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| BIOGRAPHICAL SKETCHProvide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.Follow this format for each person.  **DO NOT EXCEED FOUR PAGES.** |
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| NAMEVanessa H. Routh | POSITION TITLEProfessor |
| eRA COMMONS USER NAMEVROUTH |
| EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)* |
| INSTITUTION AND LOCATION | DEGREE*(if applicable)* | YEAR(s) | FIELD OF STUDY |
| University of California at Davis, Davis, CA | B.S. | 1986 | Physiology |
| University of California at Davis, Davis, CA | M.S. | 1989 | Physiology |
| University of California at Davis, Davis, CA | Ph.D. | 1993 | Neurophysiol./Physiol. |
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**NOTE: The Biographical Sketch may not exceed four pages. Items A and B (together) may not exceed two of the four-page limit. Follow the formats and instructions on the attached sample.**

1. **Positions and Honors.** List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

**POSITIONS/EXPERIENCE**

1993-1995: Postdoctoral fellow; Uniformed Services Univ. Health Sci., Bethesda, MD

1995-1998: Postdoctoral fellow; New Jersey Medical School (UMDNJ), Newark, NJ

March 97: July 97: Visiting Scientist; Univ. of Aberdeen, Scotland

1998-2003: Assistant Professor; Depts of Pharmacology/Physiology and Neurosciences; New Jersey Medical School (UMDNJ), Newark, NJ

2003-2010: Associate Professor; Dept of Pharmacology/Physiology; New Jersey Medical School (UMDNJ), Newark, NJ

April 2007-June 2007: Visiting Scientist; Univ. Paris 7 (CNRS), Paris, France

Jersey Medical School (UMDNJ), Newark, NJ

2010-present: Professor; Depts of Pharmacology/Physiology and Neurosciences

**OTHER PROFESSIONAL MEMBERSHIPS**

2002-present: Yale Diabetes Endocrinology Research Center: External Member

**HONORS:**

1987/8/91: Achievement Rewards for College Scientists.

1989/93: Young Investigators Award Finalist; Meeting of the North American Association for the Study of Obesity (NAASO).

1992: University of California, Davis Graduate Fellowship.

1992/3:NIH NRSA Neurophysiology/Cardiology Training Grant (predoctoral)

1993: Carlson Prize in Physiology, University of California, Davis.

1996-8: NIH Individual National Research Service Award (NRSA).

1998-02: Career Development Award, American Diabetic Association.

 UMDNJ Searle Scholar Program nominee.

 Sigma Phi Honor Society.

 Golden Key Honor Society

1. **Selected peer-reviewed publications (in chronological order).** Do not include publications submitted or in preparation.

1. Routh, V. H., Murakami, D. M., Stern, J. S., Fuller, C. A., and B. A. Horwitz. Neuronal Activity in Hypothalamic Nuclei of Obese and Lean Zucker Rats. Int. J Obesity 14:879-891, 1990.

 2. Routh, V. H., Hamilton, J. S., Stern, J. S., and B. A. Horwitz. Littersize, Adrenalectomy, and High Fat Diet Alter Hypotha­lamic Monoamines in Genetically Lean *(Fa/Fa)* Zucker Rats. J. Nutr. 123:74-84, 1993.

3. Levin, B. E., Planas, B., Routh, V. H., Hamilton, J. S., Stern, J. S., and B. A. Horwitz. Al­tered a1-Adrenergic Receptor Binding in Intact and Adre­nalectomized Obese Zucker Rats (*fa/fa*). Brain Research 614:146-154, 1993.

4. Routh, V. H., Geitzen, D., Stern, J. S., and B. A. Horwitz. Hypo­thalamic Monoaminergic Activity in 11 Week Old Cold-Exposed Lean *(Fa/Fa)* and Obese *(fa/fa)* Female Zucker Rats. Obesity Re­search 2:28-37, 1994.

5. Routh, V. H., Stern, J. S., and B. A. Horwitz. Serotonergic Ac­tivity is Depressed in the Ven­tromedial Hypothalamic Nucleus (VMN) of the Obese (*fa/fa*) Zucker Rat as Early as 12 Days of Age. Am. J. Physiol. 267: R712-R719, 1994.

6. Routh, V. H., Stern, J. S. and B. A. Horwitz. Adrenalectomy Increased Serotonin Turnover in Brains of Obese Zucker Rats. Physiol. & Behav. 58(3):491-499, 1995.

7. Routh, V. H., and C. J. Helke. 'Tachykinin Receptors in the Spi­nal Cord' in Prog. Brain Res. vol 104, Chapter 6: Neuropeptides in the Spinal Cord, eds F. Nyberg, H.S. Sharma, and Z. Weisinfeld-Hallin; New York, Elsevier pp 93-108, 1995.

8. Routh, V. H., Stern, J. S., and B. A. Horwitz. 'Adaptations of Mammals to Overnutrition' in Handbook of Physiology, Section 4: Environmental Physiology, vol 2: Adap­tations to the Environment. eds., C. Blatteis and M. Fregly; New York, Oxford Press pp 1411-1435, 1996.

9. Levin, B.E. and V.H. Routh. The Role of the Brain in Energy Balance and Obesity. Am. J. Physiol. 271(40):R491-500, 1996.

10. Routh, V. H., and C. J. Helke. A Novel Technique for Making Antibody Microprobes Us­ing Thiol-terminal Silanes and a Heterobifunctional Crosslinker. J. Neuroscience Methods 71: 163-168, 1997­.

11. Dunn-Meynell, A.A., Routh, V.H., McArdle, J.J., and B.E. Levin. Low Affinity Sulfonylurea Binding Sites Reside on Neuronal Cell Bodies in the Brain. Brain Research 745:1-9, 1997.

12. Routh, V.H., McArdle, J.J., and B.E. Levin. Phosphorylation Modulates the Activity of the ATP-Sensitive K+ Channel in the Ventromedial Hypothalamic Nucleus (VMN). Brain Research 778: 107-119, 1997.

13. Horwitz, B.A., Hamilton, J.S., Routh, V.H., Green, K. and A. Chan. Adiposity and Serum Leptin Increase in Fatty (*fa/fa*) BNZ Neonates Without Decreased VMH Serotonergic Activity. Am. J. Physiol. 274(37):E1009-E1017, 1998.

14. Levin, B.E., Dunn-Meynell, A.A., and Routh, V.H. Brain glucosensing and body energy balance: Role in obesity and diabetes Am. J. Physiol. 276: R1223- R1231, 1999.

15. Spanswick, D., Smith, M.A., Mirahamsi, S., Routh, V.H., and M.L.J. Ashford. Insulin activates ATP-sensitive K+ channels in hypothalamic neurones of lean, but not obese rats. Nature Neuroscience 3(8): 757-758, 2000.

16. Levin, B.E., Dunn-Meynell, A.A. and V.H. Routh. News and Views: Brain glucosensing and the KATP channel. Nature Neuroscience 4 (5):5-6, 2001.

17. Song, Z., Levin, B.E., McArdle J.J., Bakhos N. and Routh V.H. Convergence of Pre- and Postsynaptic Influences on Glucosensing Neurons in the Ventromedial Hypothalamic Nucleus (VMN) Diabetes 50:2673-2681, 2001.

18. Routh, V.H. Brain glucosensing neurons: Are they relevant? Physiol. & Behav. 76:403-413; 2002.

 19. Levin, B.E., Dunn-Meynell, A.A., and V.H. Routh. CNS sensing and regulation of peripheral glucose levels. Int. Review Neurobiol. 51:219-258, 2002.

 20. Dunn-Meynell, A.A., Routh, V.H., Kang, L., Gaspers, L. and B.E. Levin. Glucokinase is the likely mediator of glucosensing in central neurons. Diabetes 51: 2056- 65; 2002.

 21. Routh, V.H. Glucosensing neurons in the ventromedial hypothalamic nucleus (VMN) and hypoglycemia associated autonomic failure (HAAF). Diabetes Metabolism Research & Reviews 19: 348-356; 2003.

22. Kang, L., Routh, V.H., Kuzhikandathil, E.V., Gaspers, L.D. and B.E. Levin. Physiological and Molecular Characteristics of Rat Hypothalamic Ventromedial Nucleus Glucosensing Neurons, Diabetes, 53:549-559; 2004.

23. Routh,V.H., Song, Z. and X. Liu. The role of glucosensing neurons in the detection of hypoglycemia. Diabetes Technology and Therapeutics 6(3):413-421; 2004.

24. Wang, R., Liu, X., Hentges, ST, Dunn-Meynell, A.A., Levin, B.E., Wang, W. and V.H. Routh. The regulation of glucose-excited (GE) neurons by glucose and feeding-relevant peptides. Diabetes 53:1959-1965; 2004.

25. Levin, B.E., Routh, V.H., Kang, L., Sanders, N.M. and A.A. Dunn-Meynell. Neuronal glucosensing: What do we know after 50 years? Diabetes 53:2521-2528; 2004.

26. Song, Z. and V.H. Routh. Differential effects of glucose and lactate on glucosensing neurons in the ventromedial hypothalamic nucleus (VMN). Diabetes 54:15-22; 2005.

27. Wang, R., Cruciani-Guglielmacci, C., Migrenn, S., Magnan, C., Cotero, V.E., and V.H. Routh. The effects of oleic acid (OA) on distinct populations of neurons in the hypothalamic arcuate nucleus (ARC) are dependent on extracellular glucose levels. J. Neurophysiol. 95(3): 1491-1498, 2006.

28. Kang. L., Dunn-Meynell, A.A., Routh, V.H., Zhang, B.B., Gaspers,L.D.; Nagata, Y., Nishimura, T., Eiki, J, and B.E. Levin. Glucokinase is a critical regulator of ventromedial hypothalamic neuronal glucosensing. Diabetes, 55(2):412-20, 2006.

29. McCrimmon, R.J., Song, Z., Cheng, H., McNay, E.C., Weikart-Yeckel, C. Fan, X., Routh, V.H. and R.S. Sherwin. Corticotrophin releasing factor (CRF) receptors within the ventromedial hypothalamus regulate hypoglycemia-induced hormonal counterregulation. J. Clin Ivest. 116 (6):1723-1730, 2006. PMCID: PMC1464911

30. Song, Z. and V.H. Routh. Recurrent hypoglycemia decreases the glucose sensitivity of glucose-inhibited neurons in the ventromedial hypothalamic nucleus. Am. J. Physiol. Regul Integr Comp Physiol, 291(5):R1283-7.

31. Migrenne, S., Cruciani-Guglielmacci, C., Kang, L., Wang, R.; Rouch, C., Lefevre, A., Ktorza, A., Routh, V.H., Levin, B.E., Magnan, C. Fatty Acid Signaling in the Hypothalamus and the Neural Control of Insulin Secretion. Diabetes 55 (Suppl 2): S139-S144, 2006. PMCID:PMC2721417

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33**.** Fioramonti, X., Contie, S., Song, Z., Routh, V.H., Lorsignol A. and L. Penicaud. Characterization of glucosensing neuron subpopulations in the arcuate nucleus: integration in NPY and POMC networks? Diabetes 56(5):1219-1227, 2007 PMID: 17261674

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35. Kang L, Sanders NM, Dunn-Meynell AA, Gaspers LD, Routh VH, Thomas AP, Levin BE. [Prior hypoglycemia enhances glucose responsiveness in some ventromedial hypothalamic glucosensing neurons.](http://www.ncbi.nlm.nih.gov/pubmed/18094065) Am J Physiol Regul Integr Comp Physiol. 2008 Mar;294(3):R784-92.

36. Murphy, B.A., Fioramonti, X., Jochnowitz, N., Fakira, K., Gagen, K., Contie, S., Lorsignol, A., Penicaud, L., Martin, W.J. and V. H. Routh. Fasting enhances the response of arcuate neuropeptide Y (NPY)-glucose-inhibited (GI) neurons to decreased extracellular glucose. Am.J. Physiol – Cell. Physiol. 296:746-756; 2009, PMID: 19211911 PMCID:PMC2670660

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39. Souayah, N. Potian, J.G., Garcia, C.C., Krivitskaya, N., Boone, C., Routh, V.H., and J.J. McArdle. Motor Unit Number Estimate (MUNE) as a predictor of Motor Dysfunction in an Animal Model of Type I Diabetes. Am. J. Physiol. – Endocrinol. Metab., 297 (3): E602-608, 2009 PMCID:PMC2739699.

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. 42. Cotero, V.E., Zhang, B.B. and V. H. Routh. [The response of glucose-excited (GE) neurons in the ventromedial hypothalamus (VMH) to decreased glucose is enhanced in a murine model of type 2 diabetes mellitus (T2DM).](http://www.ncbi.nlm.nih.gov/pubmed/20002964?itool=EntrezSystem2.PEntrez.Pubmed.Pubmed_ResultsPanel.Pubmed_RVDocSum&ordinalpos=1) J. Neuroendocrinol. 22 (2): 65-74, 2010.

 43. Fioramonti X, Song Z, Vazirani RP, Beuve A, Routh VH. [Hypothalamic NO in hypoglycemia detection and counter-regulation: A two edged sword.](http://www.ncbi.nlm.nih.gov/pubmed/20518706) Antioxid Redox Signal. Antioxid Redox Signal. 2011 Feb 1;14(3):505-17. PMCID:PMC3025177

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45. Routh, V.H. Glucose Sensing Neurons in the Ventromedial Hypothalamus. Sensors 2010, *10*, 9002-9025. PMCID:PMC3196991

46. Garcia CC, Potian JG, Hognason K, Thyagarajan B, Sultatos LG, Souayah N, Routh VH, McArdle JJ. [Acetylcholinesterase deficiency contributes to neuromuscular junction dysfunction in type 1 diabetic neuropathy.](http://www.ncbi.nlm.nih.gov/pubmed/22739110) Am J Physiol Endocrinol Metab. 2012 Aug;303(4):E551-61. PMCID:PMC3423102

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49. Vazirani, R.P., Fioramonti, X. and **V.H. Routh**. Membrane potential dye imaging of ventromedial hypothalamus neurons from adult mice to study glucose sensing. J. Vis. Exp (81) e50861, doi 10.3791/50861, 2013.PMC3992114

50. Sheng, Z., Santiago, A.M., Thomas, M.P. and **V.H. Routh**. Metabolic regulation of lateral hypothalamic glucose-inhibited orexin neurons may influence midbrain reward neurocircuitry. Mol. Cell. Neurosci. 62:30-41, 2014. PMC NA (not NIH funded)

51. **Routh, V.H**., Hao, L., Santiago, A.M., Sheng, Z. and C. Zhou. Hypothalamic glucose sensing: making ends meet. Front. Syst. Neuro. Doi 10.3389/fnsys.2014.00236. (Routh, corresponding author) PMC4261699

52. Orban, B.O. **Routh, 52. V.H**., Levin, B.E. and J.R. Berlin. Direct effects of N/A (not NIH funded).

53. Hao, L., Sheng, Z., Potian, J.P., Deak, A., Rohowsky-Kochan, C. and **V.H. Routh**. Lipopolysaccharide (LPS) and tumor necrosis factor alpha (TNF03B1) blunt the response of Neuropeptide Y/Agouti-related peptide (NPY/AgRP) glucose inhibited (GI) neurons to decreased glucose. Brain Research, 1648(A): 181-192, 2016. [PMC5018455](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5018455/)

54. Santiago, A. M., Clegg, D.J. and **Routh, V.H**. Estrogens modulate ventrolateral ventromedial hypothalamic glucose-inhibited neurons. Molecular Metabolism 5(10): 823-833, 2016. PMC 5034617

55. Santiago A. M., Clegg, D.J. and **Routh, V.H.** Ventromedial hypothalamic glucose sensing and glucose homeostasis vary throughout the estrus cycle. Physiology & Behavior 167: 248-254, 2016. PMC 5159237

56. Reno, C.M., Puente, E.C., Sheng, Z., Daphna-Iken, D., Bree, A.J., **Routh, V.H.,** Kahn, B.B. and S.J. Fisher. Brain GLUT4 knockout mice have impaired glucose tolerance, decreased insulin sensitivity and impaired hypoglycemic counterregulation. Diabetes 2017 66(3):587-597 PMC 5319720.

57. Ferrario, C.R., Labouebe, G., Liu S., Nieh, E.H., **Routh, V.H**., Xu, S. and E.C. O’Connor. Homeostasis meeting motivation in the battle to control food intake. J. Neurosci. 36(45):11469-11481, 2016. PMC 5125214

58. Hashiguchi, H., Sheng, Z., **Routh, V.H.**, Gerzanich, V., Simard, J.M., and J. Bryan. Direct versus indirect actions of ghrelin on hypothalamic NPY neurons. Plos One. 12(9):e0184261, 2017 PMC5587286.

59. Hryhorczuk, C., Sheng, Z., Decarie-Spain, L., Giguère, N., Ducrot, C., Trudeau, L., **Routh, V.H**., Alquier, T., and S. Fulton. Oleic acid in the ventral tegmental area inhibits feeding, food reward and dopamine tone. Neuropsychopharmacology, 43(3): 607-616, 2017. PMC5570761

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61. Zhou, C., Teegala, S.B., Khan, B., Gonzalez, C. and V.H. Routh. Hypoglycemia: Role of hypothalamic glucose-inhibited (GI) neurons in detection and correction. Frontiers in Physiology. 9:192 doi: 10.3389/fphys.2018.00192 2018 PMC5854653

62. Teegala, S.B., Sheng, Z., Dalal, M.S., Hirschberg, P.R., Beck, K.D., and V.H. Routh. Lateral hypothalamic orexin glucose-inhibited neurons may regulate reward-based feeding by modulating glutamate transmission in the ventral tegmental area. In press 2018.

**C. Research Support.** Listselected ongoing or completed (during the last three years) research projects (federal and non-federal support). Begin with the projects that are most relevant to the research proposed in this application. Briefly indicate the overall goals of the projects and your role (e.g. PI, Co-Investigator, Consultant) in the research project. Do not list award amounts or percent effort in projects.

PREVIOUS RESEARCH SUPPORT:

American Diabetes Association Career Development Award (Routh, P.I.) 7/1/98 – 6/30/02

“The ATP-sensitive K+ (K-ATP) channel in the Ventromedial Hypothalamic Nucleus: Role in Glucose Homeostasis”

NIH NIDDK RO1: DK55619-01A1 (Routh, P.I.) 2/1/00 – 11/31/05

 “The Arcuate K-ATP channel in Health, Obesity and Diabetes”

NIH NIDDK RO1: DK64566-01 (Routh, P.I.) 11/01/02 – 7/31/07

“Glucosensing neurons in Euglycemia, Hypoglycemia & HAAF

NIH NIDDK RO1: DK55619-06 (Routh, P.I.) 1/1/05 – 12/31/09

“Glucosensing neurons in Health, Obesity and Diabetes”

NIH NIDDK R56: DK55619-10A1(Routh, P.I.) 7/1/09 – 6/30/11

“Hormonal regulation of glucose sensing neurons in health and diabetes”

Juvenile Diabetes Research Foundation (JDRF) Research Grant (Routh, P.I.) 2/1/07 – 1/31/10

“The role of nitric oxide in ventromedial hypothalamic glucose sensing”

NIH 3P30DK045735 (Program Project PI: Robert Sherwin, Yale) 2/01/2009-1/31/2011:

Regulation of glucose sensing neurons by FKBP51.

NIH R21: CA139063-01 (Routh, P.I.) 7/16/09 – 6/30/12

Role of neuropeptide Y-glucose inhibited (NPY-GI) neurons in cytokine-induced anorexia-cachexia

JDRF Award 4-2010-433 (Program Project PI: Robert Sherwin, Yale) 9/01/2010-8/31/2013

The role of sodium glucose transporters in glucose sensing

NIH NIDDK RO1: DK081538-01A1 (Routh, P.I.) 4/20/09 – 3/31/15

Hypoglycemia-induced nitric oxide in glucose sensing neurons and counterregulation

Rutgers New Jersey Medical School Foundation Bridge Award (Routh, P.I.) 3/1/13-2/29/14

Role for glucose-inhibited (GI) orexin neurons in the tendency for weight regain following dieting

American Heart Association Grant in Aid 14GRNT20380639 (Routh, P.I.) 7/1/14-6/30/17

Role for glucose-inhibited orexin neurons in the tendency for weight regain following dieting

Rutgers-BHI Pilot Grant (MPI) 11/1/15-10/31/17

Role of lateral hypothalamic glucose-inhibited orexin neurons in binge eating behavior

**ONGOING RESEARCH SUPPORT:**

Juvenile Diabetes Research Foundation 2-SRA-2014-269-M-R (Routh, P.I.) 9/1/14-8/31/16

Preservation of hypoglycemia detection and prevention of hypoglycemia associated autonomic failure in Type 1 Diabetes Mellitus with antioxidant therapy.

NIH NIDDK R01: DK103676-01A1 (MPI: Routh, corresponding P.I.) 7/1/2016-6/30/2021

Role for glucose-inhibited orexin neurons in weight regain following dieting