Contact Information

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Education

In June1986 I received a B.A. in General Biology from Revelle College, University of California at San Diego.

In June 1998 I received a Ph.D. from the Department of Cell and Developmental Biology at Oregon Health Sciences University.

Employment Record

10/05-Present: I am currently an assistant research professor in the Department of Biology at the University of North Dakota (UND). At the current time I am finishing manuscripts and seeking to transfer extramural funds obtained at Harvard University to UND. My hope is to continue and expand upon research begun at Harvard University. I have also engaged in various teaching exercises listed below.

5/98-8/05: I was a research associate in the laboratory of Dr. John Dowling at Harvard University. I have worked on several projects using forward genetics in zebrafish. One major project involves the search for genes important for ongoing neurogenesis in the embryonic and adult retina. I have gained experience in mapping several of these genes and am currently in the process of identifying them. A second involves finding genes important in mediating the rewarding properties of cocaine. I have gained a strong working knowledge of zebrafish techniques. In addition, I have learned some electrophysiology (ERG recording), and garnered extensive training in histology, immunohistochemistry and embryology. I had to adapt behavioral neuroscience techniques used in rodents to fit the zebrafish model.

1/96-4/98: I finished graduate school in the laboratory of Dr. David Grandy. My thesis involved characterizing the role of the peptide Orphanin FQ (nociceptin) in the development of morphine dependence in mice. I thus widened my molecular biology training by library screening and constructing a transgenic mouse model. In addition, I learned many behavioral techniques including icv injections of mice, locomotor and conditioned place preference assays. Finally, I acquired a background in neuroanatomy of rats and mice.

9/92-12/95: I began graduate school in the laboratory of Dr. Gabrielle Leblanc at Oregon Health Sciences University. My project was to immortalize cells from Hensen's node in an effort to characterize secreted factors affecting embryonic axis formation. These experiments required fine embryonic dissections and primary cell culture in avians, immunohistochemistry, and some molecular biology (including construction of a viral gene expression system). Dr. Leblanc chose to leave research for an administrative position at NIH so I finished my thesis in another laboratory.

4/89-9/92: I was a laboratory manager and technician for Dr. Eileen Adamson at the Burnham Institute, formerly the LaJolla Cancer Research Foundation. I conducted experiments exploring the regulation of intermediate early gene expression during differentiation of embryonal carcinoma cells and during neoplastic transformation of fibroblasts. I thus gained extensive cell culture and molecular biology experience as well as a background in protein work (Westerns and immunoprecipitation).

9/86-3/89: I was a technician in the laboratory of Dr. Horst Felbeck at the Scripps Institute of Oceanography. I helped conduct biochemistry experiments in an effort to understand the metabolism of animals and symbiotic bacteria living around the hydrothermal vents. I also performed experiments to investigate a possible link between the polyamine metabolic pathways and the symbiotic relationship between bacteria and their host organisms. In these experiments I performed biochemical extractions and enzyme assays, HPLC analysis and some basic molecular biology.

Teaching Experience

8-06-present: Currently teaching "Fundamental Neuroscience" (Biol 420) for the Biology Department at UND. In addition to lectures covering basic principles of neuronal physiology, neuroanatomy and neural development, I am organizing student focus groups that will present material on a host of current topics in neuroscience, from disease states and therapeutics to perception and language.

1-06-5-06: Developed and taught a class at the University of North Dakota (UND) called "The Neurobiology of Addiction" (Course number 499/590). The class was an upper division and graduate special topics elective covering a broad spectrum of addiction-related research ranging from biochemistry, pharmacology, genetics, to behavioral neuroscience, psychology and clinical treatment. Curriculum included guest lectures by members of most departments in the Medical School, the Centers for Neuroscience and Fetal Alcohol Research, Biology, Psychology and Clinical Psychiatry.

I participated in Biology 491/503, Special Topics Seminar Series: Topics in Molecular and Cellular Biology at UND (administered by Dr. Meberg, Dr. Rhen, and Dr. Diane Darland in the Biology Department). While not officially an instructor, I presented a paper and served primarily in an educational capacity.

I also participated in the Neuropsychopharmacology Journal Club at the UND Medical School (coordinated by Dr. Jim Haselton from the Department of Physiology,

Pharmacology and Therapeutics). This journal club was informal with voluntary participation by graduate students and faculty of the Medical School. Again my participation was also in part as an educator.

3-22-06: Gave a guest for Communications 310 at UND (administered by Dr. Jim Abbott) on the organization and function of the nervous system. The 90-minute talk moved from properties of the neuron to neuroanatomy of the brain to the neuroscience underlying learning and memory, communication, emotion, social interaction and even spirituality.

12-3-05: Delivered a guest lecture for Biology 499, Special Topics: Techniques in Molecular Biology, describing my work using genetics in zebrafish to find genes regulating neural stem cells.

6/01- 8-05: I have served as a supervisor and mentor for three students completing their honors theses at Harvard University. The first graduated last June, completing his thesis on the development of dopaminergic function in the embryonic zebrafish retina. The second student finished in April 2003. The third finished in April 2006. I have also mentored a high school student who has competed in two Massachusetts regional science fair contests, winning one.

9/01-1/02: I was a teaching assistant for a non-science major biology class at Harvard University, called from DNA to Brain. I taught two sections, gave lectures, contributed exam and homework problems, guided students in writing essays, and graded the class.

2/98-6/98: I participated in an upper division biology course on retinal development at Harvard University. I gave two formal lectures, devised homework assignments and quizzes.

Awards and Honors

2004-2006:	Mentored Research Scientific Development Award (KO-1), National Institute on drug Abuse (75,000$ /year for 3 years)
1999-2001:	National Research Service Award, Postdoctoral training, National Eye Institute (40,000$/year for 3 years)
2000:	Grant Supplement, Development of New Animal Addiction Models, National Institute on Drug Abuse (50,000$)
1993:	Pre-doctoral Tartar Fellowship, Department of Cell and Developmental Biology at Oregon Health Sciences University (2000$)
1984-1986:	Provost's Honors List, Revelle College, University of California

Selected Publications

Gross JM, Perkins BD, Amsterdam A, Egana A, **Darland T**, Matsui JI, Sciasscia S, Hopkins N and Dowling JE. Identification of Zebrafish Insertional Mutants with Defects in Visual System Development and Function. Genetics 2005, (Epub ahead of print).

Darland T and Dowling JE. Behavioral screening for cocaine sensitivity in mutagenized zebrafish. *PNAS USA* 2001; 98(20): 11691-6.

Link BA and **Darland T**. Genetic analysis of initial and ongoing retinogenesis in the zebrafish: comparing the central neuroepithelium and marginal zone. *Prog Brain Res*. 2001; 131: 565-77.

Bunzow JR, Sonders MS, Arttamangkul S, Harrison LM, Zhang G, Quigley DI, **Darland T**, Suchland KL, Pasumamula S, Kennedy JL, Olsen SB, Magenis RE, Amara SG and Grandy DK. Amphetamine, 3,4-methylenedioxymethamphetamine, lysergic acid diethylamide, and metabolites of the catecholamine neurotransmitters are agonists of a rat trace amine receptor. *Mol. Pharm.* 2001; 60 (6) 1181-8.

Allen CN, Jiang ZG, Teshima K, **Darland T**, Ikeda M, Nelson CS, Quigley DI, Yoshioka T, Allen RG, Rea MA and Grandy DK. Orphanin-FQ/nociceptin (OFQ/N) modulates the activity of suprachiasmatic nucleus neurons. *J. Neurosci.* (1999); 19(6): 2152-60.

Darland T, Grandy DK. The orphanin FQ system: an emerging target for the management of pain? *Br. J. Anaesth*. 1998; 81(1): 29-37.

Darland T, Heinricher MM, Grandy DK. Orphanin FQ/Nociceptin: a role in pain and analgesia, but so much more. *Trends in Neurosci*. 1998; 21(5): 215-21.

Quigley DI, McDougall J, **Darland T**, Zhang G, Ronnekliev O, Grandy DK, Allen RG. Orphanin FQ is the major OFQ1-17-containing peptide produced in the rodent and monkey hypothalamus. *Peptides* 1998;19(1):133-9.

Darland T, Leblanc GG. Immortalized Hensen's node cells secrete a factor that regulates avian neural crest cell fates in vitro. *Dev Biol*. 1996; 176(1): 62-75.

Leblanc GG, Holbert TE, **Darland T**. Role of the transforming growth factor-beta family in the expression of cranial neural crest-specific phenotypes. *J Neurobiol*. 1995; 26(4): 497-510.

Huang RP, **Darland T**, Okamura D, Mercola D, Adamson ED. Suppression of v-sis-dependent transformation by the transcription factor, Egr-1. *Oncogene* 1994; 9(5):1367-77.

Joh T, **Darland T**, Samuels M, Wu JX, Adamson ED. Regulation of epidermal growth factor receptor gene expression in murine embryonal carcinoma cells. *Cell Growth Differ.* 1992;3(5):315-25.

Edwards SA, **Darland T**, Sosnowski R, Samuels M, Adamson ED. The transcription factor, Egr-1, is rapidly modulated in response to retinoic acid in P19 embryonal carcinoma cells. *Dev. Biol.* 1991; 148(1): 165-73.

Darland T, Samuels M, Edwards SA, Sukhatme VP, Adamson ED. Regulation of Egr-1 and c-fos expression in differentiating embryonal carcinoma cells. *Oncogene* 1991; 6(8):1367-76.

Calogero A, Samuels M, **Darland T**, Edwards SA, Kemler R, Adamson ED. Overexpression of uvomorulin in a compaction-negative F9 mutant cell line. Dev Biol. 1991;146(2):499-508.

Manuscripts in Preparation

Darland, T, Sanghvi, K. and Dowling JE. The Marginal Zone Deficient (MZD) Mutation is in the MCM6 gene.

Darland T, Matsui J, Egana AE, Gross J. and Dowling JE Dynamics of the Zebrafish Marginal Zone: Marker and Electron Microscopic Analysis in Two Mutants Having Abnormalities in the Peripheral Retina.

Darland T, Simmons JF, Raj D and Dowling, JE. The Embryonic Effects of Cocaine on Retinal Development and Function.

Items Reported in the Popular Press

Harvard Magazine, March-April 2000. “Deep Cravings” by Craig Lambert.

Discovery Health Channel, 2001. “Body Invaders Everyday Addictions”, produced by Big Rock Productions for the Discovery Channel

ABC News, 2003. “ Help! I Can’t Help Myself” produced by Steven Brand for ABC news.