

Cardiac, Vascular and Hematologic Sciences – Study sections formed after ENQUIRE 2019

Basic Biology of Blood, Heart and Vasculature (BBHV)

The BBHV study section reviews applications focused on basic molecular and cellular mechanisms and physiology of blood, heart and vascular cells and tissues in normal and pathologic conditions. The applications in BBHV are focused on cells, tissues and experimental organisms. Cellular, biochemical, biophysical, immunological, genetic, pharmacological, and molecular biological approaches in experimental models are reviewed.

Topics

- Basic studies blood, heart and vascular cells and tissues: “Omics”, stem cell biology and regenerative medicine (including hematopoiesis and cardiac differentiation), cell lineage and cell fate studies.
- Basic mechanisms for red blood cells or hemoglobin to carry oxygen, white blood cells and platelet adhesion, migration or interactions, platelet activation, shape change, release and aggregation.
- Gene therapy and gene editing technology: Transcriptional and posttranscriptional regulation of gene expression. Signaling, epigenetics, cell-cell interactions with adhesion molecules; chemokines, cytokines.
- Vascular cell development, differentiation and proliferation. Angiogenesis, apoptosis, and autophagy.
- Protein biochemistry and structural biology of components of the blood, heart and vasculature: Including cardiac and vascular ion channels, ion exchangers, and ion pumps.
- Intercellular communication of blood, vascular and heart cells. Exosomes, ectosomes, microvesicles, microparticles. Electrical propagation of cardiovascular cells. Cell fission and fusion.
- Cardiac myocytes: Contractile function and mechanical stress generation. Calcium regulation and signaling and involvement of the vasculature.
- Cardiac hypertrophy, heart failure and heart disease: Molecular and cellular mechanisms, Myocyte growth, proliferation, metabolism and apoptosis; receptor signaling; transcriptional pathways; inflammatory/ cytokine-mediated processes.
 - Cellular mechanisms of arrhythmogenesis: genes and proteins involved.
 - Genetic cardiomyopathies: genotype-phenotype correlation; genomic and proteomic approaches.
 - Mechanisms for myocardial cell dysfunction, death (apoptosis/necrosis) and autophagy. Impact of diet, obesity or systemic metabolic disorders on myocardial metabolism mitochondrial function, or the response to ischemia/reperfusion.
 - Excitability, electrical propagation and repolarization in normal and diseased hearts; intercellular communication including gap junctions/connexins

Shared Interests and Overlaps

In general, application assignment to the basic science focused **BBHV** versus the more translational panels **IVPP, AVI, HTBT, MPPA, MPPB** is driven largely by the weight of the approach. Applications applying standard approaches to address questions of therapeutics, disease progression or

pathophysiology would go to the more translational panel. Applications addressing fundamental studies in these areas that require expertise in structural biology, cell biology, genetics, imaging or biomechanics to evaluate go to BBHV.

BBHV and **Integrative Vascular Physiology and Pathology (IVPP)** have shared interests in using stem cells and in regenerative medicine. Applications that emphasize grafts, stents, re-endothelization and stem cell treatments will be reviewed in IVPP. Applications that emphasize all types of heart, blood and hematopoietic regenerative medicine and stem cell science will be reviewed in BBHV.

BBHV and **Atherosclerosis and Vascular Inflammation (AVI)** have shared interests in endothelial cells, smooth muscle cells, and inflammatory cells. Applications that emphasize endothelial cells, smooth muscle cells, and inflammatory cells in the context of atherosclerosis will be reviewed in AVI. Applications that emphasize endothelial cells, smooth muscle cells, and inflammatory cells in the context of basic science studies will be reviewed in BBHV.

BBHV and **Hemostasis, Thrombosis, Blood Cells and Transfusion Study Section (HTBT)** have shared interests in blood research. Applications that involve the mechanism of action, the involvement of blood cells in disease and all transfusion related applications are reviewed in HTBT. Applications that emphasize basic blood cell biology, structure or omics are reviewed in BBHV.

BBHV and **Integrative Myocardial Physiology/Pathophysiology A (MPPA)** have shared interests in the area of myocyte cardiac hypertrophy, myocyte interactions, cardiomyocyte contractile function as well as metabolism and energetics aspects of heart disease. Applications that emphasize these functions on humans will be reviewed in MPPA. Applications that emphasize these functions on cells and tissues will be reviewed in BBHV.

BBHV and **Integrative Myocardial Physiology/Pathophysiology B (MPPB)** have shared interest in the area of myocardial dysfunction, myocardial cell death, aspects of electrical excitability and propagation of signals between normal and diseased hearts and arrhythmogenesis. Applications that emphasize these functions on humans will be assigned to MPPB. Applications that emphasize these functions on cells and tissues will be reviewed in BBHV.

BBHV and **Bioengineering, Technology and Surgical Sciences Study Section (BTSS)** have shared interests in regenerative medicine. Applications that emphasize regenerative medicine and wound healing, including the development of advanced tools and techniques, in the design, construction, and function of cellular and tissue-engineered constructs for surgical based interventions will be reviewed in BTSS. Applications that emphasize hematopoietic stem and progenitor cells in hematopoiesis, transplantation, homing, migration, and gene therapy will be reviewed in BBHV.

BBHV and **Cardiovascular Differentiation and Development Study Section (CDD)** have shared interests in stem cells. Applications that emphasize the ability of stem cells to correct tissue damage and which look at cell lineage and cell fate will be reviewed in BBHV.

BBHV and **Development-1 and 2 (DEV 1, DEV2)** have shared interests in stem cell biology. Applications that emphasize stem cell fate studies in cardiac, blood and vascular cells or hematopoietic stem and progenitor cells are typically assigned to BBHV.

Integrative Vascular Physiology and Pathology (IVPP)

The IVPP study section reviews applications focused on endothelial cells, blood vessels and lymphatics and their role in normal physiology and disease. Cellular, biochemical, biophysical, immunological, genetic, pharmacological, and molecular biological approaches are typical. Basic and applied aspects of cardiovascular regulation are reviewed that focus on the physiology of blood pressure regulation, the pathogenesis of hypertension and the microcirculation, biology of the endothelium and vascular smooth muscle cells and vascular homeostasis and dysfunction in experimental models. Studies on cell surface receptors and signaling processes of various hormones, paracrines, and autocrines and their mechanisms of action as related to hypertension, integrated neural-humoral control of circulation, regional hemodynamics, lymphatic circulation, and microcirculation are also considered.

Topics

- Vascular cell and molecular biology of blood vessels ranging from major arteries to the microcirculation and sex-specific microvascular disease mechanisms.
- Neural and humoral control of the cardiovascular system in vertebrate animals including systems analysis of autonomic physiology involving central and peripheral mechanisms of cardiovascular regulation.
- Mechanisms that regulate vascular angiogenesis and rarefaction, cardiovascular stem cell functions and senescence.
- Hypertension (excluding pulmonary hypertension). Mechanisms that regulate arterial blood pressure, role of kidneys and other tissues/organs, nervous and endocrine systems, autocrine, paracrine factors. Pathogenesis of systemic hypertension.
- Vascular pathology in hypertension and co-morbidities, metabolic syndrome, chronic degenerative diseases (e.g. Alzheimer, retinopathy), stroke, cardiac microvascular dysfunctions, and aging.
- Vascular inflammation, immune regulation and dysregulation.
- Microcirculation and tissue transport processes, lymphatics, autonomic regulation. Capillary/vascular dynamics, mechanics and permeability, cellular and fluid mechanics and mechanotransduction.
- Vascular responses and changes due to environmental exposure, stress, metabolic disorders, aging and vascular drug toxicity.
- Pathogenesis of microvascular diseases related to diabetic vasculopathy, stroke, ischemia/reperfusion and chronic microvascular diseases such as Raynaud's disease. Propulsion of lymph, lymphatic tone, and pathogenesis of lymphedema.
- Mediators and modulators of vascular smooth muscle contractility: calcium homeostasis; calcium sensitive proteins; neural, redox, and transcriptional regulation of genes and proteins that modulate vascular excitability and contractility; regulation of ion channel function and expression.
- Injury/repair; remodeling; angioplasty; restenosis; grafts; stents; re-endothelialization; neointima hyperplasia; spasm; varicose; embolism; fistula; edema; stem cells.

Shared Interests and Overlaps

IVPP and **Atherosclerosis and Vascular Inflammation (AVI)** have shared interests in addressing vascular inflammation and vascular responses due to environmental and physiological changes. Applications that

emphasize atherosclerosis, addressing the role of hemodynamics in atherosclerotic plaque formation and rupture and in aneurysm formation and rupture will be assigned to AVI. Applications that emphasize blood flow and circulation will be assigned to IVPP.

IVPP and with **Integrative Myocardial Physiology/Pathophysiology A (MPPA)** have shared interests in the area of cardiac contractility and vascular smooth muscle contractility. Applications that emphasize the application of these in humans will be assigned to MPPA. Applications that emphasize the application of these in cells and tissues will be reviewed in IVPP.

IVPP and **Integrative Myocardial Physiology/Pathophysiology B (MPPB)** have shared interests in the area of hypertension. Applications that emphasize hypertension in humans will be reviewed in MPPB. Applications that emphasize hypertension in the context of cells and tissues will be reviewed in IVPP.

IVPP and **Clinical Integrative Cardiovascular and Hematological Sciences (CCHS)** have shared interests in topics related to blood pressure regulation, hypertension, neural control of the cardiovascular system, and micro- or regional circulation. Applications that emphasize the clinical aspects of these topic areas in humans and human samples will be reviewed in CCHS. Applications that focus on the basic and translational aspects of these topic areas, typically in animal models, will be reviewed in IVPP.

IVPP and **Pathobiology of Kidney Disease (PBKD)** have shared interests in hypertension. Applications that emphasize studies involving hypertension-induced kidney injury will be reviewed in PBKD. Applications that emphasize hypertension studies involving cardiovascular biology, microcirculation, lymphatic and central or peripheral nervous system will be reviewed in IVPP.

IVPP, **Brain Injury and Neurovascular Pathologies (BINP)** and **Acute Neural Injury and Epilepsy (ANIE)** have shared interests in neural injury and vasculature. Applications that emphasize blood-brain barrier and vascular functions in development and treatment of neural injury will be reviewed by BINP, for animal studies, and ANIE, for human subject studies. Applications that emphasize stroke, microcirculation and flow related to hypertension will be reviewed by IVPP.

IVPP and **Cardiovascular Differentiation and Development (CDD)** have shared interests in lymphatic systems. Applications that emphasize lymphatic development, lymphangiogenesis and lymphedema focusing on structure will be reviewed in CDD. Applications that emphasize lymphatic function, lymphatic tone, and pathogenesis of lymphedema will be reviewed in IVPP.

IVPP and **Therapeutic Development and Preclinical Studies (TDPS)** have shared interests in the mechanisms of action, identifying potential therapeutic targets and/or delivering therapeutic agents aimed at treating disorders such as hypertension and vascular stiffness. Applications that emphasize characterization mechanisms of action towards identifying potential therapeutic targets and/or delivering therapeutic agents in preclinical models will be reviewed in TDPS. Applications that emphasize mechanisms of action of disorders, hypertension and vascular stiffness will be reviewed in IVPP.

Atherosclerosis and Vascular Inflammation (AVI)

AVI reviews applications involving inflammation of the vascular system with a focus on the pathobiology of the blood vessels leading to atherogenesis, its reversal and prevention. There is an emphasis on macrophage biology and hyperlipidemia, involving transport and metabolism of cholesterol, lipoproteins and their oxidation derivatives. The effects of major risk factors such as diabetes, liver disease, aging, and smoking on the vasculature are considered. Most studies use cell cultures and animal systems with some human subject approaches.

Topics:

- Lipoproteins in the vascular system and vascular disease: Function, metabolism, and oxidation. Cholesterol metabolism, and transport. Related gene expression and regulation, noncoding RNAs, post-translational modifications. Macrophage activation and regulation. Foam cell formation; plaque stability, plaque rupture and erosion. Cell-matrix interactions.
- Innate and adaptive immune mechanisms in vascular inflammation, atherosclerosis. Atheroprotection and vascular aging. Neutrophils, macrophages, monocyte subsets, T-cells and leukocytes. Cell migration, cell signaling, cytokines and chemokines, signal transduction.
- Endothelial and smooth muscle cell biology as related to atherosclerosis, vascular inflammation, plaque stability, or aneurysms. Lymphocyte-endothelial interactions and shear stress mechanotransduction mechanisms. Oxidative stress and endothelial dysfunction: Reactive oxygen species (ROS), reactive nitrogen species (RNS), nitric oxide (NO), and endothelial nitric oxide synthase (eNOS).
- Vascular disease and metabolic processes such as hyperlipidemia, abdominal aortic aneurysms, vascular calcification, adipose tissue inflammation, diabetes, atherothrombosis, vasculitis, autoimmune myocarditis.
- Effects of the environment on the vascular system. Exposure to toxins, drugs, nutritional components. The gut microbiome, lifestyle choices, diabetes and obesity. Sex specific and aging effects. Effects of turbulent blood flow, and arterial stiffening and vascular wall mechanics.
- Atherogenic mechanisms leading to myocardial infarction, stroke and peripheral artery disease.

Shared Interests and Overlaps

AVI and **Hemostasis, Thrombosis, Blood Cells and Transfusion (HTBT)** have shared interests in thrombosis. Applications that emphasize thrombosis in terms of atherosclerotic plaque rupture will be reviewed in AVI. Applications that emphasize all other thrombosis related subjects will be reviewed in HTBT.

AVI and **Integrative Vascular Physiology and Pathology (IVPP)** have shared interests in vascular inflammation and vascular responses due to environmental and physiological changes. Applications that emphasize blood flow and circulation will be reviewed in IVPP. Applications that emphasize atherosclerosis, addressing the role of hemodynamics in atherosclerotic plaque formation and rupture and in aneurysm formation and rupture will be reviewed in AVI.

AVI and **Therapeutic Development and Preclinical Studies (TDPS)** have shared interests in cardiovascular inflammatory disorders. Applications that emphasize mechanisms of action towards identifying potential therapeutic targets and/or delivering therapeutic agents aimed at treating cardiovascular inflammatory disorders such as atherosclerosis, vasculitis, myocarditis will be reviewed in TDPS. Applications that emphasize mechanisms of action of cardiovascular inflammatory disorders such as atherosclerosis, vasculitis, myocarditis will be reviewed in AVI.

AVI and **Clinical Integrative Cardiovascular and Hematological Sciences (CCHS)** have shared interests in atherosclerosis and inflammation of the vascular system. Applications that emphasize focus on clinical aspects of atherosclerosis and vascular inflammation in humans and human samples will be reviewed in CCHS. Applications that emphasize the basic and translational aspects of these topic areas in cellular and animal models will be assigned will be reviewed in AVI.

AVI and **Integrative Nutrition and Metabolic Processes (NMHD)** have shared interests in lipoproteins and cholesterol. Applications that emphasize the role of cholesterol, lipoproteins, and fatty acids - their synthesis, degradation, metabolism, utilization, and interorgan flux and turnover will be reviewed in INMP. Applications that emphasize lipoproteins and cholesterol in atherosclerosis, interactions of lipoproteins with vascular cells, the function of apolipoproteins and apolipoprotein gene expression will be reviewed in AVI.

AVI and **Basic Mechanisms of Diabetes and Metabolism (BMDM)** have shared interests in the investigation of adipose tissue depot biogenesis and remodeling. Application that emphasize on the modulation of adipocyte differentiation and function by vascular cells will be reviewed in BMDM. Applications that emphasize the understanding vascular cells, atherosclerosis, or vascular inflammation in the context of obesity will be reviewed in AVI.

AVI and **Innate Immunity and Inflammation (III)** have shared interests in inflammation. Applications that emphasize the basic aspects of innate immunity and inflammation will be reviewed in III. Applications that emphasize the inflammation of cardiovascular system will be reviewed in AVI.

AVI has shared interests with **Brain Injury and Neurovascular Pathologies (BINP)** and **Acute Neural Injury and Epilepsy (ANIE)** in vasculature. Applications that emphasize blood-brain barrier and vascular functions in development and treatment of neural injury will be reviewed in BINP, for animal studies, or ANIE, for human subjects. Applications that emphasize the role of hemodynamics in atherosclerotic plaque formation and rupture in aneurysm formation will be reviewed in AVI.

AVI and **Intercellular Interactions (ICI)** have shared interests in cell adhesion. Applications that emphasize studying cellular interactions through, cell adhesion, cell-cell interactions and extracellular matrix will be reviewed in ICI. Applications that emphasize these processes as related to vascular cells and processes will be reviewed in AVI.

AVI and **Aging Systems and Geriatrics Study Section (ASG)** have shared interests in aging. Applications that emphasize investigating neurological geriatric syndromes and disorders will be reviewed in ASG. Applications that emphasize atherosclerosis-related mechanisms of vascular aging will be reviewed in AVI.

AVI and **Cellular Aspects of Diabetes and Obesity (CADO)** have shared interests in the investigation of adipose tissue depot biogenesis and remodeling. Applications that emphasize the modulation of adipocyte differentiation and function by vascular cells will be reviewed by CADO. Applications that emphasize the understanding vascular cells, atherosclerosis, or vascular inflammation in the context of obesity will be reviewed by AVI.

Hemostasis, Thrombosis, Blood Cells and Transfusion Study Section (HTBT)

HTBT reviews applications involving basic and applied aspects of hemostasis, thrombosis, hematopoiesis, red blood cells, white blood cells, platelets, and transfusion. Studies using cellular, biochemical, biophysical, immunological, genetic, pharmacological and molecular biological approaches to define normal and pathological processes are reviewed. Applied aspects of normal and abnormal hematopoiesis, as well as applied aspects of the formed elements of the blood are also reviewed. Additional areas of review include hematopoietic stem cells, hematopoietic growth factors and their receptors, iron and heme metabolism, blood cell cytoskeleton biology, myeloid biology, transfusion medicine and gene therapy. HTBT does not review applications related to leukemia. These will typically be reviewed in the OBT/ OTC IRGS.

Topics

- Mechanisms of hemostasis, thrombosis and blood coagulation.
- Hematopoiesis, including hematopoietic stem and progenitor cells and epigenetic regulation of gene expression.
- “Omics” of blood cells and plasma proteins related to hematologic diseases.
- Thrombolysis/fibrinolysis, Plasminogen activation, sepsis, proteases and their receptors.
- Platelet and Megakaryocyte biology, congenital and acquired platelet/bleeding disorders and their gene therapy.
- Pathogenesis and pathophysiology of thromboembolism, thrombophilia, thromboembolism and related diseases. Thrombogenesis and coagulation in inflammation/immune response and cancer/uncontrolled tissue growth, acquired coagulopathies.
- Transfusion medicine, blood substitutes; blood banking; development of globin gene regulation, immunohematology.
- Inherited or acquired anemias including sickle cell anemia, sideroblastic anemias, hemolytic anemias, anemia of chronic disease and anemias of bone marrow failure. Inherited or acquired bleeding and thrombotic disorders, including hemophilia. Iron and heme metabolism and iron overload states.
- Thrombocytopenia due to aplastic anemia, lymphoma, Wiskott-Aldrich or May-Hegglin syndrome, viral infection and chemotherapy or radiation treatments.

- Leukocyte biology and diseases (not including leukemia): Leukocyte adhesion, migration and release of bioactive factors and related roles in capillary permeability, vasomotor response, blood clotting, inflammation, tissue repair and remodeling, fibroblast activation and scar formation.
- Myelopoiesis, erythropoiesis, leukopoiesis and thrombopoiesis.

Shared Interests and Overlaps

HTBT and **Atherosclerosis and Vascular Inflammation (AVI)** have shared interests in thrombosis. Applications that emphasize atherothrombosis in terms of atherosclerotic plaque rupture will be reviewed in AVI. Applications that emphasize other thrombosis- related subjects will be reviewed in HTBT.

HTBT and **Basic Biology of Blood, Heart and Vasculature (BBHV)** have shared interests in blood research. Applications that emphasize basic blood cell biology, structure, omics, and behavior will be reviewed in BBHV. Applications that emphasize the mechanism of action, the involvement of blood cells in disease and all non-clinical transfusion related applications will be reviewed in HTBT.

HTBT and **Clinical Integrative Cardiovascular and Hematological Sciences (CCHS)** have shared interests in transfusion medicine. Applications that emphasize clinical studies in transfusion medicine will be reviewed in CCHS. Applications that emphasize all other transfusion medicine applications will be reviewed in HTBT.

HTBT and **Surgery, Anesthesiology, and Trauma Study Section (SAT)** have shared interests in sepsis. Applications that emphasize involving sepsis and surgery, injury, or surgical critical care will be reviewed in SAT. Applications that emphasize involving sepsis and coagulation mechanism or effects will be reviewed in HTBT.

HTBT has shared interests with **Brain Injury and Neurovascular Pathologies (BINP)** and **Acute Neural Injury & Epilepsy (ANIE)** in neural injury. Applications that emphasize mechanisms of brain injury will be assigned to BINP (animal studies) or ANIE (human subject studies). Applications that emphasize coagulation factors in intracranial hemorrhage/clot formation will be reviewed in HTBT.

HTBT and **Intercellular Interactions (ICI)** have shared interests in cell adhesion. Applications that emphasize cellular interactions through cell adhesion will be reviewed in ICI. Applications that emphasize cell adhesion involved in platelet aggregation and thrombosis will be reviewed in HTBT.

HTBT and **Development-2 (DEV2)** have shared interests in hematopoietic stem cell biology. Applications that emphasize hematopoietic stem and progenitor cells during early embryonic hematopoietic development will be reviewed in DEV2. Applications that emphasize hematopoietic stem and progenitor cells in hematopoiesis, transplantation, homing, migration, and gene therapy will be reviewed in HTBT.

Integrative Myocardial Physiology/Pathophysiology A (MPPA)

The MPPA study section reviews basic and applied/translational applications focused on mechanisms which regulate normal and pathologic myocardial function, with an emphasis on myocardial contractility, heart failure, cardiotoxicity, inflammation and immune influences. Topics include metabolism and energetics related to myocardial function and pathology, including but not limited to contractile dysfunction, hypertrophy and heart failure; differences related to sex and age are appreciated. Representative methods and experimental strategies may include electrophysiology, stem cells/bioengineered tissue, genetics, genomics and proteomics.

Topics

- Mediators and modulators of cardiac and vascular smooth muscle contractility: calcium homeostasis; calcium sensitive proteins; neural, redox, and transcriptional regulation of genes and proteins that modulate cardiac and vascular excitability and contractility; regulation of ion channel function and expression.
- Cardiac myocyte contractile function: sarcomeric proteins; calcium regulation and signaling; calcium-force relationship; excitability, excitation contraction coupling.
- Systolic and diastolic function/dysfunction: adaptation to abnormal hemodynamic load and ventricular mechanics; mechanical signal transduction; stress-strain relationships; effects of therapeutic interventions such as pacing, ventricular assist devices and others; valvular heart disease.
- Cardiac hypertrophy and heart failure: basic molecular and cellular mechanisms; myocyte growth, proliferation, metabolism and apoptosis; receptor signaling; transcriptional pathways; inflammatory/ cytokine-mediated processes. Mechanisms of remodeling and heart failure resulting from arrhythmia.
- Genetic cardiomyopathies: genotype-phenotype correlation; genomic and proteomic approaches to cardiac hypertrophy and failure.
- Cardiac repair to address issues of remodeling and contractility deficit: strategies may include cell-based, gene therapy and the evaluation of bioengineered cells and tissues; capillary density. Topics include those related to heart transplantation, changes in ventricular and cellular function, myocardial inflammation & repair processes, recovery of cardiac function in the presence of cardiac assist devices and by tissue engineering approaches.
- Metabolism and energetics associated with heart disease: impact of diet, obesity or systemic metabolic disorders, including diabetes, obesity and hypercholesterolemia, associated with cardiac health and dysfunction; inclusion of age and sex in disease process. Issues contributing to cardiac-related metabolic dysfunction, lifestyle; diet, exercise, nutrition, environmental science; influences of age and sex in disease process.
- Cardiotoxicology: Effects of toxicants, including environmental and chemotherapeutic agents, on cardiac health and function.

Shared Interests and Overlaps

MPPA and **Integrative Myocardial Physiology /Pathophysiology B (MPPB)** have shared interests in broad topics of cardiotoxicology. Applications that emphasize drug-induced cardiotoxicology, generally

due to off-target effects during treatment of cardiovascular disorders will be reviewed in MPPB. Applications that emphasize cardiotoxic effects resulting from chemotherapeutic agents or environmental toxicants will be reviewed in MPPA.

MPPA and **Integrative Myocardial Physiology /Pathophysiology B (MPPB)** have shared interests in metabolism and metabolic dysfunction. Applications that emphasize diet and metabolism related to ischemia/reperfusion tissue injury and arrhythmogenesis will be reviewed in MPPB. Applications that emphasize on investigating cardiovascular consequences of systemic metabolic disorders, including diabetes, obesity and hypercholesterolemia, associated with cardiac dysfunction, hypertrophy and heart failure will be reviewed in MPPA.

MPPA and **Integrative Myocardial Physiology /Pathophysiology B (MPPB)** have shared interests in topics related to cardiac repair. Applications that emphasize cardiac repair, particularly those focused on regeneration following ischemic injury, will be reviewed in MPPB. Applications that emphasize cardiac repair to address issues of remodeling and associated contractility deficit, will be reviewed in MPPA.

MPPA and **Basic Biology of Blood, Heart and Vasculature (BBHV)** have shared interests in broad topics associated with cardiomyocyte contractile function as well as metabolism and energetics aspects of heart disease. Applications that emphasize studies of cellular and tissue systems will be reviewed in BBHV. Applications that emphasize research conducted in animal model systems will be reviewed in MPPA.

MPPA and **Integrative Vascular Physiology and Pathology (IVPP)** have shared interests in broad topics related to mediators and modulators of smooth muscle contractility. Applications that emphasize research related to vascular processes will be reviewed in IVPP. Applications that emphasize cardiac function will be reviewed in MPPA.

MPPA and **Clinical Integrative Cardiovascular and Hematological Sciences (CCHS)** have shared interests in topics related to heart failure and cardiomyopathy. Applications that emphasize clinical aspects of heart failure and cardiomyopathy in humans and human samples will be reviewed in CCHS. Applications that emphasize animal model systems will be reviewed in MPPA.

Integrative Myocardial Physiology/Pathophysiology B (MPPB)

The MPPB study section reviews basic and applied/translational applications focused on mechanisms which regulate normal and pathologic myocardial function, with an emphasis on myocardial infarction, ischemia-reperfusion injury, remodeling, arrhythmia and drug induced myocardial toxicity. Topics include metabolic dysfunction, particularly associated with myocardial infarction and ischemia-reperfusion injury; differences related to sex and age are appreciated. Proposed research may involve approaches which include the use of bioengineering/stem cell technologies, computational and systems biology and mathematical modeling.

Topics

- Mechanisms of ischemia/reperfusion tissue injury and post injury responses: myocardial stunning, infarction, hibernation, early post-ischemic cardiac remodeling, cellular and molecular mechanisms that govern the biology of stem cells in ischemic heart disease. Myocardial remodeling and fibrosis: extracellular matrix reorganization and collagen metabolism; cytoskeleton.
- Metabolic dysfunction, mechanisms of myocardial cell death (apoptosis/necrosis) mitochondrial dysfunction and autophagy. Influence of metabolic dysfunction related to both health and disease, including impact of lifestyle (diet, exercise, nutrition, environmental science), age and sex in disease process.
- Control of coronary blood flow: post-ischemic coronary vascular abnormalities, coronary endothelial function, angiogenesis, collateral circulation; hypertension.
- Novel methods for cardiac imaging: approaches to assess myocardial metabolism, injury, and fibrosis.
- Signal transduction: mechanisms related to myocardial ischemia/reperfusion injury, including preconditioning, postconditioning. Mechanical signal transduction; stress-strain relationships; effects of therapeutic interventions such as pacing and ventricular assist devices.
- Drug-induced cardiovascular toxicity: including pathology developed during or following treatment for disorders such as myocardial dysfunction, ischemia, hypotension, hypertension, QT-interval prolongation, arrhythmias and thromboembolism.
- Cardioprotection, cardiac repair and regeneration: cardiac repair/regeneration following ischemic injury, cardiac bioengineering, including strategies to support stem cell therapy, gene therapy and the use of bioengineered cells and tissues.
- Electrophysiological consequences of acquired heart diseases: including those related to ischemia, hypertension, diabetes, obesity, heart failure, hypertrophy, and heart transplant; mechanisms and therapy of cardiac arrhythmias and ion channel dysfunction.
- Cellular mechanisms of arrhythmogenesis: identification of genes and proteins that modulate electrical activity; electrophysiological consequences of acquired heart diseases including ischemia, hypertension, diabetes, obesity, heart failure, hypertrophy, and heart transplant.
- Excitability, electrical propagation and repolarization in normal and diseased hearts: structure and function of cardiac ion channels, ion exchangers, and ion pumps; impulse propagation; excitation contraction coupling; conduction system; intercellular communication including gap junctions/connexins; molecular and genetic evaluations of ion channels.
- Computational and systems modeling to predict arrhythmias: mathematical modeling of ion channels, myocytes, multi-cellular tissue and the whole heart; development and evaluation of interventions and biomedical devices to diagnose and treat cardiac rhythm disorders.

Shared Interests and Overlaps

MPPB and **Myocardial Physiology/ Pathophysiology A (MPPA)** have shared interests in broad topics of cardiotoxicology. Applications that emphasize cardiotoxic effects resulting from chemotherapeutic agents or environmental toxicants will be reviewed in MPPA. Applications that emphasize drug-induced cardiotoxicology generally due to off-target effects during treatment of cardiovascular disorders will be reviewed in MPPA.

MPPB and **Myocardial Physiology/ Pathophysiology A (MPPA)** have shared interests in metabolism and metabolic dysfunction. Applications that emphasize investigating the impact of systemic metabolic disorders - including diabetes, obesity and hypercholesterolemia, associated with cardiac dysfunction, hypertrophy and heart failure will be reviewed in MPPA. Applications that emphasize research related to diet and metabolism and its impact associated with ischemia/reperfusion tissue injury and arrhythmogenesis will be reviewed in MPPB.

MPPB and **Myocardial Physiology/ Pathophysiology A (MPPA)** have shared interests in cardiac repair. Applications that emphasize proposals involving remodeling and associated contractility deficit will be reviewed in MPPA. Applications that emphasize regeneration following ischemic injury will be reviewed in MPPB.

MPPB and **Basic Biology of Blood, Heart and Vasculature (BBHV)** have shared interests in topics associated with mechanisms of myocardial cell death, cellular mechanisms of arrhythmogenesis and aspects of electrical excitability & propagation of signals between normal and diseased hearts. Applications that emphasize these topics in cells and tissues will be reviewed in BBHV. Applications that emphasize these topics in in-vivo studies will be reviewed in MPPB.

MPPB and **Modeling and Analysis of Biological Systems (MABS)** have shared interests in areas of mathematical modeling and computer simulations. Applications that emphasize modeling methods, mathematical principles, or analytical approaches in the setting of cardiac arrhythmias will be reviewed in MABS. Applications that emphasize cardiac arrhythmia modeling mechanisms that range from molecular, to cellular and organ level studies will be reviewed in MPPB.

MPPB and **Clinical Integrative Cardiovascular and Hematological Sciences (CCHS)** have shared interests in areas of clinical arrhythmia and translational and clinical electrophysiology. Applications that emphasize arrhythmia clinical trials will be reviewed in CCHS. Applications that emphasize patient-oriented research and focus more on the mechanistic aspects of human cardiac electrophysiology and arrhythmias will be reviewed in MPPB.

Therapeutic Development and Preclinical Studies (TDPS)

Applications reviewed in TDPS will typically focus on preclinical work in animal models, where research efforts are focused on the generation/development of novel therapies within fields such as cardiac, vascular systems and related regulatory organ systems including hemostasis and thrombosis. Proposed research may involve efforts to develop new understanding/perspectives associated with cardiac, vascular or blood-related dysfunction/toxicology. Aims may focus on device optimization, therapeutic target development and drug discovery programs.

Topics

- Preclinical studies: including proof of concept (POC) and mechanism-of-action (MOA) studies, those providing insight toward the development of novel therapeutic strategies;

- Resuscitation studies evaluated in animal model systems;
- Dosing studies in pre-clinical models: large and small animal systems. Studies may involve varied proposed therapeutic approaches including small molecule, cell-based, viral, peptide, antibody as well as the evaluation of microbiome/microbiota-based strategies;
- Target development: including efforts to discover and/or characterize potential therapeutic targets;
- Preclinical and population “-omic” studies: those involving genomic, transcriptomic, metabolomic, etc.
- Preclinical device development and safety studies in animal models: proposed research may involve assist devices, bioengineered technologies, stem-cell based treatments;
- Development and evaluation of interventions and biomedical devices: those aimed at diagnosing and/or treating cardiac, vascular and hematologic disorders.

Shared Interests and Overlaps

TDPS and **Clinical Integrative Cardiovascular and Hematological Sciences (CCHS)** have shared interests in human, patient-oriented studies. Applications that emphasize exploratory or pre-clinical studies and are conducted in animal models prior to validation studies within humans/human-based systems will be reviewed in TDPS.

TDPS and **Integrative Vascular Physiology and Pathology (IVPP)** have shared interests in the mechanisms of action, identifying potential therapeutic targets and/or delivering therapeutic agents aimed at treating disorders such as hypertension and vascular stiffness. Applications that emphasize mechanisms of action of disorders, hypertension and vascular stiffness will be reviewed in IVPP. Applications that emphasize characterization mechanisms of action towards identifying potential therapeutic targets and/or delivering therapeutic agents in preclinical models will be reviewed in TDPS.

TDPS and **Atherosclerosis and Vascular Inflammation (AVI)** have shared interests in cardiovascular inflammatory disorders. Applications that emphasize mechanisms of action of cardiovascular inflammatory disorders such as atherosclerosis, vasculitis, myocarditis will be reviewed in AVI. Applications that emphasize mechanisms of action towards identifying potential therapeutic targets and/or delivering therapeutic agents aimed at treating cardiovascular inflammatory disorders such as atherosclerosis, vasculitis, myocarditis will be reviewed in TDPS.

TDPS and **Integrative Myocardial Physiology/Pathophysiology A (MPPA)** have shared interests in topics related to heart dysfunction including cardiac hypertrophy, heart failure and valvular disease. Applications that emphasize the characterization of underlying mechanisms of disease will be reviewed in MPPA. Applications seeking to characterize mechanisms of disease linked to the discovery of potential therapeutic targets and/or delivering therapeutic agents aimed to treat or prevent heart dysfunction and valvular disease will be reviewed in TDPS.

TDPS and **Integrative Myocardial Physiology/Pathophysiology B (MPPB)** have shared interests in topics related to ischemia/reperfusion (I/R) tissue injury, arrhythmogenesis and drug induced toxicity. Applications that emphasize the characterization of underlying mechanisms of disease will be reviewed in MPPB. Applications seeking to characterize mechanisms of disease linked to the discovery of potential therapeutic

targets and/or delivering therapeutic agents aimed to treat or prevent I/R-related heart dysfunction, arrhythmogenesis and drug toxicity will be reviewed in TDPS.

Clinical Integrative Cardiovascular and Hematological Sciences (CCHS)

CCHS reviews patient-oriented research related to cardiac, vascular and hematological systems as well as related regulatory organ systems, including hemostasis. Applications reviewed in CCHS typically focus on studies which investigate cardiovascular physiology of humans, including studies related to autonomic regulation, exercise, and aging, as well as pathology associated with cardiovascular and hematological dysfunction, including thrombosis. Applications may include studies involving genetics, pharmacology, transfusion medicine, surgical procedures, toxicity, and environmental stressors. Proposed clinical trials which focus on mechanisms of health and/or disease may be reviewed in CCHS.

Topics

- Human clinical studies, including pediatric populations, cardiovascular imaging, mechanisms and consequences of disease. Investigations may include physiology, pharmacology, electrophysiology, regional circulation, transfusion medicine, blood cell abnormalities, hemodynamics, cardiac mechanics, biomarker discovery, and genetic considerations in cardiovascular studies.
- Disease states may include cardiac and vascular ischemia, heart failure/cardiomyopathy, metabolic syndrome, atherosclerosis, stroke, dyslipidemia, hypertension, obesity, diabetes, thyroid disease, general inflammation, hypercholesterolemia, and hematologic disorders such as sickle cell disease and hemophilia.
- Modulation of cardiac/cardiovascular responses and adaptations including influence of sex, aging, pregnancy, and acute/chronic exercise on metabolic function and cardiac, vascular smooth muscle, and vascular endothelial function(s).
- Neural control of the cardiovascular system including central and peripheral autonomic physiology, pharmacology, and receptor mechanisms in healthy and diseased populations.
- Clinical studies investigating the responses of the cardiovascular system to trauma or surgery including arrhythmias associated with cardiac surgery or cardiopulmonary bypass, cardiac sudden death, resuscitation, stenting, pacemakers, cardiovascular injury and repair, and myocardial ischemia/reperfusion injury.
- Environmental stresses, cardiovascular toxicity, and modifying conditions/stimuli including smoking, altitude, microgravity, heat, cold, bed rest/deconditioning, and environmental pollution in patients.

Shared Interests and Overlaps

CCHS and **Epidemiology Study Sections – Panel A and Panel B (CHSA/B)** have shared interests in topics of cardiovascular diseases in humans. Applications that emphasize epidemiology of cardiovascular disease in human populations will be reviewed in CHSA/B. Applications that emphasize clinical and mechanistic aspects of cardiovascular disease in humans will be reviewed in CCHS.

CCHS and **Integrative Myocardial Physiology/Pathophysiology A (MPPA)** have shared interests in heart failure and cardiomyopathy. Applications that emphasize basic and translational aspects of heart failure/cardiomyopathy, typically in animal models, will be reviewed in MPPA. Applications that

emphasize clinical aspects of heart failure and cardiomyopathy in humans and human samples will be reviewed in CCHS.

CCHS and **Integrative Vascular Physiology and Pathology (IVPP)** have shared interests in topics related to blood pressure regulation, hypertension, neural control of the cardiovascular system, and micro- or regional circulation. Applications that emphasize the basic and translational aspects of these topic areas, typically in animal models, will be reviewed in IVPP. Applications that emphasize on clinical aspects of these topic areas in humans and human samples will be reviewed in CCHS.

CCHS and **Atherosclerosis and Vascular Inflammation (AVI)** have shared interests in topics related to atherosclerosis and inflammation of the vascular system. Applications that emphasize basic and translational aspects of these topic areas in cellular and animal models will be reviewed in AVI. Applications that emphasize clinical aspects of atherosclerosis and vascular inflammation in humans and human samples will be reviewed in CCHS.

CCHS and **Integrative Diabetes and Obesity (CIDO)** have shared interests in topics related to diabetes and obesity in humans. Applications that emphasize non-cardiovascular research applications related to diabetes and obesity will be reviewed in CIDO. Applications that emphasize on cardiovascular complications and endpoints related to diabetes and obesity will be reviewed in CCHS.

CCHS and **Aging Systems and Geriatrics (ASG)** have shared interests in aging related disorders which impact the cardiovascular system. Applications that emphasize patient-oriented applications involving modulation of cardiac and cardiovascular responses associated with aspects of aging or age-related diseases will be reviewed in ASG. Applications that emphasize clinical applications focused on evaluating cardiac and cardiovascular conditions and diseases in geriatric populations will be reviewed in CCHS.

CCHS and **Therapeutic Development and Preclinical Studies (TDPS)** have shared interests in human, patient-oriented studies. Applications that emphasize both animal models and human subjects, where the goal is largely pre-clinical, including resuscitation studies in animal models, will be reviewed in TDPS. Applications that emphasize studies in humans, in the context of clinical research/trials will be reviewed in CCHS.

CCHS and **Hemostasis, Thrombosis, Blood Cells and Transfusion Study Section (HTBT)** have shared interests in transfusion medicine. All applications that emphasize non-clinical transfusion medicine studies will be reviewed in HTBT. Applications that emphasize clinical studies in transfusion medicine will be reviewed in CCHS.