CURRICULUM VITAE

**Alex V. Nechiporuk**

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# I. EDUCATION:

1986 - 1991 Moscow Medical University B.S. equivalent Biology

1994 - 1996 Univ of California, Los Angeles M.S. Biomathematics

1996 - 2002 Univ of Utah, Salt Lake City/ Ph.D. Human Genetics

Children’s Hospital, Boston

2003 - 2008 Univ of Washington, Seattle Post-Doc Developmental Biology

# II. PRINCIPAL POSITIONS HELD:

1991 - 1996 Cedars Sinai Medical Center, Research Assistant Human Genetics

Los Angeles

2008 – 2015 Oregon Health & Science University Assistant Professor Cell, Developmental &

Cancer Biology

2015 – present Oregon Health & Science University Associate Professor Cell, Developmental &

Cancer Biology

2017 - present Member, The Knight Cancer Institute

# III. HONORS AND AWARD:

1996 Best oral presentation in a predoctoral category ASHG annual meeting

2004 – 2007 Individual NRSA Award NICHD

2006 Best oral presentation in postdoctoral category NW SDB annual meeting

2007 – 2013 Pathway to Independence Award NICHD

2010 – 2012 Basil O’Connor Award March of Dimes

2013 Travel Award Institute of Genetics, Mishima, Japan

2013 Research Scholar Grant American Cancer Society

# IV. PROFFESIONAL ACTIVITIES:

2008 - present Member Program in Molecular and Oregon Health & Science

Cellular Biology University

2008 – present Member Neuroscience Graduate Program Oregon Health & Science

University

# V. PROFESSIONAL ORGANIZATIONS:

**Memberships**

2000 – present Society for Developmental Biology

2011 – present American Society for Cell Biology

2016 – present The International Zebrafish Society

**Service to Professional Organizations**

2009 – 2012 Judge for poster presentations, Northwest Developmental Biology Conference

2013 Organizing committee, Northwest Developmental Biology Conference

2018- Organizing committee, Society for Developmental Biology Annual Conference

**Service to Professional Publications**

2008 – present Ad hoc reviewing for Nature, Current Biology, PNAS, eLife, Developmental Dynamics, Development, Developmental Biology, Developmental Cell, FASEB, BMC Dev-Bio, PloS One, Cell Adhesion and Migration, and others.

# VI. INVITED PRESENTATIONS:

2009 Society for Developmental Biology Annual Meeting, Mini symposium on placodes and neural crest

2009 Sensory Meeting, RIKEN, Kobe, Japan

2010 Oregon State University, Corvalis, OR

2010 Sensory Meeting, Minerve, France

2011 University of Utah, Salt City, UT

2011 University of Colorado, Denver, CO

2012 Packard Foundation, Johns Hopkins University, Baltimore, MD

2012 Annual Meeting of American Society for Cell Biology, mini symposium on microtubule   
based transport

2013 Institute of Genetics, Mishima, Japan

2013 Session chair talk, European Zebrafish Conference, Barcelona, Spain

2014 Duke University

2015 Janelia Campus Neuronal Trafficking Conference

2016 Northwest Developmental Biology Conference

2016 University of Oregon

2019 8th Strategic Conference for Zebrafish Investigators

2019 OHSU Neuroscience Graduate Program retreat (student invitation)

2020 Lewis & Clark College, OR

2020 Reed College, OR

2020 University of Colorado, Denver, CO

2020 Washington State University, WA (cancelled due to COVID-19)

2020 NIH, MD (cancelled due to COVID-19)

# VII. GOVERNMENT AND OTHER PROFESSIONAL SERVICE:

2009 National Science Foundation Review Panel, Developmental Systems Cluster

2010 – 2011 National Science Foundation Mail reviewer, Developmental Systems Cluster

2011 National Institute of Health Mail reviewer, NDPR study section

2013 National Institute of Health Member, NIH special emphases study section ZRG1 CB-Z

2014 National Science Foundation Review Panel, Developmental Systems Cluster

2015 Reviewer, NSF Animal Developmental Systems cluster

2015 - Ad Hoc reviewer, NDPR study section, NIH

2016 - Ad Hoc reviewer, NDPR study section, NIH

2016 - Reviewer, NSF Animal Developmental Systems cluster

2016 - Ad Hoc Reviewer, NSF Animal Developmental Systems cluster

2016 - Ad Hoc Reviewer, NSF EDGE program grans

2016 - Ad Hoc Reviewer, Lise Meitner Programme (Austrian postdoc fellowships)

2017 - Ad Hoc reviewer, RFA-AG-17-057 entitled, Systems Biology Approaches to Alzheimer’s Disease Using Nonmammalian Laboratory Animals (R01), NIH

2017 - 2019 Member, NDPR (F03A) study section, NIH

2019 - Mail reviewer, NSF Animal Developmental Systems cluster

2020 - Ad Hoc reviewer, Dev2 study section, NIH

# VIII. UNIVERSITY AND PUBLIC SERVICE:

**Oregon Health & Science University**

2008 – present Member, Program in Molecular and Cellular Biosciences

2008 – present Member, Neuroscience Graduate Program

2009 – 2013 Director, PMCB seminar series

2009 Co-organizer, OHSU Developmental Biology Symposium

2010 Co-organizer, OHSU Developmental Biology Symposium

2011 – 2012 Member, IACUC

2012 – 2019 Review Committee, Tartar Trust Awards

2013 – present Associate director, CDB graduate program

2014 – 2019 Member, OHSU Research Committee

2015 – CDCB Executive Committee

2015 – present Chair, CDCB Curriculum Committee

2015 PMCB admissions committee

2016 - CDB/CanB student retreat organizing committee

2017 - PMCB admissions committee

2017 - NGP admissions committee

2017 - Steering Committee, Oregon Developmental Biology Program

2018 - present Assistant Director, OHSU Program in Biomedical Sciences, Chair of the Curriculum Committee

2018 – present Member of OHSU Program in Biomedical Sciences Steering Committee

# IX. TEACHING AND MENTORING:

**Formal Scheduled Classes for OHSU Students:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Qtr** | **Academic Yr** | **Course No. & Title** | **Teaching Contribution** | **Units** | **Class Size** |
| SUM | 2008/09 | Cell620, Model Systems in Biology | *Zebrafish Module*, Lecture, Laboratory instructions | 3 | 6 |
| F | 2009/10 | Medical School Histology | *Muscle, cardiovascular system, eye, GI tract*  Lab instructor |  | ~25 |
| W | 2009/10 | Cell618, Mechanisms of Development | *Zebrafish Heart and Fin regeneration*, Lecture and discussion | 3 | 9 |
| W | 2009/10 | Cell615/Neus637, Developmental Neuro | *Chemokines and neural development*, Lecture and discussion | 3 | 10 |
| F | 2010/11 | Medical School Histology | *Endocrine system, eye, skin, GI tract, liver, gall bladder, pancreas*  Lab instructor |  | ~25 |
| W | 2010/11 | Cell615/Neus637, Developmental Neuro | *Glial Development*, Lecture and discussion | 3 | 10 |
| SPR | 2010/11 | Cell606, Developmental Biology Journal Club | Course Director | 1 | 13 |
| SPR | 2010/11 | Con665, Development, Differentiation, and Cancer | *Basic Concepts in development*, Lecture | 3 | 12 |
| SUM | 2010/11 | Cell620, Model Systems in Biology | *Zebrafish Module*, Lecture, Laboratory instructions | 3 | 5 |
| F | 2011/12 | Cell606, Developmental Biology Journal Club | Course Director | 1 | 9 |
| F | 2011/12 | Medical School Histology | *Connective tissue, muscle, cardiovascular system, endocrine system, skin, eye, GI tract. liver, gall bladder, pancreas*  Lab instructor |  | ~25 |
| W | 2011/12 | Cell606, Developmental Biology Journal Club | Course Director | 1 | 9 |
| SPR | 2011/12 | Con665, Development, Differentiation, and Cancer | *Early xenopus development*, Lecturer | 3 | 15 |
| SUM | 2012/13 | Cell620, Model Systems in Biology | *Zebrafish Module*, Lecturer, Laboratory instructions | 3 | 6 |
| F | 2012/13 | Cell606, Developmental Biology Journal Club | *Course Director* | 1 | 6 |
| F | 2012/13 | Medical School Histology | *Connective tissue, nervous tissue, muscle, cardiovascular system, endocrine system, skin, eye, GI tract. liver, gall bladder, pancreas, renal system*  Lab instructor |  | ~25 |
| SPR | 2012/13 | Cell606, Developmental Biology Journal Club | *Course Director* | 1 | 6 |
| SPR | 2012/13 | Con665, Development, Differentiation, and Cancer | *Introduction in cell polarity,* Lecturer | 3 | 10 |
| F | 2012/13 | Medical School Histology | *Epithelia, cartilage and bone, nervous tissue, cardiovascular system, blood and bone marrow, endocrine system, skin, GI tract, liver, gall bladder, respiratory system, pancreas, renal system, female and male reproductive systems*  Lab instructor |  | ~25 |
| W | 2013/14 | Cell611, Tissue Biology | *Course Co-director* | 4 | 5 |
| W | 2013/14 | Cell606, Developmental Biology Journal Club | *Course Director* | 1 | 4 |
| W | 2013/14 | NEUS625 Cell and Molecular Neurobiology | *Cell Biology of Neuron*, Lecturer and Discussion leader | 3 | 7 |
| SPR | 2013/14 | Con665, Development, Differentiation, and Cancer | *Introduction in cell polarity,* Lecturer  *Asymmetric cell division*, Lecturer | 3 | 6 |
| F | 2014/15 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 4 |
| W | 2014/15 | Cell611, Tissue Biology | *Course Co-director* | 4 | 5 |
| W | 2014/15 | NEUS625 Cell and Molecular Neurobiology | *Cell Biology of Neuron*, Lecturer and Discussion leader | 3 | 7 |
| W | 2014/15 | Con665, Development, Differentiation, and Cancer | *Introduction in cell polarity,* Lecturer | 3 | 6 |
| W | 2014/15 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 4 |
| S | 2014/15 | Cell615/Neus637, Developmental Neuro | *Neuronal Autophagy*, Lecture and discussion | 3 | 5 |
| S | 2014/15 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 4 |
| F-SUM | 2014/15 | Medical School Histology | *Connective tissue, respiratory system, endocrine system, skin, eye, GI tract, liver, gall bladder, pancreas*  Lab instructor |  | 150 |
| F | 2015/16 | NEUS625 Cell and Molecular Neurobiology | *Cell Biology of Neuron*, Lecturer | 1.5 | 7 |
| F | 2015/16 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 2 |
| F | 2015/16 | Cell610NN-0, CRISPR-Cas9 system | *Course Director* | 0.5 | 6 |
| W | 2015/16 | Cell611, Tissue Biology | *Course Co-director* | 4 | 6 |
| W | 2015/16 | Con665, Development, Differentiation, and Cancer | *Introduction in cell polarity,* Lecturer | 3 | 6 |
| W | 2015/16 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 1 |
| S | 2015/16 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 4 |
| F-SUM | 2015/16 | Medical School Histology | *Connective tissue, respiratory system, endocrine system, skin, eye, GI tract, liver, gall bladder, pancreas, etc*  Lab instructor |  | 150 |
| F | 2016/17 | NEUS625 Cell and Molecular Neurobiology | *Cell Biology of Neuron*, Lecturer | 1.5 | 9 |
| F | 2016/17 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 2 |
| F | 2016/17 | Cell610NN-0, Analysis of RNA-seq data | *Course co-Director* | 0.5 | 18 |
| W | 2016/17 | Cell611, Tissue Biology | *Course Co-director* | 4 | 6 |
| S | 2016/17 | Con665, Development, Differentiation, and Cancer | *Introduction in cell polarity,* Lecturer | 3 | 6 |
| W | 2016/17 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 1 |
| S | 2016/17 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 4 |
| S | 2016/17 | Cell615/Neus637, Developmental Neuro | *Neuronal Autophagy*, Lecture and discussion | 3 | 7 |
| F-SUM | 2016/17 | Medical School Histology | *Connective tissue, respiratory system, endocrine system, skin, eye, GI tract, liver, gall bladder, pancreas, etc*  Lab instructor |  | 150 |
| SUM | 2016/17 | CDCB Summer Undergrad Program | *Zebrafish as a model system. Lecture and lab* | 1.5 h | 30 |
| F-SUM | 2017/18 | Medical School Histology | *Connective tissue, respiratory system, endocrine system, skin, eye, GI tract, liver, gall bladder, pancreas, etc*  Lab instructor |  | 150 |
| F-S | 2017/18 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 2 |
| F | 2017/18 | NEUS625 Cell and Molecular Neurobiology | *Cell Biology of Neuron*, Lecturer | 1.5 | 9 |
| W | 2017/18 | Cell611, Tissue Biology | *Course Co-director* | 4 | 6 |
| S | 2017/18 | Con665, Development, Differentiation, and Cancer | *Introduction in cell polarity,* Lecturer | 3 | 6 |
| SUM | 2017/18 | CDCB Summer Undergrad Program | *Zebrafish as a model system. Lecture and lab* | 1.5 h | 30 |
| F-SUM | 2018/19 | Medical School Histology | *Connective tissue, respiratory system, endocrine system, skin, eye, GI tract, liver, gall bladder, pancreas, etc*  Lab instructor | 5 h | 150 |
| F-S | 2018/19 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 | 2 |
| F | 2018/19 | NEUS 625 Cell and Molecular Neurobiology | *Cell Biology of Neuron*, Lecturer | 1.5 h | 9 |
| W | 2018/19 | Cell611, Tissue Biology | *Course Co-director* | 3 h per week | 6 |
| S | 2018/19 | Con 665, Development, Differentiation, and Cancer | *Introduction in cell polarity,* Lecturer | 1.5 h | 6 |
| SUM | 2018/19 | CDCB Summer Undergrad Program | *Zebrafish as a model system. Lecture and lab* | 1.5 h | 20 |
| F-S | 2019/2020 | Cell606, Cell & Developmental Biology Journal Club | *Course Director* | 1 h | varied |
| F-SUM | 2019/20 | Medical School Histology | *Connective tissue, respiratory system, endocrine system, skin, eye, GI tract, liver, gall bladder, pancreas, etc*  Lab instructor | 5 h | 150 |
| F | 2019/2020 | MGEN 622 | *Zebrafish Genetics. Lecture and discussion* | 2 h | 5 |
| F | 2019/2020 | NEUS 625 Cell and Molecular Neurobiology | *Cell Biology of Neuron*, Lecturer | 1.5 h | 9 |
| W | 2019/20 | Cell611, Tissue Biology | *Course Co-director* | 3 h per week | 6 |
| S | 2019/20 | Con 665, Development, Differentiation, and Cancer | *Introduction in cell polarity,* Lecturer | 1.5 h | 10 |

**Non-OHSU teaching**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Qtr** | **Academic Yr** | **Course No. & Title** | **Teaching Contribution** | **Hours** | **Class Size** |
| SUM | 2008/09 | Zebrafish development and genetics, Woods Hole, MA | *Neural crest and placodes*, Lecture, Laboratory instructions | 16 | 20 |
| SUM | 2018 | Society for Developmental Biology Annual Conference, Reed College, Portland, OR | *Boot camp in zebrafish for new faculty* | 5 | 10 |

**High School and Undergraduate Students Supervised or Mentored:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Dates** | **Name** | **Program or School** | **Faculty role** |
| Summer 2009 | Sophia Li | Beaverton High School | Summer research training supervisor |
| Summer 2010 | Mayen Dada | Equity Summer Research Program at OHSU | Summer research training supervisor |
| Summer 2011 | Joy Walker | Equity Summer Research Program at OHSU | Summer research training supervisor |
| Summer  2013 | Daniel Kwong | Lake Oswego High School | Summer research training supervisor |
| 2013-2014 | Sarah Lusk | University of Oregon | Volunteer (20 hours/week) |
| Summer 2015 | Karla Lira | CURE Intern, North Salem High School | Summer research training supervisor |
| Summer 2016 | Audre May | Lewis and Clark, OR | Summer research training supervisor |
| Summer 2018 | Katie Culp | Lewis and Clark, OR | Research training supervisor |
| Summer 2019 | Katie Culp | Lewis and Clark, OR | Research training supervisor |

**Pre-doctoral Students Supervised or Mentored:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Dates** | **Name** | **Program or School** | **Faculty role** |
| 2008-2012 | Chao Zhang | Program in molecular and cellular biosciences, OHSU | Thesis committee member  Chair, thesis defense committee |
| 2008-2012 | Weike Mo | Program in molecular and cellular biosciences, OHSU | Thesis committee member |
| 2009- 2014 | Molly Harding | Neuroscience graduate program, OHSU | Ph.D. thesis supervisor |
| 2009 - 2014 | Mathew McCarroll | Program in molecular and cellular biosciences, OHSU | Ph.D. thesis supervisor |
| 2008-2011 | Mizuho Mimoto | Program in molecular and cellular biosciences, OHSU | Thesis committee member |
| 2009 | Rachel Clemens-Grisham | Program in molecular and cellular biosciences, OHSU | Rotation supervisor |
| 2009 | Xin Lim | Program in molecular and cellular biosciences, OHSU | Rotation supervisor |
| 2010 | Karen Thiebes | Neuroscience graduate program, OHSU | Rotation supervisor |
| 2012 | Alexandria Harrold | Neuroscience graduate program, OHSU | Qualifying examination committee member |
| 2012 | Maria Purice | Neuroscience graduate program, OHSU | Qualifying examination committee member |
| 2012 | Karen Thiebes | Neuroscience graduate program, OHSU | Qualifying examination committee member |
| 2013 | Lilly Winfree | Neuroscience graduate program, OHSU | Qualifying examination committee member |
| 2014 | Christal Worthen | Program in molecular and cellular biosciences, OHSU | Thesis defense committee member |
| 2014 | Nathan Nelsen | Neuroscience graduate program, OHSU | Rotation supervisor |
| 2013 - 2016 | Lilly Winfree | Neuroscience graduate program, OHSU | Thesis committee member |
| 2013 - 2016 | Maria Purice | Neuroscience graduate program, OHSU | Thesis committee member |
| 2013 - 2016 | Madalynn Erb | Neuroscience graduate program, OHSU | Thesis committee member |
| 2015 - 2018 | Itallia Pacentine | Neuroscience graduate program, OHSU | Thesis committee member |
| 2015 | Sweta Ravisankar | Program in molecular and cellular biosciences, OHSU | Rotation supervisor |
| 2016 | Sandra Schlesinger | Program in molecular and cellular biosciences, OHSU | Qualifying examination committee member |
| 2016 | Veronica Cochrane | Program in molecular and cellular biosciences, OHSU | Rotation supervisor |
| 2016 | Daniel Miller | Neuroscience graduate program, OHSU | Rotation supervisor |
| 2016 – 2018 | Reena Clements | Neuroscience graduate program, OHSU | Academic mentor |
| 2016 | Maria Purice | Neuroscience graduate program, OHSU | Examination committee member |
| 2016 | Madalynn Erb | Neuroscience graduate program, OHSU | Examination committee member |
| 2016 | Lilly Winfree | Neuroscience graduate program, OHSU | Examination committee member |
| 2016 - present | Sandra Schlesinger | Program in molecular and cellular biosciences, OHSU | Dissertation committee chair |
| 2017 – present | Leo Lin | Neuroscience graduate program, OHSU | Dissertation committee member |
| 2017 – present | Daniel Miller | Neuroscience graduate program, OHSU | Dissertation committee member |
| 2017 – present | Matthew Pomaville | Neuroscience graduate program, OHSU | Dissertation committee member |
| 2017 - present | Hannah Olson | NGP | Research supervisor |
| 2019 – present | Lauren Miller | CDB | Research supervisor |
| 2020 –  present | Benjamin Woodruff | CDB | Research supervisor |

**Postdoctoral Fellows Mentored:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Dates** | **Name** | **Program or School** | **Faculty role** |
| 2009- 2016 | Catherine Drerup | Department of Cell, Developmental & Cancer Biology, OHSU | NIH, tenure track unit chief at NICHD |
| 2009 - 2017 | Hillary McGraw | Department of Cell, Developmental & Cancer Biology, OHSU | Tenure track assistant professor, UMKC |
| 2015 - present | Adam Tuttle | Department of Cell, Developmental & Cancer Biology, OHSU | Research supervisor |

**SUMMARY OF TEACHING HOURS**

|  |  |  |
| --- | --- | --- |
| **Academic Year** | **Teaching/Mentoring Summary** | **Hours** |
| 2008/09 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 4  4  104  112 |
| 2009/10 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 14  40  200  254 |
| 2010/2011 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 27  45  200  272 |
| 2011/12 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 38  20  200  258 |
| 2012/13 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 47.5  64  200  311.5 |
| 2013/2014 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 46  55  200  301 |
| 2014/2015 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 64  60  180  304 |
| 2015/2016 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 94  50  180  324 |
| 2016/2017 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 46  20  180  244 |
| 2017/2018 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 31  18  120  169 |
| 2018/2019 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 63.5  25  150  238.5 |
| 2019/2020 | Formal class or course teaching hours:  Informal teaching hours including prep time:  Mentoring hours:  Total hours of teaching /mentoring: | 40.0  25  200  265.0 |

# X. RESEARCH AWARDS AND GRANTS

**CURRENT:**

CA170613 (Wong, PI; Nechiporuk, co-I) 08/1/2018 — 07/31/2020

DoD

Amount: $20,000/year (direct cost)

Title: Development of a Novel Circulating Tumor Cell Population for Early Detection of Recurrent Colorectal Cancer

The goal of these studies is to evaluate the growth potential of isolated CHCs obtained from patients using zebrafish as a model system.

1R01NS111419-01 (Nechiporuk, PI) 03/01/2019 – 02/28/2024

NINDS

Amount $233,300/year (direct cost)

Title: Regulation of axon outgrowth by retrograde Ret signaling.

The goal of this proposal is to dissect the mechanism of Ret retrograde signaling and identify transcriptional target of this signaling pathway.

1 R21 NS112795-01A1 Nechiporuk (PI) 04/01/20 – 09/30/2021

NINDS

Amount: $105,500/year (direct cost)

Title: Isolation and interrogation of the transcriptional profile of pioneer neurons

The goal of this proposal is to define transcriptional profile of pioneer neurons using single cell RNA sequencing approach.

1 R01 GM130868-01A1 Nechiporuk (PI) 06/01/20 – 05/30/2024

NIGMS

Amount: $200,000/year (direct cost)

Title: Protrusive behavior during collective cell migration

The goal of this project is to characterize transcriptional profile of pioneer neurons using scRNA-seq.

**PENDING RESEARCH SUPPORT**

1 R21 CA260025-01 Nechiporuk (PI) 04/01/2021 – 03/31/2023

NCI

Amount: $137,500/year

Title: High-throughput identification of molecular targets responsible for drug-induced peripheral neuropathies.

The goal of this project is to find neural targets of anti-cancer multi-kinase inhibitors that cause peripheral neuropathies.

1T32NS12177501 Nechiporuk (co-PI) 07/01/2021 - 06/30/2026

NINDS

Amount: $243,740/year (direct costs)

Title: Training Program in Developmental Neuroscience

The goal of the award is to provide training support for 2 pre- and 2 post-doctoral fellows in developmental neuroscience.

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**COMPLETED:**

Medical Research Foundation of Oregon (Nechiporuk, PI) 09/01/2017 - 12/31/2018

MRF

Amount: $40,000 (direct cost)

Title: Ret as a target of drug-induced peripheral neuropathies.

The goal of this study is to identify neural specific targets of drug-induced peripheral neuropathies

Knight Pilot Project (Nechiporuk, PI) 01/01/2017 – 12/31/2018

Knight Cancer Institute

Amount: $50,000 (direct cost)

Title: Novel zebrafish platform to assess adverse reactions of anti-cancer compounds.

The goal of this proposal is to established a high content zebrafish system for screening anti-cancer compounds for toxic side effects.

Presidential Bridge Funding (Nechiporuk, PI) 09/01/2017 – 06/30/2018

Amount: $50,000 (direct cost)

OHSU

1R01HD072844-01 (Nechiporuk, PI) NCE through 12/31/2017

NICHD

Amount: $207,500 (annual direct cost)

Title: Genetic analyses of axon transport and microtubule dynamics in Zebrafish

The goal of this proposal is to conduct a forward genetic screen to identify zebrafish mutants defective in microtubule dynamics and axon transport during development.

RSG DDC - 124733 (Nechiporuk, PI) 07/01/2013-06/31/2017

American Cancer Society

Amount: $150,00 (annual direct cost)

Title: In vivo Analysis of Collective Cell Migration in Development and Cancer

The goal of this project is to identify factors required for in collective cell migration and assay their role in collective cancer invasion.

GBMEN0245A1 – OCSSB (Nechiporuk (co-PI) 10/01/2014 – 09/30/2015

Amount : $50,000 (annual direct cost)

OHSU Center for Spatial Systems Biomedicine

Title: Fishing for identity of axonal swellings with cryo-em

This is a collaborative project to develop cryo-EM approaches for imaging axonal swellings in zebrafish

5R00HD055303 (Nechiporuk, PI) 05/01/2007-02/28/2013

NICHD

Amount: $249,000 (annual direct+indirect)

Title: Development of epibranchial placodes and ganglia in zebrafish

The goal of this study is to define the cellular bases of EB placode formation; define the role of Fgf signaling in segregation of EB placode precursors from the Pax2a subdomain; and initiate a new genetic screen to reveal recessive mutations responsible for EB placode/ganglia development.

5-FY09-116 (Nechiporuk, PI) 02/01/2009-01/31/2012

March of Dimes Basil O’Connor Research Scholarship

Amount: $150,000 (total direct+indirect cost)

Fgf-dependent innervation of lateral line in zebrafish

The goal of this study was to test whether Fgf functions as guidance cue during establishment of afferent innervation in the zebrafish lateral line system.

3R00HD055303-04S1 (Nechiporuk, PI) 09/30/2009-09/29/2010

NICHD

Amount: $42,500 (total direct)

ARRA: Development of ephibranchial placodes and ganglia in zebrafish

Purchase of a Thermo Scientific Revco cryostat and three monitoring/dosing stations for additional tanks.

Medical Research Foundation of Oregon (Nechiporuk, PI) 03/01/2009-02/28/2010

Amount: $40,000 (total direct costs)

The goal of this proposal was to investigate the genetic basis of a novel mutation that affects development of the lateral line primordium in zebrafish.

# XI. PEER-REVIEWED PUBLICATIONS

**Research Articles**

1. Jurynec MJ, Bai X, Bisgrove BW, Jackson H, **Nechiporuk A**, Palu RAS, Grunwald HA, Su YC, Hoshijima K, Yost HJ, Zon LI, Grunwald DJ. (2019). The Paf1 complex and P-TEFb have reciprocal and antagonist roles in maintaining multipotent neural crest progenitors. *Development*. Dec 16;146(24).
2. Adam M Tuttle, Catherine M Drerup, Molly H Marra, Hillary McGraw, **Alex V Nechiporuk.** (2019). Retrograde Ret signaling controls sensory pioneer axon outgrowth. *Elife*. Sep 2;8
3. Song YC, Dohn TE, Rydeen AB, **Nechiporuk AV**, Waxman JS. (2019). HDAC1-mediated repression of the retinoic acid-responsive gene ripply3 promotes second heart field development. *PLoS Genet.* May 15;15(5).
4. Drerup CM, Herbert AL, Monk KR, **Nechiporuk AV**. (2017). Regulation of mitochondria-dynactin interaction and mitochondrial retrograde transport in axons. *Elife*. Apr 17;6.
5. Amy L. Herbert, Meng-meng Fub, Catherine M. Drerupc,e, Ryan S. Graya, Breanne L. Hartya, Sarah D. Ackermana, Tom O’Reilly-Pold, Stephen L. Johnsond, **Alex V. Nechiporuk**, Ben A. Barresb, Kelly R. Monk. (2017). Dynein/dynactin is necessary for anterograde transport of Mbp mRNA in oligodendrocytes and for myelination in vivo. *PNAS*.
6. Erickson T, Morgan CP, Olt J, Hardy K, Busch-Nentwich E, Maeda R, Clemens R, Krey JF, **Nechiporuk A,** Barr-Gillespie PG, Marcotti W, Nicolson T. (2017). Integration of Tmc1/2 into the mechanotransduction complex in zebrafish hair cells is regulated by Transmembrane O-methyltransferase (Tomt). *Elife*. May 23;6.
7. Drerup CM, Lusk S, **Nechiporuk AV**. (2016). Kif1B interacts with KBP to promote axon elongation by localizing a microtubule regulator to growth cones. J Neurosci. Jun 29;36(26):7014-26. PMID:27358458.
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9. McGraw HF, Culbertson MD, and **Nechiporuk AV**. (2014). Kremen1 restricts Dkk activity during posterior lateral line development in zebrafish. *Development*. 2014 Aug;141(16):3212-21. Jul 18. PMID:25038040.
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**Commissioned book chapter**

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Hannah Olson and **Alex V Nechiporuk**. (2020). Lamellipodia-like protrusions and focal adhesions drive collective cell migration in zebrafish.

Dane Kawano, Katherine Pinter, Ronald Petralia, Ya-Xian Wang, **Alex V. Nechiporuk**, and Catherine M Drerup. (2020). NudC binds to dynein to regulate anterograde transport.

**Manuscripts under preparation:**

Adam M Tuttle, Matthew Pomaville, Kevin Wright, and **Alex V Nechiporuk.** (2019). Kit receptor is a target of multi-kinase inhibitors in drug-induced peripheral neuropathies.

# XII. RESEARCH PROGRAM:

My laboratory uses genetic and molecular approaches in zebrafish to understand development of sensory systems in vertebrates. Specifically, our research program focuses on two organ systems, cranial sensory system and mechanosensory lateral line system.

One of the goals is to establish zebrafish as an *in vivo* model system for analysis of collective cell migration in the context of embryonic development and cancer. We achieve this goal by isolating various factors that regulate collective cell migration in the lateral line system in zebrafish and testing the role of these factors in cancer cells. We have carried out a number of studies on lateral line in zebrafish, results of which have been recently published (McGraw et al., 2011; Harding and Nechiporuk, 2012; McGraw et al., 2014). The next step is to test the role of these factors in cancer cell invasion using tissue culture assays and human patient samples. This part of my research program had been is funded by American Cancer Society Award. A new R01 award from NIGMS is currently pending.

Another goal of out research team is to understand the role of microtubule-based axonal transport during development and disease using zebrafish as a model system. Axonal transport is an active movement of proteins and organelles along axons. This process is essential during axon development and maintenance and often disrupted in neurodegenerative and neurodevelopmental disorders. Toward this goal, my laboratory has been 1) isolating zebrafish mutants defective in axonal transport and microtubule dynamics and 2) developing imaging approaches to visualize these processes in intact zebrafish embryos and larvae. Over the years this research program led to a number of publications: Drerup and Nechiporuk*,* 2013; Drerup et al., 2016; Drerup et al., 2017; Tuttle et al., 2019. This part of my research program had been funded by multiple R01 awards from NIH.

Another goal of our research is to understand the bases of drug-induced neuropathies. Kinase inhibitors that target specific cellular pathways are a major class of oncology drugs that often cause drug-induced peripheral neuropathies (DIPNs) following the treatment. Whereas DIPNs impact long-term patient health and may limit the dosage or duration of chemotherapy regimens, the molecular bases of these inhibitor induced DIPNs are not understood. To study DIPNs in zebrafish, we conducted a screen with kinase inhibitor drugs and found distinct receptor pathways that cause neurotoxicity. We are working towards determining specific requirements of these signaling pathways in peripheral neuropathies and determining the mechanisms underlying inhibitor-induced neurotoxicity. The NIH grant application to support this part of our research program is slated for submission in 2020.

Finally, our laboratory has established and maintained a number of collaborations with scientists inside and outside my home institutions. These collaborations resulted in multiple publications (internal collaborations: Erickson et al., 2017; Herbert et al., 2017; external collaborations: Dalgin et al., 2011; Song et al., 2019). One of the current collaborative projects with Dr. Adam Miller from University of Oregon led to a joined NIH grant application that was submitted last summer. It received a fundable score and is currently pending research council review.