

SOONMOON YOO

(Home)

Department of Biomedical Research
 Alfred I. duPont Hospital for Children
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EDUCATION

- | | |
|---|-----------------------|
| PhD in Neurobiology <i>University of Texas Medical Branch, Galveston, TX</i> Dissertation title: "Plasmalemmal repair of injured mammalian cell lines" | May 2003 |
| Advanced Management Certificate Program (MBA) <i>University of Houston-Clear Lake, Houston, TX</i> | June 2001 |
| Master in Medicine (Biochemistry) <i>Chung-Ang University, College of Medicine, Seoul, South Korea</i> Thesis title: "Identification, purification, and characterization of new member of α_1 -adrenoceptor-coupled G_h family from pig heart muscle" | September 1996 |
| BS in Biology, <i>summa cum laude</i> <i>Chung-Ang University, Seoul, South Korea</i> | February 1994 |

FACULTY APPOINTMENTS

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| Research Scientist (In-line Assistant Professor) <i>Molecular Regeneration and Neuroimaging Laboratory, Nemours Biomedical Research, Alfred I duPont Hospital for Children, Wilmington, DE</i> | 2013 - present |
| Assistant Research Scientist (In-line Research Assistant Professor) <i>Molecular Regeneration and Neuroimaging Laboratory, Nemours Biomedical Research, Alfred I. duPont Hospital for Children, Wilmington, DE</i> | 2010 - 2013 |
| Research Assistant Professor <i>Department of Pediatrics, Thomas Jefferson University Medical College, Philadelphia, PA</i> | 2013 - present |
| Affiliated Scientist <i>Department of Biological Sciences, University of Delaware, Newark, DE</i> | 2010 - present |

TEACHING & MENTORING EXPERIENCE

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| Graduate Mentor <i>Department of Biological Sciences, University of Delaware, Newark, DE</i> | 2012 - present |
| 1. Monichan Phay (Role: chair) Candidate for PhD Degree. | 2013 - present, |
| 2. Shiva Shrestha (Role: chair) Master Degree. | 2014 - 2017 |
| 3. Santiago Suarez (Role: committee member) Master Degree | 2012 - 2015 |
| 4. Joseph Stevenson (Role: chair) Candidate for Master Degree | 2017 – present, |

Undergraduate Mentor, Nemours Summer Research Program **2007 – present**
Alfred I duPont Hospital for Children, Wilmington, DE

1. Peter Adelman 2007
Department of Chemistry and Biochemistry, University of Delaware, Newark, DE
 “Neurite growth preference between laminin and fibronectin patterning”
2. Amanda L. Gill 2012
Bryn Mawr College, Bryn Mawr, PA
 “The role of KSRP in axonal regeneration of sensory neurons”.
3. Newan Meegallan 2012
Wake Forest University, Winston-Salem, NC
 “The cis-elements within 5’UTR of RanBP1 mRNA are necessary for Ca²⁺-dependent translation in axons”.
4. Sarah Pingar 2014
Department of Chemistry and Biochemistry, University of Delaware, Newark, DE
 “Inhibition of translation by microRNAs in F11 cells”
5. Lydia Hadley 2017
Department of Biological Sciences, University of Delaware, Newark, DE
 “Local maturation of precursor miRNAs in sensory neurons”

Guest Lecturer **2012 - 2013**
Department of Biology, Drexel University, Philadelphia, PA

Graduate Assistant **1997 - 2002**
Department of Physiology & Biophysics, University of Texas Medical Branch, Galveston, TX

Teaching Assistant **1995 – 1996**
Department of Biochemistry, Chung-Ang University, College of Medicine, Seoul, South Korea

RESEARCH EXPERIENCE

Postdoctoral Researcher **2007 - 2010**
Nemours Biomedical Research, Alfred I. duPont Hospital for Children, Wilmington, DE

Postdoctoral Researcher **2003 - 2006**
Department of Neuroscience, Georgetown University Medical Center, Washington, DC

Postdoctoral Researcher **2002 - 2003**
Department of Physiology & Biophysics, University of Texas Medical Branch, Galveston, TX

Doctoral Researcher **1997 - 2002**
Department of Physiology & Biophysics, University of Texas Medical Branch, Galveston, TX

Research Assistant **1994 - 1995**
Department of Biochemistry, Chung-Ang University, College of Medicine, Seoul, South Korea

Visiting Researcher **May – August 1994**
Department of Cardiovascular System, The Cleveland Clinic Foundation, Cleveland, OH

MILITARY SERVICE

Lance Corporal **1989 - 1991**
Republic of Korea Marine Corps (ROKMC), PoHang, South Korea

AWARDS & HONORS

The 2003 George Sealy Research Award in Neurology **2003**

MEMBERSHIPS IN PROFESSIONAL AND SCIENTIFIC SOCIETIES

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| Society for Neuroscience | 1998 - present |
| International Society for Neurochemistry | 2005 - 2007 |
| American Society for Cell Biology | 2010 - 2015 |

EDITORIAL POSITIONS

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| Review Editor <i>Frontiers in Neuroscience (Neurogenomics)</i> | 2015 - present |
| Editorial Board <i>The Journal of DNA and RNA Research</i> | 2014 - present |
| Ad hoc reviewer <i>FEBS Letter</i> | 2016 – present |
| <i>Mol Neurobiol</i> | 2016 - present |
| <i>Non-Coding RNA</i> | 2015 - present |
| <i>Neural Regeneration Research</i> | 2015 - present |
| <i>JoVE</i> | 2014 |
| <i>Cell Mol Life Sci</i> | 2014 - present |
| <i>Cellular and Molecular Neurobiology</i> | 2014 - present |
| <i>Molecular & Cellular Proteomics</i> | 2012 - present |
| <i>Journal of Cell Science</i> | 2011 - 2014 |
| <i>EMBO journal</i> | 2010 - 2013 |
| <i>Journal of Neuroscience</i> | 2008 - present |
| <i>Developmental Neurobiology</i> | 2005 - present |
| <i>Journal of Neurochemistry</i> | 2005 - present |
| <i>Experimental Neurology</i> | 2005 - present |

LECTURES BY INVITATION: (list local, national, international)

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| Research seminar – National. <i>Department of Neurological Surgery, University of Miami, Miami, FL</i> “Axonal GAP-43 mRNA transport is driven by the HuD-binding site within the 3’UTR in a HuD-ZBP1 containing RNP complex” | October 22, 2012 |
| MRC SDRS Seminar Series – International. <i>Chungbuk National University, College of Medicine, Chung-Ju, South Korea</i> “Axonal mRNA transport and protein synthesis regulation in regenerating axons” | June 14, 2012 |
| Brain Korea 21 Project Seminar Series – International. <i>Department of Biology, Chung-Ang University, Seoul, South Korea</i> “Axonal mRNA localization and local protein synthesis in regenerating sciatic nerves”: | June 11, 2012 |
| MRC SDRS Seminar Series – International. <i>Chungbuk National University, College of Medicine, Chung-Ju, South Korea</i> “Roles of axonal mRNAs and microRNAs for regenerating axons” | April 14, 2017 |
| KBRI Seminar Series – International. <i>Korea Brain Research Institute, Dae-Gu, South Korea</i> “Temporal profiling of small RNAs in distal axons during regeneration following injury” | April 12, 2017 |

PUBLICATIONS, PEER REVIEWED

- Gomes, C., Lee, S.J., Gardiner, A.S., Smith, T., Sahoo, P.K., Patel, P., Thames, E., Rodriguez, R., Taylor, R., **Yoo, S.**, Heise, T., Kar, A.N., Perrone-Bizzozero, N., Twiss,

- J.L. 2017. Axonal localization of Neuritin/CPG15 mRNA is limited by competition for HuD binding. *J. Cell Sci.* Epub ahead of print. PMID: 28871047. PMC in process.
2. Phay, M., Kim, H.H., **Yoo, S.** 2016. Analysis of piRNA-like small non-coding RNAs present in axons of adult sensory neurons. *Mol. Neurobiol.* Epub ahead of print. PMID: 27966078. PMC in process.
 3. Lee, S.J., Li, Z., Litan, A., **Yoo, S.**, Langhans, S.A. 2015. EGF-induced sodium influx regulates EGFR trafficking through HDAC6 and tubulin acetylation. *BMC Cell Biology.* 16(1):24. PMID: PMC4574528.
 4. Phay, M., Kim, H.H., **Yoo, S.** 2015. Dynamic change and target prediction of axon-specific microRNAs in regenerating sciatic nerve. *PLoS One* 10(9):e0137461. PMID: PMC4557935.
 5. Kim, H.H., Lee, S.J., Gardiner, A.S., Perrone-Bizzozero, N.I., **Yoo, S.** 2015. Different motif requirements for the localization zipcode element of β -actin mRNA binding by HuD and ZBP1. 2015. *Nucleic Acid Res.* 43:7432-46. PMID: PMC4551932.
 6. Kim, H.H., Kim, P., Phay, M., **Yoo, S.** 2015. Identification of precursor microRNAs within distal axons of sensory neuron. 2015. *J. Neurochem.* 134:193-9. PMID: PMC4490939.
 7. Merianda, T.T., Coleman, J., Kim, H.H., Kumar Sahoo, P., Gomes, C., Brito-Vargas, P., Rauvala, H., Blesch, A., **Yoo, S.**, Twiss, J.L. 2015. Axonal amphoterin mRNA is regulated by translational control and enhances axon outgrowth. *J. Neurosci.* 35:5693-706. PMID: PMC4388927.
 8. Bird, C.W., Gardiner, A.S., Bolognani, F., Tanner, D.C., Chen, C-Y., Lin, W-J., **Yoo, S.**, Twiss, J.L., Perrone-Bizzozero, N. 2013. KSRP modulation of GAP-43 mRNA stability restricts axonal outgrowth in embryonic hippocampal neurons. *PLoS One* 8:e79255. PMID: PMC3828348.
 9. Merianda, T.T., Gomes, C., **Yoo, S.**, Vuppalanchi, D., Twiss, J.L. 2013. Axonal localization of neuritin/CPG15 mRNA in neuronal populations through distinct 5' and 3' UTR elements. *J. Neurosci.* 33:13735-42. PMID: PMC3755718.
 10. **Yoo, S.**, Kim, H.H., Donnelly, C.J., Vuppalanchi, D., Kim, P., Park, M., Lee, S.J., Merianda, T.T., Perrone-Bizzozero, N., Twiss, J.L. 2013. A HuD-ZBP1 ribonucleoprotein complex localizes GAP-43 mRNA into axons through its 3' untranslated region AU-rich regulatory elements. *J. Neurochem.* 126:792-804. PMID: PMC3766383.
 11. Lee, S.J., Lindsey, S., Graves, B., **Yoo, S.**, Olson, J.M., Langhans, S.A. 2013. Sonic hedgehog-induced histone deacetylase activation is required for cerebellar granule precursor hyperplasia in medulloblastoma. *PLoS One.* 8:e71455. PMID: PMC3739791.
 12. Donnelly, C.J., Park, M., Spillane, M., **Yoo, S.**, Pacheco, A., Gomes, C., Kim, H.H., Merianda, T.T., Gallo, G., Twiss, J.L. 2013. Axonally synthesized β -actin and GAP-43 proteins support distinct modes of axonal growth. *J. Neurosci.* 33:3311-22. PMID: PMC3711152.
 13. Merianda, T.T., Vuppalanchi, D., **Yoo, S.**, Blesch, A., Twiss, J.L. 2013. Axonal transport of neural membrane protein 35 mRNA increases axon growth. *J. Cell Sci.* 126:90-102. PMID: PMC3603513.
 14. Vuppalanchi, D., Merianda, T.T., Donnelly, C.J., Williams, G., **Yoo, S.**, Ratan, R.R., Willis, D.E., Twiss, J.L. 2012. Lysophosphatidic acid differentially regulates axonal mRNA translation through 5'UTR elements. *Mol. Cell Bio.* 50:136-46. PMID: PMC4610731.

15. Donnelly, C.J., Willis, D.E., Xu, M., Tep, C., Jiang, C., **Yoo, S.**, Schanen, N.C., Kirn-Safran, C.B., van Minnen, J., English, A., Yoon, S.O., Bassell, G.J., Twiss, J.L. 2011. Limited availability of ZBP1 restricts axonal mRNA localization and nerve regeneration capacity. *EMBO J.* 30:4665-77. PMID: PMC3243598.
16. Barrientos, S.A., Martinez, N.W., **Yoo, S.**, Jara, J.S., Zamorano, S., Hetz, C., Twiss, J.L., Alvarez, J., Court, F.A. 2011. Axonal degeneration is mediated by the mitochondrial permeability transition pore. *J. Neurosci.* 31:966-978. PMID: PMC3245862.
17. Vuppalanchi, D., Coleman, J., **Yoo, S.**, Merianda, T.T., Yadhati, A.G., Hossain, J., Blesch, A., Willis, D.E., Twiss, J.L. 2010. Conserved 3'UTR sequences direct subcellular localization of chaperone protein mRNAs in neurons. *J. Biol. Chem.* 285:18025-38. PMID: PMC2878564.
18. *Wu, J., ***Yoo, S.**, Wilcock, D., Lytle, J.M., Leung, P.Y., Colton, C.A., Wrathall, J.R. 2010. Interaction of NG2⁺ glial progenitors and microglia/macrophages from the injured spinal cord. *Glia.* 58:410-422. PMID: PMC2807472 (*J. Wu and S. Yoo contributed equally to this work).
19. Yudin, D., Hanz, S., **Yoo, S.**, Lavinilovitch, E., Willis, D., Gradus, T., Segal-Ruder, Y., Ben-Yaakov, K., Hieda, M., Yoneda, Y., Twiss, J.L., Fainzilber, M. 2008. Localized regulation of axonal RanGTPase controls retrograde injury signaling in peripheral nerve. *Neuron* 59:241-252. PMID: PMC2538677.
20. **Yoo, S.**, Wrathall, J.R. 2007. Mixed primary culture and clonal analysis provide evidence that NG2 proteoglycan-expressing cells after spinal cord injury are glial progenitors. *Dev. Neurobiol.* 67:860-874. PMID: 17506499.
21. Zai, L.J., **Yoo, S.**, Wrathall, J.R. 2005. Increased growth factor expression and cell proliferation after contusive spinal cord injury. *Brain Res.* 1052:147-155. PMID: 19005441.
22. Wu, X.F., **Yoo, S.**, Wrathall, J.R. 2005. Real-time PCR analysis of temporal-spatial alterations in gene expression after spinal cord contusion. *J. Neurochem.* 93:943-952. PMID: 15857397.
23. **Yoo, S.**, Wrathall, J.R. 2004. (Cover image - Oligodendrocyte cells in primary culture). *Nature Medicine*, 10(6) June 2004.
24. **Yoo, S.**, Bottenstein, J.E., Bittner, G.D., and Fishman, H.M. 2004. Survival of Mammalian B104 Cells following Neurite Transection at Different Locations Depends on Somal Ca²⁺ Concentration. *J. Neurobiol.* 60:137-153. PMID: 15266646.
25. **Yoo, S.**, Nguyen, M.P., Fukuda, M., Bittner, G.D., Fishman, H.M. 2003. Plasmalemmal Sealing of Transected Mammalian Neurites is a Gradual Process Mediated by Ca²⁺-regulated Proteins. *J. Neurosci. Res.* 74:541-551. PMID: 14598298.
26. Detrait, E.R., Eddleman, C.S., **Yoo, S.**, Fukuda, M., Nguyen, M.P., Bittner, G.D., Fishman, H.M. 2000. Axonal repair requires proteins that mediate synaptic vesicle fusion. *J. Neurobiol.* 44:382-391. PMID: 10945894.
27. Detrait, E.R., **Yoo, S.**, Eddleman, C.S., Fukuda, M., Bittner, G.D., Fishman, H.M. 2000. Plasmalemmal repair of severed neurites of PC12 cells requires Ca²⁺ and synaptotamin. *J. Neurosci. Res.* 62: 566-573. PMID: 11070500.
28. **Yoo, S.M.**, Jeong, H.S., Han, K.J., Cho, S.H., Lee, H.S., Yun, H.Y., Kwon, N.S., Baek, K.J. 1998. A new member of α_1 -adrenoceptor-coupled G α_h (transglutaminase II) family in pig heart: purification and characterization. *Exp. Mol. Med.* 30:81-86. PMID: 9873827.

29. Han, K.J., Park, H., **Yoo, S.M.**, Baek, S.H., Uhm, D.Y., Lee, H.S., Yun, H.Y., Kwon, N.S., Baek, K.J. 1998. Identification of a distinct molecular mass Gah (Transglutaminase II) coupled to α_1 -adrenoceptor in mouse heart. *Life Sci.* 62:1809-1816. PMID: 9585112.

EDITORIALS, REVIEWS, CHAPTERS, INCLUDING PARTICIPATION IN COMMITTEE REPORTS

1. **Yoo, S.** 2017. Micro in size but not in function: microRNAs in axonal survival and regeneration. *FEBS Letters*. Epub 2017 Jul 12. Doi:10.1002/1873-3468.12736. PMID: 28703309.
2. Kim, H.H., Phay, M., **Yoo, S.** 2016. Isolation and quantitative analysis of axonal small noncoding RNAs. In M.J. Kye (Ed.), *MicroRNA Technologies* (pp. 1-13). Totowa, NJ: Humana Press. Doi:10.1007/7657_2016_8.
3. Sampson, V.B., **Yoo, S.**, Kumar, A., Vetter, N., Kolb, E.A. 2015. MicroRNAs and potential targets in osteosarcoma. *Front Pediatr.* 3:69. PMCID: PMC4547013.
4. Gomes, C., Merianda, T.T., Lee, S.J., **Yoo, S.**, Twiss, J.L. 2013. Molecular determinants of the axonal mRNA transcriptome. *Dev. Neurobiol.* 74:218-32. PMCID: PMC3933445.
5. **Yoo, S.**, Twiss, J.L. 2011. The road not taken: new destinations for yeast mRNAs on the move. *EMBO J.* 30:3564-6. PMCID: PMC3181487.
6. * **Yoo, S.**, * van Niekerk, E.A., Merianda, T.T., Twiss, J.L. 2010. Dynamics of axonal mRNA transport and implications for peripheral nerve regeneration. *Exp. Neurol.* 223:19-27, PMCID: PMC2849851. (* S. Yoo and E.A. van Niekerk contributed equally to this work).

ABSTRACTS

Phay, M., Kim, H.H., **Yoo, S.** 2017. Identification and characterization of piRNA-like small noncoding RNAs present in axons of adult sensory neurons. The ACCEL 4th Annual Meeting.

Kim, H.H., Kim, P., Phay, M., **Yoo, S.** 2016. Specific piRNAs are selectively localized in the distal processes of adult sensory neuron. Keystone Symposia on Small RNA silencing.

Kim, H.H., Kim, P., Phay, M., **Yoo, S.** 2015. Identification of precursor microRNAs within distal axons of sensory neuron. The Sixth Northeast Regional Institutional Development Award Conference.

Kim, H.H., **Yoo, S.** 2014. Different motif requirements for the localization zipcode element of β -actin mRNA binding by HuD and ZBP1. The Fifth Northeast Regional Institutional Development Award Conference.

Kim, H.H., Lee, S.J., **Yoo, S.** 2014. Different motif requirements of HuD and ZBP1 for binding to the zipcode element of β -actin mRNA. Society for Neurosci., 44th Annual Meeting.

Gomes, C., Merianda, T.T., **Yoo, S.**, Twiss, J.L. 2013. RNA-RBP competition restricts axonal localizing activity of Neuritin/cpg15 UTR segments. 8th Brain Research conference: RNA metabolism in neurological disease.

Kim, H.H., **Yoo, S.** 2013. ELAV-like RNA-binding protein HuD directly binds to both GAP-43 and b-actin mRNAs in vitro. Society for Neurosci., 43rd Annual Meeting.

Kim, H.H., Kim, P., **Yoo, S.**, 2013. Alterations in localized precursor miRNAs in regenerating axons of adult sensory neurons. Keystone Symposia on Molecular and Cellular Biology. Growing to Extreme: Cell Biology and Pathology of Axons.

Kim, H.H., Kim, P., Perrone-Bizzozero, N.I., Twiss, J.L., **Yoo, S.** 2012. RNA-binding protein ZBP1 associates with β -actin and GAP-43 mRNAs with different affinities for axonal

localization. Society for Neurosci., 42nd Annual Meeting.

Yoo, S., Donnelly, C.J., Vuppalachchi, D., Perrone-Bizzozero, N.I., Twiss, J.L. 2011. Axonal GAP-43 mRNA shows dual modes of post-transcriptional regulation in injury conditioned neurons. Society for Neurosci., 41st Annual Meeting.

Yoo, S., Merianda, T.T., Willis, D.E., Perrone-Bizzozero, N.I., Perry, R.B., Yudin, D., Fainzilber, M., Twiss, J.L. 2010. Translational regulatory elements in 5'UTR sequences of axonal mRNAs confer the specificity of translation in a Ca²⁺-dependent. Translational Control Conference, Cold Spring Harbor Laboratory Meeting.

Yoo, S., Merianda, T.T., Willis, D.E., Perrone-Bizzozero, N.I., Perry, R.B., Yudin, D., Fainzilber, M., Twiss, J.L. 2010. Specificity of axonal mRNA translation is modulated in a Ca²⁺-dependent manner via the 5'UTR sequences. Society for Neurosci., 40th Annual Meeting.

Donnelly, C.J., Willis, D.E., Xu, M., **Yoo, S.**, Gomez-Curet, I., Kendall, M., Erenshteyn, M., English, A., Wang, W., Bassell, G.J., Twiss, J.L. 2009. *Co-transport of axonal mRNAs by ZBP1 facilitates neurite growth*. Society for Neurosci., 39th Annual Meeting.

Merianda, T.T., Vuppalachchi, D., **Yoo, S.**, Willis, D.E., Coleman, J.K., Twiss, J.L. 2008. *Axonal translation of NMP35 and Neuritin mRNAs contributes to intrinsic neuronal growth capacity*. 2008. Society for Neurosci., 38th Annual Meeting.

Yoo, S., Vuppalachchi, D., Merianda, T.T., Willis, D.E., Perrone-Bizzozero, N.I., Twiss, J.L. 2008. GAP-43 UTRs containing the HuD-binding site are needed for axonal mRNA transport and modulate axonal outgrowth. Society for Neurosci., 38th Annual Meeting.

Wu, J., **Yoo, S.**, Lytle, J.M., Leung, P.Y., Wrathall, J.R. 2008. Growth of purified endogenous NG²⁺ progenitors is inhibited by microglia/macrophages from the injured spinal cord. The 26th Annual National Neurotrauma Society Symposium.

Yoo, S., Perrone-Bizzozero, N.I., Twiss, J.L. 2007. HuD-binding motif in GAP-43 mRNA 3'UTR directs its subcellular localization in adult rat DRG neurons. Neurorehabilitation and Neural Repair. 12th International Symposium on Neural regeneration.

Yoo, S., Wrathall, J.R. 2005. Persistence of a glial progenitor cell population in the chronically injured adult rat spinal cord. Society for Neurosci., 35th Annual Meeting.

Yoo, S., Wrathall, J.R. 2004. In vitro analysis of the glial progenitor cells isolated from injured adult rat spinal cord. Society for Neurosci., 34th Annual Meeting.

Fishman, H.M., Nguyen, M.P., **Yoo, S.**, Bittner, G.D. 2003. Transient rise in somal [Ca²⁺] initiates B104 cell degeneration after neurite injury near the cell body. Society for Neurosci., 33rd Annual Meeting.

Yoo, S., Wrathall, J.R. 2003. Tissue culture of cells that proliferate after spinal cord contusion injury. Society for Neurosci., 33rd Annual Meeting.

Detrait, E.R., **Yoo, S.**, Eddleman, C.S., Fukuda, M., Bittner, G.S., Fishman, H.M. 2000. Plasmalemmal repair of severed neurites of PC12 cells requires divalent cations and a conserved region of synaptotagmin. Society for Neurosci, 30th Annual Meeting.

Han, K.J., Park, H., **Yoo, S.**, Lee, H.S., Yun, H.-Y., Kwon, N.S. Baek, K.J. 1998. Identification of a distinct molecular mass G α h (TGase II) coupled to α ₁-adrenoceptor in mouse heart. *Proceedings of the 6th Federation Meeting of Korean Basic Medical Scientists*, Seoul, Korea. P-78, p194.

Han, K.J., Park, H., **Yoo, S.**, Baek, S.H., Lee, H.S., Yun, H.-Y., Kwon, N.S. Baek, K.J. 1997. Identification of a low molecular mass G α h (transglutaminase II) coupled to α_1 -adrenoceptor in mouse heart. *Proceedings of the 1997 Autumn Meeting of The Korean Society of Medical Biochemistry and Molecular Biology and Korean Biochemical Society*, Seoul, Korea. PI-42, p115.

Baek, K.J., **Yoo, S.**, Han, K.J., Yun, H.-Y., Lee, H.S., Kwon, N.S. 1997. Role of phospholipase C- δ 1 in oxytocin receptor signaling: evidence for an effector via Gh protein. *Abstract for the Annual Meeting of the Biochemical Society of Korea, Seoul*. 30:61:S6-4.

Yoo, S., Han, K.J., Yun, H.-Y., Lee, H.S., Kwon, N.S., Baek, K.J. 1997. Identification of G α h family proteins coupled to α_1 -adrenoceptor in pig heart. *Abstract for 1997 5th Federation Meeting of Korean Basic Medical Scientists*, S208, Seoul, Korea.

SUPPORT

Active:

1. R21NS099959-01A1 (Yoo) 07/01/2017 – 06/30/2019
NIH/NINDS
"Function of piLRNA/MIWI pathways in neuronal axon growth and regeneration."
Role: PI.

The major goals of this project are to determine whether piLRNAs are selectively enriched in axons of neuronal cells and to examine whether these axonally enriched piLRNAs control axon growth and/or regeneration.

2. U54GM104941 (PI: Binder-Macleod)
NIH/NIGMS
Shovel Ready Pilot Grant 12/01/2016 – 5/31/2017
"Characterization of the piRNA-like small RNA from rat sensory neurons"
Role: PI for the pilot grant

The goals of this pilot research is to examine whether the piRNA-like sncRNAs that we have observed in adult sensory neurons and distal axons carry a 2'-O-methylation at the 3' end and to examine whether endogenous piRNA-like sncRNAs associate with MIWI protein to form functional PIWI/piLRNA complexes.

3. R25NS09537-01 (PI: Harrington) 01/01/2016 – 12/31/2021
NIH/NINDS
"A neuroscience-focused undergraduate research program at an HBCU"
Role: Mentor

This is a summer undergraduate research program that is targeting students at Delaware institutions and place them in research laboratories at the University of Delaware, Alfred I duPont Hospital for Children, and Delaware State University. The major goal of this program is to keep young scientists involved in Neuroscience Center activities.

Pending:

1. Neilsen Pilot Research Grant 457589 (PI: Yoo) 07/01/2017 – 06/30/2019
Craig H. Neilsen Foundation
"miRNA-controlled Na⁺ channel level in nociceptors to SCI-induced neuropathy"
Role: PI.

The objective of this grant is to determine whether expression of Nav1.8 mRNA and miRNA-455-3p is altered in axons of uninjured nociceptors after SCI and to test whether alterations of levels of these genes can reduce hypersensitivity and pain to mechanical and thermal stimuli after SCI.

2. 1R01NS099318 (PI: Yoo) 09/01/2016 – 08/31/2021
NIH/NINDS
“Localized maturation of precursor miRNAs as a mechanism to modulate axon growth”
Role: PI.

The major goal of this project is to determine whether axonal precursor miRNAs are processed locally into corresponding mature miRNAs in the isolated axons in response to local stimuli and to test the possibility that localized precursor miRNAs control axon growth and regeneration.

3. 1R01NS092797-01A1 (PI: Yoo) 04/01/2016 – 03/31/2021
NIH/NINDS
“Novel role of functional PIWI/piRNA complex in regenerating nerve”
Role: PI.

The major goal of this project is to determine whether a PIWI/piRNA pathway regulates localized gene expression by identifying axonal PIWI/piRNA complexes that are differentially regulated in both temporal and spatial manners after injury, and examining the function(s) of injury-regulated PIWI/piRNA complexes in axon growth and regeneration by loss-of-function approaches.

4. Un-numbered Application (PI: Yoo) 01/01/2014 - 12/31/2019
The New York Stem Cell Foundation
“Regulation and role of localizing precursor miRNA in axonal protein synthesis for nerve regeneration.”
Role: PI.

The major goals of this project are to determine molecular mechanism(s) of axonal precursor miRNA localization and roles of the locally processed mature miRNAs from precursors in regenerating axons.

5. DP2OD017838 (PI: Yoo) 07/01/2013 - 06/30/2018
NIH
“Role of precursor miRNAs in local protein synthesis for nerve regeneration.”
Role: PI.

The major goals of this project are to understand the mechanisms of miRNA localization in the distal axons of neuron, the interactions of pre-miRNA structures with different RNA-binding proteins for localization and the roles of miRNAs that are matured from localized pre-miRNAs in regenerating axons.

6. DP2OD010163 (PI: Yoo) 07/01/2012 – 06/30/2017
NIH
“Real-time analysis of axonal RNA expression in vivo using reversible CLiRIP-Chip.”
Role: PI.

The major goal of this project is to develop necessary methodologies to obtain highly pure axonal mRNAs that are directly associated with distinct RNA binding proteins and to visualize changes in local protein synthesis.

Overlap:

None

Completed Research Support

1. P20GM103446-16S1 (PI: Stanhope) 01/30/2017 – 04/15/2017
NIH/NIGMS
Delaware INBRE
“Transcriptome-wide identification of microRNA-433 targets in adult DRG neurons”
Role: PI for the Multi-Core Access Award

The objective of this award is to obtain genome-wide functionality of miRNA-433 that measures the in vivo impact of miRNA regulation.

2. R21NS085691 (PI: Yoo) 09/30/2013 – 08/31/2016
NIH/NINDS
“Profiling and characterizing axonal precursor microRNAs in regenerating nerve.”
Role: PI.

The major goals of this project are to profile changes of the precursor and mature miRNA expression levels in the axonal compartments following sciatic nerve injury and to identify the cis-acting region(s) of precursor miRNAs and trans-acting factor(s) that are required for localization.

3. P20GM103446 (PI: Stanhope) 09/01/2014 - 03/31/2015
NIH/NIGMS
Delaware INBRE
“Profiling mature microRNAs and piRNAs in regenerating peripheral nerve”
Role: PI for the INBRE Core Access Award

The goal is to determine if neuron-specific miRNAs reveal differential expression in response to injury during regeneration.

4. P20GM103464 (PI: Shaffer) 09/07/10 - 06/30/2015
NIH/NCRR/NIGMS:COBRE
Center for Pediatric Research
“Temporal regulation of localized mRNA translation in regenerating axon”
Role: Target Investigator

“Designing multi-component beta-hairpin hydrogels for stem cell therapy of spinal cord injury”
Role: Mentor for Transitional Investigator (Lindsey).

5. P20GM103446 (PI: Steiner) 03/01/2012 - 02/28/2014
NIH/NCRR/NIGMS
Delaware INBRE
“Defining the role of Sonic hedgehog mediated regulation of Na,K-ATPase in medulloblastoma”

Role: Co-Investigator in the Pilot grant (Langhans).

6. Post-doctoral Fellowship Award 124124 07/01/2009 – 09/17/2010

Craig H. Neilsen Foundation

“Temporal regulation of localized mRNA translation in regenerating axons.”

Role: PI.

The objective of this grant is to determine how the axonal protein synthesis machinery is regulated to confer temporal specificity to local mRNA translation after axonal injury.

7. Individual Research Grants WB2-0403-2 (PI: Wrathall) 01/01/2005 - 12/31/2006

Christopher Reeve Paralysis Foundation

“Endogenous Precursor Cells in Chronic SCI”

Role: Co-Investigator

This project will test the hypothesis that chronically after contusion injury there remain a larger than normal population of glial precursors cells that can be stimulated to divide and differentiate to improve function after SCI.

Patents:

Not applicable