CURRICULUM VITAE

Matthew Tyler Hougland

CONTACT INFORMATION
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EDUCATION & TRAINING

2013. Ph.D. Anatomical Sciences and Neurobiology, University of Louisville, Louisville, KY.
Concentration: Gene expression changes in sensorimotor circuits after spinal cord injury

2010. M.S. Anatomical Sciences and Neurobiology, University of Louisville, Louisville, KY.
Concentration: Molecular therapy approaches to recovery after contusive spinal cord injury

2007. B.S. Psychological and Brain Sciences, University of Louisville, Louisville, KY.
Concentration: Neural basis of behavior
*Graduated with Honor*s

WORK EXPERIENCE

Senior Lecturer, English	Nanjing University of Information Science and Technology Nanjing, Jiangsu, China	2017-2020
Research Assistant	University of Louisville School of Medicine Louisville, KY, USA	2013-2015
Graduate Research Assistant	University of Louisville School of Medicine Louisville, KY, USA	2007-2013
Undergraduate Research Assistant	University of Louisville School of Medicine Louisville, KY, USA	2006-2007

Post Graduate

Determining network constituents of respiratory brainstem nuclei, and response to chemical perturbations.

- Used calcium imaging, computer programming, and electrophysiology to identify rhythm generating loci in a novel slice preparation of neonatal rat brainstem.

- Tested the effects of different chemical stimuli(caffeine, methadone), to elucidate underlying mechanisms of common clinical treatments/symptoms of respiratory dysfunction in infants.

Using calcium imaging to determine cellular response properties to a line of human neural stem cells.

- Used calcium imaging and various compounds to discern which molecules/neurotransmitters induce electrical activity in a line of Human Olfactory Neuroepithelial(ONe) stem cells.

Graduate studies

Dissertation: *Gene expression analysis of Neurotrophins, Trk receptors, and putative regulatory molecules after contusive SCI.*

- Identified and characterized changes in expression of plasticity-related molecules in sensorimotor circuits after contusive spinal cord injury.

- Examined the changes seen in molecules under investigation at pre-clinically relevant time points, and used different contusion severities to determine how the nature of the injury and time after injury effect gene expression.

- Examined and compared correlative changes between different families of molecules to identify coordinated expression patterns between groups of molecules. These analyses were subsequently used in conjunction with bioinformatics analyses to determine potential transcription factor regulation.

Electrophysiological reporter for determining status of molecular manipulation.

- Provided technical guidance for a project that used cloned viral vectors of optogenetic contructs as a reporter for determining the infection status of individual cells using only electrophysiological assessments.

Other Projects

Effects of NT3 on recovery from contusive spinal cord injury, in the absence of locomotor training.

- Provided technical and critical assistance to for a project that attempted to use molecular therapy to ecotopically express NT3 in lumbar locomotor circuits caudal to injury site, and examine the subsequent effects on recovery using molecular, physiological, behavioral, and histological techniques.

Optogenetic Determination of Activity in Somatostatin Neurons within Functional Circuits.

- Expressed optogenetic constructs in somatostatin positive primary afferents to determine subsequent upstream effects on sensory circuitry to determine how activity in these neurons affected pain related behaviors using light-driven stimulation or inhibition.

Effects of Atorvastatin after Spinal Cord Injury.

- Used behavioral and histological measurements to determine the effect of Atorvastatin on recovery of locomotion after SCI, to determine if the improvements seen in previous studies were similar when different locomotor assessments were used.

Undergraduate Studies

Thesis: *Functional Imaging of Behavioral States*.

- Used PET imaging to elucidate how glucose is metabolized in a rodent model of mania, to provid evidence to suggest that the model of mania we used showed similar imaging parameters to those observed in humans.

Projects

Behavioral Assessments after Pharmacological Manipulation.

- Used open field locomotor measurements to assess the effects of different clinically applicable drugs in a rodent model of mania to compare and contrast the effects of different drugs used to treat bipolar depression with our animal model of mania in rodents.

LANGUAGE PROFICIENCY

English, German(Intermediate), Mandarin Chinese(Intermediate)

PROFESSIONAL SOCIETIES

Society for Neuroscience
2009-Present

PUBLICATIONS

Gao, Y., Peterson, S., Masri, B., Hougland, M.T., Adham, N., Gyertyán, I., Kiss, B., Caron, M.G., El-Mallakh, R.S. Cariprazine exerts antimanic properties and interferes with dopamine D2 receptor β-arrestin interactions. (2015) *Pharmacology Research Perspectives*. Feb;3:1. (PMID: 25692006)

Hougland, M.T., Harrison, B.J., Magnuson, D.S.K., Rouchka, E.C., Petruska, J.C. The Transcriptional Response of Neurotrophins and Their Tyrosine Kinase Receptors in Lumbar Sensorimotor Circuits to Spinal Cord Contusion is Affected by Injury Severity and Survival Time. (2013) *Frontiers in Physiology.*3:478. (PMID. 23316162)

Gao Y., Payne R.S., Schurr A., Hougland T., Lord J., Herman L., Lei Z., Banerjee P., El-Mallakh R.S. Memantine reduces mania-like symptoms in animal models. *Psychiatry Research.* (2011) Aug 15; 188(3):366-71. (PMID: 21269711)

Hill, C.E., Harrison, B.J., Rau, K.K., Hougland, M.T., Bunge, M.B., Mendell, L.M., Petruska, J.C. Skin incision induces expression of axonal regeneration-related genes in adult rat spinal sensory neurons. (2010) *Journal of Pain.* 11(11):1066-73. (PMID: 20627820)

Hamid H., Gao Y., Lei Z., Hougland M.T., El-Mallakh R.S. Effect of ouabain on sodium pump alpha-isoform expression in an animal model of mania. (2009) *Progress in Neuropsychopharmacology and Biological Psychiatry.* 33(7):1103-6. (PMID: 19524007)

Hougland M.T., Gao Y., Herman L., Ng C.K., Lei Z., El-Mallakh R.S. Positron emission tomography with fluorodeoxyglucose-F18 in an animal model of mania. (2008) *Psychiatry Research: Neuroimaging*. 164(2):166-71. (PMID: 18930636)

Herman L., Hougland T., El-Mallakh R.S. Mimicking human bipolar ion dysregulation models mania in rats. (2007) *Neuroscience and Biobehavioral Reviews*. 31(6):874-81 (PMID: 17720496)

POSTERS

Assessment of Neurotrophins and their Trk receptors at pre-clinically relevant time points after different contusion severities reveals novel expression patterns. Hougland MT, Harrison BJ, Magnuson DSK, Rouchka EC, Petruska JC. *19th annual Kentucky Spinal Cord and Head Injury Research Trust Symposium.* Louisville, KY. May 6-7, 2013.

Characterization of Trk receptor expression during a period of behavioral plasticity after spinal cord injury. Hougland MT, Burke DA, Harrison BJ, Yarberry C, Petruska JC. *17th annual Kentucky Spinal Cord and Head Injury Research Trust Symposium.* Louisville, KY. June 19-20, 2011.

Interference with D2 Dopamine Receptor beta-Arrestin 2 Signaling May Relate to the Antimanic Effects of Cariprazine. Peterson, S; Masri, B; Gao, YL; Hougland, T; Lei, ZM; El-Mallakh, RS; Gyertyan, I; Kiss, B; Caron, MG. *65th Annual Convention of the Society of Biological Psychiatry*. New Orleans, LA. May 20-22, 2010. Society of Biological Psychiatry

Cariprazine (RGH-188), a Potential Antipsychotic with Dopamine D3/D2 Functional Antagonist Properties, Attenuates Manic-Like Behaviors in Animal Models. Adham, N; Samoriski, G; Gao, YL; Hougland, T; Lei, ZM; El-Mallakh, RS; Kiss, B; Szombathelyi, Z; Gyertyan, I. *64th Annual Convention of the Society of Biological Psychiatry.* Vancouver, Canada. May 14-16, 2009. Society of Biological Psychiatry

Effect of memantine in an animal model of mania. Gao, YL; Hougland, T; Herman, L; Lei, ZM; El-Mallakh, JR; Banerjee, PK; El-Mallakh, RS. *63rd Annual Convention of the Society of Biological Psychiatry*. Washington, DC. 2008. Society of Biological Psychiatry

[F-18]-fluorodeoxyglucose positron emission tomography in an animal model of mania. Hougland, MT; Gao, Y; Herman, L; Ng, CK; Lei, Z; El-Mallakh, RS. *63rd Annual Convention of the Society of Biological Psychiatry*. Washington, DC. 2008. Society of Biological Psychiatry

Effects of ouabain on alpha-isoforms of Na, K-ATPase in rat brain. Hamid, H; Gao, YL; Lei, Z; Hougland, MT; El-Mallakh, RS. *International Conference on Bipolar Disorder*. Pittsburgh, PA.

SKILLS – Laboratory:
PCR/qRT-PCR, Immunohistochemistry, Histology, Cryostat, Tissue Dissection, Microsurgery, Light and Fluorescent Microscopy, Primary Cell Culture, Locomotor , Pain and Mechanical Sensory Behavioral Assessments, Drug Delivery (ICV, IP, IM, Diffusion pump), Single Cell Electrophysiology, Site-Directed Mutagenesis, Calcium Imaging, Virus Production and Delivery

SKILLS – Computer:
C, C++, Microsoft Office, Adobe Photoshop, Adobe Acrobat, CloneManager, PerlPrimer, SigmaPlot, pClamp, ImageJ

OTHER EXPERIENCE:

Graduate Teaching Assistant	University of Louisville School of Medicine	Louisville, KY, USA	2010 - 2012

- Assisted in instruction of medical students during the laboratory portion of the Medical Neurosciences course
- Provided focused tutoring

Volunteer	American Red Cross	Louisville, KY Chapter