**Curriculum Vitae**

**Amy Elizabeth Moran, Ph.D.**

**Lab Address**

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**Education**



**Ph.D. Microbiology, Immunology, Cancer Biology 2006-2011**

University of Minnesota, Minneapolis, MN

**Bachelor of Science, Biology** **1997-2001**

Gonzaga University, Spokane, Washington

**Research Experience:**



**Assistant Professor of Cell, Developmental & Cancer Biology May 2017-Present**

Oregon Health & Science University

Knight Cancer Institute

Portland, Oregon

**Post-Doctoral Research 2011-April 2017**

Earle A. Chiles Research Institute, Providence Cancer Center, Portland, OR

Advisor: Andrew Weinberg, Ph.D.

Research topics: Understanding T cell receptor signal strengths within the tumor and how immunotherapy impacts these signals.

**Doctoral Research 2006-2011**

Microbiology, Immunology, and Cancer Biology, University of Minnesota, Minneapolis, MN

Advisor: Kristin Hogquist, Ph.D.

Thesis project: Exploring the role of antigen receptor affinity in lymphocyte development

**Research Associate 2004-2006**

Lombardi Cancer Center, Georgetown University, Washington D.C.

Advisor: Edward Gelmann, M.D.

Project: Elucidating a role for the tumor supporessor NKX3.1 in androgen receptor insensitive prostate cancer progression.

**Research Assistant 2001-2004**

Department of Surgery, Dana Farber Cancer Institute, Boston, MA

Advisor: Monica Bertagnolli, M.D.

Project: Characterizing *APC* mutations in colorectal cancer patients and mice promotes tumorigenesis.

**Undergraduate Murdock Research Scholar 1999-2001**

Department of Biology, Gonzaga University, Spokane, Wa

Advisor: Mia Bertagnolli, Ph.D.

Project/Duties: Support ongoing collaboration with Spokane Blood Bank to better understand Rh factor biology in blood donation.

**Past Funding**



Collins Medical Trust **2017-2018**

American Cancer Society Postdoctoral Fellowship PF-14-053-01-LIB **2014- 2016**

Young Investigator Award, Adaptive Biotechnologies **2015**

NIH T32 AI078903 Postdoctoral Training Grant **2011-2013**

Doctoral Dissertation Fellowship **2010-2011**

NIH T32 AI07313 Pre-doctoral Training Grant **2008-2010**

3M Science and Technology Graduate Fellowship **2006-2010**

Murdock Undergraduate Research Fellowship **1999-2001**

**Current Funding**



Prostate Cancer Foundation Challenge Award **2019-2021**

*Fecal Microbiota Transplant to Enhance Response to PD-1 Inhibition in Metastatic Castration Resistant Prostate Cancer*

Role: Co-PI

The goal of the PCF Challenge award is to determine if the fecal microbiome of checkpoint blockade responders can induce anti-tumor responses in patients who failed to respond.

OHSU Knight Cancer Instiute **2019-2020**

*Relieving androgen induced immune suppression to enhance anti-tumor immunity*

Role: PI

The major goal of this project is to determine the impact of enzalutamide treatment on T cell function in treatment naïve advanced prostate cancer patients.

Sponsored Research Agreement, MedImmune, LLC **2019-2021**

*Understanding if androgen deprivation therapy with immunotherapy modifies the effector function of tumor-infiltrating T cells*

Role: PI

The goal of this work is to determine if ADT therapy with checkpoint blockade represents a novel mechanism to enhance anti-tumor T cell responses.

No Number

Role: Co-I **2019-2020** Medical Research Foundation

*Single-cell Level Analysis of Dynamic Alternative Polyadenylation in the Mammalian Immune System*

We will develop a bioinformatic tool scAPA to profile the single-cell level alternative polyadenylation (APA) usages from single-cell RNA-seq data, and apply it to profile the landscape of APA in the immune cells.

2019-CCSG-24

Role: PI **2019-2020**

OHSU Knight Cancer Institute

*Relieving androgen induced immune suppression to enhance anti-tumor immunity*

The major goal of this project is to determine the impact of enzalutamide treatment on T cell function in treatment naïve advanced prostate cancer patients.

P50 CA097186 (Nelson) **2019-2020**

NIH/NCI

Role: Awardee

*The Pacific Northwest Prostate Cancer SPORE*

*Pilot Project: Relieving androgen induced T cell suppression with ADT*

The goal of this proposal is to understand the direct effect of enzalutamide on T cell function in tumor bearing animals.

**Awards**



*Nature* Highlight on Fecal Transplants in Immunotherapy **2020**

AAI Early Stage Investigator Travel Award **2020**

Finalist, OHSU Women in Health & Academic Medicine Discovery Award **2019**

The American Association for Immunologist Public Policy Fellowship **2011-2012**

Minnesota Medical Foundation Kaplan Award for Basic Research in Immunology **2011**

MICaB Travel Award **2010**

Outstanding Graduate Student Service & Achievement Award **2009**

Minnesota Medical Foundation Jan Lunden Award **2009**

Award for Outstanding Performance as a Teaching Assistant **2008**

**Leadership Positions**



**Member: Women in Health & Academic Medicine Committee 2019-Present**

**CDCB/Computational Biology Faculty Search Committee Member 2019-Present**

**PMCB/PBMS Admission Committee Member 2019-Present**

**Society for Immunotherapy of Cancer: Advances in Cancer Immunotherapy Taskforce.**

Design curriculum for a NCI cancer immunotherapy course taught nationwide. **2014-Present**

**Research Mentor.** Since 2009 I have directed the research activities of 9 rotation **2009-Present**

graduate students and 6 undergraduate students. I currently have a third year Ph.D student

in my laboratory and co-mentor a postdoctoral fellow. In addition, I serve on the Dissertation

advisory committee of 3 Ph.D. students in the PMCB program.

**Graduate Student Liaison.** Served as the graduate student representative on the **2009-2010**

executive board of the Autumn Immunology Conference. Designed conference

agenda, identified keynote speakers, and organized conference activities. Chicago, Illinois.

**Teaching Experience:**



**Lecturer: Advanced Immunology**

OHSU, Spring Semester 2018-2020.

**Lecturer: Physician Assistant Program**

OHSU, Host-Pathogen Immunity. Fall Semester 2018-Present

**Lecturer: Wy’East Post Baccalaureate Pathway to Medicine**

OHSU, Cancer & Immunity. Fall Semester 2018-Present

**Lecturer: SITC-Advances in Cancer Immunotherapy Workshop.**

Earle A Chiles Research Institute, Providence Cancer Center. Portland, OR. October 2014.

**Visiting Lecturer**

Minneapolis Community and Technical College, Fall Semester 2009. Fall Semester 2010

**Topic Expert: Graduate level immunology course**

University of Minnesota, Medical School, MICA 8012. Fall Semester 2009.

**Lecture Teaching Assistant**

University of Minnesota, College of Biological Sciences, “Immunology” MICB 4131. Fall Semester 2008

**Laboratory Teaching Assistant**

University of Minnesota, College of Biological Sciences, “Biology of Microorganisms” MICB 3301. Spring Semester 2008

**Publications**



Graff JN, Alumkal JJ, Thomas GV, Thompson RF, Wood MA, Drake CG, Slottke RE, Beer, TM, **Moran AE**. Phase II, single-arm study of prembrolizumab with enzalutamide in men with metastatic castration resistant prostate cancer progressing on enzalutamide alone.The Journal for Immunotherapy of Cancer. 8 July (2020). PMID: 32616555

Polesso F, Munks MW, Rott KH, Smart S, Hill AB, **Moran AE**. PD-1 specific ‘blocking’ antibodies that deplete PD-1+ T cells present an inconvenient variable in pre-clinical immunotherapy experiments. bioRxiv. 14 April 2020. DOI: https://doi.org/10.1101/2020.04.14.041608

Maniar A, **Moran AE**, Graff JN. (2020) The relationship between checkpoint inhibitors and the gut microbiome and its application in prostate cancer. Oncology. 2020 Mar 19;34(3). pii: 692473

Polesso F, Sarker M, Weinberg AD, Murray SE, **Moran AE.** (2019) OX40 agonist tumor immunotherapy does not impact regulatory T cell suppressive function. The Journal of Immunology. 21 August 2019.

Polesso F, Weinberg AD, **Moran AE**. (2018) Late stage tumor regression after PD-L1 blockade with a concurrent OX40 agonist.Cancer Immunology Research. Dec 18 epub. PMID: 30563828.

Napier RJ, Lee EJ, Vance EE, Snow P, Samson KA, Dawson C, **Moran AE**, Stenzel P, Davey MP, Sakaguchi S, Rosenzweig HL. (2018) Nod2 mitigates autoimmune arthritis in SKG mice. Oct 1*.* The Journal of Immunology. PMID: 30150283.

Rao SV, **Moran AE**, Graff JN. Predictors of response and resistance to checkpoint inhibitors in solid tumors. Annals of Translational Medicine. 2017 December 5 (23):468. PMID: 29285501.

**Moran AE**, Polesso F, Weinberg AD. (2016) Immunotherapy expands and maintains the function of high affinity tumor infiltrating CD8 T cells in situ. Journal of Immunology. Aug 8 epub*.* PMID: 27503208

Dillon TJ, Takahashi M, Li Y, Tavisala S, Murray SE, **Moran AE**, Parker DC, Stork PJ. (2013). B-Raf is required for positive selection and survival of DP cells, but not for negative selection of SP cells. International Immunology. April 25(4):259-69.

**Moran AE,** Kovacsovics-Bankowski M, Weinberg AD. (2013). The TNFRs OX40, 4-1BB, and CD40 as targets for cancer immunotherapy. Current Opinion in Immunology. April 25(2):230-7.

Casey KA, Fraser KA, Schenkel JM, **Moran AE**, Abt MC, Beura LK, Lucas PJ, Artis D, Wherry EJ, Hogquist K, Vezys V, Masopust D. (2012). Antigen-Independent Differentiation and Maintenance of Effector-like Resident Memory T cells in Tissues. Journal of Immunology. May 15; 188(10): 4866-75. PMID: 22504644

**Moran AE**, Hogquist KA. (2012). T cell receptor affinity in thymic development. Immunology. April; 135(4):261-7. PMID: 22182461

**Moran AE**, Holzapfel KL, Xing Y, Cunningham NR, Maltzman JS, Punt J, Hogquist KA. (2011). T cell receptor signal strength in Treg and iNKT cell development demonstrated by a novel fluorescent reporter mouse*.* Journal of Experimental Medicine. May 23, Epub. PMCID: 3173240

Hogquist KA & **Moran AE**. Treg cells meet their limit*.* Nature Immunology. 2009 June 6 (10):565-6

Wirth, LJ, Krane, JF, Li Y, Othus, M, **Moran AE**, Dorfman DM, Norris CM, Goguen L, Posner MR, Haddad RI, Bertagnolli MM. A Pilot Surrogate Endpoint Biomarker Study of Celecoxib in Oral Premalignant Lesions. Cancer Prevention Research. 2008 Oct 1; (5):339-48

**\*Moran AE**, \*Carothers AM, Cho NL, Redston M, Bertagnolli MM. *Changes in antitumor response in C57BL/6J-Min/+ mice during long-term administration of a selective cyclooxegenase-2 inhibitor.* Cancer Research. 2006 Sep 5; 114(10):1028-35 \*equal contribution

Carothers AM, Javid SH, **Moran AE**, Hunt DH, Redston M, Bertagnolli MM. Deficient E-cadherin adhesion in C57BL/6J-Min/+ mice is associated with increased tyrosine kinase activity and RhoA-dependent actomysin contractility*.* Experimental Cell Research 2006 Feb 15; 312(4):387-400.

**Moran AE**, Carothers AM, Weyant MJ, Redston M, Bertagnolli MM. Carnosol inhibits beta-catenin tyrosine phosphorylation and prevents adenoma formation in the C57BL/6J/Min/+ (Min/+) mouse*.* Cancer Research. 2005 Feb 1; 65(3):1097-104.

Javid SH, **Moran AE**, Carothers AM, Redston M, Bertagnolli MM. Modulation of tumor formation and intestinal cell migration by estrogens in the Apc(Min/+) mouse model of colorectal tumorigenesis. Carcinogenesis. 2005 Mar; 26(3):587-95.

**Moran AE**, Hunt DH, Javid SH, Redston M, Carothers AM, Bertagnolli MM. Apc deficiency is associated with increased Egfr activity in the intestinal enterocytes and adenomas of C57BL/6J-Min/+ mice*.* Journal of Biological Chemistry. 2004 Oct 8; 279(41):43261-72

Javid SA; **Moran AE;** Carothers AM, and Bertagnolli MM. Phytoestrogen-mediated suppression of Apc-

associated intestinal tumorigenesis. Journal of Surgical Research, Oct. 2003

**Presentations/Lectures**



**Moran AE**. (2019) Androgens may underscore resistance to PD-1 therapy in metastatic prostate cancer. *Invited lecture.* Netherlands Cancer Institute. Amsterdam, Netherlands September 26, 2019.

**Moran AE.** (2019) Androgens may underscore resistance to PD-1 therapy in metastatic prostate cancer. *Invited lecture.* Vrije Universiteit Medical Center. Amsterdam, Netherlands October 3, 2019.

**Moran AE.** (2018) Multiple suppressive pathways may underscore resistance to PD-1 therapy in metastatic prostate cancer. *Invited lecture*. National Prostate Cancer SPORE Retreat. Fort Lauderdale, FL March 5, 2019.

**Moran AE.** (2018) Using single-cell RNAseq to reveal the immunological landscape of metastatic castration resistant prostate cancer. *Invited lecture*. Fred Hutchinson Cancer Research Center. Seattle, Washington. June 28, 2018.

**Moran AE.** (2018) Androgen deprivation therapy and thymopoiesis; an old idea with a new twist. *Invited lecture*. Pacific Northwest Prostate Cancer SPORE Symposium. 2018

**Moran AE.** (2018) Uncovering leukocyte heterogeneity in metastatic castration resistant prostate cancer. Invited lecture. National Prostate Cancer SPORE Retreat. March 2018.

**Moran AE.** (2017) Rational combination immunotherapy in solid tumors. Invited lecture. Pacific Northwest Prostate Cancer SPORE Retreat. July 2017.

**Moran AE**. (2017) Understanding and enhancing T cell signals in the tumor microenvironment. Invited lecture. University of Arizona, Microbiology & Immunology. January 2017.

**Moran AE**, Polesso F, and Weinberg AD. (2016) Understanding T cell receptor signals in the tumor microenvironment. Invited Oral Presentation. American Cancer Society Jiler Professors and Fellows Conference. Salt Lake City, UT.

**Moran AE**, Polesso F, and Weinberg AD. (2016) Using TCR repertoire diversity in the preclinical and clinical space to understand mechanisms of action of OX40 immunotherapy. Invited Oral Presentation. Nature Conferences. Immune Profiling in Health and Disease. Seattle, WA.

**Moran AE** and Weinberg AD. (2014) Understanding the mechanism of action of agonist OX40 as a cancer therapy agent. Invited alumni lecture. Center for Immunology, University of Minnesota, Minneapolis, MN.

**Moran AE**, Polesso F, and Weinberg AD. (2014) OX40 agonist immunotherapy expands tumor reactive CD8 T cells and synergizes with PDL1 blockade to promote tumor regression. Oral presentation, plenary session. Society for the Immunotherapy of Cancer Annual Meeting. National Harbor, Md.

**Moran AE,** Holzapfel KM, Hogquist KA. (2010) The role of T cell receptor signal strength in regulatory T cell development. Oral presentation. ThymOz: An International Workshop on T Lymphocytes. Heron Island, Australia.

**Abstracts/Posters**



**Moran AE**, Polesso F, and Weinberg AD. (2015) Immunotherapy maintains the function of high affinity tumor infiltrating CD8 T cells. Poster presentation. Nature Conferences. Immune Profiling in Health and Disease. Seattle, WA.

**Moran AE**, Polesso F, and Weinberg AD. (2015) Tumor immunotherapy expands polyclonal tumor antigen specific CD8 T cells with low and high affinity TCRs and a unique TCR repertoire. Poster presentation. Keystone Symposia: T cell development and function. Snowbird, UT.

**Moran AE** and Weinberg AD. (2014) Tumor immunotherapy expands polyclonal tumor antigen specific CD8 T cells with low and high affinity TCRs and a unique TCR repertoire*.* Poster presentation. Keystone Symposia: Immune Evolution in Cancer. Whistler, Canada.

**Moran AE** andWeinberg AD. (2013) Identification and expansion of an edogenous polyclonal population of tumor antigen specific T cells. Poster presentation. AAI. Honolulu, Hawaii.

**Moran AE** and Weinberg AD. (2014) Tumor immunotherapy expands polyclonal tumor antigen specific CD8 T cells with low and high affinity TCRs and a unique TCR repertoire*.* Poster presentation. Keystone Symposia; Immune Evolution in Cancer. Whistler, Canada.

**Moran AE**, Hogquist KA. (2009) The role of T cell receptor signal strength in lymphocyte development. Autumn Immunology Conference. Oral and Poster Presentation. Chicago, IL

**Moran AE**, Hogquist KA. (2008) Identification of immunological tolerance genes using Sleeping Beauty transposon mutagenesis.Autumn Immunology Conference. Oral and Poster Presentation, Chicago, IL.

**Moran AE**, Mick V, Odumade O, Hogquist KA. (2007) A limited role for the TGF- receptor Alk-1 in T cell development. Autumn Immunology Conference. Poster Presentation, Chicago, IL.

**Moran AE**; Carothers AM; Weyant MJ; Dannenberg AJ; and Bertagnolli MM. The rosemary constituent,

Carnosol, inhibited tumor number in the C57BL/6J-Min/+ mouse and normalized β–catenin association with

E-cadherin and tyrosine phosphorylation status*.* AACR Frontiers in Cancer Prevention Research,

October 26-30, 2004. Poster Presentation.

**Moran A**; Hughes S; Hunt D; Carothers A, and Bertagnolli M*.* Cytoskeletal function in the min/+ mouse for

colorectal cancer. AACR Annual Conference. July 11-14, 2003. Poster Presentation.

**Moran A**, Hunt D; Hughes S; Muller J; Bertagnolli M, and Carothers AM. Involvement of murine Apc in

enterocytes membrane polarity. AACR Colon Cancer: Genetics to Prevention, March 7-10, 2002. Poster

Presentation.