Vascular Tissue Engineering

M001
A completely biological “Off-the-Shelf” arteriovenous graft that reanimates
Tranquillo, Robert; Syedan, Zeeshan; Graham, Melanie; Dunn, Ty; O’Brien, Timothy; Johnson, Sandra; Schumacher, Robert
University of Minnesota, Minneapolis, MN
- acellular and completely biological tissue-engineered arteriovenous graft
- 6-month baboon study
- graft recellularization and endothelialization

M002
Combinatorial extracellular matrix micro-environments induce endothelial differentiation of human pluripotent stem cells
Huang, Ngan; Hou, Luqia; Kim, Joseph; Wanjare, Maureen; Coller, John; Natu, Vanita
Stanford University, Stanford, CA
- Combinatorial ECMs better mimic native endothelial ECM environment
- Combinatorial ECMs induced endothelial differentiation
- integrin β3 modulated endothelial differentiation

M003
Disturbed flow reprograms endothelial cell metabolism
Fang, Yun
University of Chicago, Chicago, IL
- Disturbed flow induces glycolysis and reduces mitochondrial respiratory capacity in endothelium
- Disturbed flow stabilizes hypoxia inducible factor-1α (HIF-1α) to reprogram endothelial metabolism
- VCAM1-targeted nanoparticles effectively treat atherosclerosis in ApoE-/- mice

M004
PECAM-1 mediates shear stress induced endothelial prostacyclin and nitric oxide production by distinct mechanisms
Tarbell, John; Bartosch, Anne Marie W.; Russell-Puleri, Sparkle
The City College of New York, New York, NY
- We show that anti-atherogenic molecules PGI2 and NO follow distinct mechanotransduction mechanisms
- The mechanosensor for NO is heparan sulfate proteoglycan (HSPG) glypican-1 interacting with PECAM-1
- Conversely PECAM-1 is the mechanosensor for PGI2 production without the involvement of HSPGs

Vascular Mechanics

M005
The proteoglycanome of the aortic wall: Pathogenic role of aggrecan and versican accumulation in thoracic aortic aneurysm and dissection
Koch, Christopher1; Cikach, Frank S.1; Mead, Timothy J.1; Willard, Belinda1; Galatioto, Josephine2; Emerton, Kelly B.1; Eagleton, Matthew J.1; Blackstone, Eugene H.1; Ramirez, Francesco1; Roselli, Eric E.1; Apte, Sunee1
1. Cleveland Clinic Lerner Research Institute, Cleveland, OH
2. Icahn School of Medicine at Mount Sinai, New York, NY
3. Mount Sinai School of Medicine, New York, NY
- Aggrecan and versican accumulate in human thoracic aortic aneurysm and dissection (TAAD)
- A Marfan syndrome mouse model has increased aggrecan production and decreased ADAMTS-mediated proteolysis
- Aggrecan and versican are identified as potential TAAD biomarkers
M006
The role of thrombospondin-1 in ascending aortic aneurysms in fibulin-4 mutant mice
Yanagisawa, Hiromi; Yamashiro, Yoshito; Shin, Seung Jae; Thang, Bui Q.
University of Tsukuba, Tsukuba, Japan
- Thrombospondin-1 is a mechanosensitive molecule involved in matrix-cell interactions
- Thrombospondin-1 is highly upregulated in the aneurysmal wall of fibulin-4 mutant mice
- Deletion of thrombospondin-1 prevents upregulation of Ssh1 and coffin activation and rescues aneurysms

M007
Post-transcriptional regulation of biomechanical genes limit contractile forces to preserve tissue stiffness homeostasis
Moro, Albertomaria; Discroll, Tristan; Baeyens, Nicolas; Jouy, Charlene; Gong, Cheng; Gu, Mengting; Zhang, Jing; Gerstein, Mark; Schwartz, Martin A.; Nicoli, Stefania
1. Yale University, New Haven, CT
2. University of Manchester, Manchester, United Kingdom
- High throughput sequencing of miR-mRNA-AGO2 complexes in endothelial cells identify cytoskeletal
- AGO2 deletion induced hyper-adhesive, hyper-contractile phenotype in HUVEC and HDF in 2D/3D cultures
- mechanical miRs-mRNAs network is an essential component of stiffness-dependent regulatory machinery

M009
Plasma fibronectin acts as a safeguard in the vasculature and supports synergistic and differential roles with cellular fibronectin in vascular matrix integrity
Kumra, Heena; Sabatier, Laetitia; Mosher, Deane F.; Takao, Takao; Chambon, Pierre; Reinhardt, Dieter P.
1. McGill University, Montreal, PQ, Canada
2. University of Wisconsin, Madison, WI
3. University of Liverpool, Liverpool, United Kingdom
4. Institut de Génétique et de Biologie Moléculaire et Cellulaire, Strasbourg, France
- Deletion of cellular fibronectin leads to minor effects as the plasma fibronectin is present in vessel wall
- Deletion of plasma fibronectin do not have any obvious effects because cellular fibronectin is present
- Deletion of both cellular and plasma fibronectin leads to lethality of the mice

Vascular Calcification
M010
DDR1 acts as a mechanotransducer to promote vascular calcification
Ngai, David; Bendeck, Michelle P.
University of Toronto, Toronto, ON, Canada
- Discoidin Domain Receptor-1
- Mechanotransduction
- Vascular Calcification

M011
Calcified vessels act as an important acute depot for oral phosphate in an experimental model of chronic kidney disease
Turner, Mandy; Jeronimo, Paul S.; Ward, Emilie C.; Laverty, Kimberly J.; Holden, Rachel M.; Adams, Michael A.
Queen’s University, Kingston, ON, Canada
- The acute deposition of oral load of phosphate is modified by vascular calcification
- Calcified arteries act as one of the most important depot for de novo phosphate per mg of tissue
- The deposition is equivalent or higher to that found in bone per mg of tissue
Vascular Imaging

M012
Vessel remodeling during allantois development: Establishing embryo-placenta blood circulation
Le, Henry
Baylor College of Medicine, Houston, TX
- Umbilical vessels
- vascular development imaging
- embryos development

M013
Imaging of atherosclerotic plaques using a novel SPECT radiotracer targeting LFA1
Meester, Eric1; Krenning, Boudewijn1; de Blois, Erik1; Norenberg, Jeffrey2; de Jong, Marion1; Bernsen, Monique1; van der Heiden, Kim1
1. Erasmus Medical Center Rotterdam, Rotterdam, Netherlands
2. University of New Mexico, Albuquerque, NM
- Novel SPECT Radiotracer (DANBIRT) for atherosclerosis imaging targets LFA1 on inflammatory cells
- Successful in imaging mouse plaque as confirmed by in/ex vivo SPECT, autoradiography and histology
- Preliminary data demonstrate feasibility of DANBIRT imaging to detect human atherosclerosis

Engineering Angiogenesis

M014
Engineering Ubx-based materials for scaffold neovascularization
Howell, David; Mendes, Gabrialla; Bondos, Sarah; Bayfless, Kayla
Texas A&M Health Science Center, College Station, TX
- VEGF-Ubx materials instigate and guide neovascularization ex vivo and in vivo
- To enhance Ubx materials we have incorporated FGF and SDF and VEGF alone and in combination
- Ubx-based materials will be useful for promoting vascularization of biocompatible 3D scaffolds

M015
Enhanced therapeutic angiogenesis of mesenchymal stem cells through combined mechanotransduction and pharmacological conditioning
Lee, Jason; Henderson, Kayla; Maceda, Pablo; Armenta-Ochoa, Miguel; Yoon, Eun; Samarneh, Lara; Veith, Austin; Wong, Mitchell; Dunn, Andrew; Baker, Aaron
University of Texas at Austin, Austin, TX
- Novel system that induces dynamic physiological strain waveforms was used on mesenchymal stem cells
- Combination of mechanical strain and pharmacological drugs were used to enhance angiogenesis
- Obtained endothelial and pericyte like markers in mesenchymal stem cells through the conditioning

M016
Lymphatic to blood vessel transition in adult microvascular networks
Murfee, Walter Lee1,2; Azimi, Mohammad S.1; Motherwell, Jessica1; Hodges, Nicholas A.1
1. Tulane University, New Orleans, LA
2. University of Florida, Gainesville, FL
- Lymphatic vessels transition into blood vessels during network growth in a novel tissue culture model
- Loss of lymphatic endothelial cell identity is supported by discontinuous lymphatic marker labeling
- Our results offer a new paradigm for investigating cell dynamics during microvascular network growth

The use of any recording devices during sessions is strictly prohibited. No photography of posters (including via a mobile device) without the expressed permission of the author.
**Developmental Vascular Biology and Genetics Workshop**

**Vascular Progenitors**

**D001**

A glycolytic switch is required for transdifferentiation to endothelial lineage  
Lai, Li; Reineke, Erin; Hamilton, Dale; Cooke, John P.  
Houston Methodist Research Institute, Houston, TX

- Transdifferentiation from fibroblast to endothelial cells requires glycolytic switch  
- Glycolytic manipulators could regulate transdifferentiation in vitro and in vivo  
- Poly I:C initiates the metabolic shift

**D002**

microRNA-223 limits hematopoietic stem cell production from endothelium during development  
Kasper, Dionna; He, Zhiheng; Mandl, Hanna; Moro, Albertainaria; Hirschi, Karen; Nicoli, Stefania  
Yale University Cardiovascular Research Center, New Haven, CT

- Hematopoietic stem/progenitor cells (HSPCs) arise by budding from hemogenic endothelium in development  
- Zebrafish miR-223 mutant embryos have an increased number of budding HSPCs  
- miR-223-dependent inhibition of HSPC production is conserved during mammalian embryogenesis

**Vascular Cell Biology**

**D003**

EndophilinA2 mediated endocytosis: A new internalization pathway for VEGFR2 regulating endothelial cell migration  
Genet, Gael; Baye, Kevin; Ola, Roxana; Zhang, Feng; Dubrac, Alexandre; Benedetti, Lorena; De Camilli, Pietro; Eichmann, Anne  
Yale School of Medicine, New Haven, CT

- Regulation of VEGFR2 signaling by endocytosis  
- High resolution microscopy  
- Developmental and pathological angiogenesis

**D004**

Excessive plasmin activity promotes endothelial Ripk3 transcription and murine embryonic vascular rupture  
Colijn, Sarah; Ingram, Kyle; Menendez, Matthew; Muthukumar, Vijay; Silasi-Mansat, Robert; Lupu, Florea; Griffin, Courtney T.  
Oklahoma Medical Research Foundation, Oklahoma City, OK

- Embryos with excessive plasmin activation have elevated RIPK3 in endothelial cells at midgestation  
- Genetically reducing either plasmin activation or Ripk3 rescues embryos from lethal vascular rupture  
- Plasmin works through PAR4 to upregulate Ripk3 transcription in cultured endothelial cells

**Vascular Signaling**

**D005**

Endothelial Notch signaling limits angiogenesis via control of artery formation  
Siekmann, Arndt; Hasan, Sana S.; Tsaryk, Roman; Lange, Martin; Wisniewski, Laura; Moore, John C.; Lawson, Nathan D.; Wojciechowska, Karolina; Schnittler, Hans  
1. Max Planck Institute for Molecular Biomedicine, Muenster, Germany  
2. University of Massachusetts Medical Sch, Worcester, MA  
3. University of Warsaw, Warsaw, Poland  
4. WWU Muenster, Muenster, Germany

- Artery formation  
- Notch Signaling  
- Control of gene expression

**D006**

ALK2 mediates venous specific pro-angiogenic function of BMP signaling in mammalian vessels  
Jin, Suk-Won  
Gwangju Institute of Science and Technology, Republic of Korea

- BMP signaling modulates vascular morphogenesis in a venous specific manner in mammals  
- ALK2 but not ALK3 mediates venous specific angiogenic response toward BMP signaling in mammalian ECs  
- ALK2 activates COUP-TFII, which in turn, facilitates cell proliferation in venous ECs

**D007**

A novel Smad4 model of Hereditary Hemorrhagic Telangiectasia (HHT) links angiopoietin/Tek signaling to the formation of arteriovenous malformations  
Meadows, Stryder; Crist, Angela M.; Garai, Jovanny; Baddoo, Melody; Zabaleta, Jovanny  
1. Tulane University, New Orleans, LA  
2. Louisiana State University Health Sciences Center, New Orleans, LA  
3. Tulane Cancer Center, New Orleans, LA

- Generation of a novel Smad4 mouse model of HHT that exhibits AVMs similar to patients  
- Identification of 150+ potential TGFß downstream effectors/therapeutic targets of HHT  
- Defective Angiopoietin/Tek signaling is associated with AVM formation
**Transcriptional Control/ Gene Regulation**

**D008**

**Transcriptional regulation of the SMC-selective, blood pressure-associated Rho-specific GTPase, GRAF3**

*Mangum, Kevin; Taylor, Joan M.; Mack, Christopher P.*

University of North Carolina, Chapel Hill, NC

- smooth muscle cell-selective transcription mechanisms
- genetic control of hypertension
- Notch signaling

**D009**

**The ETS factor ERG controls an endothelial-specific transcriptional regulatory program associated with super-enhancers**

*Birdsey, Graeme1; Yang, Youwen1; Kalna, Viktoria1; Hannah, Rebecca1; Shah, Aarti V.1; Osuna Almagro, Lourdes1; Boyle, Joseph J.3; Ferrer, Jorge1; Göttgens, Berthold2; Randi, Anna M.1*

1. Imperial College London, London, United Kingdom
2. Cambridge University, Cambridge, United Kingdom
3. MRC London Institute of Medical Sciences, London, United Kingdom

- ETS transcription factor ERG is essential for endothelial lineage specification and vascular development
- ChIP-seq in HUVEC identifies ERG binding to active super-enhancers, associated with core EC regulatory genes
- ERG bound super-enhancers in VCaP cells are distinct to EC, demonstrating ERG activity is cell type-specific

**Coronary Vascular Development**

**D010**

**Coordinated formation of coronary vessels and cardiac lymphatics during zebrafish heart development and regeneration**

*Lien, Ching-Ling (Ellen); Harrison, Michael R.; Feng, Xidi*

Children's Hospital Los Angeles, Los Angeles, CA

- Zebrafish is a unique model to study how vasculature forms during heart development and regeneration
- CXC chemokine signaling regulates development of coronary vessels and cardiac lymphatics
- Interactions between coronary vessels and cardiac lymphatics are essential for heart development

**D011**

**Molecular regulation of vascular smooth muscle cell recruitment to arteries during development**

*Stratman, Amber; Pham, Van N.; Farrelly, Olivia M.; Burns, Margaret C.; Davis, Andrew E.; Weinstein, Brant M.*

NICHHD/NIH, Bethesda, MD

- Smooth muscle cells recruit preferentially to arteries during early development
- cxcl12 regulates pdgf-bb ligand expression
- klf2 seemingly limits expression of cxc4 to modulate expression of pro-chemoattractant ligands for vSMC

**Lymphatic Development**

**D012**

**MMP14 suppresses lymphatic endothelial cell proliferation by inhibiting ERK activation in lymphatic valve maturation and homeostasis**

*Shawber, Carrie; Muley, Ajit; Kitajewski, Christopher; Rittano, Gloria; Saade, Mia M.*

Columbia University Medical Center, New York, NY

- MMP14 regulates lymphatic valve maturation and homeostasis
- Loss of LEC Mmp14 results in lymphatic valve defects blocking intestinal lipid uptake
- MMP14 suppresses LEC proliferation by inhibiting ERK signaling

**D013**

**PROX1 enhances Wnt/ß-catenin signaling during lymphatic vascular development**

*Cha, Boksik; Sathish, Srinivasan*

Oklahoma Medical Research Foundation, Oklahoma City, OK

- We have identified PROX1 as a novel regulator of Wnt/ß-catenin signaling
- PROX1 provides endothelial cell competence to respond to OSS and Wnt ligands activating FOXC2 expression
- Wnt-ligands secreted by LECs and mural cells are necessary for the development of lymphatic valves
**Vascular Heterogeneity**

**D014**  
Requirement for NOTCH3 in stem cell to vascular smooth muscle cell transition in infantile hemangioma  
Wu, June1; Edwards, Andrew1; Glithero, Kyle1; Grzesik, Peter1; Kitajewski, Alison A.1; Munabi, Naikhoba CO1; Hardy, Krista1; Tan, Qian Kun1; Schonning, Michael1; Kangsamsaksin, Thaned2; Kitajewski, Jan K.3; Shawber, Carrie J.3  
1. Columbia University, New York, NY  
2. Mahidol University, Bangkok, Thailand  
3. University of Illinois Chicago, College of Medicine, Chicago, IL  
- Infantile hemangiomas (IHs) have mis-expression of endothelial and perivascular cell markers  
- NOTCH3 is expressed in IHs and may help to stabilize pathological IH vasculature  
- Inhibition of NOTCH3 in IHs inhibited IH vessel development and may be a therapeutic target

**D015**  
A genomic address code integrates capillary, venule and tissue specific signals to control intestinal venule identity  
Dinh, Thanh Theresa  
Stanford University, Stanford, CA  
- A phylogenetic conserved element confers segmental and tissue specific transcriptional regulation

**Bioengineering Organ Specific Vasculatures**

**G001**  
Pericyte-derived lactadherin tightens the endothelium as identified in a novel 3D microfluidic model of the blood-brain barrier  
Dang, Lan1; Obermeier, Birgit1; Marsh, Graham1; Shimizu, Fumitaka2; Sano, Yasuteru2; Kanda, Takashi2; Duffield, Jeremy S.3; Ransohoff, Richard1  
1. Biogen, Cambridge, MA  
2. Yamaguchi University, Ube, Japan  
3. Vertex Pharmaceuticals, Boston, MA  
- Pericytes are key regulators of endothelial cell function at the blood-brain barrier (BBB)  
- We recapitulate the BBB’s unique anatomic and functional properties in a physiological flow setting  
- We identified MFG-E8 as a pericyte derived factor which enhance barrier function of MVECs

**G002**  
BBB on-a-chip: a 3D in vitro model of the human blood brain barrier (BBB)  
Wevers, Nienke; Vught, Remko V.; Spijker, Xandor; Wilschut, Karlijn J.; Trietsch, Sebastiaan J.; Vulto, Paul; Joore, Jos  
Mimetas, Leiden, Netherlands  
- Blood brain barrier model on-a-chip  
- Endothelium, astrocytes and pericytes co-culture in an easy to use platform  
- For fundamental BBB research and drug development studies

The use of any recording devices during sessions is strictly prohibited. No photography of posters (including via a mobile device) without the expressed permission of the author.
**Vascular Therapeutics**

**G003**

Doxorubicin triggers endothelial cell dysfunction by suppressing KLF2/KLF4 flow-dependent programs: Opportunities for pharmacological intervention

Slegtenhorst, Bendix; Voskuil, Floris J.; Lumertz-Saffi, Marco A.; Zhang, Yuzhi; Tullius, Stefan G.; García-Cardeña, Guillermo

Harvard Medical School and Brigham and Women's Hospital, Boston, MA

- The use of Doxorubicin (DOX) is associated with severe long-term cardiovascular risk and mortality
- DOX suppresses the flow-mediated expression of KLF2 and KLF4 in human endothelial cells
- Agents that sustain endothelial KLF2/KLF4 in the presence of Dox may benefit cancer patients

**Engineering Vascular Morphogenesis**

**G004**

YAP/TAZ-CDC42 signaling regulates vascular tip cell migration

Xin, Mei; Sakabe, Masahide; Fan, Jieqing; Odaka, Yoshinobu; Liu, Ning; Hassan, Aishlin; Duan, Xin; Stump, Paige; Byerly, Luke; Donaldson, Megan; Hao, Jiukuan; Fruttiger, Marcus; Lu, Richard; Lang, Richard A.

1. Cincinnati Children’s Hospital Medical Center, Cincinnati, OH
2. UT Southwestern Medical Center, Dallas, TX
3. University of Cincinnati, Cincinnati, OH
4. UCL Institute of Ophthalmology, London, United Kingdom

- Regulation of retinal angiogenesis by the Hippo Signaling Pathway
- Gene dosage requirements of YAP and TAZ for endothelial cell proliferation and migration
- Cytoplasmic YAP functions in promoting cell migration by activating CDC42

**G005**

Slug is a SDF1a downstream effector during angiogenesis

Hultgren, Nan; Ziegler, Mary E.; Welch-Reardon, Katrina; Hughes, Christopher C.

University of California, Irvine, Irvine, CA

- SDF1a treatment induces Slug but not Snail expression in EC during angiogenic sprouting
- The angiogenic effect of SDF1a is strongly impaired in Slug deficient retina explants
- SDF1a activates MEK5/ERK5 signaling, which turns on Slug transcription in EC

**G006**

Endothelial APLNR regulates tissue fatty acid uptake and is essential for apelin's glucose lowering effects

Chun, Hyung

Yale University School of Medicine, New Haven, CT

- Apelin's glucose lowering effect is highly dependent on endothelial APLNR signaling
- Apelin regulates endothelial FABP4 expression, which in turn determines transendothelial fatty acid transfer
- Pharmacologic inhibition of FABP4 rescues the impaired glucose utilization in apelin disrupted state

**G007**

Endothelial cell-derived factors controlling pericyte invasion and endothelial-pericyte tube co-assembly

Kemp, Scott; Davis, George E.

University of Missouri-Columbia School of Medicine, Columbia, MO

- Investigating pericyte invasion during EC-pericyte tube co-assembly
- PDGF-BB and PDGF-DD stimulate pericyte-only invasion, while ET-1 synergizes with either factor
- Blockade of PDGF-BB, PDGF-DD, and ET-1 markedly inhibits pericyte recruitment to EC-lined tubes

The use of any recording devices during sessions is strictly prohibited. No photography of posters (including via a mobile device) without the expressed permission of the author.
G008  Mechanical cues control morphogenesis and longevity of vascular networks
Haase, Kristina; Kamm, Roger D.
Massachusetts Institute of Technology, Cambridge, MA
- Simulating dynamics of the myocardium allows for investigation of vascular recovery in vitro
- Interstitial flow promotes network connectivity during the initial stages of vasculogenesis
- Cyclic compressive strain (~10%) inhibits early vasculogenesis, and results in significant remodeling

G009  Engineering 3D microvessels with biometric continuous curvature and diameter
Mandrycky, Christian; Zheng, Ying
University of Washington, Seattle, WA
- Technique to rapidly form long 3D vessels in vitro with continuous curvature
- Vessels can be formed in gel or PDMS for flow and remodeling studies
- Support the incorporation of parenchymal populations to mimic more complex tissues

Vasculata 2018
sponsored by
Washington University in St. Louis
University of Missouri – Columbia
and the
North American Vascular Biology Organization
Organizers: Gwendalyn Randolph and Kyunghee Choi, Washington University and Michael Davis, University of Missouri – Columbia
www.navbo.org/events/vasculata2018

Save the date!
July 23-26, 2018

Abstracts due
June 1, 2018
Vascular Progenitors

001 Determining the role of Egfl7 in the hemogenic endothelium
Argueta, Lissenya1; Bambino, Kathryn2; Stuhlmann, Heidi1
1. Weill Cornell Medical College, New York, NY
2. Icahn School of Medicine at Mount Sinai, New York, NY

- Endothelial-restricted gene Egfl7 is expressed at sites of budding hematopoietic stem progenitors
- Sox17 is a potential upstream regulator of Egfl7 in the hemogenic endothelium
- EGFL7 signals through NOTCH and EGFR in embryonic endothelial cells

002 Expandable arterial endothelial precursors derived from human CD34+ progenitors differ in their propensity to undergo an endothelial-to-mesenchymal transition
Vereide, David1; Miller, Auston1; Ingram, Patrick2
1. Morgridge Institute for Research, Madison, WI
2. University of Wisconsin-Madison, Madison, WI

- MYCN and SOX17 expand human arterial endothelial precursors in vitro
- Some arterial precursors readily transition to a mesenchymal state, while others do not
- The precursors that become mesenchymal reveal phenotypes associated with vascular disease

003 Alternative progenitor cells compensate to rebuild the coronary vasculature in Elabela- and Apj-deficient hearts
Sharma, Bikram
Stanford University, Stanford, CA

- ELA-APJ is required for coronary vessel (CV) sprouting from the sinus venosus (SV)
- Endocardial-derived CVs can expand to rescue defective SV sprouting
- The existence of two progenitor sources provides robustness to coronary development

004 A Xeno-Free culture system for efficient derivation and amplification of human endothelial colony-forming cells from umbilical cord blood
Marchetti, Valentina1; Lee, Kelsey1; Wagey, Ravenska1; Peters, Carrie1; Sakimoto, Susumu1; Aguilar, Edith1; Friedlander, Martin1; Thomas, Terry1; Eaves, Allen1; Szilvassy, Stephen1; Louis, Sharon1
1. StemCell Technologies, Vancouver, Canada
2. The Scripps Research Institute, La Jolla, CA

- Endothelial Progenitor Cells Endothelial Colony Forming Cells
- Xeno-free culture system for derivation and expansion of ECFCs
- Oxygen induced retinopathy in vivo model of eye disease

Stem Cells in Vascular Biology

006 Capillary origin of new endothelium in immune angiogenesis
Rajaraman, Anusha1; Szade, Agata A.1; Lazarus, Nicole1; Rahman, Milladur2; Dermadi Bebek, Denis1; Pan, Junliang2; Vestweber, Dietmar3; Kawashima, Hiroto3; Butcher, Eugene C.4
1. Stanford University, Stanford, CA
2. Palo Alto Veterans Institute for Research, Palo Alto, CA
3. Max-Planck Institute for Molecular Biomedicine, Munster, Germany
4. Chiba University, Chiba, Japan

- Lymph node blood endothelial cells expand during inflammation but their precursors remain unclear
- Our analysis shows a transitional blood endothelial phenotype during inflammation
- Antibody tagged fate-mapping reveals that capillaries give rise to high endothelial venules

007 Cx43-containing gap junctions between endothelial cells and NSC in the adult brain subventricular zone maintains NSC quiescence
Genet, Nafisha1; Zhi-Ming Ma, Gerry2; Lee, Seyoung1; Chintanaphol, Michelle1; Fang, Jennifer S.1; Baker, Kasey1; Bhatt, Neha1; Bourdieu, Antonin1; Vasavada, Hema1; ffrench-Constant, Charles1; Thomas, Jean-Leon1; Hirschi, Karen K.1
1. Yale Cardiovascular Research Center, New Haven, CT
2. MRC Centre for Regenerative Medicine, Edinburgh, United Kingdom

- In vivo study of neural stem cells (NSC) and endothelial cells (EC) interaction via connexins (Cx) in the SVZ
- In vitro modeling of NSC and EC interaction in a touch transwell co culture manner
- Cx43 is involved in NSC regulation in the murine adult SVZ niche

Vascular Signaling

008 The inhibitory protein PMEPA1, but not SMAD7, inhibits BMP signaling in endothelial cells
Citrin, Kathryn; Mouillesseaux, Kevin P.; Wylie, Lyndsay; Bautch, Victoria L.
University of North Carolina at Chapel Hill, Chapel Hill, NC

- SMAD7 knockdown does not significantly affect endothelial cell responsiveness to BMP6 stimulation
- PMEPA1 knockdown significantly increases endothelial cell responsiveness to BMP6 stimulation
- PMEPA1 knockdown decreases the proliferation of endothelial cells in culture
009
The role of NRP1 in pharyngeal arch artery morphogenesis
Navarro-Aragall, Ariadna Gador; Plein, Alice; Fantin, Alessandro; Denli, Laura; Scambler, Peter; Ruhrberg, Christiana
University College London, London, United Kingdom

- Pharyngeal arch arteries (PAAs) are essential for normal aortic arch development
- NRP1 is important for formation and development of PAAs
- Semaphorin signalling through NRP1 is important for PAAs remodelling

011
CXCL12-CXCR4 signaling plays an essential role in proper patterning of aortic arch and pulmonary arteries
Oh, S. Paul1; Kim, Bo-Gyeong2; Stanley, Edward L.1; Lee, Young Jae3
1. University of Florida, Gainesville, FL
2. Gachon University, Incheon, Korea, Republic of

- Using a novel Cxcl12-LacZ reporter line, Cxcl12 expression was visualized at systemic and pulmonary arteries
- CXCL12-deficiency resulted in aberrant vertebral artery and abnormal systemic arterial supply to lungs
- Tie2-Cre but not Wnt1-Cre mediated Cxcr4 deletion phenocopied the aortic arch and pulmonary artery patterning

012
Chloride Intracellular Channel proteins function in Sphingosine-1-phosphate signaling to regulate endothelial cell behavior and angiogenesis
Mao, De Yu1; Jilishitz, Irina2; Komarova, Yulia3; Hla, Timothy4; Kitajewski, Jan K.5; Kleinjan, Matt6
1. University of Illinois Chicago, College of Medicine, Chicago, IL
2. Columbia University Medical Center, New York, NY
3. Boston Children's Hospital, Harvard Medical School, Boston, MA

- CLIC4 and CLIC1 function downstream of S1P1 receptor in endothelial cells
- CLIC1, not CLIC4, functions downstream of S1P2 receptor in endothelial cells
- C-terminus of CLIC proteins is responsible for its function in endothelial S1P signaling

013
A mouse model for tracking and auditing endothelial cell-derived extracellular vesicles in cancer
McCann, James1; Lannigan, Joanne2; Erdbruegger, Uta3; Dudley, Andrew C.4
1. University of North Carolina, Chapel Hill, NC
2. The University of Virginia, Charlottesville, VA

- Extracellular vesicles (EVs) are important vectors for exchanging information between different cell types
- Tumor-derived endothelial cells shed abundant EVs with unique protein payloads
- Endothelial lineage-traced mice stably transport ZSGreen into EVs allowing us to track and audit EC-derived EV

014
Investigating the role of BMP9 in the development of superior cavopulmonary anastomosis-associated pulmonary arteriovenous malformations
Treggiari, Davide1; Capasso, Teresa1; Hindes, Morgan LM2; Bloch, Jamie L3; Cook, Stephen4; Trucco, Sara5; Roman, Beth L.6
1. University of Pittsburgh, Pittsburgh, PA
2. Children’s Hospital of Pittsburgh, Pittsburgh, PA

- PAVMs are a common consequence of bidirectional cavopulmonary anastomosis
- Decreased BMP9 availability might contribute to PAVM development in bidirectional cavopulmonary anastomosis
- BMP9 levels significantly decrease in individuals undergoing bidirectional cavopulmonary anastomosis

Regulation of Epithelial and Endothelial Junctions

015
Csk strengthens endothelial barrier function via tyrosine 685 of VE-cadherin
Spring, Kathleen
Max Planck Institute for Molecular Biomedicine, Münster, Germany

- Endothelial barrier regulation
- Inflammation and leukocyte extravasation
- Endothelial permeability

016
Caveolin-1 is required for Th1 cell infiltration but not tight junction remodeling at the blood-brain barrier
Lutz, Sarah1; Smith, Julian2; Kim, Dae3; Olson, Carl V.4; Eliefsen, Kyle5; Bates, Jennifer M.3; Gandhi, Sunil P.3; Agalliu, Dritan2
1. University of Illinois at Chicago, Chicago, IL
2. Columbia University Medical Center, New York, NY
3. University of California, Irvine, Irvine, CA

- Intravitral two-photon microscopy shows that TJ remodeling precedes the onset of EAE
- Caveolar transcytosis is not required for endothelial TJ remodeling in vivo
- Caveolar transcytosis is required for Th1 but not Th17 cell infiltration into the CNS
Vascular Smooth Muscle Cell Biology

017 Matrix stiffness regulates vascular smooth muscle cell osteogenic potential
Tsakali, Sofia Serena 1; Warren, Derek 2; Shanahan, Catherine M. 2
1. Kings College London, London, United Kingdom
2. University of East Anglia, Norwich, United Kingdom
- Vascular calcification
- Mechanotransduction
- Vascular smooth muscle cells

018 Identification of novel vascular smooth muscle cell markers by in vivo transcriptional profiling
Cleuren, Audrey; van der Ent, Martijn A.; Hunker, Kristina; Jiang, Hui; Ginsburg, David; Ganesh, Santhi
University of Michigan, Ann Arbor, MI
- In vivo transcriptional profiling of SMCs
- Identification/validation new vSMC markers
- Transgelin-Cre mouse model comparison

019 Loss of contractile SMCs in TAA of mouse model of Marfan syndrome is compensated by recruitment of collagen depositing cell types
Gharraee, Nazli; Lessner, Susan M.
University of South Carolina, Columbia, SC
- Diameter of ascending aorta increases significantly between 6 and 9 months in Fbn1 C1039G heterozygotes
- There is a loss of SM-MHC but not SMA in the media of ascending aorta in Fbn1 Hets vs WT
- Collagen deposition in the media and aortic annulus of Het mice increases with time compared to WT

020 Smooth muscle cell migration and polarization in response to vascular injury
Khogali, Shiemaa
University of Toronto, Toronto, ON, Canada
- Smooth muscle cell migration and polarization
- Mechanotransduction in smooth muscle cell polarization
- Smooth muscle cell biology

021 Withdrawn

022 Structure and function of resistance arteries from cardiovascular disease patients are differentially influenced by risk factors and patient characteristics
Bloksgaard, Maria 1; De Mey, Jo 2; Leurgans, Thomas 1; Riber, Lars 2; Rasmussen, Lars M.
1. University of Southern Denmark, Odense C, Denmark
2. Odense University Hospital, Odense C, Denmark
- The media-to-lumen ratio (M:L) of resistance arteries (RA) is increased in hypertension and diabetes
- We evaluated the relationship between structure and function of human RA
- Structure and function of hRA is differentially influenced by disease, drugs and risk factors

Vascular Biology

023 Correction for shrinkage during histological processing allows retrieval of the wall to lumen ratio of biobanked human resistance arteries
Bloksgaard, Maria 1; Rosenstand, Kristoffer 2; Nissen, Inger 1; Marcussen, Niels 2; De Mey, Jo 1
1. University of Southern Denmark, Odense C, Denmark
2. Odense University Hospital, Odense C, Denmark
- Structural remodeling of resistance arteries is predictive of future adverse cardiovascular events
- Assessment of remodeling requires measuring the dimensions of the live resistance artery (RA)
- Correcting for histo-processing artifacts allows future research on biobanked RA segments

025 Long non-coding RNAs are dynamically regulated and influence the progression of endothelial-to-mesenchymal transition (EndMT) in vitro
Caudrillier, Axelle; Rodor, Julie; Monteiro, João; Deng, Lin; Kok, Fatma; Baker, Andrew H.
University of Edinburgh, Edinburgh, United Kingdom
- Endothelial-to-mesenchymal transition
- Long non-coding RNA
- Vascular remodeling

026 A novel role for prostaglandin-mediated developmental programming in the ductus arteriosus
Yarboro, Michael
Vanderbilt University, Nashville, TN
- PGE2 is a known regulator of DA tone. PGE2 infusion keeps the DA relaxed; COX inhibition causes DA closure
- Unexpectedly, chronic PGE2 inhibition leads to persistent ductus patency (PDA) instead of constriction
- PGE2 appears to mediate a time-dependent developmental program crucial for postnatal function of the DA

027
Role of reactive oxygen species in regulation of contractility of isolated lymphatic vessels
Nepiyushchik, Zhanna; Mukherjee, Anish; Razavi, Mohammad; Dixon, J. Brandon
Georgia Institute of Technology, Atlanta, GA
- Lymphatic Vessels Dysfunctions. Lymphedema
- Reactive Oxygen Species in Regulation of Collecting Lymphatic Vessels Contractility
- Reactive Oxygen Species and Impaired functions of lymphatic vessels

028
Requisite endothelial reactivation and effective siRNA nanoparticle targeting of Etv2/Er71 in tumor angiogenesis
Kabir, Ashraf Ul; Lee, Tae-Jin; Pan, Hua; Berry, Jeffrey C.; Krchma, Karen; Wu, Jun; Hinman, Kristina; Novack, Deborah V.; Mecham, Robert P.; Wickline, Samuel A.; Miller, Mark J.; Choi, Kyunghee
Washington University School of Medicine in St. Louis, St. Louis, MO
1. University of South Florida, Morsani College of Medicine, Tampa, FL
- Etv2 is a unique marker for tumor endothelial cells and required for tumor angiogenesis
- Etv2 is a redox sensitive transcription factor, which links hypoxia and VEGF mediated tumor angiogenesis
- Systemic delivery of Etv2 siRNA nanoparticles inhibited tumor angiogenesis without cardiovascular side effects

029
Molecular mechanism of differential VEGF signaling regulation by Epsin and Dab2 for neovascularization
Rahman, Habibunnabi
Boston Children’s Hospital, Boston, MA
- Epsin mediated endocytosis
- VEGFR2 dependent angiogenesis
- Therapies modulating neovascularization

030
Mimicking physiological shear stress conditions in vitro by using the versatile ibidi Perfusion System
Wagner, Helga; Öffner, Wolfgang; Zantl, Roman
1. ibidi GmbH, Martinsried, Germany
2. ibidi GmbH, Plankstadt, Germany
- Flow conditioning is a substantial parameter to approach physiological conditions in EC culture
- Defined flow conditions of the experimental setup are important for reproducible results
- The ibidi Perfusion System is an easy-to-use solution to obtain striking new results in vascular biology

031
Understanding the role of oxidative stress in altering cardiovascular disease severity in elastin insufficiency
Troia, Angela; Halabi, Carmen; Danback, Joshua; Kovacs, Attila; Kozel, Beth A.
1. National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD
2. Washington University School of Medicine, St. Louis, MO
- Elastin insufficiency induced hypertension and vascular stiffness
- Elastin insufficiency is associated with increased vessel wall oxidative stress
- Genetic and drug manipulations that reduce NOX activity improve HTN and functional stiffness

032
Characterizing the role of RHOA in regulating cranial vascular integrity
Pillay, Laura; Butler, Matthew G.; Davis, Andrew E.; Castranova, Daniel A.; Gore, Aniket V.; Swift, Matthew R.; Iben, James R.; Stan, Radu V.; Weinstein, Brant M.
1. NIH, Bethesda, MD
2. Dartmouth Medical School, Lebanon, NH
- A dominant mutation in zebrafish “Bloody Mary” mutants generates an intracranial hemorrhage phenotype
- The causative mutation in “Bloody Mary” is likely a missense mutation in a zebrafish RHOA orthologue
- Vascular integrity in developing zebrafish is highly sensitive to either decreased or increased RHOA dosage

033
Development of the pectoral fin vasculature in zebrafish embryos
Paulissen, Scott; Castranova, Daniel A.; Weinstein, Brant M.
NICHD, NIH, Bethesda, MD
- Vascular development
- Zebrafish
- Lumenization

034
Determine the mechanism that governs CD151-mediated inhibition of vascular hyperpermeability
Chen, Junxiong
OUHSC, Oklahoma City, OK
- CD151 regulate endothelial barrier function
- CD151 is associated with extracellular matrix deposition
- CD151 may regulate COX-2-PGE2 via JAK/STAT signaling pathway
035 Biomarkers of cerebral small vessel endotheliopathy
Elahi, Fanny1; Altendahl, Marie2; Staffaroni, Adam2; Casaletto, Katlin2; Neuhaus, John1; Goetzl, Edward3; Kramer, Joel2
1. University of California, San Francisco, San Francisco, CA
2. Memory and Aging Center, UCSF, San Francisco, CA
3. Geriatric Research Center, UCSF, San Francisco, CA
- biomarker discovery for cerebral small vessel endotheliopathy
- exosome-derived cargo proteins as biomarkers of vascular endotheliopathy
- diagnosis of cerebral small vessel disease

036 Jagged1-Notch signaling increases metastatic behavior in tumor cells
Herts, James; Chaudhri, Reyhaan A.; Du, Jing; Gordon, Benjamin; Ktijewski, Jan K.
University of Illinois Chicago, College of Medicine, Chicago, IL
- Ligand-specific Notch Decoys exhibit differential effects on sprouting angiogenesis
- In tumor cells, Jag1 and Dll4 differentially regulate EMT-related genes and adhesion molecules
- Jag1/Notch blockade reduces tumor cell metastatic behavior

037 Hemogenic endothelium in human fetal liver?
Choi, Yoon Jung1; Hayes, Brian2; Hadland, Brandon2; Zheng, Ying1
1. University of Washington, Seattle, WA
2. Fred Hutchinson Cancer Research Center, Seattle, WA
- Human fetal liver hematopoiesis
- Human fetal liver-specific angiocrine factors
- Hematopoietic populations present in the human fetal liver

038 AAV-mediated delivery of virus-derived apoptosis and inflammasome inhibitors reduces liver allograft vasculopathy and LPS-induced ascitic inflammation in mice
Ambadapadi, Srinarayana1; Ildefonso, Cristhian J2; Yaron, Jordan R3; Domstauber, Quinn1; Zhang, Liliang1; Lewin, Alfred S2; Lucas, Alexandra1
1. Arizona State University, Tempe, AZ
2. University of Florida, Gainesville, FL
- Myxomavirus-derived apoptosis and inflammasome inhibitors reduce renal allograft vasculopathy
- AAV-mediated delivery of Myxomavirus-derived anti-inflammatories is an effective mode for delivery
- Myxomavirus-derived apoptosis and inflammasome inhibitors reduce LPS-induced inflammation in the ascites

Vascular Tissue Engineering
039 Micropatterning induced morphological and functional alterations of endothelial colony forming cells (ECFCs)
Hagen, Matthew; Hinds, Monica T.
Oregon Health & Science University, Portland, OR
- ECFCs from circulating progenitors have an endothelial phenotype suitable for tissue engineering
- Micropatterning drives fluid shear-like atherosclerotic protection in ECs. It has not been studied in ECFCs
- We have generated durable ECFC micropatterns. Further study on MPECFC function is needed

040 Reactive ion etching of vascular graft materials enhances endothelialization
Hinds, Monica1; Jurney, Patrick1; Anderson, Deirdre EJ1; Pohan, Grace2; Yim, Evelyn KF2
1. Oregon Health & Science University, Portland, OR
2. University of Waterloo, Waterloo, Canada
- Modification of PVA biomaterials is required to support endothelialization of the surface
- Reactive ion etching of PVA with O2 and N2 increased the Nitrogen content and hydrophilicity of the surface
- Etching of PVA with O2 and N2 increased the available amines and supported endothelial cell attachment

041 Islet-on-a-Chip: A vascularized micro-organ approach to enhance islet function ex vivo
Bender, Hugh1; Wortham, Matthew2; Sander, Maike2; Hughes, Christopher C.1
1. University of California, Irvine, Irvine, CA
2. University of California, San Diego, San Diego, CA
- Pancreatic islets survive poorly and do not respond to glucose stimulation when maintained in culture
- We have developed a vascularized, islet-on-a-chip platform to enhance islet survival and function ex vivo
- Islets within the platform secrete insulin in response to glucose and pharmacologic stimulation
042
Characterizing human induced pluripotent stem cell-derived endothelial cells under fluid flow-induced shear stress: comparisons to primary endothelial cell types
Soos, Agnes; Fitzsimmons, Ross E.; Santerre, J Paul; Simmons, Craig A.
University of Toronto, Toronto, ON, Canada
- Induced pluripotent stem cell-derived endothelial cells respond to extended fluid shear conditioning
- iPSC-derived endothelial cells demonstrate some similarity to primary vascular endothelial types
- Ability to form sprouts and networks supports angiogenic potential of iPSC-derived endothelial cells

043
Raman microspectroscopy for the marker-free characterization of smooth muscle cells from different tissue origins
Marzi, Julia1; Brauchle, Eva1; Schenke-Layland, Katja1; Rolle, Marsha W.2
1. University of Tuebingen, Tuebingen, Germany
2. Worcester Polytechnic Institute, Worcester, MA
- label-free characterization of smooth muscle cells in situ
- vascular tissue engineering
- Raman microspectroscopy

044
Modeling fibrin and von Willebrand factor binding within bioengineered microvessels
Rayner, Samuel1; Gunnarsson, Celina1; Chen, Junmei2; Chung, Dominic2; Lopez, Jose3; Zheng, Ying1
1. University of Washington, Seattle, WA
2. Bloodworks Northwest Research Institute, Seattle, WA
- Characterize fibrin binding to VWF fibers within a microvessel model
- Explore whether fibrin may play a role in the pathogenesis of thrombotic microangiopathies
- Understand the optimal flow conditions under which VWF-fibrin binding occurs

046
Assembly of modular tissue engineered blood vessels for modeling focal pathologies
Strobel, Hannah4; Piola, Marco5; Fiore, Gianfranco B.2,3; Soncini, Monica1; Alisberg, Eben1; Rolle, Marsha W.1
1. Worcester Polytechnic Institute, Worcester, MA
2. Politecnico di Milano, Milano, Italy
3. Dipartimento di Elettronica, Informazione e Bioingegneria, Milano, Italy
4. Case Western Reserve University, Cleveland, OH
- Developed modular TEBV from ring sub-units with localized regions of microsphere incorporation
- Fabricated custom luminal flow bioreactor for TEBV culture, which also enables endothelialization
- This modular system may potentially be used for fabricating focal disease models

047
The key role of fibronectin in the maturation of tissue engineered blood vessels
Di Paolo, Joseph1; Pezzoli, Daniele2; Kumra, Heena1; Candiani, Gabriele1; Mantovani, Diego2; Reinhardt, Dieter1
1. McGill University, Montreal, Canada
2. Université Laval, Quebec City, Canada
- Addition of plasma fibronectin increases the elastic modulus of tissue engineered blood vessels
- It also increase the production of tropoelastin and elastic fiber related proteins
- It enhanced the deposition and assembly of tropoelastin and other elastic fiber related proteins

048
Withdrawn

049
Mechanotransduction
Withdrawn

050
Endothelial Piezo1 and Gq/G11 mediate inflammatory signaling induced by disturbed flow
Albarran Juarez, Julian1; Atthoff, Till F.2; Wang, Sheng-Peng1; Wettischueck, Nina1; Offermanns, Stefan1
1. Max-Planck-Institute for Heart and Lung Research, Bad Nauheim, Germany
- Investigate the role that Piezo1 and Gq/G11-mediated signaling play in endothelial responses to disturbed flow
- Knockdown of Piezo1 and Gq/G11 inhibited induction of NF-kB activation both in vitro and in vivo
- Endothelial Piezo1 and Gq/G11 are not only essential for sensing laminar flow but also disturbed flow

051
Phosphoproteomic analysis revealed that ultrasound induces phosphorylation of adherens junctional proteins in cardiac endothelial cells
Emechebe, Uchenna1; Ammi, Azzdine Y.3; Davies, Catherine M.2; Lyon, Kristin1; Jacobs, Jon2; Alkayed, Nabil1; Barnes, Anthony1; Kaul, Sanjiv1
1. Oregon Health and Science University, Portland, OR
2. Pacific Northwest National Laboratory, Richland, WA
- We used a global proteomics approach to understand how ultrasound alters vascular function
052 Filamin A stabilizes a mechanosensitive complex containing VE-cadherin and PECAM-1 at the endothelial surface to promote angiogenesis
Duran, Camille; Torrie, Melanie; Abbey, Colette A.; Kaunas, Roland; Essner, Jeffrey J.; Bayless, Kayla
1. Texas A&M Health Science Center, College Station, TX 2. Iowa State University, Ames, IA
- Filamin A complexes and colocalizes with the mechanosensitive proteins, VE-Cadherin and PECAM-1
- Silencing Filamin A inhibits EC sprouting and VE-Cadherin and PECAM-1 localization within junctions
- CRISPR/Cas-9-generated Filamin A mutant zebrafish are reduced in size

053 Biomechanical regulation of stem cell differentiation for vascularized tissue regeneration
Sligar, Andrew; Lee, Jason; Deb, Charushena; Le, Victoria; Baker, Aaron B.
The University of Texas at Austin, Austin, TX
- Applied shear stress alters vascular marker expression in mesenchymal stem cells
- Applied shear stress creates synergistic activation of various transcription factors
- Rats treated with conditioned MSCs showed increased vascularity and perfusion

054 Endothelial cell shear stress mechanotransduction impacts glucose metabolism
Clyne, Alisa; Basehore, Sarah; Garcia, Jonathan
Drexel University, Philadelphia, PA
- Little is known about how blood flow regulates endothelial glucose metabolism in health and disease
- Our data show that steady laminar and oscillating disturbed flow differentially regulate glucose metabolism
- Endothelial cells in oscillating disturbed flow maintain eNOS O-GlcNAcylation, which inhibits phosphorylation

Vascular Mechanics
055 3D-Registration of MRI, histology and computational fluid dynamics data of human carotid plaques
Moerman, Astrid M.; Dilba, Kristine; Postema, Erik Jan; van Gaalen, Kim; Gijsen, Frank J.; Wentzel, Jolanda; van der Lugt, Aad; Rouwet, Ellen V.; Poot, Dirk H.; Klein, Stefan; van der Steen, Antonius F.W.; van der Heiden, Kim
Erasmus Medical Center Rotterdam, Rotterdam, Netherlands
- Changes in wall shear stress (WSS) during plaque progression affect underlying plaque composition
- Patient specific flow and geometry data were obtained by in vivo MRI to create a 3D WSS map
- A tool was created to register the 3D WSS map to 2D histological sections of human carotid plaques

056 Effect of lowering heart rate on wall shear stress and atherosclerosis
Xing, Ruoyu; Moerman, Astrid M.; Ridwan, Yanto; van der Steen, Antonius FW; Evans, Paul; Gijsen, Frank JH; van der Heiden, Kim
1. Erasmus Medical Center, Rotterdam, Netherlands 2. University of Sheffield, Sheffield, United Kingdom
- Ivabradine reduced heart rate in atherosclerotic mice
- Ivabradine increased normalized peak flow and WSS level during systole in atherosclerotic mice
- Ivabradine did not induce changes in plaque composition

057 Characterizing heterogeneity of venous material properties in porcine central venous thrombosis model
Vekilov, Dragoslava; Schwein, Adeline; Bismuth, Jean; Grande-Allen, K. Jane
1. Rice University, Houston, TX 2. Houston Methodist Hospital, Houston, TX
- Characterizing material properties of healthy porcine vein tissue
- Assessing material properties of venous wall in porcine central venous thrombosis model
- Analyzing the time scale of changes to central venous system vessel wall in response to thrombosis
058
Aged coronary resistance microvessels undergo adverse remodeling similar to early Type 2 diabetes
Trask, Aaron; McCallinhart, Patricia; Sunyecz, Ian L.
The Research Institute at Nationwide Children's Hospital, Columbus, OH
- Coronary Microvascular Disease
- Type 2 Diabetes
- Aging

059
The effect of G protein-coupled estrogen receptor deletion on the common carotid artery mechanical properties
Clark, Gabrielle; Abshire, Caleb; Lindsey, Sarah; Miller, Kristin
Tulane University, New Orleans, LA
- G protein-coupled estrogen receptor
- Arterial Mechanics
- Constitutive modeling

060
The role of shear stress in localization and progression of atherosclerosis in porcine coronary arteries
Hoogendoorn, Ayla; Kok, Annette M.; Hartman, Eline M.J.; Casadonte, Lorena; Peters, Ilona; Visser - te Lintel Hekkert, Maaike; van Gaalen, Kim; van der Steen, Antonius F.W.; Wentzel, Jolanda
1. Erasmus Medical Center, Rotterdam, Netherlands
2. Academic Medical Center, University of Amsterdam, Amsterdam, Netherlands
- Serial and spatial analysis of the influence of shear stress on coronary plaque growth in pigs
- Surprisingly, there are fast and slow responding pigs that show big differences in plaque morphology
- Low wall shear stress predicts coronary plaque growth

061
The role of type VIII collagen in arterial vessel stiffening
Mohabeer, Amanda; Hou, Guangpei; Zhang, Hangjun; Kroetsch, Jeffrey; Bolz, Steffen-Sebastian; Heximer, Scott; Assoian, Richard K.; Bendek, Michelle P.
1. University of Toronto, Toronto, ON, Canada
2. University of Pennsylvania Health System, Philadelphia, PA
- Collagen-VIII (Col8) is upregulated in CVD and inhibits the Rho GTPase RhoA
- Vasoconstriction to phenylephrine was enhanced in Col8-/- relative to Col8+/+ murine carotids
- Pressure-dependent increases in diameter were significantly greater in Col8-/- murine carotids

062
Obesity adversely impacts lymphatic function in lymphedema through a loss in pumping pressure
Nelson, Tyler; Nepiyushchikh, Zhanna; Dixon, J. Brandon
1. Georgia Institute of Technology, Atlanta, GA
2. Georgia Tech, Atlanta, GA
- Obesity and lymphedema
- Lymphatic function and remodeling
- Inflammation and lymphedema development

063
Protein-engineered hydrogels for transplantation of induced pluripotent stem cell-derived endothelial cells in a mouse model of peripheral arterial disease
Foster, Abigail; Dewi, Ruby E.; Cal, Lei; Hou, Luqia; Strassberg, Zachary; Alcazar, Cynthia; Heilshorn, Sarah C.; Huang, Nigan F.
Stanford University, Stanford, CA
- Injectable hydrogel, SHIELD, provides mechanical protection from cell membrane damage during transplantation
- SHIELD enhances iPSC-EC proliferation and proangiogenic factor secretion during in vitro hypoxic culture
- SHIELD enhances in vivo iPSC-EC retention and promotes improved re-vascularization of the ischemic limb

064
Engineering 3D vascular networks through tunable bio-ink design
Seymour, Alexis; Dubbin, Karen; Berry, Alex; Hori, Yuki; Heilshorn, Sarah
Stanford University, Stanford, CA
- A fundamental limitation of tissue engineering is the inability to create scalable, vascularized constructs
- While 3D printing allows complex scaffold architectures, many bio-inks do not adequately mimic native matrix
- We have created a family of highly tunable bio-inks for 3D printing of endothelial and support cells

065
Evaluation of endothelial cell phenotype in the rat mesentery culture model
Motherwell, Jessica; Murfee, Walter Lee
1. Tulane University, New Orleans, LA
2. University of Florida, Gainesville, FL
- Challenges in tissue engineering biomimetic models include recapitulating physiological complexity
- EC sprouts in ex vivo tissue culture model are similar to in vivo EC sprouts from in vivo wound healing model
- Novel ex vivo rat mesentery culture model to study angiogenesis and microvascular networks
- this method offers precise detection of target glycans
- highly specific technique will facilitate the detection and characterization of biologically important glycans

**Vascular Cell Biology I**

070

Secretion of the TLR4 ligand, NAMPT is essential to NAMPT-mediated resistance to cytokine-induced lung cell apoptosis and to enhanced acute NFκB-mediated inflammation

Garcia, Joe G.N.; Chaing, Sara; Oita, Radu

University of Arizona, Tucson, AZ

- NAMPT is an important cytozyme involved in vascular influences
- NAMPT regulates endothelial cell apoptosis
- NAMPT cleavage is critical to NAMPT secretion and pro-inflammatory effect via TLR4 binding

071

Junction-based lamellipodia drive endothelial cell rearrangements via a VE-cadherin/F-actin based oscillatory ratchet mechanism in vivo

Belting, Heinz-Georg1; Paatero, Ilkka1; Sauteur, Loïc1; Lee, Mink-Young1; Lagendijk, Anne Karine2; Heutschi, Daniel1; Hogan, Benjamin M.2; Affolter, Markus1

1. Universitaet Basel, Biozentrum, Basel, Switzerland
2. University of Queensland, St Lucia, Brisbane, QLD, Australia

- We have analyzed dynamics and function of junctional components during vascular remodeling in vivo
- Morphogenetic EC behaviors are driven by polarized and oscillating junction-based lamellipodia (JBL)
- JBL function as ratchet via VE-cad/F-actin interaction and provide the physical means for cell rearrangements

072

Endothelial cell autophagy in angiogenesis and solid tumor progression

Monkkonen, Teresa; Marsh, Timothy; Debnath, Jayanta

University of California, San Francisco, San Francisco, CA

- Autophagic flux is present in endothelial cells of pancreatic neuroendocrine tumors
- Ablation of endothelial autophagy may promote extravasation of PyMT breast cancer cells
- Endothelial cell autophagy may maintain vascular integrity and barrier function

073

Shaping waves of BMP Inhibition during vascular growth

Guhlard, Pierre

University of California, Los Angeles, Los Angeles, CA

- vasculogenesis is controlled by waves of BMP inhibition
October 15-19, 2017

MONDAY POSTER SESSIONS

Presenters at odd numbered boards will present from 7:00 to 8:00 pm
Presenters at even numbered boards will present from 8:30 to 9:30 pm

074 Excess centrosomes affect endothelial cell junctions and polarity
Berlin, Danielle; Kushner, Erich J.; Bautch, Victoria L.
University of North Carolina at Chapel Hill, Chapel Hill, NC
- Role of centrosome homeostasis in interphase endothelial cells and sprouting angiogenesis
- Effects of excess centrosomes on adherens junctions
- Effects of excess centrosomes on cell repolarization

075 Laminin-dystroglycan signaling regulates retinal arteriogenesis
Biswa, Saptarshi; Bachay, Galina; Hunter, Dale D.; Brunken, William J.
SUNY Upstate Medical University, Syracuse, NY
- Laminins in the vascular basement membrane
- Dystroglycan
- Dll4/Notch signaling and arteriogenesis

076 Vascular thiol isomerase ERp72 is critical for endothelial injury-induced thrombus formation
Wu, Yi
Soochow University, Suzhou, China
- Vascular ERp72 is critical for endothelial cells-injury-induced thrombosis
- The second and third CGHC motifs of ERp72 are important
- ERp72 is a dual regulator of thrombin generation and platelet accumulation

077 Disruption of the regulator of G protein signaling 14; A novel mechanism inhibiting vasoconstriction
Zhang, Jie; Guers, John; Yoon, Seonghun; Vatner, Dorothy E.; Vatner, Stephen F.
Rutgers University, New Jersey Medical School, Newark, NJ
- RGS14
- Hypertension
- Angiotensin II

078 Macrophage-thrombus interactions mediate repair after vascular injury
Clay, Hilary
University of California, San Francisco, San Francisco, CA
- Thrombus removal is rate limiting during vascular repair

079 Endothelial actin dynamics during blood vessel morphogenesis
Phng, Li-Kun
RIKEN Center for Developmental Biology, Kobe, Japan
- Endothelial cells are highly plastic in shape
- Endothelial cells generate diverse actin cytoskeleton structures during angiogenesis in vivo
- Actin cytoskeleton of different subcellular localization and dynamics drive distinct steps of angiogenesis

080 The transcription factor Foxc1 is required for proper vascular development during postnatal retinal angiogenesis
Norden, Pieter; Liu, Ting; Kume, Tsutomu
Northwestern University School of Medicine, Chicago, IL
- The role of Foxc1 & Foxc2 in postnatal angiogenesis is not well understood
- Foxc1 is required for postnatal retinal angiogenesis
- Foxc1 & Foxc2 regulate expression of key genes related to several signaling pathways involved in angiogenesis

081 Nck adaptor proteins modulate atherogenic endothelial activation in response to disturbed flow
Alfaidi, Mabruka; Green, Jonette M; Orr, A. Wayne
LSU Health Sciences Center - Shreveport, Shreveport, LA
- Hemodynamic shear stress induces atherogenic endothelial activation
- Pak2 regulates NF-kB activation by flow
- Nck1 but not Nck2 plays a dominant role in flow induced Pak2 and NF-kB activation

082 The increased Angiopoietin-1 released from isolated mouse lung pericytes following stimulation with hemorrhage-primed neutrophils is significantly suppressed in endothelial cell:pericyte co-culture

- Macrosphages are required for clearing the cellular components of the thrombus
- Macrophage phagocytosis of cellular debris at the injury site is mediated by plasma coagulation Factor XIII
Lomas-Neira, Joanne; Petitpas, Kaitlyn; Chung, Chun-Shiang
Rhode Island Hospital/Brown University, Providence, RI

- Primed neutrophils increase pericyte Angiopoietin-1 release into culture supernatant
- In EC:pericyte co-culture, primed neutrophils significantly reduced Angiopoietin-1 release
- EC:pericyte interactions alter their individual responsiveness to primed neutrophils

083 Phosphate transport and mineral deposition at the vascular maternal-fetal interface
Wallingford, Mary1; Neradugomma, Naveen K.1; Chalek, Julian2; Rincon, Monica1; Pereira, Leonardo2; Mao, Qingcheng3; Giachelli, Cecilia M.1
1. University of Washington, Seattle, WA
2. Metis, Seattle, WA
3. Oregon Health & Science University, Portland, OR

- Phosphate dysregulation can severely impact vascular function and is poorly understood in placenta
- We used molecular biology and histology to examine Pi in tissues, cell lines, and biological fluids
- Herein, we present the first comparative characterization of phosphate biology at the M-F interface

084 Excessive plasmin activity promotes endothelial Ripk3 transcription and murine embryonic vascular rupture
Colijn, Sarah; Ingram, Kyle; Menendez, Matthew; Muthukumar, Vijay; Silasi-Mansat, Robert; Lupu, Florea; Griffin, Courtney T.
Oklahoma Medical Research Foundation, Oklahoma City, OK

- Embryos with excessive plasmin activation have elevated RIPK3 in endothelial cells at midgestation
- Genetically reducing either plasmin activation or Ripk3 rescues embryos from lethal vascular rupture
- Plasmin works through PAR4 to upregulate Ripk3 transcription in cultured endothelial cells

Other Developmental Vascular Biology and Genetics

085 Investigation of PTPN14 interactions in balancing vascular integrity and angiogenesis
Mamai, Ons; Akhurst, Rosemary J.
University of California, San Francisco, San Francisco, CA
- HHT patient phenotype
- angiogenesis
- modifiers gene

086 Cell proliferation in fetal elastin heterozygous mice suggests mechanism underlying Williams Syndrome cardiac disease
Watson, Anderson; Levin, Mark; Yu, Zu-Xi; Kozel, Beth A.
NIH/NHLBI, Bethesda, MD

- Elastin insufficiency is associated with increased risk of sudden death in humans
- Eln+/- coronaries reveal increased SMC proliferation from E9.5, persisting later into gestation
- No prenatal differences in endothelial cell proliferation were noted in Eln+/- vs WT coronaries

087 The phenotypic and functional properties of mouse yolk-sac-derived embryonic macrophages
Yosef, Nejla1; Vadakkan, Tegy J.1; Park, June Hee2; Poche, Ross3; Thomas, Jean-Leon3; Dickinson, Mary E.3
1. Baylor College of Medicine, Houston, TX
2. Yale School of Medicine, New Haven, CT

- Established an in vitro model of mouse yolk-sac-derived embryonic macrophages
- EMs have a higher pro-angiogenic potential compared to adult macrophages
- EMs preferentially matured into microglia when co-cultured with mouse neural stem cells

088 The Wnt inhibitor Apcdd1 coordinates vascular remodeling and barrier maturation in retinal blood vessels
Mazzoni, Jenna1; Smith, Julian R.1; Cutforth, Tyler2; Shahriar, Sanjid1; Ceja, Bernardo1; Agalliu, Dritan1
1. Columbia University Medical Center, New York, NY
2. University of California at Irvine, Irvine, CA

- Apcdd1 is expressed in retinal endothelial cells during angiogenesis and barrier formation
- Apcdd1 precisely modulates Wnt/Norrin signaling activity in the retinal endothelium
- Apcdd1 coordinates the timing of vascular pruning and barrier maturation in retina

089 Tissue specific origin of endothelial cells
Yao, Jiayi; Guilhard, Pierre; Blazquez-Medela, Ana; Hoang, Jonathan; Bostrom, Kristina; Yao, Yucheng
UCLA, Los Angeles, Los Angeles, CA

Visit the Exhibits
• ECs play multiple roles in organogenesis and involve in the regulation of biological processes
• tissue-specific ECs display the morphological distinction and specific gene signatures
• tissue-specific ECs express tissue-specific markers at early developmental stages in lungs, brain and liver

090
Thrombospondin1 (TSP1) replacement prevents cerebral cavernous malformations
Lopez-Ramirez, Miguel Alejandro1; Fonseca, Gregory2; Zeineddine, Hussein A.3; Girard, Romuald4; Moore, Thomas5; Pham, Angela1; Lagarrigue, Frederic1; Lawler, Jack1; Glass, Christopher K.1; Awad, Issam A.1; Ginsberg, Mark H.1
1. University of California, San Diego, La Jolla, CA
2. The University of Chicago Medicine and Biological Sciences, Chicago, IL
3. Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA

• Krit1 inactivation in brain endothelium changes the expression of genes involved in cardiovascular development
• Loss of Krit1 results in dramatic suppression of TSP1, a potent endogenous angiogenesis inhibitor
• Suppression of TSP1 is an important downstream effect of the elevation in KLF4 that follows loss of KRT1

091
GATA2 maintains the identity of lymphovenous valve-forming endothelial cells
Mahamud, Md Riaj
University of Oklahoma Health Science Center, Oklahoma City, OK

• Lymphatic vasculature development
• Mutation in GATA2 causes lymphatic vasculature defect
• GATA2 maintain the identity of lymphovenous valve-forming cells

092
ALK1 ligands in zebrafish cardiovascular development
Capasso, Teresa; Li, Bijun; Roman, Beth L.
University of Pittsburgh, Pittsburgh, PA

• We are interested in HHT and the ALK1 signaling pathway, specifically looking the BMP ligands for ALK1
• We are using zebrafish as a model system and have mutated the alk1 ligands, bmp9, bmp10, bmp10-like
• We found that loss of bmp10 causes cardiac abnormalities and vascular and cardiac abnormalities in adulthood

093
Elucidating the role of EphB4/EphrinB2 signaling in zebrafish endocardial morphogenesis
Fontana, Federica1; Haack, Timm2; Moghtadaei, Motahareh3; Abdellah-Seyfried, Salim7
1. Universität Potsdam Abteilung, Potsdam, Germany
2. Hannover Medical School, Hannover, Germany

• EphrinB2a expression is restricted to endocardial cells at the junction of the atrium and ventricle
• EphrinB2a is involved in establishing endocardial chamber boundaries
• Loss of EphrinB2a causes defects in cardiac chamber morphogenesis and valve leaflet formation

Download the NAVBO Events App
Or go to https://confpal.com/m/navbo
Lymphatic Development

101 Deciphering the role of JUNB in lymphangiogenesis
Gutierrez Miranda, Laura; Tempelhof, Hanoch; Angel, Peter; Yaniv, Karina; Schorpp-Kistner, Marina
1. German Cancer Research Center, Heidelberg, Germany
2. Weizmann Institute of Science, Rehovot, Israel
- Morpholino-mediated downregulation of junba/junbb revealed the role of JUNB in zebrafish lymphangiogenesis
- Generation and characterization of junba/junbb zebrafish mutants using the CRISPR-Cas system
- JUNB is upregulated during an “in vitro” differentiation system of mESCs into LECs

102 Mechanisms regulating lymphangiogenesis in physiology and pathology
Chen, Hong
Harvard Medical School/Boston Children’s Hospital, Boston, MA
- hyperglycemia induces VEGFR3 degradation and impairs lymphangiogenesis
- epsin upregulation causes enhanced degradation of VEGFR3 in diabetes
- sustained VEGFR3 signaling upon epsin loss is crucial for restoring impaired lymphangiogenesis in diabetes

103 Transcriptional regulation of postnatal lymphatic valve maturation and maintenance by Foxc1 and Foxc2
Norden, Pieter; Liu, Ting; Shackour, Tarek; Kume, Tsutomu
Northwestern University School of Medicine, Chicago, IL
- Mechanisms of lymphatic valve formation, maturation, and maintenance are not well understood
- Foxc1 and Foxc2 have a key role in postnatal valve maintenance and maturation
- Identifying mechanisms regulated by Foxc1 and/or Foxc2 will help to treat lymphedema patients

104 Tightly balanced S1P-S1PR1 signaling is required for proper lymphatic vessel development
Ochsenbein, Alexandra; Wilmering Wetter, Barbara; Leonhardt, Sabine; Chang, Lena; Beerli, Christian; Guibourdenche, Christel; Seuwener, Klaus; Jurisic, Giorgia
Novartis, Basel, Switzerland
- lymphangiogenesis, molecular regulators
- in vivo, murine, development
- sphingosine-1-phosphate (S1P), S1PR1

105 Sphingosine-1-phosphate receptor 1 regulates lymphatic vascular patterning
Geng, Xin; Yanagida, Keisuke; Hla, Timothy; Srinivasan, Sathish
1. Oklahoma Medical Research Foundation, Oklahoma City, OK
2. Harvard Medical School, Boston, MA
- Lymphatic development
- Shear Stress
- S1p/S1pr1 signaling

106 Emerging roles of the chromatin-remodeling SWI/SNF ATPase BRG1 in omental lymphatic development
Menendez, Matthew; Drozd, Anna M.; Chmielewska, Joanna J.; Griffin, Courtney T.
Oklahoma Medical Research Foundation, Oklahoma City, OK
- Macrophage expression of BRG1 is required to maintain blood-lymphatic separation in the omentum
- BRG1 suppresses necroptosis in omental macrophages by inhibiting RIPK3 expression
- Genetic reduction of Ripk3 rescues blood entry into developing Brg1 mutant omental lymphatics

107 ERK5 is a novel regulator of lymphatic development
Kim, Ah-Ra
Gwangju Institute of Science and Technology, Gwangju, Republic of Korea
- ERK5 is essential regulator for lymphatic development
- ERK5 activity is regulated by cGMP-PKG-MEKK3 signaling cascade during lymphatic development
- PDE5 appears to promote inactivation of ERK5

108 An in vivo screen using zebrafish to identify small molecules that inhibit lymphatic vessel growth
Shih, Yu-Huan; Portman, Daneal E.; Welsh, Christofer M.; Shin, Masahiro; Lawson, Nathan D.
1. University of Massachusetts Medical Sch, Worcester, MA
2. Worcester Polytechnic Institute, Worcester, MA
- Lymphatic vessels are essential for fluid homeostasis and involved in pathogenic processes
- Identification of small molecules with antilymphatic activity using phenotype-based screen in zebrafish
• Small molecules selectively inhibiting lymphangiogenesis are potential leads for therapeutics

109
A novel sox18 zebrafish mutant showing subtle lymphatic defects, highly enhanced under perturbed Vegf-C signaling
Moleri, Silvia; D’Angelo, Donatella; Pezzotta, Alex; Brix, Alessia; Beltrame, Monica
Università degli Studi di Milano, Milano, Italy
• a novel sox18 mutant allele causes subtle defects in thoracic duct formation in homozygous state
• when challenged with perturbed VegfC signaling, TD defects are exacerbated even in sox18 hets
• our data reinforce the notion of an involvement of sox18 in zebrafish lymphatic development

110
RASA1 regulates endothelial cell export of the vascular basement membrane protein collagen IV to control development of the lymphatic and vascular systems
King, Philip; Chen, Di; Lapinski, Philip
University of Michigan Medical School, Ann Arbor, MI
• RASA1 is required for developmental lymphangiogenesis and angiogenesis in mice
• RASA1 promotes LEC and BEC survival during developmental lymphangiogenesis/angiogenesis
• RASA1 is required for EC export of the basement membrane protein collagen IV

Transcriptional Control/Gene Regulation

111
Mef2 transcription factors are essential for endothelial function
Lu, Yao Wei; Schwarz, John
Albany Medical College, Albany, NY
• Combined deletion of endothelial Mef2a/c/d leads to lung hemorrhage and death
• Mef2a/c/d deletion results in a highly proliferative endothelium
• Endothelial Mef2a/c/d are redundantly required for Klf2 and Klf4 expression

112
VEGF Regulates gene expression through a MAPK-ERG-p300 transcriptional network
Wythe, Joshua1; Cantu-Gutierrez, Manuel1; Khyzha, Nadiya2; Wilson, Michael D.3; Fish, Jason E.2
1. Baylor College of Medicine, Houston, TX
2. University Health Network, Toronto, ON, Canada
3. Hospital for Sick Children, Toronto, ON, Canada
• VEGF stimulation of DLL4 transcription requires MAPK/ERK phosphorylation of the ETS family member, ERG
• Like DLL4, transcription of a network of VEGF-dependent genes require MAPK/ERG/p300
• A highly conserved ERG-bound enhancer is required for VEGF induction of the angiogenic gene, HLX

113
Profiling the endothelial translatome in vivo using “AngioTag” zebrafish
Miller, Mayumi1; Gildea, Derek2; Monzo, Kathryn1; Williams-Simons, Lisa1; Pham, Van1; Aloi, Natalie1; Baxevanis, Andreas2; Weinstein, Brant1
1. NICHD, Bethesda, MD
2. NHGRI, Bethesda, MD
• Endothelial translatome
• TRAP RNAseq
• Novel vascular genes

114
Antagonistic roles for the chromatin remodeling enzymes CHD4 and BRG1 in plasmin activation and embryonic hepatic vascular integrity
Wu, Meng Ling; Griffin, Courtney T.
Oklahoma Medical Research Foundation, Oklahoma City, OK
• Excessive plasmin activity degrades hepatic extracellular matrix and compromises vascular integrity
• The chromatin remodeler CHD4 transcriptionally suppresses plasmin activation in the embryonic liver
• BRG1 acts antagonistically to CHD4 to transcriptionally balance embryonic hepatic plasmin activation

115
Long-term activation of cyclic AMP pathway in vascular cells leads to R-Ras transcriptional repression and endothelial barrier destabilization
Perrot, Carole; Komatsu, Masanobu
Sanford Burnham Prebys Medical Discovery Institute, Orlando, FL
• Transcriptional regulation of R-Ras in vascular cells
• Cyclic AMP pathway and endothelial barrier stability
• Endothelial cells and pericytes
116 Transcriptional profiling of capillary (CAP) and high endothelial cells (HEC) from human lymphoid tissues
Szade, Agata; Brulois, Kevin F.; Lee, Mike; Lazarus, Nicole H.; Dermadi, Denis; Rahman, Miladur; Butcher, Eugene C. Stanford University, Palo Alto, CA
- Lymphocyte homing into lymphoid is controlled by high endothelial cells (HEC)
- Comparison of HEC and capillary EC transcriptomes reveals subset and tissue-specific pathways
- Genes whose differential expression in HEC is conserved define core functions in lymphocyte homing

117 Withdrawn

118 Endothelial regeneration of adult arteries requires upregulation of a subset of metabolic genes
Uebelhoer, Melanie; Shirali, Aditya; Iruela-Arispe, Luisa University of California, Los Angeles, Los Angeles, CA
- Mouse model to monitor endothelial regeneration during wound healing
- Endothelial regeneration involves transcriptional changes related to stress, proliferation and ECM
- Expression of specific metabolic genes is altered during proliferative phases of wound healing

119 Somatic activating KRAS mutations in the endothelium drive MAPK/ERK/Notch signaling and brain arteriovenous malformations
Fish, Jason1; Nikolaev, Sergey2; Vetiska, Sandra1; Frosen, Juhana1; Wythe, Joshua3; Radovanovic, Ivan3
1.University Health Network - Toronto Western Hospital, Toronto, ON, Canada
2. University of Geneva Medical School, Geneva, Switzerland
3. Baylor College of Medicine, Houston, TX
- Somatic activating KRAS mutations identified in the majority of brain arteriovenous malformations
- Mutations were restricted to the endothelium of lesions and activated MAPK/ERK signaling
- Activated KRAS dysregulates angiogenic genes, including components of the Notch signaling pathway

120 miR26a targets smad1 to control vascular smooth muscle differentiation
Watterston, Charlene; Zeng, Lei; Onobadejo, Abidemi; Childs, Sarah J. University of Calgary, Calgary, AB, Canada
- Loss of miR26 leads to hemorrhage and loss of vascular stability
- Loss of microRNA26 results in upregulation of vSMC marker genes
- miR26 represses Smad1 expression downstream of BMP signaling and promote vSMC differentiation

121 Transcriptional regulation and functional role of Etv2
Singh, Bhairab University of Minnesota, Minneapolis, MN
- Functions of Dicer are important in Etv2+ vascular angioblast
- miR-130a is a critical regulator of angiogenesis and vascular patterning
- Etv2-miR130a-Jarid2 cascade is a novel network operational during vascular development

122 Withdrawn

123 Role of endothelial cell cis-acting DNA elements in regulating hemodynamic-mediated changes in gene expression in vivo
Dubinsky, Michelle; Ku, Kay K.H.; Sukumar, Aravin N.; Lee, John J.Y.; Knight, Britta K.; Steer, Brent M.; Marsden, Philip A. University of Toronto, Toronto, ON, Canada
- Shear stress responsive endothelial gene
- Genetic and epigenetic regulation
- in vivo mouse promoter-reporter construct
Vascular Cell Biology II

124
STAT1 is a negative regulator of the vascular smooth muscle to myofibroblast transition in response to vascular injury
Medley, Shayna1; He, Chaoyong2; Olson, Lorin E.1
1. Oklahoma Medical Research Foundation, Oklahoma City, OK
2. State Key Laboratory of Natural Medicines, Nanjing, China
- STAT1-/- vascular smooth muscle cells show increased proliferation & extracellular matrix production in vitro
- Vascular smooth muscle cell-specific STAT1 deletion exacerbates the injury response to carotid artery ligation
- STAT1 opposes the vascular smooth muscle to myofibroblast transition following vascular injury

125
The role of the VEGFR-1:VEGFR-2 heterodimer in vascular network assembly
Cudmore, Meli
University of Edinburgh, Edinburgh, United Kingdom
- Identification of a function of the VEGFR-1:VEGFR-2 Heterodimer
- Localisation of VEGFR-1:VEGFR-2 Heterodimer
- Angiogenesis using the embryoid body model

126
Splitting (intussusceptive) angiogenesis in human melanoma metastases and 3D cell culture – are matrix metalloproteinases (MMPs) required for pillar formation?
Levin, Max1; Ekstrand, Matsias1; Ewald, Andrew J.2; Pandita, Ankur3; McMahon, Martin2; Ny, Lars1; Werb, Zena1; Borén, Jan1; Mostov, Keith4
1. University of Gothenburg, Gothenburg, Sweden
2. Johns Hopkins University School of Medicine, Baltimore, MD
3. Huntsman Cancer Institute, Salt Lake City, UT
4. University of California, San Francisco, San Francisco, CA
- Splitting (intussusceptive) angiogenesis starts with formation of a slender intravascular pillar
- We characterized pillars in melanoma metastases and in 3D culture
- MMP inhibition stopped pillar formation in 3D by stopping cell migration and matrix remodeling

127
Positive-feedback confers robustness of angiogenesis to variable VEGF signal
Herbert, Shane1; Page, Donna J.1; Thuret, Raphael1; Bentley, Katie2
1. University of Manchester, Manchester, United Kingdom
2. University of Uppsala, Uppsala, Sweden
- Vegf signaling induces Tm4sf1 expression selectively in sprouting ECs in zebrafish embryos
- Vegf-induced Tm4sf1 expression feeds back to amplify Vegfr-mediated signaling in vitro and in vivo
- Tm4sf1-mediated positive feedback confers robustness of angiogenesis to variable Vegfr activity

128
Manipulation of microtubule dynamics markedly inhibits endothelial tip cell formation and branching tube morphogenesis
Salvador, Jocelynda; Davis, George E.
University of Missouri-Columbia School of Medicine, Columbia, MO
- Endothelial tip cell formation and network branching is blocked by manipulation of microtubule (MT) dynamics
- The MT stabilizing and disrupting agents, taxol and vinblastine, respectively inhibit EC tip cell formation
- Vinblastine, but not taxol, inhibits lumen expansion, suggesting unique differences in required MT dynamics

129
Vascular SMAD6 regulation of EC migration
Ruter, Dana L.; Mouillesseaux, Kevin P.; Bautch, Victoria L.
University of North Carolina at Chapel Hill, Chapel Hill, NC
- Loss of SMAD6 enhances endothelial cell migration in vitro
- Loss of SMAD6 enhances cellular alignment near the wound in a classical scratch wound assay
- SMAD6-mediated migration inhibition is driven through the canonical BMP pathway

130
N-cadherin regulation of vascular smooth muscle cells; the role of DDR1 and Rho GTPases
Xu, Songyi; Bendeck, Michelle P.
University of Toronto, Toronto, ON, Canada
- N-cadherin regulation is important to establish VSMC migratory arrest and prevent intimal thickening
- DDR1 stabilizes N-cadherin adhesion without affecting its total membrane levels or association with catenins
- Establishment of N-cadherin-mediated adhesion in VSMCs suppresses Cdc42 activation

131
Collaboration of Derlin-2 and Derlin-1 in mediating cyclooxygenase-2 degradation through ERAD: Role of N-glycosylation
Shyu, Song-Kun; Chen, Shu-Fen; Wu, Chun-Hu
Academia Sinica, Taipei, Taiwan
- Derlin-2 is upstream of Derlin-1 in mediating COX-2 degradation
- Caveolin-1 prefers to interact with glycosylated COX-2
• COX-2 degradation is mediated through the Derlin-2/Derlin-1/caveolin-1/p97 pathway

132  
A new mechanism that controls cardiac fibroblast to endothelial cell fate transition involving protein methylation  
Jackson-Weaver, Olan1; Wu, Jian1; Chen, Yibu; Li, Meng1; Jin, Jian2; Sucov, Henry1; Xu, Jian1  
1.University of Southern California, Los Angeles, CA  
2. Mount Sinai, New York, NY  
• Vascular cell fate determination  
• Transcription control and gene expression  
• Signal transduction

133  
Pericyte cell line isolation, validation and applications  
Zhao, Huaying  
Virginia Tech, Blacksburg, VA  
• Pericytes isolated from NG2:DSRed transgenic mouse embryos using Fluorescence Activated Cell Sorting (FACS)  
• Pericytes identification comparing with fibroblasts and endogenous pericytes in vitro and ex vivo  
• Pericytes and fibroblasts behavior patterns with HUVEC co-culture in 2D and 3D conditions

134  
Endothelial TGFβ type I receptor ALK5 regulates vascular integrity in the central nervous system using a canonical Smad-dependent pathway  
Dubrac, Alexandre; Ola, Roxana; Eichmann, Anne  
Yale University, New Haven, CT  
• Inhibition of endothelial TGFβ signaling mimics the phenotype of Diabetic Retinopathy  
• Endothelial deletion of Smad4 at P5 recapitulates the phenotypes observed in the endothelial Alk5 mutant mice  
• Endothelial TGFβ signalling is essential for pericyte identity and vascular stability

135  
Inhibiting Nck-dependent Pericyte migration improves pathological neoangiogenesis during retinopathy  
Kuenzel, Steffen; Eichmann, Anne; Dubrac, Alexandre  
Yale University, New Haven, CT  
• Pericyte dysfunction in pathological angiogenesis  
• Pericyte function during ocular vasoproliferative disease  
• Function of Nck dependent Pericyte migration

136  
BMP9/10-ALK1 signaling through Smad4 is responsible for Arterial Venous Malformations in retina development  
Ola, Roxana; Eichmann, Anne  
Yale University School of Medicine, New Haven, CT  
• Canonical Smad4 signaling triggers AVM formation downstream of BMP9/10-ALK1  
• Loss of Smad4 in ECs phenocopies BMP9/10-ALK1 signaling blockade  
• PI3K blockade rescues AVM formation in Smad4 deficient mice

137  
Investigating mural cell activity during cerebral blood flow regulation in vivo  
Bahrami, Nabila; Childs, Sarah J.  
University of Calgary, Calgary, AB, Canada  
• We identify how mural cells regulate cerebral blood flow in vivo using the zebrafish model  
• In early development, both pericytes and vSMC-covered vessels dilate in response to vasodilators  
• As vessels mature, vSMC-covered vessels continue to strongly respond to vasodilators

138  
A genetic zebrafish Rasa1 mutant model of capillary malformations- arteriovenous malformations (CM-AVM)  
Greysson-Wong, Jasper; Davari, Paniz; Ryu, Jae-Ryeon; Childs, Sarah  
University of Calgary, Calgary, AB, Canada  
• Use of morpholino & genetic Rasa1 mutant zebrafish models to determine role of Rasa1 in vascular development  
• AVM phenotype in Rasa1 mutant zebrafish recapitulates AVM seen in humans with RASA1 mutations  
• Vessel size is different between morpholino and mutant model and requires further investigation

139  
foxc1b as a marker of early vascular smooth muscle cells in zebrafish  
Whitesell, Thomas1; Ryu, Jae-Ryeon1; Workentine, Matthew1; Lawson, Nathan D.2; Childs, Sarah J.1  
1. University of Calgary, Calgary, AB, Canada  
2. University of Massachusetts Medical School, Worcester, MA  
• Mural cells expressing foxc1b wrap around endothelium in embryos and adults  
• Some foxc1b-expressing cells co-express acta2, suggesting foxc1b marks early smooth muscle cells  
• The transcriptome of foxc1b+/acta2+ cells is similar but distinct from acta2+ and pdgfrβ+ cells
140
Exploring the role of TIE2 mutation L914F in venous malformation
Boscolo, Elisa; Cai, Yuqi; Li, Xian; Goines, Jillian
Cincinnati Children’s Hospital Medical Center, Cincinnati, OH
- 3D system to study vessel lumen formation in venous malformation
- HUVEC-TIE2-L914F form massively enlarged lumens in 3D fibrin gel
- HUVEC-TIE2-L914F do not interact with normal pericytes and endothelial cells in 3D fibrin gel

Vascular Therapeutics

141
ABL kinase inhibitor Ponatinib combined with rapamycin causes regression of murine Venous Malformation
Boscolo, Elisa; Li, Xian; Cai, Yuqi; Goines, Jillian
Cincinnati Children’s Hospital, Cincinnati, OH
- screening for candidate drugs targeting mutant TIE2 signaling in venous malformation (VM)
- Ponatinib affects TIE2 and cABL activity downstream of mutant TIE2
- Ponatinib combined with rapamycin induces regression of mutated-TIE2 derived murine model of VM

142
Vascular cell permeant decoy peptides: A possible therapeutic approach to reverse aortic stiffness
Singh, Kuldeep; Nicholson, Christopher J.; Sapirstein, Robert J.; Gao, Yuan Z.; Li, Qian; Chiu, Joanna; Porter, Tyrone; Morgan, Kathleen G.
Boston University, Boston, MA
- The shock absorber function of proximal aorta is impaired with age because of aortic stiffening
- Decoy peptides targeted to n-WASP, VASP and Talin-Vinculin protein-protein interfaces decrease stiffness
- Decoy peptides can be packaged into microbubbles, ultrasound-targeted and released into proximal aortic tissue

143
S-Sulfhydration of HuR regulates cathepsin S expression in human atheromas
Bibli, Sofia Iris1; Hu, Jiong1; Zukunft, Sven1; Luck, Bert1; Sigala, Frangiska2; Szabo, Csaba2; Pfeilschifter, Josef2; Papapetropoulos, Andreas2; Fleming, Ingrid3
1. Inst for Vascular Signaling, Frankfurt am Main, Germany
2. University of Athens, Athens, Greece
3. University of Texas Medical Branch, Galveston, TX
4. Pharmacentre Frankfurt/ZAFES, Frankfurt am Main, Germany
5. Johann Wolfgang Goethe University, Frankfurt, Germany
- HuR sulfhydration
- Human atherosclerotic plaques
- Hydrogen sulfide

144
Cystathionine γ lyase sulfhydrates the RNA binding protein HuR to preserve endothelial cell function
Bibli, Sofia Iris1; Hu, Jiong1; Sigala, Frangiska2; Luck, Bert1; Zukunft, Sven1; Szabo, Csaba2; Abdel Malik, Randa1; Pfeilschifter, Josef2; Papapetropoulos, Andreas2; Fleming, Ingrid3
1. Institute for Vascular Signaling, Frankfurt am Main, Germany
2. University of Athens, Athens, Greece
3. University of Texas Medical Branch, Galveston, TX
4. Pharmacentre Frankfurt/ZAFES, Frankfurt am Main, Germany
5. Johann Wolfgang Goethe University, Frankfurt, Germany
- Endothelial Cell Activation
- Hydrogen Sulfide bioavailability
- Cystathionine Gamma Lyase ablaction

145
Catalytic subunit of telomerase prevents hyperoxia induced injury of pulmonary endothelial cells by protection of mitochondrial integrity
Beyer, Andreas1; Durand, Matt1; Clogg, Anne2; Audi, Said2; Jacobs, Elizabeth1
1. Medical College of Wisconsin, Milwaukee, WI
2. Marquette University, Milwaukee, WI
- Hyp induced mt-damage in PEC cells in the form of increased MTT levels and mt-fragmentation
- Hyp increases expression of the dominant negative splice variant of TERT, b-del TERT
- Elevated TERT protects against Hyp PEC damage while inhibition of TERT augments effects of Hyp

146
Targeted delivery of miR-145 to atheroprone vasculature by platelet-mimetic nanoparticles
Wang, Kuei-Chun; Ziang, Liangfang; Chien, Shu
University of California, San Diego, La Jolla, CA
- Therapeutic microRNAs
- Atherosclerosis
- Drug delivery

147
Activation of VEGFR1 post VEGF165b inhibition induces truncated miR17-92 cluster that targets Regulator of Calcineurin-3 to enhance perfusion in preclinical Peripheral Arterial Disease
Ganta, Vijay; Choi, Min; Luu, Victoria; Annex, Brian
University of Virginia, Charlottesville, VA
- VEGFR1 activation post VEGF165b inhibition induces miR17, miR20a levels in ischemic muscle vs. IgG
- Increased miR17-20a levels post VEGF165b inhibition inversely correlate with RCAN3 levels in ischemic muscle
- Hypoxia serum starved VR1+/− endothelium have significantly higher RCAN3 levels vs. VR1+/+ endothelium
Bioengineering Organ-Specific Vasculatures

148
High-Throughput permeability assay on perfused 3D microvessels in vitro
Duinen, Vincent1; Vught, Remko V.1; Ramakers, Christian1;
Trietsch, Sebastiaan J.1; van Zonneveld, Anton Jan1;
Hankemeier, Thomas2; Vulto, Paul1
1. Mimetas, Leiden, Netherlands
2. LUMC, Leiden University, Leiden, Netherlands
• in vitro perfused 3D microvessels
• Barrier integrity quantified by the diffusion fluorescent dextrans
• Fundamental research, drug testing

149
Perfusable 3D angiogenesis in high throughput microfluidic culture platform
Duinen, Vincent1; Vught, Remko V.1; Ramakers, Christian1;
Trietsch, Sebastiaan J.1; van Zonneveld, Anton Jan1;
Hankemeier, Thomas2; Vulto, Paul1
1. Mimetas, Leiden, Netherlands
2. LUMC, Leiden University, Leiden, Netherlands
• Perfusable 3D angiogenesis in high throughput
• Microfluidic culture platform that allows precisely controlled gradients, perfused blood vessels
• in vitro screening platform to unravel the important drivers in angiogenesis and vasculogenesis

150
A microphysiological system to model the human neurovascular unit and glioblastoma progression in vitro
Phan, Duc; Hughes, Christopher C.
University of California, Irvine, Irvine, CA
• An in vitro model of the BBB with perfused vasculature that allows for studies of permeability
• Brain environment induces ECFC-EC to take on BBB characteristics such as gene expression and less permeability
• Observe drug delivery, and the pathological changes associated with cancer development (glioma) in the CNS

151
Of the vasculature... if we had a “Google Map” for the human body?
Galis, Zorina S.
NIH/NHLBI, Bethesda, MD
• Assessing the status of single vascular cell research: What are the biggest challenges?
• The transformative effects of building ONE multidimensional, multi-scale, integrated map of human vasculature
• Key contributions that mapping the vasculature could make to the human body “Google Map”

Animal Models of Vascular Diseases

152
Withdrawn

153
pGTAG and pPRISM: two expanded tool sets for using short regions of homology for precise DNA integration in zebrafish
Essner, Jeffrey1; Torrie, Melanie E.1; Wierson, Wesley A.1;
Welker, Jordan M.; Almeida, Maira; Mann, Carla1; Bullard, Cassandra1; Duran, Camille L.2; Kwan, Kristen M.1; Chien, Chi-Bin1; Balcunas, Darius2; Dobbs, Drena1; Bayless, Kayla1; Ekker, Stephen C.2; Clark, Karl2; McGrail, Maura A.2
1. Iowa State University, Ames, IA
2. Mayo Clinic, Rochester, MN
3. Texas A&M Health Science Center, College Station, TX
4. University of Utah, Salt Lake City, UT
5. Temple University, Philadelphia, PA
• gene targeting in zebrafish
• CRISPR Cas9
• genome engineering

154
Characterization of a novel Smad4 mouse model of Hereditary Hemorrhagic Telangiectasia (HHT)
Crist, Angela; Meadows, Stryder M.
Tulane University, New Orleans, LA
• Deletion of Smad4 in a murine retinal model causes arteriovenous malformations
• Smad4 mutants exhibit increases in artery and vein diameter and a reduction in vascular outgrowth
• Loss of Smad4 leads to a distortion of artery-vein identity and altered mural cell coverage

155
Studying the in vivo effects of Lox inhibition on aortic aneurysm formation via high throughput mRNA sequencing
van der Ent, Martin; Hunker, Kristina; Cleuren, Audrey; Ginsburg, David; Jiang, Hui; Ganesh, Santhi
University of Michigan, Ann Arbor, MI
• Lysyl oxidase
• In vivo transcriptome profiling
• Aortic aneurysm
156
Endothelial Sirt6 deficiency increases arterial thrombosis by upregulating tissue factor and pro-inflammatory cytokines

Gaul, Daniel1; Calatayud, Natacha1; Bonette, Nicole1; van Tits, Lambertus J.1; Weber, Julien1; Pastek, Lisa1; Camici, Giovanni G.1; Lüscher, Thomas F.1; Matter, Christian M.1,2
1. University of Zurich, Zurich, Switzerland
2. University Hospital Zurich, Zurich, Switzerland

- Arterial Thrombosis
- Sirt6
- Tissue Factor

157
Endothelial-specific CDC42 deletion elicits cerebral vascular malformations

Castro, Marco1; Laviña Siemsen, Barbara1; Brakebush, Cord1; Gaengel, Konstantin1
1. Uppsala Universitet, Uppsala, Sweden
2. University of Copenhagen, Copenhagen, Denmark
3. Karolinska Institutet, Stockholm, Sweden

- Angiogenesis
- Cerebral vascular malformations
- Cdc42 and Cell migration

158
MHV68-induced vasculitis model is accelerated by microbiome suppression and alleviated by modified myxomavirus serpin reactive center loop-derived peptides

Ambadapadi, Sriram1; Yaron, Jordan R.1; Mahon, Brian P.2; Thomas, Ryan M.1; Jobin, Christian2; Gharalbeh, Raad3; Karst, Stephanie M.1; Tibbetts, Scott A.1; Keinan, Shahar4; Varsani, Arvind1; Zhang, Liqiang1; McFadden, Grant1; Lucas, Alexandra1
1. Arizona State University, Tempe, AZ
2. University of Florida, Gainesville, FL
3. University of California San Diego, La Jolla, CA

- Chemokine-binding glycosaminoglycans (GAGs) in the endothelial glycolcalyx alter host inflammatory responses
- Altering donor organ disaccharides and inhibiting GAG/chemokine interaction reduce renal transplant rejection
- Myxomavirus M-T7 reduces renal transplant rejection and inflammation

161
Platelet-derived calpain mediates protease-activated receptor 1-dependent vascular inflammation in diabetes

Kyselova, Anastasia1; Elghazawy, Amro1; Wittig, Ilka1; Heidler, Juliana1; Ruf, Wolfram2; Randriamboavonjy, Voahanginirina1; Fleming, Ingrid1
1. Goethe University Frankfurt, Frankfurt am Main, Germany
2. Medical Center University Mainz, Mainz, Germany

- platelet-derived microparticles
- extracellular calpain
- diabetes-assotiated vascular inflammation

159
Endothelial NDST1 knockout and treatment with a viral chemokine modulator increase heparan sulfate disaccharide (DS6) content and reduce renal allograft rejection

Yaron, Jordan1; Ambadapadi, Sriram1; Chen, Hao2; Esco, Jeffrey D.3; Zhang, Liqiang1; Lucas, Alexandra1
1. Arizona State University, Tempe, AZ
2. University of Florida, Gainesville, FL
3. University of California San Diego, La Jolla, CA

- Arterial Thrombosis
- Sirt6
- Tissue Factor
Atherosclerosis and Restenosis

163
Ultrahigh resolution phase contrast X-ray imaging of atherosclerotic plaques
Xing, Ruoyu; Rodríguez, Daniel; van der Steen, Anton FW; Klein, Stefan; Trachet, Bram; Gijsen, Frank JH; van der Heiden, Kim 1. Erasmus Medical Center, Rotterdam, Netherlands 2. Ecole Polytechnique Fédérale de Lausanne, Lausanne, Switzerland
- Phase contrast X-ray imaging reveals murine atherosclerotic plaques in ultrahigh resolution (6.5µm)
- 3D visualization & quantification of plaque components in any desired orientation
- Ultrahigh resolution plaque imaging allows the delineation of related plaque features

164
Therapeutic modulation of S-nitrosylation signaling pathways to potentiate endothelial repair via Nrf2
Das, Debapria; Liu, Xin; Tesmenitsky, Yevgenia; Croce, Kevin J. Brigham and Women’s Hospital and Harvard Medical School, Boston, MA
- GSNOR inhibition increases transcription of NRF2-regulated antioxidant genes
- GSNOR regulates vascular inflammation in part by controlling NRF2 vasculoprotective transcriptional responses
- GSNOR is an attractive therapeutic target for atherosclerotic vascular disease

165
Regulation of human atherosclerosis-induced angiogenesis by macrophages and hypoxia in an ex vivo co-culture model with rat aortic explants
Aplin, Alfred; Kohler, Ted R.; Tang, Gale L.; Nicosia, Roberto F. University of Washington, Seattle, WA
- Human plaques stimulate angiogenesis in vitro and in vivo
- Plaque stimulatory activity correlates with the presence of intraplaque macrophages
- Plaque induced angiogenesis is maladaptive under hypoxic conditions

166
Endothelial glucocorticoid receptor (GR) modulates Wnt signaling in a mouse model of atherosclerosis
Goodwin, Julie; Zhou, Han; Sessa, William C. Yale University School of Med, New Haven, CT
- Apo E KO/eGR KO mice have more severe atherosclerotic lesions than eGR replete animals
- Genomic experiment indicate that the Wnt signaling pathway is regulated by eGR

Vascular Calcification

168
Differential cardiovascular effects of teriparatide in hyperlipidemic mice with pre-existing aortic calcification
Hsu, Jeff; Lu, Jinxiu; Umar, Soban; Lee, Jason; Kulkarni, Rajar; Ding, Yichen; He, Ting; Demer, Linda L.; Tintut, Yin University of California, Los Angeles, Los Angeles, CA
- We tested effects of osteoporosis therapy on pre-existing aortic calcification in hyperlipidemic mice
- Imaging showed increased x-ray attenuation by CT scan, but decreased fluoride uptake by PET
- Teriparatide did not affect progression of aortic calcification but may change surface area and stability

169
Regulation of vascular smooth muscle cell calcification by syndecan-4/FGF-2/PKCa signaling and cross-talk with TGFβ
Borland, Samantha; Morris, Thomas G.; Borland, Shona; Morgan, Mark R.; Francis, Sheila E.; Merry, Catherine LR; Canfield, Ann E. 1. University of Manchester, Manchester, United Kingdom 2. University of Liverpool, Liverpool, United Kingdom 3. University of Sheffield, Sheffield, United Kingdom 4. University of Nottingham, Nottingham, United Kingdom
- To profile the expression of FGF-2 and syndecan-4 during VSMC mineralisation in vitro and in vivo
- To determine the role of FGF-2 and syndecan-4 in VSMC mineralisation
- To identify the signaling pathway(s) downstream of FGF-2 and syndecan-4 that regulates VSMC mineralisation

170
A role for telomerase in valvular calcification
Hortells, Luis; Garchar, Evelyn; Doyon, Genevieve; Bruemer, Dennis; St Hilaire, Cynthia University of Pittsburgh, Pittsburgh, PA
- Valvular calcification
- Aging
- Telomerase
171
Protective role of type III Sodium-Dependent Phosphate Transporter, PiT-2, against vascular calcification in a mouse model of chronic kidney disease
Yamada, Shunsuke; Wailingford, Mary C.; Leaf, Elizabeth M.; Chia, Jia Jun; Cox, Timothy C.; Speer, Mei Y.; Giachelli, Cecilia M.
University of Washington, Seattle, WA
- The aim of the study was to elucidate whether PiT-2 is protective against VC in vivo and in vitro
- PiT-2 haploinsufficiency enhanced vascular calcification in CKD mice
- PiT-2 deficiency increased matrix calcification and decreased OPG synthesis in cultured mouse VSMCs

Extracellular Matrix and Disease

172
Immunogenic matrix remodeling and myeloid cell contributions to myxomatous valve disease in a mouse model of Marfan syndrome
Kim, Andrew; Hulin, Alexa; Alfieri, Christina M.; Yutzey, Katherine E.
Cincinnati Children's Hospital Medical Center, Cincinnati, OH
- Marfan valves have matrix modification, chemokine up-regulation, and increased CD45+ leukocytes
- Valvular CD45+ leukocytes are myeloid cells that increase after pathological valve thickening
- CD206+ or MHCII+ macrophage subsets localize to regions of matrix disruption in diseased valves

173
ADAMTS6 regulates cardiac development through fibrillin-2 proteolysis
Mead, Timothy1; Gulic, Cagri2; Wang, Lauren1; Lo, Cecilia2; Apte, Suneel S.1
1. Cleveland Clinic, Cleveland, OH
2. University of Pittsburgh School of Medicine, Pittsburgh, PA
- Adamts6 is expressed in murine cardiac and musculoskeletal tissue with an undefined role
- Adamts6-/- embryos have cardiac, craniofacial and limb defects that are rescued by Fbn2+/−
- Adamts6 is a regulator of cardiac and musculoskeletal development through fibrillin-2 cleavage

174
Lipid profiling of human carotid atherosclerotic plaque with imaging mass spectrometry (MALDI-IMS)
Moerman, Astrid M.; Visscher, Mirjam; Burgers, Peter C.; van Beusekom, Heleen M.M.; Luider, Theo M.; van der Steen, Antonius F.W.; Gijsen, Frank J.; van Soest, Gijs; van der Heiden, Kim
Erasmus Medical Center Rotterdam, Rotterdam, Netherlands
- We hypothesize that the lipid signature of a plaque is related to plaque vulnerability
- We identify the unique lipid signature of human carotid plaques by MALDI-imaging mass spectrometry
- We correlate the detailed lipid profile to established compositional markers of plaque vulnerability

175
Deposition of endothelial cell-derived fibronectin by alpha5beta1 integrins mediates proinflammatory gene expression and early atherosclerosis
Orr, A. Wayne1; Al Yafeai, Zaki1; Yurdagul, Arif2; Green, Jonette M.1; Murphy, Patrick A.2
1. LSU Health Sciences Center - Shreveport, Shreveport, LA
2. UConn Health, Farmington, CT
- Oxidized LDL induces a5ß1-dependent fibronectin deposition
- Endothelial a5 knockout mice show reduced endothelial activation and early atherosclerosis
- Cell-derived but not plasma-derived fibronectin mediates EDA/EDB-dependent endothelial activation

176
Vascular smooth muscle EphA2 signaling regulates fibrillar adhesion formation to modulate fibronectin deposition
Finney, Alexandra1; Green, Jonette1; Rana, MOhammad1; Alexander, J. Steven1; Lim, Ssang-Taek2; Traylor, James G.1; Orr, A. Wayne1
1. LSU Health Sciences Center - Shreveport, Shreveport, LA
2. University of South Alabama Sch of Medicine, Mobile, AL
- EphA2 positively regulates multiple matrix-associated genes and is localized in focal adhesions
- EphA2-deficient smooth muscle cells attenuate fibrillar adhesion formation and contractility
- Vascular smooth muscle cells signal through fibronectin-binding integrins to upregulate EphA2
177 Talin1-dependent integrin activation is required for flow- and oxidized LDL-induced endothelial proinflammatory responses
Al-Yafeai, Zaki1; Yurdagul Jr, Arif2; Petrich, Brian G3; Orr, A. Wayne3
1. LSU Health Sciences Center - Shreveport, Shreveport, LA
2. Columbia University, New York, NY
3. Emory University, Atlanta, GA
- Our knowledge of Integrin affinity in endothelial cell (EC) activation is limited
- We used Talin1 L325R EC to specifically test the role of Integrin activation in EC proinflammatory response
- Blocking integrin activation blunts flow and oxidized LDL-induced proinflammatory responses

178 Cell receptor interactions of fibulin-4 and latent transforming growth factor-ß binding protein-4
Reinhardt, Dieter; Hakami, Hana; Kumra, Heena; Pagliuzza, Amelie; Djokic, Jelena; Lee, Kunjun; Lee, Chae Syng
McGill University, Montreal, PQ, Canada
- The interaction of FBLN4 with cells is mediated via cell surface heparan sulfate
- FBLN4 multimers, but not monomers, interact with cells
- LTBP-4 interacts with cells in the absence of an RGD site

179 Functional relevance of Fibulin-4 interactions with latent transforming growth factor beta binding protein-4 in the context of fibronectin and fibrillin-1
Reinhardt, Dieter; Kumra, Heena; Nelea, Valentin; Pagliuzza, Amelie; Hakami, Hana
McGill University, Montreal, PQ, Canada
- Fibulin-4 interacts with fibronectin and is directly dependent on fibronectin for its assembly
- Interaction of fibulin-4 with LTBP-4 induces a conformational change
- This induces functional changes in LTBP-4 assembly and its binding to other ECM proteins

180 Elastin haploinsufficiency results in disordered calcium homeostasis in cardiomyocytes
Levin, Mark; Kozel, Beth A.
NIH/NHLBI, Bethesda, MD
- Elastin haploinsufficiency results in disordered calcium homeostasis
- Elastin haploinsufficiency gives rise to ECG abnormalities
- Cardiomyocytes from from elastin haploinsufficient mice have increased whole cell calcium currents

182 miR-145 regulates cardiac fibrosis through selective inhibition of TGFβ signaling
Sawant, Dwitiya; Lowe, Megan; Marosis, Samantha; Trask, Aaron J.; Lilly, Brenda
The Research Institute at Nationwide Children’s Hospital, Columbus, OH
- miR-145 has multiple targets in the fibrotic pathway and it directly suppresses TGFβ signaling
- To determine whether miR-145 alleviates cardiac fibrosis by its conditional expression in mouse models
- To characterize the mechanisms by which miR-145 regulates signaling pathways involved in cardiac fibrosis

183 Integrin α5β1 and fibronectin are essential for regulating the formation of pharyngeal arch arteries
Jubran, Ali
Thomas Jefferson University, Philadelphia, PA
- Endothelium of the pharyngeal arch arteries (PAAs) is derived from the second heart field (SHF)
- Integrin α5 and Fn1 regulate PAA morphogenesis from SHF-derived precursors
- Integrin α5 regulates the deployment of endothelial progenitors and their assembly into the PAA

184 Impact of genetic GPER deletion on baseline cardiovascular parameters
Abshire, Caleb; Clark, Gabrielle L.; Miller, Kristen S.; Lindsey, Sarah H.
Tulane University School of Medicine, New Orleans, LA
- The novel estrogen receptor GPER is a potential target for postmenopausal cardiovascular disease
- Genetic GPER deletion reduced nighttime blood pressure in mature, healthy mice, independent of sex
- GPER deletion did not impact baseline ex vivo passive properties of carotid arteries

185 Alternative splicing of fibronectin regulates arterial matrix composition
Murphy, Patrick1; Jailkhani, Noor2; Del Rosario, Amanda M3; Levine, Stuart4; Begum, Shahinoor3; Hynes, Richard O2
1. UCONN Medical School, Farmington, CT
2. MIT, Cambridge, MA
- Flow responsive alterations in matrix composition in vivo including recruitment of blood proteins
- Quantitative in vitro analysis of the recruitment of blood proteins to the endothelial extracellular matrix
• Alternative splicing effects on extracellular matrix composition and recruitment of blood proteins

186
TGFβ mediated up-regulation of serpine1 via suppression of miR-30c coordinates vascular-directed fibrinolysis, sprouting angiogenesis, and tumor growth
McCann, James1; Xiao, Lin2; Khan, Omar3; Kowalski, Piotr3; Anderson, Daniel G.3,4; Pecot, Chad1; Parker, Joel1; Tsai, Yihsuan1; Wolberg, Alisa1; Mackman, Nigel1; Dudley, Andrew C.5
1. UNC Chapel Hill, Chapel Hill, NC
2. National Cancer Institute, Bethesda, MD
3. MIT, Cambridge, MA
4. Harvard Medical School, Cambridge, MA
5. The University of Virginia, Charlottesville, VA
- Endothelial cell heterogeneity in tumors
- TGFβ and fibrin-mediated angiogenesis
- Maladapted tumor-specific endothelial cells

187
Excessive plasmin compromises postnatal hepatic vascular integrity after liver injury
Gao, Sigi; Griffin, Courtney T.
University of Oklahoma Health Science Center/Oklahoma Medical Research Foundation, Oklahoma City, OK
- Plasmin activity peaks 6 hr after APAP overdose
- ECM components around hepatic vasculature are diminished after APAP overdose and plasmin elevation
- Partial reduction of plasmin activity stabilizes vascular integrity after APAP overdose

188
Improved aortic elastogenesis driven by adipose-derived mesenchymal stem cell secreted factors
Ramaswamy, Aneesh; Sides, Rachel E.; Weinbaum, Justin S.; Vorp, David A.
University of Pittsburgh, Pittsburgh, PA
- Adipose-derived MSC delivery to elastase-induced mouse aneurysm slows growth and preserves elastin
- Do MSCs secreted factors (SF) elevate adult aortic SMC elastic fiber production and organization?
- In 3D fibrin gels, SF induced 3x SMC insoluble elastin after 20 days, networked elastin after 30 days

189
Combined chronic treatment with β-blocker and inhibitor of the renin-angiotensin system decreases resistance artery stiffness in hypertensive patients
Bloksgaard, Maria1; Leurgans, Thomas1; Rasmussen, Lars M.2; Riber, Lars3; Irmukhamedov, Akhmadjon2; De Mey, Jo1
1. University of Southern Denmark, Odense C, Denmark
2. Odense University Hospital, Odense C, Denmark
- RAAS inhibitors (ACEI/ARB) but not β-blockers can reverse resistance artery (RA) remodeling
- The effect of chronic drug treatment on RA stiffness was evaluated in RA from CVD patients
- Combined treatment with ACEI/ARB and β-blocker decreases wall stiffness (vs. either treatment alone)

190 - presenting on board 24 on Monday
Development of a decellularized tissue model of early heart valve lesions
Maleki, Hoda; Simmons, Craig A.
University of Toronto, Toronto, ON, Canada
- Valve cells express osteochondral genes in early valve lesions with distinct ECM
- Established an in vitro decellularized ECM model that preserves valve ECM mechanics and composition
- This model is being used to assess pathological cell responses to early valve lesion ECM

191
Lysyl oxidase mutation in vascular disease
Lee, Vivian; Mecham, Robert
Washington University in St. Louis, St. Louis, MO
- Lysyl oxidase is required for crosslinking tropoelastin and collagen in developing vessels
- Mutations in lysyl oxidase leads to thoracic aortic aneurysm and dissection
- Mutant lysyl oxidase is retained in the endoplasmic reticulum

192
Tissue-specific role of fibulin-4 in maintaining arterial wall integrity
Halabi, Carmen; Lin, Michelle; Broekelmann, Thomas J.; Mecham, Robert P.
Washington University School of Medicine in St. Louis, St. Louis, MO
- Fbln4(E57K) mice serve as a model for autosomal recessive cutis laxa type 1B
- Elastic, but not muscular arteries, are affected by the homozygous E57K mutation in fibulin-4
- The normal desmosine content of Fbln4(E57K) vessels challenges fibulin-4’s role in elastin assembly