patients gained four letters of acuity. No adverse event was observed except a transient IOP spike in one eye. Conclusion: The present study provides clinically relevant, real-world data on the utility of iStent inject with cataract surgery in normal tension glaucoma – a population that has been understudied in the world of trabecular micro-bypass stents. Our data support the efficacy and safety of these stents in reducing intraocular pressure and medication burden among patients with normal tension glaucoma.

**14 h 30**

**Analyse comparative de 4 formules de calcul biométrique sur la prévisibilité de la réfraction post-opératoire dans la chirurgie de cataracte.**

**Marie-Ève Poirier M.D.**

Le choix de la lentille intra-oculaire est un déterminant majeur de la satisfaction du patient en post-opératoire de chirurgie de cataracte. Pour bien la choisir, il y a 3 facteurs principaux à considérer : l'évaluation des besoins spécifiques du patient pour déterminer la cible réfractive, l'obtention de mesures biométriques précises et finalement l'utilisation de formules biométriques appropriées, point sur lequel cette analyse s'est concentrée. L'objectif de cette étude était de comparer la prédictibilité des réfractions post-opératoires de 4 formules de calcul de LIO fréquemment utilisées, soient Barrett II, Hoffer Q, Holladay 2 et SRK/T. Il s'agit d'une analyse rétrospective de dossiers de 432 yeux opérés chez 421 patients pour chirurgie de cataracte au CHUM entre le 23 février 2017 et le 30 mars 2017, par 20 ophtalmologistes du CHUM. Seules les chirurgies de cataracte non combinées,

sans complications peropératoires, ayant un rapport de biométrie optique et une réfraction post-opératoire au dossier ont été inclus. Les principaux facteurs d'exclusion étaient les chirurgies de cataracte combinées (ie. Xen, iStent, GSL, VPP, DSAEK), l'insertion de lentille intra-oculaire torique ou multifocale, les antécédents de chirurgie réfractive ou de greffe cornéenne, l'absence de biométrie et/ou de réfraction post-opératoire au dossier ainsi que les mesures biométriques acoustiques (Ocuscan). Un total de 164 yeux ont été inclus, qui ont été divisés en 4 groupes selon leur longueur axiale (courts, moyens, moyens-longs, longs). Pour chaque oeil, la différence en valeur absolue entre l'équivalent sphérique de la réfraction post-opératoire obtenue et l'équivalent sphérique de la réfraction post-opératoire prédite par chacune des formules a été calculée, ce qui a permis de déterminer la moyenne d'erreur de prédiction réfractive de chaque formule pour chaque groupe de longueur axiale. De façon générale, nos résultats ont démontré que pour toute longueur axiale confondue, les formules les plus prédictibles en ordre décroissant sont les suivantes : Barrett II, SRK/T, Holladay 2, Hoffer Q. Malgré que la formule Barrett Universal II demeure une estimation imparfaite, elle s'est avérée être la plus prédictible pour tous les yeux confondus, les yeux moyens ainsi que pour les moyens-longs dans notre étude, ces résultats étant compatibles avec la littérature actuelle.

**14 h 45**

## Cyclophotocoagulation trans-sclérale micropulsée (mTSCPC) pour le traitement du glaucome au Centre hospitalier de l'Université de Montréal (CHUM).

**Michael Marchand M.D.**, Younes Agoumi, Harmanjit Singh.

Introduction : La cyclophotocoagulation (CPC) est un type de cycloablation au laser utilisée pour traiter le glaucome. Elle implique la destruction de l'épithélium et du stroma ciliaire, ce qui diminue la sécrétion d'humeur aqueuse et donc la pression intraoculaire (PIO). La CPC trans-sclérale traditionnelle (TSCPC) utilise un laser diode en continu pour son action cyclodestructrice. Plus récemment, un mode de transmission micropulsée de laser diode (Micropulse TSCPC, mTSCPC) a été utilisé pour détruire de façon plus sélective les processus ciliaires, entraînant moins de dommages collatéraux. Le but de cette étude est d'évaluer l'efficacité et la sécurité de cette nouvelle technique de cyclophotocoagulation trans-sclérale micropulsée (mTSCPC) chez les patients atteints de

glaucome. Méthode : Dans cette étude prospective interventionnelle, 51 patients adultes (n=52 yeux) souffrant de glaucome mal contrôlé malgré un traitement médical maximal toléré, et/ou mauvais candidats pour une chirurgie filtrante, ont été recrutés au département d'ophtalmologie du CHUM. Les participants ont reçu un traitement de laser mTSCPC MP3 (Iridex, Mountain View, CA, USA) sur 360° dans l'œil affecté (puissance de 2000mW de laser diode à 810nm, duty cycle de 31.33%), avec une durée ajustée selon la pigmentation de l'iris et la sévérité du glaucome (glaucome léger: 160s, glaucome modéré: 240s, glaucome avancé: 240-320s). Les patients ont été suivis pour une période de 18 mois après l'intervention afin d'évaluer la PIO, le nombre de médicaments pour le glaucome, la meilleure acuité visuelle corrigée (BCVA), le cup-to-disc ratio, les paramètres de progression du glaucome obtenus par périmétrie automatisée Humphrey Sita 24-2 et par HD-OCT Cirrus du nerf optique, et la présence de complications détectées par un examen complet à la lampe à fente. Résultats : L'issue principale de succès était définie comme une PIO finale à 18 mois comprise entre 6 et 21 mmHg, et une réduction d'au moins 25% de la PIO par rapport à la valeur initiale, le tout sans progression significative du glaucome et sans nécessiter de chirurgie incisionnelle pendant la période de suivi. Le taux de succès primaire des patients traités avec le mTSCPC était de 59,6%. La PIO moyenne a été réduite de 35,6% à 18 mois de suivi (PIO moyenne de 23,6 ± 6,5 mmHg au baseline et de 15,2 ± 4,1 mmHg à 18 mois, p<0.001). Par contre, le traitement de mTSCPC n'a pas permis une réduction significative du nombre de médications pour le glaucome durant les 18 mois de suivi (p=0.075). Aucun changement significatif d'acuité visuelle moyenne n'a été observé en post-opératoire (BCVA médiane 0,38 LogMAR en pré-opératoire et 0,40 LogMAR à 18 mois, p=0.712). Aucune complication oculaire n'a été notée dans 84,6% des cas. Le taux d'hypotonie était de 3,8%. Aucun cas d'inflammation prolongée du segment antérieur, d'amincissement scléral, de phtisis bulbi ou d'ophtalmie sympathique n'a été observé suite au traitement. Une chirurgie incisionnelle subséquente fut nécessaire dans 25% des cas en raison d'une progression du glaucome. Conclusion : La cyclophotocoagulation trans-sclérale micropulsée (mTSCPC) constitue une bonne option thérapeutique pour une réduction légère à modérée de la PIO, tout en étant plus sécuritaire et prédictible que la CPC traditionnelle dans les cas de glaucome moins avancé. Le profil amélioré d'effets secondaires fait du mTSCPC un traitement à envisager plus précocement dans la prise en charge du glaucome. Ce projet est supporté par le Fond de recherche en ophtalmologie de l'Université de Montréal (FROUM).

**15 h 45**

## Recombinant Collagen Like Peptide for Bioengineering Implants.

**Bahareh Hosseinpour**, Yasmina-Mia El Khoury.

Biomaterials, synthetic or natural provide promising approaches for innovative solutions to material engineering, regenerative medicine, and drug delivery problems. one source of a natural biomaterial is fibrous proteins from extracellular matrix (ECM), which covers a broad range of functional proteins such as helical based collagen, elastin, and fibrin. Collagen is the most abundant protein in the extracellular matrix of mammals that surrounds cells and forms the cell-interactive scaffolding of the body. The defining feature of collagen is its molecular structure which is the unique triple-helix of repeated peptides which the X-G-Y amino acid motif. Although collagens were initially discovered only in multi-cellular animals, recently, a large number of collagen-like proteins have been identified in the bacteria. A large number of the bacterial collagens have been expressed in Escherichia coli (E.Coli) which has been shown to adopt a triple-helix structure. The triple helix structures of the bacterial collagens display high thermal stability of 35-39 °C similar to the human collagens. Streptococcus pyogenes is known to produce a cell surface collagen-like protein (Scl2) which contains an N-terminal globular V- domain is an α-helix containing protein that forms trimers and has been shown to be essential for triple helix folding. There has been limited report about the fabrication of bacterial collagen and collagen-like proteins with the properties suitable for medical applications. However, the V-CL protein has not been successfully used to produce a cross-linked transparent hydrogel material yet. Silk-like collagen is a natural protein that forms fibers. It is secreted by the domestic silkworm, Bombyx mori (B.mori) and is used to produce high quality thread and textile. Silk is composed mainly of silk fibroin which is made of repeating amino acid sequence of (GAGAGS). Silk has been reported to have special properties such as biodegradability and biocompatibility. Elastin is another fibrous protein in the ECM. unlike collagen, elastin allowing for flexibility of tissues in the body to return to its original state after being stretched. Elastin comprises mainly G and V amino acid with some P. In this study, we developed an artificial protein using recombinant DNA technology. The recombinant protein combines collagen (V-CL peptide) with silk and elastin, along with cell interactive motifs from fibronectin (RGD) and laminin (YIGSR). In this research study, we produced the collagen in a low endotoxin strain of E.coli (ClearColi), in summary, we

cultured the bacteria and expressed the protein by cold shock in order to assess the protein expression, we used SDS-PAGE and western blot. Also, to ensure the purity of the expressed protein we used nickel affinity FPLC. The proteins will be desalted on a column, or by dialysis, followed by lyophilization.

**16 h 00**

**Exploring the adipose tissue-retina axis in choroidal neovascularization.**

**Roberto Diaz Marin,** Sergio Crespo-Garcia, Frédérik Fournier, Vincent De Guire, Przemyslaw Sapieha PhD.

Purpose: Obesity leads to deregulation of adipose tissue (AT) homeostasis. While obesity is an important risk factor for age-related macular degeneration (AM.D.), how the AT influences AM.D. is poorly understood. AT browning is the biochemical conversion of white adipocytes into brite adipocytes, and this process is reduced during obesity and ageing. Browning has been shown to be regulated by sympathetic nervous system (SNS) catecholamines. Based on previous research that showed a relation of choroidal neovascularization (CNV) with the SNS, our goal was to assess the impact of loss of AT browning on the pathogenesis of neovascular AM.D. in a mouse model. Methods: Laser induced CNV was induced in male C57BL/6J mice (4 impacts/eye, 400mV, 50µm diameter, 0.05sec duration); none lasered, but handled animals served as controls. AT browning and inflammation was evaluated by RT-qPCR and Western blot in white (WAT), beige (BgAT) and brown (BAT) adipose tissues during the course of CNV (3, 7 and 14 days after laser injury). Plasma levels of catecholamines were measured at 3 and 7days post-injury. Results: In the early phase of CNV (3 and 7 days after laser), only BgAT showed an increase in browning protein markers (UCP1 & PGC1α), whereas WAT and BAT were unaffected. In the late phase of CNV (14 days after laser), UCP1 protein levels were significantly downregulated in BgAT. Gene expression analysis confirmed these results and, interestingly, showed that inflammatory markers (Il6, Tnf$\alpha$ and Il1$\beta$) were upregulated in BgAT in the late phase. WAT showed an increase in gene expression of browning markers in the late CNV phase. Systemic catecholamines were more abundant in the early CNV phase. Conclusions: Our data demonstrates that laser CNV can trigger expression of browning markers and induce inflammation in AT. These findings contribute to our fundamental understanding of the role of AT in AM.D.

## RÉSUMÉS DES PRÉSENTATIONS ORALES

**16 h 15**

### Terminal electron beam sterilization for recombinant human collagen-phosphorylcholine corneal implants.

**F Simpson,** E Edin, MM Islam, O Buznyk, M Kozak Ljunggren, A Liszka, K Merrett, P Fagerholm, M Griffith PhD.

INTRODUCTION: Corneal implants composed of crosslinked recombinant human collagen type III (RHCIII) and phosphorylcholine polymers (RHCIII-MPC) have been successfully used in pilot clinical trials with 1% chloroform in 0.1 M phosphate buffered saline (C-PBS) as a preservative. To enable direct use of the implants without a stringent wash procedure with antibiotics to remove the chloroform, irradiation can be used to terminally sterilize the implants after manufacture. Electron-beam (e-beam) is a chemical-free sterilization method. Here, e-beam irradiation is evaluated as a sterilization method for RHCIII-MPC implants to ensure that it does not denature the RHC nor adversely affect their ability to promote regeneration. METHODS: Dose-finding study: Hydrogels composed of RHCIII-MPC were cast as 350µm thick, 12mm diameter corneal implants or 500 µm dog-bone shaped flat sheets for mechanical testing. The hydrogels (n=3 per group) were irradiated at 17kGy, 19kGy, or 21kGy and unirradiated controls were stored in C- PBS. Post-irradiation they were tested for their ability to maintain sterility, optical and mechanical properties, biodegradation, and cell compatibility. Clinical evaluation in rabbits: The right eye of each rabbit received an RHCIII-MPC implant by deep anterior lamellar keratoplasty that was e-beamed at 17kGy or kept in C-PBS, n=4 animals per group. In vivo confocal microscopy (IVCM) was used to assess the corneal layers pre- and post-operatively to check nerve count and ingrowth of keratocytes. Irradiated and control implants were analysed using histology and immunohistochemistry (IHC). RESULTS: Dose Finding Study: All irradiation doses resulted in implants that were able to remain sterile longer when challenged with bacteria. The optical and mechanical properties did not show significant differences in the irradiation groups and controls. All hydrogels supported cell growth. The 17kGy implants showed a slow collagenase degradation profile for 48 hours, similar to the C-PBS, while the 19kGy and 21kGy implants had high collagenase degradation for 21 hours until they stabilized. Clinical Results: Irradiated and control implants both demonstrated full re-epithelialization within a week of surgery without inflammatory reactions. All rabbits showed mild neovascularization that receded by 6-month follow-up. The implants showed a mild subepithelial haze (0.5-1.0 grade), but the

corneas remained transparent. Both irradiated and control implants showed full re-innervation. IHC showed that all corneas were positive for mucin and cytokeratins 3 and 12. All corneas were negative for blood vessels and macrophages. DISCUSSION & CONCLUSIONS: E-beam is a potentially safe form of terminal sterilization for RHCIII-MPC corneal implants. Validation of its efficacy is therefore merited.

**16 h 30**

**Dose et temps d'administration optimaux de Rytvela pour la prévention de la rétinopathie du prématuré.**

**Sarah-Eve Loiselle**, Alexandra Beaudry-Richard, Nadège Zanré, Mathieu Nadeau-Vallée, Xin Hou, Christiane Quiniou PhD, Sylvain Chemtob M.D.

Introduction : La naissance prématurée (avant la 37e semaine de gestation) est la première cause de cécité infantile. Le travail prétermе est accompagné d'inflammation utéro-placentaire dévastatrice pour les organes fœtaux vulnérables incluant les yeux. Chez ces enfants, une phase initiale d'oblitération vasculaire rétinienne suivie d'une néovascularisation aberrante intra-vitré prédispose au décollement de la rétine et à la cécité. Parmi les nombreuses cytokines inflammatoires générées par la microglie activée dans la rétine du prématuré, l'IL-1b joue un rôle central. Notre laboratoire a récemment mis au point un petit antagoniste allostérique du récepteur de l'IL-1, Rytvela (heptapeptide de 0,8 kDa), efficace contre de nombreuses affections inflammatoires. Il a été démontré que Rytvela accélère la revascularisation normale et prévient ainsi les rétinopathies ischémiques. Les objectifs pré-cliniques de ce projet visent à préparer l'entrée de Rytvela en phase clinique en établissant un profil dose-réponse dans différents modèles murins de travail prétermе et en déterminant le moment et la fréquence optimale d'administration de Rytvela. Méthodologie : L'efficacité de Rytvela à inhiber le travail prétermе et l'inflammation utéro-fœtale a été déterminée dans un modèle murin de prématurité induite par le LPS ou l'IL-1β. Des souris CD-1 enceintes ont reçu une injection de LPS (10 µg i.p.) ou d'IL-1b (1 µg/kg i.u.) au jour de gestation 16,5 en présence de différentes doses (0,1 ; 0,5 ; 1,0 ; 2,0 ; 4,0 mg/kg/jour) et temps d'administration (0,5 ; 1,0 ; 2,0 ; 4,0 ; 6,0 heures après l'injection de LPS) de Rytvela. Le taux de prématurité, la durée de la gestation et le taux de survie des nouveau-nés ont été enregistrés. Les yeux des souriceaux ont été recueillis à 1, 15 et 30 jours de vie pour des analyses biochimiques et histologiques. Les

tissus gestationnels (placenta, membrane fœtale, utérus, liquide amniotique) ont été recueillis au jour de gestation 17.5 dans une expérience séparée afin de quantifier l'expression et la production des cytokines pro-inflammatoires par PCR et ELISA. Résultats : Une dose de 2 mg/kg/jour de Rytvela permet d'antagoniser efficacement l'inflammation dans les yeux des fœtus et de prévenir les délais de croissance vasculaires dans la rétine et l'amincissement de la choroïde. La dose de 1 mg/kg/jour de Rytvela a inhibé 75 à 100% des naissances prématurées induites par le LPS et l'IL-1b. Le traitement avec Rytvela a réduit l'inflammation des tissus gestationnels. La dose de 1 mg/kg/jour était suffisante pour induire une inhibition significative de l'expression des gènes et de la production des cytokines proinflammatoires IL-6, IL-8 et IL-1b dans l'utérus, le placenta, les membranes fœtales et les liquides amniotiques. Rytvela était surtout efficace lorsqu'il était administré 30 minutes après l'apparition de l'infection et l'inflammation. Il était inefficace s'il était administré 6 heures après les injections de LPS. Conclusion : Une dose de 1 mg/kg/jour de Rytvela antagonise l'activité de l'IL-1 et réduit efficacement la production de cytokines proinflammatoires en préservant l'intégrité des organes fœtaux. Ces résultats précisent la dose pharmacologique efficace in vivo contre la rétinopathie du prématuré. En outre, plus le traitement était administré tôt, plus le travail préterme était prévenu efficacement. Rytvela est un nouveau prototype thérapeutique prometteur dans la prévention de la rétinopathie du prématuré. Plus de doses et plus de temps d'administration seront testés en laboratoire afin d'établir un profil plus complet. Nous prévoyons également quantifier l'atteinte inflammatoire de la rétine et de la choroïde et procéder à des analyses histologiques et fonctionnelles par électrorétinogramme afin d'évaluer le niveau de protection que procure les différentes doses de Rytvela.

## PRÉSENTATIONS PAR AFFICHE

**MEMBRES DU JURY : Bruno Larrivée, PhD, Cynthia Qian, M.D., Christos Boutopoulos, PhD**

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1. Does Culturing Donor Corneas Prior to Hypothermic Preservation in Optisol Prevent the Transplantation of Contaminated Corneal Grafts? An Analysis of the Utility of the Pre-Transplantation Corneal Swab Culture.

   Auteurs : **Andrei-Alexandru Szigiato M.D.**; Maude Anderson M.D.; Michèle Mabon M.D.; Annie-Claude Labbé M.D.

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2. BMP9 signaling maintains endothelial integrity and prevents hyperglycemia-induced retinal vascular permeability.

   Auteurs : Naoufal Akla, Claire Viallard, Natalija Popovic, Cindy Lora Gil, Mike Sapieha Przemyslaw, Bruno Larrivée.

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3. Manifestations oculaires de l'infection au virus du Nil occidental dans le cadre de l'épidémie 2018-2019 au Québec : protocole de recherche.

   Auteurs : Cristina Bostan, Oksana Kaminska, Annie-Claude Labbé, Alejandra Irace-Cirma, Kate Zinszer, Marie-Josée Aubin, M.D.

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4. AAP1 alters redox homeostasis in endothelial cells and inhibits angiogenesis.

   Auteurs : **Erika Hooker**, Natalija Popovic, Anthony Flamier, Gilbert Bernier, Bruno Larrivée.

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5. A case report of tuberculous endogenous endophthalmitis secondary to Mycobacterium bovis.

   Auteurs : Fares Antaki, Xavier Marchand-Senécal, **Samir Touma**, Marie-Josée Aubin, M.D..

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6. Étude comparative du port de lentille protectrice souple suite à l'implantation de la kératoprothèse Boston type 1.

   Auteurs : **Jiaru Liu**, Mona Harissi-Dagher, M.D.

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7. Unilateral reactivation of West Nile Virus chorioretinitis with occlusive vasculitis.

   Auteurs : **Ibrahim, Mariam Toma** ; Bostan, Cristina ; Aubin, Marie-Josée.

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8. A novel anti-angiogenic protein for the therapy of ocular neovascular pathologies.

   Auteurs : **Natalija Popovic**, Erika Hooker, Andrea Barabino, Frederic Provost, Gilbert Bernier, Bruno Larrivée.

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9. A novel IL-1 receptor modulator prevents photoreceptor loss in a model of age-related macular degeneration.

   Auteurs : **Rabah Dabouz**, Colin Cheng, Samy Omri, José Carlos Rivera, Sylvain Chemtob.

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10. Our experience with an ab-interno ab-externo technique for failed filtering blebs in glaucoma compared to second trabeculectomy.

    Auteurs : **Sarah Chorfi**, Denise Descovich, Mark Richard Lesk.

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11. Analyse comparative de la rentabilité de l'utilisation de la colle de fibrine et des sutures pour la fixation du tissu conjonctif lors de chirurgie d'ablation du ptérygion.

    Auteurs : **Soumaya Bouhout**, Joseph Kam, Ph.D., Dre. Marie-Claude Robert, M.D.. MSc., Dre Mona Harissi-Dagher, M.D.

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12. One-year, real-world Canadian study of iStent inject® 2nd-generation trabecular bypass with phacoemulsification.

    Auteurs : **Ali Salimi**, M.Sc.; Paul Harasymowycz, M.D.

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13. The effect of cornea preservation time on DMEK outcomes.

    Auteure : **Maria Elena Montpetit Gonzalez.**

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14. Méthodologie d'amélioration du recrutement dans le cadre d'un essai clinique portant sur l'orbitopathie dysthyroïdienne.

    Auteur : **Simon Trottier.**

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15. Development and validation of miniaturized OCT fiber probes for intraoperative guidance of intraocular interventions.

Auteurs: **Alexandre Abid**, Renaud Duval, Flavio Rezende, Christos Boutopoulos.

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## PRÉSENTATIONS PAR AFFICHE (HORS CONCOURS)

16. Automated OCTA quantitative assessment of foveal and parafoveal choriocapillaris in normal and AM.D. subjects.

    Auteurs : **Charles Bélanger Nzakimuena**, Diane Sayah, Renaud Duval, Farida Cheriet, Santiago Costantino

17. OCT as a tool to detect early sympathetic ophthalmia in an asymptomatic patient.

    Auteurs : **Zainab Khan**, Sabrina Bergeron, Miguel Burnier, Evan Kalin-Hajdu, Marie-Josée Aubin, M.D..

18. Two children with mucolipidosis type IV: corneal imaging with optical coherence tomography and novel MCOLN1 mutation.

    Auteurs : **Cristina Bostan**, Grant Mitchell, Benjamin Ellezam, Jean-François Soucy,

19. Linear chorioretinal lesions as a diagnostic sign of West Nile virus infection.

    Auteurs : **Cristina Bostan**, Mariam T Ibrahim, Mark Bamberger, Karin Oliver, Marie-Josée Aubin, M.D..

20. Co-delivery of miR-181a and melphalan by lipid nanoparticles for treatment of seeded retinoblastoma.

    Auteurs : **Houda Tahiri**, Chun Yang, NasrollahTabatabaei, Rosanne Superstein, Jeanne Leblond Chain, Pierre Hardy.

21. Transcobalamin II deficiency-associated retinopathy: case report and review of literature.

    Auteurs : **Sarah Chorfi**, Cynthia Qian.

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22. Visual impairment and the use of formal and informal home care in Canada.

    Auteurs: **Aubin MJ**, Aljied R, Buhrmann R, Freeman EE.

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23. Interaction Between Visual Acuity and Peripheral Vascular Disease with Balance: Baseline Data from the Canadian Longitudinal Study on Aging.

    Auteurs : **Aubin MJ**, Vafaei A, Buhrmann R, Kergoat MJ, Aljied R, Freeman EE.

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24. A two-year-old girl in Tanzania with crying tears of blood.

    Auteurs : **Aubin MJ**, Reyes L, Martinez D, Bottineau MC, Oestreicher J, Mapham W, Hajek J

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25. 360° intraoperative laser retinopexy for the prevention of retinal re-detachment in patients treated with primary pars plana vitrectomy.

    Auteurs : Ali Dirani, **Fares Antaki**, Marc-Andre Rheaume, Danny Gauthier, Louis Corriveau, Jean-Daniel Arbour, Karim Hammamji.

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# RÉSUMÉS DES PRÉSENTATIONS PAR AFFICHE

## 1. Does Culturing Donor Corneas Prior to Hypothermic Preservation in Optisol Prevent the Transplantation of Contaminated Corneal Grafts? An Analysis of the Utility of the Pre-Transplantation Corneal Swab Culture.

**Andrei-Alexandru Szigiato M.D.**; Maude Anderson M.D.; Michèle Mabon M.D.; Annie-Claude Labbé M.D.

Purpose: To assess the efficacy of pre-transplantation corneal swabs (PTCS) to screen for corneal graft contamination after storage in Optisol-GS corneal storage medium. Setting: Eye Bank of Québec, Hôpital Maisonneuve-Rosemont Design: Retrospective analysis of culture results and Eye Bank data Methods: All PTCS cultures performed at the Eye Bank of Québec were identified from September 2013 to June 2016 and the pathogens described. Whole cornea culture was performed on rejected grafts due to a positive PTCS and a contamination rate was calculated. Contamination rates of corneoscleral rims were compared between corneas tested with PTCS and imported corneas, which were not swabbed. Results: Among the 1966 PTCS performed, 814 (41.4%) were positive. Pathogenic bacteria were present in 140 (17.2%) corneas, including Staphylococcus aureus (n=96, 11.8%), Enterobacteriaceae. (n=14, 1.7%), and Pseudomonas aeruginosa (n=6, 0.7%). After preservation in Optisol-GS, only 7 (6.9%) corneas remained contaminated (95% CI 5.1-9.3). The sensitivity of the PTCS was 87.5% (95% CI 47.4-99.7). There was no significant difference in corneoscleral rim contamination between corneas tested with PTCS (1/388; 0.2%) compared to imported, non-swabbed corneas (3/214; 1.4%) (p=0.131). The cost to purchase the same number of rejected corneas due to false positive PTCS results was $142,884.32 (CAD) per year. Conclusion: Despite the high sensitivity of the PTCS, it has not been shown to reduce post-operative infection rates in this setting and rejects 93% of proper corneas. This makes PTCS a poor test for detecting clinically relevant contamination of donor corneas.

## 2. BMP9 signaling maintains endothelial integrity and prevents hyperglycemia-induced retinal vascular permeability.

**Naoufal Akla**, Claire Viallard, Natalija Popovic, Cindy Lora Gil, Przemyslaw Sapieha PhD, Bruno Larrivée PhD.

## RÉSUMÉS DES PRÉSENTATIONS PAR AFFICHE

But / Goal: The maintenance of a quiescent retinal vascular endothelial barrier is paramount for tissue supply and homeostasis to ensure visual function. Chronic hyperglycemia in diabetes causes structural and functional alterations of the endothelium that are accelerated by the production of several mediators such as VEGF. The disturbance of interendothelial junction stability leading to retinal hyperpermeability is one of the changes leading to diabetic macular edema (DME) that can occur at any stage of diabetic retinopathy. Advances in our understanding of the pathophysiological mechanisms of DME have enabled effective new therapies such as anti-VEGF's, which are however associated with non-negligible side effects. The discovery of endothelium-specific protective targets that could restore retinal endothelial quiescence could provide a therapeutic alternative. Signaling mediated by BMP9 circulating protein via its endothelium-specific receptor ALK1, is known for its role in the maintenance of vascular quiescence. However, its ability to protect the endothelium and prevent vascular permeability has not been tested in the context of diabetes. Méthode / Methodology: We investigated BMP9/ALK1 signalling pathway in the hyperglycemic endothelium and its effect on retinal permeability in a type 1 diabetes mouse model. Hyperglycemic endothelial cells and tissue were extracted to evaluate BMP9/ALK1 signaling. BMP9 overexpression was achieved using adenoviral vectors. Retinal permeability was measured using miles assay. Résultats / Results : We found that BMP9/ALK1 signaling was inhibited in hyperglycemic endothelial cells and blood vessels of diabetic (DB) mice, and that this loss of function was directly associated with retinal hyperpermeability. Molecularly, inhibition of this pathway triggers the activation of the VEGFR2/SRC pathway reducing interendothelial adhesion junctions. Conversely, the activation of ALK1 by sustained BMP9 overexpression in DB mice enabled the restoration of physiological permeability by regulating the levels and localization of interendothelial junctions, in part by limiting the action of VEGF signalling. We also observed that BMP9 overexpression demonstrated a regulating effect of blood glucose levels in DB mice. Our results showed that BMP9 significantly ameliorates glucose control over a 4-week span in DB mice and that this regulation was mediated primarily via the ALK3 receptor inhibiting gluconeogenic gene expression and hepatic glucose production and hence hyperglycemia. Conclusion(s) : Together, our data show that BMP9 acts on several levels to safeguard endothelial integrity preventing retinal hyperpermeability in DB mice. The effects are mediated by its endocrine effect by directly stabilizing the endothelial barrier through Alk1 and its hypoglycemic paracrine/autocrine action in the liver through Alk3. Thus, BMP9 could be used in the development of future therapeutic alternatives against several vascular diseases involving edematous complications. Source de financement / Funding : FRQS, Heart and Stroke Foundation,

FROUM, Foundation Fighting Blindness Mots clés / Keywords: Diabetes, vascular permeability, activin receptor.

### 3. Manifestations oculaires de l'infection au virus du Nil occidental dans le cadre de l'épidémie 2018-2019 au Québec : protocole de recherche.

**Cristina Bostan M.D.**, Oksana Kaminska, Annie-Claude Labbé, Alejandra Irace-Cirma, Kate Zinszer, Marie-Josée Aubin M.D.

Introduction : L'infection au virus du Nil occidental (VNO) peut être asymptomatique (80%) ; modérée (syndrome viral, <20%) ; sévère (atteinte neurologique, 1%) ; ou même mortelle. L'atteinte ophtalmologique pathognomonique, souvent asymptomatique, est une choriorétinite multifocale bilatérale avec lésions circulaires suivant le trajet des fibres nerveuses rétiniennes. Le but de cette étude est de recenser les cas d'infection à VNO survenus au Québec dans le contexte de l'épidémie de 2018-2019 ; de caractériser les trouvailles ophtalmologiques, la qualité de vie et le statut fonctionnel des patients atteints dans l'aigu et à moyen terme ; et de déterminer l'association de l'atteinte ophtalmique avec la sévérité de la maladie systémique. Méthodologie : Cette étude multicentrique comprendra un volet rétrospectif et un prospectif. Pour le volet rétrospectif, tous les patients ayant consulté dans chaque centre participant avec une infection au VNO confirmée par analyse sérologique au Laboratoire de santé publique du Québec en 2018 seront inclus. Pour le volet prospectif, tous les patients des régions socio-sanitaires de Montréal, Montérégie et Laval, avec une infection au VNO confirmée entre juin et novembre 2019, seront inclus. Les patients seront convoqués à une visite lors de laquelle ils répondront à un questionnaire (antécédent médicaux, histoire de la maladie systémique et ophtalmologique, 25-item National Eye Institute Visual Function Questionnaire, 36-Item Short Form Survey, Indice de Barthel) et passeront un examen ophtalmologique complet, une tomographie par cohérence optique rétinienne, une angiographie rétinienne, et des photos couleur de la rétine. Une deuxième visite identique aura lieu 1 an à partir de la date de confirmation de l'infection. Les données suivantes seront colligées des dossiers médicaux : données démographiques ; comorbidités ; tableau de la présentation clinique initiale ; trouvailles et traitements reçus lors des consultations initiales en ophtalmologie, neurologie et/ou maladies infectieuses ; et évolution. Résultats et impact attendus : Cette étude sera une première avec composante prospective, permettant de documenter le spectre des manifestations ophtalmologiques de l'infection à VNO, leur évolution à moyen

terme, et leur impact sur la qualité de vie liée à la fonction visuelle. L'évaluation de la prévalence de la choriorétinite pathognomonique et de son association avec la sévérité de l'atteinte systémique précisera la pertinence d'une consultation précoce en ophtalmologie devant une suspicion de VNO. Un examen des fundi précoce pourrait bénéficier la gestion des cas avec atteinte sévère, en permettant un diagnostic probable de VNO avant même la confirmation sérologique, qui prend plusieurs semaines.

### 4. AAP1 alters redox homeostasis in endothelial cells and inhibits angiogenesis.

**Erika Hooker PhD**, Natalija Popovic, Anthony Flamier PhD, Gilbert Bernier PhD, Bruno Larrivée PhD.

Introduction: Pathological neovascularization is characteristic of many vision-threatening retinal diseases affecting both adults and children. As VEGF is a primary driver of both physiological and pathological angiogenesis, current therapies for ocular neovascular diseases have focused largely on targeting VEGF activity. While initially effective at restoring visual acuity, recent studies suggest that chronic use of anti-VEGF therapies can lead to further vision impairment. Moreover, a minor subset of patients exhibit little to no response to anti-VEGF treatments highlighting the need for both alternative and adjunct therapies. We have recently identified a novel anti-angiogenic protein, AAP1, which inhibits both developmental angiogenesis and pathological neovascularization in mice. While AAP1 exhibits potent anti-angiogenic effects on the vasculature of the eye, the signaling mechanisms underlying its action have not yet been defined. The purpose of the current study is to identify the signaling events contributing to AAP1-mediated inhibition of angiogenesis. Methods: To understand the mechanism of action of AAP1, we cultured primary human umbilical vein endothelial cells (HUVECs) in the presence or absence of AAP1. Using various molecular and biochemical assays we examined the impact of AAP1 on key angiogenic signaling pathways. Results: As a key driver of angiogenesis, we first examined the impact of AAP1 on VEGF signaling. HUVECs cultured in the presence of AAP1 did not show any significant differences in VEGF responsiveness. We also did not detect any significant change in the expression level of VEGFR2 or the inhibitory VEGF receptor, VEGFR1. To clarify signaling events that may be modified by AAP1, we examined the transcriptome of ECs using the Ion Ampliseq Transcriptome Human Gene Expression Kit. From these analyses, we determined that AAP1 can modify the expressions of genes related to the metabolism of ECs, such as LDHA and GAPDH. As

the dysregulation of reactive oxygen species (ROS) homeostasis is often an indicator of metabolic stress, we first examined the level of ROS in ECs cultured in the presence and absence of AAP1. Two independent fluorescence-based assays determined that AAP1 enhances the generation of ROS in cultured HUVECs. Multiple mechanisms can lead to the generation of ROS including increased oxidative phosphorylation, reduced glycolysis and modification of pro- and anti-oxidant signaling pathways. To further understand the role of AAP1 in these pathways, we examined the redox status metabolic co-factors, NADPH and NADH. Conclusions: AAP1 is a potent inhibitor of angiogenesis in the eye. The inhibitory actions of AAP1 on endothelial cells does not occur primarily through the inhibition of VEGF signaling. Rather, AAP1 appears to reduce angiogenesis by altering the redox homeostasis of endothelial cells, making AAP1 an interesting candidate as an alternative or adjunct therapy for ocular pathological neovascularization.

### 5. A case report of tuberculous endogenous endophthalmitis secondary to Mycobacterium bovis.

Fares Antaki, Xavier Marchand-Senécal, **Samir Touma**, Marie-Josée Aubin, M.D..

Purpose: To report the first case of confirmed Mycobacterium bovis endophthalmitis in a patient with miliary tuberculosis (TB). Methods: Retrospective medical chart review. The ophthalmologic evaluation included Snellen visual acuity (VA), complete ocular examination, macular optical coherence tomography (OCT) and fundus photography. The investigations included computed tomography (CT scan) of the chest, magnetic resonance imaging (MRI) of the brain, serologic testing, microbiologic testing of vitreous specimens obtained during vitrectomy. Genomic deletion analysis of the RD-regions was used to identify Mycobacterium bovis. Results: A 77-year-old man known for Waldenström macroglobulinemia (WM) presented with a 5-day history of pain and decreased visual acuity OD. Anterior segment examination revealed granulomatous uveitis and funduscopy revealed dense vitritis with suspected peripheral focal chorioretinitis. Panuveitis with acute retinal necrosis (ARN) was suspected as working diagnosis and the patient was started on antiviral and antitoxoplasmosis treatment. Infectious, inflammatory and neoplastic etiologies were investigated. Mycobacterium bovis was isolated from the patient's vitreous after pars plana vitrectomy (PPV) and a diagnosis of TB endophthalmitis was made. Miliary TB was found on pulmonary and brain imaging. On latest follow-up, the vision did

not improve and there was no light perception (NLP) despite intraocular antibiotics, multi-drug anti-tubercular therapy (M.D.ATT) and high-dose corticosteroids. Conclusion: To our knowledge, this is the first reported case of Mycobacterium bovis endophthalmitis. Endogenous endophthalmitis caused by Mycobacterium tuberculosis complex can present in a wide-variety of ways and is typically associated with poor visual outcomes despite adequate treatment. Although the detection of mycobacteria in the vitreous can be challenging given its small volume, tuberculous endophthalmitis should be suspected and systematically ruled out on every diluted vitreous specimen obtained in the context of an infection. Collaboration with an infectious disease specialist is recommended for the best management of the patient.

## 6. Étude comparative du port de lentille protectrice souple suite à l'implantation de la kératoprothèse Boston type 1.

**Jiaru Liu**, Mona Harissi-Dagher M.D.

Introduction La kératoprothèse Boston type 1 (KPro) est une cornée artificielle utilisée chez les patients qui ne sont pas éligibles à subir une kératoplastie pénétrante. La pratique actuelle suite à l'implantation de la KPro inclut le port d'une lentille de contact pour une durée indéterminée afin de protéger l'implant contre les complications post-opératoires telles que la sécheresse, la dessiccation et la formation des dellens. Cependant, près de 50% des patients perdent leurs lentilles durant la première année après la chirurgie, puisque l'ajustement et la rétention de la lentille peuvent s'avérer difficile chez les patients qui ont des cornées plus plates ou courbées, des anomalies des paupières et une basse pression intraoculaire. De plus, le port de ces lentilles à long terme peut causer des complications telles que des dépôts lipidiques qui obstruent l'axe visuel, la conjonctivite chronique et les kératites infectieuses. Ainsi, le but de notre projet est de comparer le taux de complications à long terme et le pronostic visuel des patients qui portent des lentilles protectrices suite à la KPro et de ceux qui n'en portent pas. Méthodologie Nous avons effectué une révision des dossiers de tous les patients implantés de la KPro par une seule chirurgienne (M.H-D.) au centre hospitalier de l'université de Montréal (CHUM) de janvier 2008 au juin 2018. Au total, nous avons inclus 100 patients (113 yeux) qui avaient la KPro type 1 et qui étaient suivis au CHUM. Les patients sont séparés en deux groupes : groupe 1 consiste de patients qui portent une lentille aux suivis de 1 an et de 5 ans, groupe 2 consiste de patients sans lentille. Nous

avons recueilli des données cliniques aux suivis de 1 mois, 6 mois, puis chaque année pour un total de 5 ans. Nous avons noté la présence ou absence de lentilles, l'acuité visuelle, les complications ophtalmiques et la date de leur apparition. Des courbes Kaplan-Meier ont été conçues afin de comparer le taux de complications individuelles et totales à 1 an et à 5 ans post-opératoires. Résultats À 1 an (groupe 1 n=85, groupe 2 n=25), groupe 1 a statistiquement une moins haute incidence de complications ophtalmiques totales que le groupe 2 (p=0.0391). Cependant, à 5 ans (groupe 1 n=44, groupe 2 n=41), le groupe 1 se trouve à avoir statistiquement une plus haute incidence de complications ophtalmiques totales que le groupe 2 (p=0.0249). Une plus grande proportion de patients dans le groupe 1 a développé la fonte de cornée, la kératite infectieuse, la vitréite stérile, l'endophtalmie, la membrane rétroprosthétique et la fuite de la chambre antérieure (22.73%, 18.18%, 18.18%, 11.36%, 61.36% et 6.82%) que le groupe 2 (14.63%, 9.76%, 7.32%, 48.78% et 0%). À 5 ans, il n'y avait pas de différence significative entre l'acuité visuelle des patients des deux groupes. Conclusion En conclusion, cette étude démontre que le port de lentilles de contact ne diminue pas de manière significative le taux de complications totales à long terme liées à la KPro tel que reporté auparavant dans la littérature. En effet, à 5 ans post-op, il y a moins de complications chez ceux qui ne portent pas de lentilles. Il n'y a également pas d'amélioration significative de l'acuité visuelle. Bref, nous ne recommandons pas le port à long terme de la lentille de contact post-KPro.

## 7. Unilateral reactivation of West Nile Virus chorioretinitis with occlusive vasculitis.

**Maryam Ibrahim AL Najjar M.D.**, Cristina Bostan M.D., Marie-Josée Aubin M.D.

Purpose: To report a case of unilateral reactivation with occlusive vasculitis weeks after West Nile virus (WNV) meningoencephalitis and bilateral chorioretinitis resolution. Methods: Retrospective medical chart review. Ophthalmologic examination included Snellen visual acu-ity (VA), complete ocular examination, macular optical coherence tomography (OCT), fundus fluorescence angiography (FFA), and Humphrey standard 24-2 visual fields. Results: A 63-year-old immunocompetent diabetic caucasian male was seen in the Ophthalmology De-partment three weeks after hospital admission for fever and lethargy. A diagnosis of meningo-encephalitis secondary to WNV had been retained following serologic confirmation of infection. The patient's neurolog-ical status had been

improving with supportive therapy. A consultation in ophthalmology was requested for new onset of decreased vision. The initial evaluation revealed pinhole VA 20/30 in the right eye (OD) and 20/50 in the left eye (OS), bilateral punched-out inactive chorioretinal lesions distributed in a linear pattern in the posterior pole and mid-periphery, and macular edema OS, but no signs of vasculitis in either eye. Topical prednisolone acetate 1% and nepafenac 0.1% were started OS. At follow-up two weeks later, there was further reduction in VA OS to 20/70. Examination revealed mild posterior vitritis, diffuse retinal arterioral attenuation and sheathing, scattered cotton-wool spots and intra-retinal hemorrhages OS. Vascular leak-age and areas of capillary non-perfusion, but no macular ischemia, were evident on FFA OS. A tapering regimen of oral prednisone was started followed by mycophenolate mofetil. Intravitreal bevacizumab injec-tion and prophylactic sectoral scatter photocoagulation of the ischemic retinal areas were provided OS. At six months follow-up, the occlusive vasculitis had resolved, the VA had recovered to baseline levels, but scotomas corresponding to the involved retinal areas persisted on the patient's visual field OS, while his visual field OD showed no deficits. Conclusions: WNV infection is associated with ocular manifestations, of which chorioretinitis is the most common, occurring in up to 80% of patients with neuroinvasive disease. Reactivation of WNV-associated ocular involvement after resolution of the systemic disease has only been reported in one case. Although rare, occlusive vasculitis can be a late-onset feature of WNV infection and may be more common in diabetics. Continued follow-up after resolution of the systemic disease is important, as early detection and treatment of ocular recurrences may reduce irreversible vision loss.

## 8. A novel anti-angiogenic protein for the therapy of ocular neovascular pathologies

**Natalija Popovic**, Erika Hooker PhD, Andrea Barabino, Frederic Provost, Gilbert Bernier PhD, Bruno Larrivée PhD.

Introduction: Pathological neovascularization is associated with numerousblinding pathologies. The two principal causes of neovascular blindness in adults are wet age-related macular degeneration (AM.D.) and proliferative diabetic retinopathy (PDR). Retinopathy of prematurity (ROP) arises as side-effect of the high oxygen therapy in some pre-term neonates. Neovascularization in the subretinal space of the choroidal vasculature result in wet AM.D.. PDR and ROP both are due to the atypical growth of retinal vessels.

In these three neovascular pathologies, vascular endothelial growth factor (VEGF) stimulates endothelial cells, thus initiating the blood vessel growth. To date, the inhibition of VEGF signaling pathway is the main therapy for ocular neovascular pathologies. Current literature from basic science and clinical studies show the need for complementary anti-angiogenic therapies. We have identified a novel anti-angiogenic protein, AAP1, that inhibits developmental and pathological angiogenesis in the retina. The aim of our study is to assess the potential of AAP1 as a therapy for ocular neovascular pathologies and to define its role in endothelial cells. Methodology: To address our aims, we used various in vivo and in vitro models of physiological and pathological vascular growth. To investigate AAP1 effects on both developmental and pathological angiogenesis, we used models of oxygen induced retinopathy (OIR) model for ROP and laser-induced choroidal neovascularization (CNV) model for AM.D.. For these models, mice received intravitreal injections of AAP1. The effects of AAP1 in vitro were also evaluated using a choroidal sprouting assay. To determine the cellular effects of AAP1, migration, proliferation and apoptosis assays were performed by immunofluorescence and FACS using cultured endothelial cells. Results: Our data show that AAP1 prevents angiogenesis in vivo during retinal vascular development. Further, chronic injections of AAP1 do not adversely affect photoreceptors. AAP1 also significantly reduced neovascularization in mouse models for both choroidal and retinal pathological neovascularization. Both in vitro and in vivo data showed that AAP1 decreases cellular sprouting and migration, while it did not affect apoptosis. Conclusion: AAP1 is a potent inhibitor of angiogenesis which does notadversely affect photoreceptors, highlighting its therapeutic potential. Future studies are needed to elucidate the therapeutic potential for patients with neovascular ocular pathologies.

## 9. A novel IL-1 receptor modulator prevents photoreceptor loss in a model of age-related macular degeneration.

**Rabah Dabouz MSc**, Colin Cheng, Samy Omri PhD, José Carlos Rivera PhD, Sylvain Chemtob M.D.

Background: Age-related macular degeneration (AM.D.) is one of the leading causes of vision loss in the elderly. Two types of AM.D. are clinically recognized. Dry AM.D. is characterized by the formation of extracellular deposits called drusen, degeneration of the retinal pigment epithelium (RPE) and photoreceptor death, whereas wet AM.D. is characterized by choroidal neovascularization. Recent observations have shown that pro-

inflammatory cytokines secreted by immune cells contribute to the pathogenesis of AM.D.. Interleukin-1β (IL-1β), a key pro-inflammatory cytokine implicated in several pathological processes including neurodegeneration, has been detected in high concentrations in the eyes of AM.D. patients. However, the role of IL-1β in the pathogenesis of AM.D. is still unclear. Aim Evaluate the role of IL-1β in photoreceptor degeneration using a blue light exposure model in rodents. Methods: CD-1 mice (12-16 weeks-old) were exposed to blue LED light (6000 lux at 450nm) during 3 hours and then sacrificed on day 3 post-illumination. Mice were intraperitoneally injected or not with a peptide antagonist of the IL-1β receptor, named Rytvela twice per day until sacrifice. Several markers related to the inflammatory process such as F4/80, NLRP3, Caspase-1 and IL-1β evaluated by immunohistochemistry. Photoreceptor cell death was assessed by TUNEL assay and Caspase-3 immunofluorescence. Results: Immunofluorescence experiments revealed an infiltration of positive F4/80 cells (microglia and macrophages) into the subretinal space in mice exposed to blue light, which was significantly (p<0.01) abrogated with Rytvela treatment. Co-localization of NLRP3, Caspase-1, and IL-1β with F4/80 positive cells was clearly detected in the subretinal space, suggesting that these inflammatory cells are the main source of IL-1β. The TUNEL assay showed that Rytvela prevents photoreceptor apoptosis in the retina of mice exposed to blue light. Likewise, co-culture of retinal explants with LPS-ATP activated bone marrow-derived macrophages resulted in a high number of TUNEL positive photoreceptors, which was reduced by treatment with Rytvela. Conclusion: These results show that Rytvela attenuated the inflammatory response and prevented the death of photoreceptors in a model of dry AM.D.. Modulation of IL-1β signaling would be a useful therapeutic avenue for dry AM.D., for which no approved treatment currently exists.

### 10. Our experience with an ab-interno ab-externo technique for failed filtering blebs in glaucoma compared to second trabeculectomy.

**Sarah Chorfi M.D.**, Denise Descovich, Mark Richard Lesk M.D..

Objectives:To report the results of an ab-interno ab-externo technique to revise failed filtering blebs with 5-fluorouracil (5-FU) or mitomycin (MMC) and to compare this technique to repeating a trabeculectomy in failed blebs. Method In this retrospective chart review we looked at 3 techniques used in instances of trabeculectomy failure: ab-interno ab-externo

with 5-FU (n=15), ab-interno ab-externo with MMC (n=13) and second trabeculectomy (n=19). We did a survival analysis and defined survival as a post-op IOP≤18, a minimum of 20% reduction in IOP post-op, no glaucoma medications and no further glaucoma surgery needed during follow-up. We also included patients with the aforementioned characteristics but a 30% reduction in IOP with a diminution in the number of glaucoma medications. Results The cumulative survival was the following. In the 5-Fluorouracil (5-FU) group, 0.733 ± 0.058 at 12 months, 0.570 ± 0.068 at 24 months and 36 months. In the Mitomycin (MMC) group, 0.462 ± 0.075 at 12 months, 0.308 ± 0.070 at 24 and 36 months. In the second trabeculectomy (second trab) group, 0.884±0.035 at 12, 24 and 36 months. The percentage of patients meeting our criteria for success was 60% (9/15), 31% (4/13) and 90% (17/19) respectively for 5-FU, MMC and second trabeculectomy. We found more complications in the ab-interno ab-externo group with MMC including 2 patients who had a persistent post-op uveitis. Simultaneous phacoemulsification seemed to be a risk factor for failure when done with revision of trabeculectomy. Conclusion Repeats of trabeculectomy had a better cumulative survival rate compared to ab-interno ab-externo revisions of trabeculectomy. However, ab-interno ab-externo revisions with 5-FU and no simultaneous phacoemulsification is a reasonable first step to allow for sparing of the conjunctiva. We found an increased complication and failure rate in the group who of revision with MMC. Simultaneous phacoemulsification with revisions was a risk factor for failure.

### 11. Analyse comparative de la rentabilité de l'utilisation de la colle de fibrine et des sutures pour la fixation du tissu conjonctif lors de chirurgie d'ablation du ptérygion.

**Soumaya Bouhout**, Joseph Kam PhD, Marie-Claude Robert M.D., Mona Harissi-Dagher M.D.

Introduction : Le traitement standard du ptérygion est chirurgical. Il nécessite de retirer le tissue ptérygial et de réparer la conjonctive en utilisant de la colle de fibrine ou des points de suture. Il est suggéré dans la littérature que l'utilisation de la colle de fibrine pourrait réduire les coûts associés au traitement en diminuant la durée de l'intervention chirurgicale, sans occasionner de complications supplémentaires. Toutefois, il n'y a aucune étude formelle qui compare la rentabilité de l'une ou de l'autre de ces techniques. L'objectif de cette étude est de comparer la rentabilité économique des deux différentes méthodes de fixation du tissu conjonctif. Méthodologie : Étude rétrospective sur dossiers,

observationnelle, descriptive des patients ayant subi une chirurgie du ptérygion en utilisant de la colle de fibrine ou des sutures au Centre hospitalier de l'Université de Montréal (CHUM). Les patients inclus dans l'étude furent opérés entre janvier 2008 et janvier 2010 pour la méthode incluant seulement des sutures ; et avril 2017 à novembre 2018 pour les méthodes utilisant la colle de fibrine avec ou sans sutures. Le protocole et le temps opératoire, la facturation du chirurgien, le coût du matériel et du maintien du bloc opératoire furent pris en compte afin de comparer le rapport coût-efficacité des deux méthodes. Résultats : Un total de 114 yeux, opérés par quatre différents chirurgiens (MHD, MCR, LR, PT) furent inclus dans cette étude. Trois différentes méthodes furent identifiées pour l'adhérence du greffon ; incluant l'utilisation de la colle de fibrine seule (n=55), la combinaison de sutures et de la colle de fibrine (n=50) ou seulement des sutures (n=9). Le coût moyen du matériel par chirurgie est respectivement de 153,3 $, 167,9 $ et 97,0 $ pour les méthodes de la colle seule, de la colle avec sutures et de sutures uniquement. Dans cette étude, nous avons noté un temps procédural moyen de 40,9 ±3,9 minutes pour la méthode utilisant seulement des sutures ; de 25,6 ±2,0 minutes pour la méthode utilisant la colle seulement et de 21,1 ±2,1 minutes pour le protocole utilisant deux sutures et la colle de fibrine. Le coût du maintien d'un bloc opératoire fut estimé à 41,7 $ la minute. De ce fait, le coût total du bloc opératoire pour la méthode avec les sutures s'élève en moyenne à 1 801± 388 $. En revanche, la méthode utilisant seulement la colle de fibrine coûte en moyenne 1 220 ± 311 $ offrant ainsi un ratio d'opportunité de coût de 1,7. Dans cette cohorte, aucun patient n'a eu de récidive nécessitant une deuxième chirurgie. Conclusion: Malgré le fait que l'utilisation de la colle de fibrine lors de la fixation du greffon augmente le coût du matériel au bloc opératoire ; cette technique diminue considérablement la durée de la chirurgie menant à une réduction des coûts opératoires. Cette étude conclut que la rentabilité économique de l'utilisation de la colle de fibrine est supérieure à la méthode utilisant seulement des sutures. De plus, dans un contexte où le temps opératoire et les ressources sont limités, cette méthode offre la possibilité de performer plus de cas dans une même plage horaire.

### 12. One-year, real-world Canadian study of iStent inject® 2nd-generation trabecular bypass with phacoemulsification.

**Ali Salimi MSc**, Paul Harasymowycz M.D.

## RÉSUMÉS DES PRÉSENTATIONS PAR AFFICHE

Introduction: The first generation of trabecular micro-bypass stents has been effective in reducing the intraocular pressure (IOP) and medication burden in patients with open angle glaucoma and cataract. The recent emergence of second generation of trabecular microbypass stents has allowed improved multidirectional flow with good efficacy and safety profile. We have assessed the outcomes following implantation of two second-generation trabecular micro-bypass stents (iStent inject) with concomitant cataract surgery in glaucoma patients with varying glaucoma severity from mild to severe. Methods: In this retrospective chart review study, we evaluated the baseline clinical characteristics and the 12-month outcomes of patients with mild to severe glaucoma who underwent implantation of two iStent inject devices with concomitant cataract surgery, at a single ophthalmology clinic. The primary outcomes included the intraocular pressure (IOP) and anti-glaucoma medication use. The secondary outcomes were complete success rate (IOP≤18 mmHg without any anti-glaucoma medications) and qualified success rate (IOP≤18 mmHg with or without anti-glaucoma medications). Changes in IOP and medications were evaluated using repeated measure ANOVA with significance set at p<0.05. Results: A total of 101 eyes of 61 patients were included with an average age of 68.5±8.8 years. All eyes had moderate to severe glaucoma with the following subtypes: 56% primary open-angle, 18% primary closed-angle, 13% normal tension, 7% pseudoexfoliation, 5% pigmentary, and 1% congenital glaucoma. The preoperative IOP decreased significantly from 16.6±4.0 mmHg to 14.3±2.8 (p<0.001), and the average anti-glaucoma medication use dropped by 53% at one-year follow-up (p<0.001). Qualified and complete success rates were 90.1% and 38.6%, respectively. There were no intraoperative complications; however, eight eyes underwent secondary surgery for management of elevated IOP. Discussion: The present study provides clinically relevant, real-world data on the utility of iStent inject with cataract surgery in a heterogeneous, adequately sized patient population. Patients experienced meaningful individual-level reductions in medication burden, while participants' already-low IOP was reduced further. IOP and medication reductions were sustained consistently through 12 months postoperative, and safety was favorable. Conclusion: The findings of this retrospective case series from a Canadian ophthalmology clinic suggests that implantation of second-generation trabecular micro-bypass stents (iStent inject) combined with phacoemulsification is an effective treatment modality in reducing the IOP and the medication burden with a high success rate and a favorable safety profile in mild to severe glaucoma patients.

## 13. The effect of cornea preservation time on Descemet membrane endothelial keratoplasty.

**Maria Elena Montpetit Gonzalez M.D.**, Salim Korban, Johanna Choremis, Michèle Mabon M.D., Tanguy Boutin, Leila Mejdoub, Isabelle Brunette M.D., Julia C Talajic M.D.

Purpose: The average preservation time (PT) of donor corneas at Hôpital Maisonneuve--Rosemont (HMR) is 8 to 9 days according to Héma-Québec, but corneas are frequently used up to 14 days. In the United States the vast majority of corneas are stored fewer than 8 days as many surgeons refuse donor tissue that has been stored for longer. The effect of PT on DMEK has not yet been studied. Therefore, our overall goal is to determine if a longer PT has an impact on the outcome of DMEK cornea transplants. Methods: This is an ambispective cohort observational study involving 2 study groups. Group 1: Donor cornea preserved ≤7 days, Group 2: >7 to 14 days. Thirty-six eyes of 32 patients underwent DMEK at HMR between April 2015 and February 2018. Eyes were distributed in 2 groups according to their cornea PT (Group 1: n=17, and Group 2: n=19). The primary outcome was central endothelial cell density (ECD) at 12 months post DMEK, and secondary outcome parameters were graft failure and rebubbling rate. Results: The mean age at surgery was 68 years (range: 48-88 years; 50.2% men). Mean follow-up time was 18.3 months. Mean (±SD) preoperative donor ECD was 2697±337 cells/mm2 in Group 1 and 2840±319 cells/mm2 in Group 2. At 1 year, mean ECD decreased to 1261±559 cells/mm2 and 1190±451 cells/mm2, respectively (mean difference, 71 cells/mm2; 95% CI 271.65 to 413.65; p= 0.68). This represented an endothelial cell loss of 53±18% in Group 1 and 58±17% in Group 2. 65% of central ECD in Group 1 were over 1000 cells/mm2 compared to 53% in Group 2. Rebubbling and failure rate were 29% and 0% in Group 1 and 26% and 11% in Group 2. Mean delay from death to preservation was 11.56±5.55 hours in Group 1 and 12.49±6.18 hours in Group 2. Mean delay from stripping to surgery was 2±1.13 days (range: 0-4 days) for Group 1, and 2±1.57 days (range: 0-6 days) for Group 2. Conclusions: In this small study, PT did not significantly affect DMEK outcomes. A larger sample size is needed. If long PTs negatively impact DMEK this will affect eye bank storage worldwide. Conversely, safe use of longer PTs will allow for an increased DMEK donor pool, reducing waiting lists and facilitating tissue access.

## 14. Méthodologie d'amélioration du recrutement des patients dans le cadre d'un essai clinique portant sur l'orbitopathie dysthyroïdienne.

**Simon Trottier**, Leila Mejdoub, Peter Dolman, Isabelle Hardy M.D.

Le traitement habituel en phase initiale inflammatoire de l'orbitopathie dysthyroïdienne est la corticothérapie intraveineuse, cependant 20% à 40% des patients ne répondront pas à ce traitement ou présenteront une récidive après sa cessation. La radiothérapie est aussi utilisée de longue date dans le traitement de l'orbitopathie dysthyroïdienne, avec une efficacité mitigée selon les études. Un essai clinique multicentrique, mené par l'University of British Columbia et auquel a collaboré notre équipe au CUO-HMR, a été mis sur pied afin de déterminer si l'usage combiné de la radiothérapie et de la corticothérapie intraveineuse en phase initiale de l'orbitopathie dysthyroïdienne progressive est plus efficace que la corticothérapie IV seule à prévenir le strabisme et l'apparition nouvelle d'une neuropathie optique. Cependant, après une période de recrutement de 3 ans, 28 patients ont été recrutés au total, alors que le "n" visé est de 99 patients. Une revue de littérature de même que notre expérience présente révèlent que le le taux de participation des patients éligibles est moindre pour des essais cliniques impliquant des suivis longs et/ou complexes, des traitements à connotation négative comme la radiothérapie, ou encore la possibilité d'être randomisé à un groupe contrôle. De plus, afin d'augmenter le nombre de patients recrutés par les médecins référents dans les centres affiliés, une communication fréquente et personnalisée avec les investigateurs et la démonstration de l'impact de l'étude sur l'approche thérapeutique des cliniciens sont de mise, et un facteur à ne pas négliger est la diminution du temps requis par le médecin pour évaluer l'éligibilité avant de référer un patient. Une prolongation a été obtenue et le recrutement pour cette étude est toujours actif.

## 15. Development and validation of miniaturized OCT fiber probes for intraoperative guidance of intraocular interventions.

**Alexandre Abid, Renaud Duval, Flavio Rezende, Christos Boutopoulos.**

Introduction : Optical coherence tomography (OCT) is a non-invasive tomographic imaging technique based on low-coherence optical interferometry. A variety of endoscope prototypes integrating OCT imaging capabilities have been developed over the last

decade. These devices have found exciting applications in the ophthalmic, cardiovascular and gastrointestinal tract systems. The use of intraocular OCT capabilities for the guidance of intraocular interventions could reduce iatrogenic complications associated with challenging maneuvers of instrumentation inside the eyeball. Here we present the integration of miniaturized OCT probes with two ophthalmic surgical tools, a subretinal cannula and a vitrector. Furthermore, we show ex-vivo (pig model) validation results for those tools. Methodology : We designed and fabricated miniaturized OCT probes with tunable focus. Our approach uses specialized optical fibers components that form a micro-lens for precise delivery of the OCT beam within the eyeball. We integrated those probes with commercial subretinal cannulas and vitrectors. Guiding algorithms have been developed on LabView for both tools, enabling a) injection at desired retinal layer for the modified subretinal cannulas and b) automatic stop of the cutter for the modified vitrector. Results :Using the modified subretinal cannula we performed OCT guided insertions in agar gel, a procedure that simulates a subretinal injection. We measured that the system could precisely insert the cannula within the agar gel with a precision as low as 20 micrometers. Using the modified vitrector, a vitreoretinal surgeon has performed aggressive approaches of the retina during test vitrectomies on porcine eyes with the intention to induce retinal damage. This procedure simulated the cause of an iatrogenic retinal injury during vitrectomy. We measured that the modified vitrector and guiding system were able to prevent those retinal injuries with an efficiency as high as 80%. Conclusion: In conclusion we designed and fabricated subretinal cannulas and vitrectors integrating OCT capabilities. Both systems have been validated with challenging tasks simulating intraocular interventions. Our results indicate increased precision compared to conventional tools, thus a potential of improving the precision and efficacy for certain intraocular interventions.

RÉSUMÉS DES PRÉSENTATIONS PAR AFFICHE (HORS CONCOURS)

## 16. Automated OCTA quantitative assessment of foveal and parafoveal choriocapillaris in normal and AM.D. subjects.

**Charles Bélanger Nzakimuena, Diane Sayah, Renaud Duval, Farida Cheriet, Santiago Costantino.**

Introduction : Age-related macular degeneration (AMD) is a progressive disease which manifests primarily at the outer retina, including the retinal pigmented epithelium (RPE) and Bruch's membrane (BM), as well as the choroid. Histopathological evidence indicates a decrease in choroidal vessel density in early stage AMD, and a hemodynamic pathogenesis model of AMD links progressive scleral rigidity increases to resistance to blood circulation which prevent normal choroidal venous drainage. The capillary region of choroidal blood vessels, or choriocapillaris (CC), demonstrates an interdependency with the RPE, and damages to either one will result in degeneration of the other. A defining clinical feature of AMD is the appearance of drusen which are localised lipid, mineral and protein-containing extracellular deposits found between the BM and the basal membrane of the RPE. Drusen manifest at areas of low choroidal blood flow and are therefore considered a marker for choriocapillaris loss. Mechanisms of disease progression point to CC integrity assessment as a viable tool in determining AMD onset. OCT angiography allows non-invasive and reproducible quantification of areas of absent CC flow signal. methods : A fully automated implementation of signal void sizes analysis was developed and includes adaptive local thresholding, the computation of logarithmically binned signal void sizes, the generation of a log-log plot, trendline parameters and flow voids distributions. The CC data analysis pipeline was performed on 10 subjects with dry AMD and 10 controls. Results: Preliminary results reflect decreased CC level flow signal in dry AMD subjects. CC quantification measurements show basic agreement with manually obtained observations using a different device. Conclusion: Previous approaches to signal voids assessment required manual image processing and computations. We demonstrated that a fully automated implementation of signal void sizes analysis can be achieved and that there is basic agreement with observations obtained using a different device.

## 17. OCT as a tool to detect early sympathetic ophthalmia in an asymptomatic patient.

**Zainab Khan PhD**, Sabrina Bergeron, Miguel Burnier, Evan Kalin-Hajdu, Marie-Josée Aubin M.D.

Introduction: Sympathetic ophthalmia (SO) is a rare and dreaded complication of accidental or surgical trauma resulting in diffuse granulomatous panuveitis in both the injured (inciting) and contralateral (sympathizing) eye. SO typically comes to the attention of treating physicians after unequivocal disease onset, at which point vision may be permanently affected. This case is the first in which spectral-domain optical coherence tomography (SD-OCT) was used to diagnose early SO in an otherwise asymptomatic patient. Methods: Chart review. Histopathological examination of the enucleated eye. Ophthalmological evaluation included Snelle visual acuity (VA), complete ocular examination, macular SD-OCT and fluorescein angiography (FA). Clinical course observed over a 6 month period. Results: A 23 year-old male sustained penetrating ocular trauma to his left eye while trimming trees. Initial globe repair occurred within hours of the injury and resulted in chronically exposed uvea due to multiple complex lacerations. He was referred to the Oculoplastics service at Maisonneuve-Rosemont Hospital in Montreal, Canada, for a painful eye with no visual potential and uneventful enucleation of the traumatized eye was performed a total of 3 weeks following initial injury. One month postoperatively, the patient was referred to an optometrist for fitting of polycarbonate lenses in order to protect the remaining right eye, Routine SD-OCT of the right eye revealed retinal pigment epithelium abnormalities. The patient had no visual complaints and best corrected VA was 6/6. SD-OCT was repeated at Maisonneuve-Rosemont Hospital and revealed a small serous retinal detachment with irregularity of the retinal pigment epithelium.FA showed a small pinpoint leak and optic disc leakage in the late-phase. The patient was diagnosed with SO on the basis of his history and imaging findings. He was started on a tapering course of high-dose oral prednisone. The SDOCT and FA abnormalities resorbed over one month. At 6 months follow-up, ophthalmologic exam and imaging remained normal while solely on a long-term dose of Mycophenolate 500 mg po BID. Histologpathologic examination of the enucleated left eye demonstrated non-granulomatous inflammation and was thought to be compatible with a diagnosis of SO given the important choroidal inflammatory component and clinical findings. Conclusions: SD-OCT and FA are key tools in the diagnosis of SO. Although there is a greater risk of developing SO within one year of globe-penetrating injuries, no guidelines exist for screening of the asymptomatic patient. This case report

demonstrates that abnormalities on OCT can precede symptoms or even findings on ophthalmologic examination typical of SO. Therefore, in all patients status-post globe-penetrating trauma, we recommend complete ophthalmologic examination plus SD-OCT every 2-4 months within the first year of trauma and annually thereafter.

### 18. Two children with mucolipidosis type IV: corneal imaging with optical coherence tomography and novel MCOLN1 mutation

**Cristina Bostan M.D.**, Grant Mitchell, Benjamin Ellezam, Jean-François Soucy, Mona Harissi-Dagher, M.D., Patrick Hamel M.D.

Introduction: Mucolipidosis type IV (MPS-IV) is a rare lysosomal storage disorder with a challenging clinical diagnosis: neurologic and ocular findings are nonspecific and rarely evolve simultaneously. The identification of MCOLN1 gene mutations is confirmatory, but requires clinical suspicion. Herein, we report for the first time on the use of corneal optic coherence tomography (OCT) in the diagnosis of MPS-IV and present a novel MCOLN1 mutation. Methods: Case report. Two French-Canadian children were evaluated by our tertiary care multidisciplinary team. Both children underwent corneal optical coherence tomography (OCT) using the Bioptigen EnvisuTM system and an anterior segment probe, as well as genetic analysis using exome sequencing and Sanger confirmation in the trio. Results: The first child (31 months old) presented psychomotor delay, hypotonia, and hypoplastic corpus callosum and optic nerves. The second child (15 years old) had spastic quadriparesia, dysphagia, cognitive impairment, optic atrophy and retinopathy. Both displayed progressive bilateral corneal clouding without edema or glaucomatous signs. Corneal OCT revealed increased epithelial thickness and reflectivity, with otherwise normal corneal layers. Exome sequencing of MCOLN1 revealed a well-known missense mutation in both children (NM_020533.2:c.694A>C), a novel missense mutation in the first (NM_020533.2:c.785T>C) and a previously described nonsense mutation in the second / (NM_001008537.2:c.964C>T). Conclusion: Corneal clouding is the earliest hallmark sign of MPS-IV. Unlike other metabolic causes of bilateral clouding, involvement is limited to the corneal epithelium. Slit-lamp recognition of isolated epitheliopathy is difficult in children, especially infants. We report the first OCT imaging of abnormal epithelium in MPS-IV. This fast, non-invasive technique can facilitate identification of abnormal layers and orient genetic testing leading to timely diagnosis. Furthermore, we describe a novel MCOLN1 mutation in a French-Canadian child. The most common and

widely known MCOLN1 mutations were described in Ashkenazi Jews; comprehensive screening non-limited to these mutations is essential, as different variants may present in other ethnicities.

### 19. Linear chorioretinal lesions as a diagnostic sign of West Nile virus infection.

**Cristina Bostan M.D.**, Mariam T Ibrahim, Mark Bamberger, Karin Oliver, Marie-Josée Aubin M.D.

Purpose: To describe the ocular clinical features and imaging findings associated with West Nile virus (WNV) infection and raise awareness as to their diagnostic importance in the context of the current resurgence of human WNV cases in Canada. Methods: Case series. Medical chart review of three patients (one male, two females; 41 to 62 years old) seen in two tertiary eye care centers in Montreal, Canada, who had confirmed WNV infection by serum enzyme-linked immunosorbent assay and plaque-reduction neutralization test. Their ophthalmologic evaluation included Snellen visual acuity (VA), complete slit-lamp dilated eye exam, spectral domain optical coherence tomography (SD-OCT), and fundus fluorescence angiography (FFA). Results: The first patient experienced mild fever and generalized malaise, for which she did not seek medical care. She presented due to unilateral decreased visual acuity and floaters and her ophthalmic evaluation led to the WNV diagnosis. The other two patients had been admitted to the intensive care unit with an altered level of consciousness and fever, and were diagnosed with meningoencephalitis. An ophthalmology consultation for these patients was sought after serologic identification of WNV infection, which only became available two weeks after admission. All patients presented typical unilateral (1) or bilateral (2) multifocal placoid yellow-white chorioretinal lesions with variable pigmentation, and linear clustering following the course of the nerve fiber layer, consistent with WNV chorioretinitis. FFA revealed centrally hypofluorescent round lesions with peripheral hyperfluorescence and late staining. On SD-OCT the lesions appeared as hyper-reflective foci located at the outer retinal and sub-retinal pigment epithelial levels. Conclusion: The public health implications of WNV infection lend special importance to early diagnosis. Clinical suspicion can be challenging since systemic manifestations are not specific. Confirmatory identification of the virus relies on serologic testing, which is associated with a significant delay. WNV chorioretinitis is characterized by placoid multifocal linearly distributed chorioretinal lesions. It develops in the acute phase in up to 80% of hospitalized WNV patients and has

been found to have 100% specificity for WNV infection diagnosis. Despite supporting evidence in the literature, the diagnostic value of these chorioretinal lesions is little known by medical practitioners. With increased awareness of this pathognomonic ophthalmic involvement in WNV, patients will potentially benefit from early ophthalmologic assessment, earlier access to appropriate services for their systemic disease, and appropriate ocular treatment to reduce the incidence of potentially vision-impairing complications.

### 20. Co-delivery of miR-181a and melphalan by lipid nanoparticles for treatment of seeded retinoblastoma.

**Houda Tahiri PhD**, Chun Yang, NasrollahTabatabaei, Rosanne Superstein M.D., Jeanne Leblond Chain, Pierre Hardy M.D.

Purpose: Recent studies demonstrated that intravitreal injection of Melphalan (Mel) is remarkably effective for the control of vitreous seeds. Mel chemically cause cytotoxicity in both dividing and non-dividing tumor cells. Studies have shown that high doses of intravitreous Mel (higher than 30µM) could be destructive, causing ischemic necrosis in the retina, severe gliosis, and secondary neovascular changes. Thus, there is great concern about its noticeable toxicity, implicating the need to develop better treatment options for RB patients with vitreous seeds. To minimize unwanted treatment-related adverse events, new therapies have been investigated, including novel carriers for local drug delivery, as well as molecularly targeted therapies. Recent findings in oncology suggest that microRNAs (miRs) may hold the promise of yielding a new type of therapeutics. Methods: The RB rat and rabbit models with vitreal seeds have been well established in our laboratory. Tumor growth before and after intravitreal treatments was recorded by a RetCam apparatus. The treatment effects was confirmed by immunohistochemistry and gene expression analysis. We used Cationic switchable lipid nanoparticles (LNPs) harboring miR-181a and Mel and evaluated anti-RB effects of LNPs in our animal models. Results: Encapsulation of MEL in LNPs significantly improved its therapeutic efficiency. Gene analysis shows that miR-181a decreases the expression of anti-proliferative gene MAPK1 and anti-apoptotic gene Bcl-2, but significantly increased the expression of pro-apoptotic gene BAX. Our results suggest that the two agents (MEL and miR-181a) have a complementary effect in reducing the viability of cultured RB cells (primary and cell lines) and decreasing RB cell counts in an in-vivo xenograft RB model in rats. Since healthy cells

in the eye do not proliferate, abnormally dividing RB cells were preferentially targeted by the LNPs. Conclusion: The proposed co-delivery technique significantly increases the therapeutic impact, allows for lower administration of melphalan, and consequently, could minimize the cytotoxic side-effects of this drug.

### 21. Transcobalamin II deficiency-associated retinopathy: case report and review of literature.

**Sarah Chorfi M.D.**, Cynthia Qian M.D.

Background Transcobalamin II deficiency (TCII) is a rare autosomal recessive disorder. This condition impairs the transport of cobalamin (vitamin B12) in the body. Several other more prevalent inherited disorders of vitamin B12 metabolism have been described such as Cobalamin C disease (cblC), which can also lead to ocular complications, but there have been few cases of TCII deficiency associated ocular manifestations reported in the literature. Objective To report a case of transcobalamin II deficiency-associated retinopathy during a 20-year follow-up period. Methods: case report and review of the literature. Results Following a delayed diagnosis and subsequent treatment of congenital transcobalamin II deficiency at the age of 12 years old, a patient presented with dense macular pigmented lesions bilaterally and associated peripheral pigmentary changes. Visual acuity was 20/40 OD and 20/50 OS. Visual evoked potentials showed decreased amplitudes and delayed latencies, to a greater extent in the left eye. Electroretinography highlighted very subtle anomalies in cones and rods response in the left eye exclusively. Goldmann visual fields showed central defects sparing the most central area bilaterally following a ring-shaped conformation. OCT later showed diffuse loss of outer retinal layers. The ocular findings remained stable throughout the years despite initiation of weekly intra-muscular Hydroxycobalamin treatment. Conclusion Stabilization of Transcobalamin II deficiency-associated retinopathy was achieved after proper diagnosis and treatment initiation at the age of 12.

RÉSUMÉS DES PRÉSENTATIONS PAR AFFICHE (HORS CONCOURS)

## 22. Visual impairment and the use of formal and informal home care in Canada.

**Marie-Josée Aubin M.D.**, R Aljied, R Buhrmann, EE Freeman PhD.

Purpose: Access to home care services can allow people to continue to live at home in the face of disabling health conditions like vision loss. The extent to which older adults with visual impairment use home care in Canada is unknown. Our goal was to determine the use of formal and informal home care services in those with and without visual impairment. Methods: Participants came from the baseline exam of the Canadian Longitudinal Study on Aging Comprehensive Cohort. Inclusion criteria included being between the ages of 45 and 85 years old, community-dwelling, and living near one of the 11 data collection sites across 7 Canadian provinces. People were excluded if they were in an institution, living on a First Nations reserve, were a full-time member of the Canadian Armed Forces, did not speak French or English, or had cognitive impairment. Visual acuity was measured using the Early Treatment of Diabetic Retinopathy Study chart at 2 meters while participants wore their usual prescription for distance, if any. Visual impairment was defined as binocular acuity worse than 20/60. The use of formal, informal, and both types of home care was determined by questionnaire. Results: In 29,640 people, the use of any home care was greater in those with visual impairment than in those without it (28% versus 12%, respectively, P<0.01). After adjusting for demographics and health, people with visual impairment were more likely to use informal home care (OR=1.89, 95% CI 1.35-2.63) and formal home care either alone or along with informal care (OR=2.70, 95% CI 1.79-4.07) than those without visual impairment. Marital status was a modifier. Conclusion: These findings warrant further exploration and have major health service implications given the rising prevalence of visual impairment due to age-related eye diseases.

## 23. Interaction Between Visual Acuity and Peripheral Vascular Disease with Balance: Baseline Data from the Canadian Longitudinal Study on Aging.

**Marie-Josée Aubin M.D.**, A Vafaei, R Buhrmann, MJ Kergoat, R Aljied, EE Freeman PhD.

Purpose: To determine whether visual acuity is related to balance in older adults with peripheral vascular disease (PVD) or diabetes mellitus. Methods: Cross-sectional analysis of baseline data from the Canadian Longitudinal Study on Aging. Participants included

30,097 community-dwelling adults aged 45 to 85. Visual acuity was measured wearing habitual distance correction using the Early Treatment Diabetic Retinopathy Study chart at a two-meter distance. Poor balance was defined as being unable to stand on one leg for at least 60 seconds. PVD and diabetes were assessed by self-report of a physician diagnosis. Multiple logistic regression was used. Results: People who reported PVD (n=1,295) were more likely to have worse balance than those who did not (odds ratio (OR)=1.50, 95% confidence interval (CI)=1.29-1.77). In those who did not report PVD (n=26,211), a 1-line worse score on the visual acuity test was associated with 23% higher odds of being unable to stand for at least 60 seconds after adjusting for age, sex, education, province, body mass index, and diabetes mellitus (OR=1.23, 95% CI=1.20-1.26). In those who reported PVD, the odds of being unable to stand was almost double (OR=1.41, 95% CI=1.22-1.62). The interaction between visual acuity and PVD was statistically significant (P=.02). Conclusions: Visual acuity and PVD interact in their relationship with balance. People with poor vision and PVD may be at an especially high risk of mobility difficulties.

### 24. A two-year-old girl in Tanzania with crying tears of blood.

**Marie-Josée Aubin M.D.**, L Reyes, D Martinez, MC Bottineau, J Oestreicher, W Mapham, J Hajek.

Purpose: To report a case of bleeding eyes likely due to trachoma in a two-year-old girl living in a refugee camp in Tanzania. Study Design: This is a case report from the Nduta clinical post in rural Tanzania operated by Médecins Sans Frontières (MSF) team and MSF telemedicine network. Methods: Clinical course observed over a two-month period. Results: A two-year-old girl living in Nduta refugee camp in rural Tanzania presented with sudden onset of bloody tears and bleeding from both eyes. She was very irritable and sedation was required to allow careful ocular examination. The bulbar conjunctiva appeared normal, but there was purulent inflammation of the superior palpebral conjunctiva. She was diagnosed clinically with probable acute bacterial conjunctivitis. Gram stain showed a predominance of neutrophils; bacterial cultures and additional microbiological testing was not available. She was managed empirically with topical tetracycline, oral ciprofloxacin and azithromycin. On follow-up one week later, the conjunctiva was no longer purulent, the bloody tears had decreased and eventually resolved. There was residual hyperemic superior palpebral conjunctiva with some follicles

and tarsal linear scars, typically seen in trachomatous disease. Conclusions: Hemolacria, bleeding of tears, is a rare but dramatic clinical finding. It has been associated with a wide variety of underlying causes ranging from side effects of topical medications and trauma, to infectious conjunctivitis and cancer. In this case, the purulent discharge suggests that acute bacterial conjunctivitis likely complicated underlying trachomatous disease and resulted in the bloody tears. Worldwide over 250 million people are visually impaired and 36 million are blind. The majority live in low-resource countries where trachoma is a leading cause of visual impairment and is still hyperendemic. This case calls attention to the need to address the burden of ocular infections and the socioeconomic conditions that lead to such a disproportionate burden of visual impairment globally.

### 25. 360° intraoperative laser retinopexy for the prevention of retinal re-detachment in patients treated with primary pars plana vitrectomy.

Ali Dirani, **Fares Antaki M.D.**, Marc-Andre Rheaume M.D., Danny Gauthier M.D., Louis Corriveau M.D., Jean-Daniel Arbour M.D., Karim Hammamji M.D.

Purpose: To investigate the effect of 360° intraoperative laser retinopexy (ILR) for the prevention of recurrence of rhegmatogenous retinal detachment (RRD) in patients with primary uncomplicated RRD who underwent 23-gauge pars plana vitrectomy (PPV) with gas endotamponade. Methods: A retrospective comparative single-institution case series study was performed. Consecutive patients with primary uncomplicated RRD who underwent 23-gauge PPV with gas endotamponade between July 2013 and July 2016 were included in the study (n=151). The patients were part of two case series cohorts, one which received laser retinopexy only around identified tears/holes/lattice zones (Control group, n = 86), and one which received additional 360° intraoperative laser retinopexy (360° ILR group, n = 65). The decision to do 360° ILR was based on the discretion of the operating surgeon. The baseline characteristics and the risk of retinal re-detachment over time were analyzed and compared between the two groups. Results: There was no statistically significant difference between the 360° ILR group and the Control group for the following baseline demographic and retinal detachment characteristics: age, sex, duration of symptoms, lens status, the extent of the detachment, the macular status and the presence/ absence of inferior tears. Retinal re-detachment was seen in 4/65 eyes (6%) in the 360° ILR group compared to 18/86 eyes (21%) in the Control group (p = 0.01). Prophylactic 360° ILR was associated with a four-fold reduction in the incidence of retinal

re-detachment after surgery (Kaplan-Meier analysis log-rank test, p = 0.012). Conclusions: Intraoperative 360° laser retinopexy during PPV with gas endotamponade resulted in a significant reduction in the rate of postoperative retinal re-detachment in eyes with uncomplicated primary RRD.

Université de Montréal

**Faculté de médecine**
Département d'ophtalmologie

**ACTIVITÉ DE FORMATION PROFESSIONNELLE CONTINUE FICHE D'ÉVALUATION (www.cqdpcm.ca)**

Date **: 30 mai 2019** Coordonnateur : **Dr Sylvain Chemtob**

Type d'activité : **31e Journée de la recherche en ophtalmologie**

Modérateurs : Dr Mark Lesk, M.D. et Qian Qian Wang, M.D.

Buts et objectifs : L'objectif principal de la journée de la recherche est de donner l'occasion aux résidents du programme d'ophtalmologie de présenter leur projet de recherche, les résultats préliminaires ou les résultats finaux selon l'avancement de leurs travaux. Le second objectif est de donner une opportunité aux étudiants gradués (MSc et PhD), aux fellows et aux stagiaires de présenter les résultats de leurs recherches.

L'activité respectait-elle le Code d'éthique des intervenants en éducation médicale continue?
Oui ( ) Non ( ) Si non, pourquoi?

En général, avez-vous l'impression qu'il y avait un biais commercial durant la formation?
Oui ( ) Non ( ) Si non, pourquoi?

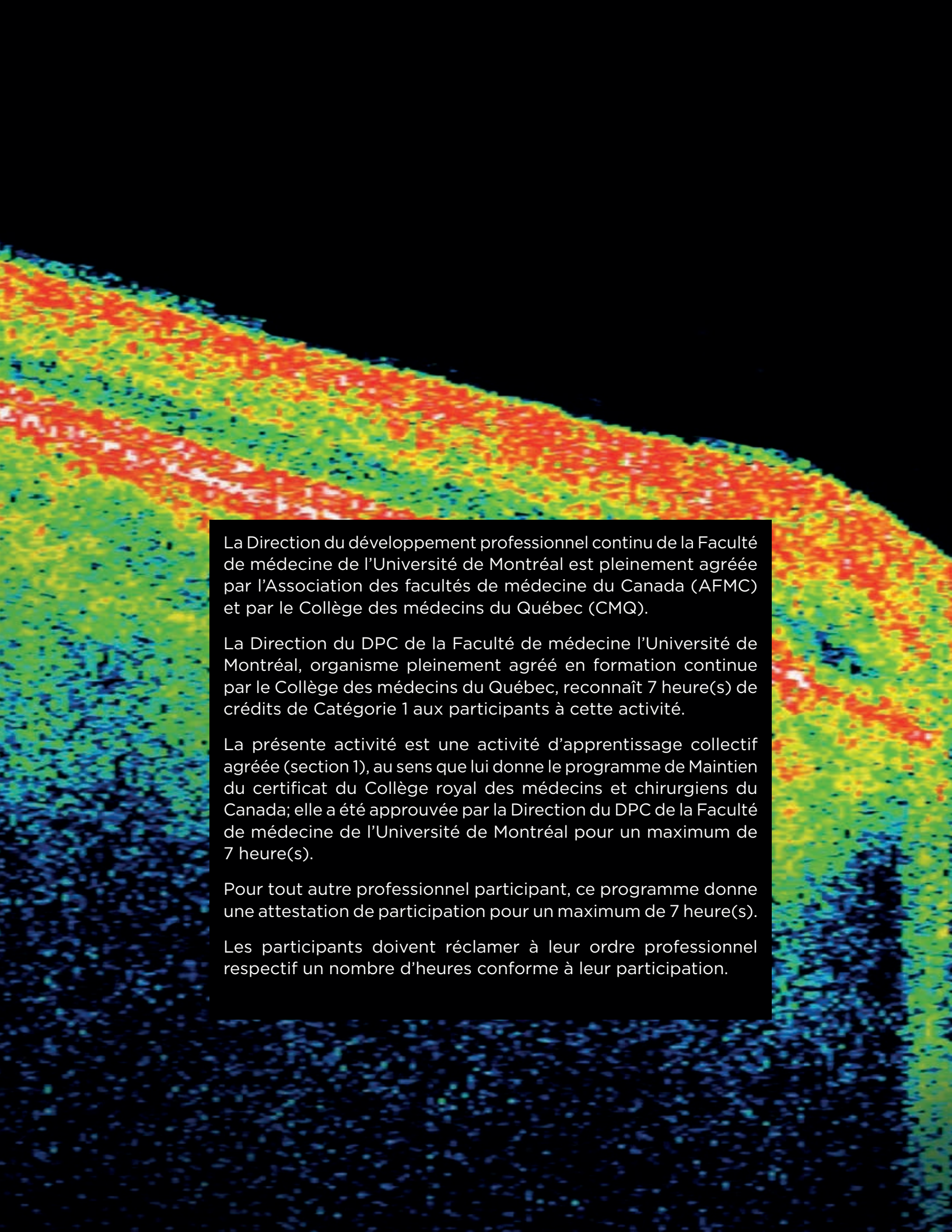
La divulgation des conflits d'intérêts par les responsables de l'activité était-elle adéquate?
Oui ( ) Non ( ) Si non, pourquoi?

Évaluation :

| | EXCELLENT | BON | MOYEN | MÉDIOCRE |
|---|---|---|---|---|
| Les présentations étaient préparées et organisées. | | | | |
| L'audiovisuel était clair. | | | | |
| Les objectifs ont été atteints. | | | | |
| J'ai identifié des messages clés qui vont m'inciter à modifier ma pratique. | | | | |
| Commentaires supplémentaires : | | | | |

# Notes

# 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).

La Direction du DPC de la Faculté de médecine l'Université de Montréal, organisme pleinement agréé en formation continue par le Collège des médecins du Québec, reconnaît 7 heure(s) de crédits de Catégorie 1 aux participants à cette activité.

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 7 heure(s).

Pour tout autre professionnel participant, ce programme donne une attestation de participation pour un maximum de 7 heure(s).

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