Clint A. Stalnecker, Ph.D.
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EDUCATION

2017 – 2022	Postdoctoral fellowship, UNC Lineberger Comprehensive Cancer Center, University of North Carolina at Chapel Hill, *Chapel Hill, NC*
2010 - 2016	PhD, Cornell University, *Ithaca, NY* Chemistry and Chemical Biology
2006 - 2009	BS, Albright College, *Reading, PA* ACS Biochemistry, *summa cum laude*

PROFESSIONAL EXPERIENCE – EMPLOYEMENT HISTORY

2022 – present	Research Assistant Professor, UNC Chapel Hill, Department of Pharmacology
2017 – 2022	Postdoctoral Fellow, UNC Lineberger Comprehensive Cancer Center (Mentor: Channing J Der, PhD)
2016	Visiting Professor, Albright College, Department of Chemistry & Biochemistry
2010 – 2016	Graduate Research Assistant (Mentor: Richard A. Cerione, PhD)
2013	Sabbatical Research, Children's Research Institute at University of Texas Southwestern Medical Center (Mentor: Ralph J DeBerardinis, MD PhD)
2010	Lab Instructor, Albright College, Department of Chemistry & Biochemistry
2009	Undergraduate Researcher, Albright College, Department of Chemistry and Biochemistry (Mentors: Pamela G. Artz, PhD & Jeffrey P Wolbach, PhD)
2008	Internship, Cephalon Pharmaceuticals, Lead Discovery and Profiling

HONORS

2019	Best Talk Award, UNC-Lineberger Postdoc-Faculty Research Day
2018	Scholarship award for Cold Spring Harbor Metabolomics course
2017	Pagano Postdoctoral Fellowship award
2015	3rd place prize Cornell Rockefeller Consulting Competition
2010	First place in Physical Chemistry division of Intercollegiate Student Chemists' Convention
2009	Undergraduate Award in Analytical Chemistry from ACS Division of Analytical Chemistry
2009	POLYED Undergraduate Award for Achievement in Organic Chemistry
2009	Undergraduate Award in Inorganic Chemistry from ACS Division of Inorganic Chemistry
2009	Jacob Albright Scholar

BIBLIOGRAPHY AND PRODUCTS OF SCHOLARSHIP

Publications (Peer-reviewed)

1. **Stalnecker CA**, Grover KR, Edwards AC, Coleman MF, Yang R, DeLiberty JM, Papke B, Goodwin CM, Pierobon M, Petricoin EF, Gautam P, Wennerberg K, Cox AD, Der CJ, Hursting SD, Bryant KL (2021)

Concurrent inhibition of IGF1R and ERK increases pancreatic cancer sensitivity to autophagy inhibitors. *Cancer Research* 82(4): 586-598

2. Klomp JE, Lee YS, Goodwin CM, Papke B, Klomp JA, Waters AM, Diehl JN, **Stalnecker CA**, Yin HH, Pierobon M, Baldelli E, Yang R, Ryan MB, Li S, Peterson J, Smith AR, Neal JT, McCormick AK, Kuo C, Counter CM, Petricoin EF, Cox AD, Bryant KL, Der CJ. (2021) CHK1 protects oncogenic KRAS-expressing cells from DNA damage and is a target for pancreatic cancer treatment. *Cell Reports* 37(9): 110060
3. Waters AM, Khatib TO, Papke B, Goodwin CM, Hobbs AG, Diehl JN, Yang R, Edwards AC, Walsh KH, Sulahian R, McFarland JM, Kapner KS, Gilbert TSK, **Stalnecker CA**, Javaid S, Barkovskaya A, Grover KR, Hibshman PS, Blake DR, Schaefer A, Nowak KM, Klomp JE, Hayes TK, Kassner M, Tang N, Tanaseichuk O, Chen K, Zhou Y, Kalkat M, Herring LE, Graves LM, Penn LZ, Yin HH, Aguirre AJ, Hahn WC, Cox AD, Der CJ (2021) Targeting p130Cas-and microtubule-dependent MYC regulation sensitizes pancreatic cancer to ERK MAPK inhibition. *Cell Reports* 34(13): 109291
4. Barkovskaya A, Goodwin CM, Seip K, Hilmarsdottir B, Pettersen S, **Stalnecker CA**, Engebraaten O, Briem E, Der CJ, Moestue SA, Gudjonsson T, Mælandsmo GM, Prasmickaite L (2021) Detection of phenotype-specific therapeutic vulnerabilities in breast cells using a CRISPR loss-of-function screen. *Mol Oncol* 15(8): 2026-2045
5. **Stalnecker CA** and Der CJ (2020) RAS, wanted dead or alive: Advances in targeting RAS mutant cancers. *Science Signaling* 13(624): eaay6013
6. Li Y, Ramachandran S, Nguyen TT, **Stalnecker CA**, Cerione RA, Erickson JW (2020) The activation loop and substrate-binding cleft of glutaminase C are allosterically coupled. *J Biol Chem* 295(5): 1328-1337
7. Greene KS, Lukey MJ, Wang X, Blank B, Druso JE, Miao-chong JL, **Stalnecker CA**, Zhang C, Abril YN, Erickson JW, Wilson KF, Lin H, Weiss RS, Cerione RA (2019) SIRT5 stabilizes mitochondrial glutaminase and supports breast cancer tumorigenesis *Proc Natl Acad Sci* 116(52): 26625-26632
8. Bryant KL, **Stalnecker CA**, Zeitouni D, Peng S, Tikunov AP, Gunda V, Pierobon M, Tomar G, Waters AM, Yan L, Diehl JN, George SD, Klomp JE, Hobbs GA, Ruiz AM, Zhang GF, Witkiewicz AK, Knudsen ES, Petricoin E, Singh PK, Macdonald JM, Tran N, Lyssiotis CA, Ying H, Kimmelman AC, Cox AD, Der CG. (2019) Combination of ERK and autophagy inhibition as a treatment approach for pancreatic cancer. *Nat Med*. 25(4): 628-640
9. Huang Q, **Stalnecker CA**, Zhang C, McDermott LA, Iyer P, O'Neill J, Reimer S, Cerione RA, Katt WP (2018) Characterization of the interactions of potent allosteric inhibitors with glutaminase C, a key enzyme in cancer cell glutamine metabolism. *J Biol Chem* 293(10):3535-3545
10. **Stalnecker CA**, Erickson JW, Cerione RA (2017) Conformational changes in the activation loop of mitochondrial glutaminase C: A direct fluorescence readout that distinguishes the binding of allosteric inhibitors from activators. *J Biol Chem* 292(15):6095-6107
11. Jeitner TM, Kristoferson E, Azcona JA, Pinto JT, **Stalnecker CA**, Erickson JW, Kung HF, Li J, Ploessl K, Cooper AJL. (2016) Fluorination at the 4 position alters the substrate behavior of L-glutamine and L-glutamate: Implications for positron emission tomography of neoplasias. *J Fluor Chem* 192:58-67
12. Li Y, Erickson JW, **Stalnecker CA**, Cerione RA, Ramachandran S (2016) Mechanistic basis of glutaminase activation: A key enzyme that promotes glutamine metabolism in cancer cells. *J Biol Chem* 291(40):20900-20910
13. **Stalnecker CA**, Ulrich SM, Li Y, Ramachandran S, McBrayer MK, DeBerardinis RJ, Cerione RA, Erickson JW (2015) Mechanism by which a recently discovered allosteric inhibitor blocks glutamine metabolism in transformed cells. *Proc Natl Acad Sci* 112(2): 394-399

Patents / Intellectual Property

1. **Stalnecker CA**, Erickson JW, Cerione RA. Labeled glutaminase proteins, isolated glutaminase protein mutants, methods of use, and kit. US Patent 11046945. June 29, 2021

2. Cerione RA, Cerione K, **Stalnecker CA**, Ulrich S. Inhibitors of kidney-type glutaminase, GLS1. US Patent 10889585. January 12, 2021
3. Cerione RA, Erickson JW, **Stalnecker CA**. Method of screening compounds. US Patent 10767212. September 9, 2020

Invited articles in non-refereed journals

1. **Stalnecker CA**, Coleman MF, Bryant KL (2022) Susceptibility to autophagy inhibition is enhanced by dual IGF1R and MAPK/ERK inhibition in pancreatic cancer, *Autophagy* 18(7): 1737-1739
2. **Stalnecker CA**, Cluntum AA, Cerione RA (2016) Balancing redox stress: Anchorage-Independent growth requires reductive carboxylation. *Transl Cancer Res* 5:3

Refereed articles in press/submitted

1. Goodwin CM, Waters AM, Klomp JE, Javaid S, Bryant KL, **Stalnecker CA**, Papke B, Yang R, Amparo AM, Ozkan-Dagliygan I, Pierobon M, Sorrentino JA, Beelen AP, Bublitz N, Luthen M, Cox AD, Wood KC, Petricoin EF, Sers C, McRee AJ, Der CJ (2022) *Cancer Research* (Accepted upon revisions)

Oral Presentations

1. Stalnecker CA. Direct inhibition of mutant KRAS(G12C) reveals targetable metabolic dependencies. Lineberger Comprehensive Cancer Center Postdoc-Faculty Research Day. Chapel Hill, NC. October 2019
2. Stalnecker CA. Drugging the undruggable – Direct targeting of mutant KRAS. ITCMS Postdoctoral Seminar Series, UNC LCCC, Chapel Hill NC. February 2019
3. Stalnecker CA. Investigating the roles of WT RAS in RAS mutant lung cancer. ITCMS Postdoctoral Seminar Series, UNC LCCC, Chapel Hill NC. September 2017
4. Stalnecker CA. Does EVERYTHING really give you cancer? Truths, half-truths, and misconceptions of a complex disease. Albright College Chemistry and Biochemistry Seminar Series, Albright College, Reading PA. November 2016
5. Stalnecker CA. Targeting altered cancer cell metabolism: Mitochondrial glutaminase regulation and inhibition by small molecules. Albright College Chemistry and Biochemistry Seminar Series, Albright College, Reading PA. October 2016
6. Stalnecker CA. Targeting altered cancer cell metabolism: Mitochondrial glutaminase regulation and inhibition by small molecules. Chemical Biology Interface retreat, Cornell University, Ithaca NY. March 2015
7. Stalnecker CA. Biomarkers – What are they? And what do they mean? Cancer Resource Center of the Finger Lakes Public Seminar Series, Cornell University, Ithaca NY. November 2014

TEACHING ACTIVITIES

Lectures to Graduate Students

2022	PHCO 702: Drugging 'undruggable' RAS, University of North Carolina at Chapel Hill; 1 lecture, 10 students enrolled
2020 – 2021	PHCO 702: Cancer Chemotherapy I, University of North Carolina at Chapel Hill; 1 lecture per year, 26 students enrolled (2020); 23 students enrolled (2021)

Undergraduate Course director

2016	CHE 325: Biochemistry I, Albright College; responsible for all lectures and laboratories, 29 students enrolled, 3 lab sections
2016	CHE 326: Biochemistry II, Albright College; responsible for all lectures and laboratories, 14 students enrolled, 2 lab sections

Undergraduate course TA

2011	CHE 3600: Organic Chemistry II laboratory, Cornell University; laboratory TA responsible for 1 lab section per week; 26 students enrolled
2010	BIOMG 3310: Principles of Biochemistry, Cornell University; lecture TA responsible for leading 1 recitation lecture per week; ~200 students enrolled

Graduate Rotation Student Mentor

Training Period	*Name, University*
2019	A. Cole Edwards, University of North Carolina at Chapel Hill
2019	Jonathan DeLiberty, University of North Carolina at Chapel Hill
2019	Priya Stepp, University of North Carolina at Chapel Hill
2019	Ye Sol (Jane) Lee, University of North Carolina at Chapel Hill
2015	Arash Latifkir, Cornell University

Masters Student Mentor

Training period	*Name, University*	*Current position*
2019 - 2022	Kajal Grover, University of North Carolina at Chapel Hill	Medical Student, Brown University

Undergraduate Student Mentor

Training period	*Name, University*	*Current position*
2017 - 2018	Griffin Barnes, University of North Carolina at Chapel Hill	Graduate Student, Department of Chemistry, University of California Irvine
2016	Trey Eberly, Albright College	Account manager, Harrisburg at HVAC Distributors
2016	Trevor Mastria, Albright College	System Engineer, Lockheed Martin
2015 - 2016	Sean Kim, Cornell University	Research Technician, Cornell University

GRANTS

Completed

2019 – 2022	NIH F32 NRSA Individual Postdoctoral Fellowship (5F32CA232529), Title: Defining the contributions of WT RAS in RAS-mutant lung cancer; ($190,000/3 years; Role: PI; 100% Effort)
2017 – 2019	Pagano Postdoctoral Fellowship Award, University of North Carolina at Chapel Hill; (Role: Trainee)

2014 – 2016	NIH F31 NRSA Individual Predoctoral Fellowship (1F31CA180650), Title: The mitochondrial enzyme glutaminase: Its role in cancer cell metabolism. ($77,000/2 years; Role: PI; 100% Effort)
2011 – 2013	NIH T32 Chemical Biology Interface Training Grant (T32GM138826) Cornell University; Role: Trainee
2009	Albright Creative Research Experience, Albright College; Role: PI, 100% Effort, $1500
2009	Albright Creative Research Experience, Albright College; Role: PI, 100% Effort, $3000

SERVICE

Professional Affiliations

2015 - present	American Association for the Advancement of Science (AAAS)
2013 – present	American Association for Cancer Research (AACR)
2007 – 2011	American Chemical Society (ACS)

Within UNC-Chapel Hill

2019 – 2021 Elected member, University of North Carolina Hill, Lineberger ITCMS NCI T32 Postdoctoral Advisory Committee

Community Outreach

2022 *Boys and Girls Club, Durham NC*
- Led group presentation to children aged 7-10 to demonstrate DNA extraction from strawberries to promote science and healthy eating habits

2020 - present *Blue Ribbon Run, Wilmington NC*
- Participated and fund-raised in annual 5k to help raise awareness for colorectal cancer

2015, 2017, 2019 *Laboratory Open Houses, UNC Chapel Hill*
- Participated in lab tours for groups of 15-30 pancreatic cancer patients or caregivers to explain our research in lay language

2017 – present *PurpleStride, Annual Walk to End Pancreatic Cancer, Raleigh NC*
- Participated and fund-raised in annual 5k to help raise awareness for pancreatic cancer

2013 – 2016 *Cancer Resource Center for the Finger Lakes, Ithaca NY*
- Volunteer member for weekly support group
- Participant in monthly public outreach seminars held at Cornell University to present cancer research in layperson terms. 2014 presentation: “Biomarkers – What are they? And what do they mean?”

2011 – 2013 *Big Brothers Big Sisters, Ithaca NY*
- Big brother member of BBS matched with two local little brothers

2012 – 2013 *Graduate Association of Chemistry (GAC), Cornell University, Ithaca NY*
- Co-vice president of GAC, a volunteer group of chemistry graduate students to promote chemistry on campus

2010, 2011 *Southern Tiers Aids Program (STAP) Aids Ride for Life, Ithaca NY*
- Team leader and fund-raiser for 100-mile bike ride to benefit STAP

RESEARCH STATEMENT

It is my ambition to conduct scientific research that furthers our understanding of cancer cell metabolism leading to the improvement of treatment options. My work focuses on how oncogenes reprogram cellular metabolism to enable their uncontrolled growth and resistance to targeted therapies. My motivation was initiated as an undergraduate, where I interned at a biotech company within their Lead Discovery and Profiling department. My role was to perform high-throughput kinase inhibition assays for receptor-tyrosine kinase inhibitors of oncogenic JAK1/JAK3 proteins. This formative experience shaped my appreciation for the challenges in drug discovery and motivated me to pursue graduate studies in Chemical Biology at Cornell University. My graduate research focused on the therapeutic targeting of oncogene-induced glutamine metabolism. This work resulted in three patents being awarded for novel glutaminase inhibitors and methods for screening compounds (US Patent 11046945, 10889585, 10767212). During graduate school, I was also a caregiver to a close friend battling cancer and volunteered at the local cancer resource center. My observations of the front-line chemotherapies used for the treatment of cancer motivated me to focus my research on improving targeted therapies.

My desire to perform more translational studies led me to pursue postdoctoral research in the laboratory of Channing Der at UNC Chapel Hill, where I study the metabolic adaptations that lead to resistance to targeted therapies in RAS mutant cancers. I have focused my efforts on expanding upon our previous finding that co-targeting autophagy and ERK-MAPK inhibition (NCT04132505, NCT04386057) is an effective therapy in pancreatic cancer, and discovered IGF1R activity as a putative mechanism of resistance. I found that targeting IGF1R, ERK, and autophagy is a superior combination approach (Stalnecker *et al.* 2022). I also performed a comprehensive multi-omic study characterizing direct $KRAS^{G12C}$ inhibition using proteomics, transcriptomics, reverse phase protein array, a metabolism-focused CRISPR/Cas9 knock-out screen, high-throughput drug sensitivity screen, and metabolomics. Direct RAS inhibitors have sparked a revolution in anti-RAS therapies and hold great promise for advancing patient treatment options. However, like virtually all targeted therapies, I have found that $KRAS^{G12C}$ inhibitors will be limited by signaling rebound and subsequent metabolic reprogramming that involves an increased reliance on amino acid metabolism.

It has emerged that direct $KRAS^{G12C}$ inhibition alone is not sufficient to obtain durable anti-tumor responses in all patients, and combination therapies are required to limit resistance. It is my hypothesis that effective combination therapies will converge on limiting metabolic processes and dissecting the mechanisms underlying this convergence will be the focus of my independent research. I will apply state-of-the-art targeted and untargeted metabolomics approaches to evaluate changes in metabolic pathways that result from combination targeted therapies, with the goal of improving our understanding of how metabolism enables cells to gain resistance.

TEACHING STATEMENT

My philosophy as an educator is to create an engaging learning environment that appreciates diverse individualistic learning styles. I believe this requires frequent real-time evaluations of how students are processing course material and how they can use this new information to come to their own conclusions. As a visiting professor for an undergraduate biochemistry course at Albright College, I accomplished this by giving daily short evaluations. This exercise provided information at the class- and individual-level. Additionally, I use real-life practical applications of the course material within lectures and as a part of laboratory demonstrations. For example, I perform real-time DNA extractions from strawberries when teaching undergraduates about DNA structure and provide historical context by reviewing original publications from Rosalind Franklin, Francis Crick, and James Watson. I believe it is crucial to incorporate scientific literature in lectures and ask students to critically evaluate the methods, data, and conclusions in open discussions. These exercises provide the opportunity for students to apply their knowledge and learn to articulate their evaluation of scientific research.

My teaching philosophy as a mentor is to foster scientific curiosity, self-confidence, and critical evaluation of scientific literature. I believe it is my responsibility to search for my mentee's motivation for study and develop

a unique training style to encourage it. I have directly mentored four undergraduate students, one masters student, and five graduate students. I encourage my mentees to explore multiple career paths and regularly monitor their progress in meeting their goals. As a research mentor, I focus on the student's ability to discern addressable research questions by interviewing their rationale, approach, and potential outcomes.

DIVERSITY, EQUITY, AND INCLUSION STATEMENT

It is extremely important to me that I always strive to be a positive role model, and my definition of a positive role model includes a devotion to promoting diversity, equity, and inclusion. Throughout my time as a graduate student, visiting professor, and postdoctoral fellow, I have been committed to creating an equitable environment in the classroom and the laboratory. I have mentored ten master's, rotation and undergraduate students, three of whom were women. I strongly believe that the promotion of equity and inclusion is vital for fostering a student's or mentee's education and potential. I have also contributed to the promotion of diversity and inclusion through my volunteer efforts. During graduate school, I served as a big brother through the Big Brother Big Sister (BBBS) organization to two local little brothers, both of which are members of a traditionally underrepresented group. This experience shaped my devotion to promote inclusion in all my efforts. I also volunteered at the Cancer Resource Center of the Finger Lakes (CRCFL) whose mission and inclusion statements are in direct agreement with my own values.

As I transition to a member of the faculty at UNC, I will continue to strive to be the best role model for my mentees and seek further training and experiences to ensure I am accomplishing this goal. I will enroll in the School of Medicine's DEI Certificate Program through which I aim to broaden my awareness of biased behavior and acquire more tools to help me be a better ally. I will also encourage my trainees to participate in ongoing efforts to promote an inclusive environment because I believe that it is important to instill this mindset in our next generation of scientists.

SERVICE AND ENGAGEMENT STATEMENT

Public engagement and science advocacy is extremely important to me. A major motivation for me to join Channing Der's laboratory for my postdoctoral training was because his lab frequently engages in public outreach. As a graduate student, I participated in multiple public outreach experiences, which even included the making of a music video for the Cornell chemistry department (https://www.youtube.com/watch?v=sngxb-1jTRc). The experience that has had the most impact was my engagement with the Cancer Resource Center of the Finger Lakes (CRCFL) and within the Chemo Treatment Center at the Cayuga Cancer Center in Ithaca, NY. The CRCFL has a partnership with Cornell University that links the research community to cancer patients. I participated in monthly public seminars where graduate students present topics in research to cancer patients and caregivers, where I presented a seminar on biomarkers titled, "*Biomarkers – What are they? And what do they mean?*". Engaging in this seminar series encouraged me to volunteer as a science advocate in weekly support group meetings at the CRCFL and within the Chemo Treatment Center.

As a visiting professor at Albright College, I gave a public lecture to explain in lay-language some misconceptions of cancer, titled "Does everything really give you cancer? Truths, half-truths, and misconceptions of a complex disease." I believe that communicated science in a digestible format is paramount to making our findings more digestible and even believable to the general public. During my postdoctoral training, I have participated in laboratory open houses for patients and caregivers for pancreatic cancer and colorectal cancer, participated and fund-raised for annual PurpleStride to benefit the Pancreatic Cancer Action Network (PanCAN) and the Blue Ribbon Run to benefit colorectal cancer research. Through these open houses and additional interactions with patients and families at fundraising events, I not only strive to answer questions and educate the public about my work, but also hope to convey the message that there are scientists focused on understanding and designing better treatments for the diseases that have impacted lives so profoundly. In my

independent position, I will continue to make public outreach and engagement a priority both by continuing my established relationships with PanCAN and the Blue Ribbon Run, as well as engaging with the boys and girls club of Durham NC to promote science outreach to youth groups. I also will continue to engage with the SECU family house to support patients by making meals and volunteering for special events.