

CURRICULUM VITAE

Varman T. Samuel, MD, PhD

Version Date: 9/30/2026

Contact Information:

Address PO BOX 208020
300 Cedar St
New Haven, CT 06520-8020
Phone: 1 (203) 937-4943
Email: varman.samuel@yale.edu

School: Yale School of Medicine

Education:

xxxx - 01/1991 BS, Cornell University, Ithaca, NY
xxxx - 01/1995 MD, NYU School of Medicine, New York, NY
xxxx - 05/2005 PhD, Yale University School of Medicine, Investigative Medicine, New Haven, CT

Career/Academic Appointments:

07/1995 - 06/1998 Residency, Internal Medicine, University of Chicago Hospitals, Chicago, IL
07/1998 - 06/2000 Postdoctoral Fellowship, Endocrinology, University of Chicago Hospitals, Chicago, IL
06/2000 - 06/2002 Postdoctoral Fellow, Endocrinology (Medicine), Yale School of Medicine, New Haven, CT
07/2000 - 06/2005 Graduate Student, Investigative Medicine Program, Yale University School of Medicine, New Haven, CT
09/2001 - 12/2001 Lecturer, Molecular Biophysics and Biochemistry, Yale School of Medicine, New Haven, CT
07/2002 - 06/2005 Postdoctoral Associate, Endocrinology (Medicine), Yale School of Medicine, New Haven, CT
09/2002 - 12/2002 Lecturer, Molecular Biophysics and Biochemistry, Yale School of Medicine, New Haven, CT
07/2003 - 06/2020 Attending Physician, Internal Medicine, VA Connecticut Healthcare system, West Haven, CT
09/2003 - 12/2003 Lecturer, Molecular Biophysics and Biochemistry, Yale School of Medicine, New Haven, CT
09/2004 - 12/2004 Lecturer, Molecular Biophysics and Biochemistry, Yale School of Medicine, New Haven, CT

07/2005 - 06/2011	Assistant Professor, Endocrinology (Medicine), Yale School of Medicine, New Haven, CT
09/2005 - 12/2005	Lecturer, Molecular Biophysics and Biochemistry, Yale School of Medicine, New Haven, CT
09/2006 - 12/2006	Lecturer, Molecular Biophysics and Biochemistry, Yale School of Medicine, New Haven, CT
07/2011 - 06/2031	Associate Professor on Term, Endocrinology (Medicine), Yale School of Medicine, New Haven, CT

Administrative Positions:

2008 - 2011	Co-Director, Mouse Metabolic Phenotyping Center, Yale School of Medicine, New Haven, CT
2013 - Present	Section Chief, Endocrinology, VA, VA Connecticut Healthcare System, New Haven, CT
2019 - Present	VISN1 Lead for Endocrinology, Specialty Services, VA New England Healthcare System, Bedford, MA
2023 - Present	Member, Diabetes/Endocrinology Field Advisory Board, Veterans Affairs, Washington, DC

Board Certification:

2003 - 2023	AB of Internal Medicine, Endocrinology & Metabolism
2023 - 2033	AB of Internal Medicine, Endocrinology & Metabolism, recertification

Professional Honors & Recognition:

International/National/Regional

1991	B.S. with Honors, Cornell University
1995	Alpha Omega Alpha, New York University School of Medicine

Yale University/Yale School of Medicine/Hospital System

2007	Clinical and Translational Scholar
------	------------------------------------

Grants/Clinical Trials History:

Current Grants

Agency:	VA
I.D.#:	BX005790-01A2
Title:	Fructose induced white adipose dysfunction: novel mechanistic insights with ketohexokinase antisense oligonucleotide
Role:	Principal Investigator
Percent effort:	N/A
Total costs:	\$581,011.00

Project period: 10/01/2023 - 09/30/2027

Agency: United States Department of Veterans Affairs
 I.D.#: I01BX005790
 Title: Exploring the mechanisms by which dietary fructose primarily impairs white adipose, not hepatic, function: insights from a novel ketohexokinase antisense oligonucleotide
 P.I.: Varman Samuel
 Role: PI
 Percent effort: N/A
 Total costs: \$581,011.00
 Project period: 10/01/2023 - 09/30/2027

Past Grants

Agency: Veteran's Administration
 I.D.#: I01 BX000901
 Title: Cellular Mechanisms of Gluconeogenesis in T2DM: Role of pyruvate carboxylase
 Role: Principal Investigator
 Percent effort: N/A
 Total costs: \$650,000.00
 Project period: 01/01/2016 - 12/31/2020

Agency: NIAAA
 I.D.#: 1R21AA029457-01
 Title: Exploring mitochondrial flux and lipid compartmentation in vivo to develop new therapies for alcoholic liver disease
 P.I.: Varman Samuel
 Role: PI
 Percent effort: N/A
 Total costs: \$460,625.00
 Project period: 04/01/2022 - 06/30/2023

Agency: National Institute on Alcohol Abuse and Alcoholism
 I.D.#: R21AA029457
 Title: Exploring mitochondrial flux and lipid compartmentation in vivo to develop new therapies for alcoholic liver disease
 P.I.: Varman Samuel
 Role: PI
 Percent effort: N/A
 Total costs: -
 Project period: 05/10/2022 - 04/30/2025

Agency: United States Department of Veterans Affairs
 I.D.#: I01BX000901

Title: Cellular mechanisms for increased gluconeogenesis in type 2 diabetes mellitus: the role of lipid induced pyruvate carboxylase acetylation in increasing hepatic gluconeogenic capacity.
P.I.: Varman Samuel
Role: PI
Percent effort: N/A
Total costs: -
Project period: 10/01/2011 - 12/31/2020

Agency: National Center for Advancing Translational Sciences
I.D.#: K23RR017404
Title: Mechanism of Fat Induced Hepatic Insulin Resistance
P.I.: Varman Samuel
Role: PI
Percent effort: N/A
Total costs: -
Project period: 07/01/2002 - 06/30/2007

Past Clinical Trials

Agencies: National Institutes of Health
I.D.#: 1 K23 RR17404-01
Title: Mechanism of Fat induced Hepatic Insulin Resistance
P.I.: Varman Samuel
Role: Principal Investigator
Percent effort: 100%
Total costs: 627950.0000
Project period: 07/01/2002 - 06/30/2007

Agencies: National Institutes of Health
I.D.#: U24 DK59365
Title: Yale Mouse Metabolic Phenotypic Center
Role: Sub-Investigator
Percent effort: 13%
Total costs: 3306667.0000
Project period: 11/01/2006 - 10/01/2011

Agencies: Yale Center for Clinical Investigation
I.D.#: Clinical and Translational Science Award (CTSA)
Title: Cellular Mechanisms for Increased Hepatic Gluconeogenesis in Type 2 Diabetes Mellitus
P.I.: Varman Samuel
Role: Principal Investigator
Percent effort: 75%
Total costs: 132336.0000

Project period: 04/01/2007 - 09/30/2008

Agencies: National Institutes of Health
 I.D.#: R24 DK085638
 Title: Genetic and Molecular Mechanisms of NAFLD and Hepatic Insulin Resistance in Humans
 Role: Sub-Investigator
 Percent effort: 25%
 Total costs: 8083798.0000
 Project period: 09/01/2010 - 08/01/2015

Agencies: Yale University School of Medicine, American Diabetes Association, Inc.
 I.D.#: 1408014461
 Title: Investigating the Role of the Polyol Pathway in the Central Nervous System
 P.I.: Janice Jin Hwang
 Role: Sub-Investigator
 Percent effort: N/A
 Total costs: -
 Project period: 10/03/2014 - 05/18/2022

Invited Speaking Engagements, Presentations & Workshops Not Affiliated With Yale: International/National

1. "In Vivo Studies of Metabolic Phenotypes: Insights into Novel Targets". IBC Life Sciences Targeting Metabolic Disorders, Boston, MA, June 2009. (Oral Presentation)
2. "Validating Novel Metabolic Targets with Antisense Oligonucleotides: Surprises and Insights". Keystone Symposia Therapeutic Modulation of RNA Using Oligonucleotides, Rockwood, CA, June 2009. (Oral Presentation)
3. "Mechanisms of Fructose Induced Insulin Resistance". American Diabetes Association Annual Scientific Sessions, Orlando, FL, June 2010. (Oral Presentation)
4. "Mechanisms of Insulin Resistance". 15th Annual Diabetes Update, Christina Care Health System, Wilmington, DE, June 2011. (Oral Presentation)
5. "Lipids and Insulin Resistance". Second International Workshop on Animal Models of Weight Loss Surgery, Boston, MA, June 2011. (Oral Presentation)
6. "Role of DGAT's in causing insulin resistance". American Diabetes Association Annual Scientific Sessions, Philadelphia, PA, June 2012. (Oral Presentation)
7. "Mechanisms of Lipid Induced Insulin Resistance". Experimental Biology, San Diego, CA, June 2012. (Oral Presentation)
8. "Studies on Fructose Metabolism". Pfizer Research Seminar, Boston, MA, June 2014. (Oral Presentation)
9. "Exploring gluconeogenesis in T2DM: Roles of pyruvate carboxylase and PEPCK". Endocrine Grand Rounds, Beth Israel-Deaconess Medical Center, Boston, MA, June 2014. (Oral Presentation)
10. "Hepatic Steatosis and Hepatic Insulin Resistance". Peking University Tenth Annual Diabetes Forum, Beijing, Beijing, June 2015. (Oral Presentation)

11. "Nonalcoholic fatty liver disease and insulin resistance". University of Minneapolis, Endocrine Conference, Minneapolis, MN, June 2016. (Oral Presentation)
12. "Insulin Resistance in Skeletal and Cardiac Muscle". 15th Annual World Congress Insulin Resistance Diabetes and Cardiovascular Disease, Los Angeles, CA, June 2017. (Oral Presentation)
13. "Pathogenesis of hepatic insulin resistance and increased gluconeogenesis: It's the liver's fault!". University of Florida, Pathogenesis of hepatic insulin resistance and increased gluconeogenesis: It's the liver's fault!, Gainesville, FL, January 2018. (Lecture)
14. "Proximal Defects in Insulin Signaling account for Hepatic Insulin Resistance". American Diabetes Association, Proximal Defects in Insulin Signaling account for Hepatic Insulin Resistance, Orlando, FL, January 2018. (Lecture)
15. "Hepatic Insulin Resistance and NAFLD". University of Washington, Hepatic Insulin Resistance and NAFLD, Seattle, WA, January 2019. (Lecture)
16. "Pathogenesis of hepatic insulin resistance (or how a UofC Endo alum drifted)". University of Chicago, Pathogenesis of hepatic insulin resistance (or how a UofC Endo alum drifted), Chicago, IL, January 2019. (Lecture)
17. "Connecting the dots between NAFLD and hepatic insulin resistance.". Case Western Reserve University, Connecting the dots between NAFLD and hepatic insulin resistance., Cleveland, OH, January 2019. (Lecture)
18. "Workgroup Memeber". VA/DOD Clinical Practice Guideline Workgroup: Type 2 Diabetes Mellitus, VA DOD joint workgrou, November 2021 - August 2023. (Other)
19. "Type 2 DM: Individualizing Therapies". Veterans Affairs, VA Echo Series, Virtual Presentation to National Audience, August 2025. (Lecture)
20. "MASLD and Hepatic Insulin Resistance: Diacylglycerol is the Proximate Cause for Impaired Insulin Action". STP Northeast Regional Symposium at Regeneron Pharmaceuticals, Tarrytown, NY, September 2025. (Lecture)

Peer-Reviewed Presentations Given at Meetings Not Affiliated With Yale:

International/National

1. Antisense Oligonucleotide Reduction of Hepatic PKC ϵ expression prevents fat-induced hepatic insulin resistance. American Diabetes Association Annual Scientific Sessions, Washington, DC, June 2006. (Other)
2. Transcription control of phosphoenolpyruvate carboxykinase and glucose 6-phosphatase fails to explain hyperglycemia in type 2 diabetes mellitus. American Diabetes Association Annual Scientific Sessions, San Francisco, CA, June 2008. (Other)
3. Fructose Stimulates Hepatic Glycogen Synthesis via Discrete Metabolic and Molecular Pathways. American Diabetes Association Annual Scientific Sessions, Boston, MA, June 2015. (Other)

Professional Service:

Peer Review Groups/Grant Study Sections

2010 - 2012	Member, VISN1 Career Development Award Review Panel, Ad Hoc member.
2011 - 2016	Member, Veterans Affairs ENDA Study Section
2012 - 2014	Member, American Diabetes Association Study Section

Advisory Boards

2018 - 2020	Expert Panel Member, Diabetes Field Advisory Council, Veteran's Administration, As part of the Diabetes Field Advisory Council, Dr. Samuel has helped draft guidance on the criteria for use for continuous glucose monitors for veterans, inpatient use of personal diabetes devices (e.g. pumps and sensors), and technologies for remote patient monitoring.
2023 - Present	Advisor, Diabetes Field Advisory Board, Veterans Affairs, Offers subject matter expertise related to the care of patients with diabetes in the VA system

Journal Services

Reviewer

2003 - Present	Reviewer, Cell
2003 - Present	Reviewer, Cell Metabolism
2003 - Present	Reviewer, New England Journal of Medicine
2003 - Present	Reviewer, Journal of Clinical Investigation
2003 - Present	Reviewer, American Journal of Physiology
2003 - Present	Reviewer, Diabetes
2003 - Present	Reviewer, Diabetes Care
2003 - Present	Reviewer, Journal of Biological Chemistry
2003 - Present	Reviewer, Journal of Clinical Endocrinology and Metabolism
2003 - Present	Reviewer, Journal of Molecular Endocrinology
2003 - Present	Reviewer, Biochimica et Biophysica Acta

Professional Organizations

American Diabetes Association

2005 - Present	Member, American Diabetes Association
----------------	---------------------------------------

Endocrine Society

2021 - Present	Member, Endocrine Society
----------------	---------------------------

Yale University / Hospital System

University

2006 - 2011	Member, VAMC IACUC
2019 - Present	Committee Member, Geriatrics Section Chief Search Committee, Participate in finding, interviewing and assessing candidates for a new section chief for Geriatrics

Medical School

2009 - 2018	Member, M.D.-Ph.D. Faculty Committee
-------------	--------------------------------------

Department

2014 - 2020 Member, Endocrinology Clinical Competency Committee, Evaluate trainees progress in relation to ACGME milestones

Hospital

2019 - 2021 Leadership Committee, Veterans Affairs, VISN1 Lead for Endocrinology
2020 - Present Member, VA Connecticut Transition Team, Participate in planning re-opening of outpatient services for VA Connecticut during the COVID Pandemic

Bibliography:

Peer-Reviewed Original Research

1. Yen A, **Samuel V**, Forbes M. Regulation of cell proliferation: Late down-regulation of c-myc preceding myelo-monocytic cell differentiation. *Journal Of Cellular Physiology* 1992, 153: 147-156. [PMID: 1522128](#), [DOI: 10.1002/jcp.1041530119](#).
2. Lasky S, Posner M, Iwata K, Santos-Moore A, Yen A, **Samuel V**, Clark J, Maizel A. Characterization of a Vitamin D3-Resistant Human Chronic Myelogenous Leukemia Cell Line. *Blood* 1994, 84: 4283-4294. [PMID: 7994044](#), [DOI: 10.1182/blood.v84.12.4283.bloodjournal84124283](#).
3. Chutkow W, **Samuel V**, Hansen P, Pu J, Valdivia C, Makielski J, Burant C. Disruption of Sur2-containing KATP channels enhances insulin-stimulated glucose uptake in skeletal muscle. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2001, 98: 11760-11764. [PMID: 11562480](#), [PMCID: PMC58803](#), [DOI: 10.1073/pnas.201390398](#).
4. **Samuel VT**, Liu ZX, Qu X, Elder BD, Bilz S, Befroy D, Romanelli AJ, Shulman GI. Mechanism of Hepatic Insulin Resistance in Non-alcoholic Fatty Liver Disease*. *Journal Of Biological Chemistry* 2004, 279: 32345-32353. [PMID: 15166226](#), [DOI: 10.1074/jbc.m313478200](#).
5. Bilz S, **Samuel V**, Morino K, Savage D, Choi CS, Shulman GI. Activation of the farnesoid X receptor improves lipid metabolism in combined hyperlipidemic hamsters. *AJP Endocrinology And Metabolism* 2005, 290: e716-e722. [PMID: 16291572](#), [DOI: 10.1152/ajpendo.00355.2005](#).
6. Savage DB, Choi CS, **Samuel VT**, Liu ZX, Zhang D, Wang A, Zhang XM, Cline GW, Yu XX, Geisler JG, Bhanot S, Monia BP, Shulman GI. Reversal of diet-induced hepatic steatosis and hepatic insulin resistance by antisense oligonucleotide inhibitors of acetyl-CoA carboxylases 1 and 2. *Journal Of Clinical Investigation* 2006, 116: 817-824. [PMID: 16485039](#), [PMCID: PMC1366503](#), [DOI: 10.1172/jci27300](#).
7. **Samuel VT**, Choi CS, Phillips TG, Romanelli AJ, Geisler JG, Bhanot S, McKay R, Monia B, Shutter JR, Lindberg RA, Shulman GI, Veniant MM. Targeting Foxo1 in Mice Using Antisense Oligonucleotide Improves Hepatic and Peripheral Insulin Action. *Diabetes* 2006, 55: 2042-2050. [PMID: 16804074](#), [DOI: 10.2337/db05-0705](#).
8. **Samuel VT**, Liu ZX, Wang A, Beddow SA, Geisler JG, Kahn M, Zhang XM, Monia BP, Bhanot S, Shulman GI. Inhibition of protein kinase C ϵ prevents hepatic insulin resistance in nonalcoholic fatty liver disease. *Journal Of Clinical Investigation* 2007, 117: 739-745. [PMID: 17318260](#), [PMCID: PMC1797607](#), [DOI: 10.1172/jci30400](#).

9. Choi CS, Savage DB, Kulkarni A, Yu XX, Liu ZX, Morino K, Kim S, Distefano A, **Samuel VT**, Neschen S, Zhang D, Wang A, Zhang XM, Kahn M, Cline GW, Pandey SK, Geisler JG, Bhanot S, Monia BP, Shulman GI. Suppression of Diacylglycerol Acyltransferase-2 (DGAT2), but Not DGAT1, with Antisense Oligonucleotides Reverses Diet-induced Hepatic Steatosis and Insulin Resistance*. *Journal Of Biological Chemistry* 2007, 282: 22678-22688. [PMID: 17526931](#), [DOI: 10.1074/jbc.m704213200](#).
10. Buhl ES, Neschen S, Yonemitsu S, Rossbacher J, Zhang D, Morino K, Flyvbjerg A, Perret P, **Samuel V**, Kim J, Cline GW, Petersen KF. Increased hypothalamic-pituitary-adrenal axis activity and hepatic insulin resistance in low-birth-weight rats. *AJP Endocrinology And Metabolism* 2007, 293: e1451-e1458. [PMID: 17895287](#), [PMCID: PMC2761595](#), [DOI: 10.1152/ajpendo.00356.2007](#).
11. Morino K, Neschen S, Bilz S, Sono S, Tsirigotis D, Reznick RM, Moore I, Nagai Y, **Samuel V**, Sebastian D, White M, Philbrick W, Shulman GI. Muscle-Specific IRS-1 Ser→Ala Transgenic Mice Are Protected From Fat-Induced Insulin Resistance in Skeletal Muscle. *Diabetes* 2008, 57: 2644-2651. [PMID: 18633112](#), [PMCID: PMC2551673](#), [DOI: 10.2337/db06-0454](#).
12. Choi CS, Befroy DE, Codella R, Kim S, Reznick RM, Hwang YJ, Liu ZX, Lee HY, Distefano A, **Samuel VT**, Zhang D, Cline GW, Handschin C, Lin J, Petersen KF, Spiegelman BM, Shulman GI. Paradoxical effects of increased expression of PGC-1 α on muscle mitochondrial function and insulin-stimulated muscle glucose metabolism. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2008, 105: 19926-19931. [PMID: 19066218](#), [PMCID: PMC2598730](#), [DOI: 10.1073/pnas.0810339105](#).
13. Ahmadian M, Duncan RE, Varady KA, Frasson D, Hellerstein MK, Birkenfeld AL, **Samuel VT**, Shulman GI, Wang Y, Kang C, Sul HS. Adipose Overexpression of Desnutrin Promotes Fatty Acid Use and Attenuates Diet-Induced Obesity. *Diabetes* 2009, 58: 855-866. [PMID: 19136649](#), [PMCID: PMC2661591](#), [DOI: 10.2337/db08-1644](#).
14. Jaworski K, Ahmadian M, Duncan RE, Sarkadi-Nagy E, Varady KA, Hellerstein MK, Lee HY, **Samuel VT**, Shulman GI, Kim KH, de Val S, Kang C, Sul HS. AdPLA ablation increases lipolysis and prevents obesity induced by high-fat feeding or leptin deficiency. *Nature Medicine* 2009, 15: 159-168. [PMID: 19136964](#), [PMCID: PMC2863116](#), [DOI: 10.1038/nm.1904](#).
15. Nagai Y, Yonemitsu S, Erion DM, Iwasaki T, Stark R, Weismann D, Dong J, Zhang D, Jurczak MJ, Löffler MG, Cresswell J, Yu XX, Murray SF, Bhanot S, Monia BP, Bogan JS, **Samuel V**, Shulman GI. The Role of Peroxisome Proliferator-Activated Receptor γ Coactivator-1 β in the Pathogenesis of Fructose-Induced Insulin Resistance. *Cell Metabolism* 2009, 9: 252-264. [PMID: 19254570](#), [PMCID: PMC3131094](#), [DOI: 10.1016/j.cmet.2009.01.011](#).
16. Erion DM, Yonemitsu S, Nie Y, Nagai Y, Gillum MP, Hsiao JJ, Iwasaki T, Stark R, Weismann D, Yu XX, Murray SF, Bhanot S, Monia BP, Horvath TL, Gao Q, **Samuel VT**, Shulman GI. SirT1 knockdown in liver decreases basal hepatic glucose production and increases hepatic insulin responsiveness in diabetic rats. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2009, 106: 11288-11293. [PMID: 19549853](#), [PMCID: PMC2700142](#), [DOI: 10.1073/pnas.0812931106](#).
17. **Samuel VT**, Beddow SA, Iwasaki T, Zhang XM, Chu X, Still CD, Gerhard GS, Shulman GI. Fasting hyperglycemia is not associated with increased expression of PEPCK or G6Pc in patients with Type 2 Diabetes. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2009, 106: 12121-12126. [PMID: 19587243](#), [PMCID: PMC2707270](#), [DOI: 10.1073/pnas.0812547106](#).
18. Roth RJ, Le AM, Zhang L, Kahn M, **Samuel VT**, Shulman GI, Bennett AM. MAPK phosphatase-1 facilitates the loss of oxidative myofibers associated with obesity in mice. *Journal Of Clinical*

- Investigation 2009, 119: 3817-3829. [PMID: 19920356](#), [PMCID: PMC2786792](#), [DOI: 10.1172/jci39054](#).
19. Erion DM, Ignatova ID, Yonemitsu S, Nagai Y, Chatterjee P, Weismann D, Hsiao JJ, Zhang D, Iwasaki T, Stark R, Flannery C, Kahn M, Carmean CM, Yu XX, Murray SF, Bhanot S, Monia BP, Cline GW, **Samuel VT**, Shulman GI. Prevention of Hepatic Steatosis and Hepatic Insulin Resistance by Knockdown of cAMP Response Element-Binding Protein. *Cell Metabolism* 2009, 10: 499-506. [PMID: 19945407](#), [PMCID: PMC2799933](#), [DOI: 10.1016/j.cmet.2009.10.007](#).
 20. Chutkow WA, Birkenfeld AL, Brown JD, Lee HY, Frederick DW, Yoshioka J, Patwari P, Kursawe R, Cushman SW, Plutzky J, Shulman GI, **Samuel VT**, Lee RT. Deletion of the α -Arrestin Protein Txnip in Mice Promotes Adiposity and Adipogenesis While Preserving Insulin Sensitivity. *Diabetes* 2010, 59: 1424-1434. [PMID: 20299477](#), [PMCID: PMC2874703](#), [DOI: 10.2337/db09-1212](#).
 21. Ayala JE, Consortium F, **Samuel V**, Morton G, Obici S, Croniger C, Shulman G, Wasserman D, McGuinness O. Standard operating procedures for describing and performing metabolic tests of glucose homeostasis in mice. *Disease Models & Mechanisms* 2010, 3: 525-534. [PMID: 20713647](#), [PMCID: PMC2938392](#), [DOI: 10.1242/dmm.006239](#).
 22. Jornayvaz FR, Jurczak MJ, Lee HY, Birkenfeld AL, Frederick DW, Zhang D, Zhang XM, **Samuel VT**, Shulman GI. A high-fat, ketogenic diet causes hepatic insulin resistance in mice, despite increasing energy expenditure and preventing weight gain. *AJP Endocrinology And Metabolism* 2010, 299: e808-e815. [PMID: 20807839](#), [PMCID: PMC2980360](#), [DOI: 10.1152/ajpendo.00361.2010](#).
 23. Lee HY, Choi CS, Birkenfeld AL, Alves TC, Jornayvaz FR, Jurczak MJ, Zhang D, Woo DK, Shadel GS, Ladiges W, Rabinovitch PS, Santos JH, Petersen KF, **Samuel VT**, Shulman GI. Targeted Expression of Catalase to Mitochondria Prevents Age-Associated Reductions in Mitochondrial Function and Insulin Resistance. *Cell Metabolism* 2010, 12: 668-674. [PMID: 21109199](#), [PMCID: PMC3013349](#), [DOI: 10.1016/j.cmet.2010.11.004](#).
 24. Weismann D, Erion DM, Ignatova-Todorava I, Nagai Y, Stark R, Hsiao JJ, Flannery C, Birkenfeld AL, May T, Kahn M, Zhang D, Yu XX, Murray SF, Bhanot S, Monia BP, Cline GW, Shulman GI, **Samuel VT**. Knockdown of the gene encoding Drosophila tribbles homologue 3 (Trib3) improves insulin sensitivity through peroxisome proliferator-activated receptor- γ (PPAR- γ) activation in a rat model of insulin resistance. *Diabetologia* 2010, 54: 935-944. [PMID: 21190014](#), [PMCID: PMC4061906](#), [DOI: 10.1007/s00125-010-1984-5](#).
 25. Lin HV, Ren H, **Samuel VT**, Lee HY, Lu TY, Shulman GI, Accili D. Diabetes in Mice With Selective Impairment of Insulin Action in Glut4-Expressing Tissues. *Diabetes* 2011, 60: 700-709. [PMID: 21266328](#), [PMCID: PMC3046830](#), [DOI: 10.2337/db10-1056](#).
 26. Jurczak MJ, Lee HY, Birkenfeld AL, Jornayvaz FR, Frederick DW, Pongratz RL, Zhao X, Moeckel GW, **Samuel VT**, Whaley JM, Shulman GI, Kibbey RG. SGLT2 Deletion Improves Glucose Homeostasis and Preserves Pancreatic β -Cell Function. *Diabetes* 2011, 60: 890-898. [PMID: 21357472](#), [PMCID: PMC3046850](#), [DOI: 10.2337/db10-1328](#).
 27. Jornayvaz FR, Birkenfeld AL, Jurczak MJ, Kanda S, Guigni BA, Jiang DC, Zhang D, Lee HY, **Samuel VT**, Shulman GI. Hepatic insulin resistance in mice with hepatic overexpression of diacylglycerol acyltransferase 2. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2011, 108: 5748-5752. [PMID: 21436037](#), [PMCID: PMC3078388](#), [DOI: 10.1073/pnas.1103451108](#).
 28. Perfield JW, Lee Y, Shulman GI, **Samuel VT**, Jurczak MJ, Chang E, Xie C, Tschlis PN, Obin MS, Greenberg AS. Tumor Progression Locus 2 (TPL2) Regulates Obesity-Associated Inflammation and

- Insulin Resistance. *Diabetes* 2011, 60: 1168-1176. [PMID: 21346175](#), [PMCID: PMC3064090](#), [DOI: 10.2337/db10-0715](#).
29. Kir S, Beddow SA, **Samuel VT**, Miller P, Previs SF, Suino-Powell K, Xu HE, Shulman GI, Kliewer SA, Mangelsdorf DJ. FGF19 as a Postprandial, Insulin-Independent Activator of Hepatic Protein and Glycogen Synthesis. *Science* 2011, 331: 1621-1624. [PMID: 21436455](#), [PMCID: PMC3076083](#), [DOI: 10.1126/science.1198363](#).
 30. Ahmadian M, Abbott MJ, Tang T, Hudak CS, Kim Y, Bruss M, Hellerstein MK, Lee HY, **Samuel VT**, Shulman GI, Wang Y, Duncan RE, Kang C, Sul HS. Desnutrin/ATGL Is Regulated by AMPK and Is Required for a Brown Adipose Phenotype. *Cell Metabolism* 2011, 13: 739-748. [PMID: 21641555](#), [PMCID: PMC3148136](#), [DOI: 10.1016/j.cmet.2011.05.002](#).
 31. Pajvani UB, Shawber CJ, **Samuel VT**, Birkenfeld AL, Shulman GI, Kitajewski J, Accili D. Inhibition of Notch signaling ameliorates insulin resistance in a FoxO1-dependent manner. *Nature Medicine* 2011, 17: 961-967. [PMID: 21804540](#), [PMCID: PMC3387563](#), [DOI: 10.1038/nm.2378](#).
 32. Birkenfeld AL, Lee HY, Guebre-Egziabher F, Alves TC, Jurczak MJ, Jornayvaz FR, Zhang D, Hsiao JJ, Martin-Montalvo A, Fischer-Rosinsky A, Spranger J, Pfeiffer AF, Jordan J, Fromm MF, König J, Lieske S, Carmean CM, Frederick DW, Weismann D, Knauf F, Irusta PM, De Cabo R, Helfand SL, **Samuel VT**, Shulman GI. Deletion of the Mammalian INDY Homolog Mimics Aspects of Dietary Restriction and Protects against Adiposity and Insulin Resistance in Mice. *Cell Metabolism* 2011, 14: 184-195. [PMID: 21803289](#), [PMCID: PMC3163140](#), [DOI: 10.1016/j.cmet.2011.06.009](#).
 33. Birkenfeld AL, Lee HY, Majumdar S, Jurczak MJ, Camporez JP, Jornayvaz FR, Frederick DW, Guigni B, Kahn M, Zhang D, Weismann D, Arafat AM, Pfeiffer AF, Lieske S, Oyadomari S, Ron D, **Samuel VT**, Shulman GI. Influence of the Hepatic Eukaryotic Initiation Factor 2 α (eIF2 α) Endoplasmic Reticulum (ER) Stress Response Pathway on Insulin-mediated ER Stress and Hepatic and Peripheral Glucose Metabolism*. *Journal Of Biological Chemistry* 2011, 286: 36163-36170. [PMID: 21832042](#), [PMCID: PMC3196114](#), [DOI: 10.1074/jbc.m111.228817](#).
 34. Lee H, Birkenfeld AL, Jornayvaz FR, Jurczak MJ, Kanda S, Popov V, Frederick DW, Zhang D, Guigni B, Bharadwaj KG, Choi CS, Goldberg IJ, Park J, Petersen KF, **Samuel VT**, Shulman GI. Apolipoprotein CIII overexpressing mice are predisposed to diet-induced hepatic steatosis and hepatic insulin resistance. *Hepatology* 2011, 54: 1650-1660. [PMID: 21793029](#), [PMCID: PMC3205235](#), [DOI: 10.1002/hep.24571](#).
 35. Kumashiro N, Erion DM, Zhang D, Kahn M, Beddow SA, Chu X, Still CD, Gerhard GS, Han X, Dziura J, Petersen KF, **Samuel VT**, Shulman GI. Cellular mechanism of insulin resistance in nonalcoholic fatty liver disease. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2011, 108: 16381-16385. [PMID: 21930939](#), [PMCID: PMC3182681](#), [DOI: 10.1073/pnas.1113359108](#).
 36. Banks AS, Kim-Muller JY, Mastracci TL, Kofler NM, Qiang L, Haeusler RA, Jurczak MJ, Laznik D, Heinrich G, **Samuel VT**, Shulman GI, Papaioannou VE, Accili D. Dissociation of the Glucose and Lipid Regulatory Functions of FoxO1 by Targeted Knockin of Acetylation-Defective Alleles in Mice. *Cell Metabolism* 2011, 14: 587-597. [PMID: 22055502](#), [PMCID: PMC3221516](#), [DOI: 10.1016/j.cmet.2011.09.012](#).
 37. Jurczak MJ, Lee AH, Jornayvaz FR, Lee HY, Birkenfeld AL, Guigni BA, Kahn M, **Samuel VT**, Glimcher LH, Shulman GI. Dissociation of Inositol-requiring Enzyme (IRE1 α)-mediated c-Jun N-terminal Kinase Activation from Hepatic Insulin Resistance in Conditional X-box-binding Protein-1 (XBP1) Knock-out Mice*. *Journal Of Biological Chemistry* 2011, 287: 2558-2567. [PMID: 22128176](#), [PMCID: PMC3268415](#), [DOI: 10.1074/jbc.m111.316760](#).

38. Jornayvaz FR, Lee HY, Jurczak MJ, Alves TC, Guebre-Egziabher F, Guigni BA, Zhang D, **Samuel VT**, Silva JE, Shulman GI. Thyroid Hormone Receptor- α Gene Knockout Mice Are Protected from Diet-Induced Hepatic Insulin Resistance. *Endocrinology* 2011, 153: 583-591. [PMID: 22147010](#), [PMCID: PMC3384074](#), [DOI: 10.1210/en.2011-1793](#).
39. Beddow SA, **Samuel VT**. Fasting hyperglycemia in the Goto-Kakizaki rat is dependent on corticosterone: a confounding variable in rodent models of type 2 diabetes. *Disease Models & Mechanisms* 2012, 5: 681-685. [PMID: 22864022](#), [PMCID: PMC3424465](#), [DOI: 10.1242/dmm.009035](#).
40. Liu W, Singh R, Choi CS, Lee HY, Keramati AR, **Samuel VT**, Lifton RP, Shulman GI, Mani A. Low Density Lipoprotein (LDL) Receptor-related Protein 6 (LRP6) Regulates Body Fat and Glucose Homeostasis by Modulating Nutrient Sensing Pathways and Mitochondrial Energy Expenditure*. *Journal Of Biological Chemistry* 2012, 287: 7213-7223. [PMID: 22232553](#), [PMCID: PMC3293520](#), [DOI: 10.1074/jbc.m111.286724](#).
41. Morino K, Petersen KF, Sono S, Choi CS, **Samuel VT**, Lin A, Gallo A, Zhao H, Kashiwagi A, Goldberg IJ, Wang H, Eckel RH, Maegawa H, Shulman GI. Regulation of Mitochondrial Biogenesis by Lipoprotein Lipase in Muscle of Insulin-Resistant Offspring of Parents With Type 2 Diabetes. *Diabetes* 2012, 61: 877-887. [PMID: 22368174](#), [PMCID: PMC3314372](#), [DOI: 10.2337/db11-1391](#).
42. Gattu AK, Birkenfeld AL, Jornayvaz F, Dziura J, Li F, Crawford SE, Chu X, Still CD, Gerhard GS, Chung C, **Samuel V**. Insulin resistance is associated with elevated serum pigment epithelium-derived factor (PEDF) levels in morbidly obese patients. *Acta Diabetologica* 2012, 49: 161-169. [PMID: 22547263](#), [DOI: 10.1007/s00592-012-0397-y](#).
43. Li X, Shan J, Chang W, Kim I, Bao J, Lee HJ, Zhang X, **Samuel VT**, Shulman GI, Liu D, Zheng JJ, Wu D. Chemical and genetic evidence for the involvement of Wnt antagonist Dickkopf2 in regulation of glucose metabolism. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2012, 109: 11402-11407. [PMID: 22733757](#), [PMCID: PMC3396493](#), [DOI: 10.1073/pnas.1205015109](#).
44. Ruan HB, Han X, Li MD, Singh JP, Qian K, Azarhoush S, Zhao L, Bennett AM, **Samuel VT**, Wu J, Yates JR, Yang X. O-GlcNAc Transferase/Host Cell Factor C1 Complex Regulates Gluconeogenesis by Modulating PGC-1 α Stability. *Cell Metabolism* 2012, 16: 226-237. [PMID: 22883232](#), [PMCID: PMC3480732](#), [DOI: 10.1016/j.cmet.2012.07.006](#).
45. Brown WH, Gillum MP, Lee HY, Camporez JP, Zhang XM, Jeong JK, Alves TC, Erion DM, Guigni BA, Kahn M, **Samuel VT**, Cravatt BF, Diano S, Shulman GI. Fatty acid amide hydrolase ablation promotes ectopic lipid storage and insulin resistance due to centrally mediated hypothyroidism. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2012, 109: 14966-14971. [PMID: 22912404](#), [PMCID: PMC3443187](#), [DOI: 10.1073/pnas.1212887109](#).
46. Jin ES, Beddow SA, Malloy CR, **Samuel VT**. Hepatic glucose production pathways after three days of a high-fat diet. *Metabolism* 2012, 62: 152-162. [PMID: 22981137](#), [PMCID: PMC3518721](#), [DOI: 10.1016/j.metabol.2012.07.012](#).
47. Erion DM, Popov V, Hsiao JJ, Vatner D, Mitchell K, Yonemitsu S, Nagai Y, Kahn M, Gillum MP, Dong J, Murray SF, Mancham VP, Bhanot S, Cline GW, Shulman GI, **Samuel VT**. The Role of the Carbohydrate Response Element-Binding Protein in Male Fructose-Fed Rats. *Endocrinology* 2012, 154: 36-44. [PMID: 23161873](#), [PMCID: PMC3529388](#), [DOI: 10.1210/en.2012-1725](#).
48. Cantley JL, Yoshimura T, Camporez JP, Zhang D, Jornayvaz FR, Kumashiro N, Guebre-Egziabher F, Jurczak MJ, Kahn M, Guigni BA, Serr J, Hankin J, Murphy RC, Cline GW, Bhanot S, Mancham VP,

- Brown JM, **Samuel VT**, Shulman GI. CGI-58 knockdown sequesters diacylglycerols in lipid droplets/ER-preventing diacylglycerol-mediated hepatic insulin resistance. Proceedings Of The National Academy Of Sciences Of The United States Of America 2013, 110: 1869-1874. [PMID: 23302688](#), [PMCID: PMC3562813](#), [DOI: 10.1073/pnas.1219456110](#).
49. Kumashiro N, Yoshimura T, Cantley JL, Majumdar SK, Guebre-Egziabher F, Kursawe R, Vatner DF, Fat I, Kahn M, Erion DM, Zhang X, Zhang D, Mancham VP, Bhanot S, Gerhard GS, Petersen KF, Cline GW, **Samuel VT**, Shulman GI. Role of patatin-like phospholipase domain-containing 3 on lipid-induced hepatic steatosis and insulin resistance in rats. Hepatology 2013, 57: 1763-1772. [PMID: 23175050](#), [PMCID: PMC3597437](#), [DOI: 10.1002/hep.26170](#).
50. Camporez JP, Jornayvaz FR, Lee HY, Kanda S, Guigni BA, Kahn M, **Samuel VT**, Carvalho CR, Petersen KF, Jurczak MJ, Shulman GI. Cellular Mechanism by Which Estradiol Protects Female Ovariectomized Mice From High-Fat Diet-Induced Hepatic and Muscle Insulin Resistance. Endocrinology 2013, 154: 1021-1028. [PMID: 23364948](#), [PMCID: PMC3578999](#), [DOI: 10.1210/en.2012-1989](#).
51. Erion DM, Kotas ME, McGlashan J, Yonemitsu S, Hsiao JJ, Nagai Y, Iwasaki T, Murray SF, Bhanot S, Cline GW, **Samuel VT**, Shulman GI, Gillum MP. cAMP-responsive Element-binding Protein (CREB)-regulated Transcription Coactivator 2 (CRTC2) Promotes Glucagon Clearance and Hepatic Amino Acid Catabolism to Regulate Glucose Homeostasis*. Journal Of Biological Chemistry 2013, 288: 16167-16176. [PMID: 23595987](#), [PMCID: PMC3668772](#), [DOI: 10.1074/jbc.m113.460246](#).
52. Vatner DF, Weismann D, Beddow SA, Kumashiro N, Erion DM, Liao XH, Grover GJ, Webb P, Phillips KJ, Weiss RE, Bogan JS, Baxter J, Shulman GI, **Samuel VT**. Thyroid hormone receptor- β agonists prevent hepatic steatosis in fat-fed rats but impair insulin sensitivity via discrete pathways. AJP Endocrinology And Metabolism 2013, 305: e89-e100. [PMID: 23651850](#), [PMCID: PMC3725564](#), [DOI: 10.1152/ajpendo.00573.2012](#).
53. Bays HE, Toth PP, Kris-Etherton PM, Abate N, Aronne LJ, Brown WV, Gonzalez-Campoy JM, Jones SR, Kumar R, La Forge R, **Samuel VT**. Obesity, adiposity, and dyslipidemia: A consensus statement from the National Lipid Association. Journal Of Clinical Lipidology 2013, 7: 304-383. [PMID: 23890517](#), [DOI: 10.1016/j.jacl.2013.04.001](#).
54. Löffler MG, Birkenfeld AL, Philbrick KM, Belman JP, Habtemichael EN, Booth CJ, Castorena CM, Choi CS, Jornayvaz FR, Gassaway BM, Lee HY, Cartee GD, Philbrick W, Shulman GI, **Samuel VT**, Bogan JS. Enhanced Fasting Glucose Turnover in Mice with Disrupted Action of TUG Protein in Skeletal Muscle*. Journal Of Biological Chemistry 2013, 288: 20135-20150. [PMID: 23744065](#), [PMCID: PMC3711282](#), [DOI: 10.1074/jbc.m113.458075](#).
55. Camporez JP, Jornayvaz FR, Petersen MC, Pesta D, Guigni BA, Serr J, Zhang D, Kahn M, **Samuel VT**, Jurczak MJ, Shulman GI. Cellular Mechanisms by Which FGF21 Improves Insulin Sensitivity in Male Mice. Endocrinology 2013, 154: 3099-3109. [PMID: 23766126](#), [PMCID: PMC3749479](#), [DOI: 10.1210/en.2013-1191](#).
56. Kumashiro N, Beddow SA, Vatner DF, Majumdar SK, Cantley JL, Guebre-Egziabher F, Fat I, Guigni B, Jurczak MJ, Birkenfeld AL, Kahn M, Perler BK, Puchowicz MA, Mancham VP, Bhanot S, Still CD, Gerhard GS, Petersen KF, Cline GW, Shulman GI, **Samuel VT**. Targeting Pyruvate Carboxylase Reduces Gluconeogenesis and Adiposity and Improves Insulin Resistance. Diabetes 2013, 62: 2183-2194. [PMID: 23423574](#), [PMCID: PMC3712050](#), [DOI: 10.2337/db12-1311](#).
57. Galbo T, Perry RJ, Jurczak MJ, Camporez J, Alves TC, Kahn M, Guigni BA, Serr J, Zhang D, Bhanot S, **Samuel VT**, Shulman GI. Saturated and unsaturated fat induce hepatic insulin resistance

- independently of TLR-4 signaling and ceramide synthesis in vivo. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2013, 110: 12780-12785. [PMID: 23840067](#), [PMCID: PMC3732992](#), [DOI: 10.1073/pnas.1311176110](#).
58. Gattu AK, Swenson ES, Iwakiri Y, **Samuel VT**, Troiano N, Berry R, Church CD, Rodeheffer MS, Carpenter TO, Chung C. Determination of mesenchymal stem cell fate by pigment epithelium-derived factor (PEDF) results in increased adiposity and reduced bone mineral content. *The FASEB Journal* 2013, 27: 4384-4394. [PMID: 23887690](#), [PMCID: PMC3804749](#), [DOI: 10.1096/fj.13-232900](#).
59. Galbo T, Perry RJ, Nishimura E, **Samuel VT**, Quistorff B, Shulman GI. PP2A inhibition results in hepatic insulin resistance despite Akt2 activation. *Aging* 2013, 5: 770-781. [PMID: 24150286](#), [PMCID: PMC3838779](#), [DOI: 10.18632/aging.100611](#).
60. Wheeler SG, Hammond CL, Jornayvaz FR, **Samuel VT**, Shulman GI, Soroka CJ, Boyer JL, Hinkle PM, Ballatori N. $\text{Ost}\alpha^{-/-}$ mice exhibit altered expression of intestinal lipid absorption genes, resistance to age-related weight gain, and modestly improved insulin sensitivity. *AJP Gastrointestinal And Liver Physiology* 2013, 306: g425-g438. [PMID: 24381083](#), [PMCID: PMC3949021](#), [DOI: 10.1152/ajpgi.00368.2013](#).
61. Gattu AK, Birkenfeld AL, Iwakiri Y, Jay S, Saltzman M, Doll J, Protiva P, **Samuel VT**, Crawford SE, Chung C. Pigment Epithelium-Derived Factor (PEDF) Suppresses IL-1 β -Mediated c-Jun N-Terminal Kinase (JNK) Activation to Improve Hepatocyte Insulin Signaling. *Endocrinology* 2014, 155: 1373-1385. [PMID: 24456163](#), [PMCID: PMC5393334](#), [DOI: 10.1210/en.2013-1785](#).
62. Giménez-Cassina A, Garcia-Haro L, Choi CS, Osundiji MA, Lane EA, Huang H, Yildirim MA, Szlyk B, Fisher JK, Polak K, Patton E, Wiwczar J, Godes M, Lee DH, Robertson K, Kim S, Kulkarni A, Distefano A, **Samuel V**, Cline G, Kim YB, Shulman GI, Danial NN. Regulation of Hepatic Energy Metabolism and Gluconeogenesis by BAD. *Cell Metabolism* 2014, 19: 272-284. [PMID: 24506868](#), [PMCID: PMC3971904](#), [DOI: 10.1016/j.cmet.2013.12.001](#).
63. Lee HY, Gattu AK, Camporez JP, Kanda S, Guigni B, Kahn M, Zhang D, Galbo T, Birkenfeld AL, Jornayvaz FR, Jurczak MJ, Choi CS, Yan Z, Williams RS, Shulman GI, **Samuel VT**. Muscle-specific activation of Ca²⁺/calmodulin-dependent protein kinase IV increases whole-body insulin action in mice. *Diabetologia* 2014, 57: 1232-1241. [PMID: 24718953](#), [PMCID: PMC5634138](#), [DOI: 10.1007/s00125-014-3212-1](#).
64. Cantley JL, Vatner DF, Galbo T, Madiraju A, Petersen M, Perry RJ, Kumashiro N, Guebre-Egziabher F, Gattu AK, Stacy MR, Dione DP, Sinusas AJ, Ragolia L, Hall CE, Manchem VP, Bhanot S, Bogan JS, **Samuel VT**. Targeting steroid receptor coactivator 1 with antisense oligonucleotides increases insulin-stimulated skeletal muscle glucose uptake in chow-fed and high-fat-fed male rats. *AJP Endocrinology And Metabolism* 2014, 307: e773-e783. [PMID: 25159329](#), [PMCID: PMC4216948](#), [DOI: 10.1152/ajpendo.00148.2014](#).
65. **Samuel VT**. The emerging role of oestrogen-related receptor γ as a regulator of energy metabolism. *Diabetologia* 2014, 57: 2440-2443. [PMID: 25257097](#), [PMCID: PMC4488899](#), [DOI: 10.1007/s00125-014-3377-7](#).
66. Camporez JP, Kanda S, Petersen MC, Jornayvaz FR, **Samuel VT**, Bhanot S, Petersen KF, Jurczak MJ, Shulman GI. ApoA5 knockdown improves whole-body insulin sensitivity in high-fat-fed mice by reducing ectopic lipid content. *Journal Of Lipid Research* 2014, 56: 526-536. [PMID: 25548259](#), [PMCID: PMC4340301](#), [DOI: 10.1194/jlr.m054080](#).
67. Vatner DF, Majumdar SK, Kumashiro N, Petersen MC, Rahimi Y, Gattu AK, Bears M, Camporez JP, Cline GW, Jurczak MJ, **Samuel VT**, Shulman GI. Insulin-independent regulation of hepatic

- triglyceride synthesis by fatty acids. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2015, 112: 1143-1148. [PMID: 25564660](#), [PMCID: PMC4313795](#), [DOI: 10.1073/pnas.1423952112](#).
68. Kliewer KL, Ke JY, Lee HY, Stout MB, Cole RM, **Samuel VT**, Shulman GI, Belury MA. Short-term food restriction followed by controlled refeeding promotes gorging behavior, enhances fat deposition, and diminishes insulin sensitivity in mice. *The Journal Of Nutritional Biochemistry* 2015, 26: 721-728. [PMID: 25913018](#), [PMCID: PMC4461460](#), [DOI: 10.1016/j.jnutbio.2015.01.010](#).
 69. Habtemichael EN, Alcázar-Román A, Rubin BR, Grossi LR, Belman JP, Julca O, Löffler MG, Li H, Chi NW, **Samuel VT**, Bogan JS. Coordinated Regulation of Vasopressin Inactivation and Glucose Uptake by Action of TUG Protein in Muscle*. *Journal Of Biological Chemistry* 2015, 290: 14454-14461. [PMID: 25944897](#), [PMCID: PMC4505512](#), [DOI: 10.1074/jbc.c115.639203](#).
 70. Camporez JP, Asrih M, Zhang D, Kahn M, **Samuel VT**, Jurczak MJ, Jornayvaz FR. Hepatic insulin resistance and increased hepatic glucose production in mice lacking Fgf21. *Journal Of Endocrinology* 2015, 226: 207-217. [PMID: 26203166](#), [DOI: 10.1530/joe-15-0136](#).
 71. Vatner DF, Snikeris J, Popov V, Perry RJ, Rahimi Y, **Samuel VT**. 3,5 Diiodo-L-Thyronine (T2) Does Not Prevent Hepatic Steatosis or Insulin Resistance in Fat-Fed Sprague Dawley Rats. *PLOS ONE* 2015, 10: e0140837. [PMID: 26485433](#), [PMCID: PMC4618341](#), [DOI: 10.1371/journal.pone.0140837](#).
 72. Pesta DH, Perry RJ, Guebre-Egziabher F, Zhang D, Jurczak M, Fischer-Rosinsky A, Daniels MA, Willmes DM, Bhanot S, Bornstein SR, Knauf F, **Samuel VT**, Shulman GI, Birkenfeld AL. Prevention of diet-induced hepatic steatosis and hepatic insulin resistance by second generation antisense oligonucleotides targeted to the longevity gene mIndy (Slc13a5). *Aging* 2015, 7: 1086-1093. [PMID: 26647160](#), [PMCID: PMC4712334](#), [DOI: 10.18632/aging.100854](#).
 73. Popov VB, Jornayvaz FR, Akgul EO, Kanda S, Jurczak MJ, Zhang D, Abudukadier A, Majumdar SK, Guigni B, Petersen KF, Manchem VP, Bhanot S, Shulman GI, **Samuel VT**. Second-generation antisense oligonucleotides against β -catenin protect mice against diet-induced hepatic steatosis and hepatic and peripheral insulin resistance. *The FASEB Journal* 2015, 30: 1207-1217. [PMID: 26644352](#), [PMCID: PMC4750414](#), [DOI: 10.1096/fj.15-271999](#).
 74. Li X, Jung JJ, Nie L, Razavian M, Zhang J, **Samuel V**, Sadeghi MM. The neuropilin-like protein ESDN regulates insulin signaling and sensitivity. *AJP Heart And Circulatory Physiology* 2016, 310: h1184-h1193. [PMID: 26921437](#), [PMCID: PMC4867389](#), [DOI: 10.1152/ajpheart.00782.2015](#).
 75. Madiraju AK, Alves T, Zhao X, Cline GW, Zhang D, Bhanot S, **Samuel VT**, Kibbey RG, Shulman GI. Argininosuccinate synthetase regulates hepatic AMPK linking protein catabolism and ureagenesis to hepatic lipid metabolism. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2016, 113: e3423-e3430. [PMID: 27247419](#), [PMCID: PMC4914193](#), [DOI: 10.1073/pnas.1606022113](#).
 76. Petersen MC, Madiraju AK, Gassaway BM, Marcel M, Nasiri AR, Butrico G, Marcucci MJ, Zhang D, Abulizi A, Zhang XM, Philbrick W, Hubbard SR, Jurczak MJ, **Samuel VT**, Rinehart J, Shulman GI. Insulin receptor Thr1160 phosphorylation mediates lipid-induced hepatic insulin resistance. *Journal Of Clinical Investigation* 2016, 126: 4361-4371. [PMID: 27760050](#), [PMCID: PMC5096902](#), [DOI: 10.1172/jci86013](#).
 77. Lee HY, Lee JS, Alves T, Ladiges W, Rabinovitch PS, Jurczak MJ, Choi CS, Shulman GI, **Samuel VT**. Mitochondrial Targeted Catalase Protects Against High-Fat Diet-Induced Muscle Insulin Resistance by Decreasing Intramuscular Lipid Accumulation. *Diabetes* 2017, 66: db161334. [PMID: 28476930](#), [PMCID: PMC5521865](#), [DOI: 10.2337/db16-1334](#).

78. Horst K, Gilijamse PW, Versteeg RI, Ackermans MT, Nederveen AJ, la Fleur SE, Romijn JA, Nieuwdorp M, Zhang D, **Samuel VT**, Vatner DF, Petersen KF, Shulman GI, Serlie MJ. Hepatic Diacylglycerol-Associated Protein Kinase C ϵ Translocation Links Hepatic Steatosis to Hepatic Insulin Resistance in Humans. *Cell Reports* 2017, 19: 1997-2004. [PMID: 28591572](#), [PMCID: PMC5469939](#), [DOI: 10.1016/j.celrep.2017.05.035](#).
79. Vatner DF, Goedeke L, Camporez JG, Lyu K, Nasiri AR, Zhang D, Bhanot S, Murray SF, Still CD, Gerhard GS, Shulman GI, **Samuel VT**. Angptl8 antisense oligonucleotide improves adipose lipid metabolism and prevents diet-induced NAFLD and hepatic insulin resistance in rodents. *Diabetologia* 2018, 61: 1435-1446. [PMID: 29497783](#), [PMCID: PMC5940564](#), [DOI: 10.1007/s00125-018-4579-1](#).
80. Gassaway BM, Petersen MC, Surovtseva YV, Barber KW, Sheetz JB, Aerni HR, Merkel JS, **Samuel VT**, Shulman GI, Rinehart J. PKC ϵ contributes to lipid-induced insulin resistance through cross talk with p70S6K and through previously unknown regulators of insulin signaling. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2018, 115: e8996-e9005. [PMID: 30181290](#), [PMCID: PMC6156646](#), [DOI: 10.1073/pnas.1804379115](#).
81. Beddow SA, Gattu AK, Vatner DF, Paoletta L, Alqarzaee A, Tashkandi N, Popov V, Church C, Rodeheffer M, Cline G, Geisler J, Bhanot S, **Samuel VT**. PEPCK1 Antisense Oligonucleotide Prevents Adiposity and Impairs Hepatic Glycogen Synthesis in High-Fat Male Fed Rats. *Endocrinology* 2018, 160: 205-219. [PMID: 30445425](#), [PMCID: PMC6307100](#), [DOI: 10.1210/en.2018-00630](#).
82. Abulizi A, Camporez JP, Zhang D, **Samuel VT**, Shulman GI, Vatner DF. Ectopic lipid deposition mediates insulin resistance in adipose specific 11 β -hydroxysteroid dehydrogenase type 1 transgenic mice. *Metabolism* 2018, 93: 1-9. [PMID: 30576689](#), [PMCID: PMC6401251](#), [DOI: 10.1016/j.metabol.2018.12.003](#).
83. Abulizi A, Camporez JP, Jurczak MJ, Høyer KF, Zhang D, Cline GW, **Samuel VT**, Shulman GI, Vatner DF. Adipose glucocorticoid action influences whole-body metabolism via modulation of hepatic insulin action. *The FASEB Journal* 2019, 33: 8174-8185. [PMID: 30922125](#), [PMCID: PMC6593882](#), [DOI: 10.1096/fj.201802706r](#).
84. **Samuel VT**, Shulman GI. Nonalcoholic Fatty Liver Disease, Insulin Resistance, and Ceramides. *The New England Journal Of Medicine* 2019, 381: 1866-1869. [PMID: 31693811](#), [DOI: 10.1056/nejmcibr1910023](#).
85. Gassaway BM, Cardone RL, Padyana AK, Petersen MC, Judd ET, Hayes S, Tong S, Barber KW, Apostolidi M, Abulizi A, Sheetz JB, Kshitiz, Aerni HR, Gross S, Kung C, **Samuel VT**, Shulman GI, Kibbey RG, Rinehart J. Distinct Hepatic PKA and CDK Signaling Pathways Control Activity-Independent Pyruvate Kinase Phosphorylation and Hepatic Glucose Production. *Cell Reports* 2019, 29: 3394-3404.e9. [PMID: 31825824](#), [PMCID: PMC6951436](#), [DOI: 10.1016/j.celrep.2019.11.009](#).
86. Nozaki Y, Petersen MC, Zhang D, Vatner DF, Perry RJ, Abulizi A, Haedersdal S, Zhang XM, Butrico GM, **Samuel VT**, Mason GF, Cline GW, Petersen KF, Rothman DL, Shulman GI. Metabolic control analysis of hepatic glycogen synthesis in vivo. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2020, 117: 8166-8176. [PMID: 32188779](#), [PMCID: PMC7149488](#), [DOI: 10.1073/pnas.1921694117](#).
87. Lyu K, Zhang Y, Zhang D, Kahn M, Horst KW, Rodrigues MRS, Gaspar RC, Hirabara SM, Luukkonen PK, Lee S, Bhanot S, Rinehart J, Blume N, Rasch MG, Serlie MJ, Bogan JS, Cline GW, **Samuel VT**, Shulman GI. A Membrane-Bound Diacylglycerol Species Induces PKC ϵ -Mediated Hepatic Insulin

- Resistance. *Cell Metabolism* 2020, 32: 654-664.e5. [PMID: 32882164](#), [PMCID: PMC7544641](#), [DOI: 10.1016/j.cmet.2020.08.001](#).
88. Abulizi A, Vatner DF, Ye Z, Wang Y, Camporez JP, Zhang D, Kahn M, Lyu K, Sirwi A, Cline GW, Hussain MM, Aspichueta P, **Samuel VT**, Shulman GI. Membrane-bound sn-1,2-diacylglycerols explain the dissociation of hepatic insulin resistance from hepatic steatosis in MTTP knockout mice. *Journal Of Lipid Research* 2020, 61: 1565-1576. [PMID: 32907986](#), [PMCID: PMC7707176](#), [DOI: 10.1194/jlr.ra119000586](#).
89. Lyu K, Zhang D, Song J, Li X, Perry RJ, **Samuel VT**, Shulman GI. Short-term overnutrition induces white adipose tissue insulin resistance through sn-1,2-diacylglycerol – PKCε – insulin receptorT1160 phosphorylation. *JCI Insight* 2021, 6: e139946. [PMID: 33411692](#), [PMCID: PMC7934919](#), [DOI: 10.1172/jci.insight.139946](#).
90. Lee H, Jang H, Li H, **Samuel V**, Dudek K, Osipovich A, Magnuson M, Sklar J, Shulman G. Deletion of Jazf1 gene causes early growth retardation and insulin resistance in mice. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2022, 119: e2213628119. [PMID: 36442127](#), [PMCID: PMC9894197](#), [DOI: 10.1073/pnas.2213628119](#).
91. Sakuma I, Gaspar R, Luukkonen P, Kahn M, Zhang D, Zhang X, Murray S, Golla J, Vatner D, **Samuel V**, Petersen K, Shulman G. Lysophosphatidic acid triggers inflammation in the liver and white adipose tissue in rat models of 1-acyl-sn-glycerol-3-phosphate acyltransferase 2 deficiency and overnutrition. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2023, 120: e2312666120. [PMID: 38127985](#), [PMCID: PMC10756285](#), [DOI: 10.1073/pnas.2312666120](#).
92. Xu W, Zhang D, Ma Y, Gaspar R, Kahn M, Nasiri A, Murray S, **Samuel V**, Shulman G. Ceramide synthesis inhibitors prevent lipid-induced insulin resistance through the DAG-PKCε-insulin receptorT1150 phosphorylation pathway. *Cell Reports* 2024, 43: 114746. [PMID: 39302831](#), [DOI: 10.1016/j.celrep.2024.114746](#).
93. Goedeke L, Strober J, Suh R, Paoletta L, Li X, Rogers J, Petersen M, Nasiri A, Casals G, Kahn M, Cline G, **Samuel V**, Shulman G, Vatner D. High-fat-diet-induced hepatic insulin resistance per se attenuates murine de novo lipogenesis. *IScience* 2024, 27: 111175. [PMID: 39524330](#), [PMCID: PMC11550620](#), [DOI: 10.1016/j.isci.2024.111175](#).
94. Sakuma I, Gaspar R, Nasiri A, Dufour S, Kahn M, Zheng J, LaMoia T, Guerra M, Taki Y, Kawashima Y, Yimlamai D, Perelis M, Vatner D, Petersen K, Huttasch M, Knebel B, Kahl S, Roden M, **Samuel V**, Tanaka T, Shulman G. Liver lipid droplet cholesterol content is a key determinant of metabolic dysfunction-associated steatohepatitis. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2025, 122: e2502978122. [PMID: 40310463](#), [PMCID: PMC12067271](#), [DOI: 10.1073/pnas.2502978122](#).
95. Zheng J, Gaspar R, Sakuma I, Hubbard B, Zhang D, Nasiri A, Kahn M, Perelis M, **Samuel V**, Petersen K, Shulman G. Cideb knockdown in mice increases mitochondrial fat oxidation and reverses hepatic steatosis and insulin resistance by the plasma membrane sn-1,2-DAGs–PKCε–insulin receptor kinaseT1150 pathway. *Diabetologia* 2025, 68: 2906-2920. [PMID: 40908405](#), [DOI: 10.1007/s00125-025-06539-8](#).
96. Sakuma I, Gaspar R, Morgan H, Zheng J, Nasiri A, Dufour S, Kahn M, Guerra M, Taki Y, Kawashima Y, Yimlamai D, Perelis M, Vatner D, Petersen K, **Samuel V**, Tanaka T, Shulman G. CIDEB and CGI-58 differentially regulate liver lipid-droplet cholesterol to modulate metabolic dysfunction-associated

steatohepatitis severity. *Cell Reports* 2026, 45: 117369. [PMID: 42234563](#), [PMCID: PMC13373722](#), [DOI: 10.1016/j.celrep.2026.117369](#).

Peer-Reviewed Reviews, Practice Guidelines, Standards, and Consensus Statements

1. **Samuel VT**, Petersen KF, Shulman GI. Lipid-induced insulin resistance: unravelling the mechanism. *The Lancet* 2010, 375: 2267-2277. [PMID: 20609972](#), [PMCID: PMC2995547](#), [DOI: 10.1016/s0140-6736\(10\)60408-4](#).
2. Jornayvaz FR, **Samuel VT**, Shulman GI. The Role of Muscle Insulin Resistance in the Pathogenesis of Atherogenic Dyslipidemia and Nonalcoholic Fatty Liver Disease Associated with the Metabolic Syndrome. *Annual Review Of Nutrition* 2010, 30: 273-290. [PMID: 20645852](#), [PMCID: PMC3730129](#), [DOI: 10.1146/annurev.nutr.012809.104726](#).
3. **Samuel VT**. Fructose induced lipogenesis: from sugar to fat to insulin resistance. *Trends In Endocrinology And Metabolism* 2010, 22: 60-65. [PMID: 21067942](#), [DOI: 10.1016/j.tem.2010.10.003](#).
4. **Samuel VT**, Shulman GI. Mechanisms for Insulin Resistance: Common Threads and Missing Links. *Cell* 2012, 148: 852-871. [PMID: 22385956](#), [PMCID: PMC3294420](#), [DOI: 10.1016/j.cell.2012.02.017](#).
5. Perry RJ, **Samuel VT**, Petersen KF, Shulman GI. The role of hepatic lipids in hepatic insulin resistance and type 2 diabetes. *Nature* 2014, 510: 84-91. [PMID: 24899308](#), [PMCID: PMC4489847](#), [DOI: 10.1038/nature13478](#).
6. Pesta DH, **Samuel VT**. A high-protein diet for reducing body fat: mechanisms and possible caveats. *Nutrition & Metabolism* 2014, 11: 53. [PMID: 25489333](#), [PMCID: PMC4258944](#), [DOI: 10.1186/1743-7075-11-53](#).
7. **Samuel VT**, Shulman GI. The pathogenesis of insulin resistance: integrating signaling pathways and substrate flux. *Journal Of Clinical Investigation* 2016, 126: 12-22. [PMID: 26727229](#), [PMCID: PMC4701542](#), [DOI: 10.1172/jci77812](#).
8. Herman MA, **Samuel VT**. The Sweet Path to Metabolic Demise: Fructose and Lipid Synthesis. *Trends In Endocrinology And Metabolism* 2016, 27: 719-730. [PMID: 27387598](#), [PMCID: PMC5035631](#), [DOI: 10.1016/j.tem.2016.06.005](#).
9. **Samuel VT**, Shulman GI. Nonalcoholic Fatty Liver Disease as a Nexus of Metabolic and Hepatic Diseases. *Cell Metabolism* 2017, 27: 22-41. [PMID: 28867301](#), [PMCID: PMC5762395](#), [DOI: 10.1016/j.cmet.2017.08.002](#).
10. **Samuel VT**, Petersen MC, Gassaway BM, Vatner DF, Rinehart J, Shulman GI. Considering the Links Between Nonalcoholic Fatty Liver Disease and Insulin Resistance: Revisiting the Role of Protein Kinase C ϵ . *Hepatology* 2019, 70: 2217-2220. [PMID: 31220350](#), [DOI: 10.1002/hep.30829](#).
11. VA/DoD Clinical Practice Guideline. (2023). Management of Type 2 Diabetes Mellitus. Washington, DC: U.S. Government Printing Office.
12. Sun X, Mahler C, Stull N, Nasiri A, Zhou B, **Samuel V**, Shulman G, Flak J, Ren H. G Protein-Coupled Receptor 17 (Gpr17) Enhances Leptin and Insulin Sensitivity in Lean and Obese Mouse Models. *Obesity* 2026, 34: 77-87. [PMID: 42130095](#), [PMCID: PMC13250742](#), [DOI: 10.1002/oby.70202](#).

Chapters

1. **Samuel V**, Shulman G. Insulin Resistance in NAFLD: Potential Mechanisms and Therapies. 2004, 38-54. [DOI: 10.1002/9780470987438.ch4](#).

2. **Samuel V**, Petersen K, Shulman G. Insulin Resistance. 2009, 469-483. [DOI: 10.1002/9780470747919.ch31](https://doi.org/10.1002/9780470747919.ch31).
3. Petersen M, **Samuel V**, Petersen K, Shulman G. Non-alcoholic Fatty Liver Disease and Insulin Resistance. 2020, 455-471. [DOI: 10.1002/9781119436812.ch37](https://doi.org/10.1002/9781119436812.ch37).

Commentaries, Editorials and Letters

1. Jornayvaz F, Jurczak M, **Samuel V**, Shulman G. Reply to Monetti et al.: Hepatic steatosis and diacylglycerol-mediated hepatic insulin resistance in acyl-CoA:diacylglycerol acyltransferase 2 (DGAT2) transgenic mice. *Proceedings Of The National Academy Of Sciences Of The United States Of America* 2011, 108: e524-e524. [PMCID: PMC3161525](https://pubmed.ncbi.nlm.nih.gov/2161525/), [DOI: 10.1073/pnas.1109195108](https://doi.org/10.1073/pnas.1109195108).
2. Birkenfeld A, Lee H, Guebre-Egziabher F, Alves T, Jurczak M, Jornayvaz F, Zhang D, Hsiao J, Martin-Montalvo A, Fischer-Rosinsky A, Spranger J, Pfeiffer A, Jordan J, Fromm M, König J, Lieske S, Carmean C, Frederick D, Weismann D, Knauf F, Irusta P, De Cabo R, Helfand S, **Samuel V**, Shulman G. Deletion of the Mammalian INDY Homolog Mimics Aspects of Dietary Restriction and Protects against Adiposity and Insulin Resistance in Mice. *Cell Metabolism* 2011, 14: 567. [DOI: 10.1016/j.cmet.2011.09.005](https://doi.org/10.1016/j.cmet.2011.09.005).
3. Madiraju AK, Erion DM, Rahimi Y, Zhang XM, Braddock DT, Albright RA, Prigaro BJ, Wood JL, Bhanot S, MacDonald MJ, Jurczak MJ, Camporez JP, Lee HY, Cline GW, **Samuel VT**, Kibbey RG, Shulman GI. Metformin suppresses gluconeogenesis by inhibiting mitochondrial glycerophosphate dehydrogenase. *Nature* 2014, 510: 542-546. [PMID: 24847880](https://pubmed.ncbi.nlm.nih.gov/24847880/), [PMCID: PMC4074244](https://pubmed.ncbi.nlm.nih.gov/24074244/), [DOI: 10.1038/nature13270](https://doi.org/10.1038/nature13270).
4. Pajvani U, Shawber C, **Samuel V**, Birkenfeld A, Shulman G, Kitajewski J, Accili D. Author Correction: Inhibition of Notch signaling ameliorates insulin resistance in a FoxO1-dependent manner. *Nature Medicine* 2023, 30: 604-604. [PMID: 38041001](https://pubmed.ncbi.nlm.nih.gov/38041001/), [DOI: 10.1038/s41591-023-02695-9](https://doi.org/10.1038/s41591-023-02695-9).
5. Banks A, Kim-Muller J, Mastracci T, Kofler N, Qiang L, Haeusler R, Jurczak M, Laznik D, Heinrich G, **Samuel V**, Shulman G, Papaioannou V, Accili D. Dissociation of the Glucose and Lipid Regulatory Functions of FoxO1 by Targeted Knockin of Acetylation-Defective Alleles in Mice. *Cell Metabolism* 2026 [PMID: 42624097](https://pubmed.ncbi.nlm.nih.gov/42624097/), [DOI: 10.1016/j.cmet.2026.08.012](https://doi.org/10.1016/j.cmet.2026.08.012).