OMB No. 0925-0001 and 0925-0002 (Rev. 10/15 Approved Through 10/31/2018)

BIOGRAPHICAL SKETCH

Provide the following information for the Senior/key personnel and other significant contributors.  
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NAME: Hartman, Richard E.

eRA COMMONS USER NAME (credential, e.g., agency login): rhartman

POSITION TITLE: Professor, Department of Psychology

EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)

| INSTITUTION AND LOCATION | DEGREE  (if applicable) | Completion Date  MM/YYYY | FIELD OF STUDY |
| --- | --- | --- | --- |
| Missouri State University | BS | 05/1993 | Experimental Psychology |
| Washington University in St. Louis | PhD | 09/2001 | Behavioral Neuroscience |
| Washington University School of Medicine | Postdoctoral | 09/2005 | Molecular and Behavioral Neuroscience |

**A. Personal Statement**

I have extensive experience with behavioral assays of rodent models of brain damage, neurodegenerative disease, and the long-term effects of early drug exposure. I have been publishing papers characterizing rodent behavioral phenotypes since 2001. My first paper characterizing neuropathology following brain injury used a mouse model of traumatic brain injury. Since then, I have published papers characterizing brain injury resulting from intracerebral hemorrhage, global ischemia, impact trauma, and exposure to radiation, ethanol and anesthetic agents, as well as characterizing a number of transgenic mouse lines. Of particular relevance to this proposal, I published papers on the behavioral and neuropathological effects of early exposure to alchohol and anesthetics in rodents. As a student and postdoctoral fellow at Washington University, I helped to set up and run their Behavioral Core Facility, and I am currently the core director of LLU’s Center for Brain Hemorrhage Research Program Project Grant. My behavioral neuroscience facility at Loma Linda University has the equipment to characterize a wide variety of behaviors, including general neurological function, learning and memory, fine and gross motor skills, affect, activity levels, etc. This ability to look at the overall pattern of many facets of behavior allows our lab to tease out subtle behavioral differences between experimental groups that would otherwise go undetected. Alternatively, measuring a variety of behaviors allows us to fairly characterize behaviors that may otherwise be misinterpreted. I feel that my experience in analyzing behavioral deficits in rodents will allow me to play an important role in designing and implementing appropriate tests for the proposed study, as well as data analysis and interpretation. I will be responsible for experimental design of the behavioral assays, managing and overseeing behavioral aspects of the project, reviewing data/statistics, and helping to prepare manuscripts.

1. Dulcich MS, **Hartman RE**. [Pomegranate supplementation improves affective and motor behavior in mice after radiation exposure.](http://www.ncbi.nlm.nih.gov/pubmed/23662154) Evid Based Complement Alternat Med. 2013;2013:940830. doi: 10.1155/2013/940830. Epub 2013 Apr 15. PubMed PMID: 23662154; PubMed Central PMCID: PMC3639646.
2. **Hartman RE**, Kamper JE, Goyal R, Stewart JM, Longo LD. [Motor and cognitive deficits in mice bred to have low or high blood pressure.](http://www.ncbi.nlm.nih.gov/pubmed/22154805) Physiol Behav. 2012 Feb 28;105(4):1092-7.
3. Wozniak DF, **Hartman RE**, Boyle MP, Vogt SK, Brooks AR, Tenkova T, Young C, Olney JW, Muglia LJ. [Apoptotic neurodegeneration induced by ethanol in neonatal mice is associated with profound learning/memory deficits in juveniles followed by progressive functional recovery in adults.](http://www.ncbi.nlm.nih.gov/pubmed/15571976) Neurobiol Dis. 2004 Dec;17(3):403-14. PubMed PMID: 15571976.
4. Jevtovic-Todorovic V, **Hartman RE**, Izumi Y, Benshoff ND, Dikranian K, Zorumski CF, Olney JW, Wozniak DF. [Early exposure to common anesthetic agents causes widespread neurodegeneration in the developing rat brain and persistent learning deficits.](http://www.ncbi.nlm.nih.gov/pubmed/12574416) J Neurosci. 2003 Feb 1;23(3):876-82. PubMed PMID: 12574416.

**B. Positions and Honors**

Positions and Employment

1994-2001 Research Assistant, Depts. of Psychiatry and Neurology, Washington University School of Medicine

2000-2001 Laboratory Manager, Animal Behavior Core Research Facility, Washington University School of Medicine

2001-2005 NIDA Fellow, Departments of Psychiatry and Neurology, Washington University School of Medicine

2004-2005 Adjunct Professor, Department of Psychology, Washington University

2005-2009 Assistant Professor of Psychology, Loma Linda University, Loma Linda, CA

2009-2014 Associate Professor of Psychology, Loma Linda University, Loma Linda, CA

2015- Professor of Psychology, Loma Linda University, Loma Linda, CA

Other Experience and Professional Memberships

American Association for the Advancement of Science

International Behavioral and Neural Genetics Society

Oxygen Club of California

Society for Neuroscience

Honors

1989-1993 Bright Flight Scholar, Dean’s List, *cum laude* in Honors College, Missouri State University

1997 Travel award, International Behavioral Neuroscience Society

2000 Competitive research fellowship, Washington University

**C. Contribution to Science**

Complete List of Published Work in NCBI Bibliography: [**http://www.ncbi.nlm.nih.gov/sites/myncbi/1Zqja6bq68j/bibliography/46707223/public/?sort=date&direction=ascending**](http://www.ncbi.nlm.nih.gov/sites/myncbi/1Zqja6bq68j/bibliography/46707223/public/?sort=date&direction=ascending)

1. I have characterized the behavioral effects of **stroke** (global and unilateral ischemia, and hemorrhage - intracerebral [basal ganglia / germinal matrix], subarachnoid, pons / cerebellum) and risk factors (high blood pressure, open heart surgery), in juvenile and adult rodents, as well as therapeutic interventions. I have collected these data as a graduate student and postdoctoral fellow, and designed studies as a principle investigator.
   1. Zhang JH, Badaut J, Tang J, Obenaus A, **Hartman R**, Pearce WJ. The vascular neural network--a new paradigm in stroke pathophysiology. Nat Rev Neurol. 2012 Dec;8(12):711-6. doi: 10.1038/nrneurol.2012.210. Epub 2012 Oct 16. PubMed PMID: 23070610; PubMed Central PMCID: PMC3595043.
   2. **Hartman RE**, Kamper JE, Goyal R, Stewart JM, Longo LD. Motor and cognitive deficits in mice bred to have low or high blood pressure. Physiol Behav. 2012 Feb 28;105(4):1092-7. doi: 10.1016/j.physbeh.2011.11.022. Epub 2011 Nov 29. PubMed PMID: 22154805.
   3. **Hartman RE**, Lee JM, Zipfel GJ, Wozniak DF. Characterizing learning deficits and hippocampal neuron loss following transient global cerebral ischemia in rats. Brain Res. 2005 May 10;1043(1-2):48-56. PubMed PMID: 15862517.
   4. **Hartman R,** Lekic T, Rojas H, Tang J, Zhang JH. Assessing functional outcomes following intracerebral hemorrhage in rats. Brain Res. 2009 Jul 14;1280:148-57. doi: 10.1016/j.brainres.2009.05.038. Epub 2009 May 21. PubMed PMID: 19464275.
2. My early work as a graduate student focused on **behavioral phenotyping of rodents**, particularly transgenic mice and rat models of stroke and brain injury. These studies led to my helping set up Washington University’s Behavioral Core Facility and my current role as director of Loma Linda University’s Behavioral Core.
   1. **Hartman RE**. Animal Models of Acute Neurological Injuries II. Chen J, Xu XM, Xu ZC, Zhang JH, editors. USA: Humana Press; 2011. Assessment of cognitive and sensorimotor deficits
   2. Schaefer ML, Wong ST, Wozniak DF, Muglia LM, Liauw JA, Zhuo M, Nardi A, **Hartman RE**, Vogt SK, Luedke CE, Storm DR, Muglia LJ. Altered stress-induced anxiety in adenylyl cyclase type VIII-deficient mice. J Neurosci. 2000 Jul 1;20(13):4809-20. PubMed PMID: 10864938.
   3. Khuchua Z, Wozniak DF, Bardgett ME, Yue Z, McDonald M, Boero J, **Hartman RE**, Sims H, Strauss AW. Deletion of the N-terminus of murine map2 by gene targeting disrupts hippocampal ca1 neuron architecture and alters contextual memory. Neuroscience. 2003;119(1):101-11. PubMed PMID: 12763072.
   4. Kamper JE, Pop V, Fukuda AM, Ajao DO, **Hartman RE**, Badaut J. Juvenile traumatic brain injury evolves into a chronic brain disorder: behavioral and histological changes over 6months. Exp Neurol. 2013 Dec;250:8-19. doi: 10.1016/j.expneurol.2013.09.016. Epub 2013 Sep 25. PubMed PMID: 24076005; PubMed Central PMCID: PMC3895624.
3. One of my laboratory’s main areas of research is on the **neuroprotective effects of phytochemicals** (e.g., compounds such as polyphenols found in plants). I showed that pomegranate supplementation reduced soluble amyloid-β and plaques by ~50% in the brains of transgenic mice. More importantly, I have shown that dietary supplementation with pomegranates improved learning and memory performance in the mice and in humans after heart surgery. Other data from our lab demonstrates that pomegranate supplementation protected against depression-like behaviors (learned helplessness) induced by radiation exposure and improved swim speed in transgenic mice.
   1. **Hartman RE**, Shah A, Fagan AM, Schwetye KE, Parsadanian M, Schulman RN, Finn MB, Holtzman DM. Pomegranate juice decreases amyloid load and improves behavior in a mouse model of Alzheimer's disease. Neurobiol Dis. 2006 Dec;24(3):506-15. Epub 2006 Sep 28. PubMed PMID: 17010630.
   2. **Hartman RE**. Micronutrients and Brain Health. Packer L, Sies H, Eggersdorfer M, Cadenas E, editors. USA: CRC Press; 2009. Actions of bioactive phytochemicals in cell function and Alzheimer's disease pathology; p.225-241. 460p
   3. Ropacki SA, Patel SM, **Hartman RE**. Pomegranate supplementation protects against memory dysfunction after heart surgery: A pilot study. Evid Based Complement Alternat Med. 2013;2013:932401. doi: 10.1155/2013/932401. Epub 2013 Sep 16. PubMed PMID: 24159353; PubMed Central PMCID: PMC3789410.
   4. Dulcich MS, **Hartman RE**. Pomegranate supplementation improves affective and motor behavior in mice after radiation exposure. Evid Based Complement Alternat Med. 2013;2013:940830. doi: 10.1155/2013/940830. Epub 2013 Apr 15. PubMed PMID: 23662154; PubMed Central PMCID: PMC3639646.
4. Characterizing rodent models of **Alzheimer’s disease** and therapeutic interventions has been a focus of my research since I worked as a postdoctoral fellow in David Holtzman’s laboratory. In the late 1990’s and early 2000’s, behavioral phenotyping of transgenic mice was still in its infancy. The sequelae of learning and memory deficits in these mice, as well as their relationship with Alzheimer’s-like neuropathology, were unknown. I modified the protocols of tests traditionally used for rats and modified them to work with mice. My work showed that, in general, these mice start life with minimal cognitive impairments and develop age- and plaque-related learning deficits similar to those observed in humans. Additionally, I showed that preventing and/or reducing neuropathology using antibodies and/or polyphenols could rescue these cognitive deficits, and that traumatic brain injury accelerated the neuropathology. These findings were recognized by the Dana Foundation as some of the most important findings in Alzheimer’s research in 2005. More recently, work with collaborators has demonstrated that traumatic brain injury in juvenile rats induces long-term behavioral deficits and Alzheimer’s-like aggregated amyloid-beta deposits in the brain.
   1. **Hartman RE**, Wozniak DF, Nardi A, Olney JW, Sartorius L, Holtzman DM. *Behavioral phenotyping of GFAP-apoE3 and -apoE4 transgenic mice: apoE4 mice show profound working memory impairments in the absence of Alzheimer's-like neuropathology*. Exp Neurol. 2001 Aug;170(2):326-44. PubMed PMID: 11476599.
   2. **Hartman RE**, Izumi Y, Bales KR, Paul SM, Wozniak DF, Holtzman DM. *Treatment with an amyloid-beta antibody ameliorates plaque load, learning deficits, and hippocampal long-term potentiation in a mouse model of Alzheimer's disease*. J Neurosci. 2005 Jun 29;25(26):6213-20. PubMed PMID: 15987951.
   3. **Hartman RE**, Shah A, Fagan AM, Schwetye KE, Parsadanian M, Schulman RN, Finn MB, Holtzman DM. *Pomegranate juice decreases amyloid load and improves behavior in a mouse model of Alzheimer's disease*. Neurobiol Dis. 2006 Dec;24(3):506-15. Epub 2006 Sep 28. PubMed PMID: 17010630.
   4. Pop V, Sorensen DW, Kamper JE, Ajao DO, Murphy MP, Head E, **Hartman RE**, Badaut J. *Early brain injury alters the blood-brain barrier phenotype in parallel with β-amyloid and cognitive changes in adulthood*. J Cereb Blood Flow Metab. 2013 Feb;33(2):205-14. doi: 10.1038/jcbfm.2012.154. Epub 2012 Nov 14. PubMed PMID: 23149553; PubMed Central PMCID: PMC3564189.

**D. Research Support**

**Ongoing Research Support**

P01 NS082184-01A1 Zhang (PI) 01/01/14-12/31/18

*Center for Brain Hemorrhage Research*

The goal of this program project grant is to determine structure/function relationships between various types of brain injury that involve damage to the neurovascular unit.

Role: Core leader (Neurobehavioral assessment)

**Completed Research Support**

School of Behavioral Health Seed grant Hartman (PI) 01/01/15-01/01/16

*The effects of pomegranate polyphenols on behavior and neuropathology following mild repeated traumatic brain injury*

The goal of this project is to determine the effects of pomegranate polyphenols on behavior and neuropathology following mild repeated traumatic brain injury.

Role: PI

NASA NRA NNH12ZTT001N Mao (PI) 01/01/13-01/01/16

*Role of oxidative stress in mediating the effects of combined exposure to simulated microgravity and radiation on neurovascular remodeling in mouse*

The goal of this project is to determine the role of oxidative stress in mediating the effects of combined exposure to simulated microgravity and radiation on neurovascular remodeling in mouse

Role: Co-investigator

NIH NICHD Badaut (PI) 01/01/10-06/30/14

*AQP4 and JNK inhibition together reduce edema and excitotoxic injury in juvenile traumatic brain injury*

The goal of this project is to assess combinatorial approaches to reducing injury after jTBI.

Role: Co-investigator

NASA NNX11AE41G Vlkolinsky (PI) 02/01/11-02/01/14

*Functional decline in mice with Alzheimer's-type neurodegeneration is accelerated by charged-particle radiation*

The goal of this project was to determine the temporal profile and dose-dependence of functional and neuropathological changes in the hippocampus after exposure to low doses of proton radiation.

Role: Co-investigator

NIH/NINDS R01 Tang (PI) 08/05/09-07/31/13

*Mechanisms of G-CSF-induced neuroprotection*

The goal of this project was to determine the neuroprotective mechanisms of G-CSF.

Role: Co-investigator