EDITORIAL | Gaso-Transmitters

Gaso-transmitters: expanding the kinetic universe of cell signaling
Jeffrey S. Isenberg, Josephine C. Adams
January 1, 2017: C1-C2
DOI: 10.1152/ajpcell.00323.2016

THEME | Gaso-Transmitters

Hydrogen sulfide, an enhancer of vascular nitric oxide signaling: mechanisms and implications
Csaba Szabo
January 1, 2017: C3-C15
DOI: 10.1152/ajpcell.00282.2016

RESEARCH ARTICLES

Exercise-induced alterations and loss of sarcomeric M-line organization in the diaphragm muscle of obscurin knockout mice
January 1, 2017: C16-C28
DOI: 10.1152/ajpcell.00098.2016

Functional loss of DHRS7C induces intracellular Ca2+ overload and myotube enlargement in C2C12 cells via calpain activation
Shinobu Arai, Masataka Ikeda, Tomomi Ide, Yuka Matsuo, Takeo Fujino, Katsuya Hirano, Kenji Sunagawa, Hiroyuki Tsutsui
January 1, 2017: C29-C39
DOI: 10.1152/ajpcell.00090.2016

CFTR-associated ligand is a negative regulator of Mrp2 expression
Man Li, Carol J. Soroka, Kathy Harry, James L. Boyer
January 1, 2017: C40-C46
DOI: 10.1152/ajpcell.00100.2016

NADPH oxidase-2 mediates zinc deficiency-induced oxidative stress and kidney damage
Mirandy S. Li, Sherry E. Adesina, Carla L. Ellis, Jennifer L. Gooch, Robert S. Hoover, Clintoria R. Williams
January 1, 2017: C47-C55
DOI: 10.1152/ajpcell.00208.2016
Glycolysis and oxidative phosphorylation are essential for purinergic receptor-mediated angiogenic responses in vasa vasorum endothelial cells
Martin Lapel, Philip Weston, Derek Strassheim, Vijaya Karoor, Nana Burns, Taras Lyubchenko, Petr Paucek, Kurt R. Stenmark, Evgenia V. Gerasimovskaya
January 1, 2017: C56-C70
DOI: 10.1152/ajpcell.00250.2016

miR-11 regulates pupal size of Drosophila melanogaster via directly targeting Ras85D
Yao Li, Shengjie Li, Ping Jin, Liming Chen, Fei Ma
January 11, 2017: C71-C82
DOI: 10.1152/ajpcell.00190.2016

Knockdown of PTRF ameliorates adipocyte differentiation and functionality of human mesenchymal stem cells
Sergio Perez-Diaz, Beatriz Garcia-Rodriguez, Yolanda Gonzalez-Irazabal, Monica Valero, Javier Lagos-Lizan, Jose M. Arbones-Mainar
January 11, 2017: C83-C91
DOI: 10.1152/ajpcell.00246.2016

Copyright © 2017 by the American Physiological Society.
RESEARCH ARTICLES

Citrulline directly modulates muscle protein synthesis via the PI3K/MAPK/4E-BP1 pathway in a malnourished state: evidence from in vivo, ex vivo, and in vitro studies
Servane Le Plénier, Arthur Goron, Athanassia Sotiropoulos, Eliane Archambault, Chantal Guihenneuc, Stéphane Walrand, Jérome Salles, Marion Jourdan, Nathalie Neveux, Luc Cynober, Christophe Moinard
January 1, 2017: E27-E36
DOI: 10.1152/ajpendo.00203.2016

Dietary gossypol suppressed postprandial TOR signaling and elevated ER stress pathways in turbot (Scophthalmus maximus L.)
Fuyun Bian, Haowen Jiang, Mingsan Man, Kangsen Mai, Huihui Zhou, Wei Xu, Gen He
January 1, 2017: E37-E47
DOI: 10.1152/ajpendo.00285.2016

Glucosamine induces ER stress by disrupting lipid-linked oligosaccharide biosynthesis and N-linked protein glycosylation
Daniel R. Beriault, Vi T. Dang, Lexy H. Zhong, Christina I. Petlura, Cameron S. McAlpine, Yuanyuan Shi, Geoff H. Werstuck
January 1, 2017: E48-E57
DOI: 10.1152/ajpendo.00275.2016

Copyright © 2017 by the American Physiological Society.

HOME CURRENT ISSUE ARCHIVES FEEDBACK SUBSCRIBE/HELP ALERTS

January 2017; volume 312, issue 1

The below Table of Contents is available online at: http://ajpgi.physiology.org/content/312/1

REVIEWS | Neurogastroenterology and Motility

A model of the enteric neural circuitry underlying the generation of rhythmic motor patterns in the colon: the role of serotonin
Terence Keith Smith, Sang Don Koh
January 1, 2017: G1-G14
DOI: 10.1152/ajpgi.00337.2016

Irritable bowel syndrome: a gut microbiota-related disorder?
Yogesh Bhattarai, David A. Muniz Pedrogo, Purna C. Kashyap
January 1, 2017: G52-G62
DOI: 10.1152/ajpgi.00338.2016

PERSPECTIVES | Neurogastroenterology and Motility

Ca2+/calmodulin/MLCK pathway initiates, and RhoA/ROCK maintains, the internal anal sphincter smooth muscle tone
Satish Rattan
RESEARCH ARTICLE | Hormones, Neurotransmitters, Growth Factors, Receptors, and Signaling

Regulation and function of bone morphogenetic protein signaling in colonic injury and inflammation
Tuo Ji, Hidehiko Takabayashi, Maria Mao, Xu Han, Xiang Xue, Jennifer C. Brazil, Kathryn A. Eaton, Yatrik M. Shah, Andrea Todisco
January 1, 2017 : G24-G33
DOI: 10.1152/ajpgi.00370.2016

In this study we report a series of novel observations that underscore the importance of bone morphogenetic protein (BMP) signaling in the regulation of colonic homeostasis during the development of injury and inflammation. In particular, we present evidence that BMP signaling mitigates the response of the colonic epithelium to injury and inflammation and that cytokines, such as TNF-α and IL-1β, inhibit the expression of BMP-4.

RESEARCH ARTICLE | Inflammation, Immunity, Fibrosis, and Infection

Probiotic mixture VSL#3 reduces colonic inflammation and improves intestinal barrier function in Muc2 mucin-deficient mice
Manish Kumar, Vanessa Kissoon-Singh, Aralia Leon Coria, France Moreau, Kris Chadee
January 1, 2017 : G34-G45
DOI: 10.1152/ajpgi.00298.2016

It is unclear whether probiotics require an intact mucin barrier to first colonize and/or exert their protective functions. In this study we used mucin-deficient (Muc2−/−) mice to interrogate if the multispecies probiotic mixture VSL#3 could enhance epithelial barrier function. In the absence of a mucus bilayer, VSL#3 dampened proinflammatory and chemokine production, accelerated restitution, and markedly improved gut permeability mediated by the short-chain fatty acid acetate in the colon.

RESEARCH ARTICLES | Neurogastroenterology and Motility

Novel insights into fecal incontinence in men
Yoav Mazor, Michael Jones, Alison Andrews, John E. Kellow, Allison Malcolm
January 1, 2017 : G46-G51
DOI: 10.1152/ajpgi.00362.2016

Fecal incontinence in men is common, yet data on sex differences in clinical features, physiology, and treatment are scarce. We provide evidence that men, compared with women, with fecal incontinence have unique clinical features and physiology and are less likely to have investigations and treatment despite successful outcome with anorectal biofeedback therapy.

Alterations of colonic function in the Winnie mouse model of spontaneous chronic colitis
Ainsley M. Robinson, Ahmed A. Rahman, Simona E. Carbone, Sarron Randall-Demillo, Rhiannon Filippone, Joel C. Bornstein, Rajaraman Eri, Kulmira Nurgali
January 1, 2017 : G85-G102
DOI: 10.1152/ajpgi.00210.2016

This is the first study to provide analyses of intestinal transit and whole colon motility in an animal model of spontaneous chronic colitis. We found that cholinergic and purinergic neuromuscular transmission, as well as the smooth muscle cell responses to cholinergic and nitrogergic stimulation, is altered in the chronically inflamed Winnie mouse colon. The changes to intestinal transit and colonic function we identified in the Winnie mouse are similar to those seen in inflammatory bowel disease patients.

RESEARCH ARTICLES | Nutrient Sensing, Nutrition, and Metabolism

Weight gain in mice on a high caloric diet and chronically treated with omeprazole depends on sex and genetic background
Milena Saqui-Salces, Amy C. Tsao, Merritt G. Gillilland III, Juanita L. Merchant
January 1, 2017 : G15-G23
DOI: 10.1152/ajpgi.00211.2016

Expression of Cav1.3 calcium channel in the human and mouse colon: posttranscriptional inhibition by IFNγ
January 1, 2017 : G77-G84
DOI: 10.1152/ajpgi.00394.2016
Maturity and age influence chief cell ability to transdifferentiate into metaplasia

Victoria G. Weis, Christine P. Petersen, Jared A. Weis, Anne R. Meyer, Eunyoung Choi, Jason C. Mills, James R. Goldenring
January 1, 2017 : G67-G76

DOI: 10.1152/ajpgi.00326.2016

Previous investigations have indicated that spasmolytic polypeptide-expressing metaplasia (SPEM) in the stomach arises from transdifferentiation of chief cells. Nevertheless, the intrinsic properties of chief cells that influence transdifferentiation have been largely unknown. We now report that the ability to transdifferentiate into SPEM is impaired in chief cells that lack full functional maturation, and as chief cells age, they lose their ability to transdifferentiate. Thus chief cell plasticity is dependent on both cell age and maturation.

Copyright © 2017 by the American Physiological Society.

RESEARCH ARTICLE | Cardiac Excitation and Contraction

Acute exposure to progesterone attenuates cardiac contraction by modifying myofilament calcium sensitivity in the female mouse heart

Hirad A. Feridooni, Jennifer K. MacDonald, Anjali Ghimire, W. Glen Pyle, Susan E. Howlett
January 1, 2017 : H46-H59

DOI: 10.1152/ajpheart.00073.2016

We investigated myocardial effects of acute application of progesterone. In females, but not males, progesterone attenuates and slows cardiomyocyte...
contraction with no effect on calcium transients. Progesterone also reduces myofilament calcium sensitivity in female hearts. This may adversely affect heart function, especially when serum progesterone levels are high in pregnancy.

**RESEARCH ARTICLE | Cardiovascular Neurohormonal Regulation**

Myocardial interstitial levels of serotonin and its major metabolite 5-hydroxyindole acetic acid during ischemia-reperfusion
Cheng-Kun Du, Dong-Yun Zhan, Tsuyoshi Akiyama, Tadakatsu Inagaki, Toshiaki Shishido, Mikiyasu Shirai, James T. Pearson
January 1, 2017 : H60-H67
DOI: 10.1152/ajpheart.00471.2016

By monitoring myocardial interstitial levels of 5-HT and its metabolite, 5-hydroxyindole acetic acid, we investigated 5-HT kinetics during myocardial ischemia-reperfusion. 5-HT accumulates but 5-HT degradation is suppressed during ischemia. After reperfusion, 5-HT degradation is enhanced and this degradation is dependent on monoamine oxidase activity but not the fluoxetine-sensitive uptake transporter.

**RESEARCH ARTICLES | Integrative Cardiovascular Physiology and Pathophysiology**

Exaggerated coronary vasoconstriction limits muscle metaboreflex-induced increases in ventricular performance in hypertension
January 1, 2017 : H68-H79
DOI: 10.1152/ajpheart.00417.2016

We found that metaboreflex-induced increases in coronary blood flow and ventricular contractility are attenuated in hypertension. α1-Adrenergic blockade restored these parameters toward normal levels. These findings indicate that the primary mechanism mediating impaired metaboreflex-induced increases in ventricular function in hypertension is accentuated coronary vasoconstriction.

Prediction of hemodynamics under left ventricular assist device
Takamori Kakino, Keita Saku, Takafumi Sakamoto, Kazuo Sakamoto, Takuya Akashi, Masataka Ikeda, Tomomi Ide, Takuya Kishi, Hiroyuki Tsutsui, Kenji Sunagawa
January 1, 2017 : H80-H88
DOI: 10.1152/ajpheart.00617.2016

Hemodynamic response to left ventricular assist device (LVAD) has not been quantitatively investigated. This is the first report of quantitative prediction of the hemodynamics on LVAD using circulatory equilibrium framework. The validated framework allows us to simulate the impact of LVAD on right atrial pressure under various right ventricular functions.

Acute limb heating improves macro- and microvascular dilator function in the leg of aged humans
Steven A. Romero, Daniel Gagnon, Amy N. Adams, Matthew N. Cramer, Ken Kouda, Craig G. Crandall
January 1, 2017 : H89-H97
DOI: 10.1152/ajpheart.00519.2016

We demonstrate that lower limb heating acutely improves macro- and microvascular dilator function within the atherosclerotic prone vasculature of the leg in aged adults. These findings provide evidence for a potential therapeutic use of chronic lower limb heating to improve vascular health in primary aging and various disease conditions.

Estrogen receptor antagonism exacerbates cardiac structural and functional remodeling in female rats
January 1, 2017 : H98-H105
DOI: 10.1152/ajpheart.00348.2016

We assessed the estrogen receptor (ER) dependence of female-specific cardioprotection using a rat model of chronic volume-overload stress. ER antagonism worsened ventricular wall stress, ventricular dilation, and cardiac dysfunction induced by volume overload. Further, blocking ERs resulted in cardiac remodeling and functional changes similar to that previously found in ovariectomized rats.

Dynamical mechanisms of phase-2 early afterdepolarizations in human ventricular myocytes: insights from bifurcation analyses of two mathematical models
Yasutaka Kurata, Kunichika Tsumoto, Kenshi Hayashi, Ichiro Hisatome, Mamoru Tanida, Yuhichi Kuda, Toshishige Shibamoto
January 1, 2017 : H106-H127
DOI: 10.1152/ajpheart.00015.2016

We investigated mechanisms of phase-2 early afterdepolarization (EAD) by bifurcation analyses of human ventricular myocyte (HVM) models.
EAD formation in paced HVMs basically depended on bifurcation phenomena in nonpaced HVMs but was strongly affected by intracellular ion concentrations in stationary and dynamic states. EAD generation did not necessarily require IKS.

Lifelong quercetin enrichment and cardioprotection in Mdx/Utrn+/− mice
Christopher Ballmann, Thomas S. Denney, Ronald J. Beyers, Tiffany Quindry, Matthew Romero, Rajesh Amin, Joshua T. Selsby, John C. Quindry
January 1, 2017 : H128-H140
DOI: 10.1152/ajpheart.00552.2016

The current investigation provides first time evidence that quercetin provides physiological cardioprotection against dystrophic pathology and is associated with improved spontaneous physical activity. Secondary findings suggest that quercetin-dependent outcomes are in part due to PGC-1α pathway activation.

RESEARCH ARTICLES | Muscle Mechanics and Ventricular Function
Cardiomyopathy-related mutation (A30V) in mouse cardiac troponin T divergently alters the magnitude of stretch activation in α- and β-myosin heavy chain fibers
Alexis V. Mickelson, Sampath K. Gollapudi, Murali Chandra
January 1, 2017 : H141-H149
DOI: 10.1152/ajpheart.00487.2016

The differential impact of α- and β-myosin heavy chain (MHC) on contractile dynamics causes a mutant cardiac troponin T (TnTA30V) to differently modulate cardiac contractile function. TnTA30Vattenuated Ca2+-activated maximal tension and length-mediated cross-bridge recruitment against α-MHC but augmented these parameters against β-MHC, suggesting divergent contractile phenotypes.

Hyperglycemia induces defective Ca2+ homeostasis in cardiomyocytes
Andrea Sorrentino, Giulia Borghetti, Yu Zhou, Antonio Cannata, Marianna Meo, Sergio Signore, Piero Anversa, Annarosa Leri, Polina Goichberg, Khaled Qanad, Jason T. Jacobson, Thomas H. Hintze, Marcello Rota
January 1, 2017 : H150-H161
DOI: 10.1152/ajpheart.00737.2016

We have investigated the effects of hyperglycemia on cardiomyocyte physiology and ventricular function. Our results indicate that defective Ca2+ handling is a critical component of the progressive deterioration of cardiac performance of the diabetic heart.

RESEARCH ARTICLES | Vascular Biology and Microcirculation
Investigating the extremes of the continuum of paracrine functions in CD34−/CD31+CACs across diverse populations
Rian Q. Landers-Ramos, Ryan M. Sapp, Emily VandeWater, Jennifer Macko, Shawn Robinson, Yan Wang, Eva R. Chin, Espen E. Spangenburg, Steven J. Prior, James M. Hagberg
January 1, 2017 : H162-H172
DOI: 10.1152/ajpheart.00342.2016

S100A8 and S100A9 proteins in concentrations secreted by CD34−/CD31+CACs with impaired function reduce endothelial cell capillary-like network formation. These effects appear to be mediated by Toll-like receptor 4 and are absent with S100A8 and S100A9 in concentrations secreted by healthy CD34−/CD31+CACs.

Positive versus negative effects of VEGF165 on Ca2+ signaling and NO production in human endothelial cells
Derek S. Boeldt, Jennifer Krupp, Fu-Xian Yi, Nauman Khurshid, Dinesh M. Shah, Ian M. Bird
DOI: 10.1152/ajpheart.00924.2015

In this manuscript, we show that VEGF levels associated with preeclampsia are a net negative contributor to potential vasodilator production in both a human ex vivo and in vitro endothelial cell model. Therefore, pharmacological targeting of VEGF-stimulated signaling pathways could be a novel treatment modality for preeclampsia-related hypertension.

RAPID REPORT
 Interruption of perivascular sympathetic nerves of cerebral arteries offers neuroprotection against ischemia
January 1, 2017 : H182-H188
DOI: 10.1152/ajpheart.00482.2016
Interruption of the perivascular sympathetic nerves can alleviate CA-induced hypoperfusion and neuronal cell death in the CA1 region of the hippocampus to enhance functional learning and memory.

Copyright © 2017 by the American Physiological Society.
January 1, 2017 : L42-L55
DOI: 10.1152/ajplung.00119.2016

Double-hit mouse model of cigarette smoke priming for acute lung injury
Pavlo Sakhatskyy, Zhengke Wang, Diana Borgas, Joanne Lomas-Neira, Yaping Chen, Alfred Ayala, Sharon Rounds, Qing Lu
January 1, 2017 : L56-L67
DOI: 10.1152/ajplung.00436.2016

SIRT3 blocks myofibroblast differentiation and pulmonary fibrosis by preventing mitochondrial DNA damage
Samik Bindu, Vinodkumar B. Pillai, Abhinav Kanwal, Sadhana Samant, Gökhan M. Mutlu, Eric Verdin, Nickolai Dulin, Mahesh P. Gupta
January 1, 2017 : L68-L78
DOI: 10.1152/ajplung.00188.2016

Region-specific role for Pten in maintenance of epithelial phenotype and integrity
Per Flodby, Janice M. Liebler, Mitsuhiro Sunohara, Dan R. Castillo, Alicia M. McConnell, Manda S. Krishnaveni, Agnes Banfalvi, Min Li, Barry Stripp, Beiyun Zhou, Edward D. Crandall, Parviz Minoo, Zea Borok
January 10, 2017 : L131-L142
DOI: 10.1152/ajplung.00005.2015

RESEARCH ARTICLES

Deformation-induced transitional myofibroblasts contribute to compensatory lung growth
Robert D. Bennett, Alexandra B. Ysasi, Willi L. Wagner, Cristian D. Valenzuela, Akira Tsuda, Saumyadipta Pyne, Shuqiang Li, Jonna Grimsby, Prapti Pokharel, Kenneth J. Livak, Maximilian Ackermann, Paul Blainey, Steven J. Mentzer
January 1, 2017 : L79-L88
DOI: 10.1152/ajplung.00383.2016

TRAIL signaling is proinflammatory and proviral in a murine model of rhinovirus 1B infection
Jason L. Girkin, Luke M. Hatchwell, Adam M. Collison, Malcolm R. Starkey, Philip M. Hansbro, Hideo Yagita, Paul S. Foster, Joerg Mattes
DOI: 10.1152/ajplung.00200.2016

Active vs. sedentary lifestyle from weaning to adulthood and susceptibility to ozone in rats
January 1, 2017 : L100-L109
DOI: 10.1152/ajplung.00415.2016

CD36 mediates H2O2-induced calcium influx in lung microvascular endothelial cells
Karthik Suresh, Laura Servinsky, Jose Reyes, Clark Undem, Joel Zaldumbide, Otgonchimeg Rentsendorj, Sruti Modekurty, Jeffrey M. Dodd-o, Alan Scott, David B. Pearse, Larissa A. Shimoda
January 10, 2017 : L143-L153
DOI: 10.1152/ajplung.00361.2016

Innovative Methodology

Enrichment of selective miRNAs in exosomes and delivery of exosomal miRNAs in vitro and in vivo
Duo Zhang, Heedoo Lee, Ziwen Zhu, Jasleen K. Minhas, Yang Jin
January 10, 2017 : L110-L121
DOI: 10.1152/ajplung.00423.2016

Copyright © 2017 by the American Physiological Society.
January 2017; volume 312, issue 1

The below Table of Contents is available online at: http://ajpregu.physiology.org/content/312/1

REVIEW | 2016 Water and Electrolyte Homeostasis/AJP: Regulatory, Integrative, and Comparative Trainee Award

Metabolic abnormalities and obesity’s impact on the risk for developing preeclampsia
Frank T. Spradley
January 1, 2017: R5-R12
DOI: 10.1152/ajpregu.00440.2016

REVIEW

Do high-salt microenvironments drive hypertensive inflammation?
Jason D. Foss, Annet Kirabo, David G. Harrison
January 1, 2017: R1-R4
DOI: 10.1152/ajpregu.00414.2016

RESEARCH ARTICLES | Cardiovascular and Renal Integration

Dietary nitrate supplementation and exercise tolerance in patients with heart failure with reduced ejection fraction
January 1, 2017: R13-R22
DOI: 10.1152/ajpregu.00263.2016

Intradermal administration of endothelin-1 attenuates endothelium-dependent and -independent cutaneous vasodilation via Rho kinase in young adults
Naoto Fujii, Tatsuro Amano, Lyra Halili, Jeffrey C. Louie, Sarah Y. Zhang, Brendan D. McNeely, Glen P. Kenny
January 1, 2017: R23-R30
DOI: 10.1152/ajpregu.00368.2016

Cerebral blood flow autoregulation in ischemic heart failure
January 12, 2017: R108-R113
DOI: 10.1152/ajpregu.00361.2016

RESEARCH ARTICLE | Exploiting Environmental Factors to Improve Health and Performance

Passive heat acclimation improves skeletal muscle contractility in humans
S. Racinais, M. G. Wilson, J. D. Périard
January 12, 2017: R101-R107
DOI: 10.1152/ajpregu.00431.2016

RESEARCH ARTICLES | Fluid and Electrolyte Homeostasis

Cardiac remodeling and increased central venous pressure underlie elevated stroke volume and cardiac output of seawater-acclimated rainbow trout
Jeroen Brijs, Erik Sandblom, Esmée Dekens, Joacim Näslund, Andreas Ekström, Michael Axelsson
January 1, 2017: R31-R39
DOI: 10.1152/ajpregu.00374.2016
Relationship between oxidative stress and brain swelling in goldfish (Carassius auratus) exposed to high environmental ammonia
David F. J. Lisser, Zachary M. Lister, Phillip Q. H. Pham-Ho, Graham R. Scott, Michael P. Wilkie
January 12, 2017 : R114-R124
DOI: 10.1152/ajpregu.00208.2016

RESEARCH ARTICLE | Hormones, Reproduction and Development

Vitamin D supplementation reduces some AT1-AA-induced downstream targets implicated in preeclampsia including hypertension
Jessica L. Faulkner, Lorena M. Amaral, Denise C. Cornelius, Mark W. Cunningham, Tarek Ibrahim, Autumn Heep, Nathan Campbell, Nathan Usry, Kedra Wallace, Florian Herse, Ralf Dechend, Babbette LaMarca
January 12, 2017 : R125-R131
DOI: 10.1152/ajpregu.00218.2016

RESEARCH ARTICLES | Hypertensive Disorders of Pregnancy: Effects on Mother and Baby

The protective effect of apolipoprotein in models of trophoblast invasion and preeclampsia
Francesca Charlton, Gabriele Bobek, Tim Stait-Gardner, William S. Price, Katrina M. Mirabito Colafella, Bei Xu, Angela Makris, Kerry-Anne Rye, Annemarie Hennessy
January 1, 2017 : R40-R48
DOI: 10.1152/ajpregu.00331.2016

Sympathetic responsiveness is not increased in women with a history of hypertensive pregnancy
Sushant M. Ranadive, Ronee E. Harvey, Brian D. Lahr, Virginia M. Miller, Michael J. Joyner, Jill N. Barnes
January 1, 2017 : R49-R54
DOI: 10.1152/ajpregu.00379.2016

RESEARCH ARTICLES | Neural Control

Reduced compensatory responses to maintain central blood volume during hypovolemic stress in women with vasovagal syncope
Johan Skoog, Helene Zachrisson, Toste Länne, Marcus Lindenberger
January 1, 2017 : R55-R61
DOI: 10.1152/ajpregu.00166.2016

Separate and shared sympathetic outflow to white and brown fat coordinately regulates thermoregulation and beige adipocyte recruitment
Ngoc Ly T. Nguyen, Candace L. Barr, Vitaly Ryu, Qiang Cao, Bingzhong Xue, Timothy J. Bartness
January 12, 2017 : R132-R145
DOI: 10.1152/ajpregu.00344.2016

Mesenteric vascular dysregulation and intestinal inflammation accompanies experimental spinal cord injury
Emily M. Besecker, Gina M. Deiter, Nicole Pironi, Timothy K. Cooper, Gregory M. Holmes
January 12, 2017 : R146-R156
DOI: 10.1152/ajpregu.00347.2016

RESEARCH ARTICLES | Obesity, Diabetes and Energy Homeostasis

Metabolic effects of prazosin on skeletal muscle insulin resistance in glucocorticoid-treated male rats
Emily C. Dunford, Erin R. Mandel, Sepideh Mohajeri, Tara L. Haas, Michael C. Riddell
January 1, 2017 : R62-R73
DOI: 10.1152/ajpregu.00146.2016

Loss of UCP1 exacerbates Western diet-induced glycemic dysregulation independent of changes in body weight in female mice
Nathan C. Winn, Victoria J. Vieira-Potter, Michelle L. Gastecki, Rebecca J. Welly, Rebecca J. Scroggins, Terese M. Zidon, T'Keaya L. Gaines, Makenzie L. Woodford, Natalia G. Karasseva, Jill A. Kanaley, Harold S. Sacks, Jaume Padilla
January 1, 2017 : R74-R84
RESEARCH ARTICLES | Physical Activity and Inactivity

Altered muscle satellite cell activation following 16 wk of resistance training in young men
January 1, 2017 : R85-R92
DOI: 10.1152/ajpregu.00425.2016

Aerobic system analysis based on oxygen uptake and hip acceleration during random over-ground walking activities
Thomas Beltrame, Richard L. Hughson
January 1, 2017 : R93-R100
DOI: 10.1152/ajpregu.00221.2016

Impact of TGF-β inhibition during acute exercise on Achilles tendon extracellular matrix
Ross M. Potter, Richard T. Huynh, Brent D. Volper, Kathryn A. Arthur, Andrew C. D’Lugos, Mikkel A. Sørensen, S. Peter Magnusson, Jared M. Dickinson, Taben M. Hale, Chad C. Carroll
January 12, 2017 : R157-R164
DOI: 10.1152/ajpregu.00439.2016

Copyright © 2017 by the American Physiological Society.

HOME CURRENT ISSUE ARCHIVES FEEDBACK SUBSCRIBE/HELP ALERTS

January 2017; volume 312, issue 1

The below Table of Contents is available online at: http://ajprenal.physiology.org/content/312/1

REVIEW | Inflammation and Inflammatory Mediators in Kidney Disease

Ironing out the cross talk between FGF23 and inflammation
Valentin David, Connor Francis, Jodie L. Babitt
January 1, 2017 : F1-F8
DOI: 10.1152/ajprenal.00359.2016

REVIEWS

Physiological roles of claudins in kidney tubule paracellular transport
Shigeaki Muto
January 1, 2017 : F9-F24
DOI: 10.1152/ajprenal.00204.2016

Ion transport in the zebrafish kidney from a human disease angle: possibilities, considerations, and future perspectives
Simone Kersten, Francisco J. Arjona
January 9, 2017 : F172-F189
DOI: 10.1152/ajprenal.00425.2016

EDITORIAL FOCUS

An experimentum crucis in salt sensitivity
RESEARCH ARTICLE | Imaging Techniques in Renal (patho)Physiology Research

Antioxidant treatment attenuates lactate production in diabetic nephropathy
Christoffer Laustsen, Per Mose Nielsen, Thomas Stokholm Nørlerger, Haiyun Qi, Uffe Kjærgaard Pedersen, Lotte Bonde Bertelsen, Jakob Appel Østergaard, Allan Flyvbjerg, Jan Henrik Ardenkjær-Larsen, Fredrik Palm, Hans Stodkilde-Jørgensen
January 9, 2017 : F192-F199
DOI: 10.1152/ajprenal.00148.2016

Bimodal dynamics of granular organelles in primary renin-expressing cells revealed using TIRF microscopy
Charlotte Buckley, Alison R. Dun, Audrey Peter, Christopher Bellamy, Kenneth W. Gross, Rory R. Duncan, John J. Mullins
January 9, 2017 : F200-F209
DOI: 10.1152/ajprenal.00384.2016

RESEARCH ARTICLE | Mechanism and Treatment of Renal Fibrosis

Mesenchymal stem cells protect against obstruction-induced renal fibrosis by decreasing STAT3 activation and STAT3-dependent MMP-9 production
Futoshi Matsui, Stephen A. Babitz, Audrey Rhee, Karen L. Hile, Hongji Zhang, Kirstan K. Meldrum
January 1, 2017 : F25-F32
DOI: 10.1152/ajprenal.00311.2016

RESEARCH ARTICLE | Translational Physiology

Crucial roles of nitric oxide synthases in β-adrenoceptor-mediated bladder relaxation in mice
January 1, 2017 : F33-F42
DOI: 10.1152/ajprenal.00137.2016

RESEARCH ARTICLES

Inflammation drives renal scarring in experimental pyelonephritis
Birong Li, Babitha Haridas, Ashley R. Jackson, Hanna Cortado, Nicholas Mayne, Rebecca Kohnken, Brad Bolon, Kirk M. McHugh, Andrew L. Schwaderer, John David Spencer, Christina B. Ching, David S. Hains, Sheryl S. Justice, Santiago Partida-Sanchez, Brian Becknell
January 1, 2017 : F43-F53
DOI: 10.1152/ajprenal.00471.2016

A kidney-selective biopolymer for targeted drug delivery
Gene L. Bidwell III, Fakhri Mahdi, Qingmeng Shao, Omar C. Logue, Jamarius P. Waller, Caleb Reese, Alejandro R. Chade
January 1, 2017 : F54-F64
DOI: 10.1152/ajprenal.00143.2016

SGK1-dependent ENaC processing and trafficking in mice with high dietary K intake and elevated aldosterone
Lei Yang, Gustavo Frindt, Florian Lang, Dietmar Kuhl, Volker Vallon, Lawrence G. Palmer
January 1, 2017 : F65-F76
DOI: 10.1152/ajprenal.00257.2016

Impaired urinary osteopontin excretion in Npt2a−/− mice
Daniel Caballero, Yuwen Li, Julian Ponsetto, Chuanlong Zhu, Clemens Bergwitz
January 1, 2017 : F77-F83
DOI: 10.1152/ajprenal.00367.2016

Serine/threonine phosphatases and aquaporin-2 regulation in renal collecting duct
Sophia M. LeMaire, Viswanathan Raghuram, Cameron R. Grady, Christina M. Pickering, Chung-Lin Chou, Ezigboiara N. Umejeig, Mark A.
The native TRPP2-dependent channel of murine renal primary cilia
Steven J. Kleene, Nancy K. Kleene
January 1, 2017 : F96-F108
DOI: 10.1152/ajprenal.00272.2016

Deletion of protein kinase C-ε attenuates mitochondrial dysfunction and ameliorates ischemic renal injury
Grazyna Nowak, Diana Takacsova-Bakajsova, Judit Megyesi
January 1, 2017 : F109-F120
DOI: 10.1152/ajprenal.00115.2016

Deficiency of mPGES-1 exacerbates renal fibrosis and inflammation in mice with unilateral ureteral obstruction
Renfei Luo, Yutaka Kakizoe, Feifei Wang, Xiang Fan, Shan Hu, Tianxin Yang, Weidong Wang, Chunling Li
January 1, 2017 : F121-F133
DOI: 10.1152/ajprenal.00231.2016

A new mouse model of hemorrhagic shock-induced acute kidney injury
Lei Wang, Jiangping Song, Jacentha Buggs, Jin Wei, Shaohui Wang, Jie Zhang, Gensheng Zhang, Yan Lu, Kay-Pong Yip, Ruisheng Liu
January 1, 2017 : F134-F142
DOI: 10.1152/ajprenal.00347.2016

The mechanosensitive BKα/β1 channel localizes to cilia of principal cells in rabbit cortical collecting duct (CCD)
January 1, 2017 : F143-F156
DOI: 10.1152/ajprenal.00256.2016

Nephron morphometry in mice and rats using tomographic microscopy
Robyn F. R. Letts, Xiao-Yue Zhai, Charita Bhikha, Birgitte L. Grann, Nicklas B. Blom, Jesper Skovhus Thomsen, David M. Rubin, Erik I. Christensen, Arne Andreasen
January 9, 2017 : F210-F229
DOI: 10.1152/ajprenal.00207.2016

Endoplasmic reticulum stress inhibition limits the progression of chronic kidney disease in the Dahl salt-sensitive rat
Victoria Yum, Rachel E. Carlisle, Chao Lu, Elise Brimble, Jasmine Chahal, Chandak Upagupta, Kjetil Ask, Jeffrey G. Dickhout
January 9, 2017 : F230-F244
DOI: 10.1152/ajprenal.00119.2016

INNOVATIVE METHODOLOGY

A small molecule screening to detect potential therapeutic targets in human podocytes
Eugen Widmeier, Weizhen Tan, Merlin Airik, Friedhelm Hildebrandt
January 1, 2017 : F157-F171
DOI: 10.1152/ajprenal.00386.2016

Copyright © 2017 by the American Physiological Society.
EDITORIAL | Cores of Reproducibility in Physiology

Cores of Reproducibility in Physiology (CORP): Advancing the corpus of physiological knowledge
Peter D. Wagner
January 1, 2017 : 89-90
DOI: 10.1152/japplphysiol.01046.2016

REVIEW | Cores of Reproducibility in Physiology

CORP: Minimizing the chances of false positives and false negatives
Douglas Curran-Everett
January 1, 2017 : 91-95
DOI: 10.1152/japplphysiol.00937.2016

RESEARCH ARTICLES | Aging and Exercise

Resistance training with instability is more effective than resistance training in improving spinal inhibitory mechanisms in Parkinson’s disease
Carla Silva-Batista, Eugenia Casella Tavares Mattos, Daniel M. Corcos, Jessica M. Wilson, Charles J. Heckman, Hélcio Kanegusuku, Maria Elisa Pimentel Piemonte, Marco Túlio de Mello, Cláudia Forjaz, Hamilton Roschel, Valmor Tricoli, Carlos Ugrinowitsch
January 1, 2017 : 1-10
DOI: 10.1152/japplphysiol.00557.2016

Patients with Parkinson’s disease (PD) have motor dysfunction. Spinal inhibitory mechanisms are important for modulating both supraspinal motor commands and sensory feedback at the spinal level. Resistance training with instability was more effective than resistance training in increasing the levels of presynaptic inhibition and disynaptic reciprocal inhibition of lower limb at rest of the patients with PD, reaching the average values of the healthy controls.

Habitual aerobic exercise does not protect against micro- or macrovascular endothelial dysfunction in healthy estrogen-deficient postmenopausal women
Jessica R. Santos-Parker, Talia R. Strahler, Victoria M. Vorwald, Gary L. Pierce, Douglas R. Seals
January 1, 2017 : 11-19
DOI: 10.1152/japplphysiol.00732.2016

This is the first study to demonstrate that habitual aerobic exercise may not protect against age/menopause-related whole forearm microvascular endothelial dysfunction in healthy nonobese estrogen-deficient postmenopausal women, consistent with recent findings regarding macrovascular endothelial function. This is in contrast to what is observed in healthy middle-aged and older aerobic exercise-trained men.

Neuromuscular electrical stimulation prior to presleep protein feeding stimulates the use of protein-derived amino acids for overnight muscle protein synthesis
Marlou L. Dirks, Bart B. L. Groen, Rinske Franssen, Janneau van Krantenburg, Luc J. C. van Loon
January 1, 2017 : 20-27
DOI: 10.1152/japplphysiol.00331.2016

Neuromuscular electrical stimulation (NMES) as well as presleep dietary protein ingestion represent effective strategies to stimulate muscle protein synthesis rates. Here we demonstrate that in older men after a day of bed rest, the application of NMES prior to presleep protein feeding stimulates the use of dietary protein-derived amino acids for overnight muscle protein synthesis by 18% compared with presleep protein feeding only.

RESEARCH ARTICLES

Obesity, type 2 diabetes, and impaired insulin-stimulated blood flow: role of skeletal muscle NO synthase and endothelin-1
Leryn J. Reynolds, Daniel P. Credeur, Camila Manrique, Jaume Padilla, Paul J. Fadel, John P. Thyfault
January 1, 2017 : 38-47
DOI: 10.1152/japplphysiol.00286.2016
Although impairments in endothelial signaling are hypothesized to reduce insulin-stimulated blood flow in type 2 diabetes (T2D), human studies examining these links are limited. We provide the first measures of nitric oxide synthase and endothelin-1 expression from skeletal muscle tissue containing native microvessels in individuals with and without T2D before and during insulin stimulation. Higher basal skeletal muscle expression of endothelin-1 and reduced endothelial nitric oxide phosphorylation (peNOS)/eNOS may contribute to reduced insulin-stimulated blood flow in obese T2D patients.

**Effect of increased and maintained frequency of speed endurance training on performance and muscle adaptations in runners**
Casper Skovgaard, Nicki Winfield Almquist, Jens Bangsbo
January 1, 2017 : 48-59

DOI: 10.1152/japplphysiol.00537.2016

Ten speed endurance training (SET) sessions improved short-term exercise capacity and 10-km performance, which was followed by further improved short-term exercise capacity, but unchanged 10-km performance after 20 SET sessions performed with either high frequency (4 per 8 days) or continued low frequency (2 per 8 days) in trained runners. The further gain in short-term exercise capacity was associated with changes in muscle expression of proteins of importance for the development of fatigue.

**Flow velocity is relatively uniform in the coronary sinus venous tree: structure-function relation**
Hao Wu, Ghassan S. Kassab, Wenchang Tan, Yunlong Huo
January 1, 2017 : 60-67

DOI: 10.1152/japplphysiol.00295.2016

A hemodynamic model is developed in the entire coronary sinus venous tree of the swine heart. A key finding is that the coronary sinus venous system complies with the area preservation rule for efficient venous return while the coronary arterial tree obeys the minimum energy hypothesis. This model can also serve as a physiological reference state to test various therapeutic rationales through the venous route.

**A pilot study examining the impact of exercise training on skeletal muscle genes related to the TLR signaling pathway in older adults following hip fracture recovery**
Alec I. McKenzie, Robert A. Briggs, Katherine M. Barrows, Daniel S. Nelson, Oh Sung Kwon, Paul N. Hopkins, Thomas F. Higgins, Robin L. Marcus, Micah J. Drummond
January 1, 2017 : 68-75

DOI: 10.1152/japplphysiol.00714.2016

These pilot data demonstrate that 3 mo of exercise training in older adults recovering from hip fracture surgery was able to mitigate skeletal muscle gene expression related to inflammation and ceramide metabolism while also improving surgical limb lean tissue, strength, and physical function.

**Intermittent parathyroid hormone administration attenuates endothelial dysfunction in old rats**
John J. Guers, Rhonda D. Prisby, David G. Edwards, Shannon Lennon-Edwards
January 1, 2017 : 76-81

DOI: 10.1152/japplphysiol.00348.2016

We have demonstrated that intermittent parathyroid hormone administration can rescue age-related vascular dysfunction by improving endothelial-dependent dilation in the aorta of older rodents. This demonstrates a novel potential benefit of parathyroid hormone administration in aging.

**Nasal high-flow therapy reduces work of breathing compared with oxygen during sleep in COPD and smoking controls: a prospective observational study**
Paolo J. C. Biselli, Jason P. Kirkness, Ludger Grote, Kathrin Fricke, Alan R. Schwartz, Philip Smith, Hartmut Schneider
January 1, 2017 : 82-88

DOI: 10.1152/japplphysiol.00279.2016

Nasal high-flow (NHF) therapy can support ventilation in patients with chronic obstructive pulmonary disease during sleep by decreasing the work of breathing and improving CO2 levels. On the other hand, oxygen supplementation corrects hypoxemia, but it produces only a minimal reduction in work of breathing and is associated with increased CO2 levels. Therefore, NHF can be a useful method to assist ventilation in patients with increased respiratory mechanical loads.

**Metabolic adaptations in skeletal muscle after 84 days of bed rest with and without concurrent flywheel resistance exercise**
José M. Irimia, Mario Guerrero, Paula Rodriguez-Miguelez, Joan A. Cadefau, Per A. Tesch, Roser Cussó, Rodrigo Fernandez-Gonzalo
January 1, 2017 : 96-103

DOI: 10.1152/japplphysiol.00521.2016

**Relationship between obstructive sleep apnea and endogenous carbon monoxide**
Masanori Azuma, Kimihiko Murase, Ryo Tachikawa, Satoshi Hamada, Takeshi Matsumoto, Takuma Minami, Morito Inouchi, Kiminobu Tanizawa, Tomohiro Handa, Toru Oga, Michiaki Mishima, Kazuo Chin
January 1, 2017 : 104-111
Endogenous carbon monoxide (CO) levels are recognized to be a surrogate marker of oxidative stress. No study has evaluated both exhaled and blood CO at the same time in obstructive sleep apnea (OSA) patients. Here we provide evidence that exhaled CO levels positively correlated with hypoxia during sleep in OSA patients, but blood CO levels did not, and that continuous positive airway pressure therapy significantly decreased exhaled CO levels in the OSA group, but did not significantly affect blood CO.

Central and peripheral responses to static and dynamic stretch of skeletal muscle: mechano- and metaboreflex implications
Massimo Venturelli, Emiliano Cè, Eloisa Limonta, Angela Valentina Bisconti, Michela Devoto, Susanna Rampichini, Fabio Esposito
January 1, 2017 : 112-120

Different modalities of passive stretching administration (dynamic or static) in combination with circulatory cuff occlusion may reduce or amplify the mechano- and metaboreflex. We showed a reduced mechanoreflex response to static compared with dynamic stretching. The lack of increase in central hemodynamics during the combined mechano- and metaboreflex stimulation implicates marginal interactions between these two pathways.

Renal sympathetic denervation attenuates hypertension and vascular remodeling in renovascular hypertensive rats
Peng Li, Pei-Pei Huang, Yun Yang, Chi Liu, Yan Lu, Fang Wang, Wei Sun, Xiang-Qing Kong
January 1, 2017 : 121-129

The effects of renal sympathetic denervation (RSD) on hypertension, cardiac function, vascular fibrosis, and renal apoptosis were studied in the 2K1C rat model. Results showed that RSD attenuated hypertension, improved vascular remodeling, and reduced vascular fibrosis through decreased sympathetic activity in the 2K1C rat model, but it did not change the kidney size, renal apoptosis, or renal caspase-3 expression. These results could suggest possible clinical efficacy of RSD for renovascular hypertension.

Rates of performance loss and neuromuscular activity in men and women during cycling: evidence for a common metabolic basis of muscle fatigue
Christopher W. Sundberg, Sandra K. Hunter, Matthew W. Bundle
January 1, 2017 : 130-141

Although men and women differed considerably in their absolute cycling performances, there was no sex difference in the metabolically based exponential time constant that described the performance-duration relationship. Similarly, the fatigue-induced increases in neuromuscular activity were not different between the sexes when compared from a metabolic perspective. These data suggest that men and women have similar rate-limiting mechanisms for short-duration dynamic exercise that are determined by the extent the exercise is supported by anaerobic metabolism.

Effect of hypohydration on thermoregulatory responses in men with low and high body fat exercising in the heat
January 1, 2017 : 142-152

This is the first known investigation to compare thermoregulatory responses to exercise heat stress between men with high and low body fat (BF) in a physiologically uncompensable environment while simultaneously examining the confounding influence of hydration status. Both groups demonstrated similar sweating and cutaneous vasodilatory responses when euhydrated, despite vast differences in rectal temperature. Furthermore, in contrast to low BF, individuals with high BF demonstrated similar increases in core body temperature when either euhydrated or hypohydrated.

Effect of sodium nitrite on local control of contracting skeletal muscle microvascular oxygen pressure in healthy rats
Trenton D. Colburn, Scott K. Ferguson, Clark T. Holdsworth, Jesse C. Craig, Timothy I. Musch, David C. Poole
January 1, 2017 : 153-160

Ischemic conditions as diverse as chronic heart failure (CHF) and frostbite inflict tissue damage via inadequate O2 delivery. Herein we demonstrate that direct application of sodium nitrite enhances the O2 supply-O2 demand relationship, raising microvascular O2 pressure in healthy skeletal muscle. This therapeutic action of nitric oxide occurred without inducing systemic hypotension and has the potential to relieve focal ischemia and preserve tissue vitality by enhancing O2 delivery.

Nondestructive cryomicro-CT imaging enables structural and molecular analysis of human lung tissue
Dragoș M. Vasilescu, André B. Phillion, Naoya Tanabe, Daisuke Kinose, David F. Paige, Jacob J. Kantrowitz, Gang Liu, Hanqiao Liu, Nick Fishbane, Stijn E. Verleden, Bart M. Vanaudenaerde, Marc Lenburg, Christopher S. Stevenson, Avrum Spira, Joel D. Cooper, Tillie-Louise Hackett, James C. Hogg
January 1, 2017 : 161-169
The described micro-CT cryostage provides a novel way to study the three-dimensional lung structure preserved without the effects of fixatives while enabling subsequent studies of the cellular matrix composition and gene expression. This approach will, for the first time, enable researchers to study structural changes of lung tissues that occur with disease and correlate them with changes in gene or protein signatures.

The effect of obesity on the contractile performance of isolated mouse soleus, EDL, and diaphragm muscles
Jason Tallis, Cameron Hill, Rob S. James, Val M. Cox, Frank Seebacher
January 1, 2017: 170-181

The effect of obesity on isolated muscle function is surprisingly underresearched. The present study is the first to examine the effects of obesity on isolated muscle performance using a method that more closely represents real-world muscle function. This work uniquely establishes a muscle-specific profile of mechanical changes in relation to underpinning mechanisms. These findings may be important to understanding the negative cycle of obesity and in designing interventions for improving weight status.

Aerobic exercise in humans mobilizes HSCs in an intensity-dependent manner
Jeff M. Baker, Joshua P. Nederveen, Gianni Parise
January 1, 2017: 182-190

Here we demonstrate for the first time that mobilization of hematopoietic stem cells (HSC) through exercise is intensity dependent, with the greatest mobilization occurring immediately after high-intensity exercise. As well, we show that exercise is a general stimulus for mobilization: increases in specific HSC populations are reliant on general mononuclear cell mobilization. Finally, we demonstrate no differences in mobilization between groups with different aerobic fitness.

Nasal high flow reduces dead space
Winfried Möller, Sheng Feng, Ulrike Domanski, Karl-Josef Franke, Gülnaz Celik, Peter Bartenstein, Sven Becker, Gabriele Meyer, Otmar Schmid, Oliver Eickberg, Stanislav Tatkov, Georg Nilius
January 1, 2017: 191-197

Clearance of expired air in upper airways by nasal high flow (NHF) can be extended below the soft palate and de facto causes a reduction of dead space. Using scintigraphy, the authors found a relationship between NHF, time, and clearance. Direct measurement of CO2 and O2 in the trachea confirmed a reduction of rebreathing, providing the actual data on inspired gases, and this can be used for the assessment of other forms of respiratory support.

INNOVATIVE METHODOLOGIES

Single passive leg movement-induced hyperemia: a simple vascular function assessment without a chronotropic response
Massimo Venturelli, Gwenael Layec, Joel Trinity, Corey R. Hart, Ryan M. Broxterman, Russell S. Richardson
January 1, 2017: 28-37

Using the single passive leg movement (PLM) technique, a variant of the vascular function assessment PLM, we have identified a novel peripheral vascular assessment method that is more easily performed than PLM, which, by not evoking potentially confounding central hemodynamic responses, may be more useful clinically.

A translational cellular model to study the impact of high-frequency oscillatory ventilation on human epithelial cell function
Anja Mowes, Beatriz E. de Jongh, Timothy Cox, Yan Zhu, Thomas H. Shaffer
January 1, 2017: 198-205

Traditionally, large-animal models are used to analyze the impact of clinical ventilators on lung cellular function. In our dual-chamber model, we interface high-frequency oscillatory ventilation (HFOV) directly with airway cells to study the effects of HFOV independently and combined with hyperoxia. Therefore, it is possible to study the preclinical impact of interventional factors without the high cost of animal models, thus reducing staff, time, as well as animal sparing.

VIEWPOINTS | Aging and Exercise

A time for exercise: the exercise window
Commentaries on Viewpoint: A time for exercise: the exercise window
January 1, 2017 : 206-209
DOI: 10.1152/japplphysiol.00685.2016

Last Word on Viewpoint: A time for exercise: the exercise window
Elsamma Chacko
January 1, 2017 : 214
DOI: 10.1152/japplphysiol.00951.2016

VIEWPOINTS
“Tighter fit” theory—physiologists explain why “higher altitude” and jugular occlusion are unlikely to reduce risks for sports concussion and brain injuries
James M. Smoliga, Gerald S. Zavorsky
January 1, 2017 : 215-217
DOI: 10.1152/japplphysiol.00661.2016

Commentaries on Viewpoint: “Tighter fit” theory—physiologists explain why “higher altitude” and jugular occlusion are unlikely to reduce risks for sports concussion and brain injuries
January 1, 2017 : 218-220
DOI: 10.1152/japplphysiol.01022.2016

Last Word on Viewpoint: All is fair in altitude and concussions
James M. Smoliga, Gerald S. Zavorsky
January 1, 2017 : 221
DOI: 10.1152/japplphysiol.01020.2016

Copyright © 2017 by the American Physiological Society.
RESEARCH ARTICLES | Auditory System Plasticity

Neural tracking of attended versus ignored speech is differentially affected by hearing loss
Eline Borch Petersen, Malte Wöstmann, Jonas Obleser, Thomas Lunner
January 1, 2017 : 18-27
DOI: 10.1152/jn.00527.2016

The present study investigates the effect of hearing loss in older listeners on the neural tracking of competing speech. Interestingly, we observed that whereas internal degradation (hearing loss) relates to the neural tracking of ignored speech, external sound degradation (ratio between attended and ignored speech; signal-to-noise ratio) relates to tracking of attended speech. This provides the first evidence for hearing loss affecting the ability to neurally track speech.

Passive stimulation and behavioral training differentially transform temporal processing in the inferior colliculus and primary auditory cortex
Maike Vollmer, Ralph E. Beitel, Christoph E. Schreiner, Patricia A. Leake
January 1, 2017 : 47-64
DOI: 10.1152/jn.00392.2016

Behaviorally relevant vs. passive electric stimulation of the auditory nerve differentially affects neuronal temporal processing in the central nucleus of the inferior colliculus (ICC) and the primary auditory cortex (AI) in profoundly short-deaf and long-deaf cats. Temporal plasticity in the ICC depends on a critical amount of electric stimulation, independent of its behavioral relevance. In contrast, the AI emerges as a pivotal site for behaviorally driven neuronal temporal plasticity in the deaf auditory system.

RESEARCH ARTICLES | Cellular and Molecular Properties of Neurons

GSG1L regulates the strength of AMPA receptor-mediated synaptic transmission but not AMPA receptor kinetics in hippocampal dentate granule neurons
Xia Mao, Xinglong Gu, Wei Lu
January 1, 2017 : 28-35
DOI: 10.1152/jn.00307.2016

GSG1L is a newly identified AMPA receptor (AMPAR) auxiliary subunit and plays a unique role in the regulation of AMPAR trafficking and function in hippocampal CA1 pyramidal neurons. However, its role in the regulation of AMPARs in hippocampal dentate granule cells remains to be characterized. The current work reveals that GSG1L regulates strength of AMPAR-mediated synaptic transmission but not the receptor kinetic properties in hippocampal dentate granule neurons.

Clarithromycin increases neuronal excitability in CA3 pyramidal neurons through a reduction in GABAergic signaling
Edyta K. Bichler, Courtney C. Elder, Paul S. Garcia
January 1, 2017 : 93-103
DOI: 10.1152/jn.00134.2016

Clinical administration of the macrolide antibiotic clarithromycin has been associated with side effects such as mania, agitation, and delirium. Here, we investigated the adverse effects of this antibiotic on CA3 pyramidal cell excitability. Clarithromycin induces hyperexcitability in single neurons and is related to a reduction in GABAergic signaling. Our results support a potentially new application of clarithromycin as a stimulant to facilitate emergence from anesthesia or to normalize vigilance.

Optimizing computer models of corticospinal neurons to replicate in vitro dynamics
Samuel A. Neymotin, Benjamin A. Suter, Salvador Dura-Bernal, Gordon M. G. Shepherd, Michele Migliore, William W. Lytton
January 1, 2017 : 148-162
DOI: 10.1152/jn.00570.2016

We developed models of motor cortex corticospinal neurons that replicate in vitro dynamics, including hyperpolarization-induced sag and realistic firing patterns. Models demonstrated resonance in response to synaptic stimulation, with resonance frequency increasing in apical dendrites with increasing distance from soma, matching the increasing oscillation frequencies spanning deep to superficial cortical layers. This gradient may enable specific corticospinal neuron dendrites to entrain to relevant oscillations in different cortical layers, contributing to appropriate motor output commands.

RESEARCH ARTICLE | Central Pattern Generators

Rhythm generation, coordination, and initiation in the vocal pathways of male African clawed frogs
Ayako Yamaguchi, Jessica Cavin Barnes, Todd Appleby
January 1, 2017 : 178-194
DOI: 10.1152/jn.00628.2016
Central pattern generators (CPGs) are considered to underlie vocalizations in many vertebrate species, but the detailed mechanisms underlying their functions remain unclear. We addressed this question using an isolated brain preparation of African clawed frogs. We discovered that two vocal phases are mediated by anatomically distinct CPGs, that there are a pair of CPGs contained in the left and right half of the brain stem, and that mechanisms underlying initiation of the two vocal phases are distinct.

**RESEARCH ARTICLE | Control of Homeostasis**

The role of adenosine in the maturation of sleep homeostasis in rats
Irma Gvilia, Natalia Suntsova, Andrey Kostin, Anna Kalinchuk, Dennis McGinty, Radhika Basheer, Ronald Szymusiak
January 1, 2017 : 327-335
DOI: 10.1152/jn.00675.2016

Brain mechanisms that regulate the maturation of sleep are understudied. The present study generated first evidence about a potential mechanistic role for adenosine in the maturation of sleep homeostasis. Specifically, we demonstrate that early postweaning development in rats, when homeostatic response to sleep loss become adult like, is characterized by maturational changes in wake-related production/release of adenosine in the brain. Pharmacologically increased adenosine signaling in developing brain facilitates homeostatic responses to sleep deprivation.

**RESEARCH ARTICLES | Control of Movement**

Sensorimotor integration of vision and proprioception for obstacle crossing in ambulatory individuals with spinal cord injury
Raza Naseem Malik, Rachel Cote, Tania Lam
January 1, 2017 : 36-46
DOI: 10.1152/jn.00169.2016

This work is unique since it examines the contribution of combined, bilateral hip and knee proprioceptive sense on the recovery of skilled walking function, in addition to characterizing gaze behavior during a skilled walking task in people with motor-incomplete spinal cord injury.

Changes in activity of fast-spiking interneurons of the monkey striatum during reaching at a visual target
Kévin Marche, Paul Apicella
January 1, 2017 : 65-78
DOI: 10.1152/jn.00566.2016

We explored the functional contributions of striatal fast-spiking interneurons (FSIs), presumed GABAergic interneurons, to distinct steps of movement generation in monkeys performing a reaching task. The activity of individual FSIs was modulated before and during the movement, consisting mostly of increased in firing rates. Changes in activity also occurred during movement preparation. We interpret this variety of modulation types at different moments of task performance as reflecting differential FSI control over distinct phases of movement.

Beat-to-beat control of human optokinetic nystagmus slow phase durations
Carey D. Balaban, Joseph M. Furman
January 1, 2017 : 204-214
DOI: 10.1152/jn.00342.2016

This study provides the first clear evidence that the generation of optokinetic nystagmus (OKN) fast phases is a decision process that is influenced by performance of a concurrent disjunctive reaction time task (DRT). The slow phase (SP) durations are consistent with a Gaussian basic interval generator and multiple interval SP durations occur more frequently in the presence of the DRT. Hence, OKN shows dual-task interference in a manner observed in voluntary movements, such as saccades.

Does the sensorimotor system minimize prediction error or select the most likely prediction during object lifting?
January 1, 2017 : 260-274
DOI: 10.1152/jn.00609.2016

Using a novel experimental model of object lifting, we tested whether the sensorimotor system models the weight of objects by minimizing lifting errors or by selecting the statistically most likely weight. We found that the sensorimotor system minimizes the square of prediction errors for object lifting. This parallels the results of studies that investigated visually guided reaching, suggesting an overlap in the underlying mechanisms between tasks that involve different sensory systems.

On identifying kinematic and muscle synergies: a comparison of matrix factorization methods using experimental data from the healthy population
Navid Lambert-Shirzad, H. F. Machiel Van der Loos
January 1, 2017 : 290-302
DOI: 10.1152/jn.00435.2016
Literature on comparing factorization methods in identifying motor synergies using numerically generated, simulation, and muscle activation data from animal studies already exists. We present an empirical evaluation of the performance of three of these methods on muscle activation and joint angles data from human reaching motion: principal component analysis, nonnegative matrix factorization, and independent component analysis. Using numerical simulation, we also studied the meaning and differences in the synergy structures returned by each method. The results can be used to unify approaches in identifying and interpreting motor synergies.

Referent control and motor equivalence of reaching from standing
Yosuke Tomita, Anatol G. Feldman, Mindy F. Levin
January 1, 2017 : 303-315
DOI: 10.1152/jn.00292.2016

Motor actions may result from minimization of the deflection of the actual body configuration from the centrally specified referent body configuration, in the limits of neuromuscular and environmental constraints. The minimization process may maintain reaching trajectory and accuracy regardless of the number of body segments involved (motor equivalence), as confirmed in this study of reaching from standing in young healthy individuals. Results suggest that the referent control process may underlie motor equivalence in reaching.

Consolidation of visuomotor adaptation memory with consistent and noisy environments
Rodrigo S. Maeda, Steven E. McGee, Daniel S. Marigold
January 1, 2017 : 316-326
DOI: 10.1152/jn.00178.2016

The adaptation of movement is essential for many daily activities. To interact with targets, this often requires learning the mapping to produce appropriate motor commands based on visual input. Here, we show that a novel visuomotor mapping is retained 1 wk after initial learning in a visually guided walking task. Furthermore, we find that this motor memory consolidates (i.e., becomes more resistant to interference from learning a competing mapping) when learning in constant and noisy mapping environments.

Evidence of common and separate eye and hand accumulators underlying flexible eye-hand coordination
Sumitash Jana, Atul Gopal, Aditya Murthy
January 1, 2017 : 348-364
DOI: 10.1152/jn.00688.2016

Previous studies on eye-hand coordination have considered mainly the means of eye and hand reaction time (RT) distributions. Here, we leverage the approximately linear relationship between the mean and standard deviation of RT distributions, as predicted by the drift-diffusion model, to propose the existence of two distinct computational architectures underlying coordinated eye-hand movements. These architectures, for the first time, provide a computational basis for the flexible coupling between eye and hand movements.

Short-latency allocentric control of saccadic eye movements
Mrimoy Chakrabarty, Tamami Nakano, Shigeru Kitazawa
January 1, 2017 : 376-387
DOI: 10.1152/jn.00451.2016

We found that the saccade end point was shifted from the actual target position toward the direction expected from allocentric coding when a large frame in the background was transiently shifted during the period of target presentation. The effect occurred within 150 ms. The present study provides direct evidence that the brain rapidly uses allocentric coding of a target to control immediate saccades.

Go-activation endures following the presentation of a stop-signal: evidence from startle
Neil M. Drummond, Erin K. Cressman, Anthony N. Carlsen
January 1, 2017 : 403-411
DOI: 10.1152/jn.00567.2016

In this study, a startling acoustic stimulus (SAS) was used to determine whether response outcome could be manipulated in a stop-signal task. Results revealed that presenting a SAS during stop-signal trials led to an increase in probability of responding even when presented 200 ms following the stop-signal. The latency of SAS responses indicates that go-activation remains accessible and modifiable well after the response is voluntarily inhibited, providing evidence against an irrevocable commitment to inhibition.

Individual differences in implicit motor learning: task specificity in sensorimotor adaptation and sequence learning
Alit Stark-Inbar, Meher Raza, Jordan A. Taylor, Richard B. Ivry
January 1, 2017 : 412-428
DOI: 10.1152/jn.01141.2015

We investigated individual differences in the ability to implicitly learn motor skills. As a prerequisite, we assessed whether individual differences were reliable across test sessions. We found that two commonly used tasks of implicit learning, visuomotor adaptation and the alternating serial
reaction time task, exhibited good test-retest reliability in measures of learning and performance. However, the learning measures did not correlate between the two tasks, arguing against a shared process for implicit motor learning.

**Right prefrontal cortex transcranial direct current stimulation enhances multi-day savings in sensorimotor adaptation**
Rachael D. Seidler, Brittany S. Gluskin, Brian Greeley
January 1, 2017 : 429-435
DOI: 10.1152/jn.00563.2016

We have previously reported that visuospatial working memory performance and magnitude of activation in the right dorsolateral prefrontal cortex predict the rate of manual visuomotor adaptation. Sensorimotor savings, or faster adaptation to a previously experienced perturbation, has been recently linked to cognitive processes. We show that facilitating the right prefrontal cortex with anodal transcranial direct current stimulation enhances sensorimotor savings compared with sham stimulation.

**High-frequency neuromuscular electrical stimulation modulates interhemispheric inhibition in healthy humans**
Nicolas Gueugneau, Sidney Grosp却不, Paul Stapley, Romuald Lepers
January 1, 2017 : 467-475
DOI: 10.1152/jn.00355.2016

High-frequency neuromuscular electrical stimulation (HF NMES) induces muscular contractions that partially match physiological motor control. Here, we tested whether HF NMES applied to the upper limb influences interhemispheric inhibition. Our results show that interhemispheric inhibition was increased after HF NMES and that this increase was correlated to the electromyographic activity within the contralateral homologous muscle. This opens up original perspectives for the implementation of HF NMES in sport training and neurorehabilitation.

**RESEARCH ARTICLE | Glial Cells and Neuronal Signaling**

- **The acute inhibition of enteric glial metabolism with fluoroacetate alters calcium signaling, hemichannel function, and the expression of key proteins**
  Jonathon L. McClain, Brian D. Gulbransen
  January 1, 2017 : 365-375
  DOI: 10.1152/jn.00507.2016

  Our study shows that the acute impairment of enteric glial metabolism with fluoroacetate (FA) alters specific glial functions that are associated with the modification of neurotransmission in the gut. These include subtle changes to glial agonist-evoked calcium signaling, the subsequent disruption of connexin-43 hemichannels, and changes in protein expression that are consistent with a transition to reactive glia. These changes in glial function offer a mechanistic explanation for the effects of FA on peripheral neuronal networks.

**RESEARCH ARTICLES | Higher Neural Functions and Behavior**

- **Seeing a straight line on a curved surface: decoupling of patterns from surfaces by single IT neurons**
  N. Apurva Ratan Murty, S. P. Arun
  January 1, 2017 : 104-116
  DOI: 10.1152/jn.00551.2016

  We have no difficulty seeing a straight line on a curved piece of paper, but in fact, doing so requires decoupling the shape of the surface from the pattern itself. Here we report a novel form of invariance in the visual cortex: single neurons in monkey inferior temporal cortex respond similarly to congruent transformations of patterns and surfaces, in effect decoupling patterns from the surface on which they are overlaid.

- **Temporal coordination of olfactory cortex sharp-wave activity with up- and downstates in the orbitofrontal cortex during slow-wave sleep**
  Naomi Onisawa, Hiroyuki Manabe, Kensaku Mori
  January 1, 2017 : 123-135
  DOI: 10.1152/jn.00069.2016

  Simultaneous recordings of local field potentials and spike activities in the anterior piriform cortex (APC) and orbitofrontal cortex (OFC) during slow-wave sleep showed that APC sharp waves tended to occur during two distinct phases of OFC upstate: early phase, shortly after the down-to-up transition, and late phase, shortly before the up-to-down transition, suggesting that during slow-wave sleep, olfactory cortex and OFC areas communicate preferentially in the specific time windows.

- **Independent coding of absolute duration and distance magnitudes in the prefrontal cortex**
  Encarni Marcos, Satoshi Tsujimoto, Aldo Genovesio
  January 1, 2017 : 195-203
Human behavioral studies have shown that spatial and duration judgments can interfere with each other. We investigated the neural representation of such magnitudes in the prefrontal cortex. We found that the two magnitudes are independently coded by prefrontal neurons. We suggest that the interference among magnitude judgments might depend on the goal rather than the perceptual resource sharing.

The relationship between ERP components and EEG spatial complexity in a visual Go/Nogo task
Huibin Jia, Huayun Li, Dongchuan Yu
January 1, 2017 : 275-283

The reaction times, the latencies/amplitudes of event-related potential (ERP) components, the Go/Nogo N2 effect, and the Go/Nogo P3 effect are linked to the electroencephalographic (EEG) spatial complexity level. The EEG spatial complexity is closely related to demands of certain cognitive processes and could reflect the neural processing efficiency of human brain. Obtaining the single-trial ERP features through single-trial spatial complexity may be a more efficient approach than traditional methods.

Role of human premotor dorsal region in learning a conditional visuomotor task
Pranav J. Parikh, Marco Santello
January 1, 2017 : 445-456

Conditional learning involves stimulus identification, motor response selection, response monitoring, memory encoding, and recall of the learned association. Premotor dorsal (PMd) has been implicated for conditional learning. However, the extent to which PMd might be involved in specific or all stages of conditional learning is not well understood. The novel finding of our study is that PMd appears to be involved with monitoring motor responses, a sensorimotor integration stage essential for conditional learning.

RESEARCH ARTICLES | Nervous System Pathophysiology

Modulation of activity and conduction in single dorsal column axons by kilohertz-frequency spinal cord stimulation
Nathan D. Crosby, John J. Janik, Warren M. Grill
January 1, 2017 : 136-147

Kilohertz-frequency spinal cord stimulation (KHF-SCS) is a new mode of SCS that may offer better pain relief than conventional SCS. However, the mechanism of action is poorly characterized, especially the effects of stimulation on dorsal column (DC) axons, which are the primary target of stimulation. This study provides the first recordings of single DC axons during KHF-SCS to quantify DC activity that has the potential to mediate the analgesic effects of KHF-SCS.

Caveolin-1 regulation of disrupted-in-schizophrenia-1 as a potential therapeutic target for schizophrenia
Adam Kassan, Junji Egawa, Zheng Zhang, Angels Almenar-Queralt, Quynh My Nguyen, Yasaman Lajevardi, Kaitlyn Kim, Edmund Posadas, Dilip V. Jeste, David M. Roth, Piyush M. Patel, Hemal H. Patel, Brian P. Head
January 1, 2017 : 436-444

The present study is the first to demonstrate that caveolin-1 can regulate DISC1 expression in neuronal models. Furthermore, the findings are consistent across three separate neuronal models that include rodent neurons (in vitro and in vivo) and human differentiated neurons derived from induced pluripotent stem cells. These findings justify further investigation regarding the modulatory role by caveolin on synaptic function and as a potential therapeutic target for the treatment of schizophrenia.

RESEARCH ARTICLES | Neural Circuits

Thalamic state control of cortical paired-pulse dynamics
Clarissa J. Whitmire, Daniel C. Millard, Garrett B. Stanley
January 1, 2017 : 163-177

For the first time, we have been able to utilize optogenetic modulation of thalamic firing modes combined with optical imaging of cortex in the rat vibrissa system to directly test the role of thalamic state in shaping cortical response properties.

Descending propriospinal neurons mediate restoration of locomotor function following spinal cord injury
Katelyn N. Benthall, Ryan A. Hough, Andrew D. McLellan
January 1, 2017 : 215-229
In the lamprey following spinal lesion-mediated interruption of long axonal projections of reticulospinal (RS) neurons, sensory stimulation still elicited relatively normal locomotor muscle burst activity, but with some coordination deficits. Computer models incorporating the spinal lesions could mimic many aspects of the experimental results. Thus, after disruption of long-axon projections from RS neurons in the lamprey, descending propriospinal (PS) neurons appear to be a viable compensatory mechanism for indirect activation of spinal locomotor networks.

Effects of ion channel noise on neural circuits: an application to the respiratory pattern generator to investigate breathing variability
Haitao Yu, Rishi R. Dhingra, Thomas E. Dick, Roberto F. Galán
January 1, 2017 : 230-242
DOI: 10.1152/jn.00416.2016

A major source of noise in neuronal circuits is the “flickering” of ion currents passing through the neurons’ membranes (channel noise), which cannot be suppressed experimentally. Computational simulations are therefore the best way to investigate the effects of this physiological noise by manipulating its level at will. We investigate the role of noise in the respiratory pattern generator and show that endogenous, breath-to-breath variability is tightly linked to the respiratory pattern.

RESEARCH ARTICLES | Sensory Processing

Whisker row deprivation affects the flow of sensory information through rat barrel cortex
Vincent Jacob, Akinori Mitani, Taro Toyoizumi, Kevin Fox
January 1, 2017 : 4-17
DOI: 10.1152/jn.00289.2016

Sensory cortical plasticity is usually quantified by changes in evoked firing rate. In this study we quantified plasticity by changes in sensory detection performance using Chernoff information and receiver operating characteristic analysis. We found that whisker deprivation causes a change in information flow within the cortical layers and that layer 5 regular-spiking cells, despite showing only a small potentiation of short-latency input, show the greatest increase in information content for the spared input partly by decreasing their spontaneous activity.

Innocuous warming enhances peripheral serotonergic itch signaling and evokes enhanced responses in serotonin-responsive dorsal horn neurons in the mouse
T. Akiyama, M. Nagamine, A. Davoodi, M. Ivanov, M. Iodi Carstens, E. Carstens
January 1, 2017 : 251-259
DOI: 10.1152/jn.00703.2016

Skin warming often exacerbates itch in patients with itchy dermatitis. We demonstrate that warming the skin enhanced serotonin-evoked, but not histamine-evoked, itch behavior and responses of sensory dorsal root ganglion cells. Moreover, serotonin, but not histamine, enhanced responses of superficial dorsal horn neurons to innocuous warming. The results suggest that skin warming selectively enhances the responses of serotonin-sensitive pruriceptors, leading to increased firing of serotonin-sensitive dorsal horn neurons that signal nonhistaminergic itch.

Stimulus context alters neural representations of faces in inferotemporal cortex
Behrad Noudoost, Neda Nategh, Kelsey Clark, Hossein Esteky
January 1, 2017 : 336-347
DOI: 10.1152/jn.00667.2016

Neurons in inferotemporal (IT) cortex anticipate the arrival of a predictable stimulus, and visual responses to an expected stimulus are more distributed throughout the population of IT neurons, providing an enhanced representation of second-order stimulus information (in this case, viewing angle). The findings reveal a potential neural basis for the behavioral benefits of contextual expectation.

Visual search for object categories is predicted by the representational architecture of high-level visual cortex
Michael A. Cohen, George A. Alvarez, Ken Nakayama, Talia Konkle
January 1, 2017 : 388-402
DOI: 10.1152/jn.00569.2016

Here, we ask which neural regions have neural response patterns that correlate with behavioral performance in a visual processing task. We found that the representational structure across all of high-level visual cortex has the requisite structure to predict behavior. Furthermore, when directly comparing different neural regions, we found that they all had highly similar category-level representational structures. These results point to a ubiquitous and uniform representational structure in high-level visual cortex underlying visual object processing.

RESEARCH ARTICLES | Spinal Control of Motor Outputs
Contractile function and motor unit firing rates of the human hamstrings
Eric A. Kirk, Charles L. Rice
January 1, 2017: 243-250

DOI: 10.1152/jn.00620.2016

We studied motor unit firing rates (MUFRs) at various voluntary contraction intensities in the hamstrings, one of the only major lower limb muscles to have MUFRs affected by muscle length changes. Within the hamstrings muscle-specific differences have greater impact on MUFRs than length changes, with the biceps femoris having reduced neural drive compared with the semimembranosus-semimembranosus. Comparing our results to other lower limb muscles, flexors have inherently higher firing rate compared with extensors.

Psychosocial stress alters the strength of reticulospinal input to the human upper trapezius
Ryan J. Marker, Serge Campeau, Katrina S. Maluf
January 1, 2017: 457-466

DOI: 10.1152/jn.00448.2016

This study is the first to quantify stress-evoked changes in the acoustic startle reflex in the upper trapezius muscle of humans, and our findings reveal a complex pattern of inhibitory and facilitatory responses consistent with observations in nonhuman primates. We further demonstrate that psychosocial stress consistently reduces the amplitude of these responses. These findings have implications for the control of motor behaviors in response to stress.

INNOVATIVE METHODOLOGY

A novel computational model to probe visual search deficits during motor performance
Tarkeshwar Singh, Julius Fridriksson, Christopher M. Perry, Sarah C. Tryon, Angela Ross, Stacy Fritz, Troy M. Herter
January 1, 2017: 79-92

DOI: 10.1152/jn.00561.2016

Visual search has traditionally been studied in cognitive and perceptual paradigms, but little is known about how it contributes to visuomotor performance. We have developed a novel computational model to examine how three underlying processes of visual search (spatial planning, working memory, and peripheral visual processing) contribute to visual search during a visuomotor task. We show that deficits integrating spatial planning and working memory underlie abnormal performance in stroke survivors with frontoparietal damage.

RAPID REPORTS

Overlap of movement planning and movement execution reduces reaction time
Jean-Jacques Orban de Xivry, Valéry Legrain, Philippe Lefèvre
January 1, 2017: 117-122

DOI: 10.1152/jn.00728.2016

In the planning of a movement, the brain has the opportunity to delay the incorporation of accuracy requirements of the motor plan in order to reduce the reaction time by up to 100 ms (average: 32 ms). Such shortening of reaction time is observed here when the first phase of the movement consists of a transport phase. This forces us to reconsider the hypothesis that motor plans are fully defined before movement onset.

Rapid and lasting enhancement of dopaminergic modulation at the hippocampal mossy fiber synapse by electroconvulsive treatment
Katsunori Kobayashi, Yuki Imoto, Fumi Yamamoto, Mayu Kawasaki, Miyuki Ueno, Eri Segi-Nishida, Hidenori Suzuki
January 1, 2017: 284-289

DOI: 10.1152/jn.00740.2016

We show that electroconvulsive therapy (ECT)-like stimulation greatly enhances synaptic potentiation induced by dopamine at the excitatory synapse formed by the hippocampal mossy fiber in mice. The effect of ECT-like stimulation on the dopaminergic modulation was rapidly induced, maintained for more than 4 wk after repeated treatments, and most likely mediated by increased expression of the dopamine D1 receptor. These effects may be relevant to fast-acting strong antidepressant action of ECT.

CORRIGENDUM

Corrigendum
January 1, 2017: 476

DOI: 10.1152/jn.z9k-4005-corr.2016

Copyright © 2017 by the American Physiological Society.
January 2017; volume 49, issue 1

The below Table of Contents is available online at: http://physiolgenomics.physiology.org/content/49/1

**REVIEW | General Interest**

Biological roles of microRNAs in the control of insulin secretion and action
Sophie Calderari, Malika R. Diawara, Alois Garaud, Dominique Gauguier
January 1, 2017: 1-10
DOI: 10.1152/physiolgenomics.00079.2016

**RESEARCH ARTICLE | Genomic and “Polyomic” Studies of Cardiovascular and Inflammatory Diseases**

Glucose regulates the intrinsic inflammatory response of the heart to surgically induced hypothermic ischemic arrest and reperfusion
Ahmed S. Bux, Merry L. Lindsey, Herman G. Vasquez, Heinrich Taegtmeyer, Romain Harmancey
January 1, 2017: 37-52
DOI: 10.1152/physiolgenomics.00102.2016

**RESEARCH ARTICLE | Physiological Genomics of Cell States and Their Regulation and Single Cell Genomics**

Pattern analysis uncovers a chronic ethanol-induced disruption of the switch-like dynamics of C/EBP-β and C/EBP-α genome-wide binding during liver regeneration
Lakshmi Kuttippurathu, Biswanath Patra, Daniel Cook, Jan B. Hoek, Rajanikanth Vadigepalli
January 1, 2017: 11-26
DOI: 10.1152/physiolgenomics.00097.2016

**RESEARCH ARTICLES | Systems Biology and Polygenic Traits**

Elevated K+ channel activity opposes vasoconstrictor response to serotonin in cerebral arteries of the Fawn Hooded Hypertensive rat
Mallikarjuna R. Pabbidi, Richard J. Roman
January 1, 2017: 27-36
DOI: 10.1152/physiolgenomics.00072.2016

Gregory N. Ruegsegger, Ryan G. Toedebusch, Joshua F. Braselton, Thomas E. Childs, Frank W. Booth
January 1, 2017: 53-66
DOI: 10.1152/physiolgenomics.00083.2016

Copyright © 2017 by the American Physiological Society.
January 2017; volume 32, issue 1

The below Table of Contents is available online at: http://physiologyonline.physiology.org/content/32/1

Editorial

Rio 2017 is Shaping Up as a Great World Congress
Denis Noble, Julie Chan, Penny Hansen, Walter Boron, Peter Wagner
December 7, 2016 : 2-4
DOI: 10.1152/physiol.00034.2016

Struggles to Establish a Career in Physiology as a Junior Faculty Member in Nigeria
Abimbola John Idowu
December 7, 2016 : 5-6
DOI: 10.1152/physiol.00032.2016

Physiology in Perspective

Physiology in Perspective: Aging and Underlying Pathophysiology
Gary C. Sieck
December 7, 2016 : 7-8
DOI: 10.1152/physiol.00035.2016

Reviews

Physiological Aging: Links Among Adipose Tissue Dysfunction, Diabetes, and Frailty
Michael B. Stout, Jamie N. Justice, Barbara J. Nicklas, James L. Kirkland
December 7, 2016 : 9-19
DOI: 10.1152/physiol.00012.2016

Expression and Processing of Amyloid Precursor Protein in Vascular Endothelium
Livius V. d'Uscio, Tongrong He, Zvonimir S. Katusic
December 7, 2016 : 20-32
DOI: 10.1152/physiol.00021.2016

Dating the Heart: Exploring Cardiomyocyte Renewal in Humans
Evan Graham, Olaf Bergmann
December 7, 2016 : 33-41
DOI: 10.1152/physiol.00015.2016

Obstacles to Translating Genotype-Phenotype Correlates in Metabolic Disease
Anu Sharma, Adrian Vella
December 7, 2016 : 42-50
DOI: 10.1152/physiol.00009.2016

Transmission of Metabolic Dysfunction Across Generations
Kathleen Jaeger, Jessica L. Saben, Kelle H. Moley
December 7, 2016 : 51-59
DOI: 10.1152/physiol.00017.2016

Sleep Neurophysiological Dynamics Through the Lens of Multitaper Spectral Analysis
Michael J. Prerau, Ritchie E. Brown, Matt T. Bianchi, Jeffrey M. Ellenbogen, Patrick L. Purdon
December 7, 2016 : 60-92
DOI: 10.1152/physiol.00062.2015

Copyright © 2017 by the American Physiological Society.
March 2017; volume 41, issue 1

The below Table of Contents is available online at: http://advan.physiology.org/content/41/1

All articles for this journal are open access.

HISTORICAL PERSPECTIVES

Promoting the APS Chapter Program by sharing its history, best practices, and how-to guide for establishing new chapters
Mari K. Hopper
March 1, 2017 : 1-9
DOI: 10.1152/advan.00122.2016

A PERSONAL VIEW

Science after school: way cool! A course-based approach to teaching science outreach
Kathleen S. Curtis
March 1, 2017 : 10-15
DOI: 10.1152/advan.00107.2016

Superhero physiology: the case for Captain America
Stanley P. Brown, John Eric W. Smith, Matthew McAllister, LeeAnn Joe
March 1, 2017 : 16-24
DOI: 10.1152/advan.00106.2016

STAYING CURRENT

Performing international outreach: PhUn Week in an Australian primary school
Patricia A. Halpin
March 1, 2017 : 25-28
DOI: 10.1152/advan.00153.2016

Cardiac electrophysiology: normal and ischemic ionic currents and the ECG
Richard E. Klabunde
March 1, 2017 : 29-37
DOI: 10.1152/advan.00105.2016

HOW WE TEACH | Generalizable Education Research

The effectiveness of TBL with real patients in neurology education in terms of knowledge retention, in-class engagement, and learner reactions
Mustafa Kemal Alimoglu, Selda Yardim, Hilmi Uysal
March 1, 2017 : 38-43
DOI: 10.1152/advan.00130.2016
Student perceptions and learning outcomes of blended learning in a massive first-year core physiology for allied health subjects
Janelle Page, Terri Meehan-Andrews, Nivan Weerakkody, Diane L. Hughes, Joseph A. Rathner
March 1, 2017 : 44-55
DOI: 10.1152/advan.00005.2016

Introductory anatomy and physiology in an undergraduate nursing curriculum
S.J. Brown, S. White, N. Power
March 1, 2017 : 56-61
DOI: 10.1152/advan.00112.2016

Medical students’ vs. family physicians’ assessment of practical and logical values of pathophysiology multiple-choice questions
Damir Secic, Dzenana Husremovic, Eldan Kapur, Zaim Jatic, Nina Hadziahmetovic, Benjamin Vojnikovic, Almir Fajkic, Amir Meholic, Lejla Bradic, Amila Hadzic
March 1, 2017 : 62-68
DOI: 10.1152/advan.00145.2015

A survey of first-year biology student opinions regarding live lectures and recorded lectures as learning tools
March 1, 2017 : 69-76
DOI: 10.1152/advan.00117.2016

Institutional and technological barriers to the use of open educational resources (OERs) in physiology and medical education
Christopher Hassall, David I. Lewis
March 1, 2017 : 77-81
DOI: 10.1152/advan.00171.2016

HOW WE TEACH | Classroom and Laboratory Research Projects

Glucose metabolism from mouth to muscle: a student experiment to teach glucose metabolism during exercise and rest
Tobias Engeroff, Johannes Fleckenstein, Winfried Banzer
March 1, 2017 : 82-88
DOI: 10.1152/advan.00124.2016

Home-based vs. laboratory-based practical activities in the learning of human physiology: the perception of students
Ben-Hur S. Neves, Caroline Altermann, Rithiele Gonçalves, Marcus Vinicius Lara, Pâmela B. Mello-Carpes
March 1, 2017 : 89-93
DOI: 10.1152/advan.00018.2016

The value of homemade phantoms for training veterinary students in the ultrasonographic detection of radiolucent foreign bodies
Carolina Mariano Beraldo, Érika Rondon Lopes, Raduan Hage, Maria Cristina F. N. S. Hage
March 1, 2017 : 94-98
DOI: 10.1152/advan.00163.2015

LETTER TO THE EDITOR

How should repeated gross mistakes in textbooks be treated?
Milorad Letić
March 1, 2017 : 99
DOI: 10.1152/advan.00145.2016

Copyright © 2017 by the American Physiological Society.
January 2017; volume 97, issue 1

The below Table of Contents is available online at: http://physrev.physiology.org/content/97/1

Reviews

Mechanistic Pathways of Sex Differences in Cardiovascular Disease
Vera Regitz-Zagrosek, Georgios Kararigas
November 2, 2016 : 1-37
DOI: 10.1152/physrev.00021.2015

Molecular Determinants of BK Channel Functional Diversity and Functioning
Ramon Latorre, Karen Castillo, Willy Carrasquel-Ursulaez, Romina V. Sepulveda, Fernando Gonzalez-Nilo, Carlos Gonzalez, Osvaldo Alvarez
November 2, 2016 : 39-87
DOI: 10.1152/physrev.00001.2016

Molecular Pathophysiology of Congenital Long QT Syndrome
November 2, 2016 : 89-134
DOI: 10.1152/physrev.00008.2016

Estrogens and Androgens in Skeletal Physiology and Pathophysiology
Maria Almeida, Michaël R. Laurent, Vanessa Dubois, Frank Claessens, Charles A. O'Brien, Roger Bouillon, Dirk Vanderschueren, Stavros C. Manolagas
November 2, 2016 : 135-187
DOI: 10.1152/physrev.00033.2015

Leveraging Physiology for Precision Drug Delivery
Wujin Sun, Quanyin Hu, Wenyan Ji, Grace Wright, Zhen Gu
November 9, 2016 : 189-225
DOI: 10.1152/physrev.00015.2016

Cardiac T-Tubule Microanatomy and Function
TingTing Hong, Robin M. Shaw
November 23, 2016 : 227-252
DOI: 10.1152/physrev.00037.2015

Ubiquitination and the Regulation of Membrane Proteins
Natalie Foot, Tanya Henshall, Sharad Kumar
December 8, 2016 : 253-281
DOI: 10.1152/physrev.00012.2016

Murine Electrophysiological Models of Cardiac Arrhythmogenesis
Christopher L.-H. Huang
December 14, 2016 : 283-409
DOI: 10.1152/physrev.00007.2016

Ghrelin, CCK, GLP-1, and PYY(3–36): Secretory Controls and Physiological Roles in Eating and Glycemia in Health, Obesity, and After RYGB
Robert E. Steinert, Christine Feinle-Bisset, Lori Asarian, Michael Horowitz, Christoph Beglinger, Nori Geary
December 21, 2016 : 411-463
April 2017; volume 97, issue 2

The below Table of Contents is available online at: http://physrev.physiology.org/content/97/2

Reviews

Ammonia Transporters and Their Role in Acid-Base Balance
I. David Weiner, Jill W. Verlander
February 1, 2017: 465-494
DOI: 10.1152/physrev.00031.2014

Vascular Adaptation to Exercise in Humans: Role of Hemodynamic Stimuli
Daniel J. Green, Maria T. E. Hopman, Jaume Padilla, M. Harold Laughlin, Dick H. J. Thijsen
February 1, 2017: 495-528
DOI: 10.1152/physrev.00011.2016

The Contribution of Small Airway Obstruction to the Pathogenesis of Chronic Obstructive Pulmonary Disease
James C. Hogg, Peter D. Paré, Tillie-Louise Hackett
February 1, 2017: 529-552
DOI: 10.1152/physrev.00025.2015

Pathophysiology of Migraine: A Disorder of Sensory Processing
Peter J. Goadsby, Philip R. Holland, Margarida Martins-Oliveira, Jan Hoffmann, Christoph Schankin, Simon Akerman
January 27, 2017: 553-622
DOI: 10.1152/physrev.00034.2015

Molecular Physiology of Freeze Tolerance in Vertebrates
Kenneth B. Storey, Janet M. Storey
January 27, 2017: 623-665
DOI: 10.1152/physrev.00016.2016

Copyright © 2017 by the American Physiological Society.

January 2017; volume 5, issue 2

The below Table of Contents is available online at: http://physreports.physiology.org/content/5/2

Original Research

A respiratory-gated micro-CT comparison of respiratory patterns in free-breathing and mechanically ventilated rats
Nancy L. Ford, Lynda McCaig, Andrew Jeklin, James F. Lewis, Ruud A. W. Veldhuizen, David W. Holdsworth, Maria Drangova
January 18, 2017: e13074
Our results will be the first comparison of lung morphology in free-breathing animals and mechanically ventilated animals, acquired using noninvasive respiratory-gated micro-CT imaging techniques. By characterizing healthy lung morphology under different respiration strategies, we can quantify how these mechanical ventilation protocols affect lung and airway structure and function.

Whole body hyperthermia, but not skin hyperthermia, accelerates brain and locomotor limb circulatory strain and impairs exercise capacity in humans
Steven J. Trangmar, Scott T. Chiesa, Kameljit K. Kalsi, Niels H. Secher, José González-Alonso
January 20, 2017 : e13108

DOI: 10.14814/phy2.13108

Whole-body hyperthermia impairs cardiovascular function and aerobic exercise capacity, but the contribution of skin hyperthermia to the ensuing regional cardiovascular strain is unclear. Body temperature was manipulated with a water-perfused suit to examine how hyperthermia affects brain and active limb circulations and accelerates fatigue during incremental maximal exercise in humans. Whole-body hyperthermia, but not skin hyperthermia, accelerated the reductions in brain and active limb perfusion, compromised aerobic metabolism and impaired exercise capacity. These findings challenge the prevailing notion that skin hyperthermia and hyperperfusion per se is the dominant factor in the development of cardiovascular strain and fatigue during exercise in hot environments.

Bicarbonate-sensing soluble adenylyl cyclase is present in the cell cytoplasm and nucleus of multiple shark tissues
Jinae N. Roa, Martin Tresguerres
January 20, 2017 : e13090

DOI: 10.14814/phy2.13090

We report the presence of the evolutionary conserved soluble adenylyl cyclase (sAC) in gill, rectal gland, intestine, eye, white muscle, and heart of leopard shark (Triakis semifasciata). In gills, sAC was abundantly present in base-secreting cells as previously reported for dogfish shark and round ray, and also in acid-secreting cells suggesting roles in regulating both acid and base secretion. In addition to the cytoplasm, sAC was present in or around cell nuclei, suggesting a role in regulating gene expression.

Aerobic efficiency is associated with the improvement in maximal power output during acute hyperoxia
Tom A. Manselin, Olof Södergård, Filip J. Larsen, Peter Lindholm
January 20, 2017 : e13119

DOI: 10.14814/phy2.13119

This study is the first to test the hypothesis that a mitochondrial capacity exceeding the capacity of the heart to deliver oxygen to the tissue is an important determinant of endurance performance and our results indicate that a large mitochondrial excess capacity is not a prerequisite of endurance capacity. We also found an interesting increase in fat metabolism (52%) during hyperoxic exercise.

Postnatal resveratrol supplementation improves cardiovascular function in male and female intrauterine growth restricted offspring
Amin Shah, Anita Quon, Jude S. Morton, Sandra T. Davidge
January 20, 2017 : e13109

DOI: 10.14814/phy2.13109

Intrauterine growth restriction (IUGR) offspring exposed to a high-fat (HF) diet chronically developed diastolic dysfunction in sex-dependent manner. However, cardiac function after I/R was reduced equally in both sexes, and this was improved by resveratrol. Resveratrol increased cardiac p-AMPK and superoxide dismutase (SOD)2 in only female IUGR offspring indicating sex-specific mechanisms for CVD treatment in IUGR.

Effects of early-life exposure to THIP on brainstem neuronal excitability in the Mecp2-null mouse model of Rett syndrome before and after drug withdrawal
Weiwei Zhong, Christopher M. Johnson, Ningren Cui, Max F. Oginsky, Yang Wu, Chun Jiang
January 20, 2017 : e13110

DOI: 10.14814/phy2.13110

Rett syndrome (RTT) is mostly caused by mutations of the X-linked MECP2 gene. Although the causal neuronal mechanisms are still unclear, accumulating experimental evidence obtained from Mecp2−/−Y mice suggests that imbalanced excitation/inhibition in central neurons plays a major role. Our study suggested early-life exposure to THIP, an extrasynaptiv GABAAR agonist and a potential therapeutic medicine, appears capable of controlling neuronal hyperexcitability in Mecp2−/−Y mice, lasts at least 1 week after withdrawal, and may contribute to the RTT-like symptom mitigation.
Reduced firing rates of high threshold motor units in response to eccentric overload
Tom G. Balshaw, Madhu Pahar, Ross Chesham, Lewis J. Macgregor, Angus M. Hunter
January 20, 2017: e13111
DOI: 10.14814/phy2.13111
Eccentric overload provides superior strength adaptation from increased type IIX fibers. We acutely measured motor unit firing characteristics following eccentric overload; we demonstrated that the high threshold motor units, typically responsible for recruiting type IIX fibers, became slower without affecting Maximal voluntary contractions.

Roflumilast and aquaporin-2 regulation in rat renal inner medullary collecting duct
Ezigobiara N. Umejiego, Yanhua Wang, Mark A. Knepper, Chung-Lin Chou
January 20, 2017: e13121
DOI: 10.14814/phy2.13121
The cyclic nucleotide phosphodiesterase inhibitor roflumilast, FDA-approved for treatment of chronic obstructive pulmonary disease, could theoretically be used to treat X-linked nephrogenic diabetes insipidus (NDI). To test the efficacy of the drug in the renal collecting duct, experiments were performed in inner medullary collecting ducts isolated from rat kidneys. Although roflumilast alone did not increase osmotic water permeability, alter subcellular distribution of aquaporin-2, or alter phosphorylation of aquaporin-2, it enhanced the collecting duct response to vasopressin. The authors conclude that roflumilast is unlikely to be effective in patients with X-linked NDI, but has potential for use in acquired NDI, in which the vasopressin receptor is intact.

Intracellular oxygen tension limits muscle contraction-induced change in muscle oxygen consumption under hypoxic conditions during Hb-free perfusion
Hisashi Takakura, Minoru Ojino, Thomas Jue, Tatsuya Yamada, Yasuro Furuichi, Takeshi Hashimoto, Satoshi Iwase, Kazumi Masuda
January 20, 2017: e13112
DOI: 10.14814/phy2.13112
The resting intracellular oxygen tension (PmbO2) decreases with the decrease in oxygen supply, and muscle contraction leads the further decrease in the oxygen saturation of myoglobin (SmbO2) and PmbO2 at each O2 condition. Moreover, the net increase in mO2 from the muscle contraction (∆mO2) gradually decreased as the net decrease in PmbO2 (∆PmbO2) decreased during muscle contraction. The results of this study suggest that ∆PmbO2 is a key determinant of the ∆mO2.

Case Reports

Uncoupling between cerebral perfusion and oxygenation during incremental exercise in an athlete with postconcussion syndrome: a case report
Sarah Imhoff, Simon Malenfant, Éric Nadreau, Paul Poirier, Damian M. Bailey, Patrice Brassard
January 24, 2017: e13131
DOI: 10.14814/phy2.13131
The case of a paralympic athlete with postconcussion syndrome who experienced a succession of convulsion-awakening periods and reported a marked increase in postconcussion symptoms after undergoing a graded symptom-limited aerobic exercise protocol is presented. Potential mechanisms of cerebrovascular function failure are then discussed.

Original Research

Effects of N-acetyl-seryl-asparyl-lysyl-proline on blood pressure, renal damage, and mortality in systemic lupus erythematosus
Pablo Nakagawa, Juan X. Masjoan-Juncos, Heba Basha, Branislava Janic, Morel E. Worou, Tang-Dong Liao, Cesar A. Romero, Edward L. Peterson, Oscar A. Carretero
January 26, 2017: e13084
DOI: 10.14814/phy2.13084
In a model of systemic lupus erythematosus with hypertension (NZBWF1 mice), N-acetyl-seryl-aspartyl-lysyl-proline prevents glomerulosclerosis without affecting the blood pressure.

Glycation abolishes the cardioprotective effects of albumin during ex vivo ischemia-reperfusion
Rudo F. Mapanga, Danzil E. Joseph, Marco Saieva, Florence Boyer, Philippe Rondeau, Emmanuel Bourdon, M. Faadiel Essop
January 26, 2017: e13107
This study shows that bovine serum albumin acts as a cardioprotective agent during ischemia-reperfusion under simulated hyperglycemic conditions. However, when it becomes glycated, albumin loses its cardioprotective and antioxidant properties. Our data reveal that intracellular AGE signaling is a key downstream mediator of glycated albumin's damaging effects.

Prestretched airway smooth muscle response to length oscillation
Ahmed M. Al-Jumaily, Kevin Roos, Sandy Bessaguet, Miguel Jo Avila
January 26, 2017: e13076

This research investigates the effect of combining both prestretch- and superimposed length oscillations (SILO) applications on contracted porcine airway smooth muscle (ASM). Isolated porcine ASM relaxation was tested with a 0.56%, 2%, or 4% stretch of its reference length (L_ref) in addition to length oscillation (LO). The results demonstrate that a prestretch does enhance the contracted ASM relaxation produced by SILO.

January 2017; volume 5, issue 1

The below Table of Contents is available online at: http://physreports.physiology.org/content/5/1

Original Research

The V-ATPase is expressed in the choroid plexus and mediates cAMP-induced intracellular pH alterations
Henriette L. Christensen, Teodor G. Păunescu, Vladimir Matchkov, Dagne Barbuskaite, Dennis Brown, Helle H. Damkier, Jeppe Praetorius
January 3, 2017: e13072

We hypothesized that the choroid plexus epithelium expresses the V-ATPase as an acid extrusion mechanism in the luminal membrane. Several V-ATPase subunits were detected and only a minor fraction of the protein was localized to the microvilli. The cells displayed significant concanamycin A-sensitive pH recovery (i.e., V-ATPase activity) only after stimulation by cAMP in a trafficking-independent manner.

Corticotropin-releasing hormone improves survival in pneumococcal pneumonia by reducing pulmonary inflammation
Brittney Burnley, Harlan P. Jones
January 4, 2017: e13000

The use of glucocorticoids to reduce inflammatory responses is largely based on the knowledge of the physiological action of the endogenous glucocorticoid, cortisol. Corticotropin-releasing hormone has also been found to mediate inflammatory responses in peripheral tissues. Our results demonstrated that intranasal administration of corticotropin-releasing hormone increases survival associated with a decrease in inflammatory cellular immune responses compared to dexamethasone. Thus, providing evidence of its use in the management of immune and inflammatory responses brought on by severe pneumococcal infection that could reduce mortality risks.

Investigation of the link between fluid shift and airway collapsibility as a mechanism for obstructive sleep apnea in congestive heart failure
Tom Carlisle, Neil R. Ward, Angela Atalla, Martin R. Cowie, Anita K. Simonds, Mary J. Morrell
January 4, 2017: e12956

We investigated the effect of rostral fluid shift on pharyngeal collapsibility as a possible mechanism for obstructive sleep apnoea in heart failure patients. Overnight rostral fluid shift was accompanied by a decrease in pharyngeal calibre and an increase in pharyngeal collapsibility. Our findings show that overnight rostral fluid shift is associated with increased narrowing and collapsibility of the airway in heart failure patients.

Endothelin-1 and ET receptors impair left ventricular function by mediated coronary arteries dysfunction in chronic intermittent hypoxia rats
Jin-Wei Wang, Ai-Ying Li, Qiu-Hong Guo, Ya-jing Guo, James W. Weiss, En-Sheng Ji
January 4, 2017: e13050

The study evaluated the effects of chronic intermittent hypoxia (CIH) on the cardiac function, and unveiled the mechanisms of ET-1 and ET receptors-mediated coronary injury in rats exposed to CIH.
Influence of focus of attention, reinvestment and fall history on elderly gait stability
Jonathan L. A. de Melker Worms, John F. Stins, Erwin E. H. van Wegen, Ian D. Loram, Peter J. Beek
January 11, 2017 : e13061
DOI: 10.14814/phy2.13061
We examined the effects of attentional focus (internal vs. external focus), reinvestment and fall history on elderly gait performance, using full body kinematics in conjunction with a virtual walking environment. Directing attention to the walking surface did not lead to improved gait stability in elderly, compared to internal attention on leg movement. Possible benefits of external focus for balance control might not be present in elderly gait.

Metabolic profiling reveals reprogramming of lipid metabolic pathways in treatment of polycystic ovary syndrome with 3-iodothyronamine
Ebru S. Selen Alpergin, Zeinab Bolandnazar, Martina Sabatini, Michael Rogowski, Grazia Chiellini, Riccardo Zucchi, Fariba M. Assadi-Porter
January 12, 2017 : e13097
DOI: 10.14814/phy2.13097
This paper reveals that subchronic treatment of T1AM in the GC-mice, as a model for polycystic ovary syndrome, is regulated through targeted gene signaling mechanism. T1AM administration induces a profound tissue-specific antilipogenic effect in liver and muscle by lowering gene expression of key regulators of lipid metabolism, while enhancing protection against oxidative stress. In contrast, T1AM has an opposing effect on the regulation of estrogenic pathways.

Respiratory gas exchange as a new aid to monitor acidosis in endotoxemic rats: relationship to metabolic fuel substrates and thermometabolic responses
Alexandre A. Steiner, Elizabeth A. Flatow, Camila F. Brito, Monique T. Fonseca, Eويل N. Komegae
January 12, 2017 : e13100
DOI: 10.14814/phy2.13100
Although acidosis is considered a key aspect of septic and endotoxic shock, the available data lack temporal resolution and stem mainly from anesthetized animals with an artificially constant body temperature. Here, we validated the respiratory exchange ratio as an aid to noninvasively trace the course of acidosis in unanesthetized rats with endotoxic shock, then used this tool to evaluate the relationship of acidosis with metabolic fuel substrates and thermometabolic responses.

Chronic TrkB agonist treatment in old age does not mitigate diaphragm neuromuscular dysfunction
Sarah M. Greising, Amrit K. Vasdev, Wen-Zhi Zhan, Gary C. Sieck, Carlos B. Mantilla
January 12, 2017 : e13103
DOI: 10.14814/phy2.13103
Our study investigated chronic 7,8-DHF (highly selective BDNF analog and TrkB agonist) treatment as a mitigating agent for age-related diaphragm neuromuscular transmission failure and sarcopenia (atrophy and force loss). While the results did not support chronic 7,8-DHF treatment as an effective therapeutic agent, they do not exclude a role for BDNF/TrkB signaling in aging-related changes in the diaphragm muscle.

Increased cardiac work provides a link between systemic hypertension and heart failure
Alexander J. Wilson, Vicky Y. Wang, Gregory B. Sands, Alistair A. Young, Martyn P. Nash, Ian J. LeGrice
January 12, 2017 : e13104
DOI: 10.14814/phy2.13104
Spontaneously hypertensive rat (SHR)s showed impaired systolic function, but developed hypertrophy to compensate and successfully maintain cardiac output. However, this was associated with an increase in stroke work, which may facilitate progression to failure in this animal model.

Underlying mechanism of the cyclic migrating motor complex in Suncus murinus: a change in gastrointestinal pH is the key regulator
Anupom Mondal, Kouhei Koyama, Takashi Mikami, Taichi Horita, Shota Takemi, Sachiko Tsuda, Ichiro Sakata, Takafumi Sakai
January 12, 2017 : e13105
DOI: 10.14814/phy2.13105
The results provide an insight mechanism that the changes in duodenal pH triggered by flowing gastric acid and the release of duodenal bicarbonate through the involvement of PGE2-α and 5HT4 receptor are the key events in the rhythmic occurrence of the migrating motor complex (MMC).

A comparison of substrate oxidation during prolonged exercise in men at terrestrial altitude and normobaric normoxia following the coingestion of 13C glucose and 13C fructose
This study compared the effects of coingesting glucose and fructose on exogenous and endogenous substrate oxidation during prolonged cycling (120 min at 55% of maximal workload) at terrestrial altitude and sea level in men. Using indirect calorimetry and isotope ratio mass spectrometry, this study showed that acute exposure to altitude reduces the reliance on muscle glycogen and increases fat oxidation during exercise in men, compared with sea level.

T-cell redeployment and intracellular cytokine expression following exercise: effects of exercise intensity and cytomegalovirus infection
Emily C. LaVoy, Maryam Hussain, Justin Reed, Hawley Kunz, Mira Pistillo, Austin B. Bigley, Richard J. Simpson
January 13, 2017 : e13070
DOI: 10.14814/phy2.13070

We examined the effects of exercise intensity and prior infection with a common virus (CMV) on the redeployment of T-cell subsets within the blood compartment in response to a single bout of exercise. We show that the augmenting effect of CMV on the redeployment of highly differentiated T cells is independent of the intensity of exercise, as CMV seropositive participants exhibited a greater mobilization of these cells compared to seronegative participants at intensities above and below lactate threshold. Furthermore, the balance of interferon (IFN)-γ+ : IL-4+ T cells was significantly increased following the greatest intensity of exercise, but returned to baseline value during recovery, suggesting a temporary enhancement of CD8+ T-cell cytotoxicity.

Three hours of intermittent hypoxia increases circulating glucose levels in healthy adults
Lauren P. Newhouse, Michael J. Joyner, Timothy B. Curry, Marcello C. Laurenti, Chiara Dalla Man, Claudio Cobelli, Adrian Vella, Jacqueline K. Limberg
January 13, 2017 : e13106
DOI: 10.14814/phy2.13106

Circulating glucose is increased after 3 h of intermittent hypoxia in healthy humans, independent of any lasting changes in insulin sensitivity. These novel findings could explain, in part, the high prevalence of diabetes in patients with sleep apnea and warrant future studies to identify underlying mechanisms.

Electrophysiologic effects of the I\(K1\) inhibitor PA-6 are modulated by extracellular potassium in isolated guinea pig hearts
Gregory S. Hoeker, Mark A. Skarsfeldt, Thomas Jespersen, Steven Poelzing
January 13, 2017 : e13120
DOI: 10.14814/phy2.13120

Under normokalemic conditions, the inward rectifier potassium channel inhibitor PA-6 significantly prolonged APD90, whereas its effect on CV was modest. During hypokalemia, PA-6 prolonged APD90 to a lesser degree, but profoundly increased CV.

Acetazolamide potentiates the afferent drive to prefrontal cortex in vivo
Lezio S. Bueno-Junior, Rafael N. Ruggiero, Matheus T. Rossignoli, Elaine A. Del Bel, Joao P. Leite, Osvaldo D. Uchitel
January 13, 2017 : e13066
DOI: 10.14814/phy2.13066

We show that the carbonic anhydrase inhibitor acetazolamide enhances paired-pulse facilitation – a short-term form of synaptic plasticity – in hippocampal-prefrontal cortical projections in vivo. Also, acetazolamide induces a net inhibitory effect on prefrontal unit activity. Thus, buffer regulation by this drug seems to reduce the spontaneous activity of the neocortex while increasing its responsiveness to afferent inputs. These findings reveal a new way of looking into the systemic effects of acetazolamide in the brain.
**Mass Transport: Circulatory System with Emphasis on Nonendothermic Species**
Dane A. Crossley, Warren W. Burggren, Carl L. Reiber, Jordi Altimiras, Kenneth J. Rodnick
Published online: December 2016
Pages: 17-66

**Pathogenesis of Hyperthyroidism**
Ishita Singh, Jerome M. Hershman
Published online: December 2016
Pages: 67-79

**Neuropeptide Regulation of Social Attachment: The Prairie Vole Model**
Manal Tabbaa, Brennan Paedae, Yan Liu, Zuoxin Wang
Published online: December 2016
Pages: 81-104

**Critical Illness Myopathy (CIM) and Ventilator-Induced Diaphragm Muscle Dysfunction (VIDD): Acquired Myopathies Affecting Contractile Proteins**
Lars Larsson, Oliver Friedrich
Published online: December 2016
Pages: 105-112

**Ischemia/Reperfusion**
Theodore Kalogeris, Christopher P. Baines, Maike Krenz, Ronald J. Korthuis
Published online: December 2016
Pages: 113-170

**Modulation of Skeletal Muscle Contraction by Myosin Phosphorylation**
Rene Vandenboom
Published online: December 2016
Pages: 171-212

**Hyperbaric Environment: Oxygen and Cellular Damage versus Protection**
Angela M. Poff, Dawn Kernagis, Dominic P. D'Agostino
Published online: December 2016
Pages: 213-234

**Dendritic Release of Neurotransmitters**
Mike Ludwig, David Apps, John Menzies, Jyoti C. Patel, Margaret E. Rice
Published online: December 2016
Pages: 235-252

**Contribution of Maladaptive Adipose Tissue Expansion to Development of Cardiovascular Disease**
Guanghong Jia, Yan Jia, James R. Sowers
Published online: December 2016
Pages: 253-262

**FREE FEATURED ARTICLES**
Endocannabinoid Signaling and the Hypothalamic-Pituitary-Adrenal Axis
Ischemia/Reperfusion
Dendritic Release of Neurotransmitters

**ALL REVIEWS**
A model of the enteric neural circuitry underlying the generation of rhythmic motor patterns in the colon: the role of serotonin
Terence Keith Smith, Sang Don Koh
January 1, 2017: G1-G14
DOI: 10.1152/ajpgi.00337.2016

Irritable bowel syndrome: a gut microbiota-related disorder?
Yogesh Bhattarai, David A. Muniz Pedrogo, Purna C. Kashyap
January 1, 2017 : G52-G62
DOI: 10.1152/ajpgi.00338.2016

Functional vascular contributions to cognitive impairment and dementia: mechanisms and consequences of cerebral autoregulatory dysfunction, endothelial impairment, and neurovascular uncoupling in aging
Peter Toth, Stefano Tarantini, Anna Csiszar, Zoltan Ungvari
January 1, 2017 : H1-H20
DOI: 10.1152/ajpgi.00338.2016

Decoding the vasoregulatory activities of bile acid-activated receptors in systemic and portal circulation: role of gaseous mediators
Stefano Fiorucci, Angela Zampella, Giuseppe Cirino, Mariarosaria Bucci, Eleonora Distrutti
January 1, 2017 : H21-H32
DOI: 10.1152/ajpgi.00338.2016

Decoding the vasoregulatory activities of bile acid-activated receptors in systemic and portal circulation: role of gaseous mediators
Stefano Fiorucci, Angela Zampella, Giuseppe Cirino, Mariarosaria Bucci, Eleonora Distrutti
January 1, 2017 : H21-H32
DOI: 10.1152/ajpgi.00338.2016

Role of microRNA in metabolic shift during heart failure
Mark V. Pinti, Quincy A. Hathaway, John M. Hollander
January 1, 2017 : H33-H45
DOI: 10.1152/ajpgi.00338.2016

Role of microRNA in metabolic shift during heart failure
Mark V. Pinti, Quincy A. Hathaway, John M. Hollander
January 1, 2017 : H33-H45
DOI: 10.1152/ajpgi.00338.2016

Metabolic abnormalities and obesity’s impact on the risk for developing preeclampsia
Frank T. Spradley
January 1, 2017 : R5-R12
DOI: 10.1152/ajpgi.00338.2016

Metabolic abnormalities and obesity’s impact on the risk for developing preeclampsia
Frank T. Spradley
January 1, 2017 : R5-R12
DOI: 10.1152/ajpgi.00338.2016

Do high-salt microenvironments drive hypertensive inflammation?
Jason D. Foss, Annet Kirabo, David G. Harrison
January 1, 2017 : R1-R4
DOI: 10.1152/ajpgi.00338.2016

Do high-salt microenvironments drive hypertensive inflammation?
Jason D. Foss, Annet Kirabo, David G. Harrison
January 1, 2017 : R1-R4
DOI: 10.1152/ajpgi.00338.2016

Ironing out the cross talk between FGF23 and inflammation
Valentin David, Connor Francis, Jodie L. Babitt
January 1, 2017 : F1-F8
DOI: 10.1152/ajpgi.00338.2016

Ironing out the cross talk between FGF23 and inflammation
Valentin David, Connor Francis, Jodie L. Babitt
January 1, 2017 : F1-F8
DOI: 10.1152/ajpgi.00338.2016

Physiological roles of claudins in kidney tubule paracellular transport
Shigeaki Muto
January 1, 2017 : F9-F24
DOI: 10.1152/ajpgi.00338.2016

Physiological roles of claudins in kidney tubule paracellular transport
Shigeaki Muto
January 1, 2017 : F9-F24
DOI: 10.1152/ajpgi.00338.2016

Ion transport in the zebrafish kidney from a human disease angle: possibilities, considerations, and future perspectives
Simone Kersten, Francisco J. Arjona
January 9, 2017 : F172-F189
DOI: 10.1152/ajpgi.00338.2016

Ion transport in the zebrafish kidney from a human disease angle: possibilities, considerations, and future perspectives
Simone Kersten, Francisco J. Arjona
January 9, 2017 : F172-F189
DOI: 10.1152/ajpgi.00338.2016

* Does not include Physiology or Physiological Reviews