POSTER PRESENTATIONS AT VASCULAR BIOLOGY 2025

MONDAY

ATHEROSCLEROSIS

M01
Vascular smooth muscle cell phenotypic switching: Drivers uncovered by CRISPR screening
Iida E Vokkolainen, Tiit Örd, Minna U Kaikkonen-Määttä
University of Eastern Finland, Kuopio, Finland

- In atherosclerosis, vascular smooth muscle cells can switch from contractile to synthetic phenotype.
- CRISPR screens can identify genes that modulate proliferation.
- Cell type–specific, proliferation-associated genes may mediate the synthetic phenotype switching.

M02
Gut microbially produced phenolic acids have differential and sex-dependent effects on host cardiometabolic phenotypes
Kelley Carr, Jiyeon Kim, Naseer Sangwan, Olga Cherepanova, Ina Nemet
Cleveland Clinic Research, Cleveland, OH, USA

- Multiple diseases, including CVD, are associated with altered gut microbiome structure and function.
- There is little mechanistic insight into how microbial metabolism of amino acids contribute to CVD.
- Phenolic acids produced by microbial metabolism of phenylalanine affect atherosclerosis progression.

M03
Exogenous CXCL5 delivery limits plaque formation in a CXCL5-haploinsufficient atherosclerosis model
Rebekah Sanchez-Hodge MPH-VPH, Gavin Hatalosky, Jaqueline Haitian Wu, Eden Hunsader B.S., Kendall Cannon, Aliyaa Pathan B.S., Alex Garris B.S., Sriya Kongala B.S., Antonella Piscoya Castro BS, Bruno Mussetti PhD, Edward Bahnson PhD, Robert Wirka MD, Jonathan Schisler MS, PhD
UNC-CH, Chapel Hill, NC, USA

- Increased CXCL5 is associated with reduced risk or severity of coronary artery disease clinically.
- CXCL5 treatment decreases plaque inflammation and macrophage infiltration.
- Ongoing studies explore the underlying cellular targets and pathways of CXCL5 in atherosclerosis.

M04
Desmosterol modulation as an anti-atherogenic therapy
Diego Saenz de Urturi[1], Katy Citrin[1], Hanming Zhang[1], Enric Esplugues[1], Alex Ramos[1], Oscar Pastor-Rojo[2], Jeffrey McDonald[3], Carlos Fernandez-Hernando[1], Yajaira Suarez[1]

[1]Yale School of Medicine, New Haven, CT, USA. [2]Servicio de Bioquímica Clínica, Hospital Universitario Ramón y Cajal IRYCIS, Madrid, Madrid, Spain. [3]Center for Human Nutrition. University of Texas Southwestern Medical Center, Dallas, TX, USA

- Liver desmosterol accumulation builds desmosterol-rich lipoproteins
- Desmosterol delivery to the plaques improves atherosclerosis
- Desmosterol has therapeutic capacity to treat atherosclerosis

M05

Epigenetic and phenotypic modulation of adventitial fibroblasts in atherosclerosis by coronary artery risk gene TCF21

Wenduo Gu MD, PhD, William Jackson BS, Alexa Grace Berezowitz, Trieu Nguyen MS, Matthew Worssam PhD, Daniel Li MD, Joao P Monteiro PhD, Chad Weldy MD, PhD, Brian Palmisano, Paul Cheng MD, PhD
Stanford University, Palo Alto, California, USA

- Adventitial fibroblasts are one of the earliest activated populations in atherosclerosis.
- We created a novel AdvFib specific CreERT2 murine model for AdvFib study in atherosclerosis.
- Adventitial fibroblast TCF21 impacts plaque phenotype through epigenetically activating AdvFibs.

M06

Endothelial Liver X receptors are required to prevent excessive endothelial inflammation and endomt in atherosclerosis progression

Kathryn Citrin[1], Yan Huang[1], Christian Castellanos[1], Alex Ramos-Perez[1], Diego Saenz de Urturi Indart[1], Nabil Boutagy[1], Michele D'Agata[1], Hanming Zhang[1], Magdalena Sternak[1], Diego Gomez Coronado[2], Jan-Ake Gustafsson[3], Lauren Biwer[1], Oscar Pastor Rojo[4], Jeffrey McDonald[5], Carlos Fernandez-Hernando[1], Yajaira Suarez[1]
[1]Yale University, New Haven, CT, USA. [2]Hospital Universitario Ramon y Cajal, Madrid, Spain. [3]University of Houston, Houston, TX, USA. [4]Hospital Ramón y Cajal-IRYCIS, Madrid, Spain. [5]UT Southwestern Medical Center, Dallas, TX, USA

- The regulation of intracellular lipid homeostasis in EC is relatively underexplored
- LXRs regulate lipid metabolism and inflammation, but their role in EC is not well defined
- EC deletion of LXRs massively accelerates atherosclerosis, EC inflammation, and the EndoMT

M07

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

Matthew L Scott Ph.D.[1], Alexandra Finney[1], Shantel Vital[1], Zaki Khattab[2], Alika Shum[1], Wayne Orr[1]
[1]LSU Health Shreveport, Shreveport, LA, USA. [2]LSU Shreveport, Shreveport, LA, USA

- Receptor tyrosine kinase signaling can be diverse, with some RTKs promoting differing outcomes

- Integrin adhesion signaling can be a key component of promoting cell proliferation
- EphA2 regulates differing processes in vSMCs through distinct signaling modalities.

BIOENGINEERING I

M08

Modeling vascular calcification: An improved in vitro system for studying osteochondrogenic transdifferentiation of vascular smooth muscle cells

João P. Monteiro PhD, Matthew D. Worssam PhD, Wenduo Gu PhD, Shaunak S. Adkar MD, Quanyi Zhao PhD, Daniel Li MD, Markus Ramste MD, PhD, Brian Palmisano MD, PhD, Chad S. Weldy MD, PhD, Ramendra K. Kundu PhD, Trieu Nguyen PhD, Paul Cheng MD, PhD, Thomas Quertermous MD
Stanford University, Stanford, CA, USA

- Our assay induces a transcriptional profile very similar to plaque chondromyocytes.
- Temporal dynamics of transcriptional changes are identified.
- Experimental manipulations on chondrogenesis can be studied in vitro.

M09

Unidirectional, pumpless, scalable: Perfusable vascular networks with long-term stability using a gravity driven microfluidic system

Artur Rodrigues, Alexis Dalaud, Camila Clavijo, Arnaud Nicholas, Nick Saites, Job Komen, Sebastiaan Trietsch, Lenie van den Broek, Todd Burton
MIMETAS B.V, Oegstgeest, Netherlands

- Stable Vascular Bed Formation for Advanced Tissue Models
- Physiologically Relevant Unidirectional Flow via Gravity-Driven Perfusion
- Microphysiological System Enables Long-Term Perfusable Vascular Networks in Fibrin Matrix

M10 *withdrawn*

M11

Surgical Micropuncture induces angiogenic changes to exosome cargo

Jazzmyn S Dawes B.S, Emily Bianchini B.S, Maryam Abdelaal B.S, Neekita Jikaria M.D, Ji Ho Park M.D, Mohammad Hossein Asgardoon M.D, Mary Landmesser B.S, Dino Ravnic D.O
Penn State College of Medicine, Hershey, PA, USA

- Utilizing exosomes to induce regenerative vascularization
- Inducing angiogenesis in ischemic tissues
- Micropuncture-induced pro-angiogenic exosomes

M12

Engineering a biomimetic multi-layered arteriole models to investigate vascular remodeling in pulmonary arterial hypertension

Jeonghyun Son PhD[1,2], Seo Woo Song PhD[1,3], Chongyang Zhang PhD[1,2], Aiqin Cao[1,2], Kamakshi Dattatray Bichu[1,2], Mark A Skylar-Scott[1,2,4], Marlene Rabinovitch[1,2]
[1]Stanford University, Stanford, CA, USA. [2]Stanford Cardiovascular Institute (CVI), Stanford, CA, USA. [3]Korea Institute of Science and Technology, Seoul, Korea, Republic of. [4]Chan Zuckerberg Biohub, San Fransisco, CA, USA

- Biomimetic arteriole-on-a-chip with smooth muscle–endothelial bilayer vessels
- Tunable flow and pressure system for physiological vessel remodeling studies
- High-throughput model to study PAH mechanisms and evaluate therapeutic strategies

M13

Engineered extracellular vesicle delivery of JP4-039 to treat vascular complications of preeclampsia

Feyza Achilova BS[1,2], Keertana Yalamanchili BS[2,3], Rayane B Teixeira PhD[3,2], Peter Wipf PhD[4], Ruhul M Abid MD,PhD[3,2]

[1]Rhode Island Hospital, Providennce, RI, USA. [2]Warren Alpert Medical School of Brown University, Providence, RI, USA. [3]Rhode Island Hospital, Providence, RI, USA. [4]University of Pittsburgh, Pittsburgh, PA, USA

- Treating endothelial and vascular dysfunction in Preeclampsia
- Engineering extracellular nano-carriers for targeted antioxidant therapy
- Novel treatment approach to reduce pregnancy-related cardiovascular risks

REGENERATIVE MEDICINE

M14

Exploring stromal vascular fraction derived blood vessel integration with host networks

Walter L Murfee PhD[1], Nien-Wen Hu PhD[1], Iulia-Maria Berianu[1], Elizabeth Wolters[1], Ryan Walker[1], Hulan Shang[2], Ramon Llull MD[2], Adam J Katz MD[2]

[1]University of Florida, Gainesville, FL, USA. [2]Wake Forest School of Medicine, Winston-Salem, NC, USA

- SVF has emerged as a heterogeneous cell mixture for regenerative vascular medicine therapies.
- SVF potential motivates questions regarding how SVF derived vessels integrate with host networks.
- Results suggest that SVF cells intertwine along host vessels rather than functionally integrate.

M15

Spatiotemporal characterization of endothelial proliferation in liver regeneration post-CCl_4 injury

Hawon Yoon, Aashita R Singh, Kanesha L Travis, Chris M Glontz, Nena Kotsalidis, D. Berfin Azizoglu

UNC-CH Dept. of Cell Biology and Physiology, Chapel Hill, NC, USA

- Understanding the direct role of liver vasculature and endothelial cells during liver regeneration
- Spatiotemporal dynamics of endothelial cell proliferation during liver regeneration post-CCl4 injury
- Quantifying endothelial proliferation using heat-induced antigen retrieval and automated analysis

M16

Vascular plasticity in the regenerating liver

Aashita S Rajput, Won Yoon, Chris M Glontz, Kanesha Travis, D. Berfin Azizoglu PhD

UNC-CH Department of Cell Biology and Physiology, Chapel Hill, NC, USA

- Vascular adaptability is key to the liver's regenerative process.
- Vascular response to liver injury is rapid and robust.
- Liver lobule plasticity is observed in the regenerating liver after acute injury.

M17

A novel integrin α3β1-CSTF3 axis controls alternative polyadenylation of the *Mmp9* mRNA in keratinocytes to enhance MMP-9 expression and promote angiogenesis in wounds and tumors

Giesse Albeche Duarte BS, Whitney M. Longmate PhD, Lei Wu MS, C. Michael DiPersio PhD

Albany Medical College, Albany, NY, USA

- Integrin α3β1-regulated alternative polyadenylation controls MMP-9 expression in wounds and tumors.
- Integrin α3β1-MEK-ERK signaling induces CSTF3 to regulate alternative polyadenylation of MMP-9 mRNA.
- Integrin α3β1-regulated APA is a novel mechanism to promote pro-angiogenic gene programs.

M18

Disrupted arterial-venous heterogeneity of the coronary microvascular plexus in post-ischemic myocardial tissue

Kaitlyn Ford[1], Hosanna Abbay[1], Amy Leonardson[1], Jennifer Franks[1,2], Nicholas W Chavkin PhD[1,2]

[1]Seattle Children's Research Institute, Seattle, WA, USA. [2]University of Washington, Seattle, WA, USA

- Post-ischemic coronary microvascular plexus undergoes maturation but is shifted toward a venous fate
- Human ischemic cardiomyopathy tissues show similar gene disruption and venous-enriched endothelium
- Arterial genes in human cardiac endothelial cells are promoted by TGF and inhibited by WNT signaling

M19 *withdrawn*

M20

High stretch, low repair: The role of formyl peptide receptor (FPR) signaling in tissue-resident endothelial progenitor cell dysfunction during hypertension

Juliana M Parente PhD, Laena Pernomian PhD, Cameron G McCarthy PhD, Camilla F Wenceslau PhD

University of South Carolina School of Medicine, Columbia, SC, USA

- Hypertension depletes tissue-resident endothelial progenitor cells
- FPR-1 signaling worsens hypertension while FPR-2 supports vascular protection

- Mechanical stretch disrupts FPR-1/-2 signaling balance and leads to impaired EPC repair capacity

M21

Local release of an optimized angiogenic growth factor cocktail from a custom biomaterial for microvascular regeneration in the post-MI heart

Stephanie M Roser MS, Collin Polucha, Kareen LK Coulombe PhD
Brown University, Providence, RI, USA

- Controlled release of VEGF, IGF-1, and PDGF from a biomaterial stimulates microvascular regeneration
- Nonlinear contrast ultrasound enables longitudinal assessment of myocardial tissue perfusion
- Microvascular regeneration may alter tissue perfusion to rescue cardiomyocyte contractility

LYMPHATIC BIOLOGY

M22

Advanced glycation end products induce lymphatic dysfunction in metabolic syndrome

Mengmeng Chang MD, PhD[1], Laurelis Santiago MS[1], Chris Katnik PhD[1], Min Zhang MD[1], Bi Zhao PhD[1], Nien-Wen Hu PhD[2], W. Lee Murfee PhD[2], Jerome W Breslin PhD[1]
[1]University of South Florida, Tampa, FL, USA. [2]University of Florida, Gainesville, FL, USA

- Metabolic syndrome causes impaired lymphatic pumping.
- snRNA-Seq analysis shows AGE-RAGE signaling is enriched in obese Zucker rat mesentery.
- AGE-BSA reduces lymphatic contraction frequency and promotes lymphatic network remodeling.

M23

Lymphatic endothelial-derived nitric oxide regulates T cell presence in the heart during cardiometabolic heart failure

Skylar A Loeb[1], Dennon Hoernig[1], Wyatt J Schug[1], Luke S Dunaway[1], Clay Grisius[1], Junjie Li[2], Shruthi Nyshadham[1], Darla Tharp[3], Miriam Cortese-Krott[2], Matthew Wolf[1], Brant E Isakson[1]
[1]University of Virginia, Charlottesville, VA, USA. [2]Heinrich-Heine University, Düsseldorf, Germany. [3]University of Missouri, Columbia, MO, USA

- Lymphatic endothelial Hba promotes cardiac remodeling during heart failure
- Lymphatic endothelial Hba regulates T cell presence in the heart during heart failure
- Nitric oxide chelation suppresses the expression of T cell trafficking genes in primary LECs

M24

Piezo2-Vegfr3 signaling axis regulates expansion of adipose tissue in obesogenic conditions via lymphangiogenesis

Zuzanna J Juskiewicz M.S.[1,2], Luke S Dunaway PhD[1], Wyatt J Schug M.S.[1,2], Skylar A Loeb M.S.[1,2], Melissa A Luse PhD[1,2], Brant Isakson PhD[1,2]

[1]Robert M. Berne Cardiovascular Research Center, University of Virginia School of Medicine, Charlottesville, VA, USA. [2]Department of Molecular Physiology and Biological Physics, University of Virginia School of Medicine, Charlottesville, VA, USA

- Piezo2 is highly expressed in lymphatic capillary endothelium.
- Flt4 expression is regulated by Piezo2, working through CALM1, KLF2 and PROX1.
- Piezo2 and Flt4 expressions are lost in obesogenic conditions, as well as after siMAF knock-down.

M25

Altered smooth muscle cell orientation and longitudinal contractions in human mesenteric collecting lymphatics from diabetic donors

Briana A Baboolall BS, Laurelis E Santiago MS, Chris Katnik PhD, Jerome W Breslin PhD
University of South Florida, Tampa, FL, USA

- Human mesenteric collecting lymphatic vessels featured intertwined SMC organization.
- Human mesenteric collecting lymphatic vessels display both longitudinal and radial contractions.
- Lymphatic smooth muscle cell orientation becomes more longitudinal in the presence of diabetes.

M26

Transcriptomic differences between lymphatic, arterial, and venous smooth muscle cells in rat mesentery

Laurelis E Santiago MS, Chris Katnik PhD, Mengmeng Chang MD, PhD, Min Zhang MD, Bi Zhao PhD, Matthew Mercurio MS, Jerome W Breslin PhD
University of South Florida, Tampa, FL, USA

- Rat lymphatic, arterial, and venous smooth muscle cell transcriptomic profiles were generated.
- Differentially expressed genes in lymphatic, artery, and vein smooth muscle cells were identified.
- The results reveal unique hub gene networks for lymphatic, artery, and vein smooth muscle cells.

M27

Pathogenic *PIK3CA* variants induce proteasome insufficiency and VE-CADHERIN and CD31 proteostasis defects *in vitro* and *in vivo*

Nour C Bacha PHMD, PhD, Benjamin Kheyfets, June K Wu MD, Carrie J Shawber PhD
Columbia University Irving Medical Center, New York, NY, USA

- PIK3CA variants induce VE-CADHERIN/CD31 proteostasis defects in human lymphatic endothelial cells
- Increased lymphatic vessels density in LM mouse model had increased VE-CADHERIN and CD31 expression
- Proteasome inhibitor, bortezomib, normalized the lymphatic vasculature in LM mouse model

M28

JAG1 expressed by breast tumor cells promotes lymphovascular invasion and lymph node metastasis

Natalia A. Obacz B.Sc.[1], Benjamin Gordon M.D./Ph.D.[1], Bhairavi Swaminathan Ph.D.[2], Rahul Vadakath[1], Pamela Teneqexhi[1], Seock Won Youn Ph.D.[1], Ziqiao Xu, Ph.D.[3], Zhengjia Chen Ph.D.[3], María Muñoz Caffarel Ph.D.[4], LA Naiche Ph.D.[1], Jan Kitajewski Ph.D.[1]

[1]University of Illinois, Chicago, Chicago, IL, USA. [2]University of Illinois, Chicago, IL, USA. [3]University of Illinois Cancer Center, Chicago, IL, USA. [4]Biogipuzkoa Health Research Institute and Hospital Donostia, San Sebastian, Spain

- Breast cancer cell expression of Notch ligand JAG1 promotes lymphovascular invasion and metastasis
- JAG1 expression is higher in breast tumor cells invading the lymph node than in primary tumors
- Breast cancer JAG1 expression alters lymphatic endothelial barrier function

M29

Engineering stem cell microenvironment for lymphatic regeneration

Donny Hanjaya-Putra Ph.D.[1], Donghyun Paul Jeong[2], Keilany Lightsey[2]

[1]University of Notre Dame, Notre Dame, indiana, USA. [2]University of Notre Dame, Notre Dame, IN, USA

- Metabolic pathways to differentiate stem cells into lymphatic endothelial cells.
- Synthetic hydrogels to control lymphatic vessel formation.
- Engineered lymphatic networks for tissue regeneration.

MECHANOTRANSDUCTION I

M30

Flow-induced mechanotransduction shapes pial collateral artery network in mice

Swarnadip Ghosh Masters, Soumyashree Das PhD

National Centre for Biological Sciences, Bangalore, Karnataka, India

- Pial collaterals in mice form by artery tip extension on microvascular tracks
- Blood-flow regulates pial artery and collateral development
- Dach1-dependent endothelial mechano-sensation is essential for formation of pial collaterals in mice

M31

Sleep is a possible moderator of endothelial function in premenopausal women with post-traumatic stress disorder

Chowdhury Ibtida Tahmin MBBS, PhD (Ongoing), Chasity Corbin, Chowdhury Tasnova Tahsin, Daniel Duprez, Ida T. Fonkoue

University of Minnesota Medical School, Minneapolis, Minnesota, USA

- Post-traumatic stress disorder(PTSD) and endothelial function in premenopausal women.
- Factors moderating the relationship between PTSD symptoms and endothelial function.
- Sleep might be a possible moderator or mediator of endothelial function in PTSD.

M32

Interstitial flow-induced phenotypic switching of vascular smooth muscle cells: Mechanistic insights and vascular implications

Nivethitha Kota Lakshminaraasimulu

Queen Mary University of London, London, United Kingdom

- Shear stress induces metabolic reprogramming in vascular smooth muscle cells
- Vascular smooth muscle cell glycocalyx mediates mechanotransduction
- cPLA2 inhibition blocks flow-induced lipid droplet formation in vessel walls

M33

Mechanoregulation of endosome dynamics during endothelial cell motility

Paula Camacho[1], Erin Berlew[1], Javier Abello[2], Melike Lakadamyali[1], Amber Stratman[2], Joel Boerckel[1]

[1]University of Pennsylvania, Philadelphia, PA, USA. [2]Washington University, St. Louis, MO, USA

- Endosomal regulators are direct transcriptional targets of YAP/TAZ mechanotransduction.
- Mechanical cues, through YAP/TAZ signaling or cytoskeletal dynamics, regulate endosome function.
- Endosomal RhoB signaling regulates migration by coordinating focal adhesion dynamics.

M34

Cytoskeletal-dependent mechanoregulation of smooth muscle cell functions and nuclear organization

Deepa Suryanarayan MS[1], Mingjun Liu PhD[2], Cristina Espinosa-Diez PhD[3], Jianxin Wei MD[1], Yang Liu PhD[4], Delphine Gomez PhD[1]

[1]University of Pittsburgh, Pittsburgh, USA. [2]New York University, New York, USA. [3]Wayne State University, Detriot, USA. [4]University of Illinois-Urbana Champaign, Urbana, USA

- Adaptation of VSMCs to mechanical forces via epigenetic reprogramming
- Cytoskeletal-nuclear communication in vascular smooth muscle cells
- Role of cytoskeletal proteins in chromatin remodeling and gene regulation

M35

Photoaged nanoplastics disrupt Gut-Brain-Heart axis via endothelial Piezo1-Notch inactivation and calcium signaling impairment

Seul-Ki Park[1], Jae Min Cho[1], Enbo Zhu[1], Jing Wang[1], Peng Zhao[1], Eliseo Castillo[2], Tzung Hsiai[1]

[1]UCLA, Los Angeles, CA, USA. [2]University of New Mexico, Albuquerque, NM, USA

- Photoaged nanoplastics disrupt endothelial barriers and promote systemic translocation.
- PA-NPs impair Piezo1-Notch signaling, causing cerebral and myocardial calcium dysregulation.
- PA-NPs compromise vascular health, affecting neurological and cardiac systems.

M36

Cavin-1 deficiency drives NOS dysregulation, vascular and diastolic dysfunction, and blood pressure dysregulation

Melissa E Reichelt PhD[1], Benjamin Quick BBiomedSci[1], Hui Yi Khoo PhD[2], Walter G Thomas PhD[2], John P Headrick PhD[3]

[1]The University of Queensland, St Lucia, Queensland, Australia. [2]The University of Queensland, St Lucia, QLD, Australia. [3]Griffith University, Gold Coasat, QLD, Australia

- Caveolae are important mechanosensors in the heart, but the cell type mediating effects are unknown
- Deletion of cardiomyocyte cavin 1 drives cardiac stiffness and reduced blood pressure.
- Recovery from ischemia was not modified by cardiomyocyte cavin deletion implicating vascular cells.

METABOLISM AND METABOLIC DISEASES I

M37

Investigating matrix Gla protein expression and phosphorylation of its conserved serine residues to understand their anti-mineralization role

Kyoungmi Bak[1,2], Vincent Richard[3], Nawara Osman[1,2], Samrin Nawer[1], Elaine Davis[1], Monzur Murshed[1,2]

[1]McGill University, Montreal, QC, Canada. [2]Shriner's Hospital for Children Canada, Montreal, QC, Canada. [3]Segal Cancer Proteomic Centre, Montreal, QC, Canada

- MGP deposits in a punctuated pattern within elastic laemellae of the mature aorta.
- The N-terminal phosphate moieties are crucial for MGP's function, but it is not derived from charge.
- FAM20C phosphorylates MGP.

M38

Endothelial NAD^+-dependent return to quiescence is required for angiogenesis

Wencao Zhao Ph.D., Zoltan Arany

University of Pennsylvania, Philadelphia, PA, USA

- NAD turnover is high in ECs, especially upon transition from proliferation to quiescence (PtoQ).
- The redox of NAD metabolism ensures the PtoQ of ECs during angiogenesis.
- Targeting NAD synthesis is a novel way to suppress pathological angiogenesis.

M39

Endothelial Wnt suppression mitigates atherosclerosis

Rizwana Afroz PhD, Begoña Lainez-Mas PhD, Julie Goodwin MD

Yale University, New Haven, CT, USA

- Endothelial-specific deletion of LRP5 significantly reduces atherosclerotic plaque formation.
- Loss of endothelial LRP5 reduces vascular inflammation.
- Endothelial LRP5 is a key driver of vascular inflammation and a potential therapeutic target.

M40

Empagliflozin treatment restores angiogenic gene regulatory pathways in cardiac microvasculature in a model of diabetes-induced heart failure with preserved ejection fraction

Cori Lau[1,2], Kai Ellis[3,2], Rathnakumar Kumaragurubaran[1], Dakota Gustafson[1], Lijun Chi[3], Paul Delgado-Olguin[3], Ahsan Siraj[1], Mansoor Husain[1], Michael D Wilson[3], Jason E Fish[1]

[1]Toronto General Hospital Research Institute, Toronto, ON, Canada. [2]University of Toronto, Toronto, ON, Canada. [3]SickKids Hospital, Toronto, ON, Canada

- Empagliflozin restores microvasculature density in a mouse model of diabetes-induced HFpEF
- Empagliflozin restores angiogenic gene expression and transcription factor activity in cardiac ECs
- Angiogenic-related genes are a potential therapeutic target to treat microvascular dysfunction

MICROCIRCULATION I

M41

Mitochondrial integrated stress signaling mediates communications between mutant and wild type ECs during CCM lesion progression

jenny H Zhou MD, Ph.D

Yale University, New Haven, CT, USA

- CCM3-deficient EPCs activate mTOR and mitochondrial integrated stress response (MSR);
- CCM3-loss augments MSR in EPCs in turn activate the IRF3 signaling in surrounding ECs;
- MSR inhibitor attenuated neuroinflammation and CCM lesions in a mouse CCM model.

M42

Evaluating the effect of JP4-039 on human pulmonary artery endothelial cells under normoxia vs. hypoxia

Yujin Kim[1], Rayane B Teixeira PhD[2], Ruhul Abid MD, PhD[1,2]

[1]Brown University, Providence, RI, USA. [2]Rhode Island Hospital, Providence, RI, USA

- Exploring the potential of JP4-039 to mitigate endothelial dysfunction in PH models.
- Mitochondria-targeted antioxidant evaluated in hypoxic pulmonary endothelial cells.
- Assessing JP4-039's effects on angiogenesis, migration, and mitochondrial function.

M43

Friend or foe? Unraveling the paradoxical role of Foxc2 in lymphedema and obesity

Kui Cui, Hong Chen

Harvard Medical School, Boston, MA, USA

- Foxc2 regulates adult lymphatic function and is upregulated in obese lymphedema patients
- Foxc2 downregulation in adults improves lymphedema and protects against obesity
- Foxc2-Epsin-VEGFR axis is a therapeutic target for obesity and lymphedema

M44

Acute deletion of adiponectin increases expression of sphingosine-1-phosphate receptors in skeletal muscle arterioles

Maxwell J Parr[1], Ashton T Foster[1], Steven L Medarev MS[2], Dilanka Ranaweera BS[1], Judy M Muller-Delp PhD[1]
[1]Kansas State University, Manhattan, Kansas, USA. [2]Florida State University, Tallahassee, Florida, USA

- Sphingosine-1-phosphate receptor 1 is expressed in skeletal muscle arterioles.
- Sphingosine-1-phosphate receptor 1 expression in skeletal muscle arterioles is sex-specific.
- Deletion of adiponectin increases S1PR1 1 expression in skeletal muscle arterioles.

M45

Sex and circulating adiponectin levels regulate expression of adiponectin R1 receptors in skeletal muscle resistance arterioles

Ashton T Foster[1], Maxwell J Parr[1], Steven L Medarev MS[2], Anthony M Ogando BS[2], Jasen M Belenko BS[2], Dilanka M Ranaweera BS[1], Judy M Muller-Delp PhD[1]
[1]Kansas State University, Manhattan, Kansas, USA. [2]Florida State University, Tallahassee, Florida, USA

- Adiponectin receptor expression is sex-specific in skeletal muscle arterioles.
- Partial reduction of circulating adiponectin reduced adiponectin receptor expression.
- Ablation of circulating adiponectin did not alter adiponectin receptor expression.

M46

Discrete bacterial pathogens elicit endothelial ADAM10 activation and vWF extrusion in vitro

Elizabeth R Flock, Juliane Bubeck Wardenburg MD, PhD, Danielle N Alfano MD
Washington University School of Medicine, St Louis, MO, USA

- Understanding the mechanisms by which discrete pathogens injure the endothelium is needed
- von Willebrand factor (vWF) serves as a marker of endothelial damage and thrombotic risk in sepsis
- Discrete pathogens can activate ADAM10 on microvascular endothelial cells resulting in vWF extrusion

M47

Exposure to e-cigarette vapor alters vascular smooth muscle cell electrophysiology and vascular reactivity

Sophia Salbato M.S., Miguel Martin-Aragon Baudel Ph.D., Maryann K Ferrara B.S., Nuria Daghbouche Rubio Ph.D., Junyoung Hong Ph.D., Hannah Voorhees B.S., Eric A Pereira da Silva Ph.D., Manuel F Navedo Ph.D., Madeline Nieves-Cintron Ph.D.
University of California Davis, Davis, CA, USA

- E-cigarette exposure alters vascular smooth muscle cell function
- E-cigarette exposure increases myogenic tone via LTCC activity
- Sex differences in e-cigarette-induced changes in vascular function

M48 *withdrawn*

M49

Identification of a novel EBF1-expressing disease-associated arterial subpopulation in pulmonary arterial hypertension

Woosoung Choi[1], Dayeon Lee[1], Aram Lee[2], Eunsik Yun[2], Shengpeng Wang[3], Jongmin Kim[2], Jihwan Park[1], Suk-Won Jin[1]
[1]Gwangju Institute of Science and Technology, Gwangju, Korea, Republic of. [2]Sookmyung Women's University, Seoul, Korea, Republic of. [3]The First Affiliated Hospital of Xi'an Jiaotong University, Xi'an, China

- A novel arterial endothelial cell subtype involved in PAH was found via single-cell analysis.
- The disease-associated arterial endothelial cells have high EBF1 expression, also seen in humans.
- EBF1 is a key regulator in PAH progression and a potential new therapeutic target for the disease.

M50

The effects of critical limb threatening ischemia on skeletal muscle pericyte adipogenesis

George Nader[1], Eric Rullman[2], Thomas Gustafsson[2], Tara Haas[1]
[1]York University, Toronto, ONTARIO, Canada. [2]Karolinska, Stockholm, Stockholm, Sweden

- Critical limb threatening ischemia causes muscle damage
- Pericyte transcriptome profile changes with ischemia
- Pericytes express adipogenic markers.

M51

Discrete pannexin 1 phosphorylation sites differentially regulate physiological outcomes in the vasculature

Brooke L. O'Donnell[1], Luke S. Dunaway[1], Skylar A. Loeb[1], Zuzanna J. Juśkiewicz[1], Wyatt J. Schug[1], Abigail Wolpe[1], Melissa A. Luse[1], Samantha C. Bielefeld[1], Andrew K.J. Boyce[2], Madison D. Williams[1], Marie Billaud[3], Angela K. Best[1], Scott R. Johnstone[4], Silvia Penuela[5], Linda Columbus[1], Anastasia F. Thévenin[6], Roger J. Thompson[2], Douglas A. Bayliss[1], Michael Koval[7], Brant E. Isakson[1]
[1]University of Virginia, Charlottesville, VA, USA. [2]University of Calgary, Calgary, AB, Canada. [3]Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA. [4]Virginia Tech Carilion, Roanoke, VA, USA. [5]University of Western Ontario,

London, ON, Canada. [6]Lafayette College, Easton, PA, USA. [7]Emory University, Atlanta, GA, USA

- In the vasculature, PANX1 channels regulate α-adrenergic constriction.
- We used mice lacking PANX1 Y198, S205 or Y308 phosphorylation sites to assess vascular phenotypes.
- PANX1 modifications exhibit distinct roles depending on the physiological process being regulated.

M52

Endothelial iron regulates coronary artery function in chronic kidney disease

Luke S Dunaway PhD[1], Nasim A Abib[2], Wyatt J Schug MS[1,3], Adam N Goldfarb MD[4], Brant E Isakson PhD[1,3]
[1]Robert M Berne Cardiovascular Research Center, University of Virginia, Charlottesville, VA, USA. [2]Robert M Berne Cardiovascular Research Center, Charlottesville, VA, USA. [3]Department of Molecular Physiology and Biophysics, University of Virginia, Charlottesville, VA, USA. [4]Department of Pathology, University of Virginia, Charlottesville, VA, USA

- Endothelial iron varies across the microvascular endothelium and is lowest in resistance arteries.
- Chronic kidney disease causes endothelial iron accumulation.
- Preventing iron uptake in the endothelium increases myocardial perfusion in CKD.

M53

Endothelial sGC-mediated transnitrosation of Connexin43 regulates vascular tone independently of cGMP–PKG signaling pathway

Pia Burboa, Veronica Kuzdowicz, Annie Beuve, Mauricio A Lillo Gallardo PhD
Rutgers, Newark, nj, USA

- Endothelial sGC regulates vascular tone via protein S-nitrosylation
- Cx43 S-nitrosylation controls hemichannel opening and Ca^{2+} influx
- Disrupting sGC–Cx43 signaling impairs EDH and vasodilation

M54

A novel non-lipogenic ABCA1 inducer improves cerebral arteriolar $Ca_V1.2$ function in humanized ApoE4 male mice

Felipe D Polk BS, Paige E Martin MS, Gregory Thatcher PhD, Paulo W Pires PhD
University of Arizona, Tucson, Arizona, USA

- ApoE4 impairs cerebral arteriolar contractility via cholesterol-dependent inhibition of CaV1.2
- CL3-3 is a novel non-lipogenic molecule that promotes cholesterol efflux via upregulation of ABCA1
- CL3-3 treatment recovers CaV1.2 function and cerebral arteriolar contractility in hApoE4 mice

M55

Mac-1–GPIbα mediated leukocyte-platelet interaction as a therapeutic target in lung injury: Evidence from genetic and novel antibody intervention

Huiyun Gao MD[1], Sofia Nekic[1], Nysha Gupta[1], Yinghua Chen PhD[1], Elizabeth Berevosky[1], Daniel I Simon MD[1,2], Yunmei Wang PhD MBA[1]

[1]Case Western Reserve University, Cleveland, Oh, USA. [2]University Hospitals Case Medical Center, Cleveland, OH, USA

- Mac-1:GPIbα mediated Leukocyte-Platelet Interaction drives lung injury in a lupus-like murine model
- Genetic or antibody disruption of Mac-1:GPIbα reduces hemorrhage and inflammation in lung injury
- Novel anti-Mac-1 chimeric antibodies show therapeutic promise in lung injury and thrombosis

INFLAMMATION I

M56

Uncovering PMCA4 as a modulator of vascular inflammation and endothelial dysfunction

Yaamini Mohan PhD[1], Kinza Khan PhD[1,2], Nerea Méndez Barbero PhD[3,4], Jorge Oller PhD[5], Manuel J Gomez PhD[6], Miguel R Campanero PhD[4,7], Elizabeth J Cartwright PhD[8], Juan Miguel Redondo PhD[4,7], Weiguang Wang PhD[9], Vinodh Kannappan PhD[9], Mark Morris PhD[9], James Cotton MD[1,2], Angel L Armesilla PhD[1,4,10,11]

[1]Cardiovascular Molecular Pharmacology Laboratory, School of Pharmacy, Research Institute in Healthcare Science, Faculty of Science and Engineering, University of Wolverhampton, Wolverhampton, United Kingdom. [2]Department of Cardiology, Heart and Lung Centre, New Cross Hospital, Wolverhampton, United Kingdom. [3]Vascular Research Laboratory, IIS-Fundación Jiménez Díaz University Hospital, Av. Reyes Católicos 2, 28040, Madrid, Spain. [4]CIBERCV, Madrid, Spain. [5]Instituto de investigación Sanitaria Fundación Jimenez Díaz (IIS-FJD),Avenida Reyes Católicos 2,28040, Madrid, Spain. [6]Bioinformatics Unit, National Center for Cardiovascular Research (CNIC), Madrid, Spain. [7]Tissue & Organ Homeostasis Program, Centro de Biologia Molecular Severo Ochoa (CBM), Consejo Superior de Investigaciones Científicas-Universidad Autónoma de Madrid, Madrid, Spain. [8]Division of Cardiovascular Sciences, University of Manchester, Manchester, United Kingdom. [9]Research Institute of Healthcare Science, Faculty of Science and Engineering, University of Wolverhampton, Wolverhampton, United Kingdom. [10]Faculty of Health Sciences- HM Hospitals, Camilo Jose Cela University, Villanueva de la Canada, Madrid, Madrid, Spain. [11]HM Hospitals Health Research Institute, Madrid 28015, Madrid, Spain

- PMCA4 knockdown increases pro-inflammatory gene expression in endothelial cells
- Cytokine signalling reveals PMCA4 as a negative regulator of NFAT and C/EBP-β pathways.
- Loss of PMCA4 promotes leukocyte recruitment, which links calcium signaling to atherosclerosis.

M57

Identification of sex-specific mechanisms of endothelial to mesenchymal transition (EndoMT) contributing to atherosclerotic plaque stability using a multi-omics approach

Kelsey M Watts PhD[1], Lexi Wallace BS[1], Mete Civelek PhD[2]
[1]University of Virginia, Charlottesville, VA, USA. [2]UCLA, Los Angeles, CA, USA

- There are sex differences in the regulation of the endothelial to mesenchymal transition (EndoMT)
- EndoMT contributes to known sex differences in plaque biology and stability
- Multi-omics of bulk and single-cell RNA-seq reveals mechanisms of EndoMT regulation

M58

T cells from preeclamptic mice drive blood pressure elevation and vascular dysfunction in TCRα$^{-/-}$ recipients following repeated hypertensive stimuli

Michele N D'Agata PhD, Pretty S Joy PharmD, Olivia R Monte BS, Lauren A Biwer PhD
Yale University, New Haven, CT, USA

- Preeclampsia increases future hypertension risk and may be due to T cell-mediated vascular changes.
- Kidney T cell infiltration does not explain increased blood pressure due to PE-exposed T cells.
- PE-exposed T cells may be sufficient to induce long-term micro- and macro-vascular alterations.

M59

Nintedanib in vitro anti-inflammatory effects on venous endothelial cells and Monocyte/Macrophages (Mo/MΦ)

Oscar Y Moreno MD, Catherine Luke LVT, Kate Micallef BS, Daniel D Myers DVM, MPH, Thomas Wakefield MD, Peter Henke MD, Andrea Obi MD
University of Michigan, Ann Arbor, MI, USA

- Nintedanib targets pathways involved in inflammation, aiming to reduce vein fibrosis and restenosis.
- We created a protocol for isolating hVECs and analyzed Nintedanib's effects on hVECs and BMDMs.
- Nintedanib reduced inflammation in hVECs and Mo/MΦ cells.

M60

Smooth muscle embryonic origin drives differential response of unique subpopulations in atherosclerosis

Kevin Mangum MD, PhD, He Zhang BS, Qinmengge Li PhD, Tyler Bauer MD, Amrita Joshi PhD, Frank Davis MD, Alex Tsoi PhD, Johann Gudjonsson MD, PhD, Katherine Gallagher MD
University of Michigan, Ann Arbor, MI, USA

- Five SMC subpopulations exist throughout the aortic tree.
- These five SMC subtypes vary by region and disease state.
- Embryonic origin drives proportion of unique SMC subtypes.

M61

A novel role of neutrophil fluid-phase endocytosis in the pathogenesis of abdominal aortic aneurysm (AAA)

Stephen Asare Addo, Amritha Sreekumar, Yusra Zaidi, Valerie Harris, Faith Burnett, Kamila Wojnar-Lason, Tamasi Roy, Douglas Sloan, WonMo Ahn, Jeffrey Thomas, Ryan Harris, Peipei Zhu, Brian Stansfield, Gabor Csanyi
Augusta University, Augusta, GA, USA

- To identify the endocytic pathway and assess the contribution of EC-derived exosomes in AAA.
- To understand the crosstalk between EC-derived exosomes and neutrophils and how this drives AAA.
- Targeting neutrophil macropinocytosis can suppress AAA development and progression.

M62 *withdrawn*

M63

KLF2 Regulates Human Endothelial Cell Size Through Cell-Autonomous Mechanisms

David H An[1,2], Guillermo García-Cardeña Ph.D.[1]
[1]Brigham and Women's Hospital, Boston, MA, USA. [2]Harvard University, Cambridge, MA, USA

- KLF2 regulates endothelial cell size and shape
- Hypertrophy is eNOS-dependent and cell-autonomous
- Alignment spreads via eNOS-independent community effects

M64

ACKR1 Functions in Pulmonary Inflammatory Pathophysiology During Metastasis and Lung Inflammation

Qianxun Wang[1], Samuel Tanner Roach[1], Rishi Patel[1], Serena Thomas[1], Braulio Aguilar[1], Chinwe Ewenighi-Amankwah[1,2], Naiche Adler[1,2], Jan Kitajewski[1,2]
[1]Department of Physiology and Biophysics, University of Illinois Chicago, Chicago, IL, USA. [2]University of Illinois Cancer Center, Chicago, IL, USA

- ACKR1 regulates chemokines and leukocyte trafficking
- Endothelial ACKR1 drives neutrophil recruitment in tumors
- Tumor and inflammatory cues upregulate ACKR1 in lung vessels

M65

Endothelial TRPV4 channels limit the development of atherosclerotic lesions.

Maniselvan Kuppusamy PhD, Cheung Heng-Mae Caroline BS, Lojy Maged Hozyen, Kyosuke Kazama, Saainikedhana Venugopal MS, Swapnil K Sonkusare
University of Virginia, Charlottesville, Virginia, USA

- TRPV4 channel in endothelial cells plays a protective role against atherosclerosis
- TRPV4 Limits Endothelial-to-Mesenchymal Transition (EndMT)
- Activating TRPV4 may represent a novel strategy to reduce atherosclerosis.

VASCULAR HEALTH AND DISEASE I

M66

Unlikely Bedfellows – Opposing Epigenetic Readers Cooperate to Drive Vascular Disease

Research fellow Jing Li PhD, Research fellow Hongtao Shen PhD, Research Associate Runze Tang PhD, Postdoc fellow Yitao Huang PhD, Professor Craig Kent MD, Professor Lian-Wang Guo PhD
University of Virginia, Charlottesville, VA, USA

- Antagonistic histone code readers can collaborate in driving smooth muscle cell proliferation
- An unexpected EED–BRD4 synchosome co-opts opposing gene programs to drive cell proliferation
- Targeting the synchosome may offer a new strategy for durable prevention of neointimal hyperplasia.

M67

CCL5-producing GZMB+ cytotoxic lymphocyte mediate renal injury in ANCA-associated vasculitis

Kallie Wang, Dr. Qian Wang, Sajede Rasouli, Dr. William H Robinson, Dr. Shady Younis
Division of Immunology & Rheumatology, Stanford School of Medicine, Stanford, CA, USA

- Cytotoxic lyphocytes in AAV pathogenesis
- Chemokine networks in AAV pathogenesis
- Cytotoxic lymphocyte markers are GZMB, PRF1, CCL5, NKG7, and GNLY

TUESDAY

MICROCIRCULATION II

T01

Autophagy inhibition aggravates renal microvascular injury secondary to ischemia-reperfusion

Hyunyun Kim M.Sc.[1,2,3], Francis Migneault Ph.D.[2,3,4], Shanshan Lan Ph.D.[1,2,3], Imane Kaci M.Sc.[1,2,3], Julie Turgeon Ph.D.[2,3], Annie Karakeussian Rimbaud B.Sc.[2], Martin Dupont B.Sc.[2], Shijie Qi M.D.[2,3], Mélanie Dieudé Ph.D.[2,4,5], Marie-Josée Hébert M.D.[1,2,3]

[1]Département de Médecine, Université de Montréal, Montréal, QC, Canada. [2]Centre de Recherche, Centre Hospitalier de l'Université de Montréal (CRCHUM), Montréal, QC, Canada. [3]Canadian Donation and Transplantation Research Program (CDTRP), University of Alberta, Edmonton, AB, Canada. [4]Département de Microbiologie, Infectiologie et Immunologie, Faculté de Médecine, Université de Montréal, Montréal, QC, Canada. [5]Medical Affairs and Innovation, Héma-Québec, Québec, QC, Canada

- Autophagy and PCD actively crosstalk in PTCs during both acute and chronic phases after renal IRI.
- CHQ enhances PTC apoptosis and exacerbates PTC rarefaction and fibrosis after renal IRI.
- Autophagy plays a critical role in preserving PTC integrity during the AKI-to-CKD transition.

T02

Improved renal outcome and microvascular protection by endothelial-specific caspase-3 knockout compared to whole-body knockout after ischemia-reperfusion injury

Hyunyun Kim M.Sc.[1,2,3], Francis Migneault Ph.D.[2,3,4], Imane Kaci M.Sc.[1,2,3], Annie Karakeussian Rimbaud B.Sc.[2], Martin Dupont B.Sc.[2], Isabelle Bourdeau B.Sc.[2], Maria Vintila B.Sc.[2,5], Julie Turgeon Ph.D.[2,3], Mélanie Dieudé Ph.D.[2,4,6], Marie-Josée Hébert M.D.[1,2,3]

[1]Département de Médecine, Université de Montréal, Montréal, QC, Canada. [2]Centre de Recherche, Centre Hospitalier de l'Université de Montréal (CRCHUM), Montréal, QC, Canada. [3]Canadian Donation and Transplantation Research Program (CDTRP), University of Alberta, Edmonton, AB, Canada. [4]Département de Microbiologie, Infectiologie et Immunologie, Faculté de Médecine, Université de Montréal, Montréal, QC, Canada. [5]Department of Medicine, McGill University, Montréal, QC, Canada. [6]Medical Affairs and Innovation, Héma-Québec, Québec, QC, Canada

- The importance of the compartment-specific role of caspase-3-dependent apoptosis after renal IRI.
- Caspase-3-dependent apoptosis in endothelial cells aggravates microvascular injury and fibrosis.
- Endothelial-specific caspase-3 KO improves renal function and tubular injury than whole body KO.

T03

High-fidelity, cell-resolved computational modeling of microvascular blood flow: Coupling single cell biophysics with microvascular network complexity

Mithun Krishnan BS[1], Patrick Alan Pangilinan BS[1], Shane LeCompte MS[2], Prosenjit Bagchi PhD[1]

[1]Rutgers University, Piscataway, NJ, USA. [2]Rutgers University, Piscataway, USA

- High-fidelity computational model of microvascular blood flow with 3D flowing red blood cells
- The model utilizes exact in vivo images of microvascular networks from any organ/tissue
- The model can be applied to hemorheological and microvascular dysfunction, vascular remodeling, etc.

T04

Predicting red blood cell transport in angiogenic and tumor vascular networks in silico

Abhay Mohan MS, Prosenjit Bagchi PhD
Rutgers University, Piscataway, NJ, USA

- High-fidelity computational model predicts details of red cell transport and hemodynamics in tumor
- Detailed hemodynamic differences between angiogenic, tumor and healthy vasculatures are made
- Open new avenue of in silico modeling to predict tumor/angiogenic microvascular hemodynamics

T05

Inflammation of microcirculatory endothelium: the battlefield of the adverse reactions to mRNA-containing COVID-19 vaccines

Akos Koller MD, PhD[1,2,3], János Szebeni MD, PhD[4,5,6]
[1]Semmelweis Univeristy, Budapest, Hungary. [2]Hungarian University of Sports Science, Budapest, Hungary. [3]New York Medical College, Valhalla, NY, USA. [4]Semmelweis University, Budapest, Hungary. [5]SeroScience LLC, Budapest, Hungary. [6]Sungkyunkwan University, Suwon, Korea, Republic of

- The COVID-19, pandemic urged the development of mRNA-LNP-based vaccines (Comirnaty and Spikevax).
- Their administration elicited adverse events, collectively referred to as post-vaccination syndrome.
- Inflammation develops on the endothelial cell surface due to transfection with mRNA-LNP, and SP.

T06

Adiponectin deficiency increases dependence on hydrogen peroxide for flow-mediated vasodilation in skeletal muscle arterioles

Steven L Medarev[1], Maxwell Parr[2], Ashton Foster[2], Dilanka Ranaweera[2], Jose Pinto[1], Judy Delp[2]
[1]Florida State University, Tallahassee, FL, USA. [2]Kansas State University, Manhattan, KS, USA

- Adiponectin regulates redox balance in skeletal muscle arterioles.
- H2O2 supports flow-mediated vasodilation in the microcirculation.
- Adiponectin loss increases reliance on H2O2 for endothelial function.

T07

Capillary and arteriole mediated neurovascular coupling: Insights from an integrated model of vasoreactivity in the cerebral microcirculation

Niloufar Khakpour, Dabasish Kumar Saha, Nikolaos Tsoukias

Florida International University, Miami, Florida, USA

- Integrated model to link cell-level dynamics to tissue hemodynamics.
- cECs sense neuronal activity and initiate electrical signals to induce upstream vessel dilations.
- Arteriole–capillary signaling coordinates CBF; PCs preserve deep flow and support autoregulation.

T08

Phosphorylation of Pannexin 1 at Y198 may be a novel mechanism for controlling renal hemodynamics

Madison D Williams MS, PhD, Brooke L O'Donnell PhD, Vikram Sabapathy PhD, Nirelle K Sitchoa, Taylor J Buckley, Santosh Karnewar PhD, Rahul Sharma PhD, Jonathan R Lindner MD, Brant E Isakson PhD
University of Virginia, Charlottesville, VA, USA

- PANX1 Y198F mutant mice have decreased renal blood flow.
- PANX1 Y198F mutant mice have lower BUN, creatinine, and renin levels.
- PANX1 phosphorylation at Y198 may be important for control of renin release and renal hemodynamics.

T09

Syndecan-1 is a critical regulator of microvascular regeneration in ischemia and endothelial cell/pericyte crosstalk

Mrigayu Ghosh, Lei Mei PhD, Gregory P Callahan MS, William Shawlot PhD, Aaron B Baker PhD
The University of Texas at Austin, Austin, Texas, USA

- Syndecan-1 loss in either endothelial cells or pericytes impairs post-ischemia revascularization.
- Syndecan-1 mediates critical endothelial cell-pericyte interactions.
- Syndecan-1 is vital during development and repair but its loss has mild effects on stable vessels.

T10

MEG9–DNA repair axis protects vascular integrity during genotoxic stress

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

- Thr lncRNA MEG9 is induced by doxorubicin to protect endothelial DNA repair and angiogenesis.
- Loss of MEG9 mislocalizes MRE11A, uncoupling DNA repair and innate immune sensing
- Therapeutic restoration of MEG9 may prevent cancer therapy-induced vascular injury

MECHANOTRANSDUCTION II

T11

Red blood cell specific Piezo1 deficiency alter vascular hemodynamics

Zuzanna J Juskiewicz M.S.[1,2], Luke S Dunaway PhD[2], Miriam Cortese-Krott PhD[3], Junjie Li PhD[3], Clay Grisius[1], Brant Isakson PhD[1,2]
[1]Robert M. Berne Cardiovascular Research Center, University of Virginia School of Medicine, Charlottesville, VA, USA. [2]Department of Molecular Physiology and Biological Physics, University of Virginia School of Medicine, Charlottesville, VA, USA. [3]Myocardial Infarction Research Laboratory, Clinic of Cardiology, Pneumology and Angiology, Medical Faculty, Heinrich-Heine-University, Düsseldorf, Germany

- RBC Piezo1 loss does not affect RBC number, hematocrit and hemoglobin level in blood
- RBC Piezo1 loss might regulate hemodynamic oxidative stress
- RBC Piezo1 loss affects mice exhaustion in running test

T12

Endothelial MAPKinase signaling to control of KLF2/4 expression dynamics and vascular homeostasis

Brian G Coon PhD
Oklahoma Medical Research Foundation, Oklahoma City, OK, USA

- Multiple endothelial mechanotransduction pathways stem from MEKK2/3 signaling
- KLF2/4 expression dynamics are an important part of vascular homeostasis
- Many vascular malformations are associated with dysregulated MEKK2/3 signaling

T13

p38 MAP kinase mediates inflammatory, mechanotransduction, and EndMT pathways that promote atherosclerosis

Janet Kwon, Tianyu Gao, Dinuk M Baduge, Jishnu Sanyal, Anthony G Passerini PhD
UC Davis, Davis, CA, USA

- An artery-on-a-chip model is utilized to study converging signaling pathways that promote EndMT.
- TNFα and low magnitude SS were synergistic in promoting a mesenchymal phenotype.
- p38 inhibition rescued HAEC from the synergistic effects of TNFα and atherogenic SS.

T14

Hemodynamic regulation of FOXO1 integrates endothelial inflammation and metabolism in atherosclerosis

Hanqiang Deng PhD, Martin A. Schwartz
Yale Cardiovascular Research Center, Department of Internal Medicine, Yale University School of Medicine, New Haven, CT, USA

- Identify FOXO1 as a key mediator linking atheroprone flow and endothelial inflammation.
- Physiological shear stress suppresses FOXO1 via KLF2-CDK2 signaling.

- Artery ECs-specific deletion of FOXO1 significantly reduces atherosclerotic plaque formation.

T15

Protective Sphingosine-1-phosphate receptor 1 signaling occurs through Notch activation via a non-canonical S1PR1-Dll4-Mpdz complex

Jennifer L Bays PhD[1,2], Jessica L. Teo PhD[1,2], Freddy Suarez Rodriguez PhD[1], Alanna M. Farrell[1], Amy E. Stoddard PhD[1,3], Esther Koh[1,3], Christopher S. Chen MD/PhD[1,2]

[1]Boston University, Boston, MA, USA. [2]Wyss Institute for Biologically Inspired Engineering, Boston, MA, USA. [3]Harvard-MIT Program in Health Sciences and Technology, Institute for Medical Engineering and Science, Massachusetts Institute of Technology, Cambridge, MA, USA

- S1PR1's barrier-protective effects extend beyond G-protein signaling and are mediated by Notch.
- Notch activation is induced by a complex of activated S1PR1 and Dll4 scaffolded by MPDZ.
- Notch protects vascular barrier and rescues junctional defects induced by S1PR1 inhibition.

MATRIX BIOLOGY

T16

Hypoxia induces endothelial to mesenchymal transition through STAT3 activation

Anastasia Cicala[1,2], Li Wang[1], Anuradha Pandit[1], Ibrahim Elmadbouh[1], Aleksandra Babicheva[1,3], Luke H. Hoeppner[1,3]

[1]The Hormel Institute, Austin, MN, USA. [2]Luther College, Decorah, IA, USA. [3]Masonic Cancer Center, Minneapolis, MN, USA

- Hypoxia induces STAT3 activation and promotes vascular permeability
- STAT3 promotes EndMT and increases the migratory capacity of HUVEC in hypoxia
- Endothelial cell-specific STAT3 knockdown leads to reduced vascular permeability in mice in hypoxia

T17

Oncostatin-M drives capillary leak in critically ill children through AP1-dependent junctional remodeling

Giulio Fulgoni PhD[1], Weiming Ni PhD[1], Elena Wilson[1], Clancy Mullan MD, PhD[1], Francesc Lopez PhD[2], Guilin Wang Phd[2], Zenaat Malik[3], James Murray[4], John Giuliano MD[1], Shan Xu PhD[1], Song Pang PhD[1], Jordan Pober MD, PhD[1], Richard Pierce MD[1]

[1]Yale School of Medicine, New Haven, CT, USA. [2]Yale Center for Genomic Analysis, New Haven, CT, USA. [3]Yale University, New Haven, CT, USA. [4]University of Cambridge, Cambridge, United Kingdom

- Endothelial cells from critically ill patients show activation of Oncostatin-M (OSM) signaling
- OSM induces endothelial permeability via unique junctional remodeling revealed by FIB-SEM imaging

- A non-canonical AP1 pathway mediates OSM effect and can be blocked with pharmacologic inhibitors

T18 *withdrawn*

T19

SMC-Specific Ercc1 deficiency leads to aortic remodeling and structural abnormalities in the urinary bladder

Parya Behzadi PhD[1,2], Kenny Mackenzie BS[1,2], Rolando A Cuevas PhD[1,2], Andrew A Wendling[1,2], Nina Gakii BS[1,2], Cynthia St. Hilaire PhD[1,2,3,4]
[1]Department of Medicine, Division of Cardiology, University of Pittsburgh, Pittsburgh, PA, USA. [2]Pittsburgh Heart, Lung, and Blood Vascular Medicine Institute, University of Pittsburgh, Pittsburgh, PA, USA. [3]Department of Bioengineering, Swanson School of Engineering, University of Pittsburgh, Pittsburgh, PA, USA. [4]Department of Cardiothoracic Surgery, University of Pittsburgh, Pittsburgh, PA, USA

- DNA damage is activated in the vasculature due to the absence of Ercc1.
- Absence of Ercc1 induced bladder enlargement and structural changes in the smooth muscle cell layer.
- Absence of Ercc1 did not result in vascular calcification but led to aortic remodeling.

T20

EndMT phenotype modulation on venous endothelium with mTOR inhibition

Kate Micallef, Oscar Moreno Rocha, Nathaniel Parchment, Sabrina Rocco, Kiran Kumar, Catherine E Luke, Daniel D Myers, Thomas Wakefield, Peter Henke, Andrea Obi
University of Michigan, Ann Arbor, MI, USA

- An mTOR inhibitor reduced EndMT and inflammatory gene expression in venous endothelial cells
- Sirolimus-coated balloons reduced vein wall thickness and fibrosis in a re-thrombosis rat model
- TGF-β drove EndMT and fibrosis in venous thrombosis

T21

Extracellular matrix role in endothelial priming and activation in atherosclerosis

Gerardo A Cruz-Marquez PhD[1], Cyrine Ben Dhaou PhD[1], Anthony W Orr PhD[2]
[1]LSUHS, Shreveport, Louisiana, USA. [2]LSUSH, Shreveport, Lousiana, USA

- Endothelial derived remodeling of the extracellular matrix primes them to be more inflammatory
- The inflammatory effects are mediated by integrins α5 and αv binding to fibronectin
- Integrins α5/αv prime cell by increasing the expression of pro-inflammatory NFκB.

METABOLISM AND METABOLIC DISEASES II

T22

Vascular endothelial growth Factor-C exacerbates fibrosis and steatosis in metabolic disease-associated steatohepatitis via liver sinusoidal endothelial dysfunction

Seock-Won Youn PhD[1], Jason Eng MD, PhD[1,2], Bhairavi Swaminathan PhD[1], Pamela Teneqexhi BS[1], Braulio Aguilar Lugo BS[1], Jose Cordoba-Chacon PhD[1], Jan Kitajewski PhD[1]

[1]University of Illinois Chicago, Chicago, IL, USA. [2]The Ohio State University, Columbus, OH, USA

- VEGF-C expression in the liver increases during MASH in humans and mice.
- Chronic expression of VEGF-C exacerbates murine MASH.
- VEGFR2/VEGFR3 inhibition reduces MASH progression.

T23

Neonatal hyperoxia causes lipid accumulation, leading to alveolar simplification and microvascular rarefaction in the lung

Elena R Pineda BS[1,2], Hajime Maeda[1], Andy Doan[1], Wenliang Song[1], Phyllis Dennery[1]

[1]Brown Univeristy, Providence, RI, USA. [2]VA Medical Center, Providence, RI, USA

- Neonatal hyperoxia causes lipid accumulation in the lung
- Neonatal hyperoxia increases fatty acid synthesis but reduces lipid hydrolysis in endothelial cells
- Inhibiting fatty acid synthesis inhibits hyperoxic lung injury

T24

Alzheimer's disease model APPNL-F mice exhibit pronounced hematopoietic changes in middle age that contribute to atheroprogression

Olivia Gannon PhD, Jessica Partridge BS, Jesse Bonin MS, Ignacia Salfate del Rio BS, Allison Rahtes PhD, Ariana Nobles BS, Molly Batchelder BS, Christina Nickerson BS, Lily Nti-keyermeh BS, Kristen Zuloaga PhD, Gabrielle Fredman PhD, Katherine C MacNamara PhD

Albany Medical College, Albany, NY, USA

- Systemic inflammation increases in aging, accelerating cardiovascular and neurodegenerative disease.
- At middle age, blood production becomes biased towards myeloid cells which may drive atherogenesis.
- Inflammation in early Alzheimer's disease may accelerate hematopoietic changes.

T25

Expansion of basophil heterogeneity in cardiometabolic disease depends on hematopoietic organ of origin

Wyatt J Schug, Skylar A Loeb, Luke S Dunaway, Zuzanna J Juśkiewicz, Tajbir Raihan, Brant E Isakson

University of Virginia, Charlottesville, VA, USA

- Basophils may contribute to endothelial dysfunction in cardiometabolic disease
- Oxidative stress alters basophil proliferation and inflammatory gene programs

- HFHS diet induces distinct basophil phenotypes in bone marrow and spleen

T26 *Reassigned: Springer Award Lecture*

T27

Microvascular endothelial barrier dysfunction induced by oxidation of LDL by heme is mediated by iron dysregulation

Vivian J Eberly BS, MS, Jamie E Meegan PhD
University of South Alabama, Mobile, AL, USA

- Oxidation of LDL by heme induces microvascular endothelial barrier dysfunction.
- Microvascular endothelial cells stimulated with heme-oxLDL exhibit increased intracellular iron.
- Barrier dysfunction induced by heme-oxLDL is prevented by chelating iron.

T28

Diabetes uncouples macrophage IL-1β signaling and VEGF-A production and consequent angiogenesis in response to injury

Theopi Rados[1,2], Sheila Sharma[1,2], Crystal Parry[1,2], Saketh Uppuluri[1,2], Elizabeth Amelotte[1,2], Julia Pierce MPH[1,2], Andrew Farinha PhD[1,2], Celia Butler[1,2], Gaurav Choudhary MD[1,2], Chris Mantsounga PhD[1,2], Alan R Morrison MD, PhD[1,2]
[1]Ocean State Research Institute Inc. at Providence VA Medical Center, Providence, RI, USA. [2]Warren Alpert Medical School at Brown University, Providence, RI, USA

- Angiogenesis is impaired in T2D, pointing to inflammation and angiogenesis being uncoupled.
- T2D macrophages have reduced IL-1R signaling, which can explain the failure of VEGF-A induction.
- Enhancing VEGF-A could be a promising strategy to improve vascular healing in diabetic patients.

DEVELOPMENT I

T29

No polarity? No problem: Redefining lumenogenesis in vitro

Talen Niven BS, Drew Grespin BS, Patrick Soonthornprapuet BS, Jordis Bickel BS, Maya Kaul MS, Joe Capozzi BS, Maggie Grespin BS, Erich J Kushner PhD
University of Denver, Denver, CO, USA

- Novel blood vessel lumen formation assay using micropatterns
- Blood vessel can rapidly lumenize in the absence of canonical polarity signaling
- Tumor blood vessels may heavily employ alternative angiogenesis pathways

T30

Role of KMT2D in Endothelial Tip-Stalk Cell Selection and Shuffling During Sprouting Angiogenesis

Sandra Sulser Ponce de Leon MSc, Terry Xie, Maria A. Serrano PhD
Boston University Chobanian and Avedisian School of Medicine, Boston, Massachusetts, USA

- KMT2D plays a role in endothelial cell specification towards arterial and tip/stalk cell identities.

- KMT2D disrupts tip and stalk cell specification, evidenced by ECs co-expressing tip/stalk markers.
- KMT2D loss results in Notch pathway hyperactivation in ECs, affecting angiogenesis.

T31
The role of the RNA-binding protein PABPC1 in endothelial gene expression and angiogenesis
Jesse Cullison B.S.[1,2], Ruyu Yan M.D., Ph.D.[1,2], Hina Iqbal Ph.D.[1,2], Emily Clifford B.S.[1,2], Katherine Hamm B.S.[1,2], Ziqing Liu Ph.D.[1,2]
[1]Department of Physiology, Medical College of Wisconsin, Milwaukee, Wisconsin, USA. [2]Cardiovascular Center, Medical College of Wisconsin, Milwaukee, Wisconsin, USA
- RNA-binding proteins (RBP) are understudied in angiogenesis.
- Our lab has identified RBP PABPC1 as playing a role in angiogenesis.
- PABPC1 modulation leads to changes in inflammation and vessel growth in developmental models.

T32
Unveiling the contribution of second heart field progenitors to embryonic vein formation
Yunping Guo Master's[1], Christina Vyzas[2], Sophie Astrof Ph.D.[1]
[1]Rutgers Biomedical Health Sciences, Newark, New Jersey, USA. [2]New Jersey Medical School, Newark, New Jersey, USA
- VEGFR2 is not strictly required for venous ECs recruitment from SHF-derived progenitors.
- The loss of Etv2 lead to decrease in the contribution of SHF-derived progenitors to venous ECs.
- Tbx1 is required for the contribution of SHF-derived progenitors to the cardinal vein.

T33 *withdrawn*

T34
Bridging chloride intracellular channels (CLICs) and Rho/Rac signaling: discovery of conserved EXC-4/CLIC physical interactors in C. elegans that function in Rho/Rac regulation
Jordan Jesse B.S., Anthony Arena PhD, Daniel Shaye PhD
University of Illinois Chicago, Chicago, IL, USA
- EXC-4 interactors in C. elegans may reveal mediators of CLIC function in Rho/Rac signaling in HUVEC.
- CLIC1 and CLIC4 are differentially required to activate Rac1 and RhoA in HUVEC downstream of GPCRs.
- CLIC signaling function is conserved during tubulogenesis of the C. elegans Excretory Canal.

T35

Molecular crosstalk between placental vascular development and infant blood-brain barrier stability

John C Chappell PhD, Audra Barnes BS, James Stupin BS
Fralin Biomedical Research Institute, Roanoke, VA, USA

- Soluble PDGFRβ may regulate placental vessels and contribute to vascular dysfunction.
- PDGFRβ isoforms show distinct patterns, suggesting different roles in vessel development.
- Low sPDGFRβ in high-risk infants may serve as a biomarker and therapeutic target.

VASCULAR ANOMALIES AND MALFORMATIONS I

T36

***Kras*^{G12D} gene controls growth and maintenance of brain arteriovenous malformations in transgenic mice**

Chul Han PhD, Alberto Fuentes MS, S. Paul Oh PhD
Barrow Neurological Institute, Phoenix, AZ, USA

- Endothelial KRAS(G12D) drives AVM initiation in transgenic mouse models
- Doxycycline-induced KRAS suppression reverses AVM size by up to 96%
- AVMs recur after KRAS reactivation, proving its role in AVM maintenance

T37

Classification of *ENG* missense mutations by protein loss of function mechanism to direct small molecule therapies for protein rescue in hereditary hemorrhagic telangiectasia

Kristina M Day, Elizabeth A Mickler, Tamara J Graves, Micheala A Aldred
Department of Medical and Molecular Genetics, and Division of Pulmonary, Critical Care, Sleep and Occupational Medicine, Department of Medicine, Indiana University School of Medicine, Indianapolis, IN, USA

- Pathogenic missense variants cause differential protein loss due to instability or traffic defects.
- Therapies against misfolded proteins have not been applied to hereditary hemorrhagic telangiectasia.
- We show misfolded protein therapies are effective at rescuing some Endoglin missense variants.

T38

Therapeutic dual VEGFA-ANG2 inhibition in Hereditary Hemorrhagic Telangiectasia

Shreya Bavishi MBBS[1], Christian Klein PhD[2], Stryder Meadows PhD[1]
[1]Tulane University, New Orleans, LA, USA. [2]Curie.bio, Zurich, Switzerland

Therapeutic discovery is greatly needed in HHT, as it currently lacks FDA-approved drug treatments.

- A CrossMab bispecific antibody targeting both VEGFA and ANGPT2 can be repurposed for HHT treatment.
- Faricimab (ANGPT2-VEGFA inhibitor) is compared to monotherapies in HHT management.

T39

Defining the role of FOXO1 in ANG2 dysregulation associated with HHT vascular pathogenesis

Anirban Ray Phd[1], Mae-Ying Z Stock-Bordnick[1], Philippe Marambaud PHD[2], Stryder Meadows PHD[1]

[1]Tulane University, New Orleans, LA, USA. [2]The Feinstein Institutes for Medical Research, Northwell Health, Manhasset, NY, USA

- SMAD4 loss increases FOXO1–ANG2 signaling, disrupting vessels and driving AVMs.
- HHT models show reduced TIE2, more FOXO1, and elevated ANG2 in endothelium.
- Targeting FOXO1 may lower ANG2 and reduce AVM severity in HHT mice.

T40

Characterization of PIK3CA-driven venous malformations uncovers aberrant tip cell behavior and dysregulated sprouting angiogenesis

Kylie M Browne BS, Stryder M Meadows PhD

Tulane University, New Orleans, LA, USA

- PIK3CAH1047R; Cdh5-CreERT2 mice develop vascular malformations in postnatal and adult vasculature.
- Mutant retina vasculature displays physiological defects as well as tip cell marker misexpression.
- mTOR inhibitor Rapamycin restores postnatal mutant vessel morphology and tip cell expression.

T41

Intracranial Aneurysm Susceptibility gene hspg2/Perlecan regulates pericyte coverage and vascular stability in zebrafish

Surya Prakash Rao Batta, Surman Gurung, Nicole K Restrepo, Vishal Mardhekar, Saulius Sumanas

University of South Florida, Tampa, Florida, USA

- Hspg2 regulates Pdgfb-Pdgfr signaling, pericyte coverage and vascular stability
- Hspg2 loss is correlated with an increase incidence of Intracranial Aneurysm
- Hspg2 regulates blood-brain-barrier by modulating pericyte dynamics

T42

Semaphorin 3A and 3F overexpression in TIE2 hyperactive endothelial cells contribute to the pathological lumen expansion in venous malformation

Sandra Schrenk PhD[1], Chhiring Sherpa MS[2], Lindsay Bischoff PhD candidate[2], Elisa Boscolo PhD[2]

[1]Cincinnati children's Hospital, Cicninnati, OH, USA. [2]Cincinnati children's Hospital, Cincinnati, OH, USA

- In a Venous Malformation xenograft model, blood vessels were lined almost exclusively by mutant EC
- TIE2-mutant EC promoted repulsion of wild-type EC via overexpression of Sema3A and Sema3F
- knock-down of Sema3A or 3F in TIE2-mutant EC normalized the blood vessel size in vivo

DISEASES (VASCULAR AND CARDIOVASCULAR)

T43

Expression of osteogenic regulators in healthy and diseased vascular smooth muscle cells

Ashleigh J Hicks BClinSci, MRes[1], Sumudu VS Gangoda BBioTech (Hons), MRes, PhD[1], Cynthia L St Hilaire PhD, FAHA[2], Jacqueline K Phillips BVSc (Hons), PhD[1]
[1]Macquarie Medical School, Faculty of Medicine Health and Human Sciences, Macquarie University, Sydney, New South Wales, Australia. [2]Department of Medicine, Division of Cardiology, Vascular Medicine Institute, University of Pittsburgh, Pittsburgh, Pennsylvania, USA

- Polycystic kidney disease mutations predispose vascular smooth muscle cells (VSMCs) to calcification
- Calcification and phenotypic changes were induced in cultured rat primary VSMCs
- Osteogenic transdifferentiation marker, ALP, was increased in the polycystic kidney disease VSMCs

T44

Versican accumulation promotes aortic disease in marfan syndrome through Akt-mediated nitric oxide pathway induction

Iván Alarcón-Ruiz* MSc[1,2], María Jesús Ruiz-Rodríguez* PhD[3,2], Sara Martínez-Martínez PhD[4,2], Jorge Oller PhD[5], Marta Toral PhD[6,2], Yilin Sun PhD[4], Ángel Colmenar[1], María José Méndez Olivares[1], Dolores López-Maderuelo[1], Christine B Kern MD[7], J Francisco Nistal MD[2,8], Arturo Evangelista PhD[9], Gisela Teixido-Tura PhD[2,10], Miguel R Campanero# PhD[4,2], Juan Miguel Redondo# PhD[4,2]
[1]Centro Nacional de Investigaciones Cardiovasculares (CNIC), Madrid, Spain. [2]Centro de Investigación Biomédica en Red de Enfermedades Cardiovasculares (CIBERCV), Madrid, Spain. [3]Yale University, New Haven, Connecticut, USA. [4]Centro de Biología Molecular Severo Ochoa (CBM-CSIC), Madrid, Spain. [5]Hospital Universitario Fundación Jiménez Díaz, Madrid, Spain. [6]Universidad de Granada, Madrid, Spain. [7]Medical University of South Carolina (MUSC), Charleston, USA. [8]Instituto de Investigación Valdecilla (IDIVAL), Santaner, Spain. [9]Teknon Medical Centre-Quironsalud. Heart Institute, Barcelona, Spain. [10]Hospital Universitari Vall d'Hebron (VHIR), Barcelona, Spain

- Adamts1 downregulation promotes versican accumulation in the aorta in Marfan Syndrome
- Versican acts via AKT-induced activation of the canonical nitric oxide pathway
- Targeting versican or its downstream signaling reverses aortic disease in Marfan syndrome

T45 *withdrawn*

T46 *withdrawn*

T47

Breast cancer induces cardiac inflammation to predispose the cardiovascular system to damage during chemotherapy

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

[1]University of Toronto, Toronto, Canada. [2]Toronto General Hospital Research Institute, Toronto, Canada. [3]Peter Munk Cardiac Centre, Toronto, Canada

- Breast cancer promotes systemic inflammation and endothelial dysfunction.
- Doxorubicin worsens cardiac injury in tumor-bearing mice through immune and vascular changes.
- Investigating tumour-induced vascular inflammation and damage may reveal new biomarkers of CTRCD.

T48

Progression of spontaneous aortic valve stenosis in aging New Zealand obese mice

Elizabeth M Amelotte B.S.[1,2], Chris Mantsounga PhD[1,2], Julia Pierce MPH[1,2], Olivya Caballero M.Sc.[1,2], Andrew Farinha PhD[1,2], Saketh Uppuluri B.S.[1,2], Celia Butler MPH[1,2], Gaurav Choudhary MD[1,2], Alan R Morrison MD/PhD[1,2]
[1]Ocean State Research Institute at the Providence VA Medical Center, Providence, RI, USA. [2]Warren Alpert Medical at Brown University, Providence, RI, USA

- Molecular mechanisms of disease for aortic stenosis
- Implications of diabetes on aortic stenosis
- Sex based differences in aortic stenosis

T49

A novel role for interleukin-1 receptor signaling in pulmonary arterial hypertension

Jill A Rose BSc, Ella Terwilliger, Mabruka Alfaidi MD., PhD.
University of Nebraska Medical Center, Omaha, NE, USA

- Hypoxia PAH model induces EndMT in pulmonary artery endothelial cells
- IRAK1 drives EndMT and endothelial dysfunction
- Elevated IRAK1 in PAH suggests therapeutic potential

T50

Coordinated aortic cell responses contribute to vascular remodeling and stiffness in hypertension

María Jesús Ruiz-Rodríguez PhD[1], Pengwei Ren PhD[1], Jay Humphrey PhD[2], George Tellides PhD[1,3]
[1]Yale School of Medicine, New Haven, CT, USA. [2]Yale School of Engineering and Applied Science, New Haven, CT, USA. [3]Veteran Affairs Connecticut Healthcare System, West Haven, CT, USA

- Aortic smooth muscle cells and macrophages are subjected to major changes in hypertension
- Hypertension initiates a well-orchestrated response within the vascular wall
- Hypertension induces recruitment of macrophages with an ECM remodeling signature to the aorta

T51

Aortic hypoplasia is mediated by TGFb/RhoGTPase activation

Pazhanichamy Kalailibgam PhD[1], Emily Bramel PhD[2], Claire Fong BS[1], Vijay Krishnan PhD[1], Diana Tambala MD[1], Aarushi Gandhi BS[1], David R Ramos Ph.D[1], Claire Ellen Shamber B.S[1], Michelle Nivar B.A[3], Manuella Lahoud Rahme M.D[3], Maggie Brand B.A[4], Shaine Morris M.D., MPH[5], Karen Buch M.D[6], Mark Chaffin A.B., S.M[7], Patrick Ellinor M.D., Ph.D[7,8], Pradeep Natarajan M.D., MMSc[7,8], Angela

Lin M.D[9], Benjamin P. Kleinstiver Ph.D[10,11,12], Patricia Musolino M.D., Ph.D[10], Mark E. Lindsay M.D., Ph.D.[8,2,4,3]
[1]GCM-MGH- Harvard Medical School, Boston, MA, USA. [2]Cardiovascular Disease Initiative, Broad Institute of Harvard and MIT, Boston, MA, USA. [3]Division of Pediatric Cardiology, Department of Pediatrics, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA. [4]Myhre Syndrome Clinic and Division of Genetics, Department of Pediatrics, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA. [5]Division of Pediatric Cardiology, Department of Pediatrics, Texas Children's Hospital, Baylor College of Medicine, Texas, USA. [6]Department of Radiology, Massachusetts General Hospital,, Boston, USA. [7]Cardiovascular Disease Initiative, Broad Institute of Harvard and MIT,, Boston, USA. [8]Cardiovascular Genetics Program, Division of Cardiology, Massachusetts General Hospital, Harvard Medical School,, Boston, USA. [9]Myhre Syndrome Clinic and Division of Genetics, Department of Pediatrics, Massachusetts General Hospital, Harvard Medical School, Boston, USA. [10]GCM-MGH- Harvard Medical School, Boston, USA. [11]Department of Pathology, Harvard Medical School, Boston, MA, USA. [12]Department of Pathology, Massachusetts General Hospital, Boston, MA, USA

- Genetic drivers of aortic hypoplasia
- Pathway overactivation
- Pathogenic convergence & therapeutic potential

ENDOTHELIUM IN HEALTH AND DISEASE

T52

Differential constitutive endothelial dysfunction in thrombotic and obstetric antiphospholipid syndrome: A study using patient-derived endothelial colony-forming cells

Roberta Ciceri[1,2], Maria Gerosa[3,4], Claudia Iannone[3,4], Luisa Charlotte Guerrieri[1,2], Monica Bacci[5], Assunta Cancellara[1,2], Fabio Tumminello[5,6], Lorenza Maria Argolini[3,4], Corrado Lodigiani[5], Marco Paolo Donadini[7,8], Silvia Della Bella[1,2], Roberto Felice Caporali[3,4], Francesca Calcaterra[1,2], Domenico Mavilio[1,2]
[1]Unit of Clinical and Experimental Immunology, IRCCS Humanitas Research Hospital, Rozzano, Italy. [2]Department of Medical Biotechnologies and Translational Medicine, University of Milan, Milan, Italy. [3]Research Centre for Adult and Pediatric Rheumatic Diseases, Department of Clinical Sciences and Community Health, University of Milan, Milan, Italy. [4]Lupus Clinic, Division of Clinical Rheumatology, ASST Pini CTO, Milan, Italy. [5]Center for Thrombosis and Hemorrhagic Diseases, IRCCS Humanitas Research Hospital, Rozzano, Italy. [6]Department of Biomedical Sciences, Humanitas University, Pieve Emanuele, Italy. [7]Dipartimento di Medicina e Chirurgia, Università dell'Insubria, Varese, Italy. [8]Centro Trombosi ed Emostasi, Ospedale di Circolo e Fondazione Macchi, ASST Sette Laghi, Varese, Italy

- Patient-derived ECFCs enable direct analysis of endothelial dysfunction in APS
- Patients with primary antiphospholipid syndrome display constitutive endothelial dysfunction
- Thrombotic and obstetric APS patients show distinct endothelial dysfunction profiles

T53

Gumby deficiency exacerbates inflammation and coronary artery remodeling in Kawasaki disease

Guanghui Qian Ph.D
Children's Hospital of Soochow University, Suzhou, Jiangsu, China

- Gumby expression level is associated with the KD pathogenesis.
- Gumby expression level is negatively associated with TNFα signaling in KD.
- Gumby deficiency aggravated KD vasculitis.

T54

Development and functional assessment of iPSC-derived endothelial cells using a novel non-invasive workflow

Stacie Chvatal, Inge Thijssen-van Loosdregt, Svenja Meiler, Denise Sullivan
Axion BioSystems, Atlanta, GA, USA

- Workflow combining live-cell imaging and real-time impedance for functional validation of iPSC-ECs
- iPSC-EC function confirmed using scratch closure, tubule formation, and TEER assays
- Cytochalasin D disrupted endothelial cell function and barrier integrity in a dose-dependent manner

T55

Extracellular vesicle protein cargo as a biomarker for cerebrovascular dysfunction in heart failure

Suejean Park[1,2], Rachel Cahalane[3], Sasha A Singh[3], Elena Aikawa[3], Jason E Fish[1,2,4]
[1]Department of Laboratory Medicine and Pathobiology, Univeristy of Toronto, Toronto, ON, Canada. [2]Toronto General Hospital Research Institute, University Health Network, Toronto, ON, Canada. [3]Center for Excellence in Vascular Biology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA. [4]Peter Munk Cardiac Centre, University Health Network, Toronto, ON, Canada

- Unique EV cargo proteins were identified for brain ECs
- EC-EVs are more reflective of the EC cell lysate with activation
- TNFα-activation of ECs drives protein profiles of EC-EVs to become more similar

T56

Pannexin1 regulation of cerebral vascular function in a mouse model of Alzheimer's disease

Amanda K Mauro PhD, Maurico Ruiz Soler, Maria Tomás-Gracia, Colleen K Duffy, Miranda E Good PhD
Tufts Medical Center, Boston, MA, USA

- Cerebral vascular dysfunction is associated with Alzheimer's disease.
- Endothelial Pannexin 1 content dictates cerebral vascular tone.
- Endothelial Pannexin 1 may be a target to improve cerebral vascular function in Alzheimer's disease.

T57

Spatial transcriptomic analysis of the tumor vasculature in the context of solid tumor T-cell bispecific therapy

Matthew Curtis, Billy Tomaszewski, Conrad Foo, Patrick Chang, Robyn Clark, Thao Nguyen, Joshua Webster, Sandra Rost, Raj Jesudason, Klara Totpal, Lisa McGinnis, Robert Piskol, Weilan Ye

Genentech, Inc., South San Francisco, CA, USA

- T-cell bispecific antibodies allow for the TCR-independent killing of target cells by CD3+ T-cells.
- Resultant cytokine release alters the immune-vascular interactions in normal tissue and solid tumor.
- Spatial transcriptomics show patterns of the tumor vasculature that may impact T-cell trafficking.

T58

Post-transcriptional regulation of vascular homeostasis by PolyA Binding Protein Cytoplasmic 1 (PABPC1)

Hina Iqbal Ph.D.[1,2], Jesse Cullison B.S.[1,2], Ruyu Yan M.D., Ph.D.[1,2], Emily Clifford B.S.[1,2], Katherine Hamm B.S.[1,2], Ziqing Liu[1,2]

[1]Department of Physiology, Medical College of Wisconsin, Milwaukee, Wisconsin, USA. [2]Cardiovascular Center, Medical College of Wisconsin, Milwaukee, Wisconsin, USA

- RBPs are understudied in vascular biology, especially in EC activation and vascular homeostasis
- Our results challenges the paradigm that PABPC1 universally binds and stabilizes all poly(A) mRNAs
- A novel role of PABPC1 in vascular homeostasis by preventing EC activation

T59

Common genetic variants In EDN1 are associated with cardiovascular traits and secreted Endothelin-1

Mohita Maurya[1,2], Cindy Y Zheng[1,3], Helen Kang[1,2], Gavin Schnitzler[1,2], Daniel I Chasman[1], Rajat M Gupta[1,2]

[1]Brigham and Women's Hospital, Boston, MA, USA. [2]Broad Institute, Boston, MA, USA. [3]Broad Institute, Boston, MAMA, USA

- Multiple variants in EDN1 locus are associated with CAD, hypertension and ascending aortic diameter
- Missense variant, rs5370 causes increased secretion of endothelin 1
- 6p24 enhancer deletion in mouse, modulates EDN1 gene expression in vascular cells

T60

Induction of iron deficiency and excess in a human retinal microvascular endothelial cell model

Kaoru Terai PhD, Timothy Monko PhD, Thomas Bastian PhD, Ellen C Ingolfsland MD

University of Minnesota, Minneapolis, MN, USA

- Iron deficiency may promote angiogenesis in human retinal microvascular endothelial cells.

- Excess iron treatment may suppress angiogenesis in human retinal microvascular endothelial cells.
- Iron deficiency enhances VEGFA expression while excess iron reduces PHD2 in cultured ECs.

T61
Hypoxia-Induced Transdifferentiated Lymphatic Endothelial Cells Modulate Immune Responses in Lung Fibrosis
Aiden Xia, Qian Wang
iLab Research Institute, Mountain view, CA, USA
- LECs undergo reprogramming in pulmonary fibrosis
- Reprogrammed LECs express venous markers and heightened proinflammatory molecules
- Reprogrammed LEC directly modulate the responses of both innate and adaptive immune cells

MICROVASCULATURE

T62
Adipogenic Profiling of the Type 2 Diabetic Coronary Microcirculation
Dr. David Cunningham PhD, Hunter Rode, Sanju Gudla, Dr. Elizabeth Garfinkle PhD, Dr. Corinne Strawser PhD, Dr. Patricia E. McCallinhart PhD, Dr. Katherine Miller PhD, Dr. Aaron J. Trask PhD
Nationwide Children's Hospital, Columbus, OH, USA
- Adipogenesis is enriched in the diabetic coronary microcirculation.
- Lipid droplets are increased in the diabetic myocardium, but not the coronary microcirculation.
- Perilipin 2 gene expression was increased in diabetic coronaries.

T63
Correlation Between Infrared Pedal Temperature Measurements and Lower Extremity Noninvasive Tests in Patients With Peripheral Artery Disease Following Revascularization
Vaishnavi Siripurapu, Adriana A Rodriguez-Alvarez, Isabella F Cieri, Shiv S. Patel, Anahita Dua
Massachusetts General Hospital, Boston, MA, USA
- Foot temperature may help detect early blood flow issues after revascularization
- Wounds linked to lower ABI/toe pressure but higher foot temperatures.
- Higher TBI correlates with lower temps at specific foot sites in wound patients.

TISSUE ENGINEERING

T64
Sacrificial Percolation of Anisotropic Networks Enables Perfusable Engineered Tissues In Vivo
Dr Terry Ching[1,2], Dr Dhananjay Deshmukh[1,2], Dr Amy Stoddard[1,2,3], Dr Alex Lammers[1], Dr Jeroen Eyckmans[1,2], Dr Chris Chen[1,2]

[1]Boston University, Boston, MA, USA. [2]Wyss Institute, Boston, MA, USA. [3]MIT, Cambridge, MA, USA

- Rapid creation of perfusable networks in thick tissues using sacrificial alginate fibers
- Viable subcutaneous implantation of engineered, cell-dense tissue constructs in mice
- On-demand in vivo channel formation by enzymatic degradation of sacrificial networks

T65

Fabricating vascular architectures using gallium as a sacrificial material

Subramanian Sundaram PhD[1,2], Dhananjay V Deshmukh PhD[1,2], Joshua H Lee[1], Christos Michas PhD[1], Sudong Kim PhD[1,2], Alex Lammers PhD[1], Jeroen Eyckmans PhD[1,2], Christopher S Chen MD, PhD[1,2]

[1]Boston University, Boston, MA, USA. [2]Wyss Institute at Harvard University, Boston, MA, USA

- Complex, multi-scalar vascular architectures engineered by molding hydrogels around gallium template
- Gallium can be removed using mild pH modulation or via electrocapillarity
- ESCAPE successfully generates a wide range of biologically-relevant vascular geometries

WEDNESDAY

INFLAMMATION II

W01

Inhibition of PTBP1 in endothelium of transplanted tissue limits cardiac allograft vasculopathy

Chris Pathoulas[1], Koki Hayashi[2], Krish Dewan[3], Ryan Gross[3], Amy L Kimble[1], QIan Li[4], Lifang Ye[4], Bing Hao[1], Bo Reese[5], Evan Jellison[1], Antoine Menoret[1], Anthony Vella[1], Dawn Bowles[3], Nichole Valenzuela[6], Jeffrey J Hsu[4], Alessandro Alessandrini[2], Patrick Murphy[1]

[1]University of Connecticut Medical School, Farmington, CT, USA. [2]Harvard University, Cambridge, MA, USA. [3]Duke University, Durham, NC, USA. [4]University of California, Los Angeles, Los Angeles, CA, USA. [5]University of Connecticut, Storrs, CT, USA. [6]Maine Health, Portland, ME, USA

- Analysis of endothelial changes in mRNA expression in heart transplant interactions with host.
- Endothelial regulation of chronic inflammatory responses in transplant by the splice factor PTBP1
- Alteration of the endothelium in transplanted tissue limits immune response and vascular injury

W02

Macrophages to smooth muscle cell crosstalk regulates cell phenotype switching

Mark C REnton PhD[1], Farwah Iqbal MD, PhD[2], Meghan W Sedovy PhD[3], Adam Hoch BS[2], Amanda Reynolds BS[2], Kailynn Roberts BS[4], Brant E Isakson PhD[5], Liwu Li PhD[6], Scott R Johnstone PhD[3,2,7]

[1]1. The Fralin Biomedical Research Institute at Virginia Tech Carilion, Center for Vascular and Heart Research, Roanoke, Virginia, USA. [2]2. Virginia Tech Carilion School of Medicine, Roanoke, VA, USA. [3]1. The Fralin Biomedical Research Institute at Virginia Tech Carilion, Center for Vascular and Heart Research, Roanoke, VA, USA. [4]3. The Fralin Biomedical Research Institute at Virginia Tech Carilion, Translational Biology, Medicine, and Health Graduate Program, Roanoke, VA, USA. [5]4. Robert M. Berne Cardiovascular Research Center, University of Virginia School of Medicine, Charlottesville, VA, USA. [6]5. Department of Biological Sciences, Virginia Tech, Blacksburg, VA, USA. [7]5. Department of Biological Sciences, Blacksburg, VA, USA

- Inflammatory macrophages drive SMC phenotypic switching
- Direct signaling via gap junctions is an important regulator of SMC phenotype
- SMC gap junction signaling drives changes in macrophage phenotype

W03

Macrophage alternative VEGF-A165 splicing as the cause of impaired inflammatory angiogenesis in the context of advanced aging

Chris S Mantsounga PhD[1,2], Julia Pierce MPH[2], Saketh Uppuluri BS[2], Andrew Farinha PhD[2], Elizabeth Amelotte BS[2], Theopi Rados[1], Gaurav Choudhary MD[2], Alan Morrison MD. PhD[1,2]

[1]Brown University, Providence, 02903, USA. [2]Providence VA Medical Center, Providence, 02908, USA

- Advanced aging leads to reduced new capillaries and arteries and VEGF-A165 splice isoform switch.
- Mechanism of action, importance, expression levels of the VEGF-A165 splicing remain unclear in aging
- Macrophage VEGF-A165 splice variant mice have been made to deepen our understanding.

W04

Aging impairs inflammatory arteriogenesis by disruption of proangiogenic VEGF-A mRNA stability conferred by Dicer1 dose-sensitive microRNAs

Chris S Mantsounga PhD[1,2], Julia Pierce MPH[1,2], Maddie Clark[2], Olivya Caballero ScM[2], Andrew Farinha PhD[1,2], Sheila Sharma ScM[1,2], Saketh Uppuluri[1,2], Elizabeth Amelotte[1,2], Theopi Rados[1,2], Jade C Neverson DO[1,2], Cadence Lee ScM[1,2], Celia Butler MPH[1,2], Frank W Sellke MD[2], Alexey Fedulov MD/PhD[2], Gauruv Choudhary MD[1,2], George Lisi PhD[2], Alan R Morrison MD/PhD[1,2]
[1]Ocean State Research Institute, Providence, RI, USA. [2]Warren Alpert Medical School of Brown University, Providence, RI, USA

- Aging is associated with reduced macrophage VEGF-A expression and impaired angio/arteriogenesis
- Expression of Dicer-1 and miR-29 is reduced in a methylation-dependent manner with aging
- Restoring miR-29 expression can promote HuR-mediated VEGF-A stability and inflammatory angiogenesis

W05

RBC redox pathways and sex-specific blood cell aggregation in a murine sickle cell model

Megan E. Butler MS, Sushma Bharrhan PhD, Tashawna Esmond, Matthew D. Woolard PhD, Karen Y. Stokes PhD
LSU Health Shreveport, Shreveport, LA, USA

- Sex-specific blood cell aggregate patterns in murine sickle cell disease model.
- Novel RBC isolation method to detect redox enzymes in murine model.
- Decreased SOD1 levels in murine sickle RBCs reflect human disease.

W06

IL-1β-driven NF-κB transcription of ACE2 as a Mechanism of Macrophage Infection by SARS-CoV-2

Andrew Farinha PhD[1,2], Cadence Lee[1,2], Rachel Khan PhD[1,2], Chris Mantsounga PhD[1,2], Sheila Sharma[1,2], Julia Pierce MPH[1,2], Elizabeth Amelotte[1,2], Celia Butler[1,2], Crystal Parry[1,2], Olivya Caballero[1,2], Jeremi Morrison[1,2], Saketh Uppuluri[1,2], Joshua Kennedy MD[3], Xuming Zhang PhD[3], Gaurav Choudhary MD[1,2], Rachel Olson PhD[4,5], Alan Morrison MD, PhD[1,2]
[1]Ocean State Research Institute Inc. at Providence VA Medical Center, Providence, RI, USA. [2]Warren Alpert Medical School at Brown University, Providence, RI, USA. [3]Department of Pediatrics at University of Arkansas for Medical Sciences, Little Rock, AR, USA. [4]Department of Veterinary Pathobiology at University of Missouri College of Veterinary Medicine, Columbia, MO, USA. [5]Laboratory for Infectious Disease Research at University of Missouri Division of Research, Innovation and Impact, Columbia, MO, USA

- We developed a novel mouse model for studying SARS-CoV2 infection that differs from current models.
- We identified an IL-1beta/NF-kB dependent pathway regulating the expression of ACE2 in macrophages.
- We identified SARS-CoV2 replication in macrophages.

W07

Impact of macrophage IL-6 expression on peripheral artery disease

Saketh Uppuluri B.S[1,2], Chris Mantsounga PhD[1,3], Rachel Khan Pharm.D, PhD[1,2], Andrew Farinha PhD[1,2], Julia Pierce MPH[4,3], Elizabeth Amelotte B.S[1,2], Celia Butler MPH[1,3], Gaurav Choudhary MD[4,3], Alan R Morrison MD, PhD[4,2]
[1]Ocean State Research Institute at the Providence VA Medical Center, Providence, RI, USA. [2]Warren Alpert Medical School at Brown University, Provicence, RI, USA. [3]Warren Alpert Medical School at Brown University, Providence, RI, USA. [4]Ocean State Research Institute at the Providence VA Medical Center, Provicence, RI, USA

- IL-6 influences macrophage-driven VEGF-A expression in pro-inflammatory angiogenesis.
- IL-6 works alongside IL-1B to influence VEGF-A expression.
- Deletion of macrophage specific IL-6 decreases angiogenesis in hind limb ischemia mice.

W08

Decoding the role of mechanobiology in regulating endothelial tissue inflammatory response

Sarah Root BA, Shailaja Seetharaman PhD, Aaron Dinner PhD, Margaret Gardel PhD
University of Chicago, Chicago, IL, USA

- Endothelial cells have heterogeneous expression in response to inflammation
- Mechanobiological signals may regulate some of the heterogeneity in inflammatory expression
- VCAM-1 expression is correlated with cell shape

W09

Cytokine co-stimulation activates brain endothelial cells with implications for CAR T-associated neurotoxicity

Ruoqian Hu[1,2], Lina Park[3], Mahashweta Bose[3], Yu-Tung Tsai[3], Joseph D. Smith[4,5], Juliane Gust[3,6], Ying Zheng[1,2]
[1]Department of Bioengineering, University of Washington, Seattle, WA, USA. [2]Institute for Stem Cell and Regenerative Medicine, Seattle, WA, USA. [3]Center for Integrative Brain Research, Seattle Children's Research Institute, Seattle, WA, USA. [4]Center for Global Infectious Disease Research, Seattle Children's Research Institute, Seattle, WA, USA. [5]Department of Pediatrics, School of Medicine, University of Washington, Seattle, WA, USA. [6]Department of Neurology, University of Washington, Seattle, WA, USA

- Microvascular disruption and capillary plugging contribute to the pathogenesis of neurotoxicity.
- We studied endothelial activation and immune cell adhesion in 3D human brain microvessels.

- Cytokine co-stimulation drives brain endothelial activation, promoting leukocyte and CAR T adhesion.

W10

Cell-free mtDNA-TLR9 signaling contributes to stress-induced vascular dysfunction via inflammasome activation in mice exposed to chronic stress

Rinaldo Rodrigues dos Passos PhD, Tiago Tomazini Gonçalves PhD, Raiana dos Anjos Moraes PhD, Diana Silva-Velasco PhD, Alexia M Crockett, Eliana Cavalli, Alaina Mullaly, Nazharee Cloude, Laena Pernomian, Noelle Frambes, Stephanie Wilczynski, Tianxin Zhang, Susan K Wood PhD, Cameron McCarthy PhD, Camilla F Wenceslau PhD, Fiona Hollis PhD, Fernanda Priviero PhD, R. Clinton Webb PhD
University of South Carolina, Columbia, SC, USA

- Chronic stress promotes mitochondrial dysfunction with the release of mtDNA via gasdermin D pore.
- Cell-free mtDNA-TLR9 contributes to stress-induced vascular dysfunction via inflammasome activation.
- Disulfiram-enriched diet administration prevents stress-induced vascular dysfunction.

METABOLISM AND METABOLIC DISEASES III

W11

Aging arteries, changing bodies: A longitudinal study of menopausal transition impact in the VCD model

Nefia Chacko BS, Maria Alicia Carrillo-Sepulveda BSN, PhD
New York Institute of Technology College of Osteopathic Medicine, Old Westbury, NY, USA

- Early perimenopausal vascular changes may elevate future CVD risk.
- Perimenopause: an obesogenic factor in midlife women
- Perimenopause: a threat to women's vascular health

W12

PPARy deacetylation protects against aortic remodeling during post-menopause

Reia A Thomas, Michelle Ou, Maria Alicia Carrillo-Sepulveda BSN, PhD
NYITCOM, Old Westbury, NY, USA

- PPARy deacetylation as a therapeutic approach to treat arterial remodeling in post-menopause.
- Post-menopause, a challenging stage in women's vascular health.
- Arterial remodeling as a hallmark of vascular complication in post-menopause.

W13

A fragile link: How falling testosterone shapes arterial and skeletal integrity in males

Eddie Louz BA, Maria Alicia Sepulveda Ph.D
New York Institute of Technology College of Osteopathic Medicine, Old Westbury, NY, USA

- The dangers of low testosterone in young male population
- Low testosterone can cause vascular complications
- Low testosterone and high risk of osteoporosis in young males

W14

The protective effects of PFKFB3 inhibition in sepsis-induced acute kidney injury

Megan Runion BS[1,2], Martijn van der Ent MS[1], Mariko Kudo PhD[1], Debra Saunders[1], Abigail Kordeliski PhD[1], Audrey Cleuren PhD[1,2]
[1]Oklahoma Medical Research Foundation, Oklahoma City, OK, USA. [2]University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA

- Fecal slurry injections lead to systemic inflammation and affect kidney function
- Endothelial cell dysfunction is associated with an increased level of glycolytic intermediates
- Inhibition of PFKFB3 dampens inflammation-induced endothelial cell and kidney dysfunction

W15

Metabolic rewiring in aortic smooth muscle cells from patients with bicuspid aortic valve

Marie Billaud PhD[1,2], Soheila Ali Akbari Ghavimi PhD[1,2], Ridha Shah BS[1], Skyler Recel-Chang[1], ryan Martinez MS[1], Amarri Harrison BS[1], Adrien Lupieri PhD[1,2], Chijioke Chukwudi[3], Taku Kasai PhD[1], Ashraf ASabe MD[1,2], Asishana Osho MD[3,2], Elena Aikawa MD, PhD[1], Sasha Singh PhD[1,2]
[1]Brigham and Women's Hospital, Boston, MA, USA. [2]Harvard Medical School, Boston, MA, USA. [3]Massachusetts General Hospital, Boston, MA, USA

- Ascending aortic aneurysms in patients with bicuspid aortic valve (BAV) show higher oxidative stress
- SMCs in BAV-aneurysms have normal baseline respiration but are less efficient under stress
- SMCs in BAV-aneurysms favor glycolysis and show signs of proton leak

W16

Vascular smooth muscle-restricted LXR deletion increases arterial lipid deposition without systemic effects

Hanming Zhang PhD, Diego Sáenz de Urturi PhD, Pablo Fernández-Tussy PhD, Enric Esplugues PhD, Yajaira Suárez PhD, Carlos Fernández-Hernando PhD
Yale University, New Haven, CT, USA

- VSMCs drive foam cell formation and lesioin remodeling via lipid accumulation.
- Myh11-CreERT2 LXR deletion has visceral SMC effects, confounding vascular analysis.
- Itga8-CreERT2 model isolates vascular LXR control of arterial lipid handling.

W17

Type 1 diabetes impairs endothelial function and alters systemic inflammation via sex hormone-dependent mechanisms in mice

Adam Saloň, Simone Kennard, Benjamin Wall, David W. Stepp, Rudolf Lucas, Tohru Fukai, Masuko Ushio-Fukai, David JR Fulton, Eric J. Belin de Chantemèle
Vascular Biology Center, Medical College of Georgia at Augusta University, Augusta, GA, USA

- T1D impairs vascular relaxation more severely in females than in males.
- Sex hormones link T1D to immune suppression and vascular dysfunction.
- Endothelial bioenergetics are altered in a sex-specific manner in T1D.

VASCULAR ANOMALIES AND MALFORMATIONS II

W18

Novel roles for centriolar protein WDR90 in endothelial cells and cardiac tissue

Sarah Colijn[1], DeHaven McCrary[1], Nahyun Kong[1], Mayssa Mokalled[1], Jessica Henty-Ridilla[2], Sheng Chih Jin[1], Silvia Jansen[1], Amber N Stratman[1]
[1]Washington University in St Louis, St Louis, MO, USA. [2]SUNY Upstate Medical University, Syracuse, NY, USA

- Genetic variants in centriolar gene WDR90 have been identified as drivers of CHD
- Adult zebrafish wdr90 mutants display partial lethality and fitness defects
- WDR90 colocalizes with actin and microtubules, particularly at adherens junctions

W19

Cellular mechanisms of AVM development in a zebrafish model of HHT

Erika N Dreikorn PhD[1], Anthony R Anzell PhD[1], Jordan A Brooks BS[1], Jack A Fiore BS[1], Andrew P Hinck PhD[2], Nathan D Lawson PhD[3], Beth L Roman PhD[1]
[1]University of Pittsburgh School of Public Health, Pittsburgh, PA, USA. [2]University of Pittsburgh School of Medicine, Pittsburgh, PA, USA. [3]UMass Chan Medical School, Worcester, MA, USA

- In a zebrafish alk1 mutants, AVMs develop in the vasculature beneath the hindbrain.
- Aberrant EC migration and flow-dependent increases in arterial and venous EC size contribute to AVMs
- While AVMs are blood flow dependent, decreasing shear stress does not ameliorate phenotype.

W20 *withdrawn*

W21

Investigating the novel role of VEGFR3 in pharyngeal arch artery development

Jonathan Dias, Christina Vyzas, Sophie Astrof
Rutgers Biomedical and Health Sciences, Newark, New Jersey, USA

- VEGFR3 ablation in the SHF results in defective 4th PAA formation.
- Deleting VEGFR3 from the SHF decreases SHF-derived cell populations.

- There are venous ECs present within the developing 4th PAA when VEGFR3 is lost.

W22

Single cell genotyping of lymphatic malformations

Dana M Jensen[1], Natalie Y.T. Au[1], Vea F Freeman[1], Meranda M Pham[1], Levan Mekerishvili[2,3,4], Robert M Meyers[2,3,4], Ivan Raimondi[2,3,4], Franco Izzo[5], Dan A Landau[2,3,4], Jonathan A Perkins[6,7], James T Bennett[1,6,8]
[1]Center for Developmental Biology and Regenerative Medicine, Seattle Children's Research Institute, Seattle, WA, USA. [2]New York Genome Center, New York, NY, USA. [3]Division of Hematology and Medical Oncology, Department of Medicine, Weill Cornell Medicine, New York, NY, USA. [4]Sandra and Edward Meyer Cancer Center, Weill Cornell Medicine, New York, WA, USA. [5]Department of Oncological Sciences, Icahn School of Medicine at Mount Sinai, New York, NY, USA. [6]Vascular Anomalies Program, Seattle Children's Hospital, Seattle, WA, USA. [7]Department of Head & Neck Surgery, University of Washington, Seattle, WA, USA. [8]Department of Pediatrics, Division Genetic Medicine, University of Washington, Seattle, WA, USA

- Single cell genotyping of vascular malformations is crucial for understanding tissue dysregulation
- A small population of mutated lymphatic endothelial cells cause lymphatic malformations
- The chromatin accessibility in mutant LECs in LMs is barely different than their WT LEC neighbors

W23

Pharmacological inhibition of Adrenomedullin signaling prevents attenuates features of Rbpj mediated brain arteriovenous malformation

Kayleigh Fanelli[1], Lily J Arnold[1], Alfredo Martínez[2], Corinne M Nielsen[1]
[1]Ohio University, Athens, OH, USA. [2]Center for Biomedical Research of La Rioja, Logroño, Spain

- Pharmacological treatment for attenuation of brain AVM
- Rbpj-Adrenomedullin signaling maintains brain endothelial cell health
- Adrenomedullin inhibition alleviated AV shunting through maintenance of endothelial cell shape

W24

The lncRNA-MIAT control the angiogenic function of Endothelial Progenitor Cells (EPCs) to maintain vascular development in a rat model of Oxygen-Induced Retinopathy (OIR)

Michel Desjarlais Ph.D[1], Borhane Annabi Ph.D[2], Sylvain Chemtob MD, Ph.D[1]
[1]CRHMR, montreal, quebec, Canada. [2]UQAM, montreal, quebec, Canada

- Endothelial progenitor cells (EPCs) dysfunction contributes to vascular anomalies
- we identify the angiogenic-associated lncRNA-MIAT downregulated in dysfunctional EPCs
- The lncRNA-MIAT promotes vascular repair in vivo in a rat OIR model

DEVELOPMENT II

W25

Revealing an unexpected developmental origin for veins in vivo and in vitro

Lay Teng Ang, Sherry Li Zheng, Anastasiia Masaltseva, Crystal Qian, Sawan K. Jha, Kristy Red-Horse, Kyle M. Loh
Stanford University, Stanford, USA

- Discovery of pre-vein ECs that precede the formation of vein ECs
- Pre-veins co-express SOX17 and APLNR, typically regarded arterial and venous markers, respectively
- Temporally dynamic signaling switch in vein development: VEGF activation, followed by inhibition

W26

Natural regression of retinal arteriovenous malformations with age

Adella P Bartoletti, Violeta Esquenazi, Belarsi Ouattara, Stryder M Meadows PhD
Tulane University, New Orleans, LA, USA

- Resolution of retinal arteriovenous malformations
- Disease models
- Hereditary hemorrhagic telangiectasia

W27

High throughput assessment of barrier function using human iPSC-derived brain microvascular endothelial cells and retinal pigment epithelial cells

Ravi Vaidyanathan[1], Christie Savic[1], Madelyn E. Donegan[1], Rebecca K. Fiene[1], Jing Liu[1], Stacie Chvatal[2], Coby Carlson[1]
[1]FUJIFILM Cellular Dynamics, Madison, WI, USA. [2]Axion BioSystems, Atlanta, GA, USA

- iPSC-derived epithelial and endothelial cells are useful tools to study barrier function in vitro
- Parameters such as cell density, media, ECM, and culture time were optimized using TEER measurement
- High-throughput assay was used to profile molecules that disrupt the barrier

W28

Uncovering the roles of the mannose receptor Mrc1a in zebrafish meningeal vascular development

Melanie Holmgren, Risa Hoshijima, Marina Venero Galanternik PhD
University of Utah, Salt Lake City, Utah, USA

- Zebrafish mutants for the mannose receptor Mrc1a show increased cephalic vascular density.
- Mrc1a mutants show increased meningeal perivascular macrophage number.
- Mrc1a may regulate meningeal vascular development via its expression in perivascular macrophages.

W29

***Notch3* and *Sox9* mark distinct, dedicated smooth muscle cell progenitor populations with differing atherosclerotic plaque fate**

Matt D Worssam PhD, Wendu Gu PhD, Daniel Y Li MD, Thomas Quertermous MD, Paul Cheng MD
Stanford University, Stanford, CA, USA

- Notch3/Sox9+ SMC progenitors account for >50% of SMC plaque contribution.
- Progeny of Notch3/Sox9+ SMCs have distinct transcriptional profiles and fate within the plaque.
- Vascular beds with differing lesional burden and character show differing progenitor abundance.

W30

Impact of smooth muscle actin pathogenic variants on INO80-mediated chromatin remodeling

Jeison Garcia Serrano Phd[1], Xueyan Duan[2], Jose E Esparza Pinelo[1], Callie S Kwartler[1]
[1]Division of Medical Genetics, Department of Internal Medicine, McGovern Medical School, The University of Texas Health Science Center at Houston, Houston, Texas, USA. [2]Division of Medical Genetics, Department of Internal Medicine, McGovern Medical School, The University of Texas Health Science Center at Houston, Houston, TX, USA

- The differential recruitment of actins by INO80 modulates its remodeling activity
- Pathogenic variants of ACTA2 severely impact the INO80 remodeling activity in vitro
- Impairment of INO80 function by ACTA2 pathogenic variants may be a novel mechanism of human disease

W31

Glucocorticoid and mineralocorticoid receptors jointly promote vascular development in kidney organoids

Cory P. Johnson Ph.D.[1], Hannah M. Somers[1], Sophie E. Craig[2], Heath Fuqua Ph.D.[1], Lynne Beverly-Staggs[1], Kailee E. Tanaka[1], Sydney M. Brown[2], Charles H. Toulmin[1], Matthew D. Cox[1], Joel H. Graber Ph.D.[1], Melissa S. Maginnis Ph.D.[2], Hermann Haller M.D.[1,3]
[1]MDI Biological Laboratory, Bar Harbor, ME, USA. [2]University of Maine, Orono, ME, USA. [3]Hannover Medical School, Hannover, Germany

- Cortisol is an important developmental signal but understudied in the vasculature
- Time-restricted hydrocortisone supplementation promotes vascular development in kidney organoids
- Glucocorticoid and mineralocorticoid receptors cooperate in hydrocortisone-induced vasculogenesis

W32

Characterizing the macrovessel-dependent immunoangiogenic milieu following surgical micropuncture

Mohammad Hossein Asgardoon MD, MPH[1], Summer Horchler DO[1], Mary Landmesser BS[1], Maryam Abdelaal BS[1], Dino Ravnic DO, MPH[1,2]
[1]The Pennsylvania State University College of Medicine, Irvin S. Zubar Plastic Surgery Research Laboratory, Hershey, PA, USA. [2]Huck Institutes of the Life Sciences, The Pennsylvania State University, University Park, State College, PA, USA

- Micropuncture of macrovessels stimulates rapid microvascular growth in hydrogel scaffolds
- Neutrophils drive early immunoangiogenic response in bioengineered microsurgical approach
- Vessel type influences angiogenic magnitude in micropuncture approach

LYMPHATIC DEVELOPMENT

W33

Mechanisms of connexin 43 loss-of-function in lymphatic valve formation

Razieh Dehghan, Ying Yang PhD
University Of South Florida, Tampa, Fl, USA

- Cx43 loss impairs lymphatic valve development in mice
- Foxo1 deletion rescues valve loss in Cx43-deficient mice.
- Mechanism of Cx43 loss-of-function in lymphatic valve development

W34

Tsc2 deficiency-mediated mTORC1 hyperactivation in lymphatic endothelial cells results in chylothorax caused by defective lymphatic valves

Richa Banerjee Ph.D., Razieh Dehghan M.Sc., Astrid Luz Knauer B.S., Ying Yang Ph.D.
University of South Florida, Tampa, Florida, USA

- LEC-specific Tsc2 deletion causes chylothorax and lymphatic vasculature defects in mice.
- TSC2 knockdown in cultured LECs causes mTORC1 hyperactivation and reduced valve gene expression.
- Ablation of LEC-specific Rptor, a mTORC1 component, rescues lymphatic defects in TSC2 KO mice.

W35

NOTCH1 is required for lymphatic button junction development

Abbigail Price BS, Diandra Mastrogiacomo BS, Kunyu Li BS, Ying Yang PhD, Joshua Scallan PhD
University of South Florida, Tampa, FL, USA

- Constitutive lymphatic-specific deletion of Notch1 prevents the remodeling of zippers into buttons
- Postnatal tamoxifen-inducible deletion of Notch1 impairs button development.
- Our results reveal a requirement of NOTCH1 signaling in lymphatic button junction formation.

W36 *withdrawn*

BIOENGINEERING II

W37

Engineering a physiological Bruch's Membrane analog to support retinal pigment epithelial cell culture and differentiation

zhangying chen, Ashley Martier, Hannah Schaps, Miller Dickerson, Mark Mondrinos, Jennifer Fang
Tulane University, New Orleans, Louisiana, USA

- Integrate the BM analog with ARPE19 and perfused microvessels into an organotypic oBRB-on-a-Chip.
- Fabricate a complex multi-layer BM analog at a physiological thickness by layering
- A valuable tool for studying mechanisms in healthy and diseased oBRB function

W38

Vascularization of capillary-scale networks for lung bioengineering

Jacob Dairaghi[1], Daichi Yada[2], Alicia Allen PhD[3], Ryan Bonvillain PhD[3], Sam Rayner M.D.[1], Ying Zheng[1]
[1]University of Washington, Seattle, WA, USA. [2]Kyoto University, Kyoto, Japan. [3]United Theraputics, Durham, NC, USA

- Collagen microvessel model enables study of EC dynamics within engineered microvascular geometries
- Enhanced capillary establishment via luminal polarization and endothelial migration
- Proliferative, migratory, and mechanical cues can enhance capillary formation in direct cell seeding

W39

Novel 3D platform to interrogate molecular mechanisms, biomechanics and matrix remodeling of calcifying vascular systems

Isabella R Jennings MS, Cecilia M Giachelli PhD, Marta Scatena PhD
University of Washington, Seattle, WA, USA

- 3D calcifying systems better recapitulate cell-ECM-mineral deposition interactions than 2D systems
- Osteogenic media impacts calcification, gel stiffening, VSMC contractility and remodeling in 3D
- Material and functional changes can be captured in 3D for improved therapeutic screening

W40

Testing novel treatment regimens in a vascularized glioblastoma-on-chip model

Lien Mari P. Reolizo MSc, PhD, Christopher C.W. Hughes PhD
University of California Irvine, Irvine, CA, USA

- State-of-the art 3D in vitro culture system of Glioblastoma-on-a-chip
- Exploiting the senescence state as an attractive therapeutic target

- VMB-GBM platform to identify FDA-approved drugs that can be repurposed to treat recurrent GBM.

W41

Caveolae cartography: Uncovering caveolar spatial organization in blood vessels

Drew B Grespin[1], Jasper S Farrington[1], Adella P Guidroz[2], Maggie S Grespin[1], Aaryn David[1], Chris Culkin[1], Liam J Russell[1], Talen G Niven[1], Patrick Soonthornprapuet[1], Dinah Loerke PhD[1], Stryder M Meadows PhD[2], Erich J Kushner PhD[1]

[1]University of Denver, Denver, CO, USA. [2]Tulane University, New Orleans, LA, USA

- Comprehensive micropattern density mapping reveals caveolar trends masked in standard cultures
- The most thorough endothelial caveolar organization study to date, relevant to atherosclerosis
- Migratory-front caveolae in mouse retinovasculature confirm micropattern data, challenge models

MICROCIRCULATION III

W42

Not all satins are equal: Distinct impacts on TNF-induced paracellular leak

Alejandra Morales-Maldonado MD, PhD, Jordan Pober MD, PhD, Richard Pierce MD

Yale University, New Haven, Connecticut, USA

- The effect of statins on TNF-induced capillary leak is variable.
- Simvastatin and pitavastatin have the most protective effect on paracellular leak.
- Simvastatin and pitavastatin reduce RhoB generation and activation.

W43

Endothelial-restricted ArhGEF15 activates RhoB and leads to paracellular capillary leak

Alejandra Morales-Maldonado MD, PhD, Francesc Lopez-Giraldez PhD, Jordan Pober MD, PhD, Richard Pierce MD

Yale University, New Haven, Connecticut, USA

- ArhGEF15 is an endothelial restricted protein that regulates vascular permeability.
- ArhGEF15 causes RhoB activation which intensifies TNF-induced capillary leak.
- Active RhoB increased total RhoB creating a pro-inflammatory positive feedback loop.

W44

Do pre-existing conditions increase the risk of endothelial dysfunction caused by 5-fluorouracil chemotherapy?

Stephen T Hammond PhD, Yoshinori Nishijima PhD, Andreas M Beyer PhD

Medical College of Wisconsin, Milwaukee, WI, USA

- 5FU chemotherapy is associated with vascular dysfunction that can limit its clinical use.

- We tested whether CVD risk factors influence the degree of 5FU-induced vascular dysfunction.
- 5FU caused similar levels of dysfunction in arterioles from healthy donors and those with ≥ 2 RF.

W45

Microvascular protection by ABCB1: A novel mechanism in chemotherapy-induced vascular toxicity

Shelby N Hader MS[1], Yoshinori Nishijima PhD, DVM, MS[1], Laura E Norwood-Toro PhD[1], Erin Birch BS[2], Chun Liu PhD[1], Andreas M Beyer PhD[1]
[1]Medical College of Wisconsin, Milwaukee, WI, USA. [2]University of Arizona, phoenix, AZ, USA

- ABCB1 links cancer and cardiovascular disease
- Chemotherapy disrupts vascular health
- miRNAs regulate vascular health and MACE

W46

Endothelial Piezo1–Pannexin1 signaling mediates flow-induced dilation of small pulmonary arteries and is disrupted in pulmonary hypertension

Maniselvan Kuppusamy, Zdravka Daneva, Yen-lin Chen, Fênix A de Araujo, Kyosuke Kazama, Saainikedhana Venugopal, Swapnil K Sonkusare
University of Virginia, Charlottesvile, VA, USA

- Functional Piezo1 is present in the pulmonary endothelium
- Piezo1 mediates flow-induced dilation in the Pulmonary endothelium
- In PH models, Piezo1–Panx1 colocalization, TRPV4 activity, and FID diminished.

W47

NKG2D Upregulation Enhances T and NK Cell Cytotoxicity, Sensitizes Tumors to Combined αPD1 and αVEGF Therapy, and Contributes to Hearing Loss Prevention in Vestibular Schwannoma Model

Simeng Lu[1], Zhenzhen Yin[1], Limeng Wu[2], Yao Sun[2], Jie Chen[2], Lai Man Natalie Wu[3], Janet L. Oblinger[4], Lukas D. Landegger[5], William Ho[2], Bingyu Xiu[2], Adam P. Jones[2], Alona Muzikansky[6], Konstantina Stankovic[5], Scott R. Plotkin[7], Long-Sheng Chang[4], Lei Xu[2]
[1]Edwin L. Steele Laboratories, Department of Radiation Oncology, Massachusetts General Hospital, Harvard Medical School, Contributed Equally, Boston, MA, USA. [2]Edwin L. Steele Laboratories, Department of Radiation Oncology, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA. [3]Medpace, Inc., Cincinnati, OH, USA. [4]Center for Childhood Cancer, Abigail Wexner Research Institute at Nationwide Children's Hospital and Department of Pediatrics, The Ohio State University, Columbus, OH, USA. [5]Department of Otolaryngology – Head and Neck Surgery and Department of Neurosurgery, Stanford University School of Medicine, Stanford, CA, USA. [6]Biostatistics Center, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA. [7]Department of Neurology and Cancer Center, Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA

- αPD1 prevents tumor-induced hearing loss
- αVEGF activates the antitumor cytotoxicity of T and NK cells via NKG2D

- Combined αPD1 with αVEGF treatment controls the growth of αVEGF resistance tumors

W48
Artificial intelligence-assisted high-fidelity prediction of red cell transport and microvascular hemodynamics
Prosenjit Bagchi PhD, Saman Ebrahimi PhD
Rutgers University, Piscataway, NJ, USA
- AI enabled high-fidelity prediction of detailed microvascular hemodynamics
- Generic tool applicable to any tissue/animal
- Provide physiologically relevant parameters and insights not readily available in vivo

ANGIOGENESIS

W49
Vascular remodeling enables B cell infiltration into the tumor microenvironment
Gabrielle Rowe Ph.D., Masanobu Komatsu Ph.D.
Johns Hopkins All Children's Hospital, Saint Petersburg, FL, USA
- High endothelial venules
- Tumor microcirculation
- Vascular normalization

W50
Downregulation of Tensin 1 and Tensin 2 contributes to cerebrovascular defects from prenatal alcohol exposure
Richard J Justice, Amy S Gardiner PhD
University of New Mexico, Albuquerque, NM, USA
- miR-150-5p impairs angiogenesis and BBB integrity, promoting vascular dysfunction in PAE.
- Tns1 and Tns2 are focal adhesion molecules that are downregulated during PAE.
- Tns1/2 overexpression rescues EtOH-induced defects in brain microvascular endothelial cells.

W51
A new culture workflow for efficient derivation and expansion of pericytes from human pluripotent stem cells
Valentina Marchetti PhD[1], Thomas Albon[2], Alessandro Dei[2], Yu-Jie Lin[2], Allen Eaves[1,2,3], Sharon Louis[1], Ryan Conder[1], Salvatore Simmini[2]
[1]STEMCELL Technologies, Vancouver, Canada. [2]STEMCELL Technologies UK Ltd, Cambridge, United Kingdom. [3]Terry Fox Laboratory, BC Cancer Agency, Vancouver, Canada
- Differentiation method for PSC-derived pericytes
- Co-culture methods for ECs and Pericytes
- Methods to reproduce the BBB system

W52

A non-canonical role of BCKDK in endothelial cell replication and angiogenesis

Wencao Zhao PhD, Wenkai Zhu MSE, Zoltan Arany MD PhD
University of Pennsylvania, Philadelphia, PA, USA

- Quiescent ECs exhibit higher BCAA catabolic activity than proliferative ECs.
- Inactivation of BCKDK inhibits endothelial cell proliferation and angiogenesis.
- BCKDK regulates endothelial cell proliferation and angiogenesis independent of BCAA metabolism.

W53

Exploring the role of macrophages in vascular function in hepatocellular carcinoma

Alexis L Scott, Shuwen Cao, Lisa Zuo, Malay Haldar
University of Pennsylvania, Philaedelphia, PA, USA

- Hepatocelluar carcinoma cells highly produce retinoic acid, which facilitates macrophage development
- Retinoic acid may drive a pro-angiogenic phenotype in tumor-associated macrophages
- Inhibition of RA production in tumors causes intratumoral hypoxia in immunodeficient mice

W54

Development of novel microvascular co-culture assay between endothelial cells and pericytes for fibrotic disease investigation and therapeutic testing

David J Csordas[1,2], Dorothy N Beck[1], John S Kim MD[3], Shayn M Peirce PhD[1,2]
[1]Department of Biomedical Engineering, University of Virginia, Charlottesville, VA, USA. [2]Robert M. Berne Cardiovascular Research Center, University of Virginia, Charlottesville, VA, USA. [3]Division of Pulmonary and Critical Care Medicine, University of Virginia, Charlottesville, VA, USA

- Primary human endothelial cell and placental pericyte co-culture.
- 96-well screening assay for the impact of stimuli and treatments on microvascular cells.
- Investigating the impact of fibrotic stimuli and antifibrotic treatments on microvascular cells.

W55

Exploring the role of endothelial cells as antigen-presenting cells in melanoma

Swetha Anandh[1], Caroline Riedstra[1], Simona Bajgai[2], Sanja Arandjelovic[1], Melanie Rutkowski[1], Andrew C Dudley[1]
[1]UVA, Charlottesville, VA, USA. [2]UVA, Char, VA, USA

- The composition of the vasculature changes in tumors with high tumor mutational burden.
- Sub-populations of tumor-associated endothelial cells upregulate genes for antigen presentation.
- Cancer immunotherapies increase endothelial cells with antigen presenting genes in human patients.

W56
Light alcohol consumption-induced cerebral angiogenesis
Pushpa Subedi MS, Jai Koticha, Abd Al Aziz Zeidan, Hong Sun PhD
LSU Health Shreveport, Shreveport, LA, USA

- Light alcohol consumption promotes cerebral angiogenesis.
- Light alcohol consumption upregulates TGFβR2 and phosphorylated TGFβRI (pTGFβRI) and AKT (pAKT).
- TGFβR2 antagonists, TA-02 and LY2109761, inhibit LAC-induced cerebral angiogenesis.

W57
The role of endothelial Toll like receptors in angiogenesis and inflammation
Molokotina Iuliia PhD, Irina Zhevlakova MD, Josh Ford, Tatiana Byzova PhD
Cleveland Clinic, Cleveland, OH, USA

- TLR4 is main TLR in EC; goes up in sterile disease (atherosclerosis, cancer).
- EC TLR4 makes CXCL1/2→CXCR2; early vessel dilation/leak. KO or CXCR2 block reduce.
- Females show stronger EC TLR2/4; double KO in EC remove female healing/influx edge.

W58
SF3B1 and splicing regulation of the angiogenic endothelium
Kaleigh Kozak, Emily Clifford, Ibrahim Vazirabad, Katherine Hamm, Hina Iqbal, Jesse Cullison, Ziqing Liu
Medical College of Wisconsin, Milwaukee, USA

- Splicing factors can be critical to the regulation of the endothelial transcriptome.
- Disruption of splicing factors can impact angiogenesis in vivo.
- Pathways affected by splicing factor changes could be conserved in human and mouse models.

W59 *withdrawn*

VASCULAR HEALTH AND DISEASE II

W60
Full-field-of-view in vivo analysis of capillary stalling: implications for small vessel disease
Saúl Huerta de la Cruz[1], Grant Hennig[1], Valentina Brunetti[2], Amreen Mughal[3], Mark T Nelson[1]
[1]University of Vermont, Burlington, VT, USA. [2]University of Pavia, Pavia, Pavia, Italy. [3]National Institute of Neurological Disorders and Stroke, Bethesda, MD, USA

- In vivo full- field-of-view imaging reveals distinct subtypes of capillary stalls
- Kir2.1 blockade or deletion increases capillary stalls incidence.
- CADASIL mice show elevated stalls, further worsened by Kir2.1 blockade.

W61

Dural Venous Sinus Smooth Muscle: An Arterial-Venous Hybrid Driving Venous Diameter Control

Madison E. Lemire[1], Hannah C. Ryan[1], Liqun He[2], Adam S. Sprouse-Blum[1], Christer Betsholtz[2,3], Nicholas R. Klug[1]

[1]Larner College of Medicine, University of Vermont, Burlington, VT, USA. [2]Uppsala University, Uppsala, Sweden. [3]Karolinska Institutet, Huddinge, Sweden

- Dural venous sinus vessels contain unique smooth muscle cells with an arterial and venous identity.
- Dural sinus SMCs elevate cytosolic Ca2+ and constrict to mechanical and pharmacological stimuli.
- Dural sinuses contain anatomical and molecular features capable of active flow regulation.

W62

Comparative Spatial Profiling Reveals Both Common and Distinct Mechanisms of Action Between Autologous Concentrated Bone Marrow Aspirate and Allogeneic Mesenchymal Stromal Cells in Human Chronic Limb-Threatening Ischemia

Dr Leni Moldovan PhD, Lili Zhang BA, Kristen Evans BSN, RN, CCRC, Jennifer Stashevsky, Dr Nicanor I Moldovan PhD, Dr Connor Gulbronson PhD, Dr Michael P Murphy MD

Indiana University, Indianapollis, Indiana, USA

- Bone marrow aspirate treatment promotes vascular and reparative responses in CLTI
- MSC treatment modulates inflammatory processes connected to regeneration
- Multiplex immunophenotyping allowed complex cellular level analysis of tissue responses to treatment

W63

Genetic and Functional Evidence That CCM2 Loss-of-Function Reduces Coronary Atherosclerosis Through Attenuation of Vascular Inflammation

Shi Fang PhD[1], Gavin Schnitzler PhD[2], Amélie Vronman PhD[1], Lily Widdup BS[1], Ran Cui PhD[2], Allison Gabbert PhD[3], Cindy Zheng BS[1], Dave Mansaray BS[1], Mengyu Chen BS[1], Aurelie Barry BS[1], Alec A. Schmaier MD, PhD[3], Peter Libby MD[1], Rajat M. Gupta MD[1]

[1]Brigham and Women's Hospital, Boston, MA, USA. [2]Broad Insitute, Cambridge, MA, USA. [3]Beth Israel Deaconess Medical Center, Boston, MA, USA

- CCM2 heterozygous knockout reduced atherosclerosis in mice.
- CCM2 have opposing effects on EC inflammation at baseline versus during established atherosclerosis.
- We identified common variant V53I as the likely causal variant for CAD protection.

W64

Endothelial transdifferentiation promotes aortic aneurysms and requires platelet-derived signals.

Dr Yogi Pratama MD, Ruoyan Zhang, Cristobal Rivera PhD, Sheehan Belleca, Dr Bhama Ramkhelawon PhD
NYULangone, NYC, NY, USA

- Endothelium differentiation
- Aortic Aneurysms
- Platelets

W65

Redox-dependent signaling in hyperoxia-induced retinal vascular arrest

Henry H. Song Ph.D.[1], Wenjing Wu Ph.D.[1], Daniyal Khan[2], Hua Zhong MS[1], Mathew S. Meaders[1], Paul T. Pierce[1], Peter Vitiello Ph.D.[1], Lynette K. Rogers Ph.D.[1], Trent E. Tipple M.D.[1], Faizah Bhatti M.D.[1]
[1]University of Oklahoma Health Sciences Center, Oklahoma City, OK, USA.
[2]Georgia Institute of Technology, Atlanta, GA, USA

- Trx1-cKO retinas showed significantly increased VO at P12 in OIR mouse model.
- Trx1-cKO retinas showed significantly increased NV at P17 in OIR mouse model.
- Trx1 regulates vascular remodeling and protects against hyperoxia-induced retinopathy in OIR.