

Curriculum Vitae  
**Melis Anahtar, MD PhD**

Date Prepared: January 2, 2020

**Education**

Year	Degree	Field of Study	Institution
09/2004-06/2008	SB	Mechanical Engineering	Massachusetts Institute of Technology (MIT)
10/2008-08/2009	MSc	Integrated Immunology	University of Oxford
09/2011-05/2015	PhD	Immunology (Douglas S. Kwon & Bruce D. Walker)	Harvard University
09/2009-05/2017	MD	Medicine	Harvard/MIT Health Sciences and Technology Program

**Postdoctoral Training**

Date	Title	Specialty	Institution
07/17-06/18	Resident	Clinical Pathology	Massachusetts General Hospital
07/18-06/19	Chief Resident	Clinical Pathology	Massachusetts General Hospital
07/19-06/20	Fellow	Medical Microbiology	Massachusetts General Hospital

**Other Professional Positions**

Year(s)	Title	Institution	Level of effort
2012-2015	Scientific consultant	Enumeral Biomedical Inc.	
2015	Scientific consultant	Epiva Biosciences/ Flagship Ventures	
2016-	Co-founder and consultant	Day Zero Diagnostics	5 hours a week

**Committee Service**

Year	Name of Committee	Institution
2009-	Distinguished Fellowships Committee	MIT

**Honors and Prizes**

Year	Name of Honor/Prize	Awarding Organization	Achievement for which awarded
2007	John C. and Elizabeth J. Chato Award for Excellence in Bioengineering	MIT	Research
2008	Wunsch Foundation Silent Hoist and Crane Award for Academic Excellence	MIT	Academic
2007	Rhodes Scholarship	The Rhodes Trust	Academic
2008	MSTP Grant Recipient	NIH Medical Scientist Training Program	Academic
2010	P.D. Soros Fellow	Paul and Daily Soros Fellowship	Academic
2012	Front-line Full Scholarship Recipient	TEDMED	Clinical
2013	Young Investigator Scholarship	Conference on Retroviruses and Opportunistic Infections (CROI)	Research
2014	International Achievement Summit	Academy of Achievement	Academic

2016	delegate Winner of the New England Region for Day Zero Diagnostics (\$10,000 prize)	Harvard Business School Alumni New Ventures Competition	Research
2016-17	Selected member	Harvard Life Lab	Research
2015-17	Selected member of the Venture Incubation Program	Harvard Innovation Lab	Research
2017	Finalist with Day Zero Diagnostics	Harvard President's Innovation Challenge	Research
2017	Audience Choice (\$1,000) with Day Zero Diagnostics	MIT Sloan Healthcare Innovations Competition	Research
2017	Leon Reznick Memorial Prize for excellence and accomplishments in research	Harvard Medical School	Research
2017	CP Conference Best Speaker Award	MGH	Clinical
2018	Poster of Distinction, Harvard Pathology Annual Retreat	Harvard Pathology	Research
2018	Pathology Research Department First Place Award, MGH Clinical Research Day	MGH	Research
2019	Pathology Research Department First Place Award, MGH Clinical Research Day	MGH	Research

## Report of Local Teaching and Training

### Teaching of Students in Courses

Year	Course Title Type of student/audience	Location Level of effort
2010-2015	HST.175: Immunology 1 <sup>st</sup> year medical students and graduate students	Harvard Medical School 10 hours a week for 12 weeks (when head teaching assistant)
2012	Imm.302qc Clinical Immunology 1 <sup>st</sup> year graduate students	Harvard University 4 hours a week for 6 weeks
2012	Immunology Summer Program Undergraduate students	Harvard University 6 hours a week for 6 weeks
2014	Harvard University CFAR Workshop on Metagenomics and Transcriptomics Technicians through senior faculty	Harvard Medical School 8 hours a day for 1 week
2017	Neuroengineering seminar (NEUR 333)	Wellesley College 2 hour lecture

### Local Invited Presentations

Year	Title of Presentation/ Type of presentation Department and Institution where presented
2016	The role of cervicovaginal bacteria in genital inflammation and HIV acquisition/ Laboratory & Molecular Medicine Conference Department of Pathology, Massachusetts General Hospital
2016	Impact of the vaginal microbiome on HIV acquisitions: lessons from a South African cohort/ Infectious Disease and Microbiome Seminar Broad Institute
2016	The role of cervicovaginal bacteria in genital inflammation and HIV acquisition/ HIV/AIDS Conference Department of Medicine, Tufts Medical Center

## Report of Regional, National and International Teaching and Presentations

### Regional

Year	Title of Presentation/ Type of presentation Location (Sponsor, if any)
2016	Impact of the vaginal microbiome on HIV acquisitions: lessons from a South African cohort Yale University Clinical Pathology Conference New Haven, Connecticut

### National

Year	Title of Presentation/ Type of presentation Location (Sponsor, if any)
2012	Characterizing protective mucosal immune responses to HIV Turkish American Scientists and Scholars Association conference. College Park, Maryland

### Report of Scholarship (\* indicates equal contribution)

- Sethu P, **Anahtar M**, Moldawer LL, Tompkins RG, Toner M. Continuous flow microfluidic device for rapid erythrocyte lysis. *Analytical Chemistry*, 2004 76(21), 6247-53. PMID 15516115.
- Aptekar JW, Cassidy MC, Johnson AC, Lee MY, Ogier AC, Vo C, **Anahtar MN**, Ren Y, Bhatia SN, Ramanathan C, Cory DG, Hill AL, Mair RW, Rosen M, Walsworth RL, Marcus CM. Silicon nanoparticles as hyperpolarized magnetic resonance imaging agents. *ACS Nano*, 2009 3(12), 4003-8. PMID 19950973.
- Streeck H, Kwon DS, Pyo A, Flanders M, Chevalier MF, Law, K., Julg B, Trocha K, Jolin JS, **Anahtar MN**, Lian J, Toth I, Brumme, Z, Chang JJ, Caron T, Rodig SJ, Milner DA, Piechoka-Trocha A, Kaufmann DE, Walker BD, Altfeld M. "Epithelial adhesion molecules inhibit HIV-1-specific CD8+ T-cell functions." *Blood*, 2011 May 12; 117(19):5112-22. PMID 21403126.
- Varadarajan N, Kwon DS, Law KM, Ogunniyi AO, **Anahtar MN**, Richter JM, Walker BD, Love JC. "Rapid, efficient functional characterization and recovery of HIV-specific human CD8+ T cells using microengraving." *PNAS*, 2012 Mar 6; 109(10):3885-90. PMID 22355106.
- Anahtar MN**, Byrne EH, Doherty KE, Bowman BA, Yamamoto H, Soumillon M, Padavattan N, Ismail N, Moodley A, Sabatini M, Ghebremichael MS, Nusbaum C, Huttenhower C, Virgin HS, Ndung'u T, Dong KL, Walker BD, Fichorova RN, and Kwon DS. "Cervicovaginal microbiota modulate host inflammatory responses in the female genital tract". *Immunity*, 2015 May 19; 42 (5): 965–976. PMID 25992865.
- Byrne EH\*, **Anahtar MN\***, Cohen KE, Moodley A, Padavattan N, Ismail N, Bowman B, Olson GS, Mabhula A, Leslie A, Ndung'u T, Walker BD, Ghebremichael MS, Dong KL, Kwon DS. "The association of injectable progestin-only contraceptives with HIV acquisition and HIV target cell frequency in the female genital tract in South African women: a prospective cohort study." *Lancet Infectious Diseases*, 2016 Apr; 16 (4): 441-8. PMID 26723758.
- Anahtar MN**, Bowman BA, Kwon DS. "Efficient nucleic acid extraction and 16S rRNA gene sequencing for bacterial community characterization." *Journal of Visualized Experiments*, 2016 Apr 14; Issue 110. PMID 27168460.
- Gosmann C, **Anahtar MN**, Handley SA, Farcasanu M, Abu-Ali G, Bowman BA, Padavattan N, Desai C, Droit L, Moodley A, Dong M, Chen Y, Ismail N, Ndung'u T, Ghebremichael MS, Wesemann DR, Mitchell C, Dong KL, Huttenhower C, Walker BD, Virgin HW, Kwon DS. "*Lactobacillus*-Deficient

Cervicovaginal Bacterial Communities Are Associated with Increased HIV Acquisition in Young South African Women". *Immunity*, 2017 Jan 17; 46 (1): 29-37. PMID: 28087240.

9. Hogan NC, **Anahtar MN**, Taberner AJ, Hunter IW. "Delivery of immunoreactive antigen using a controllable needle-free jet injector." *Journal of Controlled Release*, 2017 May 4; 258: 73-80.
10. **Anahtar MN**, Gootenberg DB, Mitchell CM, Kwon DS. "Cervicovaginal Microbiota and Reproductive Health: The Virtue of Simplicity." *Cell Host and Microbe*. 2018 Feb 14;23(2):159-168. PMID: 29447695.
11. Turbett SE\*, **Anahtar MN\***, Pattanayak V, Azar MM, Coffey KC, Eng G, Rudolf JW, Lewandrowski KB, Baron J, Rosenberg ES, Branda JA. "Use of routine complete blood count results to rule out anaplasmosis without the need for specific diagnostic testing." *Clin Infect Dis*. 2019 May 2. PMID: 31044232.
12. Gaiha GD, Rossin EJ, Urbach J, Landeros C, Collins DR, Nwonu C, Muzhingi I, **Anahtar MN**, Waring OM, Piechocka-Trocha A, Waring M, Worrall DP, Ghebremichael MS, Newman RM, Power KA, Allen TM, Chodosh J, Walker BD. "Structural topology defines protective CD8+ T cell epitopes in the HIV proteome." *Science*. 2019 May 3;364(6439):480-484. PMID: 31048489.
13. Chiappa V, Anderson MA, Barrett CD, Stathatos N, **Anahtar MN**. "Case 24-2019: A 39-Year-Old Woman with Palpitations, Abdominal Pain, and Vomiting." *N Engl J Med*. 2019 Aug 8; 381(6):567-577. PMID: 31390504.

#### **Non-peer reviewed scientific or medical publications/materials in print or other media**

1. **Anahtar M** & P Baranay. "The slope of biology: an interview with Eric Lander." *MIT Undergraduate Research Journal*. 16 (2007) 18.
2. Luckyanova M & **M Anahtar**. "Developing world prosthetics." *MIT Undergraduate Research Journal*. 17 (2008) 16.
3. **Anahtar M**. "Needle-free injectors as a sustainable alternative to syringes." *MIT International Review*. 2 (2008).

#### **Theses**

1. S.B. Thesis: **Anahtar M**. "Designing and characterizing hyperpolarizable silicon nanoparticles for Magnetic Resonance Imaging." May 9, 2008. Thesis Supervisor: Prof. Sangeeta Bhatia.
2. M.Sc. Thesis: **Anahtar M**. "The role of lymphatic endothelial cells in innate immunity: Podoplanin as a ligand for neutrophil trafficking in lymphatic vessels and hyaluronan degradation products as Toll-like receptor agonists in lymphatic endothelium." August 8, 2009. Thesis Supervisor: Prof. David Jackson.
3. Ph.D. Thesis: **Anahtar MN**. "The contribution of cervicovaginal microbiota and hormonal contraceptives to genital inflammation and HIV acquisition risk." May 13, 2015. Thesis Supervisors: Prof. Douglas Kwon and Prof. Bruce Walker
4. M.D. Thesis: **Anahtar M**. "Rapid and comprehensive bacterial identification and antimicrobial resistance determination using microfluidic enrichment and whole-genome sequencing." April 25, 2017. Thesis Supervisor: Prof. Douglas Kwon.

#### **Abstracts and Poster Presentations**

1. Hogan NC, Taberner AJ, **Anahtar MN**, Hunter IW. "Delivery of immunoreactive antigen using a lorentz-force actuated jet injector." Abstract for the 2007 Innovation in Drug Delivery Conference.
2. Markello TC, **Anahtar M**, Bernardini I, Gochuico BB, O'Brien K, Golas GA, Gahl WA. "Serum levels of the KL-6 epitope of MUC1 correlate with pulmonary fibrosis in Hermansky-Pudlak syndrome." Abstract for the 2007 American Society of Human Genetics Conference.

3. Gradstein L, Fitzgibbon EJ, Huizing M, **Anahtar M**, Hejtmancik JF, Tang J, Caruso R, Blain D, Brooks BP. "Albinism without nystagmus in a family with temperature-sensitive tyrosinase polymorphism mimicking x-linked ocular albinism." Abstract for 2008 Israel Society of Eye and Vision Research Conference.
4. Ziegler SG, Siegenthaler MP, Adams D, Wahl CE, Groden C, **Anahtar M**, Markello TC, Gahl WA. "A lack of heterozygosity linkage region resulting in rare medial arterial calcification in five siblings." Abstract presented at the 2009 American Society of Human Genetics conference.
5. Gaiha G, **Anahtar M**, Rossin E, Walker B. "Determination of structural constraint with the HIV proteome through analysis of amino acid microenvironments." Poster presented at the 2012 AIDS Vaccine conference.
6. Corleis B, Deruaz M, Olson G, Lisanti A, Bowman B, Cho JL, Medoff B, **Anahtar MN**, Vrbanac V, Tager AM, Kwon DS. "Severe depletion of lung CD4 T cells during HIV infection impairs CD4 dependent macrophage activation." Poster presented at the 2014 Conference on Retroviruses and Opportunistic Infections.
7. **Anahtar MN**, Deruaz M, Bowman B, Tager AM, Kwon DS. "Double stranded RNA stimulates IL-1 $\beta$  secretion in cervical epithelial cells via the inflammasome." Poster presented at the 2014 Conference on Retroviruses and Opportunistic Infections.
8. **Anahtar MN**, Pattanayak V, Branda JM, Azar MM, Coffey K, Eng G, Rudolf J, Baron J, Lewandrowski KB, and Turbett, SE. The development of a laboratory screening algorithm for Anaplasma phagocytophilum polymerase chain reaction testing. Poster presented at the 2018 IDWeek Conference.

### **Narrative Report**

My training is at the intersection of immunology, microbiology, biomedical engineering, and medicine. My graduate work focused on understanding the contribution of cervicovaginal microbiota and hormonal contraceptives to genital inflammation and HIV acquisition risk. We identified specific pro-inflammatory bacterial species that are endogenous to the female genital tract in many South African women and are associated with a higher risk of HIV acquisition (manuscript in review). We also found that women who use injectable progestin-only contraceptives, the most common form of birth control in sub-Saharan Africa, have a 3.9-fold higher risk of acquiring HIV than women not using family planning, and a significantly higher frequency of activated HIV target cells in the cervix.