

# Selected Publications with Seahorse Extracellular Flux (XF) Data

Sorted by Research Area. Publications may be listed in more than one area. Updated June 14, 2010.

## Aging

**Regulation of skeletal muscle oxidative capacity and insulin signaling by the mitochondrial rhomboid protease PARL.** Civitarese AE, MacLean PS, Carling S, Kerr-Bayles L, McMillan RP, Pierce A, Becker TC, Moro C, Finlayson J, Lefort N, Newgard CB, Mandarino L, Cefalu W, Walder K, Collier GR, Hulver MW, Smith SR, Ravussin E; Cell Metab. 2010 May 5;11(5):412-26.

**Bmi1 regulates mitochondrial function and the DNA damage response pathway.** Liu J, Cao L, Chen J, Song S, Lee IH, Quijano C, Liu H, Keyvanfar K, Chen H, Cao LY, Ahn BH, Kumar NG, Rovira II, Xu XL, van Lohuizen M, Motoyama N, Deng CX, Finkel T. (2009) Nature. 459(7245):387-92.

**Mitochondrial dysfunction and oxidative stress mediate the physiological impairment induced by the disruption of autophagy.** J. Julie Wu, Celia Quijano, Edmund Chen, Hongjun Liu, Liu Cao, Maria M. Fergusson, Ilsa I. Rovira, Sarah Gutkind, Mathew P. Daniels, Masaaki Komatsu and Toren Finkel (2009) Aging, April Vol. 1. No. 4.

## Cancer

**Induction of the Warburg effect by Kaposi's sarcoma herpesvirus is required for the maintenance of latently infected endothelial cells.** Delgado T, Carroll PA, Punjabi AS, Margineantu D, Hockenbery DM, Lagunoff M. Proc Natl Acad Sci U S A. 2010 May 24. [Epub ahead of print]

**Mitochondrial metabolism and ROS generation are essential for Kras-mediated tumorigenicity.** Weinberg F, Hamanaka R, Wheaton WW, Weinberg S, Joseph J, Lopez M, Kalyanaraman B, Mutlu GM, Budinger GR, Chandel NS; Proc Natl Acad Sci U S A. 2010 May 11;107(19):8788-93. Epub 2010 Apr 26.

**Alterations in bioenergetics due to changes in mitochondrial DNA copy number.** Qian W, Van Houten B; Methods; 2010 Mar 25 [Epub ahead of print]

**UOK 262 cell line, fumarate hydratase deficient (FH-/FH-) hereditary leiomyomatosis renal cell carcinoma: in vitro and in vivo model of an aberrant energy metabolic pathway in human cancer.** Yang Y, Valera VA, Padilla-Nash HM, Sourbier C, Vocke CD, Vira MA, Abu-Asab MS, Bratslavsky G, Tsokos M, Merino MJ, Pinto PA, Srinivasan R, Ried T, Neckers L, Linehan WM; (2010) Cancer Genet Cytogenet. Jan 1;196(1):45-55.

**Pharmacologically increased tumor hypoxia can be measured by 18F-Fluoroazomycin arabinoside positron emission tomography and enhances tumor response to hypoxic cytotoxin PR-104.** Cairns RA, Bennewith KL, Graves EE, Giaccia AJ, Chang DT, Denko NC; Clin Cancer Res. 2009 Dec 1;15(23):7170-4. Epub 2009 Nov 17.

**Increased OXPHOS activity precedes rise in glycolytic rate in H-RasV12/E1A transformed fibroblasts that develop a Warburg phenotype.** de Groof AJ, Te Lindert MM, van Dommelen MM, Wu M, Willemsse M, Smift AL, Winer M, Oerlemans F, Pluk H, Fransen JA, Wieringa B. (2009) Mol Cancer, Jul 31;8(1):54.

**Methods in Cancer Metabolism: Real-Time Measurement of Mitochondrial Respiration and Glycolysis Rates of Cancer Cells in a Microplate.** M. Wu; Am. Assoc. Cancer Res. Educ. Book, Apr 2009; 2009: 295 - 300.

**Hyaluronan, CD44, and Emmprin Regulate Lactate Efflux and Membrane Localization of Monocarboxylate Transporters in Human Breast Carcinoma Cells.** Slomiany MG, Grass GD, Robertson AD, Yang XY, Maria BL, Beeson C, Toole BP. Cancer Res. (2009) 69(4):1293-1301.

**Multiparameter metabolic analysis reveals a close link between attenuated mitochondrial bioenergetic function and enhanced glycolysis dependency in human tumor cells.** Wu M, Neilson A, Swift AL, Moran R, Tamagnine J, Parslow D, Armistead S, Lemire K, Orrell J, Teich J, Chomicz S and Ferrick DA., Am J Physiol Cell Physiol. 292:C125-C136, 2007.

**LDH-A inhibition, a therapeutic strategy for treatment of hereditary leiomyomatosis and renal cell cancer.** Xie H, Valera VA, Merino MJ, Amato AM, Signoretti S, Linehan WM, Sukhatme VP, Seth P., Mol Cancer Ther. 2009 March. 8(3):626-35, 2009.

**Polo-like kinases mediate cell survival in mitochondrial dysfunction.** Matsumoto T, Wang PY, Ma W, Sung HJ, Matoba S, Hwang PM., (2009) Proc Natl Acad Sci U S A., Aug 25;106(34):14542-6. (XF24 data is in the supplement to this paper.)

## Cardiovascular

**Nutrient-sensitized screening for drugs that shift energy metabolism from mitochondrial respiration to glycolysis.** Gohil VM, Sheth SA, Nilsson R, Wojtovich AP, Lee JH, Perocchi F, Chen W, Clish CB, Ayata C, Brookes PS, Mootha VK; (2010) Nat Biotechnol. Mar;28(3):249-55. Epub 2010 Feb 14.

**Mitochondrial reserve capacity in endothelial cells: The impact of nitric oxide and reactive oxygen species.** Dranka BP, Hill BG, Darley-USmar VM; (2010) Free Radic Biol Med. Jan 18. [Epub ahead of print]

**MicroRNA-210 Controls Mitochondrial Metabolism during Hypoxia by Repressing the Iron-Sulfur Cluster Assembly Proteins ISCU1/2;** Chan SY, Zhang YY, Hemann C, Mahoney CE, Zweier JL, Loscalzo J., Cell Metab. 2009 Oct;10(4):273-84.

**Regulation of vascular smooth muscle cell bioenergetic function by protein glutathiolation.** Hill BG, Higdon AN, Dranka BP, Darley-USmar VM; (2009) Biochim Biophys Acta; Nov 24. [Epub ahead of print]

**Importance of the bioenergetic reserve capacity in response to cardiomyocyte stress induced by 4-hydroxynonenal.** Hill BG, Dranka BP, Zou L, Chatham JC, Darley-USmar V., (2009) Biochem J. September 10. [Epub ahead of print.]

**O<sub>2</sub>-sensing signal cascade: clamping of O<sub>2</sub> respiration, reduced ATP utilization, and inducible fumarate respiration.** Sridharan V, Guichard J, Li CY, Muise-Helmericks R, Beeson CC, Wright GL. Am J Physiol Cell Physiol. 295(1):C29-37, 2008.

**Hypoxia-inducible factor induces local thyroid hormone inactivation during hypoxic-ischemic disease in rats.** Simonides WS, Mulcahey MA, Redout EM, Muller A, Zuidwijk MJ, Visser TJ, Wassen FW, Crescenzi A, da-Silva WS, Harney J, Engel FB, Obregon MJ, Larsen PR, Bianco AC, Huang SA. J Clin Invest. 118(3):975-83, 2008.

**ERRγ directs and maintains the transition to oxidative metabolism in the postnatal heart.** Alaynick WA, Kondo RP, Xie W, He W, Dufour CR, Downes M, Jonker JW, Giles W, Naviaux RK, Giguere V and Evans RM. Cell Metab 6:13-24, 2007 (XF24 data is in the supplement to this paper.)

**The prolyl hydroxylase oxygen-sensing pathway is cytoprotective and allows maintenance of mitochondrial membrane potential during metabolic inhibition.** Sridharan V, Guichard J, Bailey RM, Kasiganesan H, Beeson C and Wright GL. , Am J Physiol Cell Physiol. 292:C719-C728, 2007.

## Cell Physiology

**Use of cells expressing gamma subunit variants to identify diverse mechanisms of AMPK activation.** Hawley SA, Ross FA, Chevtzoff C, Green KA, Evans A, Fogarty S, Towler MC, Brown LJ, Ogunbayo OA, Evans AM, Hardie DG; Cell Metab. 2010 Jun 9;11(6):554-65.

**Bioenergetic characterization of mouse podocytes.** Abe Y, Sakairi T, Kajiyama H, Shrivastav S, Beeson C, Kopp JB; Am J Physiol Cell Physiol. 2010 May 5. [Epub ahead of print]

**Forward operation of adenine nucleotide translocase during F0F1-ATPase reversal: critical role of matrix substrate-level phosphorylation.** Chinopoulos C, Gerencser AA, Mandi M, Mathe K, Töröcsik B, Doczi J, Turiak L, Kiss G, Konrád C, Vajda S, Vereczki V, Oh RJ, Adam-Vizi V; FASEB J. 2010 Mar 10. [Epub ahead of print]

**Alterations in bioenergetics due to changes in mitochondrial DNA copy number.** Qian W, Van Houten B; Methods; 2010 Mar 25 [Epub ahead of print]

**Interdependence of AMPK and SIRT1 for Metabolic Adaptation to Fasting and Exercise in Skeletal Muscle.** Cantó C, Jiang LQ, Deshmukh AS, Matakic C, Coste A, Lagouge M, Zierath JR, Auwerx J; Cell Metab. 2010 Mar 3;11(3):213-9.

**MicroRNA-210 Controls Mitochondrial Metabolism during Hypoxia by Repressing the Iron-Sulfur Cluster Assembly Proteins ISCU1/2.** Chan SY, Zhang YY, Hemann C, Mahoney CE, Zweier JL, Loscalzo J. (2009) Cell Metab. October 10. (4):273-84.

**Negative feedback maintenance of heme homeostasis by its receptor, Rev-erbalpha.** Wu N, Yin L, Hanniman EA, Joshi S, Lazar MA. (2009) Genes Dev. September 15. 23(18):2201-9.

**Fission and selective fusion govern mitochondrial segregation and elimination by autophagy.** Twig G, Elorza A, Molina AJA, Mohamed H, Wikstrom JD, Walzer G, Stiles L, Haigh SE, Katz S, Las G, Alroy J, Wu M, Py BF, Yuan J, Deeney JT, Corkey BE, and Shirihai OS. EMBO J. 2008 Jan 23;27(2):433-46. Epub 2008 Jan 17.

## Hepatobiology & *in vitro* Toxicity

**Biguanide-induced mitochondrial dysfunction yields increased lactate production and cytotoxicity of aerobically-poised HepG2 cells and human hepatocytes in vitro.** Dykens JA, Jamieson J, Marroquin L, Nadanaciva S, Billis PA, Will Y., Toxicol Appl Pharmacol: 233(2):203-10, 2008.

**In vitro assessment of mitochondrial dysfunction and cytotoxicity of Nefazodone, Trazodone and Buspirone.** Dykens JA, Jamieson JD, Marroquin LD, Nadanaciva S, Xu JJ, Dunn MC, Smith AR, and Will Y., Toxicol Sci. 103 (2):335-45, 2008.

**Mitochondrial Dysfunction Assessed Quantitatively in Real Time by Measuring the Extracellular Flux of Oxygen and Protons.** D. Ferrick, M. Wu, A. Swift, A. Neilson; Drug-Induced Mitochondrial Dysfunction, Editor(s): James A. Dykens, Yvonne Will; John Wiley & Sons, Inc., (p 373-382), Published Online: 22 Jan 2008

## Immunology

**HVCN1 modulates BCR signal strength via regulation of BCR-dependent generation of reactive oxygen species.** Capasso M, Bhamrah MK, Henley T, Boyd RS, Langlais C, Cain K, Dinsdale D, Pulford K, Khan M, Musset B, Cherny VV, Morgan D, Gascoyne RD, Vigorito E, Decoursey TE, MacLennan IC, Dyer MJ. Nat Immunol. 2010 Mar;11(3):265-72. Epub 2010 Feb 7.

## Mitochondrial Diseases

**Mitochondrial bioenergetics and dynamics interplay in complex I-deficient fibroblasts.** Morán M, Rivera H, Sánchez-Aragó M, Blázquez A, Merinero B, Ugalde C, Arenas J, Cuezva JM, Martín MA; (2010) Biochim Biophys Acta. Feb 11. [Epub ahead of print]

**Mitochondrial and nuclear genomic responses to loss of LRPPRC expression.** Gohil VM, Nilsson R, Belcher-Timme CA, Luo B, Root DE, Mootha VK; J Biol Chem. 2010 Apr 30;285(18):13742-7. Epub 2010 Mar 10.

## Neurodegeneration

**Nutrient-sensitized screening for drugs that shift energy metabolism from mitochondrial respiration to glycolysis.** Gohil VM, Sheth SA, Nilsson R, Wojtovich AP, Lee JH, Perocchi F, Chen W, Clish CB, Ayata C, Brookes PS, Mootha VK; (2010) Nat Biotechnol. Mar;28(3):249-55. Epub 2010 Feb 14.

**Loss of thymidine kinase 2 alters neuronal bioenergetics and leads to neurodegeneration.** Bartesaghi S, Betts-Henderson J, Cain K, Dinsdale D, Zhou X, Karlsson A, Salomoni P, Nicotera P; (2010) Hum Mol Genet. Feb 1. [Epub ahead of print]

**Mitochondrial Medicine and the Neurodegenerative Mitochondriopathies.** Swerdlow, Russel H, (2009) Pharmaceuticals; 2(3), 150-167.

**Mitochondrial bioenergetic deficit precedes Alzheimer's pathology in female mouse model of Alzheimer's disease.** Yao J, Irwin RW, Zhao L, Nilsen J, Hamilton RT, Brinton RD., (2009) Proc Natl Acad Sci U S A. Aug 10. [Epub ahead of print]

**Bioenergetic Analysis of Isolated Cerebrocortical Nerve Terminals on a Microgram Scale: Spare Respiratory Capacity and Stochastic Mitochondrial Failure.** Choi WS, Gerencser AA, Nicholls DG., J. Neurochem. 109 : 1179-1191, 2009

## Obesity, Diabetes, & Metabolic Diseases

**Regulation of skeletal muscle oxidative capacity and insulin signaling by the mitochondrial rhomboid protease PARL.** Civitarese AE, MacLean PS, Carling S, Kerr-Bayles L, McMillan RP, Pierce A, Becker TC, Moro C, Finlayson J, Lefort N, Newgard CB, Mandarino L, Cefalu W, Walder K, Collier GR, Hulver MW, Smith SR, Ravussin E; Cell Metab. 2010 May 5;11(5):412-26.

**Pyruvate dehydrogenase kinase 1 controls mitochondrial metabolism and insulin secretion in INS-1 832/13 clonal beta- cells.** Krus U, Kotova O, Spéjel P, Hallgard E, Sharoyko VV, Vedin A, Moritz T, Sugden MC, Koeck T, Mulder H; Biochem J. 2010 Apr 23. [Epub ahead of print]

**Mammalian target of rapamycin complex 1 suppresses lipolysis, stimulates lipogenesis, and promotes fat storage.** Chakrabarti P, English T, Shi J, Smas CM, Kandror KV; (2010) Diabetes. Apr;59(4):775-81.

**Glucose regulates enzymatic sources of mitochondrial NADPH in skeletal muscle cells; a novel role for glucose-6-phosphate dehydrogenase.** Mailloux RJ, Harper ME. (2010) FASEB J. Mar 12. [Epub ahead of print]

**Nutrient-sensitized screening for drugs that shift energy metabolism from mitochondrial respiration to glycolysis.** Gohil VM, Sheth SA, Nilsson R, Wojtovich AP, Lee JH, Perocchi F, Chen W, Clish CB, Ayata C, Brookes PS, Mootha VK; (2010) Nat Biotechnol. Mar;28(3):249-55. Epub 2010 Feb 14.

**Interdependence of AMPK and SIRT1 for Metabolic Adaptation to Fasting and Exercise in Skeletal Muscle.** Cantó C, Jiang LQ, Deshmukh AS, Matakı C, Coste A, Lagouge M, Zierath JR, Auwerx J; (2010) Cell Metab. Mar 3;11(3):213-219.

**The homeobox protein Prox1 is a negative modulator of ERR $\alpha$ /PGC-1 $\alpha$  bioenergetic functions.** Alexis Charest-Marcotte, Catherine R. Dufour, Brian J. Wilson, Annie M. Tremblay, Lillian J. Eichner, Daniel H. Arlow, Vamsi K. Mootha and Vincent Giguère; (2010) Gens & Deevlopment, 24(6): Epub Mar 1.

**The histone deacetylase SIRT6 regulates glucose homeostasis via Hif1 $\alpha$ .** Zhong L, D'Urso A, Toiber D, Sebastian C, Henry RE, Vadysirisack DD, Guimaraes A, Marinelli B, Wikstrom JD, Nir T, Clish CB, Vaitheesvaran B, Iliopoulos O, Kurland I, Dor Y, Weissleder R, Shirihai OS, Ellisen LW, Espinosa JM, Mostoslavsky R; (2010) Cell. Jan 22;140(2):280-93.

**A plasma signature of human mitochondrial disease revealed through metabolic profiling of spent media from cultured muscle cells.** Shaham O, Slate NG, Goldberger O, Xu Q, Ramanathan A, Souza AL, Clish CB, Sims KB, Mootha VK; Proc Natl Acad Sci U S A. 2010 Jan 8. [Epub ahead of print]

**Insulin resistance and altered systemic glucose metabolism in mice lacking Nur77.** Chao LC, Wroblewski K, Zhang Z, Pei L, Vergnes L, Ilkayeva OR, Ding SY, Reue K, Watt MJ, Newgard CB, Pilch PF, Hevener AL, Tontonoz P; (2009) Diabetes. Dec;58(12):2788-96.

**KSR2 is an essential regulator of AMP kinase, energy expenditure, and insulin sensitivity.** Costanzo-Garvey DL, Pfluger PT, Dougherty MK, Stock JL, Boehm M, Chaika O, Fernandez MR, Fisher K, Kortum RL, Hong EG, Jun JY, Ko HJ, Schreiner A, Volle DJ, Treece T, Swift AL, Winer M, Chen D, Wu M, Leon LR, Shaw AS, McNeish J, Kim JK, Morrison DK, Tschöp MH, Lewis RE., (2009) Cell Metab. Nov;10(5):366-78.

**Tight coupling between glucose and mitochondrial metabolism in clonal beta-cells is required for robust insulin secretion.** Malmgren S, Nicholls DG, Taneera J, Bacos K, Koeck T, Tamaddon A, Wibom R, Groop L, Ling C, Mulder H, Sharoyko VV; (2009) J Biol Chem. 2009 Nov 20;284(47):32395-404.

**TGR5-mediated bile acid sensing controls glucose homeostasis.** Thomas C, Gioiello A, Noriega L, Strehle A, Oury J, Rizzo G, Macchiarulo A, Yamamoto H, Matakci C, Pruzanski M, Pellicciari R, Auwerx J, Schoonjans K., (2009) Cell Metab. Sep;10(3):167-77.

**Mice lacking phosphatidylcholine transfer protein/StarD2 exhibit increased adaptive thermogenesis and enlarged mitochondria in brown adipose tissue.** Kang HW, Ribich S, Kim BW, Hagen SJ, Bianco AC, Cohen DE (2009) J Lipid Res. Jun 6. [Epub ahead of print]

**C/EBP $\alpha$  and the corepressors CtBP1/2 regulate repression of select visceral white adipose genes during the induction of the brown phenotype in white adipocytes by PPAR $\gamma$  agonists.** Vernochet C, Peres SB, Davis KE, McDonald ME, Qiang L, Wang H, Scherer PE, Farmer SR. (2009) Mol Cell Biol. Jun 29. [Epub ahead of print]

**AMPK regulates energy expenditure by modulating NAD<sup>+</sup> metabolism and SIRT1 activity.** Cantó C, Gerhart-Hines Z, Feige JN, Lagouge M, Noriega L, Milne JC, Elliott PJ, Puigserver P, Auwerx J. (2009) Nature. 2009 Apr 23;458(7241):1056-60.

**Specific SIRT1 Activation Mimics Low Energy Levels and Protects against Diet-Induced Metabolic Disorders by Enhancing Fat Oxidation.** Jerome N. Feige, Marie Lagouge, Carles Canto, Axelle Strehle, Sander M. Houten, Jill C. Milne, Philip D. Lambert, Chikage Matakci, Peter J. Elliott, and Johan Auwerx Cell Metabolism 8, 347–358, 2008.

**Fission and selective fusion govern mitochondrial segregation and elimination by autophagy.** Twig G, Elorza A, Molina AJA, Mohamed H, Wikstrom JD, Walzer G, Stiles L, Haigh SE, Katz S, Las G, Alroy J, Wu M, Py BF, Yuan J, Deeney JT, Corkey BE, and Shirihai OS. EMBO J 27(2):433-46. 2008.

**Peroxisome proliferator activator receptor  $\gamma$  coactivator-1 expression is reduced in obesity: potential pathogenic role of saturated fatty acids and p38 mitogen-activated protein kinase activation.** Crunkhorn S, Dearie F, Mantzoros C, Gami H, da Silva WS, Espinoza D, Faucette R, Barry K, Bianco AC and Patti ME. J Biol Chem 282:15439-15450, 2007.

**The small polyphenolic molecule kaempferol increases cellular energy expenditure and thyroid hormone activation.** da-Silva WS, Harney JW, Kim BW, Li J, Bianco SD, Crescenzi A, Christoffolete MA, Huang SA and Bianco AC. Diabetes 56:767-776, 2007.

**Bile acids induce energy expenditure by promoting intracellular thyroid hormone activation.** Watanabe M, Houten SM, Matakci C, Christoffolete MA, Kim BW, Sato H, Messaddeq N, Harney JW, Ezaki O, Kodama T, Schoonjans K, Bianco AC and Auwerx J. Nature 439:484-489, 2006.

## Screening

**Nutrient-sensitized screening for drugs that shift energy metabolism from mitochondrial respiration to glycolysis.** Gohil VM, Sheth SA, Nilsson R, Wojtovich AP, Lee JH, Perocchi F, Chen W, Clish CB, Ayata C, Brookes PS, Mootha VK; Nat Biotechnol. 2010 Mar;28(3):249-55. Epub 2010 Feb 14.

**Biguanide-induced mitochondrial dysfunction yields increased lactate production and cytotoxicity of aerobically-poised HepG2 cells and human hepatocytes in vitro.** Dykens JA, Jamieson J, Marroquin L, Nadanaciva S, Billis PA, Will Y. Toxicol Appl Pharmacol. 2008 Dec 1;233(2):203-10. Epub 2008 Sep 10.

**Advances in measuring cellular bioenergetics using extracellular flux.** Ferrick DA, Neilson A, and Beeson C. , Drug Discov Today. 2008 Mar;13(5-6):268-74. Epub 2008 Feb 13.

## Technology

**Quantitative Microplate-Based Respirometry with Correction for Oxygen Diffusion.** Akos A. Gerencser, Andy Neilson, Sung W. Choi, Ursula Edman, Nagendra Yadava, Richard J. Oh, David A. Ferrick, David G. Nicholls and Martin D. Brand (2009) Anal. Chem. June 25, 2009.

**Multiparameter metabolic analysis reveals a close link between attenuated mitochondrial bioenergetic function and enhanced glycolysis dependency in human tumor cells.** H. HWu M, Neilson A, Swift AL, Moran R, Tamagnine J, Parslow D, Armistead S, Lemire K, Orrell J, Teich J, Chomicz S and Ferrick DA.H, Am J Physiol Cell Physiol 292:C125-C136, 2007.

**Advances in measuring cellular bioenergetics using extracellular flux.** Ferrick DA, Neilson A, and Beeson C. Drug Discov Today. 13(5-6):268-74, 2008.