BIOGRAPHICAL SKETCH

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NAME: Fernandez-Becker, Nielsen Quimaira

eRA COMMONS USER NAME (credential, e.g., agency login): FERNANDEZ.NIELSEN

POSITION TITLE: Clinical Assistant Professor in Medicine

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE *(if applicable)*	Completion Date MM/YYYY	FIELD OF STUDY
City University of New York	B.S.	1989-1994	Biology
Albert Einstein College of Medicine, Bronx, NY	M.S.	1997	Biological Sciences
Albert Einstein College of Medicine, Bronx, NY	M.D.	1994-2002	Medicine
Albert Einstein College of Medicine, Bronx, NY	Ph.D.	1994-2002	Molecular Genetics

A. Personal Statement

I am a Clinical Associate Professor in Medicine in the Division of Gastroenterology and Director of the Celiac Disease Program at Stanford University. I am highly experienced in diagnosis and management of celiac disease and gluten associated disorders. Our clinic has a strong referral base for new patients and has many established patients. As a physician-scientist, my goal is to both provide excellent patient care while seeking a better understanding of the pathophysiology of celiac disease. I have established a bio-repository of clinical specimen from celiac patients including intestinal biopsies, blood, stool and urine, and I am actively collaborating with basic scientists at Stanford (Drs. Chaitan Khosla, Calvin Kuo and Mark Davis) to investigate molecular mechanisms underlying celiac sprue. As Director of the Celiac Disease Program, I am in a unique position to identify celiac patients and appropriate controls for purposes of our collaborative studies. As a clinician with a basic science background, I am well suited to draw on my clinical expertise to analyze clinical data and correlate with experimental findings.

B. Positions and Honors

Appointments:

2002-2005 Clinical Fellow in Medicine, Massachusetts General Hospital Harvard Medical School
2005-2009 Clinical and Research Fellow in Gastroenterology, Harvard Medical School
2009-2012 Instructor in Medicine, Division of Gastroenterology and Hepatology, Stanford University
2012- present Clinical Assistant Professor of Medicine and Gastroenterology, Stanford University
2012- present Director, Celiac Disease Program, Stanford University
2019- present Clinical Associate Professor of Medicine and Gastroenterology, Stanford University

Honors and Awards:

1994 William Stratford Prize for Academic Excellence, City University of New York
1994 Edmund Baerman Award for Excellence in Biology, City University of New York
1994 Jonas Salk Award, Honorable Mention, City University of New York
1992-1994 NIH MARC/MBRS Undergraduate Program

1995-2000	NIH NIGMS MARC Predoctoral Fellowship F31-GM17568, Albert Einstein College of Medicine
2000-2002	Samuel and May Rudin Scholarship, Albert Einstein College of Medicine
2002	Deans List, Albert Einstein College of Medicine
2014	Hispanic Center of Excellence Fellowship Grant, Stanford University
2014-2015	Councilor on the Neurogastroenterology and Motility Section of the American Gastroenterological Association Institute Council
2018	Endowed Fellow, Sean N Parker Center for Allergy and Asthma Research, Stanford University

Memberships in National Scientific Societies:

2005-2009	American Society for Gastrointestinal Endoscopy
2006- 2009	American Association for the Study of Liver Diseases
2008- current	American College of Gastroenterology
2008- current	American Gastroenterological Association
2012- current	American Neurogastroenterology and Motility Society
2017- current	North American Society for Study of Celiac Disease

C. Contributions to Science

1. Early studies focused on understanding molecular mechanisms that control embryonic dorsal-ventral polarity in Drosophila. We discovered that Cactus protein undergoes regulated degradation in gradient fashion which results in graded activation of the NF-KB analogue protein dorsal protein that governs the Drosophila dorso-ventral body plan. We reported on novel separable redundant regulatory determinants in the Cactus protein.

a. Bergmann A, Stein D, Geisler R, Hagenmaier S., Schmid B, **Fernandez N**, Schnell B, Nusslein-Volhard C. A gradient of cytoplasmic Cactus degradation establishes the nuclear localization gradient of the dorsal morphogen in Drosophila. *Mechanisms of Development*. 1996; 60(1)109-23.

b. **Fernandez NQ,** Grosshans J, Goltz JS, Stein D. Separable and redundant regulatory determinants in Cactus mediate its dorsal group dependent degradation. *Development*. 2001; 128(15) 2963-74.

c. **Fernandez NQ**. Control of *drosophila* Embryonic Dorsal-Ventral Polarity by the Cactus Protein. Thesis Dissertation, 2002.

2. Later studies focused on understanding clinical predictors of response to infliximab in patients with Crohn's disease. Our findings indicated that infliximab infusion reactions led to interruption of therapy and that concomitant use of a immunomodulator had a modest effect at preventing infusion reactions.

a. Moss AC, **Fernandez-Becker N**, Jo Kim KJ, Cury D, Cheifetz AS. The impact of infliximab infusion reactions on long-term outcomes in patients with Crohn's disease. *Alimentary Pharmacology Therapeutics*. 2008; 28(2):221-7.

b. Moss AC, Kim KJ, **Fernandez-Becker N,** Cury D, Cheifetz AS. Impact of concomitant Immunomodulator use on long-term outcomes in patients receiving scheduled maintenance infliximab. *Digestive Disease Science*. 2010; 55(5): 1413-20.

c. **Fernandez-Becker NQ**, Moss AC. *In silico* analysis of T-bet activity in peripheral blood mononuclear cells in patients with inflammatory bowel disease (IBD). *In silico Biology*. 2009; 9 (5-6):355-63.

3. Current studies focus on molecular mechanisms underlying the pathogenesis of celiac disease. Celiac disease results when dietary gluten and MHC class II alleles, HLA-D02 or HLA-DQ8, trigger CD4+ T cell-dependent mucosal injury to the small bowel. Epithelial and immune cell interactions are critical for development of celiac disease. Our work supports a role for gut-homing gluten responsive CD8+ and γδ T cells following gluten exposure in celiac disease pathogenesis. To further understand celiac pathogenesis, our collaborative team (Calvin Kuo, Mark Davis, Elizabeth Mellins and myself) is currently utilizing organoids that we have generated from intestinal biopsies to define crosstalk between gluten-specific T cells and epithelium,

a. Han A, Newell E, Glanville J, **Fernandez-Becker N**, Khosla C, Chien Y, Davis M. Dietary gluten triggers concomitant activation of $CD4^+$ and $CD8^+$ αβ T cells and γδ T cells in celiac disease. *PNAS, USA*. 2013; 10(6):13073-8.
b. Wosen JE, Ilstad-Minnihan A, Co JY, Jiang W, Mukhopadhyay D, **Fernandez-Becker NQ**, Kuo CJ, Amieva MR, Mellins ED. Human Intestinal Enteroids Model MHC- II in the Gut Epithelium. *Front. Immunol.* 2019 10: 1970

4. Food allergies have increased in prevalence in last decade as have eosinophilic disorders of GI tract namely eosinophilic esophagitis (EoE). The goal of our research is to understand molecular mechanisms for food allergy. Using biopsies GI tract of peanut allergic undergoing oral-immunotherapy (OIT) we found that peanut allergic patients have gastrointestinal eosinophilia at baseline. Subsequent studies will focus on development of tissue eosinophilia longitudinally in our OIT cohort and role of B and T cells in development of food allergies.

1. Wright,B, **Fernandez-Becker NQ,** Kambham, N, Purington, N, Tupa, D, Zhang, W, Rank, M, Hirohito K, Shim, K, Bunning, B, Doyle, A, Jacobsen E, Boyd, S, Tsai, M, Holden, M, Manohar, M, Galli, S, Nadeau, K, Chinthrajah RS. Baseline Gastrointestinal Eosinophilia is Common in Oral Immunotherapy Subjects with IgE Mediated Peanut Allergy. *Front. Immunol*. 2018 9;2624

2. Ho, RA, Joshi SA, Lee JY, Martin BA, Varma S, Kwok S, Nielsen SCA, Nejad P, Haranguchi EM, Dixit PS, Shthanandan SV, Roskin KM, Zhang W, Tupa D, Bunning BJ, Manohar M, **Fernandez-Becker, NQ**, Khambam, N West RB, Hamilton RG, Tsai M, Galli SJ, Chinthrajah RS, Nadeau KC, Boyd SD. Origins and clonal convergence of gut-resident IgE+ B cells in human peanut allergy. *Sci Immunol. 2020 5(45)*

5. Gastrointestinal dysmotility is a common and disabling disorder that causes significant morbidity. Dysmotility can be result of systemic disorders such as scleroderma as well as primary gastrointestinal disorders such as gastroesophageal reflux and gastroparesis. We found that pseudo-obstruction is a rare but important cause of hospitalization in patients with Systemic Sclerosis (SSc) that is associated high degree of mortality. Subsequent studies establish a correlation between gastric and esophageal dysmotility and explore use of available pH testing to minimize PPI. Finally, our work supports use of vagal nerve stimulation as therapy for gastroparesis

a. Valenzuela A, Li S, Becker LS, **Fernandez-Becker NQ**, Khanna D, Nguyen L, Chung L. Intestinal pseudo-obstruction in patients with systemic sclerosis: an analysis of the Nationwide Inpatient Sample. *Rheumatology* 2016; 55(4):654-8.

b. Zikos, TA, Clarke JO, Triadafilopoulos G, Regalia KA, **Fernandez-Becker NQ,** Nandwani MC, Nguyen LA. A Positive Correlation between Gastric and Esophageal Dysmotility suggests common Causality. *Dig Dis Sci*. 2018

c. Triadafilopoulos G, Zikos T, Regalia K, Sonu I, **Fernandez-Becker NQ**, Nguyen L, Nandwani MCR, Clarke JO. Use of Esophageal pH Monitoring to Minimize Proton-Pump inhibitor Utilization in Patients with Gastroesophageal Reflux Symptoms. *Dig Dis Sci*. 2018 63(10):2673-2680

d. Gottfried-Blackmore, Adler EP, **Fernandez-Becker N,** Clarke J, Habtezion A, Nguyen L. Open Label pilot study: Non-invasive vagal nerve stimulation improves symptoms and gastric emptying in patients with idiopathic gastroparesis. Neurogastorenterol Motil. 2019 Dec 5:e13769

D. Additional Information: Research Support and/or Scholastic Performance

CURRENT SUPPORT:

AW737301 Sindher (PI) 10/1/18- 9/30/2021
Regeneron Pharmaceuticals
A Phase 3, Randomized, 3-Part Study to Investigate the Efficacy and Safety of Dupilumab in Adult and Adolescent Patients with Eosinophilic Esophagitis (EoE)
Major Goals: Assess Efficacy of Dupilumab in EoE patients.
Role: Co-Investigator

Completed Research Support**:**

SP-1011-002 Nadeau (PI) 9/1/2017- 9/30/2019
Adare Pharmaceuticals
FLUTicasone in Eosinophilic Esophagitis (FLUTE): A Randomized, Double-blind, Placebo-controlled, Dose-ranging, and Maintenance Study of APT-1011 in Subjects with Eosinophilic Esophagitis
Major Goals: Assess efficacy of APT-1011 in Eosinophilic esophagitis
Role: Co-Investigator

5 R01 DK063158-15 Khosla (PI) 7/1/2018 – 6/30/2019
NIH/NIDDK
Role of Transglutaminase 2 in Celiac Sprue
Major Goals: This project investigates the molecular mechanisms underlying Celiac Sprue
Role: Collaborator

U19 AI104209-04 Galli (PI) 2/01/2019 – 1/31/2019
NIH/NIAID
Integrated Genomic and Functional Studies of Tolerance Therapy for Peanut Allergy; Functional and Molecular Changes in T cells and B Cells in Peanut Allergy and Oral Immunotherapy
The major goals are to define the immune mechanisms associated with immune tolerance after oral immunotherapy.
Role: Collaborator

Scleroderma Research Foundation Chung (PI) 5/1/2012 – 4/30/2018
Northern California Scleroderma Research Consortium
The goal of this study is to develop a scientific research consortium to accelerate collaborative research on scleroderma between UCSF and Stanford
Role: Collaborator

Scleroderma Foundation Chung (PI) 1/15/2015 – 1/14/2017
Molecular Characterization of Multi-Organ Involvement in Patients with Systemic Sclerosis
The goal of this study is to identify common and organ-specific dysregulated molecular pathways among multiple organ systems in systemic sclerosis patients.
Role: Collaborator

F31- GM17568 1995-2000
NIH MARC Pre-doctoral Fellowship
Investigator: Graduate student PhD candidate
Project title: Control of drosophila Embryonic Dorsoventral polarity by the Cactus Protein

NIH MARC/MBRS Undergraduate Program 1992- 1994

Investigator: Undergraduate student
Project Title: Development of retinotectal projection in *xenopus laevis*
City University of New York, City College