

# Adrienne H. Long, MD, PhD

## EDUCATION AND TRAINING

- 2019 - 2020 **Pediatric Hematology/Oncology Fellowship, Stanford Health Care - Palo Alto, CA**
- 2016 - 2019 **Pediatrics Residency, Boston Children's Hospital and Boston Medical Center - Boston, MA**
- Boston Combined Residency Program (BCRP)
  - Integrated Research Pathway
- 2008 - 2016 **MD, Northwestern University, Feinberg School of Medicine - Chicago, IL**
- Medical Scientist Training Program
  - Magna cum laude
- 2012 - 2015 **PhD, National Institutes of Health (NIH) - Bethesda, MD**
- NIH Graduate Partnerships Program with Northwestern University
  - Cancer immunology
  - Advisor: Crystal Mackall, MD
- 2005 - 2008 **BS, Northwestern University, McCormick School of Engineering - Evanston, IL**
- Honors Program in Medical Education
  - Biomedical engineering
  - Summa cum laude

## RESEARCH EXPERIENCE

- 2017 - 2019 **Integrated Research Pathway for Pediatrics Residents**
- Dana-Farber Cancer Institute, Boston, MA
  - Advisor: W. Nicholas Haining, BM, BCh
  - Identifying immune regulatory pathways that influence efficacy of checkpoint blockade
- 2012 - 2015 **NIH Graduate Partnerships Program**
- NIH, National Cancer Institute (NCI), Pediatric Oncology Branch - Bethesda, MD
  - Advisor: Crystal Mackall, MD
  - Dissertation: 4-1BB costimulation ameliorates T cell exhaustion induced by antigen independent signaling of chimeric antigen receptors (CARs)
- 2011 - 2012 **Howard Hughes Medical Institute (HHMI)-NIH Research Scholars (Cloister) Program**
- NIH, NCI, Pediatric Oncology Branch - Bethesda, MD
  - Advisors: Crystal Mackall, MD and Rimas Orentas, PhD
  - Compared the susceptibility of hematologic and solid malignancies to CAR T cell therapies

- 2009      **Medical Student Summer Research Program**
- Northwestern University, Department of Biomedical Engineering - Evanston, IL
  - Advisor: Dean Ho, PhD
  - Synthesized and characterized nanodiamond-antibody complexes for use as targeted, controlled release therapeutics
- 2008      **Naval Research Enterprise Intern Program**
- Naval Surface Warfare Center, Carderock Division, Ceramics Group - West Bethesda, MD
  - Advisor: Inna Talmy, PhD
  - Synthesized and characterized novel, ultra-high temperature ceramic materials
- 2006 - 2007      **Summer Undergraduate Research Fellowship Program**
- National Institute of Standards and Technology, Biomaterials Group - Gaithersburg, MD
  - Advisor: Matthew Becker, PhD
  - Developed telomerase immunofluorescence methods for objectively grading tumors

## **HONORS**

- 2019      Fredrick H. Lovejoy, Jr. Senior Resident Award, BCRP
- 2016      Heller Award for Excellence in Clinical Medicine, Northwestern University Medical Scientist Training Program
- 2015      Alpha Omega Alpha Honor Medical Society
- 2015      Scholar-in-Training Award, American Association for Cancer Research
- 2014      Women in Cancer Research Award, American Association for Cancer Research
- 2013      Abstract Achievement Award, American Society of Hematology
- 2013      Fellows Award for Research Excellence, NIH
- 2013      Annual Research Day: Outstanding Presentation, NCI Pediatric Oncology Branch
- 2013      Fellows and Young Investigators Annual Colloquium: Outstanding Oral Presentation, NCI
- 2012      Annual Research Day: Outstanding Presentation, NCI Pediatric Oncology Branch
- 2011      HHMI-NIH Research Scholar
- 2010      Medical Student Summer Research Program Symposium: Top Poster, Northwestern University
- 2008      Ovid W. Eshbach Award for Outstanding Scholarship and Leadership, Northwestern University, McCormick School of Engineering
- 2008      Frey Prize for Innovation and Creativity: First Place, Northwestern University, McCormick School of Engineering
- 2008      Lyle F. Mockros Outstanding Senior Award, Northwestern University Biomedical Engineering
- 2008      Senior Design Award, Northwestern University Biomedical Engineering
- 2007      Tau Beta Pi Engineering Honors Society

## **PUBLICATIONS**

**Long AH**, Fiore JG, Gillani RN, Douglass L, Fujii AM, & Hoffman JD. Hypotonia and Lethargy in a Two-Day Old Male Infant. *Pediatrics*, doi: 10.1542/peds.2018-0788 (2019).

Ishizuka JJ, Manguso RT, Cheruiyot CK, Bi K, Panda A, Iracheta-Vellve A, Miller BC, Du PP, Yates KB, Dubrot J, Buchumenski I, Comstock DE, Brown FD, Ayer A, Kohnle IC, Pope HW, Zimmer MD, Sen DR, Lane-Reticker SK, Robitschek EJ, Griffin GK, Collins NB, **Long AH**, Doench JG, Kozono D, Levanon EY & Haining WN. Loss of ADAR1 in tumours overcomes resistance to immune checkpoint blockade. *Nature*, doi: 10.1038/s41586-018-0768-9 (2018).

Walker AJ, Majzner RG, Zhang L, Wanhainen K, **Long AH**, Nguyen SM, Lopomo P, Vigny M, Fry TJ, Orentas RJ, & Mackall CL. Tumor Antigen and Receptor Densities Regulate Efficacy of a Chimeric Antigen Receptor Targeting Anaplastic Lymphoma Kinase. *Molecular Therapy* 25, 2189-2201 (2017).

**Long AH**, Highfill SL, Cui Y, Smith JP, Walker AJ, Ramakrishna S, El-Etriby R, Galli S, Tsokos M, Orentas RJ & Mackall CL. Reduction of MDSCs with all-trans retinoic acid improves CAR therapy efficacy for sarcomas. *Cancer Immunology Research* 4, 869-880 (2016).

**Long AH**, Lee DW, & Mackall CL. Chimeric antigen receptors for cancer: progress and challenges. *Current Stem Cell Reports* 1, 187-196 (2015).

Decker B, Davis BW, Rimbault M, **Long AH**, Karlins E, Jagannathan V, Reiman R, Parker HG, Drögemüller C, Corneveaux JJ, Chapman ES, Trent JM, Leeb T, Huentelman MH, Wayne RK, Karyadi DM, & Ostrander EA. Comparison against 186 canid whole genome sequences reveals survival strategies of an ancient clonally transmissible canine tumor. *Genome Research* 25, 1646-1655 (2015).

**Long AH**, Haso WM, Shern JF, Wanhainen KM, Murgai M, Ingaramo M, Smith JP, Walker AJ, Kohler ME, Venkateshwara VR, Kaplan RN, Patterson GH, Fry TJ, Orentas RJ, & Mackall CL. 4-1BB costimulation ameliorates T cell exhaustion induced by tonic signaling of chimeric antigen receptors. *Nature Medicine* 21, 581-590 (2015).

**Long AH**, Haso WM, & Orentas RJ. Lessons learned from a highly-active CD22-specific CAR. *Oncolimmunology* 2, 2:e23621 (2013).

**Smith AH**, Robinson EM, Zhang X, Chow EK, Lin Y, Osawa E, & Ho D. Triggered release of therapeutic antibodies from nanodiamond complexes. *Nanoscale* 3, 2844-2848 (2011).

Jakupciak JP, Gallant ND, **Smith AH**, Becker ML, Tona A, & Atha DH. Improved methods and standards for telomerase detection: quantitative histopathology using antibody staining. *Biotechnic & Histochemistry* 84, 195-206 (2009).

Talmy IG, Zaykoski JA, Opeka MM, and **Smith AH**. Properties of ceramics in the system  $ZrB_2-Ta_5Si_3$ . *Journal of Materials Research* 21, 2593-2599 (2006).

## **PRESENTATIONS**

### **Clinical Oral Presentations:**

**Long AH.** Genetically Engineered T Cell Therapies for Cancer and Beyond. *Boston Combined Residency Program Basic Science Journal Club*, Boston, MA (2017).

**Long AH,** Fiorre J, & Gillani R. Hypotonia and Lethargy in a Two-Day Old Male Infant. *Boston Medical Center Challenging Clinical Case Series*, Boston, MA (2017).

**Long AH & Williams DA.** New onset bruising in a 6 year old male. *New England Blood Club*, Boston, MA (2016).

### **Research Oral Presentations:**

**Long AH,** Manguso RT, KlaegerS, Cheruiyot CK, Keane R, Ishizuka JJ, Carr SA, Haining WN. Inhibition of signal peptide peptidase triggers novel antigen presentation on non-classical MHC and sensitizes tumors to checkpoint blockade. *Keystone Symposia - Cancer Immunotherapy: Mechanistic Insights to Improve Clinical Benefit*, Whistler, BC (2019).

**Long AH,** Haso WM, Shern JF, Wanhainen KM, Murgai M, Ingaramo M, Smith JP, Walker AJ, Kohler ME, Venkateshwara VR, Kaplan RN, Patterson GH, Fry TJ, Orentas RJ, & Mackall CL. T cell exhaustion limits efficacy of chimeric antigen receptor (CAR) therapies. *NIH Pediatric Oncology Seminar Series*, Bethesda, MD (2015).

**Long AH,** Haso WM, Smith JP, Walker AJ, Fry TJ, Orentas RJ, & Mackall CL. 4-1BB costimulation ameliorates exhaustion and prolongs in vivo persistence of chimeric antigen receptor (CAR) expressing T cells. *American Association for Cancer Research Annual Meeting*, Philadelphia, PA (2015).

**Long AH,** Orentas RJ, & Mackall CL. Rapid exhaustion in human T cells induced by chimeric antigen receptor ectodomain interactions. *NIH Antibody Interest Group Seminar Series*, Bethesda, MD (2014).

**Long AH,** Orentas RJ, & Mackall CL. 14g2a based GD2 specific chimeric antigen receptors constitutively signal, leading to rapidly induced T cell exhaustion and poor anti-tumor efficacy in vivo. *American Association for Cancer Research Annual Meeting*, San Diego, CA (2014).

**Long AH,** Orentas RJ, & Mackall CL. Synthetic chimeric antigen receptors (CARs) rapidly induce exhaustion and augmented glycolytic metabolism in human T cells. *American Society of Hematology Annual Meeting*, New Orleans, LA (2013).

### **Research Poster Presentations:**

**Long AH,** Orentas RJ, & Mackall CL. Enhanced glycolytic metabolism is associated with exhaustion and poor antitumor efficacy in a xenograft model of chimeric antigen receptor T cell therapy for sarcoma. *Society for Immunotherapy of Cancer Annual Meeting*, National Harbor, MD (2013).

**Long AH,** Haso WM, Orentas RJ, & Mackall CL. Evaluating the susceptibility of solid tumors to chimeric antigen receptor modified T cell therapies: T cell exhaustion and poor anti-tumor efficacy. *American Association for Cancer Research Annual Meeting*, Washington, DC (2013).

**Long AH**, Highfill SH, Haso WM, Orentas RJ, & Mackall CL. Evaluating the susceptibility of solid tumors to chimeric antigen receptor (CAR) modified T cell therapies: murine myeloid derived suppressor cells suppress human CAR T cells in solid tumor xenograft model systems. *Society for the Immunotherapy of Cancer Annual Meeting*, Rockville, MD (2012).

### **TEACHING EXPERIENCE**

- 2012 - 2015    **NIH Internship Program in Biomedical Research - Mentor**
- NIH, NCI, Pediatric Oncology Branch - Bethesda, MD
  - Direct research mentor for two high school students, one undergraduate student, and one post-baccalaureate fellow
- 2013 - 2014    **NIH Cancer Immunotherapies Class for Summer Interns - Co-leader**
- NIH - Bethesda, MD
  - Taught a weekly class and journal club for high school and undergraduate students

### **SERVICE**

- 2017 - pres    **BCRP Academy of Basic and Translational Investigation - Resident Leader**
- Boston Children's Hospital - Boston, MA
  - Developed afternoon and evening curriculum for pediatric residents with interests in basic and translational science
- 2016 - pres    **BCRP Housestaff Association - Committee Member**
- Boston Children's Hospital - Boston, MA
  - Fundraised for and organized events to support pediatric residents
- 2014 - 2015    **Immunology Section Journal Club - Coordinator**
- NIH, NCI, Pediatric Oncology Branch - Bethesda, MD
  - Organized weekly journal club for undergraduate students, graduate students, post-doctoral fellows, and staff scientists
- 2014            **NIH Fellows Award for Research Excellence - Chief Judge**
- NIH - Bethesda, MD
  - Led study section for evaluating grant proposals
- 2013 - 2014    **NIH Post-Baccalaureate Poster Day - Judge and Lead Judge**
- NIH - Bethesda, MD
  - Lead Judge (2014)
- 2009 - 2010    **Northwestern University Women's Health Science Program, Oncofertility Saturday Academy - Mentor**
- Northwestern University - Chicago, IL
  - Mentored high school girls through a program that provides academic, personal, and social support through science based activities

- 2008 - 2010 **Chicago Youth Programs Teen Tutoring - Mentor and Program Coordinator**
- Northwestern University - Chicago, IL
  - Volunteered weekly for one-on-one mentoring sessions with underserved youth in Chicago
  - Ninth Grade Program Coordinator (2009 - 2010)
- 2008 - 2010 **American Medical Women's Association, Northwestern Student Chapter - Member and Coordinator Vice President**
- Northwestern University - Chicago, IL
  - Organized events focusing on the advancement of women in medicine and the improvement of women's health education
  - Coordinator Vice President (2009 - 2010)

**PROFESSIONAL MEMBERSHIPS**

- 2015 - pres Alpha Omega Alpha Honor Medical Society
- 2013 - pres American Society of Hematology
- 2013 - pres Society for the Immunotherapy of Cancer
- 2012 - pres American Association of Cancer Research
- 2010 - pres American Medical Association
- 2008 - pres American Medical Women's Association
- 2007 - pres Tau Beta Pi Engineering Honor Society