

BIOGRAPHICAL SKETCH

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NAME: Wu, Cheng-Chia

eRA COMMONS USER NAME (credential, e.g., agency login): freddu98

POSITION TITLE: Tenure-Track Assistant Professor

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

| INSTITUTION AND LOCATION | DEGREE (if applicable) | END DATE MM/YYYY | FIELD OF STUDY |
|--|---------------------------|---------------------|-----------------------------|
| University of California, San Diego, La Jolla, CA | BS | 09/2002 | Biochemistry & Cell Biology |
| New York Medical College, Valhalla, New York | PHD | 05/2013 | Pharmacology |
| New York Medical College, Valhalla, New York | MD | 05/2013 | Medicine |
| Greenwich Hospital, Greenwich, CT | Resident | 07/2014 | Internship in Medicine |
| NYP-Columbia University Medical Center, New York, NY | Resident | 06/2018 | Radiation Oncology |

A. Personal Statement

I am a physician scientist with dual M.D./Ph.D. degrees and is currently a first year Tenure-Track Assistant Professor at the Department of Radiation Oncology, at Columbia University Irving Medical Center. I spend 80% of my time dedicated to laboratory research and 20% in clinic. My focus is in pediatric and central nervous system (CNS) malignancies. My area of expertise is in radiation biology, cancer research, and tumor vasculature. I completed my MD/PhD training studying the role of 20-HETE in the microvasculature and how it contributes to hypertension in preclinical murine models. From there, it led to my interests in tumor vascular biology and radiation oncology. I am currently focused on pediatric CNS malignancy research with an emphasis on diffuse midline glioma/diffuse intrinsic pontine glioma and glioblastoma. I am interested in neuroimmunology and cancer immunotherapy, and the role in which the blood brain barrier plays. I am examining the use of non-invasive focused ultrasound-mediated blood brain barrier-opening in combination with radiation and immune checkpoint blockade. My research goals are to establish the use of new technology and bridge the gap between the laboratory and the clinic, and vice versa. My hope is that these projects will lay the groundwork for novel treatment strategies in patients.

B. Positions and Honors**Positions and Employment**

| | |
|-------------|--|
| 2003 - 2005 | Research Internship, Taipei Medical University, Taipei |
| 2005 - 2006 | Research Internship, University of Rochester, Rochester, NY |
| 2008 - 2011 | PhD Candidate, Department of Pharmacology, New York Medical College, Valhalla, NY |
| 2013 - 2014 | Intern Resident, Department of Internal Medicine, Greenwich Hospital, Greenwich, CT |
| 2014 - 2018 | Radiation Oncology Resident, Department of Radiation Oncology, NYP-Columbia University Medical Center, New York, NY |
| 2018 - | Tenure-Track Assistant Professor, Columbia University Medical Center, Department of Radiation Oncology, New York, NY |

Other Experience and Professional Memberships

| | |
|--------|---|
| 2013 - | Member, American Society for Radiation Oncology |
| 2013 - | Member, Radiological Society of North America |
| 2013 - | Member, American Society of Clinical Oncology |
| 2018 - | Member, Children's Oncology Group |

Honors

| | |
|------|--|
| 2007 | Winner of the Dean's Medical Student Research Award – Basic Science Research, New York Medical College, Valhalla, NY |
| 2009 | Oral Presentation, High Blood Pressure Research, Ohare, IL |
| 2009 | Second Place for Pharmacology Student Research Forum , New York Medical College, Valhalla, NY |
| 2009 | Travel Award, Winter Eicosanoid Conference, Baltimore, MD |
| 2010 | Travel Award, Winter Eicosanoid Conference, Baltimore, MD |
| 2010 | Travel Award, Keystone Symposia - Bioactive Lipids, Kyoto, Japan |
| 2011 | Oral Presentation, Winter Eicosanoid Conference, Baltimore, MD |
| 2011 | Travel Award, Winter Eicosanoid Conference, Baltimore, MD |
| 2012 | Travel Award, Winter Eicosanoid Conference, Baltimore, MD |
| 2012 | Oral Presentation, Winter Eicosanoid Conference, Baltimore |
| 2017 | Oral Presentation, American Society for Radiation Oncology, San Diego, CA |
| 2017 | Invited Speaker, Seminar at Irving Cancer Research Center, New York, NY |
| 2018 | RSNA Roentgen Resident/Fellow Research Award, Radiological Society of North America |

C. Contribution to Science

1. My early publications mainly focused on the role of androgen and androgen receptor in both normal physiological function and in disease processes. Using total androgen receptor knock-out and tissue specific knock-out models, we characterized the role of androgen receptor in preclinical murine models assessing for male and female fertility, neurodegenerative disease, and cancer.
 - a. Yang Z, Chang YJ, Yu IC, Yeh S, Wu CC, Miyamoto H, Merry DE, Sobue G, Chen LM, Chang SS, Chang C. ASC-J9 ameliorates spinal and bulbar muscular atrophy phenotype via degradation of androgen receptor. *Nat Med.* 2007 Mar;13(3):348-53. PubMed PMID: [17334372](#).
 - b. Altuwajri S, Wu CC, Niu YJ, Mizokami A, Chang HC, Chang C. Expression of human AR cDNA driven by its own promoter results in mild promotion, but not suppression, of growth in human prostate cancer PC-3 cells. *Asian J Androl.* 2007 Mar;9(2):181-8. PubMed PMID: [17334587](#).
 - c. Wang RS, Yeh S, Chen LM, Lin HY, Zhang C, Ni J, Wu CC, di Sant'Agnese PA, deMesy-Bentley KL, Tzeng CR, Chang C. Androgen receptor in sertoli cell is essential for germ cell nursery and junctional complex formation in mouse testes. *Endocrinology.* 2006 Dec;147(12):5624-33. PubMed PMID: [16973730](#).
 - d. Zhang C, Yeh S, Chen YT, Wu CC, Chuang KH, Lin HY, Wang RS, Chang YJ, Mendis-Handagama C, Hu L, Lardy H, Chang C. Oligozoospermia with normal fertility in male mice lacking the androgen receptor in testis peritubular myoid cells. *Proc Natl Acad Sci U S A.* 2006 Nov 21;103(47):17718-23. PubMed PMID: [17095600](#); PubMed Central PMCID: [PMC1693813](#).
2. During my doctoral training, my research extended from my experience with androgen / androgen receptor. My thesis focused on 20-HETE, an arachidonic acid metabolite, in the microvasculature and how it contributes to androgen-induced hypertension. Using both genetic and androgen-induced hypertensive murine models, we examined the microvascular function and tested pharmacological interventions. This study was funded by the NIH-F30 grant.
 - a. Wu CC, Gupta T, Garcia V, Ding Y, Schwartzman ML. 20-HETE and blood pressure regulation: clinical implications. *Cardiol Rev.* 2014 Jan-Feb;22(1):1-12. PubMed PMID: [23584425](#); PubMed Central PMCID: [PMC4292790](#).
 - b. Wu CC, Mei S, Cheng J, Ding Y, Weidenhammer A, Garcia V, Zhang F, Gotlinger K, Manthathi VL, Falck JR, Capdevila JH, Schwartzman ML. Androgen-sensitive hypertension associates with upregulated vascular CYP4A12-20-HETE synthase. *J Am Soc Nephrol.* 2013 Jul;24(8):1288-96. PubMed PMID: [23641057](#); PubMed Central PMCID: [PMC3736709](#).

- c. Wu CC, Schwartzman ML. The role of 20-HETE in androgen-mediated hypertension. Prostaglandins Other Lipid Mediat. 2011 Nov;96(1-4):45-53. PubMed PMID: [21722750](#); PubMed Central PMCID: [PMC3248593](#).
 - d. Wu CC, Cheng J, Zhang FF, Gotlinger KH, Kelkar M, Zhang Y, Jat JL, Falck JR, Schwartzman ML. Androgen-dependent hypertension is mediated by 20-hydroxy-5,8,11,14-eicosatetraenoic acid-induced vascular dysfunction: role of inhibitor of kappaB Kinase. Hypertension. 2011 Apr;57(4):788-94. PubMed PMID: [21321301](#); PubMed Central PMCID: [PMC3074296](#).
3. As a resident training in Radiation Oncology, my goal was to learn about clinical research. I became interested with central nervous system malignancies, in both the primary and metastatic settings. We established multiple databases to examine outcomes in patients with brain metastases and glioma. In addition, we received an intramural pilot grant for a phase I feasibility study to examine the role of palliative cannabis treatment in the setting of patients with glioblastoma receiving chemoradiation.
- a. Tai CH, Wu CC, Hwang ME, Saraf A, Grubb C, Jani A, Lapa ME, Andrews JIS, Isaacson SR, Sonabend AM, Sheth SA, McKhann GM, Sisti MB, Bruce JN, Cheng SK, Connolly EP, Wang TJ. Single institution validation of a modified graded prognostic assessment of patients with breast cancer brain metastases. CNS Oncol. 2018 Jan;7(1):25-34. PubMed PMID: [29392968](#); PubMed Central PMCID: [PMC6001561](#).
 - b. Wu CC, Wu YR, Jani A, Saraf A, Tai CH, Lapa ME, Andrew JIS, Tiwari A, Saadatmand HJ, Isaacson SR, Cheng SK, Wang TJC. Whole-brain Irradiation Field Design: A Comparison of Parotid Dose. Med Dosim. 2017 Summer;42(2):145-149. PubMed PMID: [28479012](#).
 - c. Wang TJC, Wu CC, Jani A, Estrada J, Ung T, Chow DS, Soun JE, Saad S, Qureshi YH, Gartrell R, Saadatmand HJ, Saraf A, Garrett MD, Grubb C, Isaacson SR, Cheng SK, Sisti MB, Bruce JN, Sheth SA, Lassman AB, Iwamoto FM, McKhann GM 2nd. Hypofractionated radiation therapy versus standard fractionated radiation therapy with concurrent temozolomide in elderly patients with newly diagnosed glioblastoma. Pract Radiat Oncol. 2016 Sep-Oct;6(5):306-314. PubMed PMID: [26952813](#).
 - d. Wu CC, Wang TJ, Jani A, Estrada JP, Ung T, Chow DS, Soun JE, Saad S, Qureshi YH, Gartrell R, Saadatmand HJ, Saraf A, Garrett MD, Grubb CS, Isaacson SR, Cheng SK, Sisti MB, Bruce JN, Sheth SA, Lassman AB, McKhann GM 2nd. A Modern Radiotherapy Series of Survival in Hispanic Patients with Glioblastoma. World Neurosurg. 2016 Apr;88:260-9. PubMed PMID: [26746331](#).
4. In the setting of primary and metastatic brain malignancies, there is a growing interest in the role of neuroimmunotherapy with antibody based immune checkpoint inhibitors. One question is whether the blood brain barrier limits the efficacy of treatment through 1.) penetration of the antibody, 2.) trafficking of immune cells, and 3.) affecting radiation induced abscopal effect. Focused ultrasound (FUS) with microbubbles can induce blood brain barrier opening. We are interested in establishing preclinical models of targeted radiation, in combination with FUS-induced blood brain barrier opening in the setting of neuroimmunotherapy.
- a. Wang S, Wu C, Zhang H, Karakatsani ME, Wang Y, Han Y, Chaudhary KR, Wu C, Konofagou E, Cheng S. Focused ultrasound induced-blood-brain barrier opening in mouse brain receiving radiosurgery dose of radiation enhances local delivery of systemic therapy. British Journal of Radiology. Forthcoming;
 - b. Black PJ, Smith DR, Chaudhary K, Xanthopoulos EP, Chin C, Spina CS, Hwang ME, Mayeda M, Wang YF, Connolly EP, Wang TJC, Wu CS, Hei TK, Cheng SK, Wu CC. Velocity-based Adaptive Registration and Fusion for Fractionated Stereotactic Radiosurgery Using the Small Animal Radiation Research Platform. Int J Radiat Oncol Biol Phys. 2018 Nov 15;102(4):841-847. PubMed PMID: [29891199](#); PubMed Central PMCID: [PMC6202197](#).
 - c. Wu CC, Wang S, An JJ, Smith DR, Chin C, Jadeja PH, Connolly EP, Horowitz DP. Koebner phenomenon: Consideration when choosing fractionation for breast irradiation. Adv Radiat Oncol. 2018 Apr-Jun;3(2):108-110. PubMed PMID: [29904733](#); PubMed Central PMCID: [PMC6000185](#).

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

Ongoing Research Support

UR010590, Matheson Foundation

Wu, Cheng-Chia (PI)

03/01/19-03/01/20

Focused Ultrasound Enhances Antibody Delivery and Immunogenicity in Glioblastoma

In this study, we hypothesize that the integrity of the blood brain barrier limits therapeutic effects of immune checkpoint blockade (ICB) and glioblastoma (GBM). Using Focused Ultrasound, we will study the effects of blood brain barrier-opening and ICB antibody delivery in the setting of GBM.

Role: PI

Completed Research Support

CU16-2210, Clinical Indication Track, Focused Ultrasound Foundation

Cheng (PI)

12/01/17-05/04/19

Focused Ultrasound to Enhance Immunotherapy for Metastatic Brain Melanoma

In this study, we hypothesize that the integrity of the blood brain barrier may limit cross talk between the CNS and systemic immune system to checkpoint inhibitor targeted therapy and abscopal effect for intracranial metastatic melanoma. Using a genetic melanoma mouse model that develops spontaneous brain metastases, we will assess whether the addition of focused ultrasound induced blood brain barrier disruption can enhance immunotherapy for intracranial melanoma

Role: Co-Investigator

UL1TR000040, Irving Institute / CTO Pilot Grant

Wang (PI)

11/01/15-06/30/19

Phase I Feasibility Trial for the Role of Cannabis in Patients with Glioblastoma Treated with Radiation and Temozolomide

This study is a Phase I study. Our aim is to perform a single arm phase I feasibility study to investigate the tolerability of cannabis with concurrent chemoradiation in the treatment of glioblastoma. We will test a strain of cannabis that has high concentrations of non-psychoactive CBD and relatively low concentrations of THC in order to minimize the potential for side effects in this medically ill population.

Role: Co-Investigator

CU16-1106, American Society for Radiation Oncology, Seed Grant

Wu (PI)

07/01/16-06/30/18

Focused Ultrasound-Induced Blood Brain Barrier Disruption in Checkpoint Blockade Immunotherapy and the Abscopal Effect

We hypothesize that the integrity of the blood brain barrier may limit cross talk between the CNS and systemic immune system to checkpoint inhibitor targeted therapy and abscopal effect for intracranial metastatic melanoma. Disruption of the blood brain barrier with focused ultrasound can enhance the immune response and the abscopal effect in the brain. (1 year extension requested)

Role: PI

UL1TR001873, Irving Institute / Imaging Pilot Award

Cheng (PI)

09/01/16-08/31/17

Focused Ultrasound-Induced Blood Brain Barrier Disruption in Checkpoint Blockade Immunotherapy

This is a pilot imaging grant to study the role of the blood brain barrier (BBB) in the setting of immunotherapy and radiation associated abscopal effect in melanoma brain metastases, and whether the disruption of the BBB with focused ultrasound can enhance these effects.

Role: Co-Investigator