**In K. Cho. M.S., Ph.D.**

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**EDUCATION**

**University of Georgia, Athens, GA**

 Postdoctoral fellow, Regenerative Bioscience Center 2021-Current

**Emory University, Atlanta, GA**

 Postdoctoral fellow, Genetics and Stem Cell Biology 2015-2021

 Ph.D., Genetics and Molecular Biology Program 2009-2014

**Troy University, Troy, AL**

 M.S., Environmental and Biological Sciences 2006-2009

 B.S., Cell and Molecular Biology 2002-2006

**RESEARCH EXPERIENCE**

**Postdoctoral Fellow, University of Georgia, Athens, GA** 2021-Current

 Regenerative Bioscience Center, Environmental Health Science, College of Public Health

 Advisor: Charles A. Easley, IV, M.S., Ph.D.

1. Project: Investigating the impact of atrazine exposure on paternal epigenetic inheritance

Results: Demonstrated efficacy of utilizing *in vitro* spermatogenesis model in environmental toxicant exposure monitoring

1. Project: Derivation of functional spermatogonia stem cells from rhesus macaque iPSCs
2. Project: Developing testis organoid to enhance differentiation efficiency of pluripotent stem cell toward advanced spermatogenic cells
3. Project: A novel *in vitro* fluorescent reporter platform for identifying male contraceptives (Testibow 2.0 reporter system)

**Postdoctoral Fellow, Emory University, Atlanta, GA** 2015-2021

 Department of Human Genetics, Yerkes National Primate Research Center

 Advisor: Anthony W.S. Chan, D.V.M., Ph.D.

1. Project: Combination of stem cell and gene therapy ameliorates symptoms in Huntington’s disease mice

Results: Able to ameliorate symptoms of Huntington’s disease after transplanting neural progenitor cells intracranially

1. Project: Differentiate astrocytes from neural progenitor cells to model Huntington’s disease

Results: Astrocytes derived from Huntington’s disease neural progenitor cells show disease characteristics

1. Project: A stem cell model to develop a therapeutic approach to suppress paternal CAG trinucleotide repeat expansion in Huntington’s disease

Results: Analyzed differentiating spermatogenic cells and developed a novel system to study CAG trinucleotide repeat expansion *in vitro*

Results: Discovered novel therapeutics for reducing CAG trinucleotide repeat expansion

**Graduate Student, Emory University, Atlanta, GA** 2009-2014

 Department of Human Genetics, Yerkes National Primate Research Center

 Advisors: Anthony W.S. Chan, D.V.M., Ph.D., Hui Mao, Ph.D.

1. Project: MagA as a genetic M.R.I. reporter for longitudinal in vivo stem cell monitoring.

Results: Able to demonstrate the use of MagA as a genetic MRI reporter for monitoring stem cell grafts in mice by using a Tet-On system to control expression of MagA.

**Graduate Student, Troy University, Troy, AL** 2006-2009

 Department of Environmental and Biological Sciences (Toxicology)

 Advisors: Alicia Whatley, Ph.D.

1. Project: Cytochrome P450 induction and gene expression in channel catfish (*Ictalurus punctatus*) as a biomarker for pollution assessment.

Results: Able to show mutagenicity followed by exposure to wastewater treatment plant effluent and developed cytochrome P450 as a biomarker for environmental pollution.

**Undergraduate Independent Research, Troy University, Troy, AL** 2004-2006

Biological Environmental Sciences (Cell and Molecular Biology Concentration)

 Advisor: Christi Magrath, Ph.D.

1. Project: Lead acetate exposed *Saccharomyces cerevisiae*.

Results: Demonstrate the gene population either induced or suppressed after lead acetate exposure in yeast.

**RESEARCH FIELD AND KEYWORDS**

Stem cell, regenerative medicine, stem cell therapy, gene therapy, organoid, therapeutic discovery, drug discovery, biomarker discovery, disease in a dish modeling, *in vitro* spermatogenesis, *in vitro* neurogenesis, *in vitro* directed differentiation, neuroscience, neural progenitor cells, astrocytes, Huntington’s Disease, trinucleotide repeat expansion, environmental toxicology, genetics, molecular biology, and environmental science

**RESEARCH GRANTS**

**Contributions to Ongoing Funded Research**

NIH 1R01 OD028223-01 MPI: Easley (Contact P.I.), Chan (P.I.), Orwig (P.I.)  09/09/2019-06/30/2023

Title: Derivation of Functional Spermatogonia Stem Cells from Rhesus Macaque iPSCs

Role: As a postdoctoral fellow, I develop and evaluate methodologies to derive spermatogonial stem cells (SSCs) *in vitro* from nonhuman primate (NHP) iPSCs that can be transplanted into sterile testes to restore spermatogenesis and produce healthy embryos.

R01NS101701 Chan (P.I.) 03/01/2017-02/28/2022

Title: N-terminal huntingtin and Huntington disease neuropathology

Role: The proposed study investigates how expanded N-terminal polyglutamine repeats mediate neuropathology and whether removing the N-terminal region containing polyglutamine domain can abolish the nuclear toxicity neuropathology in HD mice. I provided preliminary data.

**Completed Research Support**

HERCULES Center’s Pilot Project Chan (P.I.), Cho (Co-Inv) 04/01/2019-03/31/2020

Title: Impact of Atrazine exposure on paternal epigenetic inheritance

Role: As a postdoctoral fellow, I conducted the main experiment and produced data. The proposed study’s goal was to determine if *in vitro* exposure of differentiating rhesus male gametes to ATZ Induce epigenetic changes. We are currently working on a manuscript that will be submitted for publication soon. Also, I wrote the grant with Dr. Chan.

Huntington’s Disease Pilot Grant program Cho (P.I.) Chan (Co-Inv) Easley (Col) 05/01/2018-04/30/2019

Udall Center of Excellence for Parkinson’s Disease Research

Title: An *in vitro* spermatogenesis model to study paternal germline polyglutamine instability in Huntington’s disease

Role: As a PI of the grant, the goal of this project was to develop a platform to discover chemicals or environmental factors that could influence polyQ stability using our novel *in vitro* spermatogenesis model, hence eliminating disease “anticipation” in future generations. I wrote the grant, was the primary person to produce data, and am in the process of writing the draft for publication.

2R24OD010930-10A1 Chan (PI) 03/01/2010-12/31/2018

Title: Transgenic Huntington’s disease monkey resource (T.H.D.M.R.)

A Transgenic Huntington’s Disease Monkey Resource (T.H.D.M.R.) was established to provide a high-quality HD monkey model and biomaterials for investigators.

Role: As a postdoctoral fellow, I maintained samples and provide support for the resource. Also, I was responsible for maintaining records and database.

**1R21NS084163-01 Chan (P.I.) 07/10/2013-06/30/2016**

**Title: A gene and progenitor cell therapy in Huntington’s Disease mice**

**Role: As a postdoctoral fellow, this study aimed to evaluate the therapeutic efficacy of nonhuman primate neural progenitor cells in Huntington’s disease mice. I produced data and prepared the manuscript.**

**1R01NS064991-01 Chan (P.I.) 05/01/2009-04/30/2014**

**Title: Monitoring stem cell grafts using a novel MRI Reporter**

**Role: I maintained, characterized, and generated cell-lines. Also, I conducted animal study grafting stem cells intracranially and monitored their behavior. The purpose of this proposal was to develop a novel transgenic MRI reporter “*magA*” for non-invasive monitoring of the survival, migration, and colonization of stem cell grafts *in vivo*. I produced the data and prepared the manuscript.**

**AWARDS AND HONORS**

Huntington’s Disease Pilot Grant program 2018

Open Access Publishing Fund 2018

Travel Award, International Society for Stem Cell Research 2016

Cambridge Who’s Who Registry Among Executives and Professionals 2008

Air & Waste Management Association (Environmental Scholarship) 2008

Scholar’s Award – Troy University 2006

Summa Cum Laude – Troy University 2006

John C. Johnson Award (1st place) – Beta Beta Beta National 2006

John C. Johnson Award (1st place) – Beta Beta Beta Southeastern Regional 2006

Who’s Who Among All American Colleges and Universities 2005

National Provost’s List 2005

Phi Kappa Phi 2005

National Dean’s List 2005

**PUBLICATIONS**

**Published in peer-reviewed journals**

1. Khampang, S.\*, **Cho, I.K**.\*, Punyawai, K., Gill, B., Langmo, J.N., Nath, S., Watkins, K.A., Symosko, K.M., Fowler, K.L., Tian, S., Statz, J., Steves, A.N., Parnpai, R., White, M.A., Hennebold, J.D., Orwig, K.E., Simerly, C.R., Schatten, G., Easley, C.A., Blastocyst Development after Fertilization with In vitro Spermatids Derived from Non-Human Primate Embryonic Stem Cells. Fertility and Sterility Science. 2021.
2. Khampang, S., Parnpai, R., Mahikul, W., Easley, C.A., **Cho, I.K.**#, Chan, A.W.S.#, CAG repeat instability in embryonic stem cells and derivative spermatogenic cells of transgenic Huntington’s disease monkey. J Assist Repord Genet. 2021. Epub 2021/02/20. doi: 10.1007/s10815-021-02106-3. PMID: 33611676.
3. Clever F.\*, **Cho I.K.\***, Yang J, Chan A.W.S. Progressive Polyglutamine Repeat Expansion in Peripheral Blood Cells and Sperm of Transgenic Huntington’s Disease Monkeys. J Huntingtons Dis. 2019. Epub 2019/09/29. doi: 10.3233/JHD-190359. PubMed PMID.: 31561381.
4. **Cho I.K.**, Yang B, Forest C, Qian L, Chan A.W.S. Amelioration of Huntington’s disease phenotype in astrocytes derived from iPSC-derived neural progenitor cells of Huntington’s disease monkeys. PLoS One. 2019;14(3):e0214156. Epub 2019/03/22. doi: 10.1371/journal.pone.0214156. PubMed PMID: 30897183; PMCID: PMC6428250
5. **Cho I.K.**, Hunter C.E., Ye S, Pongos A.L., Chan A.W.S. Combination of stem cell and gene therapy ameliorates symptoms in Huntington’s disease mice. Nature Partner Journal Regenerative Medicine. 2019;4:7. Epub 2019/04/03. doi: 10.1038/s41536-019-0066-7. PubMed PMID: 30937182; PMCID: PMC6435637
6. **Cho I.K.**, Chan A.W.S. A transgenic monkey and neural stem/progenitor cell model of Huntington’s disease. In: Ram J, Conn PM, editors. Conn’s Handbook of Models for Human Aging. 2 ed. 125 London Wall, London EC2Y 5AS, United Kingdom: Elsevier Science; 2018. p. 593-616.
7. **Cho, I.K.**, Wang, S., Mao, H., Chan, A.W.S., Genetic engineered molecular imaging probes for applications in cell therapy: Emphasis on MRI approach. American Journal of Nuclear Medicine and Molecular Imaging. 2016; 6(5):234-261; Epub 2016/10/22. PubMed PMID: 27766183; PMCID: PMC5069277
8. **Cho, I.K.,** Moran, S.P., Paudyal, R., Piotrowska-Nitsche, K., Cheng, P.H., Zhang, X., Mao, H., Chan, A.W., Longitudinal monitoring of stem cell grafts in vivo using magnetic resonance imaging with inducible MagA as a genetic reporter. Theranostics 4(10):972-989. 2014. (Cover)
9. Chen, Y., Carter, R., **Cho, I.K.,** Chan, A.W., Cell-based therapies for Huntington’s disease, Drug Discovery Today 19(7): 980-984. 2014.
10. Putkhao, K., Kocerha, J., **Cho, I.K.,** Yang, J., Parnpai, R., Chan, A.W.S, Pathogenic cellular phenotypes are germline transmissible in a transgenic primate model of Huntington’s disease. Stem Cells and Development 22(8): 1198-1205. 2013.
11. Whatley, A., **Cho, I.K.,** Magrath, C., Stewart, P.M., Li. R.W., Cytochrome P450 induction and gene expression in channel catfish (*Ictalurus punctatus*) following wastewater treatment plant effluent exposure in field and laboratory settings. Journal of Environmental Protection 1(4): 362-373. 2010.
12. Whatley, A., **Cho, I.K.** Mutagenicity of Walnut Creek and Troy (Alabama) wastewater treatment plant influent and effluent. Southeastern Naturalist 9(3): 497-506. 2010.

**Submitted Manuscripts**

1. **Cho, I.K.**, Chan, A.W.S., Easley, C.A., Suppression of trinucleotide repeat expansion in spermatogenic cells in Huntington’s disease. 2021. (Submited).
2. **Cho, I.K.**\*,#,Clever, F., Hong, G.,Chan, A.W.S.#,A survey of CAG repeat instability in the peripheral and central nervous system of transgenic Huntington’s disease monkeys. 2021. (Submitted).
3. Chan, A.W.S., **Cho, I.K.**, Zhang, X., Li, C., Patel, S., Rusnak, R., Raper, J., Bachevalier, J., Moran, S.P., Xiao, H., Yang, S-H., Gumber, S., Herndon, G.H., Rosen, R.F., Hu, W., Lah, J.J., Levey, A.I., Smith, Y., Walker, L.C., Cerebral A deposition in an A-precursor protein-transgenic rhesus monkey. (Submitted).

**Manuscripts in preparation**

1. **Cho, I.K.**, RNA-Seq metadata analysis of pluripotent stem cell of Huntington’s disease.

**PATENTS**

Chan, A.W.S, (50%), Cho, I,K. (50%) Ameliorating Genetic Anticipation by Inducing CAG Repeat Contraction in Huntington’s Disease. Emory University Invention No. 20192. **Pending.**

**TEACHING EXPERIENCE**

Graduate Teaching Assistant, Emory University, Atlanta, GA 2011

Course: Microbiology

Responsibilities: Setting up labs and assisting students. Grading exams and proctoring during exams.

General Biology Lecturer, Troy University, Troy, AL 2008-2009

 Course: General Biology

 Responsibilities: Develop and deliver classes for one-hour lectures and 3-hour laboratory sessions over two semesters: developed quizzes, tests, assignments, and teaching plans.

Teaching Assistant, Troy University, Troy, AL 2006-2007

 Course: Environmental Toxicology / Molecular Biology

 Responsibilities: Develop assignments and exams.

**MENTORING EXPERIENCE**

Peng Khampang, Graduate Student 2017-2019

Current status: Associate Researcher at Suranaree University of Technology, Thailand

Siran Tian, Undergraduate Honors Thesis Student Fall 2018

Current status: Graduate Student at Johns Hopkins University

Faye Clever, Institute of Neuroscience (ION) Summer 2018

 Current status: Undergraduate student at Georgia Institute of Technology

Sarah Ye, Summer Undergraduate Research Experience (SURE) Summer 2018

 Current status: Medical student at Medical College of Georgia

Gordon Hong, Undergraduate Volunteer Student Spring 2018

 Current status: Medical Doctor Candidate at Northeast Ohio Medical University

Shoeb Lallani, Undergraduate Honors Thesis Student (Committee Member) Fall 2017

 Current status: Medical student at University of Alabama at Birmingham

Amy Meng Wang, Undergraduate Volunteer Student Fall 2017

 Current status: Medical Doctor at U.S. Army Medical Department

Emerson Hunter, The Scholarly Inquiry and Research Experience (SIRE) Fall 2016

 Current status: Veterinary Medical Student at University of Pennsylvania

Phung “Phoenix” Phung Thien, Undergraduate Volunteer Student Spring 2016

 Current status: Medical student at Medical College of Georgia

Lu Qian, Undergraduate Independent Research Thesis Student Spring 2015

 Current status: Associate Researcher at Icahn School of Medicine at Mount Sinai

**JOB EXPERIENCES**

Postdoctoral Fellow, University of Georgia, Athens, GA Current

Postdoctoral Fellow, Yerkes National Primate Research Center, Atlanta, GA 2015-2021

Teaching Assistant, Emory University, Atlanta, GA 2011

Adjunct Faculty, Troy University, Troy, AL 2008-2009

Graduate Teaching Assistant, Troy University, Troy, AL 2006-2007

Natural Science Center, Troy University, Troy, AL 2004-2006

**RESEARCH PRESENTATIONS**

1. **Cho, I.K.**, (Invited Keynote Speaker). Combination of stem cell and gene therapy ameliorates symptoms in Huntington’s disease mice. Drug Discovery News, Advances in Gene Therapy, 2021.
2. **Cho, I.K.,** Suppression of trinucleotide repeat expansion in spermatogenic cells in Huntington’s disease. Tri-Repro Symposium on Reproductive Biology and Infertility, 2021.
3. **Cho, I.K.** Accessing the impact of atrazine on spermatogopnial stem cell development in vitro. Environmental Health Sciences Research Symposium, University of Georgia, 2021.
4. **Cho, I.K.**, Chan, A.W.S., Stem cell model to investigate trinucleotide repeat instability in male germ cells. Research in Progress. 2020.
5. **Cho, I.**K., Hunter, C., Ye, S., Hope, J., Chan, A.W.S., Longitudinal Behavior Assessment to Evaluate the Efficacy of Neural Progenitor Cell Therapy in Huntington’s disease Mice. Emory University Department of Human Genetics Research Symposium. 2018.
6. **Cho, I.K.**, Hunter, C.E., Ye, S., Pongos, A.L., Chan, A.W.S., Combination of stem cell and gene therapy ameliorates symptoms in Huntington’s Disease mice., Emory University Department of Human Genetics Research Symposium. 2017.
7. **Cho, I.K.**, Hunter, C., Ye, S., Hope, J., Chan, A.W.S., Longitudinal Behavior Assessment to Evaluate the Efficacy of Neural Progenitor Cell Therapy in Huntington’s disease Mice, HD2016. 2016.
8. **Cho, I,K.,** Yang, B., Forest C., Chan, A.W.S., Amelioration of Huntington’s disease phenotype in astrocytes derived from iPSC-derived neural progenitor cells of Huntington’s disease monkeys. I.S.S.C.R. 2016.
9. **Cho, I.K.,** Cheng, H.Y., Zhang, X., Mao, H., Chan, A.W.S., MagA as a novel genetic M.R.I. reporter for monitoring stem cell grafts. I.S.S.C.R. 2011.
10. **Cho, I.K.,** Whatley, A., Magrath, C., Li, Li., Induction of the cytochrome P450 enzyme in channel catfish *Ictalurus punctatus* following exposure to wastewater treatment plant effluent. Association of Southeastern Biologist. 2009.
11. **Cho, I.K.,** Whatley, A., Mutagenicity of Walnut Creek and Troy (Alabama) wastewater treatment plant influent and effluent. Association of Southeastern Biologist. 2009.
12. **Cho, I.K.,** Lead acetate exposed *Saccharomyces cerevisiae* – gene expression and growth of deletion strains. Beta Beta Beta National Convention. 2006.
13. **Cho, I.K.,** Lead acetate response: correlation of deletion strain growth and gene expression. Southeastern Regional Yeast Meeting. 2006.
14. **Cho, I.K.,** Lead acetate response: correlation of deletion strain growth and gene expression. Alabama Academy of Science. 2006.
15. **Cho, I.K.,** Cho, Y.Y., Thompson, J., Evaluation of light scattering particles as a means to increase path length for absorption experiment. Alabama Academy of Science. 2004.

**LEADERSHIP AND SERVICE**

Korean Emory Graduate Students – President – founding member – 2012-2013

S.A.V.E (Scholars in Active Volunteering at Emory) – founding member – Historian – 2011

Habitat for Humanity – 2005-2017

Local Orchestra Conductor – 2007-2008

Beta Beta Beta – Vice-president (2006) and Historian (2005)

**PROFESSIONAL ASSOCIATIONS**

International Society for Stem Cell Research

American Association for the Advancement of Science

American Physician Scientists

Korean American Scientists and Engineers Association

**SKILLS**

Stem cells (murine, nonhuman primate, and human)

Genetics and molecular biology techniques (PCR, qRT-PCR (taqman, SYBR green), Western, ICC, IHC, IP,

RNA isolation, DNA isolation, cloning, microarray, flow cytometry, ELISA, and fluorescence microscopy

Differentiation (neural lineage)

NPC establishment (murine and primate)

*In vitro* spermatogenesis, Testicular organoid, Epigenetics – bisulfite sequencing

RNA-sequncing, Data analysis (quantitative imaging analysis and statistics)

Various cell cultures (primary cell culture of various tissue samples and selective cell isolation)

Lentivirus production and transduction/cell line establishment

Mouse surgery (intracranial surgery and cell grafts for teratoma forming assay)

Cryosection sample preparation, General Histology, Bioinformatics, MRI, Nanoparticles, Illustration

Rhesus infant care

Computer programs (MatLab, SPSS, JMP, GraphPad, KaleidaGraph, ImageJ, Adobe programs, R, and M.S. Office)