

ORAL PRESENTATIONS AT VASCULAR BIOLOGY 2026

REGULATION OF VASCULAR DEVELOPMENT

1

Primary cilia protein IFT88 is a key governor of smooth muscle phenotype

Brendan J O'Brien PhD, Kathleen A Martin PhD

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- A significant subpopulation of differentiated SMCs form primary cilia in vitro and in vivo.
- TGF- β signals in part through the primary cilia and IFT88 is required for signal transduction.
- In vivo Ift88 deletion results in aortic dilatation, fibrosis, and pre-aneurysmal remodeling.

2

Endothelial PCBP1 is essential for developmental angiogenesis and cardiac morphogenesis

Shuhan Lyu PhD¹, Sheri Juntilla¹, Bo Zhou², Hao Wu², Hong Chen², Yao Wei Lu¹

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- Endothelial PCBP1 is essential for developmental angiogenesis and cardiac morphogenesis.
- Endothelial PCBP1 regulates VEGFR2 signaling post-transcriptionally.
- PCBP1 links endothelial RNA metabolism to cardiovascular development.

CELL COMMUNICATION IN ATHEROSCLEROSIS

3

Inhibiting Interleukin-6 trans signaling increases murine survival from cardiovascular events

Victoria M Milosek MS, Maggie Shifflett, Vlad Serbulea PhD, Sohel Shamsuzzaman PhD, Rebecca A Deaton PhD, Gary K Owens PhD

University of Virginia, Charlottesville, VA, USA

- Atherosclerosis therapy requires reducing vascular inflammation while preserving innate immunity.
- Distinct IL6 signaling pathways enable selective targeting of chronic inflammation.
- Selective IL6 trans signaling inhibition improves survival in a murine model of MI and stroke.

4

Discovery of a nutrient sensing checkpoint required for continual efferocytosis

Abraham Quaye PhD, Tanvir Ahmed, Dhananjay Kumar PhD, Rajan Pandit, Theresea-Anne Governale, Arif Yurdagul PhD

LSU Health Shreveport, Shreveport, LA, USA

- mTORC1 activation is necessary to promote continual efferocytosis in macrophages
- mTORC1-mediated continual efferocytosis requires the lysosomal arginine-sensing capacity of SLC38A9
- SLC38A9 myeloid cell knockout worsens atherosclerosis progression and promotes plaque instability

VASCULAR MALFORMATIONS

5

Dynamic regulation of the retrotransposon LINE-1 during infantile hemangioma progression

Mehrnaz Mehrabipour PhD¹, Lan Huang PhD¹, Yuchen Zhou BS¹, Annegret Holm MD, PhD¹, Jill Wille Sears MS¹, Mat François PhD², Joyce Bischoff PhD¹

¹Boston Children's Hospital, Harvard Medical School, Boston, MA, USA. ²The University of Sydney, Sydney, NSW, Australia

- Stage-specific activation of the LINE-1 retrotransposon in the vascular tumor infantile hemangioma

- Hemangioma stem cells isolated from patient IH support LINE-1 retrotransposon activity
- Non- β -blocking R(+) propranolol engages LINE-1-associated DNA damage and stress pathways

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MYC-induced hypertranscription drives pathological vascular remodeling in sporadic arteriovenous malformations

Negar Khosraviani^{1,2}, Ruilin Wu², Kai Ellis³, Andrew Mazzanti⁴, Emilie Boudreau², Ivan Radovanovic⁵, Michael D Wilson³, Joshua D Wythe⁶, Miguel Ramalho-Santos⁴, Jason E Fish^{1,2}

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- KRAS-mutant brain AVMs are characterized by endothelial hypertranscription
- A KRAS-MEK-MYC axis drives pathological vascular remodeling in AVMs
- Targeting MYC may offer a new therapy for KRAS-drive brain AVMs

ORGAN CROSSTALK IN CARDIOMETABOLIC DISEASE

7

Defective lymphatic drainage and junctional disorganization impair cardiac injury resolution after myocardial infarction

Long Nguyen Hoang Do¹, Jingjing Pang¹, Esteban Delgado¹, Jianan Zhao¹, Liam Flynn¹, Hongxia Liu¹, Erhe Gao¹, Jungcheng Wei¹, Xiaofeng Yang¹, Michael Autieri¹, Guillermo Oliver², Xiaolei Liu¹

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- Lymphatic dysfunction increases inflammation, cardiac fibrosis and worsens cardiac function after MI
- Prox1 haploinsufficiency disrupts lymphatic vessel morphology and junctional organization after MI
- Prox1 stabilizes lymphatic endothelial cell junctions by balancing VEGFR2/VEGFR3/ERK signaling

8

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

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¹University of Toronto, Toronto, ON, Canada. ²University Health Network Research Institutes, Toronto, ON, Canada

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

EMERGING TOPICS IN MICROCIRCULATION

9

Early-life protein restriction exacerbates metabolic dysfunction and impairs pancreatic vascular responses induced by a hypercaloric diet

Leticia Barssotti, Daniele Guizoni, Kênia Oliveira, Joel Silva Junior, Everardo Carneiro, Ana Paula Davel
Universidade Estadual de Campinas (UNICAMP), Campinas, Brazil

- Early-life protein restriction aggravates adult hypercaloric diet-induced metabolic dysfunction.
- Early-life protein restriction impairs islet capillary adaptation to a hypercaloric diet.
- Early malnutrition induces selective vascular hyperreactivity in the pancreatic artery.

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Liraglutide suppresses inflammatory and barrier-disruptive responses in human lung microvascular endothelial cells through a potential GLP-1R-independent mechanism

David M Aslaner¹, Brandon Baer^{1,2}, Camille Brice¹, Jamie E Meegan^{1,3}, Nathan D Putz¹, Jason Lin¹, Gabby Longway¹, Avery M Bogart¹, Keagan M Trexler¹, Tatsuki Koyama¹, Vern E Kerchberger¹, Lorraine B Ware¹, Julie A Bastarache¹
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- Liraglutide as rescue therapy reduces sepsis severity and vascular inflammation in mice.
- Liraglutide directly protects lung microvascular endothelium from LPS-induced barrier disruption.
- Endothelial protection occurs without detectable GLP-1R, suggesting an alternate receptor.

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Piezo1-mediated mechanotransduction in endothelial dysfunction during severe dengue

Lindsay Whalen B.A., Justin Richner PhD, Yulia Komarova PhD
University of Illinois Chicago, Chicago, IL, USA

- Severe dengue causes life-threatening vascular leakage and endothelial barrier failure.
- Dengue virus NS1 impairs endothelial barriers independently of whole-virus infection.
- NS1 disrupts endothelial barriers through a newly identified Piezo1–Ca²⁺–YAP1 pathway.

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Lymphatic endothelial alpha globin promotes cardiomyocyte hypertrophy during heart failure through local nitric oxide scavenging and T cell retention

Skylar A Loeb¹, Wyatt J Schug¹, Luke S Dunaway¹, Dennon Hoernig¹, Zuzanna J Juskiewicz¹, Clayton T Grisius¹, Junjie Li², Shruthi Nyshadham¹, Darla L Tharp³, Miriam Cortese-Krott², Matthew Wolf¹, Brant E Isakson¹
¹University of Virginia School of Medicine, Charlottesville, VA, USA. ²Eberhard Karls University of Tübingen, Tübingen, Germany. ³University of Missouri, Columbia, Missouri, USA

- Lymphatic endothelial Hba regulates promotes cardiomyocyte hypertrophy during heart failure
- Lymphatic endothelial Hba reduces NO bioavailability locally in the heart
- Lymphatic endothelial Hba promotes T cell retention in the heart during heart failure

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Understanding pericyte cell states and their roles in pancreatic ductal adenocarcinoma

Christian Palacios-Gomez, Matthew J. Lazzara, Shayn M. Peirce
University of Virginia, Charlottesville, VA, USA

- Pathological reprogramming of pericytes
- Hypoxic pericytes
- scRNA-seq analysis of pericyte phenotypes

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Calcitonin receptor-like receptor (CLR) signaling regulates lymphatic lipid metabolism and intestinal lipid transport

Yanna Tian Ph.D., Kerstin Baran, Kathleen M. Caron Ph.D.
UNC-CH, Chapel Hill, North Carolina, USA

- Lymphatic CLR signaling is essential for intestinal lipid homeostasis
- Loss of lymphatic CLR signaling alters enterocyte lipid metabolism
- AM/CGRP-CLR signaling regulates lipid handling in LECs

NEUROVASCULAR COUPLING AND PATTERNING

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A mitochondrial program encodes brain vascular reserve

Ivan FAN XIA PhD¹, Dingding Zhang MD,PHD², Yi-Cheng Zhu MD,PHD², Stefania Nicoli PhD¹

¹Yale University, New Haven, CT, USA. ²Peking Union Medical College Hospital, Beijing, Beijing, China

- Brain collateral architecture is developmentally encoded and predicts vascular resilience;
- Embryonic endothelial tip cell mitochondrial state programs brain vascular topology;
- Circulating miR-125a marks individuals with structurally vulnerable brain collaterals.

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Choline regulates angiogenesis and promotes remyelination in post stroke repair

Dibyanti Mukherjee PhD, Amara Larphaveesarp Bs, Fernando Gonzalez MD, Thomas Arnold MD

University of California, San Francisco, San Francisco, CA, USA

- Choline promotes vascular repair and remyelination after neonatal ischemic stroke.
- FLVCR2-mediated choline transport is essential for post-stroke brain repair.
- Choline improves long-term neurological recovery after neonatal stroke.

OMICS IN INFLAMMATORY CVD

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Single-cell transcriptomics reveals endothelial and stromal remodeling linked to chronic venous obstruction following venous stenting

Oscar Moreno MD, Catherine E Luke LVT, Amber Clay RVT, RDCS, Sabrina Rocco MS, David Gordon MD, Daniel D Myers DVM, MPH, Thomas Wakefield MD, Peter K Henke MD, Andrea T Obi MD

University of Michigan, Ann Arbor, MI, USA

- Single-cell sequencing defines endothelial remodeling in chronic venous obstruction.
- EndMT-like endothelial cells emerge during chronic venous remodeling.
- Distinct stromal cell states may drive fibrosis after venous stenting.

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Divergent immune and smooth muscle programs define sex-specific remodeling in ascending aortic aneurysm

Elena Repges MD¹, Ridha Shah BS¹, Soheila Ali Akbari Ghavimi PhD¹, Taylor Nordan MD¹, Adrien Lupieri PhD¹, Alexander Gorelick PhD², Taku Kasai PhD¹, Asishana Osho MD³, Ashraf Sabe MD³, Elena Aikawa PhD¹, Sasha Singh PhD¹, Peter Libby MD¹, Marie Billaud PhD¹

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- Biological sex differences in ascending aneurysmal aorta offer clues to the clinical sex disparity
- Female aneurysm is defined by IFN γ /STAT1 inflammation and stress response
- Male aneurysm retains a contractile, cytoskeletal, and mechanotransductive program

ENGINEERING STRATEGIES FOR VASCULARIZATION AND DISEASE MODELING

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Circulating nanoplastics induce cardiotoxicity and vascular inflammation in a perfusable engineered human cardiovascular microtissue

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- We develop and validate an extensively-vascularized engineered cardiovascular niche (eCVN).
- The eCVN augments cardiac and endothelial function, and allows for delivery of soluble factors.
- Circulation of nanoplastics in eCVN evokes cardiotoxicity and vascular inflammation.

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Blood perfusion drives microvessel maturation in engineered microvascular grafts

Angela Zhou^{1,2}, Shabana Vohra¹, Sitong Huo^{1,3}, Sara Vasconcelos^{1,2,3}

¹University Health Network, Toronto, Ontario, Canada. ²Department of Laboratory Medicine and Pathobiology, Toronto, Ontario, Canada. ³Department of Biomedical Engineering, Toronto, Ontario, Canada

- Drivers of vascular maturation in transplantation
- Engineering vascularization strategies
- Microvascular remodeling

PULMONARY MICROCIRCULATION IN PULMONARY HYPERTENSION

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ROR2 signaling regulates pericyte function and microvascular stability in pulmonary arterial hypertension

Arpita Roy PhD, Stuti Agarwal PhD, Ankita Mitra PhD, Ramesh Nair PhD, Vinicio de Jesus Perez MD
Stanford School of Medicine, Palo Alto, California, USA

- Pulmonary arterial hypertension
- Disrupted endothelial–pericyte communication
- Dysregulated ROR2 signaling

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Restoring endothelial TMEM100 reverses the pulmonary arterial hypertension phenotype resulting from TBX4 deficiency

Mauro Lago Docampo PhD^{1,2,3}, Divya Guntur PhD⁴, Vrishank Chandrasekhar¹, Mark Gantman BS², Lingli Wang MD^{1,3}, Aiqin Cao PhD^{1,3}, Yapeng Liu MD-PhD^{1,2,3}, Kamakshi Bichu MS^{1,2,3}, Chanatjit Chewsamoot PhD⁵, Chongyang Zhang PhD^{1,2,3}, Micheala Aldred PhD⁶, Ripa Arora PhD⁷, Ioannis Karakikes PhD², Marlene Rabinovitch MD^{1,2,3}

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- TBX4-deficient SMCs cause endothelial dysfunction via disrupted BMP and Notch signaling.
- TMEM100 links BMP and Notch pathways through receptor trafficking and maturation.
- TBX4 mutations induce an EndMT signature, and replenishing TMEM100 is a therapeutic strategy.

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Targeting the ERG-EDNRB axis in lymphatic endothelial cells to attenuate bleomycin-induced pulmonary fibrosis

Arun Narota PhD, Tapiwa Muvavarirwa, Xintao Qiu, Kevin Niu, Irbazhusain Shaikh, Maria Trojanowska
Boston University School of Medicine, Boston, MA, USA

- LEC Erg deletion enhances lymphatic drainage and reduces bleomycin-induced lung fibrosis.
- Erg loss upregulates EDNRB, establishing EDNRB as the key mediator of improved clearance.
- Targeting the Erg-EDNRB axis offers a novel therapeutic strategy for lung diseases.

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Extracellular matrix-related protein Cthrc1 is a potential target in pulmonary hypertension

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- scRNA-seq identifies an ECM-related SMC expansion signature in early PH.
- Pharmacological or genetic CTHRC1 inhibition reduces pulmonary vascular remodeling and PH.
- Overexpression of CTHRC1 in SMCs worsens distal muscularization and PH.

LYMPHATICS: AGING AND FUNCTION

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Connexin 37-mediated late G1 state enables lymphatic valve morphogenesis

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- Cx37 controls valve lymphatic endothelial cell cycle state by promoting a late G1 state
- A late G1 state is required for proper lymphatic valve formation
- Valve defects in Cx37-deficient embryos can be restored by pharmaceutically driving a late G1 state

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Characterization of novel lymphatic capillary mural cells (LCMCs)

Vishakha Vishwakarma PhD, Daniel Castranova, Madeleine Kenton, Brant M Weinstein PhD
NICHD, NIH, Bethesda, MD, USA

- Novel mural cell population identified on zebrafish lymphatic capillaries
- These mural cells show pericyte-like transcriptional signature by scRNA-seq
- Drainage assay reveals functional role of LCMCs in lymphatic capillaries

METABOLISM AND EPIGENETICS INTERSECTION IN CARDIOVASCULAR DISEASE

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Empagliflozin restores angiogenic gene regulatory pathways in the cardiac microvasculature in diabetes-induced heart failure with preserved ejection fraction

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³SickKids Hospital, Toronto, ON, Canada

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

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TGFβ negatively regulates CPT1A-mediated fatty acid oxidation to impair cardiac lymphangiogenesis and exacerbate cardiac dysfunction following myocardial ischemia

Esteban Delgado BS, Long Do MS, Liam Flynn BS, Jingjing Pang PhD, Jianan Zhao PhD, Hongxia Liu MS, Erhe Gao PhD, Nathaniel Snyder PhD, Xiaolei Liu PhD
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- TGF β signaling negatively regulates cardiac lymphangiogenesis and cardiac repair after MI
- TGF β signaling negatively regulates CPT1A-mediated fatty acid oxidation in LECs
- Targeting TGF β signaling in lymphatics during disease has significant therapeutic potential

NEW TRENDS IN VASCULAR BIOLOGY

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Platelets unlock endothelial plasticity toward mesenchymal fates to promote aortic Aneurysm

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- Platelet effector role on regulating endothelial cell fate to disrupt vascular homeostasis.
- Reenforce the pathological role of platelet-derived Tgfb1 in abdominal aortic aneurysms.
- Endothelial plasticity as a targetable node to curb aortic aneurysms progression.

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Engineering macrophage-informed vascularization: From native microvessel biology to regenerative applications

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³University of Toronto, Toronto, Canada

- Macrophages are required for microvessel sprouting; donor and host pools act redundantly
- Perivascular CSF1 supports macrophage survival and pro-angiogenic function in grafts
- Co-transplanting endothelial cells, macrophages, and fibroblasts restores vascularization

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The splicing factor SF3B1 is essential for safeguarding global splicing integrity and suppressing ferroptosis in endothelial cells to support angiogenesis

Kaleigh Kozak BS, Emily Clifford BS, Yanan Xing PhD, Katherine Hamm BS, Jesse Cullison BS, Hina Iqbal PhD, Ziqing Liu PhD

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- RNA-binding proteins are important for endothelial cell gene expression and angiogenesis
- Endothelial cells can die of ferroptosis, a lipid peroxidation-triggered cell death
- The splicing factor SF3B1 suppresses ferroptosis in EC through regulating GPX4 splicing

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Piezo2-Vegfr3 signaling axis regulates lymphangiogenesis in calcium dependent manner

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- Piezo2 is highly expressed in lymphatic capillary endothelium.
- Piezo2 is a predominant way for Ca²⁺ to enter capillary LECs.
- Piezo2 regulates Flt4 expression, because of it regulates density of LVs in adipose tissue.

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Type 1 diabetes abrogates female vascular protection through renin-angiotensin -aldosterone system-dependent oxidative stress despite preserved endothelial bioenergetics

Adam Saloň PhD, Simone Kennard, Liu Fang, David Stepp, Rudolf Lucas, Tohru Fukai, Masuko Ushio-Fukai, David Fulton, Eric Belin de Chantemèle

Vascular Biology Center, Medical College of Georgia at Augusta University, Augusta, Georgia, USA

- Endothelial dysfunction occurred despite preserved glycolytic and mitochondrial function.
- T1D increased AT1A, NOX2, superoxide, and MMP9 in female vessels.
- Losartan, Tempol, and estrogen replacement restored endothelial function.

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Engineering lymphatic vascular tissues from human induced pluripotent stem cells

Donny Hanjaya-Putra PhD, Donghyun Paul Jeong

University of Notre Dame, Notre Dame, IN, USA

- Metabolically Driven Differentiation of Human Stem Cells to generate Lymphatic Endothelial Cells
- Engineering Synthetic Biomaterials to promote Lymphatic Regeneration in Lymphedema models
- Differentiated LECs secreted lymphangiocrine factors to support organ regeneration and maturation

MUSCULOSKELETAL MICROCIRCULATION

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Impacts of metabolic disease and aging on synovial microvasculature in knee osteoarthritis: Roles of synovial endothelial-to-mesenchymal transition

Qinli Guo BSc, Joseph Dan Klapak BAT, Garth Blackler BAT, J. Geoffrey Pickering, C. Tom Appleton

Western University, London, ON, Canada

- Microvascular dysfunction may mediate the impact of metabolic disease on osteoarthritis joints.
- Synovial endothelial cells can respond to OA by undergoing endothelial-to-mesenchymal transition.
- Endothelial migration and tubule formation induced by OA stimuli can be impaired by metabolic stress.

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The histone modification H3K4me2 and the DNA demethylase TET2 coordinately regulate microvascular SMC recruitment and coverage during hindlimb ischemia-induced angiogenesis

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- TET2 has a pro-migratory role in hypoxic SMC.
- The H3K4me2/TET2 complex regulates SMC participation in microvascular remodeling.
- TET2 expression in hypoxic SMC is dependent on HIF-1a.