
BIOGRAPHICAL SKETCH

NAME: Modrek, Aram Sandaldjian

eRA COMMONS USER NAME (credential, e.g., agency login): asm523

POSITION TITLE: Post-doctoral fellow and Resident in Radiation Oncology (trainee)

EDUCATION/TRAINING

INSTITUTION AND LOCATION	DEGREE	Completion Date MM/YYYY	FIELD OF STUDY
University of California, Irvine, CA, USA	B.S.	06/2011	Biomedical Engineering
NYU Grossman School of Medicine, NY, USA	Ph.D.	12/2016	Molecular Oncology
NYU Grossman School of Medicine, NY, USA	M.D.	06/2018	Medicine
NYU Grossman School of Medicine, NY, USA	Internship	06/2019	Medicine
NYU Grossman School of Medicine, NY, USA	Residency	present	Radiation Oncology
NYU Grossman School of Medicine, NY, USA	Postdoctoral	present	Glioma Biology

A. Personal Statement

I am an NCI/NIH K08 funded resident physician with a secured tenure-track physician-scientist position at Keck School of Medicine of USC (beginning in the Summer of 2023). In 2018 I graduated from an NIH funded Medical Scientist Training (MD/PhD) Program at the NYU Grossman School of Medicine. During my thesis years I studied the role of IDH mutations as they work in concert with p53 and ATRX to mediate early stages of gliomagenesis via epigenetic dysregulation in a human neural stem cell based gliomagenesis model we created. In my current residency and post-doctoral training period (ending in Summer of 2023), I am granted protected research time as a B. Leonard Holman Research Fellow in radiation oncology permitting >75% protected research time, allowing me to dedicate time and effort to my ongoing project. My NCI K08 funded project is to determine how epigenetic alterations evolve around sites of DNA damage, and how this process contributes to treatment resistance in glioblastoma.

Ongoing and recently completed projects that I would like to highlight include:

NCI/NIH K08 (1K08CA263302)

Role: PI

09/20/22 – 08/30/27

Epigenetic alterations after DNA damage repair drive treatment resistance in glioblastoma

American Brain Tumor Association Basic Science Research Fellowship (BRF2200027)

Role: PI

9/2022 – 8/2024

Epigenetic alterations after DNA damage repair drive treatment resistance in glioblastoma

RSNA Research Resident/Fellow Grant (RR2249)

Role: PI

7/2022 – 6/2023

DNA damage drives genome reorganization in glioblastoma

Novocure grant for preclinical studies of Tumor Treating Fields (FP00031644)

Role: Co-Investigator (PI: Jane Skok)

8/2021 – 7/2023

Epigenetic mechanisms of adaptation and treatment resistance after Tumor Treating Field application

NYU NIH CTSI Pilot Project Grant (NYU NIH/NCATS UL1TR001445)

Role: PI

1/2021-12/2021

Epigenetic alterations after DNA damage repair drive treatment resistance in glioblastoma

B. Positions and Honors

Positions and Employment

2019-Present Resident Physician, NYU School of Medicine, Department of Radiation Oncology, NY

2019-Present Holman Research Fellow, NYU School of Medicine, Department of Radiation Oncology, NY

2018-2019 Medical Internship, NYU School of Medicine, Department of Medicine, NY

2011-2018 MST Program (MD/PhD) trainee, NYU Grossman School of Medicine, NY

2011-2018 3-year accelerated MD-pathway, NYU Grossman School of Medicine, NY

Other Experience and Professional Memberships

2021- Member, American Association for Cancer Research

2021- Member, American Society of Clinical Oncology

2019- Member, American Society for Radiation Oncology

2014- Member, Society for Neuro-Oncology

Honors

2022 AACR-American Brain Tumor Association Scholar-in-Training Award

2019 First Prize, Best Paper Award in *Pathogens* (Pourchet and Modrek et al., *Pathogens* 2017)

2017 Department of Medicine award for best essay in Medical Science, NYU School of Medicine

2016 Sackler Travel Grant Award, NYU School of Medicine

2009 Armenian-American's Citizens League Scholarship

2009 Undergraduate Research Opportunities Program, Research Grant Award

2007-2011 Dean's honor list, University of California, Irvine

C. Contributions to Science

1. Glioma epigenetics and response to therapy

I completed significant work on the role of IDH1 mutation, an epigenetic effector, in gliomagenesis. Prior to this research, the oncogenic roles of IDH, p53 and ATRX, which all occur together in astrocytoma, were not well understood. I found that each oncogenic alteration drastically remodeled the DNA-methylation landscape of the cell, ultimately leading to dysregulation of factors responsible for differentiation. In exploring this mechanism further, we found that CTCF sites, which regulate chromatin domains, were disrupted by methylation, leading to inappropriate downregulation of tumor suppressor genes. My work as a post-doctoral fellow has resulted in a first author publication where we study a cancer-stem cell marker's (PDPN) role in radioresistance using *in vitro* and intra-cranial patient-derived glioblastoma models.

1. **Modrek AS**, Eskilsson E, Ezhilarasan R, Wang Q, Goodman LD, Ding Y, Zhang ZY, Bhat K, Le T, Barthel FP, Tang M, Yang J, Long L, Gumin J, Lang F, Verhaak R, Aldape K, Sulman EP. PDPN marks a subset of tumor initiating and radiation resistant glioblastoma cells. *Frontiers in Oncology*. Front Oncol. 2022 Aug 10;12:941657. doi: 10.3389/fonc.2022.941657. PMID: 36059614; PMCID: PMC9434399.
2. **Modrek AS**, Golub D, Khan T, Bready D, Prado J, Bowman C, Deng J, Zhang G, Rocha PP, Raviram R, Lazaris C, Stafford JM, LeRoy G, Kader M, Dhaliwal J, Bayin NS, Frenster JD, Serrano J, Chiriboga L, Baitalmal R, Nanjangud G, Chi AS, Golfinos JG, Wang J, Karajannis MA, Bonneau RA, Reinberg D,

Tsirigos A, Zagzag D, Snuderl M, Skok JA, Neubert TA, Placantonakis DG (2017). Low-grade astrocytoma mutations in IDH1, p53, and ATRX cooperate to block differentiation of human neural stem cells via repression of SOX2. *Cell Reports*, 21(5):1267-1280. PMCID: PMC5687844.

3. **Modrek AS**, Prado J, Bready D, Dhaliwal J, Golub D, Placantonakis DG (2018). Modeling glioma with human embryonic stem cell-derived neural lineages. *Methods in Molecular Biology*, 1741:227-237. PMID: 29392705.
4. Stafford JM, Lee CH, Voigt P, Descostes N, Saldaña-Meyer R, Yu JR, Leroy G, Oksuz O, Chapman JR, Suarez F, **Modrek AS**, Bayin NS, Placantonakis DG, Karajannis MA, Snuderl M, Ueberheide B, Reinberg D. Multiple modes of PRC2 inhibition elicit global chromatin alterations in H3K27M pediatric glioma. *Sci Adv*. 2018 Oct;4(10):eaau5935. doi: 10.1126/sciadv.aau5935. PubMed PMID: 30402543; PubMed Central PMCID: PMC6209383.

Complete List of Published Work in NCBI MyBibliography:

www.ncbi.nlm.nih.gov/myncbi/1X_MeklrFiU58/bibliography/public/