# Hannah Gruner, Ph.D.

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**Education**

Ph.D. Cell and Molecular Biology
*Department of Biology*
*University of Nevada, Reno*
*January 2015- August 2018*

M.Sc. Cell and Molecular Biology
*Department of Biology*
*University of Nevada, Reno*
*August 2012- December 2014*

B.Sc. Neuroscience
*Departments of Biology and Psychology*
*University of Nevada, Reno*
*August 2009- May 2012*

**Research Experience**

*Postdoctoral Scholar* August 2018 - Current
Mentor: Michael T. McManus, Ph.D.

- High-content imaging screens
  Developed high-throughput pipeline to analyze complex morphological phenotypes of cultured cells.

*Ph.D. Candidate* January 2015 - August 2018
Mentor: Pedro Miura, Ph.D.

- The function of the *Calm1* extended 3'UTR mRNA in neurodevelopment.
  Using CRISPR-Cas9 we deleted the extended 3'UTR of the gene *Calmodulin 1 (Calm1)* in mouse. We found the extended 3'UTR isoform of *Calm1* is necessary for neural development of the dorsal root ganglion (DRG). Immunostaining and confocal image analysis of embryonic mice were performed to examine defects in the developing DRG. Developed methods for quantifying axon guidance defects. *Ex vivo* neural explant assays were carried out to determine factors influencing guidance defects. Lastly, subcellular localization of *Calm1* mRNA isoforms was determined using smFISH.

- Profiling circular RNAs in the aging mouse brain.
  Using next generation sequencing we profiled circRNAs in the aging mouse cortex, hippocampus, and heart. My research showed that a large proportion circRNAs globally accumulate in the aging mouse cortex and hippocampus, but not in the aged mouse heart. Additionally we discovered this age upregulation trend is independent of host gene mRNA expression, suggesting increased transcription is not causing circRNA upregulation with age.

- Profiling circular RNAs in the aging *C. elegans*.
  CircRNA expression was profiled in progressively aged *C. elegans*. Profiling circRNA expression across the lifespan of the nematode Caenorhabditis elegans (C. elegans) illustrated that circRNAs dramatically accumulate with age within the entire animal. These findings suggest age-upregulated circRNAs is a conserved phenomenon.

*Master's Student* August 2012 - December 2014
Mentor: Grant Mastick, Ph.D.

- Robo1/2 loss results in facial nerve and nuclei guidance errors.
  Using Robo1/2 double mutant mouse embryos we investigated the role of Robo receptors in guiding the developing facial nerve and nucleus. Using immunohistochemistry and subsequent confocal microscopy analysis we found mutant facial axon and cell bodies experience dramatic developmental defects.

*Undergraduate researcher* January 2011- May 2012
Mentor: Grant Mastick, Ph.D.

- Screening neuronal population specific enhancers via *in ovo* electroporation.
  Utilizing the VISTA Enhancer Browser we identified medial longitudinal fasciculus (MLF) specific enhancer patterns. Performed *in ovo* electroporation to transfect enhancer reporter plasmids into developing chicken nervous system to test enhancer potential as a MLF molecular marker.

**Publications**

1. Hu Z, **Gruner HN**, Gagacheva J, Gulyaeva O. K Na 1.1 Channels as a Target for Treating Early-Onset Epilepsy. Nat Rev Drug Discov. 2020
2. Bongmin Bae*, **Gruner HN***, Maebh Lynch, Ting Feng, Kevin So, Daniel Oliver, Grant S Mastick, Wei Yan, Simon Pieraut and Pedro Miura. Elimination of Calm1 long 3' UTR mRNA isoform by CRISPR-Cas9 gene editing impairs dorsal root ganglion development and hippocampal neuron activation in mice. RNA. 2020.
3. **Gruner HN**, Kim M, Mastick GS. Robo1 and 2 Repellent Receptors Cooperate to Guide Facial Neuron Cell Migration and Axon Projections in the Embryonic Mouse Hindbrain. Neuroscience. In Press, 2019
4. Cortes-Lopez M, Gruner M, Cooper D, **Gruner HN**, Voda A, van der Linden A, Miura P. Global accumulation of circRNAs during aging in *Caenorhabditis elegans*. BMC Genomics. 19(1):8, 2018.
5. **Gruner H**, Cortes-Lopez M, Cooper DA, Bauer M, Miura P. CircRNA accumulation in the aging mouse brain. Scientific Reports. 6:38907, 2016
6. Kim KT, Kim N, Kim HK, Lee H, **Gruner HN**, Gergics P, Park C, Mastick GS, Park HC, Song MR. ISL1-based LIM complexes control Slit2 transcription in developing cranial motor neurons. Scientific Reports. 6:36491, 2016

**Presentations**

Poster

1. **Gruner H**, Cortes-Lopez M, Bauer M, Miura P. Accumulation of Circular RNAs in the aging mouse brain. 2016 Keystone Symposia Conference Q5: Noncoding RNAs in Health and Disease. Santa Fe, NM. Feburary 22nd, 2016.

2. **Gruner H**, Lynch M, Gapuz V, Miura P. Investigating the role of the extended 3UTR of *Calm1* in cardiac disease. COBRE CNTN 1st Annual Meeting. Las Vegas, NV. October 8th, 2016.

Oral

1. **Gruner H**, Miura P. Investigating the role of *Calm1* extended 3'UTR in the heart and brain. Gradventure graduate student recruitment event. University of Nevada, Reno. Febuary 2017.
2. **Gruner H**, Cytoskeletal Systems and Cellular Movement. Biology 315 Cell Biology. University of Nevada, Reno. October 2017.
3. **Gruner H**, Effective poster presentations and design. UNR Neuroscience graduate seminar. University of Nevada, Reno. November 2017.

**Teaching**

*Confocal Microscope Student Administrator* April 2014 - August 2016
Training users, troubleshooting user issues for UNR COBRE Imaging core Leica SP8 confocal

*Teaching Assistant* January 2014 - December 2014
Laboratory in Genetics and Cell Biology (Biology 395)

*Teaching Assistant* August 2013 - December 2013
Neurobiology (Biology 477)

**Awards**

*Second Place Poster Competition: The Sierra Nevada Chapter of the Society for Neuroscience 8th Annual Research Symposium. Reno, NV* Oct 21st 2016

*UNR Graduate Student Association (GSA) Travel Award* September, 2016

*Research Assistantship: Molecular Biosciences Graduate Program at the University of Nevada* August 2012- August 2013

**Outreach**

*Sierra Nevada Chapter of the Society for Neuroscience* March 2012-March 2017
Science outreach at local K-12 and public demonstrations

*Youth Science Institute* May 2015-2017
Annual volunteer presenter on hands on anatomy of the nervous system

*National Alliance on Mental Illness (NAMI).* May 2013
Volunteer presenter on neurodiversity in the human brain

*Annual Davidson Academy Young Scholar Summit* June 2011- June 2013
Volunteer presenter: Visualizing the developing chicken embryo