Daniel E. Cortes-Perez M.D., PhD., M.S.

Associate Research Scientist
The Jackson Laboratory
Main street, Bar Harbor, ME 04609
Cell: 207 6692981 Email: dan.cortes@jax.org
LinkedIn: https://www.linkedin.com/in/daniel-cortes-70237bb6 Twitter: edcortes22
Webpage: https://www.jax.org/people/daniel-cortes-perez

I have chosen to dedicate my career to the pursuit of exploration and innovation in the field of stem cell biology and neurosciences, for the betterment of human health; my years of molecular and cellular biology research with clinical underpinnings offer a unique experiential platform for therapeutical and translational discoveries.

EDUCATION

Universidad Nacional Autónoma de México, México City, México.

- **Ph.D.**, Biochemistry, February, 2017
  - *Summa cum laude*
  - Dissertation: “Transgenic expression of Glial cell-line Derived Neurotrophic Factor promotes neuronal differentiation of embryonic stem cells”
  - Committee: Principal, Dr. Iván Velasco Velázquez
    Dr. Lourdes Massieu Trigo, Dr. Susana Castro Obregón
- **Master of Science**, Biological Sciences Program, October 2008
  - Thesis: “Ischemia-reperfusion-induced hyperglycemia is stimulated by inosine through hepatic A3 adenosine receptor”
  - Advisor: Dr. Enrique Piña Garza

Universidad Nacional Autónoma de México, **School of Medicine** México City, México

- **Medical Doctor**, June 2007
  - Licensed in Mexico
  - GPA: 3.68/4.0

RESEARCH EXPERIENCE

The Jackson Laboratory, Bar Harbor, ME, USA

Pera Lab

- Associate Research Scientist, November 2022 – present
- Postdoctoral Associate, 2017 – 2022

- Project Title: An in vitro neurogenetics platform for precision disease modeling in the mouse
  - Development of a single novel protocol for the differentiation of genetically diverse mouse stem cells and human pluripotent stem cells (PSCs) that can be used in both species
  - Use new protocol to generate an in vitro pipeline to study neurogenetics in vitro
- Project Title: Genetic strategies to increase resilience after stroke
  - Using genetically diverse mouse and human PSCs, harness transcriptomic and phenotypic differences to find genetic drivers of resilience and improve the outcome of an in vitro stroke in cerebral organoids
- Project Title: Regenerative capacity of pluripotent stem cell-derived retinal pigment epithelium
  - Development of an efficient retinal pigmental epithelium differentiation protocol for genetically diverse PSC and transdifferentiation into photoreceptors

Cellular Physiology Institute (Instituto de Fisiología Celular), UNAM, Mexico City, Mexico

Velasco Lab

- Research Assistant, 2014 – 2017
  - Lab manager
- Ph.D. Candidate, 2010 – 2017
  - Project Title: Effect of glial cell-derived neurotrophic factor (GDNF) during spinal motor neuron development
    - Elucidate the effects of GDNF during early the development of the spinal motor neurons using mouse embryonic stem cells (mESC)
  - Project Title: Transplantation of GDNF-secreting, PSC-derived dopaminergic neurons into parkinsonian rats
    - To increase the survival of transplanted PSC-derived dopaminergic neurons by generating a transgenic constitutive GDNF-secreting PSC with the final goal of increasing behavioral recovery in parkinsonian rats
- M.S. Candidate, 2007 – 2008
- Project Title: Activation of A3 adenosine receptor by Inosine promotes hyperglycemia in a rat model of ischemia-reperfusion
  - To study the role that inosine has in homeostasis during an ischemia/reperfusion event in the liver and isolated hepatocytes of wistar rats.

CLINCIAL EXPERIENCE

General Practitioner

Hospital Médica Nápoles, 2007 – 2008.

SKILLS AND TECHNIQUES

Wet Lab Skills:

- Cell culture
  - Mouse and human stem cell culture, stem cell reprograming, neural/neuronal differentiation, cerebral organoid formation, muscle, osteocyte and adipocyte differentiation, culture of different type of cell lines (HEK293, mouse fibroblasts, feeder cells, C2C12, mouse embryonic stem cells, human pluripotent stem cells), microfluidic cultures, harvest and expansion of mouse embryonic fibroblast, harvest and expansion of midbrain and cortical embryonic rodent neurons
- Molecular biology
  - Transfection, transduction, transformation, generation of competent bacteria, lentiviral production, cloning, plasmid construction, PCR, real time PCR, TaqMan probes, DNA/RNA/plasmid extraction, CRISPR/Cas9 systems, primer design, western blotting, protein extraction
- Imaging
  - Immunostaining, tissue clearing, epifluorescent and confocal microscopy, high-throughput microscopy, Imaris, Cell profiler, Harmony
- Surgery
  - Stereotaxic surgery
  - Cellular transplantation
- Neurosciences
  - Electrophysiology, local field potential, multielectrode array

Dry Lab Skills:

- Statistics
  - ANOVA, Bayesian methods, linear models
  - RNA-sequencing analysis, regulatory network analysis, isoform switch analysis
- Scientific Applications
  - R and R studio, HPC
- Writing and communications
  - Technical and non-technical

PUBLICATIONS

1. *In preparation:* **Daniel Cortes**, Kevin Charland, Arojit Mitra, Laura Reinholdt, Martin F. Pera. A universal protocol for differentiation of neurons and cerebral organoids from genetically diverse mouse and human pluripotent stem cells.
2. **Daniel E. Cortes**, Mélanie Escudero, Arojit Mitra, Austin C. Korgan, Alyssa Edwards, Kristen M.S. O'Connell, Laura G. Reinholdt, Martin F. Pera. *An in vitro neurogenetics platform for precision disease modeling in the mouse*. doi: https://doi.org/10.1101/2022.01.21.477242. Biorxiv
3. Rolando Lara-Rodarte, **Daniel Cortés**, Karla Soriano, Francia Carmona, Luisa Rocha, Enrique Estudillo, Adolfo López-Ornelas and Iván Velasco. *Mouse Embryonic Stem Cells Expressing GDNF Show Enhanced Dopaminergic Differentiation and Promote Behavioral Recovery After Grafting in Parkinsonian Rats.* Front Cell Dev Biol2021 Jun 22;9:661656. doi: 10.3389/fcell.2021.661656. eCollection 2021.
4. **Daniel Cortes** & Martin F. Pera. *The genetic basis of inter-individual variation in recovery from traumatic brain injury*. npj Regenerative Medicine volume 6, Article number: 5 (2021). 10.1038/s41536-020-00114-y NPJREGENMED-00376
5. Andrea Tenorio-Mina, **Daniel Cortés,** Joel Esquivel-Estudillo, Adolfo López-Ornelas, Alejandro Cabrera-Wrooman, Rolando Lara-Rodarte, Itzel Escobedo-Avila, Fernanda Vargas-Romero, Diana Toledo-Hernández, Enrique Estudillo, Juan José Acevedo-Fernández, Jesús Santa-Olalla Tapia, Iván Velasco. *Human Keratinocytes Adopt Neuronal Fates After In Utero Transplantation in the Developing Rat Brain*. Cell Transplantation. Jan-Dec 2021;30:963689720978219. doi: 10.1177/0963689720978219
6. Vargas-Romero, González-Barrios, Guerra-Calderas, Escobedo-Avila, **Cortés-Pérez**, López-Ornelas, Rocha, Soto-Reyes, Velasco. *Histamine Modulates Midbrain Dopamine Neuron Differentiation Through the Regulation of Epigenetic Marks.* Front Cell Neurosci. 2019 May 21;13:215. doi: 10.3389/fncel.2019.00215.
7. Castillo-Bautista CM, Torres-Tapia LW, Rangel-Méndez JA, Peraza-Sánchez SR, **Cortés D**, Velasco I, Moo-Puc RE (2019). *Neuroprotective effect of Mayan medicinal plant extracts against glutamate-induced toxicity.* J Nat Med. 2019 Feb 16. doi: 10.1007/s11418-019-01284-w. [Epub ahead of print]
8. **Cortes D,** Carballo-Molina O, Castellanos-Montiel MJ, Velasco I. (2017). *The Non-Survival Effects of Glial Cell Line-Derived Neurotrophic Factor on Neural Cells. Front Mol Neurosci*. 2017 Aug 22;10:258. doi: 10.3389/fnmol.2017.00258
9. **Cortés D**, Robledo-Arratia Y, Hernández-Martínez R, Escobedo-Ávila I, Bargas J, Velasco I. (2016*). Transgenic GDNF Positively Influences Proliferation, Differentiation, Maturation and Survival of Motor Neurons Produced from Mouse Embryonic Stem Cells*. Front Cell Neurosci. Sep 12;10:217. doi: 10.3389/fncel.2016.00217.
10. Escobedo-Avila I, Vargas-Romero F, Molina-Hernández A, López-González R, **Cortés D**, De Carlos JA, Velasco. (2014). *Histamine impairs midbrain dopaminergic development in vivo by activating histamine type 1 receptors*. Mol Brain. Aug 12;7(1):58. doi: 10.1186/s13041-014-0058-x.

11. **Cortés D**, Guinzberg R, Villalobos-Molina R, Piña E. (2009). *Evidence that endogenous inosine and adenosine-mediated hyperglycaemia during ischaemia-reperfusion through A3 adenosine receptors.* Auton Autacoid Pharmacol. Oct;29(4):157-64. doi: 10.1111/j.1474-8665.2009.00443.x.
12. Guinzberg R, **Cortés D**, Díaz-Cruz A, Riveros-Rosas H, Villalobos-Molina R, Piña E. (2006) *Inosine released after hypoxia activates hepatic glucose liberation through A3 adenosine receptors*. Am J Physiol Endocrinol Metab. 2006 May;290(5): E940-51.

FELLOWSHIPS AND AWARDS

Grants:

- JAX Scholar Award, The Jackson Laboratory, 2019

Fellowships:

- Ph.D. fellowship, National Council for Science and Technology, 2009 – 2014
- IBRO, travel grant for international congress, Rio de Janeiro, 2015
- Master of Science fellowship, National Council for Science and Technology, 2006 – 2007
- Research Assistant fellowship, Researcher's national system, 2002 – 2005

Awards:

- Gustavo Baz Prada Social Service Award, UNAM Medical School, 2007
    - For exceptional work during social service in medical school
- Scientific Photography Honorific Award, UNAM, 2015

CONSULTING EXPERIENCE

Samuel Beck Lab, Mount Desert Island Biological Laboratory, 2018

- Establishment of pluripotent stem cell (PSC), osteoblast, chondrocyte and adipocyte differentiation

Malavika Raman Lab, Tufts University, 2019

- Generated protocols and trained personnel for spinal motor neuron differentiation from PSC

Rick Meisner, Genetic Engineering, The Jackson Laboratory, 2020

- Protocol consultation and training of personnel for cortical neuron differentiation from PSC

Justin McDonough, Cellular Engineering, The Jackson Laboratory, 2021

- Protocol consultation and training of personnel for cortical neuron differentiation from PSC

Laura Reinholdt Lab, The Jackson Laboratory, 2022 – 2023
- Protocol consultation and training of personnel for neural precursor cell differentiation from mouse PSC

Catherine Kaczorowski Lab, University of Michigan, 2022 – 2023
- Generated protocols and trained personnel for neuronal differentiation and cerebral organoid formation from PSC

TEACHING AND LEADERSHIP

- Assistant Teacher, Biochemistry and Molecular Biology, UNAM Medical School
    - 2002 – 2003, 2006 – 2007
- Assistant Teacher, Physiology, UNAM Medical School, 2010 – 2011
- Assistant Scientist, Laboratory Manager, Velasco Lab, Cellular Physiology Institute (Instituto de Fisiologia Celular), UNAM, 2014 – 2017

CONGRESS AND SYMPOSIUM PRESENTATIONS

Posters:

- **Cortes D,** Charland K, Pera M. Cerebral organoids reveal genetic differences associated with resilience in an in vitro stroke model. ISSCR conference, Jun 14-17, 2023, Boston, MA.
- **Cortes D,** Charland K, Pera M. Cerebral organoids reveal genetic differences associated with resilience in an in vitro stroke model. Society for Neuroscience conference 2022, Nov 12-15, San Diego, California.
- **Cortes-perez, Daniel.** Mélanie Escudero, Arojit Mitra, Austin C. Korgan, Alyssa Edwards, Kristen M.S. O'Connell, Laura G. Reinholdt,Pera, Martin. An in vitro neurogenetics platform for precision disease modeling in the mouse. ISSCR conference 2022, San Francisco, California.
- **Cortes-perez, Daniel.** Mélanie Escudero, Arojit Mitra, Austin C. Korgan, Alyssa Edwards, Kristen M.S. O'Connell, Laura G. Reinholdt,Pera, Martin. An in vitro model to study the association of genetic diversity and neurological conditions reveals novel genes in Dyrk1a-related disorders and axonal injury linked to susceptibility and resilience. SfN conference 2021, Virtual, 2020.
- **Cortes-perez, Daniel.** Mélanie Escudero, Arojit Mitra, Austin C. Korgan, Alyssa Edwards, Kristen M.S. O'Connell, Laura G. Reinholdt, Pera, Martin EFFECT OF GENETIC BACKGROUND ON OUTCOME IN A STROKE MODEL USING MOUSE

EMBRYONIC STEM CELL-DERIVED CORTICAL NEURONS. ISSCR conference 2020, Boston, MS, USA, 2020.

- **Daniel Cortes,** Kevin Hayes, Arojit Mitra, Laura Reinholdt, Martin Pera. Modeling the impact of genetic background on neurodevelopmental mutations using mouse and human PSC. ISSCR conference 2019, Los Angeles, CA, USA.
- **Dan Cortes,** Kevin Hayes, Martin Pera. Genetic background interacts with DYRK1a signaling disruption during neural commitment on pluripotent stem cells. Bar Harbor, ME. USA. May, 2019.
- **Daniel Cortes,** Chien-Yu Tung, Martin Pera. NOVEL PROTOCOL FOR DIFFERENTIATION OF COLLABORATIVE CROSS FOUNDER EMBRYONIC STEM CELLS INTO CORTICAL NEURONS. JAX-GM, Connecticut, USA. May, 2018. Poster
- **Cortés, D.** Robledo, Y. Escobedo, I. Hernández, R. Bargas, J. Velasco, I. GLIAL-DERIVED NEUROTROPHIC FACTOR (GDNF) PROPERTIES DURING PROLIFERATION, DIFFERENTIATION, MATURATION AND SURVIVAL OF DOPAMINERGIC AND MOTOR NEURONS DIFFERENTIATED FROM MOUSE EMBRYONIC STEM CELLS. International brain research organization, 9^{th} international congress. Rio de Janeiro, Brazil. July 7-11, 2015. Poster
- **Cortés, D**, Velasco I. Transgenic expression of Glial-cell derived neurotrophic factor (GDNF) promotes differentiation and survival of mouse embryonic stem cell-derived dopaminergic neurons. International society for stem cell research.11th International annual meeting. June 12-15, 2013, Boston, MA. USA. Poster
- **Cortés D**, Guinzberg R, Piña E. Ischemia-reperfusion stress produced inosine-mediated hyperglycemia through A3 adenosine receptor. Purines 2008, Copenhaguen, Denmark, June 29th – July, 2nd 2008. Poster
- **Cortés, D.** Robledo, Y. Escobedo, I. Hernández, R. Bargas, J. Velasco, I. TRANSGENIC GDNF POSITIVELY AFFECTS PROLIFERATION, DIFFERENTIATION, MATURATION AND SURVIVAL OF DOPAMINE AND MOTOR NEURONS PRODUCED FROM MOUSE ES CELLS. Third congress of stem cells and regenerative medicine. Sociedad mexicana para la investigación en células troncales. México, D.F. November 2015. Oral presentation and Poster
- **Cortés, D.** Robledo, Y. Escobedo, I. Hernández, R. Bargas, J. Velasco, I. Glial-derived neurotrophic factor (GDNF) favors differentiation of mouse embryonic stem cells to motor neurons. XXX congress of the national society for biochemistry. Sociedad Mexicana de Bioquímica. November 2014. Guadalajara, Jalisco, Mex. Poster.
- **Cortés, D**, Velasco, I. Transgenic expression of Glial cell line-Derived Neurotrophic factor promotes differentiation and survival of ESC-derived dopaminergic neurons. First national congress of stem cell and regenerative medicine. México DF. September 2013.
- **Cortés, D**, Velasco, I. Effect of GDNF transgenic expression over ESC differentiation towards dopaminergic neurons. X Congress of the national society for developmental biology. Sociedad Mexicana de Biología del Desarrollo A.C. San Miguel Regla, México. October, 2011.

- **Cortés D**, Guinzberg R, Piña E. Hormonal role of inosine through A3 adenosine receptor released after ischemia/reperfusion within skeletal muscle. Regulation of hepatic metabolism. XXVI congress of the national society for biochemistry. Sociedad Mexicana de Bioquímica. November 2006. Guanajuato, Gto, México.
- **Cortés D**, Guinzberg R. Inosine binds specifically to A3 adenosine receptor. XXV congress of the national society for biochemistry. Sociedad Mexicana de Bioquímica. December 2004. Ixtapa Zihuatanejo, México.
- **Cortés D**, Guinzberg R, Piña E. Participation of inosine receptors in hepatic metabolism regulation. XXIV congress of the national society for biochemistry. Sociedad Mexicana de Bioquímica. November 2002. Pto. Vallarta, Jalisco, México.

Presentations:

- NeuroEDDU Seminar. An in vitro neurogenetics platform for precision modeling of Autism and other neurological disorders. March 30th, 2023. McGill University, Montreal Canada. Invited speaker.
- Maine Science Festival 2023. 5-minute genius. Bangor, Maine. March 24th, 2023. Invited speaker.
- **Cortes-perez, Daniel.** Pera, Martin. Stem cell-derived neurons reveal genetic differences associated with resilience in a stroke model. JAX symposium, Portland Maine, May 2022. Oral presentation
- **Cortes D**, Velasco I. Learning from Nature: Comparative Biology of Tissue Regeneration and Aging. MDIBL Bar Harbor 2017, Aug 4-6. Oral presentation.

COURSES

- Single Cell RNA-Seq Carpentry, The Jackson Laboratory, 2022
- R Statistics, The Jackson Laboratory, 2019
- R for Beginners, The Jackson Laboratory, 2019
- Stem Cell Research Training Course 2009. Generation of induced-Pluripotent Stem Cells (iPS) from skin fibroblasts. Differentiation of iPS cells into motoneurons. Partners of Harvard Medical School/Harvard Stem Cell Institute/Universidad Nacional de Cordoba. Cordoba, Argentina. August 21st-29th, 2009

CITATIONS

ARTICLE	Google Scholar 11/16/23
Mouse Embryonic Stem Cells Expressing GDNF Show Enhanced Dopaminergic Differentiation and Promote Behavioral Recovery After Grafting in Parkinsonian Rats	4
Human Keratinocytes Adopt Neuronal Fates After In Utero Transplantation in the Developing Rat Brain	1

The genetic basis of inter-individual variation in recovery from traumatic brain injury	24
Histamine Modulates Midbrain Dopamine Neuron Differentiation Through the Regulation of Epigenetic Marks	4
Neuroprotective effect of Mayan medicinal plant extracts against glutamate-induced toxicity	5
The non-survival effects of glial cell line-derived neurotrophic factor on neural cells	48
Transgenic GDNF positively influences proliferation, differentiation, maturation and survival of motor neurons produced from mouse embryonic stem cells	16
Histamine impairs midbrain dopaminergic development in vivo by activating histamine type 1 receptors	19
Evidence that endogenous inosine and adenosine-mediated hyperglycaemia during ischaemia--reperfusion through A3 adenosine receptors	20
Inosine released after hypoxia activates hepatic glucose liberation through A3 adenosine receptor	62

MAGAZINE OR BOOK COMMUNICATIONS

Book chapters:

- Oxford Textbook of Traumatic Brain Injury. Chapter “Genetics and TBI”. Dan Cortes and Martin Pera. Oxford University Press. In press
- “Stem Cells” Biology and Biomedical Applications” “Células Troncales: Biología y Aplicaciones en Biomedicina”, Antonieta Chávez-González, Jesús Chimal-Monroy, Eugenia Flores-Figueroa y Mónica Lamas, Editores. Co-publicado por la UNAM y la editorial Porrúa-Grañen. Capítulo 3. Células troncales embrionarias. Verónica Ramos Mejía, Iván Velasco, **Daniel Cortés**. 2017.

Magazine chapter:

- Iván Velasco, Itzel Escobedo-Avila, **Daniel Cortés**, Oscar Carballo-Molina. Diferenciación neuronal de células troncales. Revista de la Facultad de Medicina, UNAM, Mensaje Bioquímico. Volumen XXXIX, ISSN 0188-137X, 2015

APPEARANCE IN MEDIA

- Maine Science Podcast interview, July 2023

    - Link to episode: https://maine-science-podcast.simplecast.com/episodes/dan-cortes-genetics
- “Myths and realities about stem cells” TV Report, “diálogos en confianza” de Canal Once del IPN en el programa “mitos y realidades de las células madre” December 2016

REVIEWERSHIP

- Reviewer for eLife, 2020 – 2024
- Reviewer for Biomacromolecules, 2021

MENTORSHIP AND OUTREACH

Advisor:

- María José Castellanos, Bachelor of Science, UNAM, Mexico, 2016 – 2017
- Cristina Castillo, Master of Science, UNAM, Mexico, 2016
- Melanie Escudero, Master of Science, The Jackson Laboratory, USA, 2018

Mentor:

- Kevin Hayes, Postbaccalaureate, The Jackson Laboratory, 2018 – 2019
- Alyssa Edwards, Summer Student, The Jackson Laboratory, 2019
- Alain Zhang, Academic Year Intern, The Jackson Laboratory, 2019
- Nicole da Costa, Summer Student, The Jackson Laboratory, 2021
- Kevin Charland, Rotational PhD student, Tuffs University 2022
- Elise MacDonald, Summer Student, The Jackson Laboratory, 2022
- Sig Reinholdt, Academic Year Intern, The Jackson Laboratory, 2023
- Pilar Saavedra-Weiss, Summer Student, The Jackson Laboratory, 2023

Committees:

- Housing Committee, The Jackson Laboratory, 2019 – 2020
- Diversity, Equity, and Inclusion committee, The Jackson Laboratory, 2020 – 2021
- Jackson Laboratory Scientific Symposium organizing committee, 2019 – 2021

Outreach:

- Jackson Laboratory Open House for Maine students, 2018 – 2020
    - Presentation and workshop on stem cells
- Maine State Science Fair Judge, March 2019
- SACNAS Virtual Conference Mentor-Judge, 2020
- Language translation of Jackson Laboratory online minicourses (English to Spanish), 2021

LANGUAGES

Spanish

- Native speaker

English

- Fluent
- Highly developed with technical writing

HOBBIES AND INTERESTS

- Running
  - Road and trail
  - Marathons, Ultramarathons
- Cycling
  - Road, mountain, gravel
  - Sponsored by Raramuri, 2015 – 2016
- Meditation

REFERENCES

Ivan Velasco, Ph.D.

Professor, UNAM

Office: +52 55 56225649

ivelasco@ifc.unam.mx

Martin Pera, Ph.D.

Professor, The Jackson Laboratory

Office: +1 207-288-6000

martin.pera@jax.org

Catherine Kaczorowski, Ph.D.

Professor, Michigan Neuroscience Institute

kaczoro@med.umich.edu