

Charles Albert Hoeffler

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EDUCATION

Year	Degree	Field	Institution
1995	B.S.	Molecular and Cellular Biology w/ Honors, summa cum laude	University of Arizona, Tucson, AZ
2004	Ph.D.	Molecular and Cellular Biology	University of Arizona, Tucson, AZ

POSTDOCTORAL TRAINING

Year	Mentor or Director	Place of Training
2004-2006	Dr. Eric Klann	Baylor College of Medicine, Houston, TX
2006-2009	Dr. Eric Klann	New York University, New York, NY

ACADEMIC APPOINTMENTS

Year	Academic Title	Institution
2013-present	Assistant Professor	University of Colorado, Boulder
2013 (Aug)-present	Adjunct Asst. Professor	New York University School of Medicine, New York, NY
2010-2013 (Aug)	Assistant Professor	New York University School of Medicine, New York, NY
2010-2013	Director	NYU School of Medicine Rodent Behavior Core
2011-present	Adjunct Faculty	Center for Neural Science, New York University

AWARDS AND FELLOWSHIPS

Year	Name of Award
1991	American Legion Scholar
1991	President's Award for Excellence
1992	National Hispanic Scholarship Fund Finalist
1993	Goldwater Scholar Finalist
1994	Biomedical Research Abroad Vistas Open Fellow
1994	NIH Research Training Grant for Minorities, Fellowship Finalist
1996	National Science Foundation Minority Pre-Doctoral Fellowship
2009	ISN Biennial Meeting Young Investigator Presenter Travel Award
2012	Minority New Investigator Award, Alzheimer's Association
2012	Whitehead Fellowship for Junior Faculty
2013	Blas Frangione Young Investigator Merit Award
2014	Essel Investigator Award, Brain & Behavior Research Foundation
2014	Carl Storm Underrepresented Minority Travel Award, Gordon Research Conference Neurobiology of Aging
2019	BRF Fay Frank Seed Grant CU application finalist

TEACHING EXPERIENCE AND TRAINING

Year	Name of Course	Type of Teaching	Contact Hours
NYU			
2005	Topics in Neuroscience (Baylor)	Lecture	
2010	Disorders of the Nervous Disorder	Lecture	

2011	Laboratory in Neural Science I, II	Lecture and Lab
2012	Disorders of the Nervous Disorder	Lecture
2013	The Assembly of Neural Circuits	Lecture

CU

2013	Faculty Teaching Excellence Program, <i>Teaching in a Nutshell, Designing and Grading Assessments and Exam, and In Pursuit of Teaching-Research Synergy</i>	
2014-present	IPHY 4600, Immunology	Lecture
2014	IPHY, 580-097, Independent Study (Undergraduate Research)	
2015	LEAP (Leadership Education for Advancement and Promotion) <i>Introductory Leadership Workshop</i>	
2015-present	IPHY 6010, Neurobiology of Aging and Neurodegeneration	Lecture
2018-2019	ASSETT Faculty Fellow, <i>Integrating and exploring new technologies, teaching methods, and learning experiences in the classroom</i>	
2018-	IPHY 6010, Neuroinflammation and the Nervous System	Lecture
2019-	IPHY 6010-002: Sem-Behavioral Genetics	Lecture/Pro-Sem
2021 (Fall)	IPHY 3060, Cell Physiology (<i>expected</i>)	Lecture/Lab

MENTORING OF GRADUATE STUDENTS, RESIDENTS, POST-DOCTORAL FELLOWS IN RESEARCH

Under my direct supervision:

Name	Position	Time Period	Present Position
Helen Wong	Postdoctoral	2016-2020	Senior Scientist, PTC Therapeutics
Daniel Peterson	Postdoctoral	2016-2018	Asst. Professor (Tenure track), Dept. Psych, Southern Georgia Univ
Josien Levena	Postdoctoral	2011-2017	Principal Investigator, Boulder BIOPath
Cristian Zambrano	Postdoctoral	2014-2015	Post-doc, IPHY CU Boulder
Alanna Mayberry	Graduate Student	2020-present	Ph.D. candidate, IPHY
Mina Griffioen	Graduate Student	2020-present	Ph.D. candidate, IPHY
Andrew Lombardi	Graduate Student	2019-present	Ph.D. candidate, IPHY
Emily Schmitt	Graduate Student	2019-present	Master's candidate, IPHY
Luke Link	Graduate student	2018-2020	Master's degree, IPHY
Ryan Milstead	Graduate student	2015-present	Ph.D. candidate, IPHYx
Helen Wong	Graduate student	2010-2015	Post-doc, IBG CU Boulder
Kelsey Loupy	Graduate student	2016-2018	Chris Lowry, IPHY Ph.D. candidate
Jarryd Butler	Graduate student	2015-2018	Master's degree, IPHY
Carolyn Ardizzone	Graduate student	2014-2016	Master's degree, IPHY, Med Student
Camille Davy	Graduate student	2012-2013	
Sarya Abi-Habib	Graduate student	2011-2012	Pfizer (Master's)
Charlotte Wincott	Graduate student	2012-2014	Senior Medical Science Liaison, Psychiatry at Alkermes
Shiyao Liang	Undergraduate	2019-present	
Jaeson Chin	Undergraduate	2019-present	
Alex Brown	Undergraduate	2019-2020	
Jessica Pafford	Undergraduate (BSI)	2018-2020	Technician, Anschutz Medical School
Hannah Tobias	Undergraduate	2019-Summer	
Anthony Russo	Undergraduate	2019-Summer	UPenn Graduate School
Samantha Stone	Undergraduate	2016-2019	
Emily Schmitt	Undergraduate (BSI)	2017-2019	Master's candidate, IPHY
Shelby Davenport	Undergraduate	2018-2019	
Stephanie Quintana	Undergraduate	2016-2017	Denver University Graduate Program
JoEllen Fresia	Undergraduate (BSI)	2016-2017	
Andrew Wax	Undergraduate (UROP)	2015-2016	Medical School Applicant
Alexander Dobzanski	Undergraduate (UROP)	2015-2016	Medical School, Temple University
Ellie Rhodes	Undergraduate	2015-2016	

Jarryd Butler	Undergraduate	2014-2015	Graduate Student, CU Boulder
Nicholas Giron	Undergraduate	2014-2015	
Mimi Trinh	Undergraduate	2004-2006	Research Scientist, Takeda
Elizabeth Arnold	Undergraduate	2006-2008	Graduate student, UT Southwestern
Neil Majmundar	Undergraduate	2007-2009	Graduate student, NJ School of Med
Areum Kang	Undergraduate	2008-2010	Graduate student, Rutgers
Sydney Wanner	High school STEM student	2019-2020	
Cynthia Lin	High school STEM student	2017-2019	
Jia Seow	High school STEM student	2016 Summer	
Pradan Harihara	High school STEM student	2016 Summer	
Max Sherman	High school STEM student	2015	
Valerio Casalino	High school STEM student	2015	
Nika Sabasteanski	High school student	2012	
Jeanette Chao	High school student	2011	

In advisory or committee function:

Name	Position	Supervisor
Jon Maffie	Graduate student	Bernardo Rudy
Heather Bowling	Graduate student	Moses Chao/Eric Klann
Kara Zang	Graduate student	Niels Ringstad
Ryan McCarthy	Graduate student	Marissa Ehringer
Sonia Bellmesova	Graduate student	Marissa Ehringer
Brian Cadle	Graduate student	Ryan Bachtel
Coral Cabrera	Graduate student	Jerry Stitzel
Hunter Matthews	Graduate student	Jerry Stitzel
Jordan Buck	Graduate student	Jerry Stitzel

SERVICE

MAJOR COMMITTEE ASSIGNMENTS

Year	Name of Committee, Role, Institution
2012	CSHL New Neuroscience Faculty Conference, Junior Faculty Organizer
2014	CU, Integrated Physiology, Welfare Committee
2014	CU, Institute for Behavioral Genetics, Training Committee
2014	CU, IACUC Animal Welfare Committee Ad Hoc Reviewer
2016	CU, Institute for Behavioral Genetics, Diversity and Outreach Committee
2018	CU, Integrated Physiology, TQF Committee
2020	CU, Institute for Behavioral Genetics, CUBS Diversity Initiative Committee

MAJOR REVIEWER ASSIGNMENTS

2012-2013	CDMRP Tuberous Sclerosis Complex Research Program, Scientific Reviewer
2012-present	CDMRP Neurofibromatosis Research Program, Ad-hoc Reviewer
2013-present	NSF ICOB Neuroscience, Study Section Reviewer
2014-present	Biotechnology and Biological Sciences Research Program, UK, Reviewer
2014-present	Alzheimer's Society Research Programme, UK, Reviewer
2014-present	Alzheimer's Association, Young Investigator Grants, Reviewer
2015-present	NSF, Neural Systems, Modulation Panel
2015-present	NSF, Animal Behavior Panel
2016-present	NIH, NOMD study section, Ad hoc reviewer
2017-present	NIH, SYN study section, Ad hoc reviewer
2018-present	Wellcome Trust/DBT India Alliance, Ad hoc reviewer
2019-present	Complex Brain Disorder Study Section, Standing Member

UNIVERSITY OF COLORADO, BOULDER

2015-present Mentor, Summer Mentoring program through CU Science Discovery,
STEM high school research outreach initiative (Dr. Karthryn Penzkover)

2020 CU-Boulder BRF Fay Frank Seed Grant reviewer

BOULDER VALLEY COMMUNITY

2015-present Science Fair Judge Volunteer High Peaks Elementary, BVSD II

MEMBERSHIPS, OFFICES, AND COMMITTEE ASSIGNMENTS IN PROFESSIONAL SOCIETIES

Year	Society
2000-Present	Member, Society for Neuroscience
2005-Present	Member, Molecular and Cellular Cognition Society
2008-Present	Member, American Society for Biochemistry and Molecular Biology
2008-Present	Member, American Society for Biochemistry and Molecular Biology
2010-Present	Member, Society for the Advancement of Chicanos Native Americans in Science
2012-Present (ISTAART)	Member, International Society to Advance Alzheimer's Research and Treatment

EDITORIAL POSITIONS

Editor: *Acta Neuropathologica*

Ad-hoc reviewer: *Journal of Neuroscience, Molecular and Cellular Biology, Journal of Biological Chemistry, Acta Neuropathologica, Behavioral Neuroscience, Neurobiology of Disease, PLoS ONE, PLoS Biology, Biological Psychiatry, Translational Psychiatry, Molecular Psychiatry, Human Molecular Genetics, Nature Medicine, Science, Neuroreports, BMC Biology, Frontiers in Neuroscience, European Journal of Neuroscience*

MAJOR RESEARCH INTERESTS

Protein synthesis regulation and memory
Protein synthesis regulation and synaptic plasticity
Neurodevelopmental disorders
Neurodegenerative disorders
Drug addiction and Astrogliosis

MAJOR PRESENTATIONS

Talk (invited, presented virtually) Using mouse models to study complex brain disease and developmental disorders, March 24th, Oregon Health Sciences University, Portland, OR, USA

Talk (Invited), Dose correction of Regulators of calcineurin rescues sleep abnormalities in a mouse model of Down syndrome, November 2019, Chicago, USA

Talk (Invited), Regulators of calcineurin and mitochondrial dysfunction in Down Syndrome, T21RS International Conference 2019, June 2019, Barcelona, Spain

Talk (Invited), Isoform specific roles for AKT in hippocampal plasticity and Behavior 2/25/19, University of Colorado, Denver, Denver, USA

Talk (Invited), Regulators of calcineurin, EEG and sleep abnormalities in DS, Annual LCI conference, Linda Crnic Institute, University of Colorado Anschutz Medical Campus, October 24, 2018, Denver CO, USA

Talk (Invited), Isoform specific roles for AKT in hippocampal plasticity, 9/18/18, Champaign-Urbana, IL., USA

Talk, Regulators of calcineurin controls mitochondrial fission in Down Syndrome, Linda Crnic Institute, University of Colorado Anschutz Medical Campus, 10/24/17, Denver CO, USA

Talk (Invited), Isoform specific roles for AKT in hippocampal plasticity, 10/6/17, Ft. Collins., USA

Poster, Regulators of calcineurin and mitochondrial dysfunction related to Alzheimer's disease, Gordon Conference, Neurobiology of Age-related Diseases, 8/7/16, Barcelona, Spain

Talk (Invited), Regulators of calcineurin and Alzheimer's disease related neurodegeneration, Alzheimer's Association International Conference, 7/20/15, Washington D.C., USA

Talk (Invited), Regulators of calcineurin and age-related oxidative stress and neurodegeneration, Gordon Research Conference, Oxidative Stress, 3/15/15, Ventura CA, USA

Talk, Regulators of calcineurin and age-related neurodegeneration, Department of Pharmacology, University of Colorado Anschutz Medical Campus, 12/1/14, Denver CO, USA

Talk, Understanding Genetic Sources of Neurodegeneration, CU-Boulder – IPHY Colloquium Seminar Series, 10/13/14, CU-Boulder, USA

Talk, Identifying cellular lesions underlying neurodegeneration, School of Biological Sciences, University of Northern Colorado, 9/26/14, Greeley CO, USA

Talk, Understanding Genetic Sources of Neurodegeneration, CU-Boulder – Interdepartmental Neuroscience Seminar Series, 9/23/14, CU-Boulder, USA

Poster (Wong), Age-dependent effects of RCAN1 overexpression on memory and synaptic plasticity Society for Neuroscience, 11/11/13, San Diego, USA

Talk, GABAergic interneuron loss in a mouse model for tau pathology associates with dysregulated synaptic plasticity and behavior, Alzheimer's Drug Discovery Foundation meeting, 9/9/13, Jersey City, USA

Poster (Levenga), GABAergic interneuron loss in a mouse model for tau pathology associates with dysregulated synaptic plasticity and behavior", Alzheimer's Drug Discovery Foundation meeting, 9/9/2013, Jersey City, USA

Poster, (Levenga), GABAergic interneuron loss in a mouse model for tau pathology associates with dysregulated synaptic plasticity and behavior, NYU research day, 9/16/13, NYU School of Medicine, New York, USA

Poster, (Levenga), GABAergic interneuron loss in a mouse model for tau pathology associates with dysregulated synaptic plasticity and behavior, Society of Neuroscience meeting, 11/7/13, San Diego, USA

PUBLICATIONS

RESEARCH PAPERS

1. Wong H, Levenga J, LaPlante L, Keller B, Cooper-Sansone A, Borski C, Milstead R, and **Hoeffler C** Isoform-specific roles for AKT in affective behavior, spatial memory, and extinction related to psychiatric disorders (Accepted at *eLIFE* 12/15/2020) PMID: 33325370
2. Evans LM, Johnson EC, Melroy-Greif WE, Hewitt JW, Hoeffler CA, Matthew C Keller 1 4, Laura M Saba 6, Jerry A Stitzel JA, Ehringer MA, The Role of A Priori-Identified Addiction and Smoking Gene Sets in Smoking Behaviors, *Nicotine Tob Res* (2020) Jul 16;22(8):1310-1315. doi: 10.1093/ntr/ntaa006.
3. Levenga J, Peterson D, Wong H, Cain P, and **Hoeffler CA** Sleep Behavior and EEG Oscillations in Aged Dp(16)1Yey/+ Mice: A Down Syndrome Model (2018) *Neuroscience*, Apr 15;376:117-126. doi: 10.1016/j.neuroscience.2018.02.009. PMID: 29454635
4. Levenga J, Wong H, Milstead RA, Keller BN, LaPlante LE, and **Hoeffler CA**, AKT isoforms have distinct hippocampal expression and roles in synaptic plasticity, (2017) *Elife*. Nov 27;6. pii: e30640. doi: 10.7554/eLife.30640. PMCID: PMC5722612

5. Ostroff LE, Botsford B, Gindina S, Cowansage KK, LeDoux JE, Klann E, and **Hoefffer CA**, Accumulation of polyribosomes in dendritic spine heads, but not bases and necks, during learning depends on cap-dependent translation initiation, (2017) *J. Neuroscience Feb 15;37(7):1862-1872*, PMID: PMC5320614
6. Koukoulis F, Rooy M, Tziotis D, Sailor KA, O'Neill H, Nilges M, Changeux JP, Levenga J, **Hoefffer CA**, Stitzel J, Gutkin B, DiGregorio DA, Maskos U, Nicotine reverses hypofrontality in animal models of addiction and schizophrenia (2017) *Nature Medicine 23(3):347-354*. PMID: 28112735
7. Rajamohamedsait HB, Shamir DB, Krishnaswamy S, Rajamohamedsait WJ, Rasool S, Gonzalez V, Levenga J, Gu J, **Hoefffer CA**, Sigurdsson EM, Affinity of Tau Antibodies for Soluble Pathological Tau Species but not their Immunogen or Insoluble Tau Aggregates Predicts In Vivo and Ex Vivo Efficacy, *Mol Neurodegeneration*, (2016) Aug 30;11(1):62. PMID: PMC5006503
8. Choi GB, Yim YS, Wong H, Kim S, Kim H, Kim SV, **Hoefffer CA***, Littman DR, Huh JR*, The maternal IL-17a pathway promotes autism-like phenotypes in offspring, (2016) *Science*, Feb 26;351(6276):933-9, PMID: 26822608 *corresponding authors
9. Wong H, Cain P, Levenga J, Cain P, Choi Y, McMillan DR, Rothermel B, Klann E and **Hoefffer CA**, Regulator of calcineurin 1 (RCAN1) overexpression leads to age-dependent behavioral and synaptic deficits related to oxidative stress (2015) *Acta Neuropathologica*, Oct 24, PMID:26497675
10. Wincott CM, Abera S, Vunck S, Choi Y, DeVito LM, Hofmann F, **Hoefffer CA**, Ziff EB, cGMP-Dependent Protein Kinase Type II Knockout Mice Exhibit Working Memory Impairments, Decreased Repetitive Behavior, and Anxiety-like Traits (2014) *Neurobiology of Learning and Memory*, Oct;114:32-9, PMID:24752151
11. Karayannis T, Au E, Patel JC, Kruglikov I, Markx S, Delorme R, Héron D, Salomon D, Glessner J, Restituito S, Gordon A, Rodriguez-Murillo L, Roy NC, Gogos J, Rudy B, M.E. Rice2, Karayiorgou M, Hakonarson H, Keren B, Huguet G, Bourgeron T, **Hoefffer CA**, Tsien RW, Peles E, Fishell G, Cntnap4 Differentially Contributes to GABAergic and Dopaminergic Synaptic Transmission (2014) *Nature*, Jul 10;511(7508):236-40. PMID: 24870235
12. Trinh M, Kaphzan H, Antion M, Cavener D, **Hoefffer C**, and Eric Klann. Phosphorylation Distinctly Limits the Expression of Hippocampal Metabotropic Glutamate Receptor-dependent Long-term Depression (2014) *Learning and Memory*, Apr 16;21(5):298-304. PMID: 24741110
13. Heather Bowling, Guoan Zhang, Aditi Bhattacharya, Luis M. Perez-Cuesta, Katrin Deinhardt, **Charles A. Hoefffer**, Thomas A. Neubert, Wen-biao Gan, Eric Klann, Moses V. Chao, Antipsychotics Activate mTORC1-Dependent Translation to Enhance Neuronal Morphological Complexity. *Science Signaling*. (2014) Jan 14;7(308) doi: 10.1126/ PMID: 24425786
14. **Hoefffer CA**, Wong H, Cain P, Levenga J, Cowansage K, Davy C, Majmundar N, Choi Y, McMillan DR, Rothermel B, and Klann E. Regulator of calcineurin 1 (RCAN1) modulates expression of innate anxiety and anxiogenic responses to selective serotonin reuptake inhibitor (SSRI) treatment (2013) *J. Neurosci*. Oct 23;33(43):16930-44. PMID: 24155299
15. Levenga J, Wong H, Krishnamurthy P, Rajamohamed Sait HB, Sigurdsson E, and **Hoefffer CA**. Tau pathology induced loss of GABAergic interneurons leads to altered hippocampal synaptic plasticity and behavioral impairments (2013) *Acta Neuropathologica Communications*, 1-34. PMID: 24252661
16. Wincott CM, Kim S, Titcombe RF, Tukey DS, Girma HK, Pick JE, DeVito LM, Hofmann F, **Hoefffer C**, and Ziff E. Spatial Memory Deficits and Motor Coordination Facilitation in cGMP-Dependent Protein Kinase Type II-deficient Mice. (2013) *Neurobiology of Learning and Memory*; 99:32-7, PMID: 23103773
17. **Hoefffer CA**, Santini E, Ma T, Arnold EC, Whelan AM, Wong H, Pierre P, Pelletier J, and Klann E. Multiple components of eIF4F are required for protein synthesis-dependent hippocampal long-term potentiation. (2013) *J. Neurophysiology*;109(1):68-76, PMID: 23054596
18. **Hoefffer CA**, Sanchez E, Hagerman RJ, Danh YM, Nguyen V, Wong H, Whelan AM, Zukin RS, Klann E, and Tassone F. Altered mTOR signaling and enhanced CYFIP2 expression levels in subjects with Fragile X syndrome. (2012) *Genes, Brains, and Behavior*; 11:332-41, PMID: 22268788
19. Rakowski-Anderson T, Wong H, Rothermel BA, Cain P, Lavilla C, Pullium JK, **Hoefffer CA**. Characterization of Fecal Corticosterone Levels in RCAN1 mutant Mice. (2012) *Comp. Medicine* 62:87-94, PMID: 22546913
20. Valjent E, Bertran-Gonzalez J, Bowling H, Lopez S, Santini E, Matamalas M, Bonito-Oliva A, Hervé D, **Hoefffer C**, Eric Klann E, Girault J, Fisone G. Haloperidol regulates the state of phosphorylation of ribosomal protein S6 via activation of PKA and phosphorylation of DARPP-32. (2011) *Neuropsychopharmacology* 36:2561-70, PMID:21814187

21. **Hoeffler CA**, Ma T, Wong H, Massaad CA, Zhou P, Iadecola C, Murphy MP, Pautler RG, Klann E. Amyloid Beta-Induced Impairments in Hippocampal Synaptic Plasticity Are Rescued by Decreasing Mitochondrial Superoxide. (2011) *J. Neurosci.* 31:5589-95, PMID: 21490199
22. Connor SA, **Hoeffler CA**, Klann E, Nguyen PV. Fragile X mental retardation protein regulates heterosynaptic plasticity in the hippocampus. (2011) *Learn. & Mem.* 18:207-20, PMID: 21430043
23. **Hoeffler CA**, Cowansage KK, Arnold EC, Banko JL, Moerke NJ, Rodriguez R, Schmidt EK, Klosi E, Chorev M, Lloyd RE, Pierre P, Wagner G, LeDoux JE, Klann E. Inhibition of the interactions between eukaryotic initiation factors 4E and 4G impairs long-term associative memory consolidation but not reconsolidation. (2011) *Proc. Natl. Acad. Sci. U S A.* 108:3383-8, PMID: 21289279
24. Ma, T., **Hoeffler, C.A.**, Capetillo-Zarate, E., Yu, F., Wong, H., Tampellini, D., Klann, E., Blitzer, R.D., and Gouras, G.K. (2010) Dysregulation of the mTOR pathway mediates impairment of synaptic plasticity in a mouse model of Alzheimer's disease. *PLoS One.* 5(9) PMID: 20862226
25. Suvrathan A, **Hoeffler CA**, Wong H, Klann E, Chattarji S. Characterization and reversal of synaptic defects in the amygdala in a mouse model of fragile X syndrome. (2010) *Proc. Natl. Acad. Sci. USA.* 107:11591-6, PMID: 20534533
26. Sharma, A, **Hoeffler, CA**, Takayasu Y, Miyawaki T, McBride SM, Klann E and Zukin RS. Dysregulation of mTOR signaling in fragile X syndrome. (2010) *J. Neurosci.* 30:694-702. PMID: 20071534
27. **Hoeffler CA**, Tang W, Santillan, A, Wong H, Patterson RJ, Martinez, LA, Tejada-Simon, MV, Hamilton SL and Klann E, Removal of FKBP12 Enhances mTOR-Raptor Interactions, LTP, and Perseverative/Repetitive Behavior. (2008) *Neuron* 60:832-845, PMID: 19081378
28. Antion MD, Hou L, Wong H, **Hoeffler CA**, Klann E. mGluR-dependent long-term depression is associated with increased phosphorylation of S6 and synthesis of elongation factor 1A but remains expressed in S6K-deficient mice. (2008) *Mol. Cell. Biol.* 28:2996-3007, PMID: 18316404
29. Antion MD, Merhav, M, **Hoeffler CA**, Reis G, Kozma SC, Thomas G, Schuman, EM, Rosenblum K, and Klann E, Removal of S6K1 and S6K2 Leads to Divergent Alterations in Learning and Synaptic Plasticity. (2008) *Learn. & Mem.* 15:29-38, PMID: 18174371
30. **Hoeffler CA**, Dey A, Sachan N, Shelton J, Richardson J, Patterson RJ, Klann E and Rothermel BA. The Down Syndrome Critical Region Protein RCAN1 Regulates Long-Term Potentiation and Memory via Inhibition of Phosphatase Signaling. (2007), *J. Neurosci.* 27:13161-13172, PMID: 18045910
31. Kishida K, **Hoeffler, CA**, Hu D-Y, and Klann E. Synaptic Plasticity Deficits and Mild Memory Impairments in Mouse Models of Chronic Granulomatous Disease. (2006) *Mol. Cell. Biol.*, 15:5908-20. PMID: 16847341
32. **Hoeffler CA**, Sanyal S, Ramaswami M. Acute induction of conserved synaptic signaling pathways in *Drosophila melanogaster*. (2003) *J. Neurosci.* 23:6362-72, PMID: 12867522
33. Sanyal S, Sandstrom DJ, **Hoeffler CA**, Ramaswami M., AP-1 functions upstream of CREB to control synaptic plasticity in *Drosophila*. (2002) *Nature.* 416:870-4. PMID: 11976688
34. Yamauchi Y, **Hoeffler C**, Yamamoto A, Takeda H, Ishihara R, Maekawa H, Sato R, Su-II S, Sumida M, Wells MA, Tsuchida K. (2000) *Arch Insect Biochem Physiol.*;43(1):16-21, PMID: 10613959

Invited Reviews and Book Chapters

35. Wong, **Hoeffler C**, Maternal IL-17A in autism (2018) *Exp Neurol.* 2018 Jan;299(Pt A):228-240. doi: 10.1016/j.expneurol.2017.04.010. Epub 2017 Apr.
36. Joshua Suhl and **Charles Hoeffler**, Fragile X Syndrome: From Genetics to Targeted Treatment. (2017) Chapter: FMRP binding properties (Elsevier Press)
37. Santini E, Klann E and **Hoeffler C.**, Translational Regulation of Synaptic Plasticity. (2012) *Multidisciplinary Tools for Investigating Synaptic Plasticity* (Springer Press)
38. **Hoeffler CA**, Klann E, mTOR signaling: at the crossroads of plasticity, memory and disease. (2010) *Trends Neurosci.* 33:67-75. Epub 2009 Dec 4., Review: PMID: 19963289
39. **Hoeffler CA**, Klann E. NMDA Receptors and Translational Control (2009). *Biology of the NMDA Receptor*, Chapter 6, PMID: 21204412

Manuscripts in preparation or submitted

Wong H, Buck JM, Pafford JT, Keller BN, Stitzel JA, and **Hoeffler CA** RCAN1 knockout and overexpression recapitulate an ensemble of rest-activity and circadian disruptions characteristic of Down syndrome, Alzheimer's disease, and normative

aging disorders (withdrawn from *Neurobiology of Aging*, accepted for submission in 2021 *Frontiers Aging Neuroscience* Special Down's syndrome edition expected publication April 2021)

Sofya Gindina, Benjamin Botsford, Kiriana Cowansage, Joseph LeDoux, Eric Klann, **Charles Hoeffler**, and Linnaea Ostroff "Upregulation of eIF4E, but not other translation initiation factors, in dendritic spines during memory consolidation" (submitted to *Journal of Neuroscience*, JN-RM-3068-20, under review as of December 6th, 2020)

Josien Levenga, Helen Wong, Ryan Milstead and **Hoeffler CA** Immunohistological examination of AKT isoforms in the brain; cell-type specificity that may underlie AKT's role in complex brain disorders and neurological disease (submitted to *Cerebral Cortex*, CerCor-2020-00972, under review as of December 4th, 2020)

Levenga J, Ardizzone C, Wong H, Moldovan R, and **Hoeffler CA** Genetic correction of RCAN1 rescues mitochondrial deficits and calcineurin signaling in the DP16 mouse model of Down syndrome (under editorial review *Neurobiology of Aging*)

Levenga J, Peterson D, Wong H, Cain P, and **Hoeffler CA** Rescue of Sleep and EEG abnormalities in the DP16 mouse model of Down syndrome by genetic correction of RCAN1 (In preparation)

Adams DJ, Eisenberg SP, Levenga J, **Hoeffler CA**, and Stowell MH, Beta-Amyloid Inhibition of Neurotransmission and LTP is Synaptophysin Dependent: Functional Evidence for Linkage between APP/PSEN1 and ApoE4 Genotypes. (under review *Neuroscience now at Bioarchives*)* The senior PI (Stowell) has taken a pause in submitting this manuscript while gathering new data.

Wong H, Levenga J, LaPlante L, and Hoeffler CA Genetic control of inflammatory responses in an MIA model by IL-17 receptor expression (in preparation)

Wong H, Bowling H, Levenga J, Davy C, Schneider R, Chao M, and **Hoeffler CA**, 5' Upstream sequences regulate cap-independent protein synthesis in response to synaptic stimulation (In preparation)

FUNDING

Current Research Support

Departmental Research Development Fund

Agency: University of Colorado, Boulder. Type: Start-up Grant.

Role: PI (Hoeffler)

Period: 8/1/2013-ongoing

The major goal of this grant is to set up PI's laboratory and fund preliminary studies needed to be competitive for extramural support.

Linda Crnic Bridge Funding Grant

Direct: \$25,000/yr

Period: 12/1/2020-11/30/2021

Agency: Linda Crnic Foundation

Targeting dysregulated mitochondrial activity in DS-related Alzheimer's disease

Role: PI (Hoeffler)

The purpose of this grant is to examine the role of Regulator of Calcineurin over-expression in Down Syndrome models of mitochondrial dysfunction involved in DS-linked neurodegeneration

NIH R01 AG064465-01

Direct: \$490,000/yr

Period: 7/1/2019-6/30/2024

Sleep Disruption and Alzheimer's Disease Pathology

Role: MPI (Opp, Hoeffler, Link PIs)

The purpose of the grant is to assess perform definitive studies to determine the extent to which sleep disruption per se contributes to AD pathology have not been conducted. We will use mice expressing an inducible mutant amyloid precursor protein (APP) transgene to temporally dissociate sleep disruption and mutant APP expression from subsequent A β deposition and AD-like pathology. The grant focuses on neuroinflammation mediated by activity of PKR as central mediator of this process.

LeJeune Foundation

Direct: €40K (€6K added for 2021) /yr

Period: 12/01/2018-6/30/2021

(NCE due to COVID-19)

RCAN1, synaptic plasticity, and neuronal phosphatase dysregulation in Down syndrome

Role: PI

The purpose of this grant is to develop FRET based reporters to examine Calcineurin phosphatase dysregulation and mitochondrial dysfunction associated with Down Syndrome.

NIH R01, NS086933-01 Direct: \$250,000/yr Period: 4/1/2015-3/31/2021 (NCE)

Agency: NINDS

Akt regulation of synaptic plasticity and behavior,

Role: PI (Hoeffler)

This proposed research addresses fundamental questions about the differentiation of neurobiological signaling involved in cognition, which has important implications for mental health. By defining Akt isoform-specific regulation of synaptic plasticity and cognition, our approach will provide new insight into Akt-dependent mechanisms affected in neurological diseases and psychiatric disorders associated with cognitive impairments

Pending or to be resubmitted

NIH P50 DA048754-01 A1 Center Grant Direct: \$2.2 million/yr Period: 7/1/2021-6/30/2026

Translational Center on the Genetics of Addiction (RESUBMITTED 9/2020)

Role Co-I (Ehringer PI)

The goal of this project is to form a Translational Center on the Genetics of Nicotine Dependence, which will bring together an interdisciplinary team well qualified to pursue "post-GWAS" studies aimed at understanding genetic mechanisms and neurobiology of genes associated with smoking behaviors in humans. It will include four Research Projects, supported by two Cores (Administrative Core and Statistics and Analytics Core). Project 1 will assess genome-wide differences in human brain-specific microRNA (miRNA) expression levels between active smoking and nonsmoking decedents. Project 2 will map genes that impact free-choice oral nicotine intake in mice and determine the transcriptome analysis of nicotine consumption in HS/Npt mice. Project 3 will evaluate the effects of target genes on behavior in various stages of nicotine dependence. Project 4 will perform functional assays to will evaluate the neurobiological effects of target genes at various stages of nicotine dependence.

NIH R01 NS086933-06-A1 Renewal (submitted 7/2020, Council decision in Jan 2021) Direct: 475k/year
Period: 4/1/2021-3/31/2026

Agency: NIMH

Dissecting Akt isoform-specific roles in cell type and sex-dependent differences in complex brain disorders

Role: PI

The grant aims to test the hypothesis that Akt isoforms regulate brain function in a cell- and sex-specific fashion, and these expression differences serve to modulate AKT-dependent signaling in cognition and neural responses. The aims of this proposal are to: (1) determine if interneuronal AKT1 activity is required for synaptic plasticity, network activity, and normal cognition; (2) determine if astroglial AKT2 activity modulates behavior, neurotransmission, and responses to neuroinflammatory stimulation; and (3) determine the mechanism underlying sex-dependent requirements for AKT in neural function related to neuropsychiatric disorders and responses to therapeutic agents and neuroinflammatory stimulation.

NIH R01, DA053245 (Not discussed Oct 2020, to be resubmitted) Direct: 425k/yr Period:4/1/2021-3/31/2026

Agency: NIDA

The role of astrocytic AKT2 in responses to nicotine exposure

Role: Lead PI (MPI with J. Stitzel)

The purpose of this grant is to test the central hypothesis is that AKT2-dependent signaling regulates behavioral responses to nicotine and that Akt2 mediates these effects in an astrocyte and sex-dependent fashion. Aim1: will determine how inhibition of astroglial AKT2 activity affects nicotine-induced cognitive and memory effects. Aim2 will determine if astroglial AKT2 activity mediates nicotine withdrawal-induced cognitive, memory, and sleep effects. Aim3 Identify molecular mechanisms linking nicotine to AKT2 mediated astrocytic responses following chronic nicotine exposure.

NIH R21, DA053457 (Not discussed Oct 2020) Direct: 125k/yr Period:4/1/2021-1/31/2023

Agency: NIDA

AKT2-dependent astroglial function in nicotine mediated memory effects nicotine

Role: PI

The purpose of this grant is to test the central hypothesis is that AKT2-dependent signaling regulates memory formation from both acute (enhancing) nicotine exposure but also impairments in cognition and memory during withdrawal from chronic use. Aim1: will determine how inhibition of astroglial AKT2 activity affects acute nicotine-induced memory enhancements. Aim2 will determine if astroglial AKT2 activity mediates nicotine withdrawal-induced memory deficits.

NIH R21/R33, DA053415 (SUBMITTED June 2020, scored and resubmitted Dec 2020) Direct: 125k/yr (R21) 350k/yr (R33) Period:4/1/2021-1/31/2026

Agency: NIDA

Role of glial expression in nicotine behaviors for genes identified through human GWAS

Role: PI (MPI proposal with M. Ehringer and J. Stitzel)

The purpose of this grant is to test use an astrocyte cell culture screen to select genes identified from a genome-wide association study (GWAS) related to smoking and nicotine use. The R21 component of the study has two goals, Aim1 will screen ~50 GWAS gene candidates for astrocyte response to chronic nicotine treatment and Aim2 will generate two conditional knockout mice from this screen. The R33 component will test the conditional knockout mice generated in R21 for *in vivo* astrocytic responses to nicotine, nicotine-related behavioral assays, and finally we will perform RNASeq studies in the conditional knockout mice to identify gene expression networks regulated the identified genes of interest.

NIH R01, (submitting April 2021)

Direct: 425k/yr

Period:9/1/2021-8/30/2026

Agency: NIA INCLUDE Initiative

Regulator of Calcineurin1 in mitochondrial function, sleep, and neurodegeneration

Role: PI

The purpose of this grant is to examine the role of Regulator of Calcineurin1 in Down syndrome (DS) related sleep related abnormalities and neurodegeneration. We will use a combination of genetic models include DS model mice, transgenic RCAN1 overexpression mice and RCAN1 knockout mice. Aim1: will determine if RCAN1 regulates sleep related abnormalities Aim2: will determine if RCAN1 regulates circadian behavior Aim3: will determine if RCAN1 overexpression promotes neurodegeneration through mitochondrial dysfunction in DS.

Past Research Support

Linda Crnic Seed Grant

Direct: \$100,000/yr

Period: 4/1/2018-3/31/2019

Agency: Linda Crnic Foundation

Targeting dysregulated mitochondrial activity in DS-related Alzheimer's disease

Role: PI (Hoeffler)

The purpose of this grant is to examine the role of Regulator of Calcineurin over-expression in Down Syndrome models of mitochondrial dysfunction involved in DS-linked neurodegeneration

Calico Biolabs

Direct: \$26,000/yr

Period: 9/1/2018-8/31/2019

Agency: Industry collaboration

Exploring the physiological effector of novel eIF2A inhibitors in synaptic plasticity and protein synthesis control Role: PI (Hoeffler)

The purpose of this industry seed grant is to explore the pharmacological impacts of ISRIB and two other novel molecule inhibitors of eIF2A on protein synthesis dependent forms of hippocampal plasticity

R21 DA036673-01

Direct: \$150,000 Y1, \$125,000 Y2

Period: 2/1/2015-1/31/2017

Analysis of alpha4 nicotinic receptors using viral re-expression in alpha4 KO mice

Agency: NIDA

Role: (PI: Stitzel, Co-I: Hoeffler 5% effort AY and summer)

The goal of this project is to better understand the role of putative phosphorylation sites in the alpha4 nicotinic receptor subunit nicotine in nicotine-induced upregulation of the alpha4 receptor population and whether increased receptor numbers are essential for nicotine withdrawal associated learning deficits that likely contribute to smoking relapse.

MNIRGDP-12-258900

Direct: \$50,000/yr

Period: 2/1/2013-1/31/2017

Loss of GABAergic signaling underlies synaptic and behavioral deficits in a Tau model of Alzheimer's disease

Agency: Alzheimer's Association. Type: Mentored New Investigator Grant (MNIRGD)

Role: PI (Hoeffler)

The purpose of this grant is to examine the role of pathological tau in and synaptic and behavioral impairments.

Linda Crnic Seed Grant

Direct: \$100,000/yr Period: 4/1/2015-3/31/2016

Agency: Linda Crnic Foundation

Targeting dysregulated mitochondrial activity in DS-related Alzheimer's disease

Role: PI (Hoeffler)

The purpose of this grant is to examine the role of Regulator of Calcineurin over-expression in Down Syndrome models of mitochondrial dysfunction involved in DS-linked neurodegeneration

SFARI 27444

Direct: \$250,000/yr Period: 7/1/2013-6/30/2016

Roles of RORgamma-t and pro-inflammatory Th17 cells in ASD

Agency: Simons Foundation. Type: SFARI Autism Investigator Award

Role: (Co-I: Hoeffler, PI: D. Littman; New York University, School of Medicine)

The purpose of this grant is to characterize the impact of the transcription factor RORγ-t on IL-17 signaling and the display of autistic-related behavior in a maternal model of inflammation.

Sie Foundation Post-doctoral Fellowship

Direct: \$58,000/yr Period: 5/1/2014-4/30/2016

Agency: Anna and John J. Sie Foundation. Type: Post-doctoral Fellowship Award.

Role: PI (Levenga, Mentor: Hoeffler)

The purpose of this grant is to identify the role of RCAN1 in age related hyperexcitability and oxidative stress related to Down syndrome.

NARSAD 21069

Direct: \$30,000/yr Period: 1/15/2014-1/14/2016

Regulators of calcineurin in the pathophysiology of schizophrenia

Agency: Brain and Behavior Research Foundation (NARSAD). Type: Young Investigator Award.

Role: PI (Hoeffler)

The purpose of this grant is to identify the role of RCAN1 on Calcineurin signaling in the display of schizophrenia-associated behavior in mouse disease models.

NYU Whitehead fellowship for Junior Faculty

Direct: \$30,000/yr Period: 09/01/2012-8/31/2013

Alternative Translational Mechanisms in Memory Formation

Agency: New York University. Type: Young Investigator Award

Role: PI (Hoeffler)

F31 NS042366

Period: 08/1/2002-02/1/2004

Neural Activity and Gene Expression in D. melanogaster.

Agency: NIH, NINDS. Type: NRSA Pre-doctoral fellowship.

Role: PI (Hoeffler)

Applied but declined or withdrawn

WITHDRAWN (Eligibility eliminated because of R01 award)

Webb-Waring Biomedical Research Awards

Direct: \$125,000/yr Period: 7/1/2015-6/30/2017

Agency: Boettcher Foundation

Department of Defense Direct: \$250k/yr (1.5 mil for project)

Period: 8/1/2017-7/31-2022

Funding FOA: FY2017 MURI Topic 20 (ARO): Nutritional and Environmental Effects on the Gut Microbiome and Cognition

High throughput screening and modeling to identify immunoregulatory bacteria and bacterial metabolites that increase cognitive performance

Role: Co-I (Lowry, Program Project PI)

The purpose of the grant Identify microbes, consortia of microbes and microbially-derived metabolites (microbially-derived fatty acids), that bias DC-mediated immune responses towards an immunoregulatory state and determine how these interactions are impacted by effectors of host stress responses (norepinephrine and glucocorticoid hormones). We will determine which microbial strains or microbially-derived metabolites impact immunoregulatory and cognitive and behavioral models under baseline and stressful conditions. Treatments that skew mouse DCs and T cells to an immunoregulatory state.

NIH R01, R01AG054636 (Not discussed) Direct: \$275k/yr Period: 12/01/2016-11/30/2021

Agency: NIA

The role of pathological tau in cognition, GABAergic function, and cell survival

Role: PI (Sigurdsson Co-I)

The purpose of this grant was to examine the cell-specific toxic effect of pathological tau expression on cognition, synaptic plasticity and cell survival. The proposal also aimed to determine the therapeutic efficacy of two novel immunotherapeutic approaches to pathological tau clearance.

NIH R01, 1R01MH110551-01 Direct: \$175,000/yr (Sub only) Period: 7/1/2016-6/30/2021

Agency: NIMH

Exercise, kynurenine metabolism, and calcineurin's role in anxiety and depression

Role: Co-I (Hoeffler)

This proposed research addresses fundamental questions about the role of RCAN1 and calcineurin regulation in the generation of kynurenic acid (KA). KA is involved in cognition and neurodegeneration. RCAN1 activity in skeletal muscle may play an important role in defining KA function in the brain. This project seeks to characterize the role of RCAN1 in both skeletal muscle and the brain in the display of affective behaviors.