BIOGRAPHICAL SKETCH

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NAME: Chang, Kun-Che
eRA COMMONS USER NAME (credential, e.g., agency login): KUN-CHE.CHANG
POSITION TITLE: Postdoctoral Researcher

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	START DATE MM/YYYY	END DATE MM/YYYY	FIELD OF STUDY
Natl. Dong Hwa University	BS	09/2002	06/2006	Life Sciences
Natl. Tsing Hua University	MS	09/2006	01/2008	Biotechnology
University of Colorado Denver	PHD	09/2011	12/2015	Toxicology/ Ophthalmology
Stanford University	Postdoc training	07/2016	Present	Ophthalmology/ Neurosciences

A. Personal Statement

I have been devoted to science since the year I joined a research lab as a summer intern student at Notional Dong Hwa University in Taiwan in 2003. My academic training and research experience since that have provided me with an excellent background in multiple biological disciplines including molecular biology, biochemistry, biotechnology, toxicology, visual science and neuroscience. As an undergraduate student, I conducted research with Dr. Kuo-Cheng Peng on Xylanase purification and characterization. As a graduate student for my master's degree, I published a work regarding to eosinophil cationic proteins in airway model in Dr. Yiu-Kay Lai's lab [1]. As a predoctoral student, I joined Dr. J. Mark Petrash's lab working on the effects of aldose reductase on ocular diseases. I uncovered the role of aldose reductase in retinal microglia [2] and non-enzymatic role of aldose reductase in posterior capsular opacification [3]. During my graduate career, I received several internal and external research awards. After obtaining my PhD, I continue to build my research career on ophthalmology and neurosciences as a postdoctoral research at Stanford University. My sponsor Dr. Jeffrey Goldberg is the professor and chair of Department of Ophthalmology and also an expert in neurosciences filed. He has an extensive record for training postdoctoral fellows. The proposed research will provide me with novel conceptual and technical raining in developmental biology, neuroregeneration and stem cell therapy. In my first year being a postdoctoral research, I was able to quick get in the research path and wrap up a project leading to a publication [4]. In addition, the proposed training includes career development activities and workshops-e.g. grant writing, public presentation, lab management and scientific communication with faculties on campus, which are all designed to enhance my capabilities of being an independent investigator. Overall, in my past scientific career, I have been productive in research by myself and with cooperation. In terms of my career goals, I aspire to be an academic researcher and hope to one day direct my own research program focused on developing strategies to treat neurodegenerative disease.

1. **Chang KC**, Lo CW, Fan TC, Chang MD, Shu CW, Chang CH, Chung CT, Fang SL, Chao CC, Tsai JJ, Lai YK* "TNF-α Mediates Eosinophil Cationic Protein-induced Apoptosis in BEAS-2B Cells" ***BMC Cell Biology.*** 2010, 11:6.
2. **Chang KC**, Ponder J, Labarbera DV, Petrash JM* "Aldose Reductase Inhibition Prevents Endotoxin-Induced Inflammatory Responses in Retinal Microglia" ***Invest Ophthalmol Vis Sci.*** 2014, 55(5):2853-61.
3. **Chang KC** and Petrash JM* "Aldose Reductase Mediates Transforming Growth Factor beta 2 (TGF-beta 2)-induced Migration and Epithelial-to- Mesenchymal Transition of Lens-Derived Epithelial Cells" ***Invest Ophthalmol Vis Sci.*** 2015**,** 56(8):4198-4210
4. **Chang KC**[#,*], Hertz JY[#], Zhang X[#], Jin XL, Shaw P, Derosa BA, Li JY, Venugopalan P, Valenzuela DA, Patel RD, Russano KR, Alshamekh SA, Sun C, Tenerelli K, Li C, Velmeshev D, Cheng Y, Boyce TM, Dreyfuss A, Uddin MS, Muller KJ, Dykxhoorn DM and Goldberg JL* "Novel regulatory mechanisms for

the SoxC transcriptional network required for visual pathway development" ***J Neurosci.*** 2017, 37(19):4967-4981.

B. Positions and Honors

Positions and Employment

2009 - 2010 Research assistant, National Taiwan University
2010 - 2011 Research assistant, University of Minnesota Twin City
2011 - 2012 Teaching assistant, University of Colorado Denver
2015 - 2016 Transitional Postdoctoral Researcher, University of Colorado Denver
2016 - Postdoctoral Researcher, Stanford University

Other Experience and Professional Memberships

2011 - 2012 Member, American Association for Cancer Research
2011 - 2012 Member, American Society for Cell Biology
2012 - Member, Association for Research in Vision and Ophthalmology
2015 - 2016 Society of Toxicology
2015 - 2016 American Academy of Optometry
2016 - Society of Neuroscience

Honors

2003 - 2004 **Book Aroma Award**, National Dong Hwa University
2012 **MWSOT Student Travel Award**, The 30th Annual Regional Meeting of the Mountain West Society of Toxicology
2013 - 2015 **C. Werner and Kitty Hirs Research Award** for Ph.D. student travel to national meetings, Graduate School at Anschutz Medical Campus, University of Colorado
2013 **Award for School of Medicine Class of 2017 Poster Choice**, University of Colorado Denver Anschutz Medical Campus 28th Annual Student Research Forum
2014 **Trainee Award**, The 17th International Workshop on the Enzymology and Molecular Biology of Carbonyl Metabolism
2014 **Award for best poster of vision sciences class**, University of Colorado Denver Anschutz Medical Campus 29th Annual Student Research Forum
2015 **Harold C. Heim Awards for Excellence in Graduate Research**, University of Colorado Denver Anschutz Medical Campus, Skaggs School of Pharmacy and Pharmaceutical Sciences
2018 **ARVO Travel Grant,** The 2018 annual meeting of the Association for Research in Vision and Ophthalmology
2018 **JNS Travel Award,** The 41th Annual Meeting of the Japan Neuroscience Society

C. Contribution to Science

I. **Early Research Career:** My early career contributions in my Master training were involved in the mechanism of heat shock protein 90 in gliosarcoma cells [1-2] and the effect of eosinophil cationic protein in airway model [3]. After a year military obligation, I continued to contribute to science as a research assistant in Nation Taiwan University and co-authored in three translational publications [4-6]. In addition, I joined a Pharmacology lab as a research assistant at University of Minnesota Twin City working on chromatin remodeling and participated a project leading to a second author publication [7].

1. Chao CC, Sun FC, Wang CH, Lo CW, Chang YS, **Chang KC**, Chang MD, Lai YK* "Concerted actions of multiple transcription elements confer differential transactivation of HSP90 isoforms in geldanamycin-treated 9L rat gliosarcoma cells" 2008, ***J Cell Biochem.*** 104(4):1286-96.
2. Lo CW, Chang YS, Chao CC, Chang MD, **Chang KC**, Lai YK* "Control mechanisms of differential translation of Hsp90 isoforms in 9L rat gliosarcoma cells" 2009, ***J Cell Biochem.*** 107(3):418-27.
3. **Chang KC**, Lo CW, Fan TC, Chang MD, Shu CW, Chang CH, Chung CT, Fang SL, Chao CC, Tsai JJ, Lai YK* "TNF-α Mediates Eosinophil Cationic Protein-induced Apoptosis in BEAS-2B Cells" ***BMC Cell Biology.*** 2010,11:6

4. Lu PH, Kuo TC, **Chang KC**, Chang CH, Chu CY* "Gefitinib-induced epidermal growth factor receptor (EGFR)-independent keratinocyte apoptosis is mediated by JNK activation pathway" ***Br J Dermatol.*** 2011, 164(1):38-46
5. Lai CW, Chen KY, Hung CS, Kuo SW, Chang YJ, Lin MT, **Chang KC,** Wu MH* "Serum vascular endothelial growth factor-D levels correlate with cervical lymph node metastases in papillary thyroid carcinoma" ***Growth Factors.*** 2011, 29(2-3):57-62.
6. Wu MH, Tsai YT, Hua KT, **Chang KC,** Kuo ML, Lin MT* "Eicosapentaenoic acid and docosahexaenoic acid inhibit macrophage-induced gastric cancer cell migration by attenuating the expression of matrix metalloproteinase 10" ***J Nutr Biochem.*** 2012***,*** 23(11):1434-9.
7. Ho PC, **Chang KC**, Chuang YS, Wei LN* "Cholesterol regulation of receptor -interacting protein 140 via microRNA-33 in inflammatory cytokine production" ***FASEB J.*** 2011, 25(5):1758-66.

II. Graduate Career (Ph.D.): My graduate research contributions focused on the roles of aldose reductase in ocular disease. Since my major was pharmacy/toxicology, I was dedicated to developing natural compounds for eye therapy. Results from my research led to a possibility of novel natural products against uveitis [8-10], diabetic cataract [11-13] and hyperglycemia-induced retinopathy [14]. In addition, my research also revealed the enzymatic and non-enzymatic properties of aldose reductase on posterior capsular opacification [15-16]. All the works were collected and written in a review article currently submitted [17].

8. **Chang KC**, Laffin B, Ponder J, Enzsoly A, Nemeth J, Labarbera DV, Petrash JM* "Beta-glucogallin reduces the expression of lipopolysaccharide -induced inflammatory markers by inhibition of aldose reductase in murine macrophages and ocular tissues" ***Chem Biol Interact.*** 2013, 202(1-3):283-7
9. **Chang KC**, Ponder J, Labarbera DV, Petrash JM* "Aldose Reductase Inhibition Prevents Endotoxin-Induced Inflammatory Responses in Retinal Microglia" ***Invest Ophthalmol Vis Sci.*** 2014, 55(5):2853-61
10. **Chang KC,** Shieh B, Petrash JM* "Aldose reductase mediates retinal microglia activation" ***Biochem Biophys Res Commun.*** 2016, 473(2):565-571
11. Li L, **Chang KC**, Zhou Y, Shieh B, Ponder J, Abraham AD, Ali H, Snow A, Petrash JM, Labarbera DV* "Design of an Amide N-glycoside Derivative of β-Glucogallin: A Stable, Potent, and Specific Inhibitor of Aldose Reductase" ***J Med Chem.*** 2013, 57(1):71-7
12. Snow A, Shieh B, **Chang KC**, Pal A, Lenhart P, Ammar D, Ruzycki P, Palla S, Reddy GB, Petrash JM* "Aldose reductase expression as a risk factor for cataract" ***Chem Biol Interact.*** 2015, 234: 247-253
13. **Chang KC**, Li L, Sanborn TM, Shieh B, Lenhart P, Ammar D, LaBarbera DV, Petrash JM* "Characterization of Emodin as a Therapeutic Agent for Diabetic Cataract" ***J Nat Prod.*** 2016, 79(5):1439-1444
14. **Chang KC**, Snow A, Labarbera DV, Petrash JM* "Aldose Reductase Inhibition Alleviates Hyperglycemic Effects on Retinal Pigment Epithelial Cells" ***Chem Biol Interact.*** 2015, 234: 254-260
15. **Chang KC** and Petrash JM* "Aldose Reductase Mediates Transforming Growth Factor beta 2 (TGF-beta 2)-induced Migration and Epithelial-to- Mesenchymal Transition of Lens-Derived Epithelial Cells" ***Invest Ophthalmol Vis Sci.*** 2015, 56(8):4198-4210
16. **Chang KC**, Shieh B, Petrash JM* "Influence of Aldose Reductase on Epithelial-to-Mesenchymal Transition Signaling in Lens Epithelial Cells" ***Chem Biol Interact.*** 2017, Epub ahead of print
17. **Chang KC** and Petrash JM* "Aldo-Keto Reductases: Multifunctional Proteins as Therapeutic Targets in Diabetes and Inflammatory Disease" ***Advances in Experimental Medicine and Biology.*** 2017, Submitted

III. **Postdoctoral Career:** As a postdoctoral fellow, I take challenges on developmental biology and neurosciences fields. My current research focuses on the mechanism and regulation of retinal ganglion cell (RGC) differentiation. Early this year, I published a work showing that SoxC transcript factors are sufficient and necessary for RGC development [18]. I am now working on cell-based replacement therapies using induced-RGCs from stem cells. A cooperative stem cell manuscript was published early this year [19]. In addition to research article writing, I am also trained to write review articles [20-21].

18. **Chang KC**[#,*], Hertz JY[#], Zhang X[#], Jin XL, Shaw P, Derosa BA, Li JY, Venugopalan P, Valenzuela DA, Patel RD, Russano KR, Alshamekh SA, Sun C, Tenerelli K, Li C, Velmeshev D, Cheng Y, Boyce TM, Dreyfuss A, Uddin MS, Muller KJ, Dykxhoorn DM and Goldberg JL "Novel regulatory

mechanisms for the SoxC transcriptional network required for visual pathway development" ***J Neurosci.*** 2017, 37(19):4967-4981 (# Co-first author).

19. Wu S, **Chang KC**, Nahoum M, Goldberg JL* "Induced pluripotent stem cells promote retinal ganglion cell survival after transplant" ***Invest Ophthalmol Vis Sci.*** 2018, 59(3):1571-1576.
20. **Chang KC*** and Hertz J* "SoxC transcription factors in retinal development and regeneration" ***Neural Regen Res.*** 2018, 12(7):1048-1051.
21. Wu S#, **Chang KC#***, Goldberg JM "Retinal Cell Fate Trajectory" ***Trends in Neurosciences.*** 2018, 41(4):165-167. (# Co-first author).

Complete List of Published Work in My Bibliography:
https://www.ncbi.nlm.nih.gov/myncbi/browse/collection/51347894/?sort=date&direction=descending

D. Additional Information: Research Support and/or Scholastic Performance

Scholastic Performance

A= 90 or above, B= 80 or above on 100 point scale

National Tsing Hua University

YEAR	SCIENCE COURSE TITLE	GRADE
2006	Bioindustry	A
2006	Detection and Analysis of Macromolecules	A
2006	X-Ray Diffraction and Application	A
2007	Biological Databases	A
2007	Special Topics in Bioindustry	A
2006-2008	Seminar	A
2006-2008	Thesis Research	A
2008	**Degree Conferred M.S**	
	Cumulative Graduate GPA: 4.0	

University of Colorado Denver

YEAR	SCIENCE COURSE TITLE	GRADE
2011	Statistics for Basic Sciences	A
2011	Fundamentals of Pharmaceutical Sciences	A
2011	Molecular Target for Organ Toxicity	A-
2011	Ethics Issues: Tox/Phsc	A
2011-2014	Current Topics: Toxicology Research	A
2011-2014	Research: Toxicology	A
2012	Histophysiology	B
2012	Environmental-Target Organ Toxicology	A
2012	Drug Metabolism Pharmacogenetics	A-
2012	Methods for Pharm Sci and Molecular Toxicology	A
2014-2015	Doctoral Thesis Research	A
2015	**Degree Conferred Ph.D.**	
	Cumulative Graduate GPA: 3.95	