

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 Urturi¹, Katy Citrin¹, Hanming Zhang¹, Enric Esplugues¹, Alex Ramos¹, Oscar Pastor-Rojo², Jeffrey McDonald³, Carlos Fernandez-Hernando¹, Yajaira Suarez¹

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- 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 Citrin¹, Yan Huang¹, Christian Castellanos¹, Alex Ramos-Perez¹, Diego Saenz de Urturi Indart¹, Nabil Boutagy¹, Michele D'Agata¹, Hanming Zhang¹, Magdalena Sternak¹, Diego Gomez Coronado², Jan-Ake Gustafsson³, Lauren Biwer¹, Oscar Pastor Rojo⁴, Jeffrey McDonald⁵, Carlos Fernandez-Hernando¹, Yajaira Suarez¹

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- 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 Finney¹, Shantel Vital¹, Zaki Khattab², Alika Shum¹, Wayne Orr¹

¹LSU Health Shreveport, Shreveport, LA, USA. ²LSU 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 Saïtes, 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

Vascular tortuosity causes curvature-dependent endothelial cytoskeletal and cell-cell adhesion disorganization and local loss of barrier function

Robert Fischer Ph.D.¹, Paniz Rezvan-Sangsari MS¹, Nicole Morgan PhD¹, Clare M Waterman PhD²

¹NIH/NIBIB, Bethesda, MD, USA. ²NIH/NHLBI, Bethesda, MD, USA

- Endothelial cells sense flow dynamics and local curvature, altering their adhesions and cytoskeleton
- Local differences in cytoskeletal organization are accompanied by increased permeability.
- vessel shape itself may contribute to vascular disease outcomes

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 Asgardoost 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}
¹Stanford University, Stanford, CA, USA. ²Stanford Cardiovascular Institute (CVI), Stanford, CA, USA. ³Korea Institute of Science and Technology, Seoul, Korea, Republic of. ⁴Chan Zuckerberg Biohub, San Francisco, 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 PhD⁴, Ruhul M Abid MD, PhD^{3,2}

¹Rhode Island Hospital, Providence, RI, USA. ²Warren Alpert Medical School of Brown University, Providence, RI, USA. ³Rhode Island Hospital, Providence, RI, USA. ⁴University 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 PhD¹, Nien-Wen Hu PhD¹, Iulia-Maria Berianu¹, Elizabeth Wolters¹, Ryan Walker¹, Hulan Shang², Ramon Llull MD², Adam J Katz MD²

¹University of Florida, Gainesville, FL, USA. ²Wake 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-CCl₄ injury

Hawon Yoon, Aashita R Singh, Kanisha 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, Kanisha 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 $\alpha 3\beta 1$ -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 $\alpha 3\beta 1$ -regulated alternative polyadenylation controls MMP-9 expression in wounds and tumors.
- Integrin $\alpha 3\beta 1$ -MEK-ERK signaling induces CSTF3 to regulate alternative polyadenylation of MMP-9 mRNA.
- Integrin $\alpha 3\beta 1$ -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 Ford¹, Hosanna Abbay¹, Amy Leonardson¹, Jennifer Franks^{1,2}, Nicholas W Chavkin PhD^{1,2}

¹Seattle Children's Research Institute, Seattle, WA, USA. ²University 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

Investigation of the cellular dynamics and molecular drivers of cutaneous wound healing in zebrafish

Leah J Greenspan PhD, Keith Ameyaw, Daniel Castranova, Van Pham, Gennady Margolin, Caleb Mertus, Brant Weinstein

National Institutes of Health, Bethesda, MD, USA

- Delays in vessel regrowth are a major contributor to defects in wound healing.
- Our new rotary tool injury system can be used to study cutaneous wound healing in zebrafish.
- Live imaging shows changes to immune and endothelial cell behavior with age during wound healing.

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, PhD¹, Laurelis Santiago MS¹, Chris Katnik PhD¹, Min Zhang MD¹, Bi Zhao PhD¹, Nien-Wen Hu PhD², W. Lee Murfee PhD², Jerome W Breslin PhD¹

¹University of South Florida, Tampa, FL, USA. ²University 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 Loeb¹, Dennon Hoernig¹, Wyatt J Schug¹, Luke S Dunaway¹, Clay Grisius¹, Junjie Li², Shruthi Nyshadham¹, Darla Tharp³, Miriam Cortese-Krott², Matthew Wolf¹, Brant E Isakson¹

¹University of Virginia, Charlottesville, VA, USA. ²Heinrich-Heine University, Düsseldorf, Germany. ³University 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 PhD¹, 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}

¹Robert M. Berne Cardiovascular Research Center, University of Virginia School of Medicine, Charlottesville, VA, USA. ²Department 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 Kheifets, 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 Vadakath¹, Pamela Teneqexhi¹, 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

¹University of Illinois, Chicago, Chicago, IL, USA. ²University of Illinois, Chicago, IL, USA. ³University of Illinois Cancer Center, Chicago, IL, USA. ⁴Biogipuzkoa 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 Jeong², Keilany Lightsey²

¹University of Notre Dame, Notre Dame, Indiana, USA. ²University 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 Camacho¹, Erin Berlew¹, Javier Abello², Melike Lakadamyali¹, Amber Stratman², Joel Boerckel¹

¹University of Pennsylvania, Philadelphia, PA, USA. ²Washington 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 MS¹, Mingjun Liu PhD², Cristina Espinosa-Diez PhD³, Jianxin Wei MD¹, Yang Liu PhD⁴, Delphine Gomez PhD¹

¹University of Pittsburgh, Pittsburgh, USA. ²New York University, New York, USA.

³Wayne State University, Detroit, USA. ⁴University 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 Park¹, Jae Min Cho¹, Enbo Zhu¹, Jing Wang¹, Peng Zhao¹, Eliseo Castillo², Tzung Hsiai¹

¹UCLA, Los Angeles, CA, USA. ²University 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 PhD¹, Benjamin Quick BBSci¹, Hui Yi Khoo PhD², Walter G Thomas PhD², John P Headrick PhD³

¹The University of Queensland, St Lucia, Queensland, Australia. ²The University of Queensland, St Lucia, QLD, Australia. ³Griffith University, Gold Coast, 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

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

- MGP deposits in a punctuated pattern within elastic lamellae 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 Kumaragurubaran¹, Dakota Gustafson¹, Lijun Chi³, Paul Delgado-Olguin³, Ahsan Siraj¹, Mansoor Husain¹, Michael D Wilson³, Jason E Fish¹

¹Toronto General Hospital Research Institute, Toronto, ON, Canada. ²University of Toronto, Toronto, ON, Canada. ³SickKids 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 Kim¹, Rayane B Teixeira PhD², Ruhul Abid MD, PhD^{1,2}

¹Brown University, Providence, RI, USA. ²Rhode 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

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 Parr¹, Ashton T Foster¹, Steven L Medarev MS², Dilanka Ranaweera BS¹, Judy M Muller-Delp PhD¹

¹Kansas State University, Manhattan, Kansas, USA. ²Florida 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 Foster¹, Maxwell J Parr¹, Steven L Medarev MS², Anthony M Ogando BS², Jasen M Belenko BS², Dilanka M Ranaweera BS¹, Judy M Muller-Delp PhD¹

¹Kansas State University, Manhattan, Kansas, USA. ²Florida 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-Cintrón 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

Enhanced capillary permeability contributes to neuropathic pain in obese skin

Yuta Kouji, Yosuke Mukoyama

National Heart, Lung, and Blood Institute, Bethesda, MD, USA

- Obesity induces fenestration and hyperpermeability in the skin superficial capillary vessels.

- Inhibiting capillary leakage prevents neuropathic pain in obesity.
- Targeting capillary permeability provides a new therapeutic approach for obesity-induced pain.

M49

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

Woosung Choi¹, Dayeon Lee¹, Aram Lee², Eunsik Yun², Shengpeng Wang³, Jongmin Kim², Jihwan Park¹, Suk-Won Jin¹

¹Gwangju Institute of Science and Technology, Gwangju, Korea, Republic of.

²Sookmyung Women's University, Seoul, Korea, Republic of. ³The 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 Nader¹, Eric Rullman², Thomas Gustafsson², Tara Haas¹

¹York University, Toronto, ONTARIO, Canada. ²Karolinska, 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

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- 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

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- 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 Ca²⁺ influx
- Disrupting sGC–Cx43 signaling impairs EDH and vasodilation

M54

A novel non-lipogenic ABCA1 inducer improves cerebral arteriolar Cav1.2 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–GPIIb mediated leukocyte-platelet interaction as a therapeutic target in lung injury: Evidence from genetic and novel antibody intervention

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

- Mac-1:GPIIb mediated Leukocyte-Platelet Interaction drives lung injury in a lupus-like murine model
- Genetic or antibody disruption of Mac-1:GPIIb 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

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- 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

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¹University of Virginia, Charlottesville, VA, USA. ²UCLA, 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 $\text{TCR}\alpha^{-/-}$ 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/M Φ)

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/M Φ 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 BS.c, Amritha Sreekumar MS.c, Yusra Zaidi Ph.D., 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

Lights, trauma, action! Visualizing immune cell-vessel interactions after meningeal vascular injury in adult zebrafish

Aurora Kraus PhD, Jean Sebastien Prosper Santiago BS, Daniel Castranova MS, Brant M Weinstein PhD
NIH/NICHHD, Bethesda, MD, USA

- neuroinflammation after meningeal vascular injury
- vascular wound regeneration
- Live longitudinal imaging of intact adult zebrafish

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}

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- 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}

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QC, Canada. ⁵Department of Medicine, McGill University, Montréal, QC, Canada.

⁶Medical 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 BS¹, Patrick Alan Pangilinan BS¹, Shane LeCompte MS², Prosenjit Bagchi PhD¹

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

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⁴Semmelweis University, Budapest, Hungary. ⁵SeroScience LLC, Budapest, Hungary. ⁶Sungkyunkwan 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 Medarev¹, Maxwell Parr², Ashton Foster², Dilanka Ranaweera², Jose Pinto¹, Judy Delp²

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- 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

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¹Wayne State University, Detroit, MI, USA. ²Oregon Health and Science University, Portland, OR, USA

- The 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

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- 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

Plxnd1-mediated mechanosensing of blood flow controls the caliber of the Dorsal Aorta via the transcription factor Klf2

Jia He Ph.D.

NYU Grossman School of Medicine, New York University, NY, USA

- Plexin-D1 mechanosensing determines the diameter of the DA during development

- The transcription factor KLF2 is a key downstream Plxnd1 mechanoeffecter in this context
- Plxnd1, via KLF2, increases endothelial cell size to expand the DA caliber.

T14

Hemodynamic regulation of FOXO1 integrates endothelial inflammation and metabolism in atherosclerosis

Hangiang 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-DII4-Mpdz complex

Jennifer L Bays PhD^{1,2}, Jessica L. Teo PhD^{1,2}, Freddy Suarez Rodriguez PhD¹, Alanna M. Farrell¹, Amy E. Stoddard PhD^{1,3}, Esther Koh^{1,3}, Christopher S. Chen MD/PhD^{1,2}

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- 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 DII4 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

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³Masonic 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 PhD¹, Weiming Ni PhD¹, Elena Wilson¹, Clancy Mullan MD, PhD¹, Francesc Lopez PhD², Guilin Wang PhD², Zenaat Malik³, James Murray⁴, John Giuliano MD¹, Shan Xu PhD¹, Song Pang PhD¹, Jordan Pober MD, PhD¹, Richard Pierce MD¹

¹Yale School of Medicine, New Haven, CT, USA. ²Yale Center for Genomic Analysis, New Haven, CT, USA. ³Yale University, New Haven, CT, USA. ⁴University 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

Single-cell discovery of GLDN and PTPRZ1 as novel regulators in extracellular matrix and TGF- β -driven vascular remodeling in Marfan syndrome

Audrey Zhu

Lynbrook High School, San Jose, CA, USA. Stanford Robinson Lab, Stanford, CA, USA

- Single-cell RNA-seq reveals transcriptional diversity in Marfan aortic smooth muscle cells
- GLDN⁺/PTPRZ1⁺ cluster linked to ECM remodeling and TGF- β -driven vascular phenotypes
- GLDN and PTPRZ1 emerge as potential biomarkers and targets in Marfan vascular disease

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}

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- 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 PhD¹, Cyrine Ben Dhaou PhD¹, Anthony W Orr PhD²

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- Endothelial derived remodeling of the extracellular matrix primes them to be more inflammatory
- The inflammatory effects are mediated by integrins $\alpha 5$ and αv binding to fibronectin
- Integrins $\alpha 5/\alpha v$ prime cell by increasing the expression of pro-inflammatory NF κ B.

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 PhD¹, Jason Eng MD, PhD^{1,2}, Bhairavi Swaminathan PhD¹, Pamela Teneqexhi BS¹, Braulio Aguilar Lugo BS¹, Jose Cordoba-Chacon PhD¹, Jan Kitajewski PhD¹

¹University of Illinois Chicago, Chicago, IL, USA. ²The 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

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¹Brown University, Providence, RI, USA. ²VA 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 atheroprogession

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

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- 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

An epigenetic link between metabolism and smooth muscle cell differentiation

Jose E Esparza Pinelo B.S., Jessica Chen, Aminat Dosunmu M.S., Hannah Krenz B.S., Jeison Garcia Serrano PhD, Angie Gonzalez B.S., Dianna M Milewicz MD, PhD, Callie S Kwartler PhD

UTHSCH, Houston, TX, USA

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

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-1 β 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}

¹Ocean State Research Institute Inc. at Providence VA Medical Center, Providence, RI, USA. ²Warren 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

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- 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

Thrombomodulin marks mesenchymal progenitor cells within the human vascular adventitia

Neelima Thottappillil PhD¹, Mario Gomez-Salazar PhD¹, Sharon Onggo M.S.¹, Yiyun Wang PhD¹, Zhao Li PhD¹, Xin Xing PhD¹, Shreya Arondekar M.S.¹, Ishbel Camila Del Rosario Alvia M.S.¹, Maryam Beg M.S.¹, Qizhi Qin PhD¹, Myles Zhou M.S.¹, Manyu Zhu PhD¹, Mary Archer B.S.¹, Kristen Broderick M.D.¹, Patrick Cahan PhD¹, Bruno Peault PhD², Aaron W James PhD¹

¹Johns Hopkins university School of Medicine, Baltimore, MD, USA. ²UCLA, Los Angeles, LA, USA

- Thrombomodulin identifies progenitor cells within tunica adventitia of human blood vessels.
- Thrombomodulin expression is associated with stemness of adventitial progenitors.
- Thrombomodulin expressing progenitors are regulated by CERS4 transcription factor via NF-KB signaling.

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}

¹Department of Physiology, Medical College of Wisconsin, Milwaukee, Wisconsin, USA. ²Cardiovascular 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's¹, Christina Vyzas², Sophie Astrof Ph.D.¹

¹Rutgers Biomedical Health Sciences, Newark, New Jersey, USA. ²New 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

Studying the role of endothelial calcium signaling *in vivo*

Megan Detels, Miranda Marvel, Dan Castranova, Van Pham, Brant Weinstein
Eunice Kennedy Shriver National Institute of Child Health and Human Development, NIH, Bethesda, MD, USA

- Understanding endothelial calcium signaling in vascular development
- Developing new transgenic lines to both visualize and manipulate endothelial calcium signaling
- Endothelial calcium dynamics in living, intact developing zebrafish embryos and larvae

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 PDGFR β may regulate placental vessels and contribute to vascular dysfunction.
- PDGFR β isoforms show distinct patterns, suggesting different roles in vessel development.
- Low sPDGFR β 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 MBBS¹, Christian Klein PhD², Stryder Meadows PhD¹

¹Tulane University, New Orleans, LA, USA. ²Curie.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 PhD¹, Mae-Ying Z Stock-Bordnick¹, Philippe Marambaud PHD², Stryder Meadows PHD¹

¹Tulane University, New Orleans, LA, USA. ²The 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 α 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 PhD¹, Chhiring Sherpa MS², Lindsay Bischoff PhD candidate², Elisa Boscolo PhD²

¹Cincinnati children's Hospital, Cincinnati, OH, USA. ²Cincinnati 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, MRes¹, Sumudu VS Gangoda BBioTech (Hons), MRes, PhD¹, Cynthia L St Hilaire PhD, FAHA², Jacqueline K Phillips BVSc (Hons), PhD¹

¹Macquarie Medical School, Faculty of Medicine Health and Human Sciences, Macquarie University, Sydney, New South Wales, Australia. ²Department 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 PhD⁵, Marta Toral PhD^{6,2}, Yilin Sun PhD⁴, Ángel Colmenar¹, María José Méndez Olivares¹, Dolores López-Maderuelo¹, Christine B Kern MD⁷, J Francisco Nistal MD^{2,8}, Arturo Evangelista PhD⁹, Gisela Teixido-Tura PhD^{2,10}, Miguel R Campanero# PhD^{4,2}, Juan Miguel Redondo# PhD^{4,2}

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- 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

PEPD plays a dynamic role across multiple cell types in an in vivo human wound healing model

Reecha Suri MS¹, Kevin Emmerich PhD¹, Rebecca Harper PhD², Manfred Boehm MD¹

¹NIH NHLBI, Bethesda, MD, USA. ²Baker Institute, Melbourne, Victoria, Australia

- single-cell RNA sequencing on a three-timepoint wound healing model
- distinct cell states arise during wound healing
- prolidase deficiency alters wound healing pathways

T46

Uncovering the Etiology of Köhlmeier-Degos Disease using integrative Clinical and Translational approaches: Early Findings

Sahana Manohar-Sindhu¹, Cornelia Cudrici¹, Shubham Goel², Rebecca Huffstutler¹, Adriana de Jesus Rasheed³, Kevin Emmerich¹, Elyse MacCall¹, Natalia Dmitrieva¹, Robin Schwartzbeck¹, Elisa Ferrante¹, Raphaela Goldbach-Mansky³, Keisuke Nagao², Manfred Boehm¹

¹National Heart, Lung, and Blood Institute, Bethesda, MD, USA. ²National Institute of Arthritis and Musculoskeletal and Skin Diseases, Bethesda, MD, USA. ³National Institute of Allergy and Infectious Diseases, Bethesda, MD, USA

- Köhlmeier-Degos disease identified as an interferonopathy
- JAK inhibition for Degos disease shows promising results
- iPSC-derived endothelial cells and 3D vascular organoids being developed for disease modelling

T47

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

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¹University of Toronto, Toronto, Canada. ²Toronto General Hospital Research Institute, Toronto, Canada. ³Peter 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}

¹Ocean State Research Institute at the Providence VA Medical Center, Providence, RI, USA. ²Warren 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

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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 PhD¹, Pengwei Ren PhD¹, Jay Humphrey PhD², George Tellides PhD^{1,3}

¹Yale School of Medicine, New Haven, CT, USA. ²Yale School of Engineering and Applied Science, New Haven, CT, USA. ³Veteran 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 PhD¹, Emily Bramel PhD², Claire Fong BS¹, Vijay Krishnan PhD¹, Diana Tambala MD¹, Aarushi Gandhi BS¹, David R Ramos Ph.D¹, Claire Ellen Shamber B.S¹, Michelle Nivar B.A³, Manuella Lahoud Rahme M.D³, Maggie Brand B.A⁴, Shaine Morris M.D., MPH⁵, Karen Buch M.D⁶, Mark Chaffin A.B., S.M⁷, Patrick Ellinor M.D., Ph.D^{7,8}, Pradeep Natarajan M.D., MMSc^{7,8}, Angela Lin M.D⁹, Benjamin P. Kleinstiver Ph.D^{10,11,12}, Patricia Musolino M.D., Ph.D¹⁰, Mark E. Lindsay M.D., Ph.D.^{8,2,4,3}

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- 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 Bacci⁵, Assunta Cancellara^{1,2}, Fabio Tumminello^{5,6}, Lorenza Maria Argolini^{3,4}, Corrado Lodigiani⁵, Marco Paolo Donadini^{7,8}, Silvia Della Bella^{1,2}, Roberto Felice Caporali^{3,4}, Francesca Calcaterra^{1,2}, Domenico Mavilio^{1,2}

¹Unit of Clinical and Experimental Immunology, IRCCS Humanitas Research Hospital, Rozzano, Italy. ²Department of Medical Biotechnologies and Translational Medicine, University of Milan, Milan, Italy. ³Research Centre for Adult and Pediatric Rheumatic Diseases, Department of Clinical Sciences and Community Health, University of Milan, Milan, Italy. ⁴Lupus Clinic, Division of Clinical Rheumatology, ASST Pini CTO, Milan, Italy. ⁵Center for Thrombosis and Hemorrhagic Diseases, IRCCS Humanitas Research Hospital, Rozzano, Italy. ⁶Department of Biomedical Sciences, Humanitas University, Pieve Emanuele, Italy. ⁷Dipartimento di Medicina e Chirurgia, Università dell'Insubria, Varese, Italy. ⁸Centro 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 TNF α 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 Cahalane³, Sasha A Singh³, Elena Aikawa³, Jason E Fish^{1,2,4}

¹Department of Laboratory Medicine and Pathobiology, University of Toronto, Toronto, ON, Canada. ²Toronto General Hospital Research Institute, University Health Network, Toronto, ON, Canada. ³Center for Excellence in Vascular Biology, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA. ⁴Peter 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
- TNF α -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, Mauricio 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}

¹Department of Physiology, Medical College of Wisconsin, Milwaukee, Wisconsin, USA. ²Cardiovascular 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 Chasman¹, Rajat M Gupta^{1,2}

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

WEDNESDAY

INFLAMMATION II

W01

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

Chris Pathoulas¹, Koki Hayashi², Krish Dewan³, Ryan Gross³, Amy L Kimble¹, Qlan Li⁴, Lifang Ye⁴, Bing Hao¹, Bo Reese⁵, Evan Jellison¹, Antoine Menoret¹, Anthony Vella¹, Dawn Bowles³, Nichole Valenzuela⁶, Jeffrey J Hsu⁴, Alessandro Alessandrini², Patrick Murphy¹

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- 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 PhD¹, Farwah Iqbal MD, PhD², Meghan W Sedovy PhD³, Adam Hoch BS², Amanda Reynolds BS², Kailynn Roberts BS⁴, Brant E Isakson PhD⁵, Liwu Li PhD⁶, Scott R Johnstone PhD^{3,2,7}

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- 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 MPH², Saketh Uppuluri BS², Andrew Farinha PhD², Elizabeth Amelotte BS², Theopi Rados¹, Gaurav Choudhary MD², Alan Morrison MD. PhD^{1,2}

¹Brown University, Providence, 02903, USA. ²Providence 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 Clark², Olivya Caballero ScM², 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 MD², Alexey Fedulov MD/PhD², Gaurav Choudhary MD^{1,2}, George Lisi PhD², Alan R Morrison MD/PhD^{1,2}

¹Ocean State Research Institute, Providence, RI, USA. ²Warren 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-1 β -driven NF- κ B 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 MD³, Xuming Zhang PhD³, Gaurav Choudhary MD^{1,2}, Rachel Olson PhD^{4,5}, Alan Morrison MD, PhD^{1,2}

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- We developed a novel mouse model for studying SARS-CoV2 infection that differs from current models.
- We identified an IL-1 β /NF- κ B 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}

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³Warren Alpert Medical School at Brown University, Providence, RI, USA. ⁴Ocean State Research Institute at the Providence VA Medical Center, Providence, RI, USA

- IL-6 influences macrophage-driven VEGF-A expression in pro-inflammatory angiogenesis.
- IL-6 works alongside IL-1 β 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

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¹Department of Bioengineering, University of Washington, Seattle, WA, USA.

²Institute for Stem Cell and Regenerative Medicine, Seattle, WA, USA. ³Center for Integrative Brain Research, Seattle Children's Research Institute, Seattle, WA, USA.

⁴Center for Global Infectious Disease Research, Seattle Children's Research Institute, Seattle, WA, USA. ⁵Department of Pediatrics, School of Medicine, University of Washington, Seattle, WA, USA. ⁶Department 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 MS¹, Mariko Kudo PhD¹, Debra Saunders¹, Abigail Kordeliski PhD¹, Audrey Cleuren PhD^{1,2}

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- 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

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- 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

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Yale University, New Haven, CT, USA

- VSMCs drive foam cell formation and lesion 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

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- 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

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- 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

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- 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

PROX1 increases vascular permeability and causes blood-brain barrier breakdown in neurovascular diseases

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- PROX1 upregulation in brain endothelial cells leads to blood–brain barrier breakdown
- PROX1 acts as a transcriptional repressor of Claudin-5 and β -catenin, key regulators of the BBB
- Modulating PROX1 expression in glioblastoma may restore BBB function and improve treatment outcomes

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 Jensen¹, Natalie Y.T. Au¹, Veia F Freeman¹, Meranda M Pham¹, Levan Mekerishvili^{2,3,4}, Robert M Meyers^{2,3,4}, Ivan Raimondi^{2,3,4}, Franco Izzo⁵, Dan A Landau^{2,3,4}, Jonathan A Perkins^{6,7}, James T Bennett^{1,6,8}

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- 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 Fanelli¹, Lily J Arnold¹, Alfredo Martínez², Corinne M Nielsen¹

¹Ohio University, Athens, OH, USA. ²Center 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.D¹, Borhane Annabi Ph.D², Sylvain Chemtob MD, Ph.D¹

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- 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

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¹FUJIFILM Cellular Dynamics, Madison, WI, USA. ²Axion 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

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- 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. Somers¹, Sophie E. Craig², Heath Fuqua Ph.D.¹, Lynne Beverly-Staggs¹, Kailee E. Tanaka¹, Sydney M. Brown², Charles H. Toulmin¹, Matthew D. Cox¹, Joel H. Graber Ph.D.¹, Melissa S. Maginnis Ph.D.², Hermann Haller M.D.^{1,3}

¹MDI Biological Laboratory, Bar Harbor, ME, USA. ²University of Maine, Orono, ME, USA. ³Hannover 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

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- 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

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- 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

Studying the development of the zebrafish Axillary Lymphoid Organ as a model for understanding secondary immune organ assembly

Nicholas M Kynast¹, Daniel Castranova¹, Madeline Kenton¹, Aurora Kraus¹, Christopher W Dell^{2,3}, Jong S Park¹, Marina Venero Galanternik¹, Gilseung Park⁴, Daniel Lumbantobing⁵, Louis Dye⁶, Miranda Marvel¹, James Iben⁷, Kiyohito Taimatsu¹, Van Pham¹, Reegan J Willms⁸, Lucas Blevens⁴, Tanner Ford Robertson⁹, Yiran Hou⁹, Anna Huttenlocher⁹, Edan Foley⁸, Lynne Parentil⁵, J. Kimble Frazer¹⁰, Kedar Narayan^{2,3}, Brant M Weinstein¹

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- Studying the development of the zebrafish Axillary Lymphoid Organ
- Live imaging of lymphatic development
- Understanding secondary immune organ assembly in early development

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

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- 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 Dairaghi¹, Daichi Yada², Alicia Allen PhD³, Ryan Bonvillain PhD³, Sam Rayner M.D.¹, Ying Zheng¹

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³United Therapeutics, 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 Grespin¹, Jasper S Farrington¹, Adella P Guidroz², Maggie S Grespin¹, Aaryn David¹, Chris Culkin¹, Liam J Russell¹, Talen G Niven¹, Patrick Soonthornprapuet¹, Dinah Loerke PhD¹, Stryder M Meadows PhD², Erich J Kushner PhD¹

¹University of Denver, Denver, CO, USA. ²Tulane 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 statins 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

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¹Medical College of Wisconsin, Milwaukee, WI, USA. ²University 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**

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University of Virginia, Charlottesville, 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 α PD1 and α VEGF Therapy, and Contributes to Hearing Loss Prevention in Vestibular Schwannoma Model**

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- α PD1 prevents tumor-induced hearing loss
- α VEGF activates the antitumor cytotoxicity of T and NK cells via NKG2D
- Combined α PD1 with α VEGF treatment controls the growth of α VEGF 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.

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- 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 PhD¹, Thomas Albon², Alessandro Dei², Yu-Jie Lin², Allen Eaves^{1,2,3}, Sharon Louis¹, Ryan Conder¹, Salvatore Simmini²

¹STEMCELL Technologies, Vancouver, Canada. ²STEMCELL Technologies UK Ltd, Cambridge, United Kingdom. ³Terry 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, Philadelphia, PA, USA

- Hepatocellular 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

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- 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 Anandh¹, Caroline Riedstra¹, Simona Bajgai², Sanja Arandjelovic¹, Melanie Rutkowski¹, Andrew C Dudley¹

¹UVA, Charlottesville, VA, USA. ²UVA, 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 TGF β R2 and phosphorylated TGF β RI (pTGF β RI) and AKT (pAKT).
- TGF β R2 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**Mechanisms of coronary angiogenesis in developing mouse hearts**

Bikram Sharma PHD

Ball State University, Muncie, IN, USA

- Hypoxia regulates coronary angiogenesis
- VEGF-A/VEGF-R2/SOX17 regulates coronary angiogenesis potentially downstream of hypoxia.
- DHX36 regulates coronary angiogenesis potentially upstream of Hif1alpha.