

# Ritchie Q. Ho, Ph.D.

## CURRICULUM VITAE

September 18, 2020

### PROFESSIONAL CONTACT INFORMATION:

Center for Neural Sciences and Medicine  
Board of Governors Regenerative Medicine Institute  
Departments of Biomedical Sciences and Neurology  
Cedars-Sinai Medical Center  
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### EDUCATION:

Ph.D. University of California, Los Angeles (UCLA), Molecular Biology, 2013  
B.A. University of California, Berkeley, Molecular and Cell Biology, 2004

### PROFESSIONAL EXPERIENCE:

#### **Present Position:**

10/2019 – Present Research Scientist, Cedars-Sinai Medical Center

#### **Previous Position:**

02/2014 – 09/2019 Postdoctoral Scientist, Cedars-Sinai Medical Center  
10/2013 – 01/2014 Postdoctoral Researcher, UCLA  
09/2007 – 09/2013 Graduate Student Researcher, UCLA  
04/2005 – 05/2007 Research Technician, California Institute of Technology

### RESEARCH FOCUS AND INTERESTS:

Establish aging models from patient-derived cells to understand how the aging process can potentiate late-onset diseases. Faithful aging models will advance the development of predictive diagnostics and preventive therapies for patients predisposed to these diseases.

### HONORS AND SPECIAL AWARDS:

2020 Howard Hughes Medical Institute Gilliam Fellow Advisor, Cedars-Sinai Medical Center  
2020 Institutional Nomination for Pew Biomedical Scholars Award, Cedars-Sinai Medical Center  
2018 Burns and Allen Research Institute Bohdan (Danny) Malaniak Award for Excellence in Postdoctoral Research, Cedars-Sinai Medical Center  
2012 Dissertation Year Fellowship, UCLA  
2011 Molecular Biology Institute Amgen Dissertation Award, UCLA  
2011 University Fellowship, UCLA  
2010 Molecular Biology Institute Paul D. Boyer Outstanding Teaching Award, UCLA  
2005 Special Recognition in Biocatalytics Award, Pasadena City College

### RESEARCH GRANTS AND FELLOWSHIPS RECEIVED:

#### **Active/Ongoing:**

09/2017 – 08/2023 NIA K99/R00 Pathway to Independence Award AG056678: Comparative genomics approaches to improve iPSC-derived motor neuron models of ALS  
\$97,017 (K99), \$249,000 (R00)  
Role: PI, 100% effort

**Inactive/Completed:**

09/2008 – 08/2010 NIAID T32 UCLA Interdisciplinary Training in Virology and Gene Therapy Fellowship  
AI060567  
\$20,722 (2008), \$20,976 (2009), \$21,180 (2010) + Tuition/Fees  
Role: Trainee, 100% effort

**PUBLICATIONS:****Research Papers – Peer-Reviewed**

McCauley, M., O'Rourke, J.G., Yanez, A., Markman, J., **Ho, R.**, Wang, X., Jin, M., Muhammad, A.K.M.G., Bell, S., Landeros, J., Valencia, V., Harms, M., Arditi, M., Jefferies, C., Baloh, R.H. (2020) C9orf72 in myeloid cells suppresses STING-induced inflammation. *Nature*. Sep;585(7823):96-101. PMID: 32814898

Laperle, A.H.\*, Sances, S.\*, Yucer, N.\*, Dardov, V.J., Garcia, V.J., **Ho, R.**, Fulton, A., Jones, M.R., Roxas, K., Avalos, P., West, D., Banuelos, M., Shu, Z., Murali, R., Maidment, N.T., Van Eyk, J. E., Tagliati, M., Svendsen, C.N. (2020). iPSC modeling of young onset Parkinson's Disease reveals a molecular signature of disease and novel therapeutic candidates. *Nat. Med.* 26(2), 289-299. PMID: 31988461

Zhou, Y., Carmona, S., Muhammad, A.K.M.G., Bell, S., Landeros, J., Vazquez, M., **Ho, R.**, Franco, A., Lu, B., Dorn, G.W., et al. (2019). Restoring mitofusin balance prevents axonal degeneration in a Charcot-Marie-Tooth type 2A model. *J. Clin. Invest.* 130, 1756–1771. PMID: 30882371

Sances, S., **Ho, R.**, Vatine, G., West, D., Laperle, A., Meyer, A., Godoy, M., Kay, P.S., Mandefro, B., Hatata, S., et al. (2018). Human iPSC-Derived Endothelial Cells and Microengineered Organ-Chip Enhance Neuronal Development. *Stem Cell Reports* 10, 1222–1236. PMID: 29576540

Vatine, G.D.\*, Al-Ahmad\*, A., Barriga, B.K., Svendsen, S., Salim, A., Garcia, L., Garcia, V.J., **Ho, R.**, Yucer, N., Qian, T., et al. (2017). Modeling Psychomotor Retardation using iPSCs from MCT8-Deficient Patients Indicates a Prominent Role for the Blood-Brain Barrier. *Cell Stem Cell* 20, 831-843.e5. PMID: 28526555

**Ho, R.**, Sances, S., Gowing, G., Amoroso, M.W., O'Rourke, J.G., Sahabian, A., Wichterle, H., Baloh, R.H., Sareen, D., and Svendsen, C.N. (2016). ALS disrupts spinal motor neuron maturation and aging pathways within gene co-expression networks. *Nat. Neurosci.* 19, 1256–1267. PMID: 27428653

O'Rourke, J.G., Bogdanik, L., Yáñez, A., Lall, D., Wolf, A.J., Muhammad, A.K.M.G., **Ho, R.**, Carmona, S., Vit, J.P., Zarrow, J., et al. (2016). C9orf72 is required for proper macrophage and microglial function in mice. *Science* 351, 1324–1329. PMID: 26989253

O'Rourke, J.G., Bogdanik, L., Muhammad, A.K.M.G., Gendron, T.F., Kim, K.J., Austin, A., Cady, J., Liu, E.Y., Zarrow, J., Grant, S., **Ho, R.**, et al. (2015). C9orf72 BAC Transgenic Mice Display Typical Pathologic Features of ALS/FTD. *Neuron* 88, 892–901. PMID: 26637796

Pasque, V.\*, Tchieu, J.\*, Karnik, R., Uyeda, M., Sadhu Dimashkie, A., Case, D., Papp, B., Bonora, G., Patel, S., **Ho, R.**, et al. (2014). X chromosome reactivation dynamics reveal stages of reprogramming to pluripotency. *Cell* 159, 1681–1697. PMID: 25525883

**Ho, R.\***, Papp, B.\*, Hoffman, J.A., Merrill, B.J., and Plath, K. (2013). Stage-specific regulation of reprogramming to induced pluripotent stem cells by Wnt signaling and T cell factor proteins. *Cell Rep.* 3, 2113–2126. PMID: 23791530

Deneen, B., **Ho, R.**, Lukaszewicz, A., Hochstim, C.J., Gronostajski, R.M., and Anderson, D.J. (2006). The transcription factor NFIA controls the onset of gliogenesis in the developing spinal cord. *Neuron* 52, 953–968. PMID: 17178400

## Research Papers – In Revision

**Ho, R.#**, Workman, M.J., Mathkar, P., Wu, K., Kim, K.J., O'Rourke, J.G., Kellogg, M., Montel, V., Banelos, M.G., Aladesuyi, O., Diaz-Garcia, S., Oheb, D., Huang, S., Khrebtukova, I., Watson, L., Ravits, J., Taylor, K., Baloh, R.H., Svendsen, C.N.# (2020) Single-cell RNA-seq analysis of human iPSC-derived motor neurons resolves early and predictive ALS signatures. *Cell Syst.*; preprint: bioRxiv. 2020 Apr 27; doi: <https://doi.org/10.1101/2020.04.27.064584>

## Reviews

Sances, S., Bruijn, L.I.\*, Chandran, S.\*, Eggen, K.\*, **Ho, R.\***, Klim, J.R. \*, Livesey, M.R.\*, Lowry, E.\*, Macklis, J.D.\*, Rushton, D.\*, et al. (2016). Modeling ALS with motor neurons derived from human induced pluripotent stem cells. *Nat. Neurosci.* 19, 542–553. PMID: 27021939

**Ho, R.\***, Chronis, C.\*, and Plath, K. (2011). Mechanistic insights into reprogramming to induced pluripotency. *J. Cell. Physiol.* 226, 868–878. PMID: 20945378

## Editorials

Keenan, A.B., Jenkins, S.L., Jagodnik, K.M., Koplev, S., He, E., Torre, D., Wang, Z., Dohlman, A.B., Silverstein, M.C., Lachmann, A., et al. (2018). The Library of Integrated Network-Based Cellular Signatures NIH Program: System-Level Cataloging of Human Cells Response to Perturbations. *Cell Syst.* 6, 13–24. PMID: 29199020

\* co-first authorship

# co-corresponding authorship

## INVITED LECTURES AND PRESENTATIONS:

- 02/2020 Integrated Center for Neural Repair Seminar, UCLA, Los Angeles, CA  
“Mapping the Intersection of Aging and Amyotrophic Lateral Sclerosis in Human iPSC and Mouse Models”
- 06/2019 University of Alabama at Birmingham School of Medicine, Birmingham, AL  
“Mapping the Intersection of Aging and Late-Onset Diseases in Human iPSC Models”
- 06/2019 Institute for Quantitative Health Science and Engineering, Michigan State University, East Lansing, MI  
“Mapping the Intersection of Aging and Late-Onset Diseases in Human iPSC Models”
- 05/2019 Center for Neurodegenerative Disease and Therapeutics, Rosalind Franklin University, North Chicago, IL  
“Mapping the Intersection of Aging and Late-Onset Diseases in Human iPSC Models”
- 05/2019 Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong  
“Mapping the Intersection of Aging and Late-Onset Diseases in Human iPSC Models”
- 04/2019 Center for Health Sciences, Oklahoma State University, Tulsa, OK  
“Mapping the Intersection of Aging and Late-Onset Diseases in Human iPSC Models”
- 04/2019 School of Medicine and Health Sciences, George Washington University, Washington D.C. “Mapping the Intersection of Aging and Late-Onset Diseases in Human iPSC Models”
- 10/2017 Chan Zuckerberg Initiative-New York Stem Cell Foundation Workshop: iPSC-Derived Cellular Models for Human Biology and Disease, New York, NY  
“Development of Organ-Chip system to model human ALS and Parkinson’s disease”
- 07/2017 Gordon Research Seminars: Biology of Aging, Les Diablerets, CHE  
“Mechanistic Insights into Aging and ALS Pathology Using Orthologous Transcriptomic Analysis in Mice”
- 06/2017 Bio-Rad Droplet Digital Technology Symposium, San Diego, CA  
“Single-Cell RNA Seq Reveals iPSC-Derived Neural Subtype Specific Models of Amyotrophic Lateral Sclerosis”
- 01/2017 Illumina Single-Cell Sequencing Symposia, San Diego, CA  
“Single cell RNA-sequencing reveals expression kinetics and populations of iPSC-derived motor neuron

## ALS models”

- 08/2016 The Stem Cell Podcast  
“Modeling ALS with Stem Cells”
- 03/2011 Bridges to Stem Cells Graduate School Workshop, Pasadena City College, Pasadena, CA  
“Stage-specific regulation of reprogramming to induced pluripotent stem cells by Wnt signaling and T cell factor proteins”

### **POSTER PRESENTATIONS:**

**Ho, R.,** Workman, Mathkar, P., Wu, K., Kim, K.J., O’Rourke, J.G., M., Kellogg, M., Montel, V., Banuelos, M.G., Oheb, D., Avalos, P., Roxas, K., Lee, W., Huang, S., Khrebtukova, I., Watson, L., Taylor, K., Baloh, R.H., Svendsen, C.N. (2020) Single-cell resolved human iPSC models reveal early and predictive ALS signatures. 10<sup>th</sup> Annual California ALS Research Summit, Los Angeles, CA

**Ho, R.,** Mathkar, P., Oheb, D., Elder, R., Workman, M., Svendsen, C.N. (2019) Resolving the intersection among spinal motor neuron aging and amyotrophic lateral sclerosis in the SOD1G93A mouse model using single nuclei RNA-seq. Neuroscience 2019, Chicago, IL

**Ho, R.,** Workman, M., Kellogg, M., Montel, V., Mathkar, P., Oheb, D., Banuelos, M.G., Huang, S., West, D., Khrebtukova, I., Watson, L., Taylor, K., Svendsen, C.N. (2019) Single-cell reconstruction of human hindbrain and spinal cord in iPSC models of ALS reveals cell type-specific transcriptional signatures of disease. International Society of Stem Cell Research, Los Angeles, CA

**Ho, R.,** Workman, M., Kellogg, M., Montel, V., Mathkar, P., Oheb, D., Banuelos, M.G., Huang, S., West, D., Khrebtukova, I., Watson, L., Taylor, K., Svendsen, C.N. (2018) Anatomical reconstruction of disrupted transcriptional signatures in iPSC models of ALS using single cell RNA-seq. California ALS Research Summit, Palo Alto, CA

**Ho, R.,** Workman, M., Kellogg, M., Montel, V., Banuelos, M.G., Huang, S., West, D., Khrebtukova, I., Mandefro, B., Watson, L., Taylor, K., Svendsen, C.N. (2018). Spatial reconstruction of the spinal cord from iPSC models of ALS with single cell RNA-seq. Neuroscience 2018, San Diego, CA

**Ho, R.,** Tom, C., Mathkar, P., Lim, R., Geater, C., Allen, N., Kemp, P., Thompson, L., Svendsen, C.N., Mattis, V. (2017) Transcriptional comparisons of iPSC-derived striatal cell models delineate gene network interactions among physical time in culture, cellular maturation, age, and Huntington’s disease. Gordon Research Conferences: Biology of Aging, Les Diablerets, CHE

**Ho, R.,** Sances, S., Gowing, G., Amoroso, M.W., O’Rourke, J.G., Sahabian, A., Wichterle, H., Baloh, R.H., Sareen, D., and Svendsen, C.N. (2016). ALS disrupts spinal motor neuron maturation and aging pathways within gene co-expression networks. Cell Symposia: 10 years of iPSCs, Berkeley, CA

**Ho, R.,** Sances, S., Gowing, G., Amoroso, M.W., O’Rourke, J.G., Sahabian, A., Wichterle, H., Baloh, R.H., Sareen, D., and Svendsen, C.N. (2015). ALS disrupts spinal motor neuron maturation and aging pathways within gene co-expression networks. Motor Neurone Disease, Orlando, FL

**Ho, R.,** Sances, S., Gowing, G., Amoroso, M.W., O’Rourke, J.G., Sahabian, A., Wichterle, H., Baloh, R.H., Sareen, D., and Svendsen, C.N. (2015). ALS disrupts spinal motor neuron maturation and aging pathways within gene co-expression networks. Neuroscience 2015, Chicago, IL

**Ho, R.\***, Wang, J.\*, Chronis, C., Sahakyan, A., Denholtz, M., Heath, J., Plath, K. (2013) Single cell cytokine secretion profiling reveals heterogeneous subpopulations coordinating human pluripotent stem cell colony growth. Cell Symposia: Using Stem Cells to Model and Treat Human Disease, Los Angeles, CA

**Ho, R. \***, Papp, B.\*, Hoffman, J.A., Merrill, B.J., and Plath, K. (2012). Stage-specific regulation of reprogramming to induced pluripotent stem cells by Wnt signaling and T cell factor proteins. Gordon Research Conferences: Reprogramming Cell Fate, Galveston, TX

**Ho, R. \***, Papp, B.\*, Hoffman, J.A., Merrill, B.J., and Plath, K. (2011). Stage-specific regulation of reprogramming to induced pluripotent stem cells by Wnt signaling and T cell factor proteins. World Stem Cell Summit, Pasadena, CA

\* equal contribution

### **PROFESSIONAL ACTIVITIES:**

#### **Professional Associations/Society Memberships:**

05/2015 – Present      Society for Neuroscience  
10/2019 – Present      International Society for Stem Cell Research

#### **Editorial Services (ad hoc reviewer):**

*Cell, Cell Reports, Cell Stem Cell, Genes and Development, The Journal of Neuroscience, Nature\**, *Nature Communications, Nature Reviews Drug Discovery, Nature Reviews Genetics, Science, PLOS One\**

\* invited

### **TEACHING ACTIVITIES:**

03/2019 – Present      Lecturer, Human Genetics and Genomics, Cedars-Sinai Medical Center  
   “Single Cell Omics”  
09/2015 – 2017      Coordinator, Epigenomics Journal Club, Cedars-Sinai Medical Center  
10/2014                      Lecturer, Methods in Cell and Molecular Biology, Cedars-Sinai Medical Center  
   “Viral/nonviral gene delivery & expression systems”  
2010                          Teaching Assistant, Molecular Cell Developmental Biology 144: Molecular Biology, UCLA  
2008                          Teaching Assistant, Molecular Cell Developmental Biology 60: Biomedical Ethics, UCLA

### **MENTORSHIP:**

2020 – Present      Thomas Mota, Ph.D. Student, Cedars-Sinai Medical Center  
2020 – Present      Michael Ramos Edison, Ph.D. Student, Cedars-Sinai Medical Center  
2019 – 2020      Renia Pilikian, Research Bioinformatician I  
2019 – Present      Wonhee Lee, Research Associate I; applying to medical schools  
2018 – 2020      Pranav Mathkar, Research Associate II; currently Ph.D. student at University of Vermont  
2017 – 2019      Daniel Oheb, Research Associate I; currently M.D. student at University of Arizona  
2017                          Colin Koziol, Ph.D. Student, Cedars-Sinai Medical Center  
2017                          Andy Chung, Research Intern; applying to M.D., Ph.D. programs  
2017                          Michael Workman, Ph.D. student; currently Postdoctoral Scientist, Cedars-Sinai Medical Center  
2016 – 2017      Jonathan Challacomb, CIRM Bridges Intern; currently Sales Specialist at MilliporeSigma  
2016 – 2017      Marlesa Godoy, Research Associate I; currently Ph.D. student, UCLA  
2016                          Jackson Stogel, Research Intern; currently undergraduate student at UC Berkeley  
2015 – 2017      Deborah Elyahoozadeh, Research Intern; currently nursing student at UC San Diego  
2015                          Victoria Dardov, Ph.D. Student; currently HHMI postdoctoral associate at St. Jude Children's Research Hospital