

SEEMA BHATNAGAR

Department of Anesthesiology
The Children's Hospital of Philadelphia
University of Pennsylvania Perelman School of Medicine
Abramson Research Center Suite 402
3615 Civic Center Blvd.
Philadelphia, PA 19104-4399

Phone: 267-426-0951 Fax: 215-590-3364 E-mail: bhatnagars@email.chop.edu

Citizenship: Canada and the United States

Professional Experience

Associate Professor (with tenure)	Department of Anesthesiology and Critical Care Children's Hospital of Philadelphia University of Pennsylvania School of Medicine 09/2012- present
Assistant Professor	Department of Anesthesiology and Critical Care Children's Hospital of Philadelphia University of Pennsylvania School of Medicine 09/2005- 08/2012
Associate Professor (with tenure)	Department of Psychology University of Michigan, 07/2005
Assistant Professor	Department of Psychology University of Michigan, 1999-2005.
Post-doctoral Fellow	Department of Physiology Mentor: Dr. Mary Dallman University of California at San Francisco, 1994-1999.

Education

Ph.D.	Department of Neurological Sciences Dissertation Advisor: Dr. Michael J. Meaney McGill University, 1994.
M.A.	Department of Psychology University of Manitoba, 1988.
B.Sc.	Department of Psychology McGill University, 1984.

Grants and Awards

Current:

NIMH R01MH109975 PI: Bhatnagar 05/15/2016 - 02/28/2021

“Sex differences in orexins”

The goal is to determine the neuroendocrine, behavioral and cognitive consequences of the higher expression of orexins in female compared to male rodents and the mechanisms by which these sex differences arise.

NIMH 2R01MH093981-06 PI: Bhatnagar 07/01/2016 - 06/30/2019
“Development of Defensive Behavior and Social Stress Consequences”

This proposal will study the role of orexins and CRF in the effects of social stress in male and female rats at different stages of adolescence and adulthood with regard to neuronal activity and cognitive function.

NIMH R01MH111751 PI: Bhatnagar 09/15/2016 - 06/30/2021
“Stress, CRF and Locus coeruleus-cortical network activity”

The goal of this application is to examine network activity between locus coeruleus and prefrontal cortex in rats undergoing chronic social defeat stress.

NASA NNX14AN49G PI: Goel, N 10/01/2014 - 09/30/2017
“Biomarkers as Predictors of Resiliency and Susceptibility to Stress in Space”

The goal of this research is to uncover measures in the blood that may predict if individuals will be resilient to the stressors encountered on a space mission, such as sleep deprivation. Our role is to measure blood microRNAs. Currently in no-cost extension.

Role: Co-I

Cohen Veterans Bioscience PI: Bhatnagar 09/01/2017- 08/30/2019
“Validating constructs relevant to PTSD in a model of individual differences in response to social defeat in rats”

The goal of this research is to examine constructs relevant to PTSD, sleep disruptions, fear responses and the persistence of these effects as well as biomarkers of vulnerability to the effects of stress in a social defeat paradigm in rats.

Previously Funded:

Army Research Office/DARPA W911NF1010093 PI: Bhatnagar 06/01/2010 -
09/30/2016

“Testing novel approaches to preventing the effects of stress: from preclinical to translational studies in military personnel.”

\$6,500,000 direct costs

The goal of this multi-team proposal was the identification of novel structures and pathways that mediate resilience to the effects of stress in animal models and to validate these in military personnel.

Merck LKR136861 PI: Bhatnagar 01/01/2015 - 12/31/2016
“Evaluation of orexin 1 receptor regulation of stress, anxiety, and reward”

This research determined the role of the orexin 1 receptor in habituation to repeated stress, anxiety related behavior and conditioned place preference to cocaine.

NIMH R21MH102735 PI: Bhatnagar 07/25/2014 - 05/31/2016
“Orexins/hypocretins and resilience to stress”

The goal of this research was to determine the role of orexins in mediating resilience to chronic social defeat stress in adult male rats. DREADDS targeted to orexin neurons will be used to stimulate or inhibit orexin neurons.

NIDDK R56DK102367 PI: Valentino, R. 09/01/2014 - 04/15/2017
“Central processing of bladder information”

Role: Co-I

NIAID R01AI072197 PI: Haczku, A. 07/01/2010 - 06/30/2015
 “Mechanisms of social stress-enhanced allergic airway response in a mouse model”
 07/01/2010- 06/30/2015
 Role: Sub-contractor

NIMH R21MH090420 PI: Bhatnagar 06/15/2010 - 04/30/2013
 “Social stress in adolescent females and the brain norepinephrine system”

US Army Research Institute Conference Grant W911NF-12-1-0246 06/10/2012 - 02/09/2013
 “The International Stress Neurobiology Workshop 2012”
 Role: PI

NSF Conference Grant IOS-1216503 PI: Bhatnagar 06/01/2012 - 05/31/2013
 “Neurobiology of Stress Workshop 2012”

NIMH R21MH099488 PI: Beck, S. 09/21/2012 - 06/30/2014
 “Serotonin-limbic system interactions”
 Role: Other significant contributor

NIMH R01GM088156 PI: Kelz, M. 04/15/2010 - 03/31/2012
 “Neuronal Basis Underlying Volatile Anesthetic Induced Hypnosis”
 Role: Other significant contributor

NIHLBI R01HL079588 PI: Kelz, M. 12/15/2011 - 11/30/2013
 “Intermittent Hypoxia: Mechanisms of Hypersomnolence”
 Role: Other significant contributor

NIDA R01 PI: Becker, J. 08/30/2009 - 07/31/2011
 “Drug Abuse: Sex differences in developmental and environmental influences”
 Role: Sub-contractor

NIDA P50 DK052620 PI: Valentino, R. 09/01/2008 - 08/31/2013
 “Detrusor Smooth Muscle Remodeling in Partial Bladder Outlet Obstruction”
 The goal was to examine the effects of repeated social defeat stress on bladder function.
 Role: Co-Investigator

NIMH 5R01MH058250-15 PI: Valentino, R. 08/01/2007 - 06/30/2013
 “Corticotropin-Releasing Factor/Serotonergic Interactions”
 Role: Co-I

NIMH R01MH067651 PI: Bhatnagar, S. 02/01/2003 - 01/31/2008
 “Neural circuitry underlying chronic stress effects”.
 The goal was to determine the pathways through which the paraventricular thalamus regulates responses to chronic stress.

NIDA R01 PI: Woods, J. 12/01/2002 - 12/01/2006
 “CRH antagonists for treatment of drug abuse”.
 Role: Co-PI

NSF (IBN 0115212) PI: Bhatnagar 09/01/2001 - 09/01/2003
“Neuroendocrine effects of repeated social defeat in rats”.
The goal was to develop a model of chronic social defeat in rats and to determine its neuroendocrine and behavioral consequences.

Faculty Career Development Award, University of Michigan, 2002
NARSAD Young Investigator Award, 2000-2002
NARSAD Young Investigator Award, 1998-2000

Post-doctoral Fellowship Medical Research Council of Canada, 1994-1997

Graduate Studentships Heart and Stroke Foundation of Canada, 1991-94
Fondation de Recherches Scientifiques du Quebec, 1990 (declined)
Medical Research Council of Canada, 1990 (and declined)
Fonds pour Formation des Chercheurs (Quebec), 1989-90

Teaching and Supervisory Experience

Teaching

University of Pennsylvania (2005 onward)

Lectures in Neuropharmacology/Neurochemistry PHRM510 INSC596 course.
Lectures in Advanced Topics in Neuropharmacology course.
Lectures in Neuroendocrinology course.

University of Michigan

W 2002, F 2003, F 2004:

Neuroscience Perspectives on Stress and Disease (graduate level, 6-10 students).

F 2000, F 2001, W 2004: Introduction to Biopsychology (undergraduate level, 250-300 students).

W 2001: Coordinator for Biopsychology Colloquium Series and associated graduate course (10 students)

F 1999, W 2003, F 2004: Neuroendocrinology of Stress and Disease (upper level undergraduate, 25-30 students).

Supervision

Graduate Students: Azra Jaferi (NRSA awardee), Nicola Grissom, Vikram Iyer

Post-doctoral Fellows: Susan Wood (co-supervised), Willem Heydendael,

Pushpinder Multani, Sarah Beltrami, Shannon Blume-Rice,.

Current: Jiah Pearson-Leary, Laura Grafe (F32 awardee), Brian Corbett (T32 awardee), Kimberly Urban (T32 awardee), Melvin (Shawn) Bates (minority fellowship awardee).

Undergraduate Students trained: 3-7 per semester, current overall total of over 70

Department Service

University of Michigan:

Department of Psychology Executive Committee

Evolutionary/Comparative Psychology Search Committee

Member, total of 10 Dissertation committees (2 chair)

Member, Graduate Group Committee (2 years)

Member, Department of Psychology Augmented Executive Committee

Children's Hospital of Philadelphia
Member, Research Council, Department of Anesthesiology and Critical Care
(2016-2018)

Campus Activities

University of Pennsylvania:

Member, Admissions Committee, Neuroscience Graduate Program
Member, Neuroscience Graduate Group
Member, Department of Psychology Graduate Group
Member, Pharmacology Graduate Group
Member, Mahoney Institute of Neurological Science
Member, 12 Dissertation committees
Rotation Talks Committees
Mentor, Neuroscience Graduate Group First year Journal Club

University of Michigan:

Member, Neuroscience Program
Member, Brain and Behavior Group, Center for Human Growth and Development
Mentor, Students Association for Neuroscience

Scientific and Professional Service

Grant Review Committees

Member: BRAIN (Brain Research through Advancing Innovative Neurotechnologies) Initiative RFA "Development and Validation of Novel Tools to Analyze Cell-Specific and Circuit-Specific Processes in the Brain" Special Emphasis Panel/Scientific Review Group (03/2018, 02/2017 and 08/2014, ZMH1 ERB-M 03 and ZMH1 ERB-L 04).

Ad Hoc Member:

U54 applications "Specialized Centers of Research Excellence (SCORE) on Sex Differences ZRG1 EMNR A (70) Review Panel (07/2018)

Biobehavioral Research Awards for Innovative New Scientists (NIMH BRAINS (11/2017; 10/2018)

Molecular Neuropharmacology and Signaling (MPNS) Study Section for NIH (2015, 2016)

NIGMS scientific review group to evaluate Support of Competitive Research Program (SCORE) applications (2012; 11/2016)

Developmental Brain Disorders Study Section for NIH (2015)

Member: Neurobiology of Motivated Behavior Study Section, NIH (2004-2008)

Ad hoc Member: Neurobiology of Motivated Behavior Study Section, NIH (2003-2004)

Ad Hoc Member: Biological Studies Division- NSF (2005-present)

Other Committees

Member: Stress Neurobiology in the 21st Century: Challenges & Opportunities. NIMH (2017-2018).

Member: Ad Hoc Committee on Pain and Distress-American Physiological Society (2005)

Editorial Board Positions

Editorial Board: Stress: The International Journal on the Biology of Stress (2011-present)

Editorial Board: Developmental Psychobiology (2011-present)

Editorial Board: Physiology and Behavior (2011-present)

Editorial Board: Neurobiology of Stress (2014-present)

Ad hoc Reviewer for Journals

Acta Physiologica, American Journal of Physiology, Behavioral Brain Research, Biological Psychiatry, Brain, Behavior and Immunity, Brain Research, Brain Structure and Function, Cognitive, Affective and Behavioral Neuroscience, Comprehensive Physiology, Developmental Psychobiology, Endocrinology, European Journal of Neuroscience, Frontiers in Psychiatry, Hormones and Behavior, Journal of Comparative Neurology, Journal of Neuroendocrinology, Journal of Neuroscience, Neurobiology of Learning and Memory, Neuroendocrinology, Neuropsychopharmacology, Neuroscience, Pharmacological Research, Psychoneuroendocrinology,

Organizing Roles in Scientific Meetings

Organizing Committee, Neurobiology of Stress Workshop, 2018, Banff, Alberta, Canada.

Chair, Symposium on “Adaptation to repeated stress: genes, plasticity and developmental influences”. International Society for Psychoneuroendocrinology, 2017 Zurich, Switzerland.

Chair, Symposium on “Sex Differences in Stress Responses”, Organization for the Study of Sex Differences Annual Meeting, 2016, Philadelphia, PA.

Organizing Committee, Neurobiology of Stress Workshop, 2016, Irvine CA.

Chair, Education and Career Opportunities Committee, Neurobiology of Stress Workshop, 2016, Irvine, CA.

Chair, Symposium on "Neural Mechanisms Underlying Resilience to Stress" at the Society for Neuroscience Annual Meeting 2014, Washington DC.

Co-Organizer, “Neurobiology of Stress Workshop”. Philadelphia, June 2012. Only regularly held (biennial) conference dedicated to the study of the neurobiology of stress and its impact on physical and mental health. Co-organizer is Dr. Teresa Reyes, Dept. of Pharmacology, Univ. of Pennsylvania.

Chair, Workshop titled: Programming by stressful and adverse events in adolescence of adult stress reactivity, cognition and emotions. 8th International Brain Research Organization World Congress, Florence, Italy, 2011.

Invited Presentations

2020. Keynote address. Neurobiology of Stress Workshop, University of South Carolina School of Medicine.

2019. University of Cincinnati

01/2019. 34th Annual Mortimer D. Sackler Winter Conference in Developmental Psychobiology.

12/2018. Brain Health Institute, Rutgers University.

06/2218. “Sex differences in the role of orexins in mediating habituation to repeated stress and stress-induced changes in sleep and cognitive function”. Canadian Congress of Neuropharmacology, Vancouver, Canada.

03/2018. Department of Physiology and Pharmacology, University of Western Ontario, London, Ontario, Canada.

03/2018. “Orexins mediate sex differences in the stress response and cognitive flexibility”. Eastern Psychological Association Annual Meeting, Philadelphia, PA.

01/2018. Department of Psychiatry, University of Michigan, Ann Arbor, MI.

01/2018. Department of Neurobiology and Anatomy, Drexel University, Philadelphia PA

09/2017. “Development of paraventricular thalamic regulation of habituation to stress from adolescence to adulthood”. International Society for Psychoneuroendocrinology, Zurich, Switzerland.

06/2017. “Orexins and resilience to stress”. Symposium at the International Behavioral Neuroscience Society, Hiroshima, Japan.

10/19/2016. Neural mechanisms and biomarkers of stress resilience, Dept. of Psychology and Neuroscience, Temple University, Philadelphia, PA.

10/04/2016. “Neural Mechanisms and biomarkers of stress resilience: sex and developmental influences”. Department of Child and Adolescent Psychiatry and Behavioral Science, CHOP/Penn School of Medicine.

06/07/2016. Talk in Symposium titled “Resilience Redux”. International Behavioral Neuroscience Society, Budapest, Hungary.

03/11/216: “Mechanisms of Resilience to Stress”. Dept. of Pharmacology, Physiology and Neuroscience, University of South Carolina School of Medicine.

01/2016. “Orexin actions in the prefrontal cortex”. Winter Congress on Brain Research, Breckenridge, CO.

02/2015: "Sex differences in response to social defeat in adolescence and adulthood". Winter Congress on Brain Research, Big Sky, Montana.

11/2014: Role of the vasculature and of VEGF in mediating resilience to social stress: Symposium on Neural mechanisms underlying resilience to stress. Society for Neuroscience Annual Meeting, 2014.

10/2014: "Neural Substrates Regulating Adaptations to Repeated Stress", Neuroscience Program, University of Delaware

08/2014: "Neural Substrates Regulating Adaptations to Repeated Stress", Department of Neurobiology, University of Pittsburgh.

03/28/2013: "Repeated stress and resilience". Dept. of Psychology, Brain and Cognitive Science Group, Temple University,

03/23/2012: "Considering Sex Differences in Biomedical Research" Retreat, University of Pennsylvania.

02/10/2012: "Individual differences and neural substrates underlying adaptations to repeated stress", Dept. of Cellular and Physiological Sciences, University of British Columbia, Vancouver, B.C.

09/2011: "Neural circuitry underlying adaptations to repeated stress", Dept. of Physiology and Biophysics, Rosalind Franklin School of Medicine, Chicago Illinois.

07/2011: "Social stressors in adolescence have sex specific effects on adult stress reactivity", 8th International Brain Research Organization World Congress, Florence, Italy

02/22/2011: "Neural circuitry underlying adaptation to repeated stress", The Rockefeller University, New York, NY.

12/01/2010: "Neural substrates underlying adaptation to stress", Albany Medical College, Albany, NY, USA.

07/11/2010: "Effects of Orexin in the posterior paraventricular thalamus on neuroendocrine function, behavior and Orexin receptor internalization", International Congress of Neuroendocrinology, Rouen, France.

06/11/08: "Thalamic-amygdala regulation of adaptation to repeated stress", American Neuroendocrine Society, San Raphael, California.

04/11/08: "Enduring effects and individual differences in the impact of chronic social stress in rodents" Stokes Research Institute Annual Retreat.

03/28/08: "Models of stress and distress in stress neurobiology research", PRIMR (Public Responsibility in Medicine and Research) Annual IACUC Conference, Atlanta, Georgia.

07/26/07: “Adaptation to Repeated stress: Role of amygdala-thalamic circuitry”, Stress Physiology meeting, Office of Naval Research, San Diego, CA.

08/15/07: “Neuroendocrine Habituation to Repeated Stress”, Workshop on Habituation, University of British Columbia, Vancouver, British Columbia.

11/07/05: “Stress Research and Management”, American Association of Laboratory Animal Medicine Annual Meeting, St. Louis, MO

Winter 2004: Dept. of Psychiatry, Univ. of Cincinnati

Winter 2004: Dept. of Psychiatry, Mt. Sinai School of Medicine

Fall 2003: Center for Molecular and Cellular Neuroscience, Rutgers University

Fall 2003: Stress Neurobiology Group, University of Pennsylvania

Winter 2003: Brain Steroid Meeting, Breckenridge, CO.

Fall 1998: Dept. of Neurology, UCSF, San Francisco, CA.

Winter 1998: Dept. of Pharmacology, University of Bradford, Bradford, UK

Publications

(*h*-index of 43; *i10*-index of 83)

<https://orcid.org/0000-0003-4371-0910>

<http://www.researcherid.com/rid/M-7110-2017>

<https://www.ncbi.nlm.nih.gov/sites/myncbi/seema.bhatnagar.1/bibliography/45837532/public/?sort=date&direction=ascending>

Peer-Reviewed Journal Articles

Goel, N., Taylor, D., Eacret, D., Pearson-Leary, J., Kilgore, S., Abel, T., Bhatnagar, S. Blood microRNAs are cross-species signatures of sleep deprivation. In Preparation.

Corbett, B., F., Luz, S., Arner, J., Pearson-Leary, J., Sengupta, A., Taylor, D., Gehrman, P., Ross, R., Bhatnagar, S. The Sphingosine-1-phosphate receptor 3 in the medial prefrontal cortex promotes resilience to stress through reductions in inflammatory processes. In Review.

Grafe, L., Geng, E., Corbett, B., Urban, K., Bhatnagar S. Sex and stress dependent effects on dendritic morphology and spine densities in putative orexin neurons. In Review.

Dustrude, E.T., Caliman, I.F., Bernabe, C.S., Bonaventure, P., Bhatnagar, S., Johnson, P.L., Molosh, A.I., Shekhar, A. Postsynaptic Orexin 1 Receptor facilitates Central Amygdala Neuron Depolarization via Sodium-Calcium Exchanger. In Review, *Frontiers in Neuroscience*.

Pearson-Leary, J., Zhao, C., Bittinger, K., Eacret, D., Luz, S., Vigderman, A.S., Dayanim, G., Bhatnagar, S. The gut microbiome of stress vulnerable rats induces pro-depressive behaviors and inflammatory processes in the ventral hippocampus. In Revision.

Reyes, B.A.S., Zhang, X.-Y., Dufourt, E.C., Bhatnagar S., Valentino, R.J., Van Bockstaele, E.J. Neurochemically distinct circuitry regulates locus coeruleus activity during female social stress depending on coping style. In Revision, *Brain Structure and Function*.

75. Eacret, D., Grafe, L., Gotter, A.L., Renger, J.J., Winrow, C.J., Bhatnagar, S.. Orexin signaling during social defeat stress influences subsequent social interaction behaviour and recognition memory. In Press, Behavioural Brain Research.
74. Blume-Rice, S. Nam, H., Luz, S. Bhatnagar, S. Sex- and age-dependent effects of orexin 1 receptor blockade on open field behavior and neuronal activity. *Neuroscience*, Jun 15;381:11-21. doi: 10.1016/j.neuroscience.2018.04.005. PMID: 29678754
73. Grafe, L., Eacret, D. and Bhatnagar, S. Reduced stress-induced orexin activity is associated with resilience to stress. *eNeuro*, Apr 16;5(2). pii: ENEURO.0273-17.2018. doi: 10.1523/ENEURO.0273-17.2018. PMID: 29662948
72. Cook, P.A., Johnson, T., Martin, S., Gehrman, P., Bhatnagar, S., Gee, J. (2017) Retrospective study of predictors of return to duty vs. medical retirement in an active duty military population with Traumatic Brain Injury. *Journal of Neurotrauma*, Dec 14. doi: 10.1089/neu.2017.5141. PMID: 29239267
71. Salvatore, M., Wiersielis, K., Luz, S., Bhatnagar, S., Waxler, D., Bangasser, D. (2017) Sex differences in circuits activated by corticotropin releasing factor in rats. *Hormones and Behavior*. *Horm Behav*. Dec 14;97:145-153. doi: 10.1016/j.yhbeh.2017.10.004. PMID: 29037972.
70. Pearson-Leary, J., Eacret, D., Nicholas, B., Takano, H., Chen, R. & Bhatnagar, S. (2017) Inflammation and vascular remodeling in the ventral hippocampus induce vulnerability to stress. *Translational Psychiatry*, 7, 12. DOI: 10.1038/tp.2017.122. PMID:28654094
69. Grafe, L.A., Eacret, D., Luz, S., Gotter, A.L., Winrow, C.J., Bhatnagar S. (2017) Orexin 2 receptor regulation of the hypothalamic-pituitary-adrenal (HPA) response to acute and repeated stress. *Neuroscience*, Apr 21;348:313-323. doi: 10.1016/j.neuroscience.2017.02.038. PMID: 28257896
68. Grafe, L., Eacret, D., Luz, S., Bhatnagar, S. Orexins modulate sex differences in habituation to stress and cognitive flexibility. (2017) *Biological Psychiatry*, Apr 15;81(8):683-692. doi: 10.1016/j.biopsych.2016.10.013. Epub 2016 Oct 18. PMID: 27955897
Commentary on this article:
 Holmes, A. *Sex and Orexins: Uncovering a mechanism underlying sex differences in stress susceptibility*. *Biological Psychiatry*, Volume 81, Issue 8, 15 April 2017, pages 642-644.
67. Chen, R.J., Kelly, G., Sengupta, A., Heydendael, W., Nicholas, B., Beltrami, S., Luz, S., Peixoto, L., Abel, T. Bhatnagar, S. (2015) Circulating microRNAs as biomarkers for stress resilience or vulnerability. *Neuroscience* Oct 1; 305:36-48 PMID: 26208845
66. Ver Hoeve, E.S., Kelly, G., Luz, S., Ghanshani, S., Bhatnagar, S. (2013) Short-term and Long-term Effects of Repeated Social Defeat During Adolescence or Adulthood in Female Rats *Neuroscience* Sep 26;249:63-73 PMID: 23402852
65. Kenworthy, C.A., Sengupta, A., Luz, S.M., Ver Hoeve, E.S., Meda, K., Bhatnagar, S., Abel, T. (2014) Social defeat induces changes in histone acetylation and expression of histone

modifying enzymes in the ventral hippocampus, the prefrontal cortex, and the dorsal raphe nucleus. *Neuroscience* Apr 4; 264:88-98. PMID: 23370319

64. Chaijale NN, Curtis AL, Wood SK, Zhang XY, Bhatnagar S, Reyes BA, Van Bockstaele EJ, Valentino RJ.: Social Stress Engages Opioid Regulation of Locus Coeruleus Norepinephrine Neurons and Induces a State of Cellular and Physical Opiate Dependence.

Neuropsychopharmacology 2013. Sep;38(10):1833-43 PMID: 23660707

63. Berube, P., Laforest, S., Bhatnagar, S., Drolet, G. (2013) Enkephalin and Dynorphin mRNA expression are associated with resilience or vulnerability to chronic social defeat stress.

Physiology and Behavior Oct 2; 122:237-45. PMID: 23665402.

62. Bangasser, D.A, Lee, C.S., Cook, P.A., Gee, J.C., Bhatnagar, S., Valentino, R.J. (2013) Manganese-enhanced magnetic resonance imaging (MEMRI) of acute stress responses in rats with a history of repeated social stress. *Physiology and Behavior* Oct 2;122:228-36. PMID:

23643825

61. Heydendael W, Sengupta A, Beck S, Bhatnagar S. (2013) Optogenetic examination identifies a context-specific role for orexins/hypocretins in anxiety-related behavior. *Physiology and Behavior* May 10;130:182-90. PMID: 24140988

60. Wood, S., McFadden, K., Grigoriadis, D., Bhatnagar, S., Valentino, R. (2012) Depressive and cardiovascular disease comorbidity in a rat model of social stress: a putative role for corticotropin-releasing factor. *Psychopharmacology* 222(2): 325-36, 2012. PMCID: 22322324

59. Hong, S., Flashner, B., Chiu, M., ver Hoeve, E., Luz, S., Bhatnagar, S. (2012) Social isolation in adolescence alters behaviors in the forced swim and sucrose preference tests in female but not in male rats. *Physiol Behav* 105(2): 269-75, PMCID: 21907226

58. Heydendael, W., Sengupta, A., Bhatnagar, S.: Putative genes mediating the effects of orexins in the posterior paraventricular thalamus on neuroendocrine and behavioral adaptations to repeated stress. *Brain Res Bull* 89(5-6): 203-210, 2012. PMCID: 22982687

57. Bowens, N., Heydendael, W., Bhatnagar, S., Jacobson, L. (2012) Lack of elevations in glucocorticoids correlates with dysphoria-like behavior after repeated social defeat. *Physiology and Behavior* 105(4): 958-965. PMID: 22108507

56. Heydendael, W., Sharma, K., Iyer, V., Luz, S., Piel, D., Beck, S.G., Bhatnagar, S. (2011) Orexins/Hypocretins act in the posterior paraventricular thalamic nucleus during repeated stress to regulate facilitation to novel stress. *Endocrinology* 152(12): 4738-4752, December. PMCID: 21971160

55. Bingham, B., McFadden, K., Zhang, X., Bhatnagar, S., Beck, S., Valentino, R. (2011) Early adolescence as a critical window during which social stress distinctly alters behavior and brain noradrenergic activity. *Neuropsychopharmacology*, 36(40), 896-909. PMID: 21178981

54. Grissom, N. M., Bhatnagar, S. (2011) The basolateral amygdala regulates adaptation to stress via beta-adrenergic receptor-mediated reductions in phosphorylated extracellular signal-regulated kinase. *Neuroscience*, 178, 108-122. PMID: 21256934
53. Weinberg, M.S., Grissom, N., Paul, E., Bhatnagar, S., Maier, S.F., Spencer, R.L. (2010) Inescapable but not escapable stress leads to increased struggling behavior and basolateral amygdala *c-fos* gene expression in response to subsequent novel stress challenge. *Neuroscience*, 170(1), 138-148. PMID: 20600641
52. Weintraub, A., Singavarelu, J., Bhatnagar, S. (2010) Enduring and sex-specific effects of adolescent isolation in rats. *Brain Research*, 1343, 83-92. PMID: 20438720
51. Wood, S.K., Walker, H.E., Valentino, R.J., Bhatnagar, S. (2010) Individual differences in reactivity to social stress predict susceptibility and resilience to a depressive phenotype: Role of corticotropin releasing factor. *Endocrinology* Apr;151(4):1795-805. PMID: 20160137
Highlighted in "Trends: News, Notes and Insights", Endocrine Society Newsletter, March 2010.
50. Wood, S.K., Baez, M.A., Bhatnagar, S., Valentino, R.J. (2009) Social stress-induced bladder dysfunction: potential role of corticotropin-releasing factor. *American Journal of Physiology*, 296, R1671-1678. PMID: 19279290
49. Thomas, M.B., Hu, M., Lee, T.M., Bhatnagar, S., Becker, J.B. (2009) Sex-specific susceptibility to cocaine in rats with a history of prenatal stress. *Physiol Behav.* May 25;97(2):270-7. PMID: 19268677
48. Grissom, N., Kerr, W., Bhatnagar, S. (2008) Struggling behavior during restraint is regulated by stress experience. *Behav Brain Res.* 2008 Aug 22;191(2):219-26. PMID: 18466984
47. Jaferi, A. & Bhatnagar, S. (2007) Corticotropin-releasing-hormone receptors in the medial prefrontal cortex regulate hypothalamic-pituitary-adrenal activity and anxiety-related behavior regardless of prior stress experience. *Brain Research*, 1186, 212-223 PMID: 18001698
46. Vining, C., Iyer, V., Bhatnagar, S. (2007) Intracerebroventricular administration of corticotropin releasing hormone antagonists produces different effects on hypothalamic-pituitary-adrenal responses to novel restraint depending on the stress history of the animal. *Journal of Neuroendocrinology*, Mar;19(3):198-207. PMID: 17280593
45. Grissom, N., Iyer, V., Vining, C., Bhatnagar, S. (2007) The physical context of previous stress experiences modifies hypothalamic-pituitary-adrenal responses to a subsequent homotypic stress. *Hormones and Behavior*, Jan;51(1):95-103. PMID: 17054953
44. Jaferi, A. & Bhatnagar, S. (2006) Corticosterone can act at the posterior paraventricular thalamus to inhibit hypothalamic-pituitary-adrenal activity in animals that habituate to repeated stress. *Endocrinology*, Oct;147(10):4917-30. PMID: 16809449
43. Dallman, M.F., Pecoraro, N.C., La Fleur, S.E., Warne, J.P., Ginsberg, A.B., Akana, S.F., Laugero, K.C., Houshyar, H., Strack, A.M., Bhatnagar, S., Bell, M.E. (2006) Glucocorticoids, chronic stress, and obesity. *Prog Brain Res*;153:75-105. PMID: 16876569

42. Bhatnagar, S., Vining, C., Kinni, V., Iyer, V. (2006) Changes in hypothalamic pituitary adrenal function, body temperature and food intake during repeated social stress exposure. *Journal of Neuroendocrinology*, 18(1), 13-24. PMID: 16451216
41. Bhatnagar, S. & Vining, C. (2004) Pituitary-adrenal activity in acute and chronically stressed male and female mice lacking the 5-HT-3A receptor.. *Stress*, 7(4), 251-256. PMID: 16019590
40. Bhatnagar, S., Lee, T., Vining, C. (2005) Prenatal stress differentially affects habituation of hypothalamic pituitary adrenal responses to repeated restraint in adult male and female rats. *Hormones and Behavior*, 47, 430-438. PMID: 15777808
39. Bhatnagar, S., Nowak, N., Babich, L., Bok, L. (2004) Deletion of the 5-HT-3 receptor differentially regulates behavior of males and females in the Porsolt swim and defensive withdrawal tests. *Behavioral Brain Research*, 153(2), 527-535.
38. Bhatnagar, S., Sun, L., Raber, J., Maren, S., Julius, D., Dallman, M.F. (2004) Changes in anxiety-related behaviors and hypothalamic pituitary adrenal activity in mice lacking the 5-HT-3A receptor. *Physiology and Behavior*, 81(4), 545-555. PMID: 15178147
37. Bhatnagar, S., Huber, R., Lazar, E., Pych, L., Vining, C. (2003) Chronic stress alters behavior of chronically stressed rats in the conditioned defensive burying test: Role of the posterior paraventricular thalamus. *Pharmacology, Biochemistry and Behavior*, 76(2), 343-349. PMID: 14592687
36. Bhatnagar, S. & Vining, C. (2003) Facilitation of hypothalamic pituitary adrenal responses to novel stress in rats exposed to repeated social stress using the resident/intruder paradigm. *Hormones and Behavior*, 43(1), 158-165. PMID: 12614646
35. Jaferi, A., Nowak, N., Bhatnagar, S. (2003) Negative feedback functions in chronically stressed rats: role of posterior paraventricular thalamus. *Physiology and Behavior*, 78, 365-373. PMID: 12676271
34. Li, Y., Robinson, T.E., Bhatnagar, S. (2003) Effects of maternal separation on behavioural sensitization produced by repeated cocaine administration in adulthood. *Brain Research*, 960(1-2), 42-47.
33. Dallman, M.F., Akana, S.F., Laugero, K.D., Gomez, F., Manalo, S., Bell, M.E., Bhatnagar, S. (2003). A spoonful of sugar: Feedback signals of energy stores and corticosterone regulate responses to chronic stress. *Physiology & Behavior*, 79(1), 3-12. PMID: 12818705
32. Dallman, M.F., Pecoraro, N., Akana, S.F., La Fleur, S.E., Gomez, F., Houshyar, H., Bell, M.F., Bhatnagar, S., Laugero, K., Manalo, S. (2003) Chronic stress and obesity: a new view of "comfort food". *Proceedings of the National Academy of Sciences*, 100(20), 11696-11701. PMID: 12975524

31. Bhatnagar, S. Huber, R., Nowak, N., Trotter, P. (2002) Lesions of the posterior paraventricular thalamus block habituation of hypothalamic-pituitary-adrenal responses to repeated restraint. *Journal of Neuroendocrinology*, 14(5), 403-410. PMID: 12000546
30. Laugero, K.D., Bell, M.E., Bhatnagar, S., Soriano, L., Dallman, M.F. (2001). Sucrose ingestion normalizes central expression of corticotropin-releasing factor mRNA and energy balance in adrenalectomized rats: a glucocorticoid-metabolic-brain axis? *Endocrinology*, Jul; 142(7):2796-804.
29. Bhatnagar, S, Viau, V., Chu, A., Soriano, L. Meijer, O., Dallman, M.F. (2000). A Cholecystokinin-mediated pathway to the paraventricular thalamus is recruited in chronically stressed rats and regulates hypothalamic-pituitary-adrenal function. *Journal of Neuroscience*, 20(14), 5564-5573. PMID: 10884340
28. Bhatnagar, S., Bell, M.E., Liang, J., Soriano, L., Nagy, T.R., Dallman, M.F. (2000). Corticosterone facilitates saccharin intake in adrenalectomized rats. Does corticosterone increase stimulus salience? *Journal of Neuroendocrinology*, May;12(5):453-60.
27. Bell, M.E., Bhatnagar, S., Akana, S., Choi, S., Dallman, M.F. (2000). Disruption of arcuate/paraventricular nucleus connections changes body energy balance and response to acute stress. *J Neurosci*, Sep 1; 20(17):6707-13. PMID: 10964976
26. Bell, M.E., Bhatnagar, S., Liang, J., Soriano, L., Nagy, T.R., Dallman, M.F. (2000). Voluntary sucrose ingestion, like corticosterone replacement, prevents the metabolic deficits of adrenalectomy. *Journal of Neuroendocrinology*, May; 12(5):461-70.
25. Dallman M.F., Akana S.F., Bhatnagar S., Bell M.E., Strack A.M. (2000). Bottomed out: metabolic significance of the circadian trough in glucocorticoid concentrations. *Int J Obes Relat Metab Disorders*, Jun; 24 Suppl 2:S40-6 PMID: 10997607
24. Raber, J., Akana, S.F., Bhatnagar, S., Dallman, M.F., Wong, D., Mucke, L. (2000). Hypothalamic-pituitary-adrenal function in *ApoE* ^{-/-} mice: Possible role in behavioral and metabolic alterations. *Journal of Neuroscience*, 20(5), 2064-71. PMID: 10684907 F
23. Dallman, M.F., Akana, S.F., Bell, M.E., Bhatnagar, S., Choi, S., Chu, A., Gomez, F., Laugero, K., Soriano, L., Viau, V. (1999). Warning! Nearby construction can profoundly affect your experiments. *Endocrine*, 11(2), 111-3. PMID: 10709756
22. Akana, S.F., Strack A.M., Hanson E.S., Horsley C.J., Milligan E.D., Bhatnagar S., Dallman, M.F. (1999). Interactions among chronic cold, corticosterone and puberty on energy intake and deposition. *Stress*, Dec; 3(2):131-46. PMID: 10938575
21. Bhatnagar, S. & Dallman, M.F. (1999). The paraventricular nucleus of the thalamus alters rhythms in core temperature and energy balance in a state-dependent manner. *Brain Research*, 851(1-2), 66-75. PMID: 10642829
20. Dallman, M.F., Akana, S.F., Bhatnagar, S., Bell, M.E., Choi, S., Chu, A., Horsley, C., Levin, N., Meijer, O., Soriano, L. Strack, A.M. & Viau, V. (1999). Starvation: early signals, sensors and sequelae. *Endocrinology*, 140(9), 4015-4023.

19. Bhatnagar, S., Dallman, M.F., Roderick R.E., Basbaum, A.I. & Taylor, B.K. (1998). The effects of prior chronic stress on cardiovascular responses to acute restraint and formalin injection. *Brain Research*, 797(2), 313-320. PMID: 9666156
18. Bhatnagar, S. & Dallman, M.F. (1998). Neuroanatomical basis for facilitation of hypothalamic-pituitary-adrenal responses to a novel stressor after chronic stress. *Neuroscience*, 84(4), 1025-1039. PMID: 9578393
17. Smythe, J.W., Bhatnagar, S., Murphy, D., Timothy, C., Costall, B. (1998). The effects of intra-hippocampal scopolamine infusions on anxiety in rats as measured by the black-white box test. *Brain Research Bulletin*, 45(1), 89-93.
16. Bhatnagar, S., Costall, B., Smythe, J.W. (1997). Hippocampal cholinergic blockade enhances hypothalamic-pituitary-adrenal responses to stress. *Brain Research*, 766, 244-248. PMID: 9359609
15. Bhatnagar, S., Shanks, N., Meaney, M.J. (1996). Plaque-forming cell responses and antibody titers following injection of sheep red blood cells in nonstressed, acute, and/or chronically stressed handled and nonhandled animals. *Dev Psychobiol*, 29(2), 171-182. PMID: 8919094
14. Akana, S.F., Hanson, E.S., Horsley, C.J., Strack, A.M., Bhatnagar, S., Bradbury, M.J., Milligan, E.D., Dallman, M.F. (1996). Clamped corticosterone (B) reveals the effect of endogenous B on both facilitated responsivity to acute restraint and metabolic responses to chronic stress. *Stress*, 1(1), 33-49. PMID: 9807060
13. Smythe, J.W., Murphy, D., Bhatnagar, S., Timothy, C., Costall, B. (1996). Muscarinic antagonists are anxiogenic in rats tested in the black-white box. *Pharmacology, Biochemistry & Behavior*, 54(1), 57-63. PMID: 8728539
12. Bhatnagar, S. & Meaney, M.J. (1995). Hypothalamic-pituitary-adrenal function in chronic intermittently cold stressed neonatally handled and non handled rats. *Journal of Neuroendocrinology*, 7(2), 97-108. PMID: 7767330
11. Bhatnagar, S., Mitchell, J.B., Betito, K., Boksa, P., Meaney, M.J. (1995). Effects of chronic intermittent cold stress on pituitary adrenocortical and sympathetic adrenomedullary functioning. *Physiology & Behavior*, 57(4), 633-9. PMID: 7777596
10. Betito, K., Mitchell, J.B., Bhatnagar, S., Boksa, P., Meaney, M.J. (1994). Regulation of the adrenomedullary catecholaminergic system after mild, acute stress. *American Journal of Physiology*, 267(1 Pt 2): R212-20. PMID: 7914070
9. Meaney, M.J., Bhatnagar, S., Larocque, S., McCormick, C., Shanks, N., Sharma, S., Smythe, J., Viau, V., Plotsky, P.M. (1993). Individual differences in the hypothalamic-pituitary-adrenal stress response and the hypothalamic CRF system. *Annals of the New York Academy of Sciences*, Oct 29, 697, 70-85. PMID: 8257024

8. Meaney, M.J., Bhatnagar, S., Diorio, J., Larocque, S., Francis, D., O'Donnell, D., Shanks, N., Sharma, S., Smythe, J., Viau, V. (1993). Molecular basis for the development of individual differences in the hypothalamic-pituitary-adrenal stress response. *Cellular and Molecular Neurobiology*, 13(4), 321-47. PMID: 8252606
7. Bhatnagar, S., Meaney, M.J., Amir, S. (1993). The effects of prostaglandin E2 injected into the paraventricular nucleus of the hypothalamus on brown adipose tissue thermogenesis in spontaneously hypertensive rats. *Brain Research*, 613(2), 285-7.
6. Meaney, M.J., Viau, V., Bhatnagar, S., Betito, K., Iny, L.J., O'Donnell, D., Mitchell, J.B. (1991). Cellular mechanisms underlying the development and expression of individual differences in the hypothalamic-pituitary adrenal stress response. *Journal of Steroid Biochemistry and Molecular Biology*, 39(2), 265-274. PMID: 1888687
5. Meaney, M.J., Aitken, D.H., Bhatnagar, S., Sapolsky, R.M. (1991). Postnatal handling attenuates certain neuroendocrine, anatomical and cognitive dysfunctions associated with aging in female rats. *Neurobiology of Aging*, 12(1), 31-38. PMID: 2002881
4. Meaney, M.J., Mitchell, J.B., Aitken, D.H., Bhatnagar, S., Bodnoff, S.R., Iny, L.J., Sarrieau, A. (1991). The effects of neonatal handling on the development of the adrenocortical stress response: Implications for neuropathology and cognitive deficits in later life. *Psychoneuroendocrinology*, 16 (1-3), 85-103. PMID: 1961847
3. Meaney, M.J., Viau, V., Aitken, D.H., Bhatnagar, S. (1989). Glucocorticoid receptor levels in brain and pituitary of the lactating rat. *Physiology & Behavior*, 45(1), 209-212.
2. Meaney, M.J., Viau, V., Aitken, D.H., Bhatnagar, S. (1988). Stress-induced occupancy and translocation of hippocampal glucocorticoid receptors. *Brain Research*, 445(1), 198-203. PMID: 3365557
1. Meaney, M.J., Aitken, D.H., Bhatnagar, S., Van Berkel, D., Sapolsky, R.M. (1988). Effect of neonatal handling on age-related impairments associated with the hippocampus. *Science*, 239, 766-768. PMID: 3340858

Publications: Chapters and Reviews

Wyrofsky, R. R., Reyes, B. A., Kirby, L.G., Bhatnagar, S., Van Bockstaele, E.J. Endocannabinoids, stress signaling, and the locus coeruleus-norepinephrine system. Invited Review, Submitted *Neurobiology of Stress*.

Grafe, L.A., Bhatnagar, S. The contribution of orexins to sex differences in the stress response. Invited Review, *Brain Res.* 2018 Aug 3. pii: S0006-8993(18)30411-6. doi: 10.1016/j.brainres.2018.07.026. PMID: 30081036

Grafe, L.A., Bhatnagar, S. Orexins and Stress: An Update. Invited Review, *Frontiers in Neuroendocrinol.* 2018 Oct;51:132-145. doi: 10.1016/j.yfrne.2018.06.003. Epub 2018 Jun 19. Review. PMID: 29932958

Wood S.K., Bhatnagar S. (2015) Resilience to the effects of social stress: evidence from clinical and preclinical studies on the role of coping strategies. *Neurobiol Stress*. Jan 1;1:164-173. PMID: 25580450

Hsu DT, Kirouac GJ, Zubieta JK, Bhatnagar S. (2014) Contributions of the paraventricular thalamic nucleus in the regulation of stress, motivation, and mood. *Front Behav Neurosci*. Mar 11;8:73. PMID: 24653686

Nesse, R.M., Bhatnagar, S., Ellis, B. (2015). Chapter 11: Evolutionary Origins and Functions of the Stress Response. Book title: *Stress Concepts and Cognition, Emotion, and Behavior*. Elsevier Press

Rankin, C.H., Abrams, T., Barry, R. Bhatnagar, S., Cerutti, D., Clayton, D., Colombo, J., Coppola, G., Geyer, M., Glanzman, D., Marsland, S., McSweeney, F., Wilson, D., Wu, C.-F., Thompson, R. (2009) Habituation Revisited: An Updated and Revised Description of the Behavioral Characteristics of Habituation. *Neurobiology of Learning and Memory*, 92(2), 135-138. PMID: 18854219

Grissom, N. Bhatnagar, S. (2009). Habituation to repeated stress: Get used to it. *Neurobiology of Learning and Memory*, 92(2), 202-206. PMID: 18667167

Dallman MF, Pecoraro NC, La Fleur SE, Warne JP, Ginsberg AB, Akana SF, Laugero KC, Houshyar H, Strack AM, Bhatnagar S, Bell ME. Glucocorticoids, chronic stress, and obesity. *Prog Brain Res*. 2006;153:75-105.

Nesse, R.M., Bhatnagar, S., Young, E.A. (2006). Evolutionary Origins and Functions of the Stress Response. *Encyclopedia of Stress*. Ed. G. Fink, Academic Press.

Bhatnagar S, Vining C, Denski K. (2004). Regulation of chronic stress-induced changes in hypothalamic-pituitary-adrenal activity by the basolateral amygdala. *Ann N Y Acad Sci*, Dec;1032:315-9.

Dallman, M.F., Viau, V., Bhatnagar, S., Laugero, K., Gomez, F. & Bell, M.E. (2002). Corticotropin-releasing factor (CRF), corticosteroids and stress: Energy balance, the brain and behavior. *Hormones, Brain and Behavior*. Editors: D.W. Pfaff, A.P. Arnold, A.M. Etgen, S. E. Fahrbach & R.T. Rubin. Academic Press.

Dallman, M.F., Bhatnagar, S. & Viau V. (2000). The HPA (hypothalamic-pituitary-adrenal) axis *Encyclopedia of Stress*. Ed. G. Fink, Academic Press.

Dallman, M.F. & Bhatnagar, S. (2000). Chronic stress: Role of the hypothalamo-pituitary-adrenal axis. *Handbook of Physiology*.

Meaney, M.J., Bhatnagar, S., MacIntosh, D.S., McCormick, C.M., Shanks, N., Smythe, J.W., & Viau, V. (1993). Perinatal stress and neuroendocrine development in rats. In C.R. Pfeiffer (Ed.), *Intense Stress and Mental Disturbance in Children*. American Psychiatric Press Inc. New York.

Meaney, M.J., Bodnoff, S.R., Bhatnagar, S., O'Donnell, D., Welner, S.A., & Poirier, J. (1992). Glucocorticoids as mediators of brain aging. In M.H. Makman and G.B. Stefano (Eds.), *Model Systems: Neuroregulatory Mechanisms in Aging*. Manchester University Press.

Meaney, M.J., O'Donnell, D., Viau, V., Bhatnagar, S., Sarrieau, A., Smythe, J.W., Shanks, N., and Walker, C.-D. (1991). Corticosteroid Receptors in Rat Brain and Pituitary During Development and Hypothalamic-Pituitary-Adrenal (HPA) Function. In P. McLaughlin and I. Zagon (Eds.), *Receptors and the Developing Nervous System*. Chapman and Hall, London.

Meaney, M.J., Mitchell, J.B., Bhatnagar, S., Viau, V., & Bodnoff, S.R. (1991). Early environmental regulation of the hypothalamic-pituitary-adrenal axis: The role of serotonin. In T. Fujji (Ed.), *Functional Neurobiology of Short Term Exposure to Drugs*. Teikyo University Press, pp. 55-72.

Meaney, M.J., Aitken D.H., Bhatnagar, S., Bodnoff, S.R., Mitchell, J.B., Viau, V. & Sarrieau, A. (1990). Neonatal handling and the development of the adrenocortical response to stress, In N. Gunzenhauser (Ed.) *Advances in Touch: New Implication in Human Development*. Johnson & Johnson Pediatric Round Table Series, Vol. 14. Skillman, NJ, pp. 1-21.

Selected Conference Proceedings and Abstracts (since 2010)

Urban K.R., Corbett B., and Bhatnagar S. Sex Differences in Paraventricular Thalamic Neuron Function in the Adolescent Rat. Society for Neuroscience Annual Meeting Abstracts, 2018.

Grafe, L., Geng, E., Bhatnagar S. Changes in morphology and spine densities in orexin neurons after repeated stress in male and female rats. Society for Neuroscience Annual Meeting Abstracts, 2018.

Corbett, B., Luz, S., Bhatnagar, S. . Molecular and circuit mechanisms underlying paraventricular thalamic regulation of habituation to stress. Society for Neuroscience Annual Meeting Abstracts, 2018.

Arner, J.R., Bates, M.L.S., Curtis, A.L., Bhatnagar S. Examining coherence between locus coeruleus and cortical network activity. Society for Neuroscience Annual Meeting Abstracts, 2018.

Bates, M.L.S., Arner, J., Curtis, A., Bhatnagar, S. Exploring the effects of corticotropin-releasing factor in locus coeruleus on cortical network activity. Society for Neuroscience Annual Meeting Abstracts, 2018.

Pearson-Leary, J., Feindt-Scott, E., Bhatnagar, S. Fear learning in stress vulnerable and resilient rats Society for Neuroscience Annual Meeting Abstracts, 2018.

Shi, Y., Reyes, B.A.S., Van Bockstaele, E.J., Zhang, X.-Y., Luz, S., Bhatnagar, S. Social stress activates amygdalar contricotropin releasing factor and brainstem enkephalinergic afferents to the rat locus coeruleus in adolescent rats depending on coping strategy. Society for Neuroscience Annual Meeting Abstracts, 2018.

Corbett, B., Luz, S., Bhatnagar, S. Paraventricular thalamic regulation of habituation to repeated stress: molecular and network mechanisms. Society for Neuroscience Annual Meeting Abstracts, 2017.

Jiah Pearson-Leary, Kyle Bittinger, Chunyu Zhao, Ceylan Tanes, Darrell Eacret, Sandy Luz, Gabriel Dayanim, Seema Bhatnagar. Vulnerability and resiliency to social defeat stress is mediated by the gut microbiome. Society for Neuroscience Annual Meeting Abstracts, 2017.

Brian Corbett, Nate Sotuyo, Jiah Pearson-Leary, Sandra Luz, Seema Bhatnagar. Sphingosine-1-phosphate receptor 3 in the medial prefrontal cortex promotes resilience to social defeat. Society for Neuroscience Annual Meeting Abstracts, 2017.

Laura A. Grafe, Sandra M. Luz, Seema Bhatnagar. Orexins and sex differences in stress-induced cognitive and sleep deficits. Society for Neuroscience Annual Meeting Abstracts, 2017.

Goel, N., Taylor, D.M., Abel, T., Kilgore, W.D.S., Pearson-Leary, J., Bhatnagar, S. MicroRNAs are cross-species markers of sleep loss in humans and rats. Society for Neuroscience Annual Meeting Abstracts, 2017.

Janeese A. Brownlow, Holly Barilla, Philip R. Gehrman, Richard J. Ross, Mitchel A. Kling, Seema Bhatnagar. Different Relations with Sleep Disturbance across PTSD Symptom Clusters in OEF/OIF Veterans . American Sleep Society Meeting 2017.

Paolo Nucifora, Mitchel Kling, Richard Ross, Cobb Scott, Holly Barilla, Janeese Brownlow, Philip Gehrman, Seema Bhatnagar. Mean Diffusion Kurtosis Correlated to Severity of Depressive and Postconcussive Symptoms. Human Brain Mapping Annual Meeting, 2017.

Corbett, B., Luz, S., Bhatnagar, S. Investigating the role of the paraventricular thalamic nucleus in regulating the stress response: potential molecular mechanisms. Society for Neuroscience Annual Meeting Abstracts, 2016.

Corbett, B., Sotuyo, N., Pearson-Leary, J., Luz, S., Bhatnagar, S. Sphingosine 1 phosphate 3 receptors in the medial prefrontal cortex promote resilience to social defeat. Society for Neuroscience Annual Meeting Abstracts, 2016.

Pearson-Leary, J., Bittinger, K., Tanes, C., Bhatnagar, S. Individual differences in the microbiome of rats resilient or vulnerable to the effects of chronic social defeat stress. Society for Neuroscience Annual Meeting Abstracts, 2016.

Eacret, D., Grafe, L., Luz, S., Bhatnagar, S. Inhibition of orexin neurons by DREADDs promotes resilience to social defeat. Society for Neuroscience Annual Meeting Abstracts, 2016.

Dustrude, E.T., Bernabe, C.S., Bhatnagar, S., Johnson, P.L. Moloshi, A.I., Shekhar, A. Orexin depolarizes central amygdala neurons via activation of orexin receptor 1 and downstream activity of sodium calcium exchanger. Society for Neuroscience Annual Meeting Abstracts, 2016.

Eacret, D. Grafe, L., Luz, S., Wilson, L.N., Gotter, A., Winrow, C. Bhatnagar, S. Orexin 2 receptor regulation of the hypothalamic-pituitary-adrenal (HPA) response to acute and repeated stress.

Society for Neuroscience Annual Meeting 2015.

Grafe, L., Cornfeld, A., Luz, S., Bhatnagar, S. The role of orexins in sex differences in the stress response and in cognitive function. Society for Neuroscience Annual Meeting 2015.

Corbett, B., Beltrami, S., Luz, S., Sutoyo, N., Bhatnagar, S. Sphingosine-1-phosphate receptor dysregulation contributes to depressive-like behavior in stress-susceptible rats. Society for Neuroscience Annual Meeting 2015.

Pearson-Leary, J., Eacret, D., Chen, R., Wilson, L., Bhatnagar, S. Interleukin-1 α in the ventral hippocampus mediates aspects of stress vulnerability. Society for Neuroscience Annual Meeting 2015.

Blume-Rice, S., Luz, S., Eacret, D., Sotuyo, N., Valentino, R.J., Bhatnagar S. The effect of orexin receptor blockade on open field behaviors are both sex and age dependent. Society for Neuroscience Annual Meeting 2015.

Chen, R., Beltrami, S., Kelly, G., Sengupta, A., Heydendael, W., Nicholas, B., Luz, S., Bhatnagar, S. MicroRNA profiles in medial prefrontal cortex and amygdala in rats resilient or vulnerable to chronic stress. Society for Neuroscience Annual Meeting, 2014.

Beltrami, S, Chen, R., Kelly, G., Sengupta, A., Heydendael, W., Nicholas, B., Luz, S., Bhatnagar, S. Circulating blood microRNAs are biomarkers for resilience or vulnerability to the effects of chronic social stress in rats. Society for Neuroscience Annual Meeting, 2014.

Grafe, L., Luz, S., Bhatnagar, S. Orexins may contribute to sex differences in adaptation to stress. Society for Neuroscience Annual Meeting, 2014.

Pearson-Leary, J., Nicholas, B., Bhatnagar, S. Vascular endothelial growth factor (VEGF) and vascular density in hippocampus of rats vulnerable or resilient to the effects of chronic stress. Society for Neuroscience Annual Meeting, 2014.

Luz, S., Schwarzbach, H., Kelly, G., Valentino, R.J., Bhatnagar, S. Different patterns of neuronal activity in adolescent compared to adult females exposed to repeated social stress. Society for Neuroscience Annual Meeting, 2014.

Luz, S., Kelly, G., Valentino, R.J., Bhatnagar, S.: Chronic social defeat in female rats produces different long-term effects on social anxiety-like behaviors depending on age. Society for Neuroscience Abstracts 2013.

Kelly, G., Pearson-Leary, J., Sengupta, A., Nicholas, B., Heydendale, W., Luz, S., Bhatnagar, S.: Involvement of vascular endothelial growth factor in the medial prefrontal cortex in regulating resilience to stress. Society for Neuroscience Abstracts 2013.

Bhatnagar, S., Sengupta, A., Heydendale, W., Pearson-Leary, J., Kelly, G., Piel, D., Beck, S.: The use of designer receptors exclusively activated by designer drugs (DREADDS) to elucidate the role of orexins in adaptations to stress. Society for Neuroscience Abstracts 2013.

Chaijale, N., Curtis, A.L., Snyder, K., Bhatnagar, S., Valentino, R.J.: Social stress engages opioid modulation of the locus coeruleus-norepinephrine system and increases the salience of reward. Society for Neuroscience Abstracts 2013.

Curtis, A.L., Luz, S., Bhatnagar, S., Valentino, R.J.: Effect of Adolescent social isolation on adult social interaction and activity of locus coeruleus (LC)-norepinephrine (NE) neurons in female rats. Society for Neuroscience Abstracts 2013.

Heydendael, W., Sengupta, A., de Lecea, L., Beck, S., Bhatnagar, S. Optogenetic examination of orexin/hypocretin regulation of behaviors in the rat. Society for Neuroscience abstracts 2011.

Kenworthy, C., Luz, S., Ver Hoeve, E., Meda, K., Bhatnagar, S., Abel, T. Epigenetic modifications induced by stress and genes targeted by these modifications in socially defeated rats. Society for Neuroscience abstracts 2011.

Schwartz, L., Heydendael, W., Sengupta, A., Gunnam, S., de Zoeten, E., Bhatti, T., Bhatnagar, S. Repeated stress produces enteric inflammation in rats exposed to a sub-threshold dose of dextran sodium sulfate. Society for Neuroscience abstracts 2011.

Kelly, G., Sengupta, A., Heydendael, W., Bhatnagar, S. Examination of gene expression in posterior paraventricular thalamus following repeated stress with and with out the orexin 1 receptor antagonist SB334867. Society for Neuroscience abstracts 2011.

Ver Hoeve, E., Luz, S., Ghanshani, S., Bhatnagar, S. Effects of repeated social defeat during adolescence or adulthood in female rats. Society for Neuroscience abstracts 2011.

Cook, P., Dhillon, P., Avants, B., Brun, C., Luz, S., Bhatnagar, S., Gee, J. White matter microstructure associated with resilience to social stress in rats as assessed by diffusion tensor magnetic resonance imaging (DTI). Society for Neuroscience abstracts 2011.

Sengupta, A., Heydendael, W., Bhatnagar, S. Identification of putative genes in the prefrontal cortex regulating vulnerability or resilience to the effects of social defeat in rats. Society for Neuroscience abstracts 2011.

Valentino, R.J., Bangasser, D., Lee, C., Ver Hoeve, E., Cook, P., Gee, J., Bhatnagar, S. Acute stress produces regionally distinct brain activation of rats exposed to chronic social stress that is related to coping response: a manganese-enhanced MRI study. Society for Neuroscience abstracts 2011.

Chaijale, N., Curtis, A., Wood, S.K., Snyder, K., Luz, S., Bhatnagar, S., Valentino, R.J. Effects of social stress on locus coeruleus activity and cognitive flexibility. Society for Neuroscience abstracts 2011.

Grissom, N., Bhatnagar, S.: Intra BLA beta-AR agonist administration enhances habituation to repeated stress. Society for Neuroscience abstracts 2010

M.B. Thomas, M.T. Dassanayake, S. Bhatnagar, J.B. Becker: Sex-specific sensitization of addiction-like behaviors induced by prenatal stress. Society for Neuroscience Abstracts 2010.

Wood, S.K., McFadden, K., Grigoriadis, D., Bhatnagar, Valentino, R.J. Individual differences in stress reactivity during social stress may predict susceptibility and resilience to depression and cardiovascular co-morbidity: Role of corticotropin-releasing factor. *Experimental Biology*, 2010

Susan K. Wood, Kile V. McFadden, Dimitri Grigoriadis, Seema Bhatnagar, Rita J. Valentino: Individual differences in response to social stress may predict susceptibility and resilience to depression and cardiovascular co-morbidity: Role of corticotropin-releasing factor. *Society for Neuroscience Abstracts* 2010

Heydendael, W., Bhatnagar, S.: Orexins Regulate Adaptation To Repeated Stress. 49th American College of Neuropsychopharmacology Annual Meeting December 2010.