

## BIOGRAPHICAL SKETCH

NAME <b>Erin E. Kershaw</b>		POSITION TITLE Associate Professor of Medicine University of Pittsburgh	
EDUCATION/TRAINING			
INSTITUTION AND LOCATION	DEGREE	MM/YY	FIELD OF STUDY
Cornell University, Ithaca, NY	B.A.	05/91	Biology
Cornell University Medical College, New York, NY	M.D.	05/97	Medicine (Honors in research)
New York Presbyterian Hospital-Cornell Medical Center, New York, NY	Intern & Resident	06/00	Internal Medicine
Beth Israel Deaconess Medical Center, Boston MA	Fellow	06/03	Endocrinology

### A. Personal Statement

The goal of the current proposal is promote the scientific training and career development of young investigators in the field of endocrinology and metabolism. My specific role will be to serve as a mentor as well as a member of the Training Committee. I have broad experience in the field of endocrinology and metabolism including over 20 years of experience specifically devoted to clinical and scientific efforts to understand obesity and its complications. I have trained with leaders in this field and, as a result, have developed specific expertise in key research areas relevant to this application including metabolic physiology in cells, rodents, and humans. Since joining the University of Pittsburgh, my research program has focused on the role of intracellular lipid metabolism in glucose homeostasis and insulin action with a specific emphasis on novel lipid metabolizing enzymes and lipid droplet proteins. One such protein, Adipose Triglyceride Lipase (ATGL), is the rate-limiting enzyme in triacylglycerol hydrolysis. I have published several manuscripts on the function, regulation, and physiological relevance of ATGL both *in vitro* and *in vivo*. I have further successfully competed for and administered grants to fund the above work including a Howard Hughes Medical Institute Physician-Scientist Early Career Award and an NIH/NIDDK R01 Award. Through the above research efforts, I have developed collaborative relationships with leaders in the field who will complement my own expertise to facilitate the scientific training and career development of trainees at all levels. In this regard, I have contributed to the scientific and academic develop of several trainees ranging from undergraduate students to trainees at the T32 and K level. Several of my prior trainees have subsequently secured independent tenure-track research positions, academic positions, and/or positions in pharmaceutical companies. I have also held research training leadership positions. Specifically, I currently serve as the Associated Program Director for Research for the Clinical Endocrine Fellowship Program and am also a member of the Physician Scientist Training Program Steering Committee at the University of Pittsburgh. In summary, I have demonstrated a record of successful and productive research in the field of endocrinology and metabolism. I also have experience training mentees and preparing them for academic careers. This experience has prepared me to serve as a mentor and to contribute to training oversight on the Training Committee for this T32 application.

### B. Positions and Honors

#### Positions and Employment

<b>1993-1995</b>	<b>Howard Hughes Medical Institute Medical Student Research Fellow</b> Laboratory of Rudolph L. Leibel, The Rockefeller University, NY, NY
<b>1996-1997</b>	<b>Medical Student Research Fellow</b> Laboratory of Marvin C. Gershengorn, Cornell University Medical College, NY, NY
<b>1997-2000</b>	<b>Intern and Resident in Internal Medicine</b> Department of Medicine, New York Presbyterian Hospital – Cornell Medical Center, NY, NY
<b>1999-2000</b>	<b>Resident Research Fellow</b> Laboratory of Markus Stoffel, The Rockefeller University, NY, NY
<b>2000-2003</b>	<b>Clinical and Research Fellow in Endocrinology and Metabolism</b>

- Laboratory of Jeffrey S. Flier, Division of Endocrinology, Department of Medicine, Beth Israel Deaconess Medical Center, Joslin Diabetes Center, and Harvard Medical School, Boston, MA
- 2003-2008** **Instructor in Medicine**  
Division of Endocrinology, Department of Medicine, Beth Israel Deaconess Medical Center, Joslin Diabetes Center, and Harvard Medical School, Boston, MA
- 2008-** **Assistant Professor**  
Department of Medicine, Division of Endocrinology, University of Pittsburgh, Pittsburgh, PA
- 2013-** **Faculty Member**  
Interdisciplinary Biomedical Graduate Program, Molecular Genetics and Developmental Biology, University of Pittsburgh, Pittsburgh, PA
- 2013-** **Faculty Member**  
Vascular Medicine Institute, University of Pittsburgh, Pittsburgh, PA
- 2014-** **Associate Professor**  
Department of Medicine, Division of Endocrinology, University of Pittsburgh, Pittsburgh, PA

### Grant Review Panels

- 03/2009** *Ad hoc* reviewer University of Toledo, Interdisciplinary Research Initiation Award Program
- 07/2010** *Ad hoc* reviewer NIH/NIDDK, 2010/07 ZDK1 GRB-7 (O3)
- 03/2011** *Ad hoc* reviewer Univ of Pittsburgh, Clinical and Translational Science Institute P&F Program
- 10/2011** *Ad hoc* reviewer NIH/NIDDK, Cellular Aspects of Diabetes and Obesity (CADO)
- 03/2012** *Ad hoc* reviewer NIH/NCI, 2012/05 ZCA1 SRLB-D (M1) R
- 03/2013** *Ad hoc* reviewer NIH/NIGMS, 2013/05 ZGMI TWD-C(CC)
- 04/2013** *Ad hoc* reviewer University of Washington, Diabetes Research Center (DRC) P&F Program
- 05/2013** *Ad hoc* reviewer Italian Telethon Foundation for Biomedical Research
- 06/2013** *Ad hoc* reviewer NIH/NHLBI, 2013/10 ZHL1 PPG-R(01)1
- 03/2014** *Ad hoc* reviewer NIH/NIDDK, 2014/03 DDK-B
- 05/2014** *Ad hoc* reviewer NIH/NCCAM, 2014/05 ZAT1 PK (29) P

### Professional Memberships

- 2013-** Member American Diabetes Association
- 2013-** Member The Obesity Society

### Honors and Awards

- 1991** Cornell University, Departmental Honors for graduating in top 10% of the class
- 1991** Cornell University, Alumni Program Research Award
- 1991** Golden Key National Honor Society
- 1992** Cornell University Medical College, David P. Barr Research Fellowship
- 1993** Howard Hughes Medical Institute (HHMI), Medical Student Research Award (Year 1)
- 1994** Howard Hughes Medical Institute (HHMI), Medical Student Research Award (Year 2)
- 1994** Cornell University Medical College, Dr. Harold Lampton Biomedical Research Award for research entitled "Molecular genetic basis for type 2 diabetes susceptibility in obese rodents"
- 1995** Cornell University Medical College, Dean's Research Award for research entitled "Molecular mapping of simple sequence repeats for Pgm1 and C8 $\beta$  in the vicinity of the rat *fatty* locus"
- 1995** Howard Hughes Medical Institute (HHMI), Award for Continuation of Medical Studies (Year 1)
- 1996** Howard Hughes Medical Institute (HHMI), Award for Continuation of Medical Studies (Year 2)
- 1996** Cornell University Medical College, Alpha Omega Alpha Medical Honor Society
- 1997** Cornell University Medical College, Medical Doctorate with Honors in Research
- 1997** Cornell University Medical College, Janet M. Glasgow Memorial Achievement Award
- 1997** The Endocrine Society, Honorary Membership Award for Endocrine Research and Education
- 1999** New York Presbyterian Hospital, David E. Rogers Memorial Research Award for research entitled "Identification of hepatocyte nuclear factor 3 $\alpha$  target genes using differential display"
- 2002** Endocrine Fellows Foundation, Endocrine Fellow Research Award
- 2009-** Howard Hughes Medical Institute (HHMI), Physician-Scientist Early Career Award
- 2009** University of Pittsburgh, Nominee for the Searle Scholars Program

<b>2010-2012</b>	University of Pittsburgh, Department of Medicine Junior Scholar Award
<b>2012</b>	University of Pittsburgh Senior Vice Chancellor's Research Seminar Invited Speaker
<b>2012</b>	Semi-annual Novo Nordisk Diabetes & Obesity Biologics Science Forum Semi-Finalist
<b>2013</b>	University of Pittsburgh, Nominee for the American Diabetes Association Pathways Program
<b>2014</b>	University of Pittsburgh Division of Endocrinology Chief Distinction Award for Physicians who strengthen the overall academic mission of the Division

### C. Selected Peer-reviewed Publications

- Kershaw EE**, Chua SC, Leibel RL. Localization of a (CA)<sub>n</sub> repeat in the glucagon-like peptide-1 receptor gene (*Glp1r*) to proximal mouse chromosome 17 and its linkage to other markers. Mamm Genome. **1995** Apr;6(4):301-3.
- Kershaw EE**, Chua SC, Williams JA, Murphy EM, Leibel RL. Molecular mapping of SSRs for Pgm1 and C8b in the vicinity of the rat fatty locus. Genomics. **1995** May;27(1):149-54.
- Meierfrankenfeld B, Abelenda M, Jauker H, Klingenspor M, **Kershaw EE**, Chua SC, Leibel RL, Schmidt I. Perinatal energy stores and excessive fat deposition in genetically obese (*fa/fa*) rats. Am J Physiol. **1996** Apr;270(4 Pt 1):E700-8.
- Chua SC, White DW, Wu-Peng S, Liu SM, Okada N, **Kershaw EE**, Tartaglia LA, Leibel RL. Phenotype of *fatty* due to a Gln269Pro mutation in the leptin receptor (*Lepr*). Diabetes. **1996** Aug;45(8):1141-3.
- Kahle EB, Butz KG, Chua SC, **Kershaw EE**, Leibel RL, Fenger TW, Hansen CT, Michaelis OE. Rat corpulent (*cp*) mutation maps to the same interval on (*Pgm1-Glut1*) rat chromosome 5 as the *fatty* (*fa*) mutation. Obes Res. **1997** Mar;5(2):142-5.
- Chung WK, Zheng M, Chua M, **Kershaw EE**, Power-Kehoe L, Tsuji M, Wu-Peng S, Williams J, Chua SC, Leibel RL. Genetic Modifiers of *Lepr<sup>fa</sup>* associated with variability in insulin production and susceptibility to NIDDM. Genomics. **1997** May;41(3):332-44.
- Kershaw EE**, Morton NM, Dhillon H, Ramage L, Seckl JR, Flier JS. Adipocyte-specific glucocorticoid inactivation protects against diet-induced obesity. Diabetes. **2005** Apr;54(4):1023-31. PMID: PMC2819172.
- Kershaw EE**, Hamm JK, Verhagen LAW, Peroni O, Katic M, Flier JS. Adipose triglyceride lipase: function, regulation by insulin, and comparison with adiponutrin. Diabetes. **2006** Jan;55(1):148-57. PMID: PMC2819178.
- Kershaw EE**, Schupp M, Guan HP, Gardner NP, Lazar MA, Flier JS. PPAR $\gamma$  regulates adipose triglyceride lipase in adipocytes in vitro and in vivo. Am J Physiol Endocrinol Metab. **2007** Dec;93(6):E1736-45. PMID: PMC2819189.
- Zabolotney JM, Kim YB, Welsh LA, **Kershaw EE**, Neel BG, Kahn BB. Protein tyrosine phosphates 1B (PTP1B) expression is induced by inflammation in vivo. J Biol Chem. **2008** May;283(21):14230-41. PMID: PMC2386946.
- Kienesberger PC, Lee D, Pulinilkunnit T, Brenner DS, Cai L, Magnes C, Koefeler HC, Streith IE, Rechberger GN, Haemmerle G, Flier JS, Zechner R, Kim YB, and **Kershaw EE**. Adipose triglyceride lipase deficiency causes tissue-specific changes in insulin signaling. J Biol Chem. **2009** Oct;284(44):30218-29. PMID: PMC2781577.
- Basantani MK, Sitnick MT, Cai L, Brenner DS, Gardner NP, Li JZ, Schoiswohl G, Yang K, Kumari M, Gross RW, Zechner R, and **Kershaw EE**. Pnpla3/Adiponutrin deficiency in mice does not contribute to fatty liver disease or metabolic syndrome. J Lipid Res. **2011** Feb;52(2):318-29. PMID: PMC3023552.
- Eguchi J, Wang X, Yu S, **Kershaw EE**, Chiu PC, Dushay J, Estal JL, Klein U, Maratos-Flier E, Rosen ED. Transcriptional control of adipose lipid handling by IRF4. Cell Metab. **2011** Mar;13(3):249-59. PMID: PMC3063358.
- Haemmerle G, Moustafa T, Woelkart G, Kotzbeck P, Büttner S, Schmidt A, van de Weijer T, Hesselink M, Kienesberger P, Zierler K, Schreiber R, Eichmann T, Kolb D, Schweiger M, Kumari M, Eder S, Schoiswohl G, Wonsiroj N, Jäger D, Pollak N, Preiss-Landl K, Kolbe T, Rüllicke T, Pieske B, Trauner M, Lass A, Zimmermann R, Hoefler G, Cinti S, **Kershaw EE**, Schrauwen P, Madeo F, Mayer B, and Zechner R. ATGL-mediated fat catabolism regulates cardiac mitochondrial function via PPAR $\alpha$  and PGC-1 $\alpha$ . Nat Med. **2011** Aug;17(9):1076-85. PMID: PMC3244833.

15. Kienesberger PC, Pulinilkunnil T, Sung MY, Haemmerle G, **Kershaw EE**, Young ME, Light PE, Oudit GY, Zechner R, Dyck JRB. Myocardial ATGL overexpression decreases the reliance on fatty acid oxidation and protect against pressure overload-induced cardiac dysfunction. Mol Cell Bio. **2011** Feb;32(4):740-50. PMID: PMC3272983.
16. Kumari M, Schoiswohl G, Poeschl M, Cornaciu I, Rangrez AY, Eder S, Oberer M, Haemmerle G, Lass A, **Kershaw EE**, Zimmermann R, and Zechner R. Adiponutrin (PNPLA3) functions as a nutritionally regulated lysophosphatidic acid acyltransferase. Cell Metab. **2012** May;15(5):691-702. PMID: PMC3361708.
17. Yang Z, Hulver M, McMillan RP, Cai L, **Kershaw EE**, Yu L, Xue B, and Shi H. Regulation of leptin and insulin signaling by muscle suppressor of cytokine signaling 3 (SOCS3). PLoS One. **2012**; 7(10)e47493. PMID: PMC3480378.
18. Obrowsky S, Chandak PG, Patankar JV, Povoden S, **Kershaw EE**, Bogner-Strauss JG, Hoefler G, Levak-Frank S, Kratky D. Adipose triglyceride lipase is a TG lipase of the small intestine and regulates intestinal PPAR $\alpha$  signalling. J Lipid Res. **2013** Feb;54(2):425-35. *NOTE: Cover.* PMID: PMC3541705.
19. Pulinilkunnil T, Kienesberger PC, Negendran J, Waller TJ, Young M, **Kershaw EE**, Korbitt G, Haemmerle G, Zechner R, Dyck JRB. Myocardial adipose triglyceride lipase overexpression protects diabetic mice from the development of lipotoxic cardiomyopathy. Diabetes. **2013** May; 62(5):1464-77. PMID: PMC3636613.
20. Kienesberger PC, Pulinilkunnil T, Nagendran J, Young ME, Bogner-Strauss JG, Hackl H, Khadour R, Heydari E, Haemmerle G, Zechner R, **Kershaw EE\***, Dyck JR\*. Early structural and metabolic cardiac remodelling in response to inducible adipose triglyceride lipase ablation. Cardiovasc Res. **2013** Aug;99(3):442-51. \*Co-last, Co-corresponding authors. PMID: PMC3718322.
21. Sitnick MT\*, Basantani MK\*, Cai L\*, Schoiswohl G, Yazbeck CF, Distefano G, Ritov V, Delany JP, Schreiber R, Stolz DB, Gardner NP, Kienesberger PC, Pulinilkunnil T, Zechner R, Goodpaster BH, Coen P, and **Kershaw EE**. Skeletal muscle triacylglycerol hydrolysis does not influence metabolic complications of obesity. Diabetes. **2013** Oct;62(10):3350-61. *Cover. \*Authors contributed equally to this work. NOTE: Cover.* PMID: PMC3781480.
22. Mottillo EP, Balasubramanian P, Lee YH, Weng Changren, **Kershaw EE**, and Granneman JG. Coupling of lipolysis and de novo lipogenesis in brown, beige, and white adipose tissue during chronic  $\beta$ 3-adrenergic receptor activation. J Lipid Res. Accepted Sep 5, 2014. PMID: pending.
23. Rachakonda VP, Reeves VL, Aljammal J, Wills RC, Trybula JS, DeLany JP, Kienesberger PC, and **Kershaw EE**. Serum autotaxin is independently associated with hepatic steatosis in severely obese women. Obesity. Accepted Oct 13, 2014. (Obesity-14-0850-Orig). PMID: pending (NIHMS636179).

## D. Research Support

### Ongoing Research Support

**1 R01 DK090166-01**  
NIH/NIDDK

**Kershaw, Erin E. (PI)**

**Dates: 02/01/11-01/31/16**

**Title:** Adipose Triglyceride Lipase (ATGL/PNPLA2) in lipotoxicity and the metabolic syndrome

**Description:** The goals of this project are to determine the contribution of lipid metabolism by adipocyte triglyceride lipase (ATGL/PNPLA2) to systemic and tissue-specific (adipose tissue and skeletal muscle) glucose homeostasis and insulin action using genetically-engineered mice as model systems.

**Role:** PI

### Completed Research Support

**Physician-Scientist Early Career Award** **Kershaw, Erin E. (PI)**  
**Howard Hughes Medical Institute**

**Dates: 08/01/09-07/31/14**

**Title:** Contribution of Patatin-like phospholipase domain containing proteins (PNPLAs) to lipotoxicity and the metabolic syndrome.

**Description:** The goals of this project are to determine the contribution of proteins in the PNPLA family (ATGL/PNPLA2, Adiponutrin/PNPLA2, other) to metabolic disease. This award provides no PI salary support.

**Role:** PI

**Junior Scholar Award  
University of Pittsburgh**

**Kershaw, Erin E. (PI)**

**Dates: 07/01/10-06/30/11**

**Title:** Adiponutrin/PNPLA3 in lipotoxicity and the metabolic syndrome.

**Description:** The goals of this project were to evaluate the role of adiponutrin/PNPLA3 in metabolic disease using genetically-engineered mice and cells as model systems.

**Role:** PI

**R03 DK077697  
NIH/NIDDK**

**Kershaw, Erin E. (PI)**

**Dates: 04/01/07-03/31/10**

**Title:** Contribution of Adipose Triglyceride Lipase (ATGL/PNPLA2) in skeletal muscle to lipid metabolism and insulin action

**Description:** The goals of this project were to evaluate the contribution of adipocyte triglyceride lipase (ATGL/PNPLA2) to lipid metabolism and insulin action in cultured myotubes and to generate an animal model of increased ATGL expression exclusively skeletal muscle.

**Role:** PI

**K08 DK065833  
NIH/NIDDK**

**Kershaw, Erin E. (PI)**

**Dates: 01/01/04-12/31/08**

**Title:** Adipocyte-specific glucocorticoid metabolism by 11 beta hydroxysteroid dehydrogenases (11 $\beta$ HSDs)

**Description:** The goals of this project were to evaluate the role of adipocyte-specific glucocorticoid metabolism by 11 $\beta$ HSDs in metabolism by determining whether transgenic 11 $\beta$ HSD2-mediated inactivation of glucocorticoid action exclusively in adipocytes is sufficient to protect against obesity and the metabolic syndrome.

**Role:** PI