POSTER PRESENTATIONS AT VASCULAR BIOLOGY

MONDAY

ANGIOGENESIS

M01

Endothelial TDP-43 controls sprouting angiogenesis and vascular barrier integrity, and its deletion triggers neuroinflammation

Eloi Montanez
University of Barcelona, Barcelona, Spain

- TDP-43 is required for sprouting angiogenesis.
- TDP-43 is required for vascular barrier integrity and blood vessel stability.
- Loss of enothelial TDP-43 triggered vascular degeneration and neuroinflamation.

M02

Evidence for a novel Ovol/Slug/Snail signaling axis to regulate partial endothelial-to-mesenchymal transition in sprouting angiogenesis

Kapil Thapa[1], Christopher Justus Hatch[2], Christopher Hughes[2], Jennifer Fang[1]
[1]Tulane University, New Orleans, LA, USA. [2]University of California-Irvine, Irvine, CA, USA

- Endothelial cells are hypothesized to undergo mesenchymal transition during angiogenesis.
- Transcription factors like Slug, Snail and Ovols might play crucial role in driving such transition.
- In cancer, such transition might be uncontrolled thus giving rise to dysregulated blood vessels.

M03

Using a 3D model of the neurovascular unit to assess vascular function following alcohol exposure

Monica Long BS, Marissa Westenskow BA, Amy Gardiner PhD
University of New Mexico Health Science Center, Albuquerque, NM, USA

- Understanding how alcohol exposure affects the vasculature in the context of the neurovascular unit
- Establishing a microfluidics 3D model of the neurovascular unit
- Assessing angiogenesis and permeability in brain microvascular endothelial cells

M04

Epigenetically controlled adult brain vasculature: The critical roles of HDAC2 and PRC2

Sithara Thomas Ph.D, Lalit K Ahirwar Ph.D., Cikesh PC MSc, Devin W McBride Ph.D., Spiros L Blackburn MD, Peeyush Kumar Thankamani Pandit Ph.D.
The Vivian L. Smith Department of Neurosurgery, University of Texas Health Science Center McGovern Medical School, Houston, Texas, USA

- HDAC2 and PRC2 key epigenetic regulators in CNS endothelial cells
- The significance of HDAC2 and PRC2 in the maintenance of adult brain vessels explained
- Epigenetic mechanisms regulating adult brain angiogenesis and vascular aging are explained.

M05

Endothelial Von Hippel-Lindau deletion causes abnormal vascular network formation through ectopic activation of HIF-CXCR4 signaling axis

Wenling Li[1], Koh Nakayama[2], Rina Shimada[3], Ryo Sato[1], Yoshiaki Kubota[4], Yosuke Mukouyama[1]
[1]NHLBI, Bethesda, MD, USA. [2]Asahikawa Medical University, Asahikawa, Japan. [3]Tohoku University, Sendai, Japan. [4]Keio university, Tokyo, Japan

- Endothelial VHL deletion induces ectopic Cxcr4 expression via constitutive HIF stabilization
- Ectopic HIF-Cxcr4 signaling activation leads to abnormal vascular network formation.
- AMD3100, Cxcr4 antagonist, partially restores vascular abnormalities in EC-specific VHL deletions.

M06

Pericyte recruitment to the endothelium at the maternal-fetal interface during placental distress

Audra Barnes BS[1,2], John Chappell PhD[1,2]
[1]School of Biomedical Engineering and Sciences, Virginia Tech, Blacksburg, VA, USA. [2]Center for Vascular and Heart Research, Fralin Biomedical Research Institute, Roanoke, VA, USA

- Soluble Platelet-Derived Growth Factor Receptor-beta protein and mRNA were found in mouse placenta.
- PDGF-BB pathway regulators seem to promote PC recruitment to placental vessels throughout gestation.
- PC precursors expanded in an in vitro model of early-stage vessels exposed to an EC growth media.

M07

Surfactant protein A: Indirect and direct regulation of retinal endothelial cell morphology and function

Henry Song PhD[1], Wen Chen MS[2], Shirley Wang PhD[1], Peter Vitiello PhD[1], Faizah Bhatti MD[3]
[1]University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA. [2]UT Austin, Austin, TX, USA. [3]University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma City, USA

- Prematurely born infants have dysregulated angiogenesis, which is driven by immune modulators
- Surfactant protein A is deficient in preemies and maintains cytoskeleton in various cell types
- SP-A increases endothelial cell structure, stability and promotion of vascularization

M08

The role of satellite cells in inducing collateral vessel growth in peripheral artery disease

Christopher L Jean-Baptiste BS, Tao Yu PhD, Laura Hansen PhD
Emory University, Atlanta, Georgia, USA

- Satellite cells promote angiogenesis upon activation stimuli
- Satellite cell delivery promotes collateral vessels in hind limb ischemia
- Hyperglycemia effects on satellite cell niche

M09

Stress-relaxing hydrogels modulate endothelial cell transplantation in a mouse model of peripheral arterial disease

Ngan F Huang PhD[1], Sree Aravindan BS[2], Caroline Hu BS[2], Gladys Chiang BS[2], Beu Oropeza PhD[2], Michelle S Huang BS[1], Sarah C Heilshorn PhD[1]

[1]Stanford University, Stanford, CA, USA. [2]Veterans Affairs Palo Alto Health Care System, Palo Alto, CA, USA

- Hydrogels can serve as therapeutic cell delivery vehicles.
- Mechanical properties such as stress relaxation rate can influence transplant cell viability.
- Induced pluripotent stem cell-derived endothelial cells have therapeutic potential to treat PAD.

M10

Deciphering the pro-proliferative mechanism of cytochrome b5 reductase 4 in endothelial cells using unbiased causal inference

Shuai Yuan PhD, Stefanie N. Taiclet, Scott A. Hahn, Adam C. Straub PhD

University of Pittsburgh, Pittsburgh, PA, USA

- Bayesian network causal inference helps identify essential components in a gene regulatory network.
- CYB5R4 regulates endothelial lipid and nucleotide metabolism.
- CYB5R4 promotes ribonucleotide reduction by interacting with RRM2 to promote cell proliferation.

M11

The role of endothelial Toll like receptors in angiogenesis and inflammation

Iuliia Molokotina PhD

Cleveland Clinic, Cleveland, OH, USA

- Endothelial TLR4 activation promotes angiogenesis, monocyte adhesion and cytokine secretion in vitro
- Endothelial TLR4 knockout delays wound closure, reduces tumor growth & monocyte infiltration.
- Sex differences: Stronger TLR2/4 pathways in female ECs influence inflammation and healing

M12

Collateral arteriogenesis involves a sympathetic denervation that is associated with abnormal α-adrenergic signaling and a transient loss of vascular tone

Trevor R Cardinal PhD, Alexander Silva MS, Christopher J Hatch BS, Megan T Chu MS

Cal Poly, San Luis Obispo, CA, USA

- Arteriogenesis is a therapeutic target for peripheral artery disease
- Vasodilation is impaired following arteriogenesis due to a loss of vascular tone
- The loss of vascular tone is associated with a sympathetic denervation of the collateral

DEVELOPMENT

M13

Organoid model of vascular development and remodeling after engraftment to the chick chorioallantoic membrane

William J Kowalski, Shravani Vatti, Tyler Sakamoto, Chengyu Liu, Guibin Chen, Manfred Boehm, Yoh-suke Mukouyama
NHLBI, Bethesda, MD, USA

- Vascular organoids derived from mouse embryonic stem cells formed a 3D capillary plexus in vitro
- Organoids transplanted to the chick CAM remodeled and formed smooth-muscle wrapped vessels
- Vascular organoids connected to the chick host circulation

M14

Characterizing the function of a novel arterial-specific notch-like receptor in vascular development

Miranda Marvel, Yehyun Abby Kim, Madeleine Kenton, Brant M Weinstein
NICHD/NIH, Bethesda, MD, USA

- Discovery of arterial-specific notch-like (notchl) receptor in zebrafish
- Notchl may have a role in regulating arterial development and gene expression
- GOF and LOF models in zebrafish will elucidate the roles of this notch-like receptor in zebrafish

M15

Investigation of COUP-TFII in human vein development

Alanna L Pyke[1,2], Zhainib Amir-Ugokwe[3], Pratima Prabala B.S.[3], Mira Moufarrej Ph.D.[3], Emily Trimm[3], Wen-Chuan Hsieh Ph.D.[3], Donna Poscablo Ph.D.[3], Kyle Loh Ph.D.[2,4,5], Lay Teng Ang Ph.D.[2,6], Sawan K Jha PhD[3], Kristy Red-Horse PhD[3,4,2,7]
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- Transcription factor, COUP-TFII, affects human vein differentiation in vitro.
- COUP-TFII's ligand binding domain is important to its function.
- Gene expression profiles change with COUP-TFII mutants in human vein differentiation.

M16

COUPTFII expressing endothelial cells are important compensatory cells for pharyngeal arch artery formation

Gideon Obeng PhD, Sophie Astrof PhD
Rutgers University, Newark, NJ, USA

- lntegrin alpha5 and extracellular matrix interactions
- pharyngeal arch artery development
- Vascular patterning

GENETICS

M17

Exploring the vascular structural adaptations and endothelial genetic signature alterations across the first trimester in the human decidua

Bethan Wilson, Meghan Riddell PhD
The University of Alberta, Edmonton, AB, Canada

- Endothelial cells in the human decidua express pro-migratory genotypes in the early first trimester
- Human decidual vasculature develops high calibre blood vessels with low EC proliferation
- Decidual blood vessels undergo vascular fusion to achieve large calibre, low resistance vessels

M18

Impact of cancer therapy on epigenetic and lncRNA regulation in vascular endothelial cells

Chayan Bhattacharya PhD[1], Miguel Nieto-Hernandez[1], Sydney Rudolph[1], Ava Carr[1], Sudarshan Anand PhD[2], Cristina Espinosa-Diez PhD[1]
[1]Wayne State University, Detroit, MI, USA. [2]Oregon Health & Science University, Portland, OR, USA

- Cancer survivors face a higher risk of vascular dysfunction due to increased genotoxic stress.
- Genotoxic stressors induce epigenetic reprogramming in endothelial cells at different levels
- Understanding epigenetic changes in lncRNA could pave the way for new therapies for cancer survivors

M19

New In vitro models system for treat Pitt-Hopkins syndrome

Yanina Tkachenko PhD, Meysam Ganjibaksh PhD, Abuzar Kaleem PhD, Babatunde Ogunlade PhD, Vera Iakovleva MD, Shibi Likhite PhD, Kathrin Meyer PhD
Nationwide Children's Hospital, Columbus, OH, USA

- Here, we developed a novel gene therapy using an AAV-based targeted U7 small RNA
- Understanding upstream regulation of TCF4 expression to developing therapeutic strategies
- Improved the hampered survival neurons in contact with patient derived induced astrocytes

MALFORMATIONS

M20

Gnaq overactivation in zebrafish embryos causes mosaic vascular anomalies

Emma Heeg, Sarah Childs
University of Calgary, Calgary, AB, Canada

- Vascular malformations
- Disease modelling
- Vascular patterning

M21

Inhibition of endothelial histone deacetylase 2 shifts endothelial-mesenchymal transitions in cerebral arteriovenous malformation models

Yan Zhao PhD[1], Xiuju Wu MD, PhD[1], Yang Yang MD, PhD[1], Li Zhang PhD[1], Xinjiang Cai MD, PhD[1], Kristina I Bostrom MD, PhD[1,2], Yucheng Yao MD, PhD[1]

[1]Division of Cardiology, David Geffen School of Medicine at UCLA, Los Angeles, California, USA. [2]The Molecular Biology Institute at UCLA, Los Angeles, California, USA

- Cerebral endothelial cells acquired mesenchymal markers and formed AVMs after MGP deletion
- HDAC2 induction altered specific histone modifications, causing mesenchymal transition in the ECs
- Limiting endothelial HDAC2 prevented endothelial-mesenchymal transition and reduced cerebral AVMs

VASCULAR ANOMALIES AND HHT

M23

Analysis of alk1 control of the endothelial cell development during intersegmental vessel formation in zebrafish to understand Hereditary Hemorrhagic Telangiectasia (HHT) pathogenesis

Minsoo Kim Master of Science in Engineering, Arndt Siekmann Professor

University of Pennsylvania, Philadelphia, PA, USA

- HHT is characterized by abnormal connections between arteries and veins, leading to AVMs.
- Alk1 and endoglin are the key regulators in BMP signaling pathway, crucial for angiogenesis.
- Alk1 mutations in zebrafish reveal capillary dilations, highlighting HHT phenotypic variations.

M24

Utilizing RiboTag to identify key changes that effect vascular morphogenesis in 3D-culture

Samantha King, Qing-fen Li PhD, Kevin Pumiglia PhD

Albany Medical College, Albany, NY, USA

- TRAP-Seq allows for robust enrichment of endothelial genes in 3D co-cultures.
- Distinct transcriptional/translational changes occur through early-late endothelial morphogenesis.
- Expression patterns from co-cultures of PIK3CA-H1047R HUVECs can predict changes that occur in vivo.

M25

Inhibition of mTORC1 is superior to AKT inhibition in reversing vascular effects of PIK3CA^{H1047R} mutation

Kevin Pumiglia PhD, Qing-fen Li PhD

Albany Medical College, Albany, NY, USA

- Key elements of PIK3CA vascular malformations can be modeled in vitro, in situ, and in vivo
- Inhibiting mTOR is more effective than AKT, to normalize PIK3CA-induced vascular malformations.
- Transcriptomic targets induced by PIK3CA and reversed by inhibitors inform pathogenesis

M26

Genetic and pharmacological targeting of mTORC1 in mouse models of HHT indicate dosage specificity in arteriovenous malformation

Antonio Queiro-Palou MSc, Lars Jakobsson PhD
Karolinska Institutet, Solna, Stockholm, Sweden

- Is mTORC1 cell-autonomously regulated downstream of BMP9/ENG/ACVRL1 in endothelial cells in vivo?
- What stage of the AVM process in HHT1 mouse models is affected by endothelial mTORC1 signalling?
- What impact does differential mTORC1 activation have on vascular morphogenesis and malformation?

M27

Cell autonomous and non-Cell autonomous roles of Semaphorin 3A and 3F in TIE2-mutated venous malformation

E Sandra Schrenk[1], Lindsay Bischoff[2], Elisa Boscolo[2]
[1]Cincinnati Children's Hospital, Cincinnati, OH, USA. [2]Cincinnati Children's Hospital, Cincinnati, oh, USA

- Are mutant TIE2 vessels in venous malformation recruiting WT endothelial cells to grow? NO!
- Semaphorin3A and 3F are overexpressed in TIE2 mutant EC
- Silencing of Sema3A/3F rescues migration, lumen incorporation of the WT EC, and vessel size

M28

Lymphatic endothelial cell secretome stimulates osteoclast differentiation and bone resorption

Ernesto Solorzano PhD[1], Gabrielle T Robinson[1], Andrew L Alejo MD[1], Hope C Ball PhD[1], Alex P Powell[1], Mitchell W Bailey[1], Kennedy Nkachukwu[1], Bryce Pember[1], Trinity A Kronk[1], Jared Hinton[1], Michael Kelly MD[2], Fayez F Safadi PhD[1]
[1]NEOMED, Rootstown, Ohio, USA. [2]Cleveland Clinic, Cleveland, Ohio, USA

- Lymphatic secretome stimulates bone resorption
- Complex Lymphatic Anomalies trigger osteopathy
- Osteoclast activation in response to lymphatic stimulation

VASCULAR BIOLOGY

M30

Advancing a lipedema research roadmap: Recommendations to characterize the biology of a complex disease

Ashok Srinivasan PhD, Felicitie Daftuar, Guy S. Eakin PhD, Stephanie Galia, Laura Harmacek PhD, Jonathan Kartt, Stephanie Peterson
Lipedema Foundation, New York, NY, USA

- The Lipedema field is nascent, with 50% of research papers published in the past 5 years.
- In our roadmap we have indicated which next steps are a priority for characterizing disease biology.
- Several recommendations regarding lymphatics and vascular biology are highlighted.

M31

Addressing filovirus-induced vascular leak and hemorrhage: Identification of products and methods to evaluate medical countermeasure efficacy

Olivia Molinar-Inglis PhD[1,2], Ethan J Fritch PhD[1,2], Carol J Diaz-Diaz PhD[1], Karen A Martins Phd[1]
[1]Antivirals and Antitoxins (AVAT) Program, Division of Chemical, Biological, Radiological, and Nuclear (CBRN) Medical Countermeasures, Biomedical Advanced Research and Development Authority (BARDA), Administration for Strategic Preparedness and Response (ASPR), U.S. Department of Health and Human Services (HHS), Washington, DC, USA. [2]Oak Ridge Institute for Science and Education (ORISE) Fellows, Oak Ridge, TN, USA

- models to assess vascular dysfunction and drug efficacy in filovirus infection are needed
- drug repurposing for filovirus mitigation
- interplay between hemorrhage and inflammation

M32

Transmural adaptations of coronary circulation in the setting of heart failure with preserved ejection fraction

Sal I Essajee M.S[1], Selina M Tucker B.S[2], Johnathan D Tune Ph.D.[1], Gregory M Dick Ph.D.[1]
[1]University of North Texas, Health Science Center, Fort Worth, Texas, USA. [2]University of North Texas, Health Science Center, Fort Worth, Texas, USA

- HFpEF and coronary vascular impairment
- Heart failure causes stiffening of coronary arteries
- HF affects vascular reactivity

BLOOD FLOW REGULATION IN THE MICROVASCULATURE

M33

Development of a refined protocol for culturing isolated intact resistance arteries for longer to better understand vascular signaling mechanisms in mice and humans

Md Abdul Hakim PhD, Hans Ackerman MD DPhil
NIAID/NIH, Rockville, MD, USA

- Refining a method to culture isolated resistance arteries ex vivo
- Culturing isolated resistance arteries overnight (~24 hours)
- A method to be potentially useful for silencing genes regulating vascular function

M34

Drag-reducing polymers alleviate post-sepsis cerebral and peripheral ischemia

Denis E Bragin PhD[1], Olga A Bragina PhD[2], Alexy Trifimov MD, PhD[3], Can Ince PhD[4], Michael R Pinsky MD[5], Edwin M Nemoto PhD[6]

- Enhancing microcirculation blood flow
- Microvascular shunts in sepsis
- multiorgan dysfunction syndrome

M35

Iron regulates nitric oxide signaling through endothelial α-globin

Luke S Dunaway PhD[1], Shruthi Nyshadham BS[1], Melissa A Luse PhD[1], Skylar A Loeb MS[1], Timothy M Sveeggen PhD[2], Pooneh Bagher PhD[2], Adam N Goldfarb PhD[1], Brant E Isakson PhD[1]
[1]University of Virginia, Charlottesville, VA, USA. [2]University of Nebraska, Omaha, NE, USA

- Iron deficiency increases endothelial nitric oxide signaling.
- Endothelial a-globin is regulated by iron.
- Iron transporters are differentially expressed along the vascular endothelium.

M36

3D imaging of sympathetic neurons around collateral vessels after arteriogenesis in a mouse model

Yasmina Yerima, Nathan Tran, Trevor Cardinal Ph.D
California Polytechnic State University of San Luis Obispo, San Luis Obispo, CA, USA

- Arteriogenesis therapeutic target for PA
- Changes in vascular function with arteriogenesis
- Innervation for vascular function

LYMPHATIC BIOLOGY

M37

Mesenteric collecting lymphatic vessels from human donors with diabetes mellitus display altered smooth muscle cell orientation

Briana A Baboolall, Laurelis E. Santiago, Jerome W Breslin
University of South Florida, Tampa, FL, USA

- Longitudinal contractions have been observed in human lymphatic vessels, especially with diabetes.
- Human lymphatic smooth muscle cell orientation was evaluated using Imaris software.
- Lymphatic smooth muscle cell orientation becomes more longitudinal in the presence of diabetes.

M39

Interleukin-19 is a key lymphangiocrine factor mediating effects of VEGFC

Amanda M Peluzzo BS, Sheri Kelemen, Michael V Autieri PhD
Temple University, Philadelphia, PA, USA

- Lymphatic Function in Atherosclerosis
- Lymphatic Permeability
- Molecular Effects of Interleukin-19 on Lymphatic Endothelial Cells

M40

The second heart field in lymphovenous valve development: Understanding lymphatic dysfunction in congenital heart disease

Christina A Vyzas MA, Sophie Astrof PhD
Rutgers New Jersey Medical School, Newark, NJ, USA

- We found second heart field (SHF)-derived cells in the venous layer of lymphovenous valves (LVVs).
- Vegfr2 deletion in SHF-derived cells disrupts LVV morphology and leads to blood in lymphatics.
- SHF defects causing congenital heart disease may also precipitate abnormal LVV development.

M41

Glucocorticoid regulation of lymphatic vessel permeability and pumping

Jianyong Zhong MD/PhD, Hai-Chun Yang MD/PhD, Valentina Kon MD, Elaine L. Shelton PhD
Vanderbilt University Medical Center, Nashville, Tennessee, USA

- Glucocorticoids regulate lymphatic vessel permeability
- Glucocorticoids regulate lymphatic vessel pumping dynamics
- Lymphatic dysfunction may be a novel mechanism for glucocorticoid-induced adiposity and hypertension

M42

Defining the role of the Noonan-Syndrome gene, Lztr1, in the murine lymphatic endothelium

Gabrielle E Largoza BS[1], Patrick W Devine MD, Ph.D[2], Joshua D Wythe Ph.D[1]
[1]University of Virginia, Charlottesville, VA, USA. [2]University of California San Francisco, San Francisco, CA, USA

- Establishment of mouse and zebrafish models harboring knockout alleles and novel missense variants.
- Preliminary data suggest lymphatic vessel patterning defects that phenocopy KRAS gain of function.
- We aim to determine how Lztr1 regulates RAS-MAPK signaling to understand the etiology of NIHF.

M43

AIBP-CAV-1-VEGFR3 axis dictates lymphatic cell fate

Longhou Fang PhD
Houston Methodist Research Inst, Houston, TX, USA

- AIBP enhances lymphatic cell fate.
- APOA1 binding protein (AIBP) promotes lymphangiogenesis.
- AIBP promotes lymphangiogenesis via reducing caveolin-1 inhibition of VEGFR3 signaling

SIGNALING I

M44

Repressing AIBP-HDL-miR223 axis promotes the vascular fate transition from CXCR4+ capillary to collateral artery

Longhou Fang PhD
Houston Methodist Research Inst, Houston, TX, USA

- Loss of AIBP promotes collateral circulations in femoral artery ligation.
- Loss of AIBP enhances CXCR4+ capillary transition to artery.
- HDL-miR223 axis mediates the AIBP effect on the vascular fate transition.

M45

Lymphatic malformation endothelial cells with PIK3CA variants have VE-CADHERIN and CD31 misexpression due to lysosome and proteasome insufficiency

Nour C Bacha PHMD, PhD[1], Samantha K Rosen[2], Samantha A Kaplan[1], June K Wu MD[1], Carrie J Shawber PhD[1]

[1]Columbia University Irving Medical Center, New York, NY, USA. [2]Barnard College, New York, NY, USA

- VE-CADHERIN/CD31 increased in lymphatic malformation endothelial cells (LMECs) with PIK3CA variants
- In LMECs VE-CADHERIN/CD31 proteostasis defects are linked with lysosome and proteasome insufficiency
- In mice with LEC PIK3CA variants, VECADHERIN expression was increased with cytoplasmic accumulation

M46

Regulation of VEGF signaling by RNA-binding protein PCBP1

Yao Wei Lu Ph.D.[1], Bo Zhu Ph.D.[2], Hao Wu Ph.D.[2], Da-Zhi Wang Ph.D.[3], Hong Chen Ph.D.[2]

[1]University of Southern California, Los Angeles, CA, USA. [2]Boston Children's Hospital, Boston, MA, USA. [3]University of South Florida, Tampa, FL, USA

- RNA-binding protein PCBP1 is abundantly expressed in angiogenic endothelium.
- Loss of endothelial PCBP1 reduces VEGF signaling and angiogenic response in vitro and in vivo.
- PCBP1 promotes VEGFR2 expression via post-transcriptional regulation.

M47

Peritoneal dialysis aggravates and accelerates atherosclerosis in uremic ApoE−/− mice

Jamie Kane[1,2], Winnie G Vos[1], Laura A Bosmans[1], Bram W van Os[1], Myrthe den Toom[1], Sanne Hoeksema-Hackmann[3], Denise Moen-de Wit[3], Marion J Gijbels[1,4], Linda Beckers[1], Aldo Grefhorst[1], Johannes H.M. Levels[1], Lily Jakulj[1,5], Marc G Vervloet[1,6], Esther Lutgens[1,2], Etto C Eringa[1,7]

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- Peritoneal dialysis (PD) patients have a markedly increased risk atherosclerosis
- Current mouse models are inadequate to investigate why- this project aimed to rectify this imbalance
- PD worsens uremic atherosclerosis via T-cell inflammation and reveals a new drug target

M48

The novel high mobility group protein HMGXB4 is critical for promoting phenotypic switching of vascular smooth muscle cells

Xiangqin He PhD, Guoqing Hu MD, Kunzhe Dong PhD, Jiliang Zhou PhD

Augusta University, Augusta, GA, USA

- The uncharacterized nuclear protein HMGXB4
- Novel mouse model
- Translational potential

M49

Loss of the v-SNARE VAMP8 protects against aortic aneurysm: Implications of impaired platelet cargo release

Shayan Mohammadmoradi PhD[1], Elizabeth Driehaus[1], Kory Heier[1], Hammodah Alfar[1], Bryana Levitan MSc[1], Smita Joshi PhD[2], Kristen McQuerry PhD[1], Sidney Whiteheart PhD[1]
[1]University of Kentucky, Lexington, KY, USA. [2]Morehead State University, Morehead, KY, USA

- VAMP8 in Platelet Exocytosis
- Platelet Cargo Release and AAA
- AngII and Platelet Transcriptome

M50

Characterizing the role of mitochondrial network structure and fluidic shear stress mechanotransduction in endothelialization using holotomographic microscopy

Juliette Noyer BSBME[1], William Leineweber PhD[2], Patrick Jurney PhD[1]
[1]San Jose State University, San Jose, CA, USA. [2]Stanford University, Palo Alto, CA, USA

- HTM offers the unique ability to observe the dynamics of mitochondrial network structure.
- Mechanotransduction of fluid shear stress affects mitochondrial networks structure and dynamics.
- Mitochondrial networks play a key role in endothelialization, but are difficult to study.

M51

Regulation of cardiovascular function is impaired in newborn growth restricted lambs

Charmaine R Rock B.Sc(Hons)[1,2], Amy E Sutherland PhD[1,2], Suzanne L Miller PhD[1,2], Beth J Allison PhD[1,2]
[1]Hudson Institute of Medical Research, Clayton, Victoria, Australia. [2]Monash University, Clayton, Victoria, Australia

- Preterm growth restricted newborns often display poor cardiovascular control
- Growth restricted lambs have a reduced ability to regulate blood pressure via α1-adrenergic pathways
- Regulation of blood pressure was further impaired after administration of atropine and propranolol

M52

Role of COL8A1 in inflammatory endothelial-to-mesenchymal transition

Qian Li, Sriharsha Talapaneni, Yonghong Meng, Linda Demer, Yin Tintut, Jeffrey Hsu
UCLA, Los Angeles, USA

- TNF-a induces EndMT in long time treatment and reduces COL8A1 expression in early time treatment.
- COL8A1 helps maintain endothelial phenotypes.
- COL8A1 knockdown augments TNF-a -induced NFKB-Snail signaling.

M53

Adrenomedullin is enriched in human lung vascular niche and enhances endothelial cell maturation in bioengineered vascular models

Yifan Yuan PhD[1], Yongdae Yoon PhD[1], Shannon Kirk BS[1], Micha Sam B Raredon MD, PhD[2], Naftali Kaminski MD[2], Laura E Niklason MD, PhD[2]

[1]University of Maryland School of Medicine, Baltimore, MD, USA. [2]Yale School of Medicine, New Haven, CT, USA

- We identified top ligand-receptor pairs with the human lung microvascular niche using scRNAseq.
- Adrenomedullin enhances cell-cell integrity and reduces inflammatory response.
- Adrenomedullin improves endothelial functions in bioengineered vascular models.

TUESDAY

MICROCIRCULATION

T01

Role of microvascular shunts in the pathogenesis of vascular disease

Edwin M Nemoto PhD[1], Denis E Bragin PhD[2], Alexy Trofimov MD, PhD[3]

[1]University of New Mexico, Albuquerque, NM, USA. [2]Lovelace Biomedical Research Institute, Albuquerque, NM, USA. [3]Privolzhsky Research Medical University, Nizhny, Novgorod, Russian Federation

- Central role of microvascular shunts in vascular disease
- Tissue edema shunting blood flow through organs via microvascular shunts
- Therapeutic intervention to reverse microvascular shunt flow

T02

Efficacy of drag-reducing polymer in attenuating microvascular shunt flow

Edwin M Nemoto PhD[1], Denis E Bragin PhD[2], Alexy Trofimov MD, PhD[3]

[1]University of New Mexico, Albuquerque, NM, USA. [2]Lovelace Biomedical Research Institute, Albuquerque, NM, USA. [3]Privolzhsky Research Medical University, Nizhny, Novgorod, Russian Federation

- microvascular shunt flow in acute stroke and traumatic brain injury
- Drag reducing polymer on microvascular shunt flow
- Reversal of microvascular shunt flow by high molecular weight drag reducing polymers

T03

The angiogenic effect of micropuncture on arterial and venous endothelial cells

Mohammad Hossein Asgardoon MD, MPH, Mary Landmesser bs, Dino Ravnic DO, MPH

The Pennsylvania State University, Hershey, PA, USA

- Micropuncture enhances angiogenesis in venous endothelial cells more than in arterial cells.
- Venous endothelial cells release more pro-angiogenic factors post-micropuncture.
- Micropuncture-induced angiogenesis varies by vessel type, with veins showing greater responsiveness.

T04

Does flow affect angiogenic factor secretion in endothelial cells undergoing micropuncture?

Mohammad Hossein Asgardoon MD, MPH, Mary Landmesser BS, Dino Ravnic DO, MPH
The Pennsylvania State University College of Medicine, Hershey, PA, USA

- Flow enhances angiogenic factor release post-micropuncture in endothelial cells.
- Venous endothelial cells show greater responsiveness to micropuncture than arterial cells.
- Dynamic conditions amplify angiogenic factor secretion from ECs more than static conditions.

T05

Single cell RNAseq methods reveal distinct endothelial cell subtypes

Kara E McCloskey PhD, Maria Mendoza BS
UC Merced, Merced, CA, USA

- Tip ECs are key players in angiogenesis, but mouse markers do not translate to human tissues.
- From scRNAseq data, we found 32 EC subpopulations and clusters of tip-specific ECs.
- A unique marker profile for human tip ECs and a subset of matrix degradation proteins was found.

T06

African turquoise killifish (Nothobranchius furzeri): A novel model to investigate vascular aging

Anastasia Paulmann, Hannah M. Somers, Cory P. Johnson, Lynne Baverly-Staggs, Matthew Cox, Hermann Haller
Mount Desert Island Biological Laboratory, Bar Harbor, Maine, USA

- African turquoise killifish, the shortest-lived vertebrate, show aging-related capillary rarefaction
- SGLT2 inhibitors may slow aging by preserving microvasculature through improved vascular signaling
- Killifish show sex-dimorphic reduction of microvasculature

T07

Tortuous microvessels and the unique 3D hemodynamics therein

Nasim Hossain[1], Nien-Wen Hu[2], Ali Kazempour[1], Walter Lee Murfee PhD[2], Peter Balogh[1]
[1]New Jersey Institute of Technology, Newark, NJ, USA. [2]University of Florida, Gainesville, FL, USA

- Tortuosity increases blood apparent viscosity compared to straight vessels
- Tortuosity diminishes the Fahraeus Effect by reducing average red blood cell speed
- Tortuosity causes distinct wall shear stress and cell-free layer 3D spatial patterns

T09

Hypoxia impairs Kv7 channel function in porcine coronary arterioles

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[1]Texas A&M University, College Station, TX, USA. [2]Michael E. Debakey Institute for Comparative Cardiovascular Science and Biomedical Devices, College Station, TX, USA

- Novel therapeutic targets for the treatment of ischemic heart disease.
- Reactive oxygen species signaling in the coronary microcirculation.
- An in vitro approach to a complicated in vivo disease.

INFLAMMATION

T10

High concentrations of fructose generates interleukin 12 but not reactive oxygen species in THP-1 cell

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- Fructose leads to metabolic syndrome, fatty liver, hyperuricemia, and worsening of atherosclerosis
- Sugar stimulation of THP-1 cells does not result in reactive oxygen species generation
- Cytokine generation from fructose stimulated THP-1 cells

T11

VEGF-D enhances vascular integrity in acute lung injury

Yifan Yuan PhD[1], Yongdae Yoon PhD[1], Shannon Kirk BS[1], Lokesh Sharma PhD[2], Wenwen Tang PhD[3], Dianqing (Dan) Wu PhD[3], Laura E Niklason MD, PhD[3], Naftali Kaminski MD[3]
[1]University of Maryland School of Medicine, Baltimore, MD, USA. [2]University of Pittsburgh Medical Center, Pittsburgh, PA, USA. [3]Yale School of Medicine, New Haven, CT, USA

- We identifies soluble signals in human lung microvascular niche using scRNAseq.
- VEGF-D improves vascular barrier function and reduces inflammatory response.
- VEGF-D reduces permeability in acute lung injury animal model.

T12

Ischemia training leads to a systemic effect that reprograms bone marrow-derived monocytes

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[1]University of Miami, Miami, FL, USA. [2]Florida International University, Miami, FL, USA. [3]Vanderbilt University, Nashville, TN, USA. [4]University of Cincinnati, Cincinnati, OH, USA

- Ischemia training leads to a systemic effect caused by EVs that epigenetically reprogram BM-Mono.
- Monocytes with downregulation of Dhcr24 are less inflammatory and able to improve arteriogenesis.
- Low adhesion of ischemic-trained monocytes is related with low levels of Dhcr24 and integrins.

T13

Distinct impact of myeloid cell TRIM59 on atherosclerosis and insulin resistance

Baohui Xu MD/PhD[1,2], Dongmei Yan MD/PhD[3], Jiayu Ye PhD[2], Matthijs Jan van Ee BS[1], Zeng Jin PhD[3], Wenjia Ai MD/PhD[1,2], Makoto Samura MD/PhD[1,2], Junjie Ju MD[1,2], Weirong Fang PhD[4], Hong S Lu MD/PhD[5], Alan Daugherty PhD[5], Philip S Tsao PhD[1,2], Ronald L. Dalman MD[1]
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- Myeloid cell-specific TRIM59 promoted experimental atherosclerosis.
- Myeloid cell-specific TRIM59 attenuated insulin resistance.
- Myeloid TRIM59 had no impact on lipid levels.

T14

Unravelling TNFα regulatory regions on PMCA4 RNA in PAEC's through adenovirus-mediated 3'UTR infection

Ezra Leander Santhosh David[1], Jude C Ihugba[1], Sathishkumar Kurusamy[1], Kinza Khan[1], Jayashre Jayachandran[1], Juan Miguel Redondo[2], Elizabeth J Cartwright[3], James Cotton[4], Angel L Armesilla[1]
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- TNF-α destabilizes PMCA4 RNA, reducing protein levels and triggering apoptosis in hPAEC.
- PMCA4 downregulation may lead to calcium overload, worsening TNF-α-induced apoptosis in PAH.
- Silencing PMCA4 doesn't impact TNF-α, BMP 9, or TGF-β signaling pathways in vascular cells

T15

3D perfusable brain microvasculature for modeling immune-endothelial activation of neurotoxicity

Ruoqian Hu, BS[1,2], Annie Tsai, BS[3], Joseph D Smith PhD[4,5], Juliane Gust MD, PhD[3,6], Ying Zheng PhD[1,2]

- Inflammatory microvascular dysfunction is a risk factor of neurotoxicity in immunotherapy.
- We used 3D perfusable brain microvessel and capillary to model neurotoxicity in a human system.
- Increased leukocyte-endothelial adhesion after cytokine release may contribute to neurotoxicity.

T16

Targeted mRNA delivery to the inflamed lung for the treatment of ARDS

Zhengjie Zhou PhD
University of Chicago, Chicago, IL, USA

- lung inflammation
- lung injury
- Endothelial cell

LEUKOCYTE RECRUITMENT AND INTERACTION WITH THE VASCULATURE (POSTERS)

T17

COUP-TFII and ETS composite elements dictate segmental specificity of post-capillary addressin expression

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- The genome is seeded with composite elements that contribute to vascular plasticity.
- COUP-TFII and ETS composite elements target segmental address expression.
- COUP-TFII and ETS form heterodimers that act on cis-regulatory elements.

T18

Pathological renal capillary regression is reduced upon genetic deletion of global TNFα and endothelial IL-1 receptor

Charmain F Johnson PhD[1], Kate Wheeler BS[1], Jun Xie MD[1], Courtney T Griffin PhD[1,2]

[1]Oklahoma Medical Research Foundation, Oklahoma City, Oklahoma, USA. [2]2Department of Cell Biology, University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma, USA

- TNFa and IL-1 isoforms (IL1a and IL1b) are reported to have pro-regressive roles
- Loss of TNFa and endothelial IL1 receptor 1 decreases renal PTC regression after UUO
- TNFa and IL-1 isoforms play pro-regressive roles in both physiological and pathological regression

TRANSCRIPTIONAL REGULATION OF INFLAMMATION AND RESOLUTION (POSTERS)

T19

JunB mediates endothelial responses and chromatin accessibility in response to inflammatory signals

Ramon Bossardi Ramos Ph.D, Nina Martino, Amber Bahr, Katherine MacNamara Ph.D., Alejandro P. Adam Ph.D.

Albany Medical College, Albany, NY, USA

- IL-6 treatment alters chromatin accessibility and downregulates EZH2 expression in endothelial cells
- JunB promotes epigenetic changes post-IL-6 signaling in endothelial cells.
- Post-sepsis pneumonia increases mortality and induces significant renal inflammation.

T20

Improved venous endothelial function via mTOR inhibition in thrombosis

Oscar Y Moreno MD, Catherine E Luke LVT, Amber Clay RVT RDCS, Kiran Kumar BS, Sabrina Rocco MS, Nathaniel Parchment MD, David Gordon MD, Daniel D. Myers DVM MPH, Thomas Wakefield MD, Peter Henke MD, Andrea Obi MD

University of Michigan, Ann Arbor, MI, USA

- Sirolimus reduces CAMs and inflammatory markers in vein endothelial cells.
- Sirolimus decreases endothelial-leukocyte adhesion and vascular permeability.
- Sirolimus may prevent recurrent venous thrombosis and fibrosis in veins.

ATHEROSCLEROSIS

T21

Regulation of atherosclerosis-related endothelial cell phenotypes by Liver X Receptors in cardiovascular disease

Kathryn Citrin[1], Yan Huang[1], Nabil Boutagy[1], Alex Ramos Perez[1], Hanming Zhang[1], Diego Saenz de Urturi[1], Bal Krishna Chaube[1], Zhenwu Zhuang[1], Oscar Pastor Rojo[1], Jeffrey McDonald[2], Carlos Fernandez-Hernando[1], Yajaira Suarez[1]

[1]Yale University, New Haven, CT, USA. [2]UT Southwestern Medical Center M, Dallas, TX, USA

- LXRs are promising regulators of EC metabolism and inflammation during atherosclerosis
- EC-KO of LXRs significantly accelerates atherosclerosis initiation and progression in mice
- LXR KD in EC reveals altered chromatin accessibility and AP-1 activity in inflammation

T22

Development of 3D microfluidics organ-on-chip model to mimic the intra-plaque microvasculature

Hend Salah Fayed MSc, Hend Ghassan Eldous MSc, Ayman Al Haj Zen MD/PhD
College of Health and Life Sciences, Hamad Bin Khalifa University, Doha, Qatar

- Novel 3D organ-on-chip model for intraplaque microvessels
- To study the interaction between transmigrated monocytes and smooth muscle cells
- The new model can be adapted for high-throughput drug screening

T23

Inhibition of PDK4 by aortic smooth muscle TGFβ elevates acetyl-CoA and ameliorates atherosclerosis

Rong-Mo Zhang PhD[1], Xiaolong Zhu PhD[1], Hosung Bae[2], Yanming Li[3], Huying Shen[3], Cholsson Jang[2], Nathaniel Snyder[4], Martin Schwartz[1], Michael Simons[1]
[1]Yale University, New Haven, CT, USA. [2]University of California, Irvine, Irvine, USA. [3]Baylor College of Medicine, Houston, USA. [4]Temple University, Philadelphia, PA, USA

- TGFβ maintains smooth muscle contractility and ameliorates atherosclerosis by inhibiting PDK4.
- PDK4 inhibition by TGFβ induces acetyl-CoA, which post-translationally enhances TGFβ signaling.
- Reducing acetyl-CoA levels suppresses TGFβ signaling.

T24

Both canonical and noncanonical heat shock factor 1 (HSF1) signaling in smooth muscle cells contribute to atherosclerosis

Abhijnan Chattopadhyay PhD, Andrew K Morse BS, Suravi M Majumder PhD, Callie S Kwartler PhD, Dianna M Milewicz MD, PhD
University of Texas Health Science Center at Houston, Houston, TX, USA

- Canonical HSF1 signaling (HSF1-HMGCR-PERK) in SMCs contributes to atherosclerosis.
- PERK deficiency blocks HSF1 signaling, indicating presence of noncanonical HSF1 signaling.
- Noncanonical HSF1 signaling (PERK-mTORC1-HSF1) has a distinct contribution to atherosclerosis.

T25

Smooth muscle cytoglobin alters vascular SMC phenotype in murine atherosclerosis

Kurrim Gilliard BS, Frances Jourd'heuil BS, Le Gia Cat Pham BS, Gabrielle Fredman PhD, David Jourd'heuil PhD
Albany Medical College, Albany, NY, USA

- Cytoglobin in smooth muscle cells plays a crucial role in atherosclerotic plaque stability.
- Smooth muscle loss of cytoglobin leads to more LGALS3+ transition state smooth muscle cells.
- Redox signaling through cytoglobin is an important modulator of SMC fate in atherosclerosis.

SIGNALING II

T26

Acetaminophen overdose reveals protease-activated receptor 4 as a low-expressing but potent receptor on the hepatic endothelium

Rahul Rajala B.A., B.S.[1,2,3], Audrey C.A. Cleuren Ph.D.[1,2], Courtney T Griffin Ph.D.[1,2]
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- PAR4 is a low-expressing but highly potent receptor on hepatic endothelial cells in vivo.
- Endothelial PAR1 and PAR4 can act synergistically but also possess distinct functions.
- TRAPseq can be used to study GPCR-mediated transcriptional reprogramming in vivo.

T27

Identifying how endothelial protease-activated receptors control insulin signaling: Implications for diabetes

Rahul Rajala B.A., B.S.[1,2,3], Courtney T Griffin Ph.D.[1,2]

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- Loss of endothelial PARs promotes insulin sensitivity in mice and protects against Type 1 diabetes.
- Loss of PARs promotes insulin receptor activity and insulin transcytosis across the endothelium.
- Targeting endothelial insulin transcytosis in diabetes represents a novel and therapeutic strategy.

T28

Defining regulatory programs driving endothelial cell specification

Danyang Chen Ph.D., Juan M. Melero-Martin, William T. Pu

Boston Children's Hospital, Boston, MA, USA

- A highly efficient hiPSC-ECs differentiation protocol
- Single cell transcriptomic profiles and chromatin landscapes of EC specification
- The mechanisms by which ETV2 drives endothelial cell specification and differentiation

T29

S-Nitrosylated connexin 43 hemichannels play an essential role in vascular hyperpermeability

Pia C Burboa PhD, Walter N Duran PhD, Mauricio A Lillo PhD

Rutgers New Jersey Medical School, Newark, NJ, USA

- I-R injury pro-inflammatory environment (VEGF) increases endothelial vascular hyperpermeability.
- Cx43 hemichannels activate crucially in VEGF-induced hyperpermeability.
- NO-mediated S-nitrosylation Cx43 is critical in VEGF-induced hyperpermeability.

T30

TIFA and BRCC3 regulation of the non-canonical TGFß signaling in pulmonary arterial hypertension

Tong-You WEI, John SHYY

UCSD, San Diego, CA, USA

- TIFA activation drives noncanonical TGF-β signaling in pulmonary arterial hypertension.
- BRCC3 deubiquitinates TIFA, mitigating pulmonary arterial hypertension severity.
- BRCC3 modulates noncanonical TGF-β signaling via TIFA in pulmonary arterial hypertension.

T31

Vascular control of adipogenesis via secreted factor signaling

Samuel Bollinger B.S.

Stanford, Palo Alto, CA, USA

- The vascular endothelial secretome dynamically responds to circulating signals
- Vascular endothelial cells secrete factors that alter preadipocyte function and adipogenesis
- The vascular endothelium may regulate adjacent cell populations by altering its secretome

T32

Smooth muscle TSP1 regulates VSMC phenotypic switching in diabetes

Shreya Gupta MS[1,2], Amy Mathias MS[2], Joshua Treadway BA[2], Priya Raman PhD[1,2]

[1]Kent State University, Kent, OH, USA. [2]Northeast Ohio Medical University, Rootstown, OH, USA

- smooth muscle TSP1 regulates VSMC cell cycle progression in diabetes
- smooth muscle TSP1 regulates VSMC differentiation and G0-G1 cell distribution in diabetes
- smooth muscle TSP1 plays a direct regulatory role in VSMC phenotypic switching in diabetes

T33

Long-term vascular endothelial growth Factor-C expression exacerbates fibrosis and steatosis in metabolic disease-associated steatohepatitis

Seock-Won Youn PhD, Jason W Eng MD/PhD, Bhairavi Swaminathan PhD, Brian Mao PhD, Rahul Vadakath BS, Pamela Teneqexhi BS, Jose Cordoba-Chacon PhD, Jan K Kitajewski PhD

University of Illinois Chicago, Chicago, IL, USA

- Pathological angiogenesis of LSECs contributes to MASH development.
- VEGF-C is an increasing factor during MASH development.
- The inhibition of VEGF-C receptors decreases MASH progression.

TRANSLATIONAL RESEARCH

T34

A scalable and efficient method for manufacturing human pluripotent stem cell-derived endothelial cells

Valentina Marchetti PhD[1], Ishpreet Dhillon[1], Li Jing Sheaves[1], Zahra Mantaka[1], Ravenska Wagey[1], Allen C Eaves[1,2], Andrew Gaffney[1], Sharon A Louis[1], Ryan Conder[1]

[1]STEMCELL Technologies, Vancouver, Canada. [2]Terry Fox Laboratory, Vancouver, Canada

- PSC-Endothelial Cells
- Scale up manufacturing of PSC-Endothelial Cells
- Cryopreservation of PSC-Endothelial Cells

ENDOTHELIUM IN HEALTH AND DISEASE

T37

Endothelial cell STING contributes to capillary rarefaction and systolic dysfunction induced by cardiac pressure overload

Erin Sanders BS[1], Noah Wagner BS[1], Abraham Bayer BS[1], Sasha Smolgovsky BS, MS, PhD[1], Brandon Theall BS[1], Mark Aronovitz MS[1], Rob Blanton MD, PhD[2], Kuljeet Kaur PhD[1]

[1]Tufts Graduate School of Biomedical Sciences, Boston, MA, USA. [2]Molecular Cardiology Research Institute, Boston, MA, USA

- Endothelial STING modulates EC crosstalk with Cardiomyocytes that contributes to heart failure
- Secreted products downstream of Endothelial STING lead to adverse cardiac remodeling
- Endothelial STING orchestrates cardiomyocyte hypertrophy and capillary rarefaction in heart failure

T38

Investigating disease with high-throughput, real-time impedance monitoring of vascular endothelial cell permeability

Michael Ngo PhD[1], Mirna Rodriguez PhD[1], David Greenberg PhD[2], Danielle Califano PhD[2], Kim Williams PhD[1]

[1]Kodiak Sciences, Palo Alto, California, USA. [2]Axion BioSystems, Atlanta, Georgia, USA

- Impedance-based methods provide efficient, noninvasive data collection of barrier integrity
- Inflammation-induced retinal disease research and development
- Advanced technology for retinal endothelial barrier studies

T39

The interplay of cannabinoids and endothelial dysfunction

Hillary H Le BS, Deirdre EJ Anderson PhD, Monica T Hinds PhD

Oregon Health & Science University, Portland, Oregon, USA

- Cannabinoids can induce endothelial dysfunction by increasing inflammation
- THC, a partial agonist to CB1 and CB2, can induce endothelial dysfunction
- The glycocalyx regulates endothelial inflammation and can be altered by cannabinoids

T40

Post-transcriptional regulation of vascular homeostasis by RNA-binding proteins

Hina Iqbal PhD, Jesse Cullison BS, Ruyu Yan PhD, Emily Clifford BS, Katherine Hamm BS, ZIQING LIU PhD

Medical College of Wisconsin, Milwaukee, WI, USA

- Post-transcriptional gene regulation by RNA-binding proteins in EC is critical for vascular function
- PABPC1 is required for the maintenance of vascular homeostasis under normal physiological conditions
- PABPC1 suppress inflammatory gene expression in EC

T41

Perivascular macrophage - a new player for vascular integrity and endothelial regeneration

Bisheng Zhou PhD

University of Illinois at Chicago, Chicago, Illinois, USA

- Perivascular macrophage as new player in regulation of lung vascular function.
- Perivascular macrophages facilitate endothelial regeneration and vascular repair following ALI.
- Perivascular macrophages instruct endothelial regeneration via metabolic - epigenetic reprogramming.

T42

Investigating how the tumour microenvironment predisposes the cardiovascular system to cancer-therapy induced cardiotoxicity

Priya Mistry[1,2], Crizza Ching[1,2], Dakota Gustafson[1,2], Paaladinesh Thavendiranathan[3], Jason Fish[1,2]

[1]Toronto General Hospital Research Institute, University Health Network, Toronto, ON, Canada. [2]University of Toronto, Toronto, ON, Canada. [3]Peter Munk Cardiac Centre, University Health Network, Division of Cardiology, Department of Medicine, Toronto, ON, Canada

- Breast cancer can induce systemic vascular inflammation and endothelial dysfunction.
- The presence of a tumour may exacerbate cardiovascular damage caused by chemotherapy treatment.
- Investigating tumour-induced vascular inflammation and damage may reveal new biomarkers of CTRCD.

T43

The role of Smad1 in endothelial cell survival and EndMT during vein graft remodeling

Caleb Sipwoli BA, Dan Yang MD/PhD, Yuchi Ma MS, Hong San MD, Jinzhi Wie, Robin Schwartzbeck
NIH/NHLBI, Bethesda, Maryland, USA

- Endothelial specific Smad1 deletion leads to loss of endothelial cells and increased stenosis.
- Smad1-mediated EC survival protects against the proliferation and migration of smooth muscle cells.
- BMP9 actives Smad1/5/8 but did not reduce neointima formation after vein grafting.

T44

Cardiometabolic disease enhances basophil-endothelium interactions for inflammation resolution

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[1]University of Virginia, Charlottesville, USA. [2]University of Virginia, Charlottesville, VA, USA

- NOX4-driven H2O2 increases basophil activation, linking oxidative stress to cardiometabolic disease.
- Basophils can modulate adhesion molecule expression and promote a pro-inflammatory phenotype
- Basophil-endothelial interactions offers new insights into inflammation in vascular dysfunction.

T45

Elevation of miR-150-5p in brain microvascular endothelial cells by prenatal alcohol exposure is mediated by transcriptional mechanisms

Marissa R Westenskow BA, Amy S Gardiner PhD
University of New Mexico School of Medicine, Albuquerque, NM, USA

- MiR-150-5p is a microRNA that mediates brain vascular defects in prenatal alcohol exposure.
- Altered transcription contributes to elevated miR-150-5p in brain microvascular endothelial cells.
- Differential promoter methylation and transcription factor activation alter miR-150 transcription.

T46

Spontaneous loss of endothelial cell barrier function in the kidney in zfyve21 knockout mice

Quan Jiang[1], Guiyu Song[1], Liying He[2], Xue Li[1], Bo Jiang[1], Qianxun Wang[1], Shaoxun Wang[1], Catherine Kim[3], Mahsa Nouri Barkestani[1], Roberto Lopez[1], Matthew Fan[1], Kujani Wanniarachchi[4], Maya Quaranta[1], Xuefei Tian[1], Arya Mani[1], Anjelica Gonzalez[1], Julie E Goodwin[1], William C Sessa[1], Shuta Ishibe[1], Dan Jane-wit[1,5]
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- Loss of ZFYVE21 in endothelial cells leading to spontaneous renal failure.
- ZFYVE21 sustains ENOS activity on Rab5+ endosomes to preserve vascular barrier function.
- We identified a Golgi-to-endosome trafficking mechanisms sustaining ENOS activity.

T47

Single-allele TDP-43G348C mutation leads to endothelial dysfunction and blood-brain barrier defects in mouse models of amyotrophic lateral sclerosis and frontotemporal dementia

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[1]University of Connecticut Medical School, Farmington, Connecticut, USA. [2]Rare Disease Translational Center and Technology Evaluation and Development Labroatory, Bar Harbor, ME, USA. [3]University of Connecticut, Storrs, Connecticut, USA

- Loss of TDP-43 in brain ECs leads to BBB dysfunction
- TDP-43 deficiency triggers ALS/FTD-related brain changes
- TDP-43 mutations increase BBB permeability in mice

DISEASES (VASCULAR AND CARDIOVASCULAR)

T48

Can vascular wall hyperplasia be mitigated for a long term through short-term perivascular interventions? — a perspective from epigenetic memory

Takuro Shirasu MD,PhD[1,2], Go Urabe MD,PhD[1,3], Nisakorn Yodsanit PhD[4], Yitao Huang PhD[1], Matthew S Stratton PhD[5], Matthew Joseph[6], Ruosen Xie PhD[4], Yuyuan Wang PhD[4], Lynn M Marcho PhD[7], Jing Li PhD[1], Runze Tang PhD[1], Ki Ho Park MD, PhD[1], Bowen Wang PhD[1,8], K. Craig Kent MD[1], Shaoqin Gong PhD[4,9], Lian-Wang Guo PhD[1,10]

- Short-term perivascular interventions maintain long-term intimal hyperplasia suppression.
- A nanoparticle/hydrogel hybrid system, Pericelle, was applied perivascularly for drug delivery.
- Epigenetic memory may be involved in intimal hyperplasia

T49

Investigating genetic modifiers in ABCC6-related calcification disorders: Insights from mouse models and patient-derived cell lines

Xinyi Sun MS[1], Hunter Miller[1], Stacie Loftus PhD[2], Barbara N Pusey[2], David Adams MD/PhD[2], William A Gahl MD/PhD[2], Hal C Dietz MD[1], Shira G Ziegler MD/PhD[1]

[1]Johns Hopkins University School of Medicine, Baltimore, MD, USA. [2]National Human Genome Research Institute, Baltimore, MD, USA

- Biallelic ABCC6 variants can cause PXE and GACI with no observed genotype-phenotype correlation.
- Variable calcification phenotypes were observed in Abcc6 knockout mice bred on different strains.
- TLR4 was identified as a potential modifier affecting calcification in ABCC6-related disorders.

T50

Chromatin interaction analysis to identify functional non-coding SNPs controlling the pathogenesis of pulmonary arterial hypertension

Wei Sun MD[1], Nishita Kalepalli BS[2], Satoshi Okawa PhD[2], Neil Kelly MD, PhD[2], Gang Li PhD[2], Stephen Y Chan MD, PhD[2]

[1]University of California, San Diego, San Diego, CA, USA. [2]University of Pittsburgh, Pittsburgh, PA, USA

- Post-GWAS mechanistic study on PAH susceptibility.
- Non-coding SNP functionality in target gene regulation.
- New pathogenic mechanism for PAH.

T51

Validity of using FAPI-PET to assess the severity of Köhlmeier-Degos disease

Sahana Manohar-Sindhu, Cornelia Cudrici, Rebecca Huffstutler, Elyse MacCall, Natalia Dmitrieva, Robin Schwartzbeck, Elisa Ferrante, Manfred Boehm
National Heart, Lung, and Blood Institute, Bethesda, MD, USA

- FAPI-PET maybe be a viable tool to evaluate Kohlmeier-Degos disease severity
- Kohlmeier-Degos disease is a rare small vessel vasculopathy with no treatment options
- There exists no objective way to directly measure systemic Kohlmeier-Degos disease activity

T52

Rapamycin increases murine lifespan but does not reduce mineral volume in a Matrix GLA Protein knockout mouse model of medial arterial calcification

Parya Behzadi[1,2], Rolando Cuevas[1,2], Alex Crane[1,2], Andrew Wendling[1,2], Claire Chu[1,2], William J Moorehead III[1,2], Ryan Wong[1,2], Mark Brown[1,2], Swathi Suresh[1,2], Joshua Tamakloe[1,2], Cynthia St. Hilaire[1,2]
[1]University of Pittsburgh, Pittsburgh, PA, USA. [2]Pittsburgh Heart, Lung, and Blood Vascular Medicine Institute, Pittsburgh, PA, USA

- Rapamycin extended the lifespan of Mgp-/- mice.
- Rapamycin reduced medial arterial calcification in Mgp-/- mice.
- Rapamycin's effects in Mgp-/- mice depend on its inhibition of mTORC1 complexes

T53

TERT and STAT5 play a pivotal role in osteogenic differentiation in mice

Rolando A Cuevas PHD, Parya Behzadi PhD, Mark Brown BS, Cynthia L St Hilaire PhD
University of Pittsburgh, Pittsburgh, PA, USA

- Aortic valve cells transform into osteoblast-like cells and secret bone-like minerals into the ECM.
- TERT and STAT5 participate in the osteogenic transformation of aortic valve cells.
- STAT5 controls pathways common to inflammation, cell differentiation, and chromatin remodeling.

T54

EHE fusion YAP1/TFE3 drives endothelial to mesenchymal transition

Ant Murphy, Sam Hartzler, Madison Yates, Annaleigh Powell-Benton PhD, Nimod Jansen, Sagar Utturkar PhD, Nadia Lanman PhD, Jason Hanna PhD
Purdue University, West Lafayette, IN, USA

- YAP1/TFE3 fusion protein drives EndMT in endothelial cells.
- Basic helix-loop-helix domains donated by TFE3 are necessary for YT to promote EndMT.
- TFE3 overexpression is sufficient to confer anoikis resistance in endothelial cells.

T55

Emerging roles for dysregulated miRNAs and mesenchymal plasticity in vascular sarcomas

Bozhi Liu, Ant Murphy, Annaleigh Benton PhD, Jason Hanna PhD
Purdue University, West Lafayette, IN, USA

- MiRNA loss promotes angiosarcoma and enhancement of miRNA biogenesis reduces AS proliferation.
- A CRISPR-Cas9 screen identified miR-410 as a potent tumor suppressing miRNA.
- Fusion protein drivers of EHE lead to altered miRNA expression and EndMT.

T56

Smooth muscle cell lysyl oxidase is essential for matrix cross-linking and arterial integrity in large but not small arteries

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- SMC-specific LOX is essential for matrix cross-linking and arterial integrity in conduit arteries.
- SMC-specific LOX is dispensable in muscular and resistance arteries.
- EC-specific LOX is largely dispensable for arterial development.

INFLAMMATION II

W01

Targeting Age-related Mechanisms that Impair Arteriogenesis to Improve Blood Flow after Injury

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- Aging is associated with decreased angio/arteriogenesis after vascular injury.
- Our understanding of the age-related mechanisms impairing angio/arteriogenesis remains incomplete.
- VEGFA stabilization by miRNA may be a novel therapeutic approach to improving angiogenesis in aging.

BIOENGINEERING

W02

3D bioprinted pulmonary artery model for Williams Syndrome vascular pathology

Maher Saadeh B.S.[1,2], Lakshmi Dasi Ph.D.[1,2], Reza Avazmohammadi Ph.D.[3], Morteza Mahmoudi Ph.D.[4], Hanjoong Jo Ph.D.[1,2], Wilbur Lam M.D., Ph.D.[1,2], Vahid Serpooshan Ph.D.[1,2], Holly Bauser-Heaton M.D., Ph.D.[1,2]
[1]Emory University, Atlanta, GA, USA. [2]Georgia Institute of Technology, Atlanta, GA, USA. [3]Texas A&M University, College Station, TX, USA. [4]Michigan State University, East Lansing, MI, USA

- Utilizing 3D bioprinting to develop in vitro vascular models
- Studying mechanotransduction in elastin arteriopathies
- Development of vascular disease from genetic diseases

MATRIX BIOLOGY

W03

Regulating the cell shift of adipose progenitor cells in white adipose tissue fibrosis

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- Single-cell RNA seq data show two new populations ASC1 and ASC4 come out in Pd-KO mice.
- The Pdgfra+ and Dpp4+ cell populations are an important signal of early fibrosis in the WAT
- Sb431542 or Sitagliptin can rescue part of fibrosis caused by Mgp deletion.

W05

Cathepsin K knockout in humanized sickle cell disease transgenic mice mitigate carotid artery remodeling in a sex-dependent manner

Hannah Song phD[1], Manu O Platt phD[1], Liana H Hatoum MS[2], Julia N Frank BS[1], David Alexander BS[2], Audrey Noguchi BS[1]

[1]National Institutes of Health, Bethesda, MD, USA. [2]Georgia Institute of Technology, Atlanta, GA, USA

- Sickle cell disease causes increased carotid arteries cross-sectional area and elastin breaks
- Sickle cell disease cathepsin K -/- decreased elastin perimeter and increased medial thickness
- Chronic inflammation in sickle cell disease induces cathepsin K mediated vascular remodeling

W06

Development of ionizable lipid nanoparticle-based delivery systems for therapeutic intervention in vascular elastin-mediated diseases

Meysam Ganjibakhsh Ph.D[1], Yanina Tkachenko Ph.D[1], Kathrin Meyer[1], Gahae Kim[1], Sanzida Afrin[1], Russell H Knutsen Ph.D[1], Beth A Kozel MD, Ph.D[1,2]

[1]The Research Institute at Nationwide Children's Hospital, Columbus, Oh, USA. [2]The Ohio State University, College of Medicine, Columbus, USA

- Formulation enhances delivery of RNA, DNA, and drugs for vascular diseases.
- Supporting multimodal treatment strategies.
- Demonstrated efficient uptake and localization in cells via microscopy and flow cytometry.

EMERGING TECHNOLOGIES AND MODELING OF THE VASCULATURE (POSTERS)

W09

Decoding maternal-fetal communication: Advanced genetic and imaging tools unravel placental exchange mechanisms

Siqi Gao, Triloshan Thillaikumaran, Jenna Bockman, Mei Chen, Patricia Mericko-Ishizuka, Jisheng Yang, Mark Kahn

University of Pennsylvania, Philadelphia, PA, USA

- New genetic and imaging techniques delineate maternal-fetal exchange at the blood-placental barrier.
- Proteins synthesized in the placenta can be tracked on both the maternal and fetal sides.
- The placental vasculature not only serves a transport function but also actively secretes proteins

W11

Glucocorticoid receptor signaling drives kidney organoid vascularization through suppression of inflammation

Cory P. Johnson PhD[1,2], Hannah M. Somers BS[1], Kailee E. Tanaka[1,3], Charles H. Toulmin[2,1], Hermann Haller MD[1,4]

[1]MDI Biological Laboratory, Bar Harbor, ME, USA. [2]Colby College, Waterville, ME, USA. [3]Brown University, Providence, RI, USA. [4]Hannover Medical School, Hannover, Germany

- Kidney organoids can be vascularized in the absence of flow
- Glucocorticoid-mediated suppression of inflammation influences vascular development
- Co-differentiation of renal and vascular tissues supports vessel infiltration

W12

A 3D bioprinted human vascularized organ-on-a-chip system to recapitulate drug-induced vascular injury in response to antibody-drug conjugates

Queeny Dasgupta PhD, Purboja Purkayastha, Clara Erice, Juliana Navarro Yepes, Kim Phan, Carly Truong, Han Yong Duk, Alma Antonio, Tracy Lin, Soon Seng Ng, Taci Pereira
Systemic Bio, Houston, TX, USA

- 3D bioprinting can be used to create vascularized organ-on-a chip models to mimic vascular injury
- The model captures off-target toxicity of ADCs like loss of endothelial lining, inflammation
- The in vitro model mimics clinical hallmarks of liver injury like ALT activity and elevated LDH

W13

Whole blood-based assay for studying functional properties of endothelial cells using continuous-flow endothelium-on-chip system

Oshin Sharma PhD[1], Madeleine Tincher B. S.[2], William Wulftange M. Sc.[2], Fang Wang[1], Umut Gurkan PhD[1,2]
[1]Department of Mechanical and Aerospace Engineering, Case Western Reserve University, Cleveland, Ohio, USA. [2]Department of Biomedical Engineering, Case Western Reserve University, Cleveland, Ohio, USA

- Whole blood assays are more physiologically relevant than blood component assays.
- Whole blood flow activates endothelial cells in an in vitro vessel model.
- Change in shear stress levels impact endothelial cell health

REGENERATIVE MEDICINE

W14

Dynamic and lineage plasticity of the pulmonary venous endothelium

Joanna Wong[1], Gan Zhao PhD[1], David B Frank MD, PhD[2], Andrew E Vaughan PhD[1]
[1]University of Pennsylvania, Philadelphia, PA, USA. [2]Children's Hospital of Philadelphia, Philadelphia, PA, USA

- Regeneration of the adult pulmonary vasculature after injury
- Venous endothelial cell contribution to the capillary plexus
- Postnatal developmental pulmonary angiogenesis does not involve venous contribution to capillaries.

W15

Recruiting neural stem cells to the endothelium to enhance endothelial resilience

Hong Chen PhD
Havard Medical School, Boston, MA, USA

- Recruiting Neural Stem Cells to the Endothelium to Enhance Endothelial Resilience.
- Loss of epsins creates a niche for pluripotent neural stem cells acquiring endothelial identity.
- CXCl12-CXCR4 signaling plays a key role in enhanced endothelial resilience in neurovasculature.

W16

Development of a clinical-grade protocol for generating large-scale functional human iPSC-derived Endothelial cells

Arwin Aghamaleky-Sarvestany PhD[1], Aaron Frank MSc[1], Susan Lei BSc[1], Ruby Moran[1], Chunyan Liu[1], Dhruv Sareen PhD[1,2]
[1]Cedars Sinai Medical Center, Biomanufacturing Center, Los Angeles, California, USA. [2]Board of Governors Regenerative Medicine Institute, Cedars Sinai Medical Center, Los Angeles, California, USA

- Generating clinical-grade iPSC-derived endothelial cells (iECs) with high purity and functionality.

- Standarization of iPSC-induced iEC biomanufacturing to produce optimal differentiation protocol.
- Large-scale production of iECs using automated processing and cell stack technology.

W17

Mechanobiological revitalization of mesenchymal stem cells from aged patients for enhancing vascular regeneration

Miles Massidda PhD[1], Andrei Demkov[2], Aiden Sices[2], Jason Lee PhD[1], Muyoung Lee[2], Jonghwan Kim PhD[1], Aaron Baker PhD[1]

[1]University of Texas at Austin, Austin, TX, USA. [2]Texas at Austin, Austin, TX, USA

- Mechanical conditioning reduces senescence and increases long term culture expansion of MSCs.
- Mechanical stretch reduces senescence by inducing ATM signaling and enhancing DNA damage repair.
- Mechanical stretch enhances proliferation through an oxidative stress mediated mechanism.

METABOLISM AND METABOLIC DISEASES

W18

Chemically modified rhamnan sulfate compounds as therapeutics for inflammation and non-alcoholic fatty liver disease

Gregory Callahan, Amol M Vibhute PhD, Cassandra Callmann PhD, Aaron B Baker PhD

University of Texas at Austin, Austin, TX, USA

- Chemically modified polysaccharides have enhanced properties in reducing inflammation and NAFLD.
- Chemically modified polysaccharides reduce lipid accumulation in hepatocytes.
- Chemically modified polysaccharides block multiple mechanisms of inflammation in endothelial cells.

W19

Pericentrin deficiency in smooth muscle cells leads to mitochondrial dysfunction associated with Moyamoya -like cerebrovascular disease

Suravi Majumder PhD, Jose Emiliano Esparza Pinelo, Callie S Kwartler PhD, Dianna M Milewicz

UTHealth Houston, Houston, TX, USA

- Pericentrin variants cause moyamoya-like disease/pediatric stroke and lead to immature SMCs
- Pericentrin deficient SMCs display mitochondrial dysfunction
- Nicotinamide riboside restores SMC differentiation and blocks SMC migration in PCNT KO SMC

W20

An epigenetic link between metabolism and smooth muscle cell differentiation in Acta2 p.R179 cells

Anita Kaw MD, PhD, Jose Emiliano Esparza Pinelo, Suravi Majumder PhD, Hannah Krenz, Jessica Chen, Angie Gonzalez, Dianna M Milewicz MD, PhD, Callie S Kwartler PhD

University of Texas Health Science Center at Houston, Houston, TX, USA

- Acta2 p.R179 variants cause moyamoya-like disease and lead to immature smooth muscle cells (SMCs)
- Nicotinamide riboside (NR) restores SMC differentiation and prevents strokes in Acta2R179C/+ mice
- NR reduces levels of 2-hydroxygluterate to activate TET2 and increase SMC differentiation

SIGNALING III

W21

Characterizing CXCR4 activation in the regenerating heart of neonatal mice

Lauren R Reyes[1], Jeffrey A Naftaly[2], Karen Martinez Gonzalez[3], Daniel Sorensen PhD[4], Kristy Red-Horse PhD[2,3,4]

[1]Stanford University, Program in Human Biology, Stanford, USA. [2]Stanford University, Department of Biology, Stanford, USA. [3]Stanford University, Institute for Stem Cell Biology and Regenerative Medicine, Stanford, USA. [4]Howard Hughes Medical Institute, Stanford, USA

- In the regenerating neonatal heart, CXCR4 activation in immune cells is important.
- In the regenerating neonatal heart, CXCR4 activation in endothelial cells is important.
- There is heterogeneity in immune cell types undergoing CXCR4 activation post injury.

W22

Characterization of Human Intracranial Aneurysms using spatial proteomics and transcriptomics at single-cell resolution

Tanyeri Barak MD, Batur Gultekin, Danielle F. Miyagishima PhD, Buket Peksen, Gabriella Gutierrez, Kanat Yalcin MD, Zach Moynihan, Adife Gulhan Ercan-Sencicek PhD, Declan McGuone MD, Murat Gunel MD

Yale University, New Haven, CT, USA

- Spatial multiomics of IA tissue reveals key gene/protein expression profiles and cell states.
- Adventitia displays immune-regulatory role in aneurysm formation.
- Activation of STING-NFkB axis suggests potential mechanisms for IA formation and instability.

W23

A human single-cell atlas identifies druggable signaling pathways in pulmonary veno-occlusive disease

David B Frank MD, PhD[1,2], Maria C Basil MD, PhD[2], Susan M Lin MD[2], Sylvia N Michki PhD[1], Prashant Chandrasekaran PhD[1], Sriyaa Suresh BA[1]

[1]Children's Hospital of Philadelphia, Philadelphia, PA, USA. [2]University of Pennsylvania, Philadelphia, PA, USA

- Fibrous venous intimal remodeling and capillary proliferation defined PVOD
- Single-cell RNA sequencing identified abnormal cellular populations and signaling
- Abnormal vascular signaling mechanisms that are druggable

W24

RAS isoform specificity in vascular endothelial cell regulation

Samantha King

Albany Medical College, Albany, NY, USA

- Translation bias results in low KRAS protein expression levels in primary HUVECs.
- Despite KRAS codon optimization, HRAS is superior in activating Akt and driving HUVEC proliferation.
- TRAP-seq was used evaluate changes in the RAS isoform translatomes from HUVECs in a 3D co-culture.

W25

Space is a young mouse's game – age as variable in post-flight recovery

Timothy M. Sveeggen PhD[1], Hossein Fazelinia PhD[2], Heather C.M. Allaway PhD[3], Pooneh Bagher PhD[1]

[1]Department of Cellular and Integrative Physiology, Omaha, NE, USA. [2]Proteomics Core Facility, Children's Hospital of Philadelphia, Philadelphia, PA, USA. [3]School of Kinesiology, Louisiana State University, Baton Rouge, LA, USA

- Spaceflight is associated with increased oxidative stress.
- Antioxidant defenses are known to decrease with age.
- Advanced age at spaceflight likely exacerbates oxidative stress.

W26

KRAS induces hypertranscription in endothelial cells to drive brain arteriovenous malformation (bAVM) pathogenesis

Negar Khosraviani[1,2], Ruilin Wu[1,2], Emilie Boudreau[2], Joshua D Wythe[3,4], Jason E Fish[1,2]
[1]Department of Laboratory Medicine and Pathobiology, University of Toronto, Toronto, Ontario, Canada.
[2]Toronto General Hospital Research Institute, University Health Network, Toronto, Ontario, Canada.
[3]Department of Cell Biology, University of Virginia School of Medicine, Charlottesville, Virginia, USA.
[4]Robert M. Berne Cardiovascular Research Center, University of Virginia School of Medicine, Charlottesville, Virginia, USA

- Endothelial cells expressing KRAS-G12V undergo hypertranscription.
- MYC identified as a regulator of hypertranscription in KRAS-G12V endothelial cells.
- Loss of MYC activity mutant ECs prevented cell enlargement and angiogenic phenotypes.

W27

The role of EphA2 in vascular smooth muscle cell proliferation, migration, and mitogenic signaling

Matthew L Scott Ph.D., Alexandra Finney PhD, Shantel Vital, Brenna Pearson-gallion, Alika Shum, Zaki Khattab, Wayne Orr
LSU Health Shreveport, Shreveport, LA, USA

- Receptor tyrosine kinase signaling regulates VSMC proliferation and migration
- Different signaling mechanisms of EphA2 distinctly regulate different functions of VSMC behavior
- In vivo VSMC-specific EphA2 knockout significantly attenuates VSMC-mediated vascular remodeling

W28

Novel protective role of TLR4-signaling in smooth muscle cells

Olga A Cherepanova PhD, Junyoung Hong PhD
Cleveland Clinic, Cleveland, OH, USA

- TLR4-signaling in SMC protects against atherosclerosis
- Loss of TLR4 shifts SMC toward pro-atherogenic phenotypes
- Loss of TLR4 in SMC does not affect neointima formation after carotid ligation injury

W29

Effects of peroxynitrite on vascular smooth muscle cell BKCa channels

Paige E Martin MS, Felipe Polk B.S., Josiane da Silva PhD, Paulo Pires PhD
University of Arizona, Tucson, Arizona, USA

- BKCa channels are impaired in 5x-FAD male and female mice via different mechanisms.
- In female 5x-FAD mice, BKCa channel impairment is at least partially due to reversible oxidation.
- Peroxynitrite oxidizes BKCa channels in a reversible manner and impairs channel function.

W30

Peripheral vascular dysfunction in the 5x-FAD mouse model of Alzheimer's disease

Marlie Nochomovitz, Josiane F Silva PhD, Viktoras Sangster-Biye', Felipe D Polk, Stephanie H Thai M.S, Paulo W Pires PhD
University of Arizona, Tucson, Arizona, USA

- Reduction in nitric oxide-eNOS signaling underlies impaired vasodilation in 5x-FAD mice.
- Nitric oxide is reduced in 5x-FAD mesenteric arteries, without an increase in ROS.
- 5x-FAD mesenteric arteries have reduced vasomotion response to phenylephrine and acetylcholine.

W31

Metabolic basis of adventitial fibroblasts activation in aortic aneurysm

Cameron D.A. Mackay PhD Student, Anshul S. Jadli PhD, Megan Meechem PhD Student, Darrell D. Belke PhD, Vaibhav B. Patel PhD
University of Calgary, Calgary, Alberta, Canada

- Pharmacological inhibition of Drp1 ameliorates Ang-II induced aortic aneurysm.
- Activated adventitial fibroblasts present with fragmented mitochondria and metabolic abnormalities
- Targeted fibroblast-specific Drp1 deletion protects against aortic aneurysm

W33

Endothelial TRPV4/Cx43 hemichannel signaling is a key node in regulating vasomotor tone

Pia Burboa[1], Pablo Gaete[2], Walter Duran[1], Jorge Contreras[3], Mauricio Lillo[1]
[1]Rutgers University, NJ, Newark, USA. [2]UC Davis, Davis, CA, USA. [3]Rutgers University, Newark, NJ, USA

- Cx43h role in vascular function unclear
- Endothelial Cx43 hemichannels play a key role on Ca2+ influx
- TRPV4/Cx43 signaling is vital for hyperpolarization

CEREBRAL MICROVASCULAR FUNCTION (POSTERS)

W37

Endothelial ROCK isoform redundancy protects against spontaneous intracerebral and gastrointestinal hemorrhage

Rachel Knipe MD, Patricia L Brazee PhD, Mariel Kozberg MD PhD, Ilyaas Sugal BS, Eugene Kim BS, Katharine Ference BS, Roderick Bronson, James Liao MD
MGH, Boston, MA, USA

- Genetic deletion of both ROCK isoforms leads to intracranial and GI hemorrhage.
- ROCK deletion leads to hemorrhage in the absence of a second hit injury.
- Spontaneous hemorrhage into the brain and GI tract may be due to loss of ROCK signaling.

W38

Targeting the cerebrovasculature to combat glioblastoma multiforme

William Gillespie, Joshua Wythe
University of Virginia School of Medicine, Charlottesville, VA, USA

- GBM features extensive heterogeneity in the endothelium and tumor microenvironment.
- A VEGF-MAPK-ETS-BRD4 signaling axis may be a novel therapeutic target to disrupt glioma progression.
- Immunocompetent mouse models of GBM feature progressive BBB dysfunction and immune cell recruitment.

W39

Microglia are necessary for regulating cerebral capillary basal tone

William A. Mills III PhD[1], Niesha A Savory BS[2], Morgan A Coburn PhD[1], Dennis H Lentferink PhD[1], Fernando G Ibáñez BA[3], Praise Agochi BA[1], Arnav Gupta[1], Elina Rastegar[1], Deetya Gupta[1], Brant E. Isakson PhD[1], Marie-Ève Tremblay PhD[3], Ukpong B Eyo PhD[1]
[1]University of Virginia, Charlottesville, VA, USA. [2]Pennsylvania State University, Hershey, PA, USA. [3]University of Victoria, Victoria, British Columbia, Canada

- Microglia reside at capillaries, whereas perivascular macrophages reside at larger vessels
- Microglial elimination reduces capillary diameter and red blood cell flux
- Our findings model microglial and vascular phenotypes observed in Alzheimer's Disease

W40

Significant alterations in brain microvessel hemodynamics after whole brain irradiation

Michelle R Tamplin PhD, Vikram Subramanian PhD, Anthony H Vitale, Denise Juhr, Vincent Magnotta PhD, Michael Petronek PhD, Isabella M Grumbach MD, PhD
University of Iowa, Iowa City, IA, USA

- Decreased blood flow and cognitive function were detected 1 yr post-WBI.
- Oxidative stress, detected by T2*-weighted MRI, is significantly increased 1 yr post-WBI.
- Proteomics analyses reveal potential mechanisms which support these phenotypic changes.

W41

Microvascular proteome changes in the brain after radiation therapy

Isabella M Grumbach MD PhD[1,2,3], Vikram Subramanian Ph.D[1], Denise Juhr[1], Piero Giansanti Ph.D[4]
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- Understanding radiation induced changes in brain microvasculature using proteomics
- Proteome changes in cerebral microvasculature after radiation therapy
- Signaling pathways affected by irradiation in cerebral microvasculature

MECHANOTRANSDUCTION

W42

Precision mRNA nanomedicine restoring mechanosensitive endothelial METTL7A and internal m7G of mRNA to lessen atherosclerosis

Yun Fang
The University of Chicago, Chicago, IL, USA

- METTL7A governs the mechanosensitive internal m7G methylome of endothelial mRNA.
- The mechanosensitive METTL7A-m7G axis regulates the endothelial transcriptome by mRNA stability.
- METTL7A restoration in inflamed endothelial cells by precision nanomedicine lessens atherosclerosis.

W43

Endothelial cell Piezo1 promotes vascular smooth muscle cell differentiation on large arteries

Javier Abello PhD, Ying Yin, Yonghui Zhao PhD, Rajan Sah MD, Amber Stratman PhD
Washington University in St. Louis, St. Louis, MO, USA

- Mechanosensor ion channel Piezo1 influences vSMC association to arteries through klf2a regulation.
- Mechanical forces driven by flow types affect mural cell differentiation and vascular stabilization.
- Genetic dysregulation of Piezo1 results in loss od vSMC acummulation.

W44

Cerebrovascular resistance increases in concomitant severe traumatic brain injury with intracranial hematomas

Alexy O Trofimov MD, PhD[1], Ekaterina Volkova MD[1], Edwin M Nemoto PhD[2], Denis E Bragin PhD[3]
[1]Privolzhsky Research Medical University, Nizhny, Novgorod, Russian Federation. [2]University of New Mexico, Albuquerque, NM, USA. [3]Lovelace Biomedical Research Institute, Albuquerque, NM, USA

- Cerebrovascular resistance after traumatic brain injury with and without hematomas
- Cerebrovascular resistance measured by CT and transcranial doppler of both MCA
- CVR in patients with CTBI is significantly higher and remains elevated after IH evacuation.

W45

Cerebral arterial compliance decreases in patients with traumatic intracranial hematomas.

Alexy O Trofimov MD, PhD[1], Elizabeth Kalinkina MD[1], Anastasia Medvedeva MD[1], Edwin M Nemoto PhD[2], Denis E Bragin PhD[3]
[1]Privolzhsky Research Medical University, Nizhny, Novogrod, Russian Federation. [2]University of New Mexico, Albuquerque, NM, USA. [3]Lovelace Biomedical Research Institute, Albuquerque, NM, USA

- Cerebral arterial compliance with space occupying lesions after traumatic brain injury
- Dynamic helical ECG-gated computed tomography angiography (DHCTA) measured arterial compliance
- Changes in arterial compliance after traumatic brain injury after intracranial hematoma evaculation

W46

Activation of endothelial potective genetic programs in human vein valves by rapid cyclic compression devices: Implications for DVT prevention

Sravanthi Bandla[1], Sarbani Ghosh[1], Matthew Montoya Rush[1], John Welsh[2], Isaiah Turnbull[1], Mark Hoofnagle[1]
[1]Washington University of Saint Louis, Saint Louis, Missouri, USA. [2]Osciflex, Philadelphia, Pennsylvania, USA

- RCCD-induced OSS flow can promote an anti-thrombotic protective phenotype at vein valves
- RCCD can restore the expression of OSS genes in critically ill brain-dead donors
- Genes at femoral vein valves were compared between RCCD-treated and untreated extremities per donor

W47

CXCR3-CXCL11 signaling restricts angiogenesis and promotes pericyte recruitment

Jihui Lee[1], Megan Goeckel[2], Allison Levitas[1], Sarah Colijn[1], Jimann Shin[1], Anna Hindes[1], Geonyoung Mun[1], Zarek Burton[1], Bharadwaj Chintalapati[1], Ying Yin[1], Javier Abello[1], Lilianna Solnica-Krezel[1], Amber Stratman[1]
[1]Washington University School of Medicine in St Louis, St. Louis, USA. [2]University of Nebraska Medical Center, Omaha, USA

- endothelial cells
- cardiovascular development

- chemokine signaling

W49

Mesodermal fibronectin mediates the development of the great arteries by regulating cell shape, polarity, and mechanotransduction in the second heart field

Sophie Astrof PhD[1], Cecilia Arriagada PhD[2]
[1]Rutgers University, Newark, NJ, USA. [2]Universidad San Sebastián, San Sebastián, Chile

- Fibronectin (Fn1) synthesized by the mesoderm coordinates multiple progenitor cell behaviors.
- Fn1 balances progenitor interactions with Tenascin C regulating mechanotransduction.
- The balance of pre- and anti-adhesive signals regulates great artery morphogenesis.

W50

The vimentin cytoskeleton mediates morphology-induced endothelial function through phosphorylation of yes-associated protein

Meghan E Fallon PhD[1,2], Jiaqing Pang[2], Theodora T Alese[2], Owen JT McCarty PhD[2], Anthony P Barnes PhD[2], Monica T Hinds PhD[2]
[1]Yale University, New Haven, CT, USA. [2]Oregon Health & Science University, Portland, OR, USA

- Micropatterning alters the endothelial transcriptome and induces an anti-inflammatory phenotype.
- EC micropatterning induces YAP phosphorylation and cytosolic retention even in presence of TNF-α.
- Vimentin inhibition decreases EC proinflammatory gene expression while maintaining morphology.

W51

Crp3 absence impairs focal adhesion signaling and aortic smooth muscle cell contraction

João Carlos Ribeiro-Silva PhD[1], Paola Cristina Branco PhD[1], Gabriela Cruz MSc[1], Miriam Helena Fonseca-Alaniz PhD[1], Christoph Ballestrem PhD[2], José Eduardo Krieger MD, PhD[1], Ayumi Aurea Miyakawa PhD[1]
[1]Heart Institute (InCor-HCFMUSP), São Paulo, SP, Brazil. [2]The University of Manchester, Manchester, United Kingdom

- Crp3 is a mechanosensor in arterial SMCs
- Crp3 deficiency leads to impaired FA signaling and vascular mechanotransduction
- Ang II stimulation of Crp3-/- SMCs shows altered FAK-paxillin phosphorylation and contraction

W52

Therapeutic potential of targeting Interleukin-1 Type-1 Receptor Kinase-1 in disturbed flow-induced endothelial mesenchymal activation

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Louisiana State University Health Shreveport, Shreveport, Louisiana, USA

- Inhibition of Interleukin 1 signaling
- Endothelial to mesenchymal activation by disturbed flow
- IRAK signaling in endothelial cell phenotype