

# CURRICULUM VITAE

Date Updated: October 7, 2021

## Part I: General Information

**Name:** Eleftheria Maratos-Flier

**Position:** Professor Emerita, Harvard Medical School  
Director, Translational Medicine, NIBR

E-mail: emaratos@bidmc.harvard.edu

Phone: 617-470-5866

## Education:

B.A. New York University, New York, New York

M.D. Mount Sinai School of Medicine  
New York, New York

## Licensure and Certification:

Massachusetts License Registration  
American Board of Internal Medicine

## Academic Appointments:

1982-1987	Instructor in Medicine	Harvard Medical School
1987-1999	Assistant Professor of Medicine	Harvard Medical School
1999-2010	Associate Professor of Medicine	Harvard Medical School
2010-2018	Professor of Medicine	Harvard Medical School
2018-	Professor Emerita	Harvard Medical School

## Current Position:

2018- Director, Translation Medicine  
Cardiovascular and Metabolism Translational Medicine  
Novartis Institutes for Biomedical Research

## Hospital or Affiliated Institution Appointments:

1982-1999	Associate Physician	Brigham and Women's Hospital Boston, Massachusetts.
1987-	Active Provisional Staff	Beth Israel Deaconess Medical Center Boston, Massachusetts.

1982-1983	Research Associate	Joslin Diabetes Center Section of Cellular and Molecular Physiology Boston, MA
1984-2000	Investigator	Joslin Diabetes Center Section of Cellular and Molecular Physiology Boston, MA
2000- 2004	Head, Section on Obesity Senior Investigator	Joslin Diabetes Center, Boston, Massachusetts

**Other Professional Positions:**

2001-2018	Affiliate Faculty	Program in Neuroscience Harvard Medical School
2002-2010	Society Research Fellow	Peabody Society Harvard Medical School
2005-2018	Associate Advisor	Peabody Society Harvard Medical School
2006-2010	Director, Role of Discovery in Medicine, Year I course	Harvard Medical School
2011-2018	Associate Member	Broad Institute
2018-	Director, Translational Medicine	NIBR, Cambridge

**Hospital and Health Care Organization Service Responsibilities:**

1982-1990	Diabetes Attending	Joslin Diabetes Center
1982-1996	Diabetes Attending	Brigham and Women's Hospital
1982-2000	Diabetes Outpatient Clinic	Brigham and Women's Hospital
2000-2004	Diabetes Outpatient Clinic	Joslin Diabetes Center
2004-	Staff Physician	Beth Israel Deaconess

**Major Administrative Responsibilities:**

1984-1986	Co-Organizer Longwood Medical Area Diabetes Seminar Series
1991-1994	Co-Organizer Longwood Medical Area Diabetes Seminar Series
1994-2002	Director, Molecular Core, Joslin Diabetes Center

1999-2002	Organizer, Longwood Medical Area Diabetes Seminar Series
2002-2004	Director, Animal Physiology Core, Joslin Diabetes Center
2004-2012	Director, Animal Physiology Core, Division of Endocrinology Beth Israel Deaconess Medical Center
2006-2008	Associate Director, Endocrine Fellowship, BIDMC
2009-2018	Director, Office for Academic Careers and Faculty Development Beth Israel Deaconess Medical Center

**Major Committee Assignments:**

1998-2004	Joslin Animal Care Committee (IACUC)
1999-2002	Endocrine Society - Annual Meeting Steering Committee
2002-	Ad Hoc Reviewer, Special Study Section /NPSA/NIDDK/NIH
2005-2009	Medical Education Reform Committee, Concentrations Subgroup
2006-2011	Harvard Medical School Curriculum Committee
2006-2009	Chair, Student Research Committee Harvard Medical School
2006-2010	Ad Hoc Reviewer NIH - IPOD (NIDDK) study section
2008-2011	Reviewer Klarman Foundation Grants
2011-2013	Reviewer Davis Foundation Post-doctoral Awards
2009-2013	Member, NIH-IPOD (NIDDK) study section

**Professional Societies:**

1984-	American Diabetes Association	Member
1987-	The Peabody Society, Harvard Medical School	Member
1996-	The Endocrine Society	Member
2003	Association of American Physicians (AAP)	Elected
2003-2010	NAASO	Member
2005-2016	Society for Neuroscience	Member
2007-2016	American Physiological Society	Member

**Community Service Related to Professional Work:**

1983-2007	Volunteer science teaching in elementary and high school
1993-2004	Co-manager of academic discussion list on healthcare reform, "Healthre"

**Editorial Boards:**

1999-2003	Endocrinology
2002-2007	Obesity Research, Associate Editor
2005-2010	Diabetes, Editorial Board
1998-	Ad hoc: Nature Medicine, Cell Metabolism, Proceedings of the National Academy of Science, Journal of Clinical Investigation, American Journal of Physiology.
2013-	Editorial Board, Molecular Metabolism

## Awards and Honors:

1972	Phi Beta Kappa
1980	Postdoctoral Fellowship, American Cancer Society
1981-1982	Mary K. Iacocca Research Fellowship, Joslin Diabetes Center
1998, 2002	Merck Senior Fellows Award to Maratos-Flier's Fellows
2003	Annual Patricia Usher Memorial Lecture, Beth Israel Deaconess Medical Center
2012	Saul Horowitz Distinguished Alumni Award, Mount Sinai School of Medicine
2020	Endocrine Society Roy O, Greep Award for Outstanding Research Contributions

## PART II: Research, Teaching and Clinical Contributions

### A. Narrative Report:

#### Report of Research

##### Overview of Major Research Interests:

- Fibroblast growth factor 21: Regulation of energy expenditure, hepatic metabolism and pancreatic function.
- Melanin Concentrating Hormone: Physiology and Mechanism of Action
- Hypothalamic peptides and appetite regulation/interaction of leptin with other regulators of eating behavior
- Human translational studies

Obesity is a significant medical problem which is a risk factor for the development multiple illnesses including type II diabetes, cardiovascular disease, peripheral vascular disease, liver disease and several cancers. While obesity results from excess caloric intake in relation to energy expenditure, the underlying causes remain poorly understood. Energy balance is known to be regulated by complex interactions between the periphery and the central nervous system; however, energy balance is also regulated by diet. My major research interest is defining the molecular mediators which regulate inter-relationships between the brain, the periphery and diet thus contributing to the obese state and to the pathologic consequences of obesity.

1: **FGF21: Past observations:** Fibroblast growth factor 21 is a member of the endocrine FGF family. It is expressed in several metabolically active tissues including liver, white adipose tissue, brown adipose tissue and pancreas. I first became interested in FGF21 when my group found that hepatic expression was massively induced in mice on a ketogenic diet (KD). Using a gene discovery approach, we identified FGF21 as a critical mediator of fatty acid oxidation. We were first to report this and to show that adenovirus mediated knockdown led to marked fatty liver and serum hypertriglyceridemia in mice eating KD, as mice fail to increase fatty acid oxidation and ketogenesis appropriately. We further demonstrated that FGF21 is required for the normal metabolic response (weight loss and increased energy expenditure) to the diet. We confirmed the role of FGF21 by showing that FGF21 deficient mice show none of the metabolic effects of KD, gaining rather than losing weight and also failing to increase energy expenditure.

My group since demonstrated direct action of FGF21 on the liver, FGF21 resistance in obesity and FGF21 induced browning in inguinal adipose tissue that mimics cold exposure. We were also the first to report on the link between serum FGF21 and non-alcoholic fatty liver disease in humans (NAFLD).

*Work on FGF21 and MCH:*

**FGF21 and Inflammation:** After finding that FGF21 correlated with NAFLD in humans we speculated that FGF21 might play a role in the progression of NAFLD to non-alcoholic-steatosis and cirrhosis. Using a non-obese model of NAFLD (generated by feeding mice a methionine choline deficient diet) we found that mice lacking FGF21 (FGF21KO) show accelerated progression of NAFLD and develop both increased fibrosis and inflammation. Furthermore, replacement of FGF21 in FGF21KO mice consuming the steatotic diet prevents the adverse effects of the diet on the liver.

My group also found that FGF21 deletion is associated with pancreatic inflammation. To induce obesity in mice, we use a standard high fat/high sucrose diet. As expected, WT mice become obese and insulin resistant and develop islet cell hyperplasia. However the histology of the acinar pancreas appears normal. When littermate mice lacking FGF21 are placed on the same diet, they develop the same degree of obesity and insulin resistance as the wild type mice. However we found remarkable infiltration of the acinar pancreas in the periductal area with lymphocytes. Histologically these are large, uniform appearing infiltrates that are positive for CD3 antigens, indicating a T-cell infiltrate. Future work in this area would involve immune-characterization of the infiltrates as a prerequisite to understanding the molecular mechanisms involved.

**FGF21 and Carbohydrate Metabolism:** My group defined a critical role for FGF21 in sugar metabolism and pursued this in both mouse and human studies. In FGF21-KO mice we described a rapid deterioration in mice consuming either high sucrose or high fructose diets, independent of the fat content of the diet. As carbohydrate consumption induces ChREBP we are examining the relationship between this transcription factor and FGF21. This finding led directly to clinical studies in humans. Prior to our work that in normal human subjects, fructose ingestion leads to acute robust (average four fold) increases of FGF21 which are maximal after two hours of ingestion, no acute regulation of FGF21 had been discovered in humans. In obese subjects and in those with metabolic syndrome, baseline levels are increased however there is an additional acute increase after fructose loading leading to a higher area under the curve. The emerging data suggest that FGF21 may serve as a fructose sensor and regulate fructose disposal.

**2. Melanin Concentrating Hormone: Past Observations:** My research defined the role of the neuropeptide (MCH), which is exclusively expressed in the lateral hypothalamus, as an orexigenic peptide. I then reported that deletion of MCH was associated with a lean, hyper-metabolic phenotype and that overexpression was associated with increased susceptibility to obesity. My group defined intracellular signaling pathways mediated by Gq and Gi coupled receptors and were the first to note that MCH played a role in regulating dopaminergic tone in the accumbens nucleus. We recently generated an MCH receptor-cre mouse which we used to map the expression of the rodent melanin concentrating hormone receptor (MCHR1). We also generated a mouse that co-expresses MCHR1 with MCHR2, (MCHR2 is seen is only expressed in higher vertebrates) and found that MCHR2 acts to limit diet induced obesity and mediates actions distinct from MCHR1. My lab focused on a series of studies aimed at mapping outputs of

the MCH neurons in the lateral hypothalamus. Although neuronal populations with the highest expression of MCH receptor are in the striatum, especially the nucleus accumbens, the synaptic connectivity between the lateral hypothalamus is not particularly active and reports on direct MCH effects on accumbens neurons are inconsistent. We found an active connection between MCH neurons in the lateral hypothalamus and the lateral septum, an area of the brain that is involved in anxiety and reward functions. This work is being continued by a colleague focusing on using an optogenetic and DREADD approach in defining MCH actions in this area.

**3. Human Studies:** As an endocrinologist I am interested in translational studies in humans. Prior to joining Novartis I was awarded investigator initiated funding from Astra-Zeneca to study the mechanisms of weight loss of the diabetes drug exenatide (Byetta) in obese non-diabetic women, focusing on the effects of exenatide on energy expenditure. My second area of interest, noted above, is understanding human FGF21 physiology and the relationship between the FGF21 response to fructose and diet composition, metabolic syndrome and obesity. The work on FGF21 in humans was funded using discretionary funding.

### **Current Work as TME at Novartis Institutes for Biomedical Research:**

As a member of the cardiovascularmetabolic (CVM) group my work focuses on assets aimed at targeting obesity, T2 Diabetes and cardiovascular disease. I currently direct two active studies that have progressed to human subjects. For one asset I have been the TA responsible to close out a SAD study. I was also the director responsible for formulating the clinical study protocol for an upcoming PoC study. This involved multiple aspects of input from line functions such as PK and PCS and regulatory, interactions with principle investigators at CROs. The protocol was recently approved by the internal review board. A successful update of the investigators brochure was just finalized. The protocol will be submitted shortly to the FDA. I work on a daily basis with the clinical trial operational lead on aspects of data transfer and other issues required. We are aiming for FPFV in December, 2021. A second, earlier stage protocol will move into FIH in late 2022. I also closed out a study that was a successful proof of concept trial. This asset is being out-licensed and a manuscript on the results is in review with the journal Science and Translational medicine. For clinical studies I lead teams which include members with diverse expertise. I am responsible for evaluating and integrating information relevant to conduct of the studies including safety and efficacy. I am also responsible for obtaining internal board approvals for conduct design, assembling IND to regulatory authorities, writing protocols and investigators brochures, managing incoming data from clinical studies, writing final study reports. I also am responsible for direct interactions with principle investigators at CROs as well as influencing choice of CROs.

My other significant role involves my regular interaction with pre-clinical scientists in the CVM space. Given my academic background I function as a local KOL providing information on the physiologic and mechanistic contributors to obesity and metabolic dysregulation. I contribute to decisions on choice of targets to evaluate. I am also a member of the pre-clinical teams evaluating drug candidates in pre-clinical models to ensure adequate information has been acquired to facilitate transition to clinical study. In this role I am active on two early teams with assets aimed at the treatment of metabolic disease.

### **Professional Development and Teaching:**

**Academic Careers and Faculty Development:** In late 2009 I took on the role of directing this office at Beth Israel Deaconess. This was a new office, mirroring a trend in other hospitals, aimed at providing structured opportunities for faculty. I was one of several senior level faculty who applied and I was offered the position after interviews with members of the BIDMC center for education and after submitting a proposal describing my plans for “growing” a program.

**Programs:** In this role I put in place multiple programs; these ranged from 60-90 minute single sessions to day long programs. A sample of topics covered included:

(Myself as presenter, 2-3 times a year)

- Giving a Lecture
- Making it to the next step for Postdocs
- Making it to the next step for Instructors
- Publishing your paper
- Assembling RO1 (three sessions)

Other presenters:

- Negotiating
- Hiring and Firing
- Promotion to Assistant Professor
- Promotion to Associate Professor
- Promotion to Professor
- Taxes for Foreign Nationals
- Work Life Balance
- Making the Most out of a Meeting as Chair or Participant

Workshops with multiple presentations:

- Junior Faculty Leadership Workshop (one day)
- Assembling a K award (one day, twice a year)

On a yearly basis, 500 post-doctoral fellows and faculty attend these session. The overall rating for quality and utility averages a 4.3 on a scale of 1-5 where 5 is the best and 1 is the worst.

### **Guideline Development:**

In 2014 I was asked by Dr. Richard Schwartzstein to convene a task force to develop guidelines for post-doctoral fellows training at Beth Israel Deaconess Medical Center, including MDs, PhD, citizens and foreign nationals. I convened a committee of faculty which included a department chair, a division chief, and a range of senior to junior faculty to develop these guidelines. We solicited input from research administration, BIDMC legal and human resources. In addition to guidelines involving responsibilities and benefits we also assembled the forms and procedures required to meet the guidelines such as annual review forms, salary forms, appointment extension forms and vacation tracking forms. The guidelines will be presented to BIDMC leadership in March for approval, pending feedback from the leadership group.

Once the guidelines are approved, I planned assembled a ½ day postdoctoral fellow orientation which would be offered three times a year and will required attendance for incoming post-doctoral fellows. The next project in this area was to developed a set of guidelines for mentors/mentees aimed at improving this occasionally difficult relationship. These planned activities ended when I transitioned to Novartis.

**Advising:**

From 2010 until 2018 I consulted with faculty for career advising. I saw an average of six faculty members per month for “one on one” advice. The faculty queries range from a review of the Harvard format Curriculum Vitae to specific concerns about readiness for promotion to seeking advice about problematic mentor relationships.

**Teaching:**

Between 2007 and 2010, I was involved in developing and co-directing a new, one month, required course for first year HMS students, “the Role of Discovery in Medicine”. The goal of this course is to highlight the critical importance of scholarly work in changing medical paradigms and medical practice and to examine methodology essential to the process of discovery. This course has evolved and is now an elective for students planning to submit proposals for funding from HMS for either bench or clinical/translational research. When I initially worked on the course, two diseases, Obesity/Type II diabetes and Breast Cancer were used as disease paradigms in seminars aimed at assisting students in assembling high quality research proposals. A series of lectures in the fall covered such topics such as approaches to clinical versus bench research, finding a lab and writing a research proposal.

I also provided ongoing supervision of 4-6 post-doctoral research fellows in my laboratory. I have supervised senior thesis of three seniors at Harvard college. I mentor and acted as a senior advisor to two junior level investigators. I also participate as an invited speaker in the IHP course at Harvard Medical School.

I regularly teach in the upper level Endocrinology course organized by Dr. Monty Krieger at MIT.

**Clinical Contributions:**

I see outpatients with diabetes one afternoon monthly a diabetes obesity specialist. This clinical activity takes place at Beth Israel Deaconess Medical Center. Approximately 90% of my patients involve long term follow up. Each afternoon clinic generates an addition two to three hours of follow up time in the form of patient phone calls and communication with referring physicians. Diabetes care requires particularly intensive phone follow up for the purpose of blood sugar monitoring.

**B. Research Funding Information** (entirely for bench research).

<u>Years</u>	<u>Source</u>	<u>PI</u>	<u>Grant Title</u>
--------------	---------------	-----------	--------------------

Completed:



1983-1984	Juvenile Diabetes Foundation 82R609	PI	Viral Interactions with Beta Cells
1984-1989	NIH Clinical Investigator Award 5K08AM1252	PI	Viral Pathogenesis in Endocrine Cells
1984-1986	American Diabetes Association	PI	Cellular Processing of Reovirus and Infection of Islet Cells
1989-1992	American Heart Association	PI	Viral Receptors on Endocrine Cells
1990-1995	NIH R01 A128971-05	PI	Molecular Characterization of the Reovirus Receptor
1994-1999	Markey Charitable Trust	PI	DNA Sequencing & Oligo Synthesis Core
1995-1996	Boston Obesity Research Center NIH 5P30DK46200-04	PI	Identification of Novel Hypothalamic Genes that are Differentially Regulated in Obesity
1996-1997	American Diabetes Association	PI	Melanin Concentrating Hormone: A Novel Orexigenic Neuropeptide
1996-1998	Eli Lilly and Company	PI	Study directed to Obesity, Energy Homeostasis and Metabolic Control
1996-1997	NIH 5P30DK36836-11	PI	MCH: A Novel Regulator of Feeding Behavior
1998-2003	NIH 1R01DK53978	PI	Anatomic and Physiologic Characterization of MCH Action
1999-2004	NIH 1R01DK56113	PI	Gene Targeting Approaches to MCH and Energy Balance
2000-2010	NIH 1P01DK56116-06	PI	Program Project Grant with B. Kahn PI EMF PI on Project IV and Core C
2007-2010	Amylin Pharmaceuticals	PI	The Effect of Exenatide on Weight Loss, Energy Expenditure and Hunger in Obese Women Without

			Diabetes
2005-2011	NIH R01DK069983-05	PI	Actions of MCH in the Brain
2011-2012	Jeffrey B Picower Foundation	PI	Molecular mediators of FGF21 action
Ongoing:			
2011-2019	NIH R01DK028082-29	PI	Metabolic Actions of FGF21
2012-2016	Amylin Pharmaceuticals	PI	Patterns, predictors and mechanisms Of weight loss with exenatide treatment in overweight and obese women without diabetes.

### **C. Report on Current Research Activities:**

#### Project:

My current research activities focus on translational studies related to obesity, type 2 diabetes and lipid disorders at the Novartis Institutes for Biomedical Research. I serve as translational medicine expert leading teams to transition potential drugs from pre-clinical studies into humans.

### **Report on Teaching**

#### Local Contributions

##### a. Medical School Courses

- 1982-1996 Teaching of residents and fellows while Attending Physician at Brigham and Women's Hospital, Boston, Massachusetts.
- 1982- 2004. Supervised research training of 1-3 M.D. Postdoctoral Fellows, medical and college students and Research Assistants at the Joslin Diabetes Center, Boston, Massachusetts
- 2004-2018 Supervised research training of 4-6 MD or PhD postdoctoral fellows, medical students and undergraduates in the Endocrine Division of Beth Israel Deaconess Medical Center
- 1984-1988 First year medical tutor at Harvard Medical School, Boston, Massachusetts.
- 1988-1992 Tutor in Patient/Doctor I, Harvard Medical School  
This course meets weekly throughout the academic year.  
In addition to a two hour tutorial approximately two additional weeks of time outside the classroom for observation of students,

with patients, discussions and feedback were required.

- 1991-1994 Advisor, Peabody Society in Pilot Advisory Program, Harvard Medical School
- 1995-2005 Participated as lecturer and tutor in CBC, 5 hours each time
- 2005-2006 Tutor, Prevention and Nutrition
- 2006-2009 Co-director, Role of Discovery in Medicine, required course for first year Harvard Medical Students
- April 2007 Thesis Committee, Jacob Newman Marcus, Orexin Receptors and the Central Autonomic System, Harvard Medical School
- Dec. 2007 Thesis Committee, Thaddeus John Unger, Examination of Deficits in Energy Balance and Affective Behavior Following Central or Hypothalamic Depletion of Brain-Derived Neurotrophic Factor, Tufts University
- May 2013 2013 Leadership and Faculty Development Conference & 2013 Minority Health Policy Annual Meeting, Session Commenter

#### b. Advisory and Supervisory Responsibilities

1982-1996 While an attending physician at the Brigham I met with fellows and residents three times per week while on service (two months of the year.) The sessions were devoted to presentation of patients and discussion and teaching. (They were not used for provision of clinical services.)

1994- Supervise research for 2-5 research fellow approximately 350 hrs/yr.

2005-2008 Co-direct, Endocrine Fellowship program with Dr. Evan Rosen

#### c. Advisees and Trainees:

1986-1989 Eric Verdin (postdoctoral fellow), Professor of Medicine, UCSF

1989-1991 Louise Montgomery (postdoctoral fellow), Associate Professor of Biology, Chairman Department of Biology, Marymount University, Arlington, VA

1991-1993 Ali El-Ghorr (postdoctoral fellow), Faculty Division of Biomedicine and Clinical Laboratory Sciences, University of Edinburgh

1994-1997 Daqing Qu, (postdoctoral fellow), Research Scientist, Millipore Corporation

1997-1999 David Ludwig (postdoctoral fellow), Associate Professor, Harvard Medical School, Children's Hospital, Boston

1997-2001 Nicholas Tritos, (postdoctoral fellow), Instructor in Medicine, Massachusetts General Hospital, Boston, MA

2002-2005 Richard Bradley (postdoctoral fellow), Private sector, business development.

1997-2000 Jason Mastaitis (pre-doc), Ph.D., Department of Neurobiology, Mount Sinai School of Medicine, New York, New York

2000-2003 Daniel Trombly (pre-doc), Graduate student, Department of Neuroscience, Northwestern University, Chicago, Illinois

2001-2002 Jason Karamachandran (senior thesis) Pathology Resident, Stanford University, San Francisco, California

2002-2003 Neha Jadeja, (senior thesis), Medical Student, Harvard Medical School, Boston

2001-2003 Gabriella Segal-Lieberman (postdoctoral fellow) Assistant Professor of Medicine, Sheba Medical Center Institute of Endocrinology, Ramat-Gan, Israel

2001-2004 Efi Kokkotou, (postdoctoral fellow), Assistant Professor of Medicine, Harvard Medical School, Division of Gastroenterology, Beth Israel Deaconess Medical Center, Boston

2002-2006 Pavlos Pissios, (postdoctoral fellow), Assistant Professor of Medicine, Harvard Medical School, Division of Endocrinology, Beth Israel Deaconess Medical Center, Boston

2003-2007 Justin Y. Jeon, (postdoctoral fellow), Assistant Professor, Exercise Physiology, Korea

2003-2007 Adam R. Kennedy, (postdoctoral fellow), Scientist, Cytokinetics, San Francisco, California.

2005-2011 F. Martin Fisher, (postdoctoral fellow), Instructor, Beth Israel Deaconess Medical Center

2006-2008 Jody Dushay (postdoctoral fellow), Instructor, Beth Israel Deaconess Medical Center

2007-2011 Andrew C. Adams, (postdoctoral fellow), Staff Scientist, Lilly Pharmaceuticals

2009-2011 Patricia Chui, (postdoctoral fellow), Attending Physician, New York University Medical School

2011-2013 Co-mentored Tahereh Ghorbani, (postdoctoral fellow), Attending Physician, Joslin Diabetes Center

2012-2014 Elena Toschi, (postdoctoral fellow), Attending Physician, Joslin Diabetes Center

2009-2015 Nicholas Douris, (postdoctoral fellow), Scientist Alkeremes Cooperation, Waltham, MA

2009-2015 Melissa Chee, (postdoctoral fellow), Assistant Professor of Neurobiology, Carlton University, Ontario, Canada.

2013-2017 Darko Stevanovic, post-doctoral fellow, Global Director of Medical and Scientific Affairs - Sanvita Medical at Nova Biomedical

2011-2017 Garima Singhal, post-doctoral fellow, Scientist Dicerna Pharmaceuticals

2015-2018 Bhavna Desai, post-doctoral fellow, Consultant, Simon-Kucher & Partners

2. Regional, National and International Contributions:

Symposium Lecturer:

Regional:

May 2000	Department of Physiology Seminar, University of Massachusetts Medical School
Oct. 2000	Inaugural Obesity Research Center Symposium Boston University, Invited Speaker
May 2003	Pat Usher Memorial Lecture, Division of Endocrinology Beth Israel Deaconess Medical Center, Boston
Oct. 2006	Beth Israel Deaconess Research Day, Invited Speaker
Oct. 2008	Brigham and Women's/Children's Hospital, Endocrine Grand Rounds
Dec. 2008	Longwood Medical Area Diabetes Seminar, Joslin Diabetes Center
July 2009	Boston Obesity and Nutrition Research Center Annual Symposium
Nov. 2010	Endocrine Grand Rounds, Massachusetts General Hospital, Boston
Mar. 2011	Medical Grand Rounds, Beth Israel Deaconess Medical Center, Boston

- Oct. 2011 Endocrine Grand Rounds, Rhode Island Hospital, Providence
- Oct. 2013 Frontiers in Medicine, Beth Israel Deaconess Medical Center, Boston

National:

- Aug. 1996 Aspen Lipid Conference
- Feb. 1997 Maui Meeting on Diabetes and Obesity
- June 1997 Endocrine Society, 79<sup>th</sup> Annual Meeting, Symposium Speaker
- Sep. 1997 National Institute of Health, NIDDK, “The Brain and the Adipocyte”
- Mar. 1998 Pennington Biomedical Research Center “Nutrition, Genetics and Obesity”
- June 1998 American Diabetes Association, 58<sup>th</sup> Annual Meeting, Symposium Speaker “Neuroendocrine Regulation of Energy Balance and Satiety”
- Oct. 1998 Banbury Conference/Cold Spring Harbor The Molecular Physiology of Weight Regulation and Obesity
- June 1999 Endocrine Society, 81<sup>st</sup> Meeting, Symposium Speaker
- Feb. 2000 Keystone Symposium, Invited Speaker
- Feb. 2001 Keystone Symposium, Invited Speaker
- Jan. 2002 Keystone Symposium, Molecular Control of Adipogenesis and Obesity, Invited Speaker
- July 2002 Gordon Research Conference, Mechanism of Hormone Action, Invited Speaker
- Feb. 2003 AAAS Symposium Speaker
- June 2004 8<sup>th</sup> Neuroendocrine Workshop, Invited Speaker
- June 2004 Endocrine Society 86<sup>th</sup> Annual Meeting, Symposium Speaker
- Jan. 2005 Keystone Symposium, Invited Speaker
- May 2006 Appetite and Obesity, Cold Spring Harbor Symposium, Invited Speaker
- May 2008 New York Academy of Sciences, Invited Speaker
- June 2008 Endocrine Society, Annual Meeting, Symposium Speaker
- Jan. 2009 Keystone Symposium, Invited Speaker
- Aug. 2009 Kern Aspen Lipid Conference, Invited Speaker
- April 2010 Presidential Symposium, American Society for Nutrition, Invited Speaker
- June 2010 American Diabetes Association, Annual Meeting, Invited Speaker
- June 2010 Endocrine Society, Annual Meeting, Invited Speaker
- Feb. 2011 NIDDK, “Toward a Clinical Definition of Leptin Resistance”, Invited Participant
- Mar. 2011 Endocrine Grand Rounds, University of Pennsylvania
- Nov. 2011 Endocrine Grand Rounds, Brown University
- Dec. 2011 Endocrine Grand Rounds, Columbia University

Jan. 2012 Keystone Symposium, Invited Speaker, Plenary Session  
 June 2012 Endocrine Society, Annual Meeting, Invited Speaker  
 June 2013 ADA, Invited Speaker  
 Jan. 2014 Vanderbilt University, Department of Physiology Seminar Series  
 Nov. 2014 Invited Lecturer, Dept. Pharmacology, U of Pennsylvania  
 June 2015 Iconoclasm Meeting, Prior to ADA, Boston, MA  
 June 2016 Lecturer at University of Iowa Carver College of Medicine  
 Diabetes & Obesity

International:

July 1997 International Diabetes Foundation, Helsinki Meeting  
 Aug. 1998 Adipo- Science Meeting, Osaka, Japan  
 Nov 1999 Institut Pasteur, Euroconference “Obesity: Genetics, Pathophysiology and Therapeutics,” Invited Speaker  
 March 2004 Days of Molecular Medicine, Cambridge, England, Invited Symposium Speaker  
 Jan. 2012 Keystone Symposium, Genetic and Molecular Basis of Obesity and Body Weight Regulation, Invited Speaker  
 Aug. 2012 Australian Diabetes Association, Brisbane Australia, Annual Meeting  
 Mar. 2013 Keystone Symposium, Neuronal Control of Appetite, Metabolism and Weight, Invited Speaker  
 Mar. 2015 Keystone Symposium, Obesity and the Metabolic Syndrome: Mitochondria and Energy Expenditure, Invited Speaker  
 Nov. 2015 Invited Speaker, Karolinska Institute, Stockholm, Sweden  
 Sep. 2016 Invited Speaker, 4<sup>th</sup> Helmholtz-Nature Medicine Diabetes Conference, Munich, Germany  
 Feb. 2017 Invited Speaker, Zydus-Cadila Symposium, Ahmedabad, India  
 Apr. 2017 Invited Speaker, International Symposium on Insulin Receptor and Insulin Action  
 July 2017 Society for Ingestive Behavior, invited Lecturer, Montreal, Canada  
 Nov. 2017 Invited Lecturer, University of Montreal, CHUM Research Center  
 Nov 2017 Invited Lecturer, Australian New Zealand Diabetes Meeting  
 Mar 2019 Symposium Speaker, Annual Endocrine Society Meeting

Leadership Roles

2000-2003 Endocrine Society, Meeting Organizing Committee  
 2007 Keystone Symposium, Organizer: Obesity, Peripheral and Central Pathways Regulating Energy Homeostasis  
 2015 Keystone Symposium, Obesity and the Metabolic Syndrome: Mitochondria and Energy Expenditure, Co-Organizer

**PART III: Bibliography**

## **Original Reports**

1. Halpern AM, **Maratos E**. Excimer formation in saturated amines. *J Am Chem Soc* 1972; 94:8273-8275.
2. **Maratos E**, Taub RN, Bramis J. Amelioration of streptozotocin-induced diabetes in mice by the implantation of pancreatic islets in diffusion chambers. *Mt Sinai J Med NY* 1976; 43:415-422.
3. Flier JS, **Maratos-Flier E**, McIsaac D, Pallotta J. Endogenous digitalis-like activity circulates in the plasma of the toad, *bufo marinus*. *Nature* 1979; 279:342-344.
4. **Maratos-Flier E**, Spriggs DR, Fields BN, Kahn CR. Specific plasma membrane receptor for reovirus on rat pituitary cells in culture. *J Clin Invest* 1983; 72:617.
5. **Maratos-Flier E**, Goodman MJ, Fields BN, Kahn CR. Differential effects of viral infection on islet and pituitary cells in culture. *Endocrinology* 1985; 116:2430-2437.
6. **Maratos-Flier E**, Goodman MJ, Murray AH, Kahn CR. Ammonium inhibits processing and cytotoxicity of a non-enveloped virus. *J Clin Invest* 1986; 78:1003-1007.
7. Verdin EM, **Maratos-Flier E**, Carpentier JL, Kahn CR. Persistent infection with a non-transforming virus leads to altered expression of growth factor receptors and responses. *J Cell Physiol* 1986; 128:457-465.
8. Verdin EM, **Maratos-Flier E**, Kahn CR, Sodoyez JC, Sodoyez-Goffaux F, De Vos CJ, Lynn SP, Fields BN. Visualization of viral clearance in the living animal. *Science* 1987; 236:439-442
9. **Maratos-Flier E**, Kao CY-Y, Verdin EM, King GL. Receptor mediated vectorial transcytosis of epidermal growth factor by MDCK cells. *J Cell Biol* 1987; 105:1595-1601.
10. Verdin EM, Lynn, SP, Fields BN, **Maratos-Flier, E**. Uptake of reovirus serotype I by the lungs from the bloodstream is mediated by the viral hemagglutinin. *J Virol* 1988; 62:545-551.
11. Verdin EM, King GL, **Maratos-Flier E**. Characterization of a common high-affinity receptor for reovirus serotypes 1 and 3 on endothelial cells. *J Virol* 1989; 63:1318-1323.
12. Montgomery LB, Kao C-Y-Y, Verdin E, Cahill C, **Maratos-Flier E**. Infection of a polarized epithelial cell line with wild type reovirus leads to viral persistence and altered cellular function. *J Gen Virol* 1991; 72:2939-2946.
13. El-Ghorr AA, Gordon D, George K, and **Maratos-Flier E**. Regulation of expression of the reovirus on differentiated HL60 cells. *J Gen Virol* 1992; 73:1961-1968.
14. Qu D, Ludwig DS, Gammeltoft S, Piper M, Pelleymounter MA, Cullen MJ, Mathes WF,



- Przypek J, Kanarek R, **Maratos-Flier E**. A role for melanin-concentrating hormone in the central regulation of feeding behavior. *Nature* 1996; 380:243-247.
15. Mantzoros CS, Qu D, Frederich RC, Susulic VS, Lowell BB, **Maratos-Flier E**, Flier JS. Activation of  $\beta$ -3 adrenergic receptors suppresses leptin expression and mediates a leptin-independent inhibition of food intake in mice. *Diabetes* 1996;45:909-914.
  16. Ahima RS, Prabakaran D, Mantzoros C, Qu D, Lowell B, **Maratos-Flier E**, Flier JS. Role of leptin in the neuroendocrine response to fasting. *Nature* 1996; 382:250-252.
  17. Elmquist JK, Ahima RS, **Maratos-Flier E**, Flier JS, Saper CB. Leptin activates neurons in ventrobasal hypothalamus and brainstem. *Endocrinology* 1997; 138(2): 839-842
  18. Mantzoros CS, Frederich RC, Qu D, Lowell BB, **Maratos-Flier E**, Flier JS. Severe leptin resistance in brown fat deficient UCP-DTA mice despite suppression of hypothalamic NPY. *Diabetes* 1998; 47:230-238.
  19. Ludwig DS, Mountjoy KG, Tatro JB, Gillette JA, Frederich RC, Flier JS, **Maratos-Flier E**. Melanin-concentrating hormone: a functional melanocortin antagonist in the hypothalamus. *Am J Physiol* 1998; 274:E627-33
  20. Vicent D, Piper M, Gammeltoft S, **Maratos-Flier E**, Kahn CR. Alterations in skeletal muscle gene expression of ob/ob mice by mRNA Differential Display. *Diabetes* 1998; 47:1451-8.
  21. Tritos N, Vicent D, Gillete J, Ludwig DS, Flier E, **Maratos-Flier E**, Functional interactions between melanin concentrating hormone, neuropeptide Y and Anorectic neuropeptides in the Rat Hypothalamus. *Diabetes*, 1998;47:1687-1692.
  22. Tritos N, Elmquist JK, Mastaitis JW, **Maratos-Flier E**. Altered expression of multiple orexigenic peptide mRNAs in the hypothalamus of obese hyperleptinemic UCP-DTA mice. *Endocrinology* 1998;139:4634-4641.
  23. Elmquist JK, **Maratos-Flier E**. Saper CB, Flier JS. Unraveling the central nervous system pathways underlying responses to leptin. *Nat Neuroscience* 1998; 6:445-450.
  24. Shimada M, Tritos N, Lowell BB, Flier JS, **Maratos-Flier E**. Absence of melanin concentrating hormone produces hypophagia and a lean phenotype. *Nature* 1998 396:670-674.
  25. Elias CF, Saper CB, **Maratos-Flier E**, Tritos N, Lee C, Kelly J, Ollmann MM, Barsh GS, Sakurai T, Yanagisawa M, Elmquist JK. Chemically defined projections linking the mediobasal hypothalamus and the lateral hypothalamic are. *Journal of Comparative Neurology* 1998 4:442-459.
  26. Vicent D, **Maratos-Flier E**, Kahn CR. The branch point enzyme of the mevalonate pathway for protein prenylation is overexpressed in the ob/ob mouse and induced by adipogenesis. *Mol Cell Biol*. 2000 6:2158-66.

27. Bradley R, Kokkotou E, **Maratos-Flier E**, Cheatham B, Melanin-concentrating hormone regulates leptin synthesis and secretion in rat adipocytes. *Diabetes* 2000 49:1073-1077.
28. Kokkotou E, Mastaitis JW, Qu D, Hoersch D, Bonter K, Slieker L, Tritos NA, **Maratos-Flier E**. Characterization of [Phe13, Tyr19]-MCH analog binding activity to the MCH receptor. *Neuropeptides* 2000 34:240-247.
29. Kokkotou EG, Tritos NA, Mastaitis JW, Slieker L, **Maratos-Flier E**. Melanin Concentrating Hormone Receptor is a target of leptin action in the mouse brain. *Endocrinology* 2001 142:680-686.
30. Ludwig DS, Tritos NA, Mastaitis JW, Kulkarni R, Kokkotou E, Lowell B, Flier JS, **Maratos-Flier E**. Melanin-concentrating hormone overexpression in transgenic mice leads to obesity and insulin resistance. *J. Clin. Invest.* 2001 107:379-386.
31. Tritos NA, Mastaitis JW, **Maratos-Flier E**. Characterization of melanin concentrating hormone and pre-pro-orexin expression in the murine hypothalamus. *Brain Research, Brain Res.* 2001 895(1-2):160-6.
32. Bradley RL, Mansfield JP, **Maratos-Flier E**, Cheatham B. Melanin-concentrating hormone activates signaling pathways in 3T3-L1 adipocytes. *Am J Physiol Endocrinol Metab* 2002 Sep;283(3):E584-92
33. Tritos NA, Mastaitis J, Kokkotou, Puigserver P, Spiegelman B, **Maratos-Flier E**. Characterization of the peroxisome proliferator activated receptor coactivator 1 alpha (PGC-1 $\alpha$ ) expression in the murine brain. *Brain Research* 2003 961:255-60.
34. Bates SH, Stearns WH, Dundon TA, Schubert M, Tso AWK, Wang Y, Banks AS, Lavery HJ, Haq AK, **Maratos-Flier E**, Neel BG, Schwartz MW, Myers MG. Stat 3 signaling is required for leptin regulation of energy balance but not reproduction, *Nature* 2003 421:856-9
35. Segal-Lieberman G, Trombly DJ, Juthani V, Wang X, **Maratos-Flier E**. NPY ablation in C57BL/6 mice leads to mild obesity and to an impaired refeeding response to fasting, e-published ahead of print, *Am J Physiol Endocrinol Metab.* 2003; 284(6):E1131-9
36. Pissios P, Trombly DJ, Tzamelis I, **Maratos-Flier E**. Melanin-concentrating hormone receptor 1 activate ERK and synergizes with G<sub>s</sub> coupled pathways. *Endocrinology.* 2003; 144(8):3514-23.
37. Segal-Lieberman G, Bradley RL, Kokkotou E, Carlson M, Trombly DJ, Wang X, Bates S, Myers MG Jr., Flier JS, **Maratos-Flier E**. Melanin-concentrating hormone is a critical mediator of the leptin deficient phenotype. *Proc Natl Acad Sci U S A.* 2003;100(17):10085-90.
38. Tritos NA, Kokkinos A, Lampadariou E, Alexiou E, Katsilambros N, **Maratos-Flier E**. Cerebrospinal fluid ghrelin is negatively associated with body mass index. *J Clin*

Endocrinol Metab. 2003;88(6):2943-6.

39. **Tritos NA, Mun E, Bertkau A, Grayson R, Maratos-Flier E, Goldfine A. Serum ghrelin levels in response to glucose load in obese subjects post-gastric bypass surgery. *Obes Res.* 2003;11(8):919-24.**
40. Bluher S, Ziotopoulou M, Bullen JW Jr, Moschos SJ, Ungsunan L, Kokkotou E, **Maratos-Flier E**, Mantzoros CS. Responsiveness to peripherally administered melanocortins in lean and obese mice. *Diabetes.* 2004 53(1):82-90.
41. Bluher S, Moschos S, Bullen J, Kokkotou E, **Maratos-Flier E**, Wiegand SJ, Sleeman MW, Mantzoros CS. CNTF Ax15 alters energy homeostasis, decreases body weight and improves metabolic control in diet-induced obese and UCP1-DTA mice. *Diabetes.* 2004 53(11):2787-96.
42. Tritos NA, Segal-Lieberman G, Vezerides PS, **Maratos-Flier E**. Estradiol-induced anorexia is independent of leptin and melanin concentrating hormone. *Obesity Research.* 2004 12:716-724.
43. Gibson WT, Pissios P, Trombly DJ, Luan J, Keogh J, Wareham NJ, **Maratos-Flier E**, O'Rahilly S, Farooqi IS. Melanin-concentrating hormone receptor mutations and human obesity: functional analysis. *Obesity Research.* 2004 12:743-749.
44. Bullen JW Jr, Ziotopoulou M, Ungsunan L, Misra J, Alevizos I, Kokkotou E, **Maratos-Flier E**, Stephanopoulos G, Mantzoros CS. Short-term resistance to diet-induced obesity in A/J mice is not associated with regulation of hypothalamic neuropeptides. *Am J Physiol Endocrinol Metab.* 2004 287:E662-70
45. Bluher S, Moschos S, Bullen J Jr, Kokkotou E, **Maratos-Flier E**, Wiegand SJ, Sleemann MW, Mantzoros CS. Ciliary neurotrophic factorAx15 alters energy homeostasis, decreases body weight, and improves metabolic control in diet-induced obese and UCP1-DTA mice. *Diabetes.* 2004 53:2787-96.
46. Bates SH, Dundon TA, Seifert M, Carlson M, **Maratos-Flier E**, Myers MG Jr. LRb-STAT3 signaling is required for the neuroendocrine regulation of energy expenditure by leptin. *Diabetes.* 2004 Dec 53:3067-73.
47. Bradley JR, Mansfield JPR. **Maratos-Flier E**. Neuropeptides Including Neuropeptide Y and Melanocortins Mediate Lipolysis in Murine Adipocytes. *Obesity Research.* 2005 13:653-651.
48. Kokkotou E, Jeon JY, Wang X, Marino FE, Carlson M, Trombly DJ, **Maratos-Flier E**. Mice with MCH ablation resist diet induced obesity through strain specific mechanisms. *Am J Physiology Reg. Integ.Comp. Physiol.* 2005. 289:R117-124
49. Georgescu D, Sears RM, Hommel JD, Barrot M, Bolanos CA, Marsh DJ, Bednarek MA, Bibb JA, **Maratos-Flier E**, Nestler EJ, DiLeone RJ. The Hypothalamic neuropeptide melanin-concentrating hormone acts in the nucleus accumbens to modulate feeding

- behavior and forced-swim performance. *J Neuroscience*. 2005. 25:2933-40.
50. Jeon JY, Bradley RL, Kokkotou E, Marino FE, Wang X, Pissios P, **Maratos-Flier E**. MCH<sup>-/-</sup> Mice are Resistant to Aging Associated Increases in Body Weight and Insulin. *Diabetes*. 2006. 55:428-34
  51. Fulton S, Pissios P, Manchon RP, Stiles L, Frank L, Pothos EN, **Maratos-Flier E**, Flier JS. Leptin Regulation of the mesoaccumbens dopamine pathway. *Neuron*. 2006. 51:811-22.
  52. Pissios P, Ozcan U, Kokkotou E, Okada T, Liew CS, Liu S, Peters JN, Dhalgren G, Karamchandani J, Kudva YC, Kurpad AJ, Knenedy RT, **Maratos-Flier E**, Kulkarni RN. Melanin Concentrating hormone is a novel regulator of islet function and growth. *Diabetes*. 2007. 56:311-9
  53. Kennedy AR, Pissios P, Out HH, Xue B, Asakura K, Furukawa N, Marino FE, Liu FF, Kahn BB, Libermann TA, **Maratos-Flier E**. A high fat, ketogenic diet, induces a unique metabolic state in mice. *Am J Physiol Endocrinol Metab*. 2007 292:E1724-39
  54. Badman MK, Pissios P, Kennedy AR, Koukos G, Flier JS, **Maratos-Flier E**. Hepatic Fibroblast Growth Factor 21 Is Regulated by PPARalpha and Is a Key Mediator of Hepatic Lipid Metabolism in Ketotic States. *Cell Metab*. 2007 6:426-437
  55. Handschin C, Chin S, Li P, Liu F, **Maratos-Flier E**, Lebrasseur NK, Yan Z, Spiegelman BM. Skeletal muscle fiber-type switching, exercise intolerance, and myopathy in PGC-1alpha muscle-specific knock-out animals. *J Biol Chem*. 2007 282:30014-21.
  56. Katic M, Kennedy AR, Leykin I, Norris A, McGettrick A, Gesta S, Russell SJ, Bluher M, **Maratos-Flier E**, Kahn CR. Mitochondrial gene expression and increased oxidative metabolism: role in increased lifespan of fat-specific insulin receptor knock-out mice. *Aging Cell*. 2007 6:827-839.
  57. Pissios P, Frank L, Kennedy AR, Porter DR, Marino FE, Pothos EN, **Eleftheria Maratos-Flier**. Regulation of Mesolimbic Dopamine by Melanin Concentrating Hormone. *Biol. Psych*. 2008 184-91.
  58. Bradley RL and **Maratos-Flier, E**. Dietary Fatty Acids Differentially Regulate Production of TNF- $\alpha$  and IL-10 by 3T3-L1 Adipocytes. *Obesity*. 2008 16:938-44.
  59. Kokkotou E, Moss AC, Torres D, Karagiannides I, Cheifetz A, Liu S, O'Brien M, **Maratos-Flier E**, Pothoulakis C. Melanin-concentrating hormone as a mediator of intestinal inflammation. *Proc Natl Acad Sci U S A*. 2008. 105:10613-8.
  60. Bradley RL, Jeon JY, Liu FF, **Maratos-Flier E**. Voluntary Exercise Improves Insulin Sensitivity and Adipose Tissue Inflammation in Diet-Induced Obese Mice. *Am J Physiol Endocrinol Metab*. 2008 American Journal of Physiology E:586-94
  61. Zhang R, Dhillon H, Yin H, Yoshimura A, Lowell BB, **Maratos-Flier E**, Flier JS.

- Selective inactivation of Socs3 in SF1 neurons improves glucose homeostasis without affecting body weight. Epublished ahead of print. *Endocrinology*. 2008. 149:5654-61.
62. Willie JT, Sinton CM, **Maratos-Flier E**, Yanagisawa M. Abnormal response of melanin-concentrating hormone deficient mice to fasting: Hyperactivity and rapid eye movement sleep suppression. *Neuroscience*. 2008 156:819-29.
  63. Zhang R, **Maratos-Flier E**, and Jeffrey S. Flier. Reduced Adiposity and High-Fat Diet-Induced Adipose Inflammation in Mice Deficient for Phosphodiesterase 4B. *Endocrinology*. 2009 150: 3076 – 82.
  64. **Patti ME, Houten SM, Bianco AC, Bernier R, Larsen PR, Holst JJ, Badman MK, Maratos-Flier E, Mun EC, Pihlajamaki J, Auwerx J, Goldfine AB. Serum Bile Acids Are Higher in Humans With Prior Gastric Bypass: Potential Contribution to Improved Glucose and Lipid Metabolism Obesity. 2009 17: 1671-1677.**
  66. Badman M, Koestler A, Flier JS, Kharitononkov A, **Maratos-Flier E**. Fibroblast Growth Factor 21 Deficient Mice Demonstrate Impaired Adaptation to Ketosis. *Endocrinology*. 2009 150:4931-40.
  67. Badman M, Kennedy A, Adams A, Pissios P, **Maratos-Flier E**. A Very Low Carbohydrate Ketogenic Diet Improves Glucose Tolerance in ob/ob Mice Independent of Weight Loss. *Am J Physiology Endocrinol Metab*. 2009. epublished ahead of print.
  68. Glier MB, Pissios P, Babich SL, Macdonald ML, Hayden MR, **Maratos-Flier E**, Gibson WT. The metabolic phenotype of SCD-1 deficient mice is independent of melanin-concentrating hormone. *Peptides*. 2009 31:123-129.
  69. Estall JL, Ruas JL, Choi CS, Laznik D, Badman M, **Maratos-Flier E**, Shulman GI, Spiegelman BM. PGC-1alpha negatively regulates hepatic FGF21 expression by modulating the heme/Rev-Erb(alpha) axis. *PNAS* 2009 106:210-225
  70. Adams AC, Astapova I, Fisher FM, Badman MK, Kurgansky KE, Flier JS, Hollenberg AN, **Maratos-Flier E**. Thyroid hormone regulates expression of fibroblast growth factor 21 in a PPAR $\alpha$  dependent manner. *J Biol Chem*, 2010 285:14078-82.
  71. **Dushay J, Chui PC, Gopalakrishnan GS, Varela-Rey M, Crawley M, Fisher FM, Badman MMK, Martinez-Chantar ML, Maratos-Flier E. Increased fibroblast growth factor 21 in obesity in nonalcoholic fatty liver disease. Gastroenterology, 2010 139:456-63**
  72. Leptin exacerbates sepsis-mediated morbidity and mortality. Shapiro NI, Khankin EV, Van Merus M, Shih SC, Lu S, Yano M, Castro PR, Maratos-Flier E, Parikh SM, Karumanchi SA, Yano K. *J Immunology* 2010 185:517-24
  73. Obesity is an FGF21 resistant state. Fisher FM, Chui PC, Antonellis PJ, Bina HA, Kharitononkov A, Flier JS, **Maratos-Flier E**. *Diabetes* 2010, Aug 3. Epub ahead of print.

74. Briançon N, McNay DE, **Maratos-Flier E**, Flier JS. Combined Neural Inactivation of SOCS-3 and PTP-1B Reveal Additive, Synergistic, and Factor-Specific Roles in the Regulation of Body Energy Balance. *Diabetes*. 2010 59:3074-84.
75. Aboulaich N, Chui P, Flier JS, **Maratos-Flier E**. PTRF regulates lipolysis via a phosphorylation-dependent mechanism. *Diabetes*. 2011 Mar; 60(3):757-65. Epub 2011 Jan 31.
76. Eguchi J, Wang X, Yu S, Kershaw EE, Chiu PC, Dushay J, Estall JL, Klein U, **Maratos-Flier E**, Rosen ED. Transcriptional control of lipid handling by IRF4 *Cell Metab*. 2011 Mar 2;13(3):249-59.
77. Krashes MJ, Koda S, Ye C, Rogan SC, Adams AC, Cusher DS, **Maratos-Flier E**, Roth BL, Lowell BB. Rapid, reversible activation of AgRP neurons drives feeding behavior in mice. *J Clin Invest*. 2011 1;121(4):1424-8.
78. Adams AC, Domouzoglou EM, Chee MJ, Segal-Liebermann G, Pissios P, **Maratos-Flier E**. Ablation of the hypothalamic neuropeptide melanin concentrating hormone is associated with behavioral abnormalities that reflect impaired olfactory integration. *Behav Brain Res*. 2011. 224(1):195-200.
79. Fisher FM, Estall JL, Adams AC, Antonellis PJ, Bina HA, Flier JS, Kharitonkov A, Spiegelman BM, **Maratos-Flier E**. Integrated Regulation of Hepatic Metabolism by Fibroblast Growth Factor 21 (FGF21) in Vivo. *Endocrinology*. 2011 152(8):2996-3004.
80. Vela K, Ramadoss P, Lam F, Harris J, Ye F, Same P, O'Neil N, **Maratos-Flier E**, Hollenberg A. NPY and MC4-R signaling regulate thyroid hormone levels during fasting through both central and peripheral pathways. *Cell Metab*. 2011 7;14(6):780-90.
81. *Dushay J, Gao C, Gopalakrishnan GS, Crawley M, Mitten EK, Wilker E, Mullington J, Maratos-Flier E. Short-Term Exenatide Treatment Leads to Significant Weight Loss in a Subset of Obese Women Without Diabetes. Diabetes Care. Diabetes Care. 2012 35(1):4-11.*
82. McNay DE, Briançon N, Kokoeva MV, **Maratos-Flier E**, Flier JS. Remodeling of the arcuate nucleus energy-balance circuit is inhibited in obese mice. *J Clin Invest*. 2012 122(1):142-52.
83. Tschöp MH, Speakman JR, Arch JR, Auwerx J, Brüning JC, Chan L, Eckel RH, Farese RV Jr, Galgani JE, Hambly C, Herman MA, Horvath TL, Kahn BB, Kozma SC, **Maratos-Flier E**, Müller TD, Münzberg H, Pfluger PT, Plum L, Reitman ML, Rahmouni K, Shulman GI, Thomas G, Kahn CR, Ravussin E. A guide to analysis of mouse energy metabolism. *Nat Methods*. 2011 28;9(1):57-63.
83. Fisher FM, Kleiner S, Douris N, Fox EC, Mepani RJ, Verdeguer F, Wu J, Kharitonkov A, Flier JS, , Spiegelman BM\*. **Maratos-Flier E** \*(co-senior

- authors). FGF21 regulates PGC-1 $\alpha$  and browning of white adipose tissues in adaptive thermogenesis. *Genes Dev.* 2012 26(3):271-81.
84. Carracedo A, Weiss D, Leliaert AK, Bhasin M, de Boer VC, Laurent G, Adams AC, Sundvall M, Song SJ, Ito K, Finley LS, Egia A, Libermann T, Gerhart-Hines Z, Puigserver P, Haigis MC, **Maratos-Flier E**, Richardson AL, Schafer ZT, Pandolfi PP. A metabolic prosurvival role for PML in breast cancer. *J Clin Invest.* 2012 Sep 4;122(9):3088-100.
  85. Robins SC, Stewart I, McNay DE, Taylor V, Giachino C, Goetz M, Ninkovic J, Briancon N, **Maratos-Flier E**, Flier JS, Kokoeva MV, Placzek M.  $\alpha$ -Tanycytes of the adult hypothalamic third ventricle include distinct populations of FGF-responsive neural progenitors. *Nat Commun.* 2013;4:2049. doi: 10.1038/ncomms3049. PubMed PMID: 23804023.
  86. Dai Y, Kiselak T, Clark J, Clore E, Zheng K, Cheng A, Kujoth GC, Prolla TA, **Maratos-Flier E**, Simon DK. Behavioral and metabolic characterization of heterozygous and homozygous POLG mutator mice. *Mitochondrion.* 2013 Jul;13(4):282-91. doi: 10.1016/j.mito.2013.03.006. Epub 2013 Mar 27.
  87. Suzuki R, Ferris HA, Chee MJ, **Maratos-Flier E**, Kahn CR. Reduction of the cholesterol sensor SCAP in the brains of mice causes impaired synaptic transmission and altered cognitive function. *PLoS Biol.* 2013;11(4):e1001532. doi: 10.1371/journal.pbio.1001532. Epub 2013 Apr 9.
  88. Chee MJ, Pissios P, **Maratos-Flier E**. Neurochemical characterization of neurons reexpressing melanin-concentrating hormone receptor 1 in the mouse hypothalamus. *J Comp Neurol.* 2013 Jul 1;521(10):2208-34. doi: 10.1002/cne.23273.
  89. Pissios P, Hong S, Kennedy AR, Prasad D, Liu FF, **Maratos-Flier E**. (2013) Methionine and choline regulate the metabolic phenotype of a ketogenic diet. *Molecular Metabolism* 2: 306-313
  90. Chee MJ, Pissios P, Prasad D, **Maratos-Flier E**. Expression of melanin-concentrating hormone receptor 2 protects against diet-induced obesity in male mice. *Endocrinology.* 2014 Jan;155(1):81-8. doi: 10.1210/en.2013-1738. Epub 2013 Dec 20. PubMed PMID: 24169555; PubMed Central PMCID: PMC3868808.
  91. Domouzoglou EM, Fisher FM, Astapova I, Fox EC, Kharitonov A, Flier JS, Hollenberg AN, **Maratos-Flier E**. Fibroblast Growth Factor 21 and Thyroid Hormone Show Mutual Regulatory Dependency but Have Independent Actions In Vivo. *Endocrinology.* 2014 May;155(5):2031-40. doi: 10.1210/en.2013-1902. Epub 2014 Feb 24. PubMed PMID: 24564398; PubMed Central PMCID: PMC3990851.

92. Williams RH, Chee MJ, Kroeger D, Ferrari LL, **Maratos-Flier E**, Scammell TE, Arrigoni E. Optogenetic-mediated release of histamine reveals distal and autoregulatory mechanisms for controlling arousal. *J Neurosci*. 2014 Apr 23;34(17):6023-9. doi: 10.1523/JNEUROSCI.4838-13.2014. PubMed PMID: 24760861; PubMed Central PMCID: PMC3996219.
93. Fisher FM, Chui PC, Nasser IA, Popov Y, Cunniff JC, Lundasen T, Kharitononkov A, Schuppan D, Flier JS, **Maratos-Flier E**. Fibroblast Growth Factor 21 Limits Lipotoxicity by Promoting Hepatic Fatty Acid Activation in Mice on Methionine and Choline-deficient Diets. *Gastroenterology*. 2014 Jul 29. pii: S0016-5085(14)00969-X. doi: 10.1053/j.gastro.2014.07.044. [Epub ahead of print] PMID:25083607
94. **Dushay JR, Toschi E, Mitten EK, Fisher FM, Herman MA, Maratos-Flier E. Fructose ingestion acutely stimulates circulating FGF21 levels in humans. *Molecular Metabolism*. 2015;4(1):51-57. doi:10.1016/j.molmet.2014.09.008.**
95. Chee MJ, Arrigoni E, **Maratos-Flier E**. Melanin-concentrating hormone neurons release glutamate for feedforward inhibition of the lateral septum. *J Neurosci*. 2015 Feb 25;35(8):3644-51. doi: 10.1523/JNEUROSCI.4187-14.2015. PubMed PMID: 25716862.
96. Douris N, Stevanovic DM, Fisher FM, Cisu TI, Chee MJ, Nguyen NL, Zarebidaki E, Adams AC, Kharitononkov A, Flier JS, Bartness TJ, **Maratos-Flier E**. Central Fibroblast Growth Factor 21 Browns White Fat via Sympathetic Action in Male Mice. *Endocrinology*. 2015 Jul;156(7):2470-81. doi: 10.1210/en.2014-2001. Epub 2015 Apr 29. PubMed PMID: 25924103.
97. Carracedo A, Rousseau D, Douris N, Fernández-Ruiz S, Martín-Martín N, Weiss D, Webster K, Adams AC, Vazquez-Chantada M, Martinez-Chantar ML, Anty R, Tran A, **Maratos-Flier E**, Gual P, Pandolfi PP. The promyelocytic leukemia protein is upregulated in conditions of obesity and liver steatosis. *Int J Biol Sci*. 2015 Apr 11;11(6):629-32. doi: 10.7150/ijbs.11615. eCollection 2015. PubMed PMID: 25999785.
98. Chee MJ, Douris N, Forrow AB, Monnard A, Lu S, Flaherty SE 3rd, Adams AC, **Maratos-Flier E**. Melanin-concentrating hormone is necessary for olanzapine-inhibited locomotor activity in male mice. *Eur Neuropsychopharmacol*. 2015 Oct;25(10):1808-16. doi: 10.1016/j.euroneuro.2015.05.010. Epub 2015 Jun 3. PubMed PMID: 26092201.



99. Hong S, Moreno-Navarrete JM, Wei X, Kikukawa Y, Tzamelis I, Prasad D, Lee Y, Asara JM, Fernandez-Real JM, **Maratos-Flier E**, Pissios P. Nicotinamide N-methyltransferase regulates hepatic nutrient metabolism through Sirt1 protein stabilization. *Nat Med.* 2015 Aug;21(8):887-94. doi: 10.1038/nm.3882. Epub 2015 Jul 13. PubMed PMID: 26168293.
100. Douris N, Melman T, Pecherer JM, Pissios P, Flier JS, Cantley LC, Locasale JW, **Maratos-Flier E**. Adaptive changes in amino acid metabolism permit normal longevity in mice consuming a low-carbohydrate ketogenic diet. *Biochim Biophys Acta.* 2015 Oct;1852(10 Pt A):2056-65. doi: 10.1016/j.bbadis.2015.07.009. Epub 2015 Jul 11. PubMed PMID: 26170063.
101. Singhal G, Fisher fM, Chee MJ, Tan TG, Ouamari AE, Adams, AC, Najarian R, Kulkarni RN, Bwnoist C, Flier JS, **Maratos-Flier E**. Fibroblast Growth Factor 21 (FGF21) protects against high fat diet induced inflammation and islet hyperplasia in pancreas. *PLOS one.* 2016 11(2):e0148352 doi:10.1371/journal.pone.0148252
102. Singhal G, Douris N, Fish AJ, Zhang X, Adams AC, Flier JS, Pissios P, **Maratos-Flier E**. Fibroblast growth factor 21 has no direct role in regulating fertility in female mice. *Mol Metab.* PMID: 27656406 PMCID: PMC5021666
103. Fisher FM, Kim M, Doridot L, Cunniff JC, Parker TS, Levine DM, Hellerstein MK, Hudgins LC, **Maratos-Flier E**, Herman MA. A critical role for ChREBP-mediated FGF21 secretion in hepatic fructose metabolism. *Mol. Metab.* 6:14-21 2017 PMID: 28123933 PMCID: PMC5220398
104. Douris N, Desai BN, Fisher FM, Cisu TI, Fowler AJ, Zarebidaki E, Nguyen NL, Morgan DA, Bartness TJ, Rahmouni K, Flier JS, **Maratos-Flier E**. Beta-adrenergic receptors are critical for weight loss but not for other metabolic adaptations to the consumption of a ketogenic diet in male mice. *Mol. Metab.* 6:854-862 2017. PMID: 28752049 PMCID: PMC5518722
105. *Desai BN, Singhal G, Watanabe M, Stevanovic D, Lundasen T, Fisher FM, Mather ML, Vardeh HG, Douris N, Adams AC, Nasser IA, FitzGerald GA, Flier JS, Skarke C, Maratos-Flier E. Fibroblast Growth Factor 21 (FGF21) is robustly induced by ethanol and has a protective role in ethanol associated liver injury. Mol Metab. 6:1395-1406 2017. PMID 29107287 PMCID: PMC5681240*
106. *Ter Horst KW, Gilijamse PW, Demirkiran A, van Wagenveld BA, Ackermans MT, Verheij J, Romijn JA, Nieuwdorp M, Maratos-Flier E, Herman MA, Serlie MJ. The FGF21 response to fructose predicts metabolic health and persists after bariatric surgery in obese humans. T Mol Metab. 2017 Nov;6(11):1493-1502*

107. Singhal G, Kumar G, Chan S, Fisher FM, Ma Y, Vardeh HG, Nasser IA, Flier JS, **Maratos-Flier E**. Deficiency of fibroblast growth factor (FGF21) promotes hepatocellular carcinoma (HCC) in mice on a long term obesogenic diet. *Mol Metab.* 2018 Jul;13:56-66
108. *Migdal A, Comte S, Rodgers M, Heineman B, Maratos-Flier E, Herman M, Dushay J. Fibroblast Growth Factor 21 and glucose dynamics in humans. Obes Sci Pract. 2018. 4:484-489*
109. Chee MJ, Hebert AJ, Flaherty SE, Pissios P, **Maratos-Flier E**. Conditional deletion of melanin-concentrating hormone receptor 1 from GABAergic neurons increases locomotor activity. *Mol Metab.* 2019 29:114-123
110. Watanabe M, Singhal G, Fisher FM, Beck TC, Morgan DA, Socciarelli F, Mather ML, Risis R, Bourke J, Rahmouni K, McGuinness OP, Flier JS, **Maratos-Flier E**. Liver-derived FGF21 is essential for full adaptation to ketogenic diet but does not regulate glucose homeostasis. *Endocrine* 2019 e-published ahead of print.
111. Sandhu B, Perez-Matos MC, Tran S, Singhal G, Syed I, Geldgrge L, Mitsuhashi S, Pelletier J, Huang J, Yalcin Y, Csizmadia E, Tiwari-Heckler S, Enjyhji K, Sevigny J, **Maratos-Flier E**, Robson SC, Jian ZG. Global deletion of NTPDase3 protects against diet-induced obesity by increasing basal energy metabolism. *Metabolism* 2021 118:154
112. *Rader DJ, Maratos-Flier E, Nguyen A, Hom D, Ferrier M, Li Y, Komapa J, Martic M, Hinder M, Basson CT, Yowe D, Diener J, Goldfine AB. LLF580, an FGF21 analog, reduces triglycerides and hepatic fat in obese adults with modest hypertriglyceridemia. J Clin Endocrinol Metab. 2021, e published ahead of print*

#### Reviews, Chapters and Editorials

1. Flier JS, **Maratos-Flier E**. Health care reform: a free market perspective. *Diabetes Reviews* 1994;2(4):359-367.
2. **Maratos-Flier E**. Oral agents for the treatment of type II diabetes mellitus. In: Becker KL Principles and Practice of Endocrinology and Metabolism, Second Edition. Philadelphia: J.B. Lippincott Company, 1995;1235-1238.
3. **Maratos-Flier E**, Goldstein BJ, Kahn CR. The insulin receptor and post receptor mechanisms. In: Pickup JC, Williams G, eds. Textbook of Diabetes, Second Edition. Oxford: Blackwell Science, Inc. 1997: 10.1-10.22.
4. **Maratos-Flier E**, Qu D, Gammeltoft S. Analysis of gene expression in hypothalamus in obese and normal mice using differential display. In: Pardee AB, Liang P, eds. Differential Display: Methods in molecular biology. Humana Press: 297-304.
5. **Maratos-Flier E**. Retroviruses and Endocrine Glands. In: Tyler K, Oldstone MAB, eds. Current Topics in Microbiology and Immunology. Volume 233/I and II. 1998

6. Flier, J.S. and **Maratos-Flier E.** Obesity and the Hypothalamus. Novel Peptides for New Pathways. *Cell*: 1998; 437-440.
7. Tritos NA, **Maratos-Flier E.** Two important systems in energy homeostasis: melanocortins and melanin-concentrating hormone. *Neuropeptides*: 1999 33:339-349
8. Flier JS, **Maratos-Flier E.** Energy Homeostasis and Body Weight. *Curr Biol*:2000 23:R215-7.
9. Mobbs CV, Bray GA, Atkison RL, Bartke A, Finch CE, **Maratos-Flier E**, Crawley JN, Nelson JF. Neuroendocrine and pharmacological manipulations to assess how caloric restriction increases life span. *J of Gerontology Series A – Biol. Sci. and Med. Sci.* 2001 56:34-44
10. **Maratos-Flier E** and Flier JS. The stomach speaks – ghrelin and weight regulation. *N Engl J Med.* 2002 May 23;346(21):1662-3.
11. Pissios P and **Maratos-Flier E.** Melanin concentrating hormone: from fish skin to skinny mammals. *Trends in Endocrinology and Metabolism.* *Trends Endocrinol Metab.* 2003 Jul;14(5):243-8.
12. **Maratos-Flier E** and Flier JS. Obesity. *Joslin’s Diabetes Mellitus, 5<sup>th</sup> Edition.* 2005, C. Ronald Kahn, Editor
13. Bachman E and **Maratos-Flier E.** Appetite regulation and thermogenesis. *Endocrinology*, DeGroot, L. Editor. 2005
14. **Maratos-Flier E** and Flier JS. Obesity. *Harrison’s Principles of Internal Medicine, 16<sup>th</sup> Edition.* Kasper DL, Braunwald E, Fauci AS, Hauser SL, Longo DL and Jameson JL, eds. McGraw-Hill, New York 2005
15. Pissios P, Bradley RL and **Maratos-Flier E.** Expanding the Scales: The Multiple Roles of MCH in Regulating Energy Balance and Other Biological Functions. *Endocrine Reviews.* 2006 Oct;27(6):606-20.
16. Flier JS, **Maratos-Flier E.** What Fuels Fat? *Sci. Am* 2007 297:72-81
17. Pissios P, **Maratos-Flier E.** More than Satiety: central serotonin signaling and glucose homeostasis. *Cell Metab.* 2007 Nov;6:345-7
18. **Maratos-Flier E.** The long reach of leptin. *Nat Med.* 2008 Jun;14(6):604-6.
19. **Maratos-Flier E.** Appetite Regulation and Thermogenesis, *Endocrinology*, DeGroot, L., Editor, 2010

20. Domouzoglou EM, **Maratos-Flier E**. Fibroblast growth factor 21 is a metabolic regulator that plays a role in the adaptation to ketosis. *Am J Clin Nutr*. 2011 ;93(4):901S-5.
21. Flier JS and **Maratos-Flier E**. Biology of Obesity. In Harrison's Principles of Internal Medicine, 18th Edition. D Longo, A Fauci, D Kasper, S Hauser, J Jameson and J Loscalzo eds., McGraw-Hill, New York, NY. 2012. p. 622-629.
22. Fisher FM, **Maratos-Flier E**. Stress heats up the adipocyte. *Nat Med*. 2013 Jan;19(1):17-8. doi: 10.1038/nm.3058
23. Douris N, **Maratos-Flier E**. Two paths diverge in the brain: melanin-concentrating hormone controls hepatic and adipose metabolism. *Gastroenterology*. 2013 Mar;144(3):501-4. doi: 10.1053/j.gastro.2013.01.029. Epub 2013 Jan 21.
24. **Maratos-Flier E**. Metabolic Disease Puts Up a Fight: Microbes, metabolism and medications. *Nat Med*. 2013 Oct 7;19(10):1218-9. doi: 10.1038/nm.3373. PubMed PMID: 24100983
25. Fisher FM, **Maratos-Flier E**. SUMO wars. *Mol Metab*. 2013 Dec 17;3(2):81-3. doi: 10.1016/j.molmet.2013.12.002. eCollection 2014 Apr. PubMed PMID: 24634813.
26. Domouzoglou EM, Naka KK, Vlahos AP, Papafaklis MI, Michalis LK, Tsatsoulis A, **Maratos-Flier E**. Fibroblast growth factors in cardiovascular disease: The emerging role of FGF21. *Am J Physiol Heart Circ Physiol*. 2015 Sep 15;309(6):H1029-38. doi: 10.1152/ajpheart.00527.2015. Epub 2015 Jul 31. Review. PubMed PMID: 26232236.
27. Fisher FM, **Maratos-Flier E**. Understanding the Physiology of FGF21. *Annual Review Physiology*. 78: 223-241, 2016.
28. **Maratos-Flier E**. Fatty liver and FGF21 physiology. *Exp Cell Res*. Online, May 2017, doi: 10.1016/j.yexcr.2017.05.006.
29. Flier JS, **Maratos-Flier E**. Cell Met. E-pub. 22-June-2017. Leptin's Physiologic Role: Does the emperor of energy balance have no clothes? [doi.org/10.1016/j.cmet.2017.05.013](https://doi.org/10.1016/j.cmet.2017.05.013)
30. **Maratos-Flier E**. Chapter 40, "Obesity" in *Williams Textbook of Endocrinology, 14<sup>th</sup> Edition, Editors: Shlomo Melmed & Ronald Koenig & Clifford Rosen & Richard Auchus & Allison Goldfine*