

Toufic Mayassi

Broad Institute of MIT and Harvard, 415 Main St – Cambridge, MA 02142 USA

• ☎ (757) 725 3997 • ✉ tmayassi@broadinstitute.org • 🐦 @TouficMayassi

Training

Broad Institute of MIT and Harvard

Postdoctoral Associate, Advisor: Ramnik Xavier

Cambridge, MA

2020 – present

University of Chicago

Postdoctoral Associate, Advisor: Bana Jabri

Chicago, IL

2019 – 2020

Education

University of Chicago

Ph.D., Committee on Immunology, Advisor: Bana Jabri

Chicago, IL

2012 – 2018

Title: Dietary gluten permanently reshapes the tissue-resident intraepithelial $\gamma\delta$ T cell compartment in celiac disease

Old Dominion University

M.S., Biotechnology, Advisor: David Gauthier

Norfolk, VA

2010 – 2012

University of Virginia

B.S., Biology

Charlottesville, VA

2004 – 2008

Publications

Primary papers

Toufic Mayassi, Chenhao Li, Åsa Segerstolpe, Toru Nakata, Eric M Brown, Paula Herbst, Daniel B Graham, and Ramnik J Xavier. Spatially restricted immune and microbiota-driven adaptation of the gut. *Nature*, November 2024.

Benjamin D McDonald[†], Hope D Anderson[†], **Toufic Mayassi**[†], Magdalena Justyniarska, Benhamin S Gully, Caroline Kaiser, Narutoshi Hibino, Andrew Koh, Jamie Rossjohn, Samantha Riesenfeld, and Bana Jabri. Multifaceted $v\gamma 4$ - $btln3/8$ interaction impacts the composition and function of intraepithelial lymphocytes. *Under review in Nature Immunology*, 2024.

Toru Nakata, Chenhao Li, **Toufic Mayassi**, Helen Lin, Åsa Segerstolpe, Emma Diamond, Tommaso Biancalani, Shreya Gaddam, and S Parkar. Genetic vulnerability to healing reveals a spatially resolved epithelial restitution program. *Science Translational Medicine*, 2023.

Daniel F Rojas-Tapias, Eric M Brown, Emily R Temple, Michelle Onyekaba, Ahmed Mohamad, Kellyanne Duncan, Melanie Schirmer, Rebecca L Walker, **Toufic Mayassi**, Kerry A Pierce, Julian Avila-Pacheco, Clary B Clish, Hera Vlamakis, and Ramnik J Xavier. Inflammation-associated nitrate facilitates ectopic colonization of oral bacterium *veillonella parvula* in the intestine. *Nature Microbiology*, 2022.

Maria Magdalena Zorro, Raul Aguirre-Gamboa, **Toufic Mayassi**, Cezary Ciszewski, Donatella Barisani, Shixian Hu, Rinse K Weersma, Sebo Withoff, Yang Li, Cisca Wijmenga, Bana Jabri, and Iris H Jonkers. Tissue alarmins and adaptive cytokine induce dynamic and distinct transcriptional responses in tissue-resident intraepithelial cytotoxic T lymphocytes. *J. Autoimmun.*, 108:102422, March 2020.

Cezary Ciszewski, Valentina Discepolo, Alain Pacis, Nick Doerr, Olivier Tastet, **Toufic Mayassi**, Mariantonia Maglio, Asjad Basheer, Laith Q Al-Mawsawi, Peter H R Green, Renata Auricchio, Riccardo Troncone, Thomas A Waldmann, Nazli Azimi, Yutaka Tagaya, Luis B Barreiro, and Bana Jabri. Identification of a γc receptor antagonist that prevents reprogramming of human tissue-resident cytotoxic T cells by IL15 and IL21. *Gastroenterology*, 158(3):625–637.e13, February 2020.

Gautam Goel, Jason A. Tye-Din, Shuo-Wang Qiao, Amy K. Russell, **Toufic Mayassi**, Cezary Ciszewski, Vikas K. Sarna, ..., Bana Jabri, Ludvig M. Sollid, and Robert P. Anderson. Cytokine release and gastrointestinal symptoms after gluten challenge in celiac disease. *Science Advances*, 5(8), 2019.

Toufic Mayassi, Kristin Ladell, Herman Gudjonson, James E McLaren, Dustin G Shaw, Mai T Tran, Jagoda J Rokicka, Ian Lawrence, Jean-Christophe Grenier, Vincent van Unen, ..., Luis B Barreiro, Jamie Rossjohn, David A Price, and Bana Jabri. Chronic Inflammation Permanently Reshapes Tissue-Resident Immunity in Celiac Disease. *Cell*, 176(5):967–981, February 2019.

Špela Konjar, Ulrika C Frising, Cristina Ferreira, Reinhard Hinterleitner, **Toufic Mayassi**, Qifeng Zhang, Birte Blankenhaus, Nejc Haberman, Yunhua Loo, Joana Guedes, Marta Baptista, Silvia Innocentin, Joerg Stange, Douglas Strathdee, Bana Jabri, and Marc Veldhoen. Mitochondria maintain controlled activation state of epithelial-resident T lymphocytes. *Science immunology*, 3(24), June 2018.

Marlies Meisel, Reinhard Hinterleitner, Alain Pacis, Li Chen, Zachary M Earley, **Toufic Mayassi**, ..., Eugene B Chang, A Murat Eren, Christopher R Weber, Lambert Busque, Lucy A Godley, Elena F Verdu, Luis B Barreiro, and Bana Jabri. Microbial signals drive pre-leukaemic myeloproliferation in a Tet2-deficient host. *Nature*, 557(7706):580–584, May 2018.

Romain Bouziat, Reinhard Hinterleitner, Judy J Brown, Jennifer E Stencel-Baerenwald, Mine Ikizler, **Toufic Mayassi**, ..., Luis B Barreiro, Ramnik J Xavier, Aylwin Ng, Terence S Dermody, and Bana Jabri. Reovirus infection triggers inflammatory responses to dietary antigens and development of celiac disease. *Science*, 356(6333):44–50, April 2017.

Marlies Meisel, **Toufic Mayassi**, Hannah Fehlner-Peach, Jason C Koval, Sarah L O'Brien, Reinhard Hinterleitner, Kathryn Lesko, Sangman Kim, Romain Bouziat, Li Chen, Christopher R Weber, Sarkis K Mazmanian, Bana Jabri, and Dionysios A Antonopoulos. Interleukin-15 promotes intestinal dysbiosis with butyrate deficiency associated with increased susceptibility to colitis. *The ISME journal*, 11(1):15–30, January 2017.

Mala Setty, Valentina Discepolo, Valérie Abadie, Sarah Kamhawi, **Toufic Mayassi**, Andrew Kent, Cezary Ciszewski, Maria Maglio, Emily Kistner, Govind Bhagat, Carol Semrad, Sonia S Kupfer, Peter H Green, Stefano Guandalini, Riccardo Troncone, Joseph A Murray, Jerrold R Turner, and Bana Jabri. Distinct and synergistic contributions of epithelial stress and adaptive immunity to functions of intraepithelial killer cells and active celiac disease. *Gastroenterology*, 149(3):681–91.e10, September 2015.

Adrienne M Luoma, Caitlin D Castro, **Toufic Mayassi**, Leslie A Bembinster, Li Bai, Damien Picard, Brian Anderson, Louise Scharf, Jennifer E Kung, Leah V Sibener, Paul B Savage, Bana Jabri, Albert Bendelac, and Erin J Adams. Crystal structure of V δ 1 T cell receptor in complex with CD1d-sulfatide shows MHC-like recognition of a self-lipid by human $\gamma\delta$ T cells. *Immunity*, 39(6):1032–1042, December 2013.

Reviews.....

Toufic Mayassi and Ramnik J Xavier. Untangling the cd4 t cell response to the microbiota. *PNAS*, 120(16), Apr 2023.

Toufic Mayassi, Luis B Barreiro, Jamie Rossjohn, and Bana Jabri. A multilayered immune system through the lens of unconventional T cells. *Nature*, 595(7868):501–510, July 2021.

Toufic Mayassi and Bana Jabri. Human intraepithelial lymphocytes. *Mucosal Immunology*, 11(5):1281–1289, September 2018.

Sangman Michael Kim[†], **Toufic Mayassi**[†], and Bana Jabri. Innate immunity: actuating the gears of celiac disease pathogenesis. *Best Practice & Research Clinical Gastroenterology*, 29(3):425–435, June 2015.

[†] Equal contribution.

Oral Presentations & Posters

Oral Presentations.....

Keystone Symposia Conference on Innate Immunity Across the Molecular, Cellular, and Therapeutic, Banff Canada – "Molecular cartography reveals robust, adaptable, and resilient intestinal networks" – 2024

Klarman Cell Observatory Scientific Advisory Board Meeting, Cambridge MA – "Molecular cartography reveals hard-wired and microbial regulated spatial regionalization of the gut" – 2022

Keystone Symposia Conference on Tissue Immunity, Boulder CO – "Insights into tissue-resident immunity and intraepithelial $\gamma\delta$ biology from celiac disease" – 2020

Rising Stars Symposium in Human Immunology, Chicago IL – "Insights into $\gamma\delta$ IEL biology from celiac disease" – 2019

18th International Congress of Mucosal Immunology, Washington D.C. – "Selecting the repertoire and functional niche of V δ 1 $\gamma\delta$ T cells in health and disease" – 2017

Autumn Immunology Conference, Chicago IL – "The small intestine selects the T cell receptor repertoire and functional niche of V δ 1 $\gamma\delta$ T cells in health and disease" – 2016

Fred Hutch 1st Annual Immunology Graduate Student Symposium, Seattle WA – "Novel insights into V δ 1 $\gamma\delta$ T cells using celiac disease as a model" – 2016

16th ICDS, Prague CZ – "Characterizing TCR $\gamma\delta$ T cells in tissues and disease" – 2015

Posters

Gordon Research Conference on Immunochemistry and Immunobiology, West Dover VT – "Chronic inflammation permanently reshapes the human tissue-resident $\gamma\delta$ intraepithelial T cell compartment" – 2018

18th International Congress of Mucosal Immunology, Washington D.C. – "Selecting the repertoire and functional niche of V δ 1 $\gamma\delta$ T cells in health and disease" – 2017

Autumn Immunology Conference, Chicago IL – "The small intestine selects the T cell receptor repertoire and functional niche of V δ 1 $\gamma\delta$ T cells in health and disease" – 2016

15th ICDS, Chicago IL – "Cysteinyl Leukotrienes and NKG2D Mediated Cytotoxicity" – 2013

Teaching Assistantships

Mucosal Immunology IMMU 3700 - University of Chicago - Spring 2015

Immunopathology BIOS 25258 - University of Chicago - Winter 2014

Biological Microscopy BIOL 812 - Old Dominion University - Spring 2011

Mentoring/Training/Advising

Mentored 8 graduate students: feedback on experimental design, data analysis/interpretation, and writing

Trained 3 graduate students, 5 research technicians, and 2 undergraduate students at the bench

Advised 2 research associates on independent projects

Outreach

University of Chicago committee on immunology graduate recruitment talks

Journal club establishment and maintenance

Intramural soccer

Running club

Hiking club

Honors & Awards

Best Dissertation Award - Outstanding Performance in the Field of Immunology (\$500) – 2019

Best Poster Award - Gordon Research Conference on Immunochemistry and Immunobiology (\$500) – 2018

University of Chicago Graduate Council Travel Fund (\$600) – 2017

Computational Experience

R, \LaTeX

Processing and analysis of single cell multiomic and spatial transcriptomic datasets

Bench Experience

Expert.....

Human immunology and animal models

Advanced cell isolation methods for epithelial, stromal, and immune cells from mucosal tissue

Processing human peripheral blood and gut tissue biopsies

Designing *ex vivo/in vitro* cellular assays/systems

Cell culture (broad cell types including the generation of primary human cell lines from peripheral and tissue T cells)

Flow cytometry (30 plus color) and Fluorescence-activated cell sorting (self sorting, bulk, single cell)

Smart-seq2 and 10x genomics Single-cell RNA-sequencing pipelines

10x genomics Visium and Xenium and Slide-seq2 spatial transcriptomics pipelines

Cloning/Transfection/Transduction

Immunofluorescence/Immunohistochemistry/Fluorescence microscopy

Competent.....

Gas chromatography-mass spectrometry (GC-MS)

CyTOF (panel design, sample prep, and instrument operation)

Electron microscopy

Bioplex/ELISA

CODEX

ChIP-seq

References

Ramnik Xavier, M.D., Ph.D. - Postdoc Mentor

Kurt J. Isselbacher Professor of Medicine in the Field of Gastroenterology

Core Institute Member, Broad Institute of MIT and Harvard

rxavier@broadinstitute.org

(617) 6433331

Bana Jabri, M.D., Ph.D. - Ph.D. Mentor

Sarah and Harold Lincoln Thompson Professor

Dept. of Medicine, Pathology and Pediatrics, University of Chicago

bjabri@uchicago.edu

(773) 8348670

Pete Savage, Ph.D.

Associate Professor | Department of Pathology

Chair of Committee on Immunology, University of Chicago

psavage@bsd.uchicago.edu

(773) 7027553