Clayton E. Mathews
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BIOGRAPHICAL

Name:	Clayton E. Mathews		
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EDUCATION AND TRAINING

UNDERGRADUATE:

Dates Attended	Name and Location of Institution	Degree Received (Year)	Field of Study
1987-1991	The North Carolina State University Raleigh, NC	B.S. (1991)	Biochemistry

GRADUATE:

1992-1994	The University of Georgia Athens, GA Thesis topic: Correlation of Mitochondrial Mutations with Glucose Intolerance	M.S. (1994)	Foods & Nutrition
1994-1997	The University of Georgia Athens, GA Dissertation Topic: Effects of Mitochondrial Mutations on Cellular Energy Production and Pancreatic Beta Cell Function	Ph.D. (1997)	Foods & Nutrition

POST-DOCTORAL FELLOWSHIP:

1997-2001	The Jackson Laboratory, Bar Harbor, ME	

PROFESSIONAL EXPERIENCE

Academic:

2013-Present	University of Florida Department of Pathology, Immunology, & Laboratory Medicine	Professor
2013-Present	University of Florida Department of Food Science and Human Nutrition	Professor
2009-2013	University of Florida	Professor

	Department of Pediatrics	
2008-Present	Immunology and Microbiology Program Interdisciplinary Biomedical Graduate Program University of Florida College of Medicine	Graduate Faculty Status
2009-Present	Immunology and Microbiology Program Interdisciplinary Biomedical Graduate Program University of Florida College of Medicine	Co-Director
2009-2013	University of Florida Department of Pathology, Immunology, & Laboratory Medicine	Associate Professor with Tenure
2009-2013	University of Florida Department of Food Science and Human Nutrition	Associate Professor
2009-2013	University of Florida Department of Pediatrics	Associate Professor
2007-2008	The University of Pittsburgh, Pittsburgh, PA Department of Pediatrics Department of Immunology	Associate Professor with Tenure
2007-2008	The University of Pittsburgh, Pittsburgh, PA Department of Immunology	Associate Professor
2001-2007	Immunology Program Interdisciplinary Biomedical Graduate Program The University of Pittsburgh School of Medicine	Graduate Faculty Status
2001-2007	The University of Pittsburgh, Pittsburgh, PA Department of Pediatrics	Assistant Professor
9/1997-4/2001	The Jackson Laboratory, Bar Harbor, ME	Postdoctoral Fellow
10/1994-9/1997	The University of Georgia, Athens, GA	Graduate Research Assistant
2/1994-10/1994	The National Institutes of Health, Bethesda, MD	Predoctoral Fellowship
	NIDDK: Research Area: Trafficking and Plasma Membrane Docking and Fusion of GLUT4 Containing Low Density Microsomes in Adipocytes	
1/1992-1/1994	The University of Georgia, Athens, GA	Graduate Research Assistant
Non-Academic		
1988, 1989	The Weyerhaeuser Company	Environmental Research Technician

MEMBERSHIPS IN PROFESSIONAL AND SCIENTIFIC SOCIETIES

American Diabetes Association
American Association of Immunologists
The Oxygen Society

PUBLICATIONS

Refereed Articles

1. **Mathews CE**, McGraw RA, Berdanier CD. 1995. A point mutation in the mitochondrial DNA of diabetes prone BHE/cdb rats. FASEB J 9:1638-1642.
2. **Mathews CE**, Wickwire KL, Hathcock-Rice D, Berdanier CD. 1996. Maternal diet has little effect on the glucose tolerance and age changes in enzyme activity in male progeny of gestationally diabetic rats. Int J Diabetes 4:17-27.
3. **Mathews CE** and Berdanier CD. 1997. A gene screen for mitochondrial diabetes mellitus in BHE/Cdb rats. Exp Clin Endocrinol Diabetes 105:86-87.
4. Jia T, Wickwire KL, **Mathews CE**, Berdanier. 1998. Neither the cholesterol nor arginine content of whole egg explains its beneficial effect on glucose homeostasis in BHE//Cdb rats. J Nutr Biochem 9:170-177.
5. **Mathews CE** and Berdanier CD. 1998. Noninsulin-dependent diabetes mellitus as a mitochondrial genomic disease. Proc Soc Exp Biol Med 219:97-108.
6. Ebert DH, Bischof LJ, Steeper RS, Chapman SC, Svitek CA, Goldman JK, **Mathews CE**, Leiter EH, Hutton JC, O'Brien RM. 1999. Structure and promoter activity of an islet-specific glucose-6-phosphatase catalytic subunit-related gene. Diabetes 48:543-551.
7. Graser RT, **Mathews CE**, Leiter EH, Serreze DV. 1999. MHC characterization of ALR and ALS mice: Respective similarities to the NOD and NON strains. Immunogenetics 49:722-726.
8. **Mathews CE** and Leiter EH. 1999. Resistance of ALR/Lt islets to free radical-mediated diabetogenic stress is inherited as a dominant trait. Diabetes 48:2189-2196.
9. **Mathews CE** and Leiter EH. 1999. Constitutive differences in antioxidant defense status distinguish alloxan-resistant and alloxan-susceptible mice. Free Radic Biol Med 27:449-455.
10. **Mathews CE**, McGraw RA, Dean R, Berdanier CD. 1999. Inheritance of a mitochondrial DNA defect and impaired glucose tolerance in BHE/cdb rats. Diabetologia 42:35-40.
11. **Mathews CE**, Graser RT, Serreze DV, Leiter EH. 2000. Reevaluation of the major histocompatibility complex genes of the NOD-progenitor CTS/Shi strain. Diabetes 49:131-134.
12. **Mathews CE**, Wickwire K, Flatt WP, Berdanier CD. 2000. Attenuation of circadian rhythms of food intake and respiration in aging diabetes-prone BHE/Cdb rats. Am J Physiol. 279:R230-R238.
13. **Mathews CE**, Graser RT, Savinov AY, Serreze DV, Leiter EH. 2001. Unusual resistance of ALR/Lt beta cells to autoimmune destruction: Role for beta cell expressed resistance determinants. Proc Natl Acad Sci USA. 98:235-240.
14. Berdanier CD, Everts HB, Hermoyian C, **Mathews CE.** 2001. Role of vitamin A in mitochondrial gene expression. Diabetes Res Clin Pract 54:11-27.
15. **Mathews CE**, Dunn BD, Hannigan MO, Huang C-K, Leiter EH. 2002. Genetic Control Of Neutrophil Superoxide Burst Activity In Diabetes Resistant ALR/Lt Mice. Free Radical Biol. Med. 32:744-751.
16. **Mathews CE**, Langley SH, Leiter EH. 2002. New Mouse Model to Study Islet Transplantation in Insulin Dependent Diabetes Mellitus. Transplantation 73:1333-1336.

17. **Mathews CE**, Pietropaolo SL, Pietropaolo M. 2003. Reduced Thymic DC Expression of Islet Cell Antigen 69 Contributes to Loss of Self Tolerance. Ann NY Acad Sci. 1003:412-417.
18. **Mathews CE**, Graser RT, Bagley RJ, Caldwell JW, Li R, Churchill GA, Serreze DV, Leiter EH. 2003. Genetic Analysis of Resistance to Type 1 Diabetes in ALR/Lt Mice, a NOD-related Strain with Defenses Against Autoimmune-mediated Diabetogenic Stress. Immunogenetics. 55:491-496.
19. **Mathews CE,** Bagley RJ, Leiter EH. 2004 ALS/Lt: A New Type 2 Diabetes Mouse Model Associated with Low Free Radical Scavenging Potential. Diabetes. 53:125-129.
20. Milton MJ, Poulin M, **Mathews C**, Piganelli JD. 2004 Generation, maintenance, and adoptive transfer of diabetogenic T-cell lines/clones from the nonobese diabetic mouse. Methods Mol Med. 102:213-226.
21. **Mathews CE**, Leiter EH, Spirina O, Bykhovskaya Y, Ringquist S, Gusdon AM, Fischel-Ghodsian N. 2005 *mt-Nd2* Allele of the ALR/Lt Mouse Confers Resistance Against both Chemically-Induced and Autoimmune Diabetes. Diabetologia 48:261-267.
22. Kitiphongspattana K, **Mathews CE**, Leiter EH, Gaskins HR. 2005 Proteasome inactivation alters glucose-stimulated insulin secretion and turnover in pancreatic ß cells. J Biol Chem. 280:15727-15734.
23. Pomerleau DP, Bagley RJ, Holl TM, Serreze DV, **Mathews CE**, Leiter EH. 2005 MHC-linked diabetes susceptibility in NOD/Lt mice: subcongenic analysis localizes a component of *Idd16* at the *H2-D* end of the diabetogenic $H2^{g7}$ complex. Diabetes 54:1603-1606.
24. **Mathews CE**, Suarez-Pinzon WL, Baust JJ, Strynadka K, Leiter EH, Rabinovitch A. 2005 Mechanisms Underlying Resistance of Pancreatic Islets from ALR/Lt Mice To Cytokine-Induced Destruction. J Immunol. 175:1248-1256.
25. Chang Y-G, Yap S, Ge X, Piganelli J, Bertera S, Giannokakis N, **Mathews CE**, Prud'homme G and Trucco M. 2005. DNA vaccination with an insulin construct and a chimeric protein binding to both CTLA4 and CD40 ameliorates type 1 diabetes in NOD mice. Gene. Ther. 12:1679-1685.
26. Takaki T, Marron MP, **Mathews CE**, Guttmann ST, Bottino R, Trucco M, DiLorenzo TP, Serreze DV. HLA-A*0201-restricted T-cells Contributing to Type 1 Diabetes in "Humanized" Mice are Cytotoxic to Human Pancreatic ß Cells, and Identify Autoantigens with Potential Clinical Relevance. 2006 J Immunol. 176:3257-3265.
27. Ge X, Piganelli JD, Tse HM, Bertera S, **Mathews CE**, Trucco M, Wen L, Rudert WA. 2006 Co-expression of HLA-DR4 Alleles Diminishes HLA-DQ8-restricted CD4 T Cell Responses: A Possible Mechanism For the DR4-mediated Modulation Effect To the Type 1 Diabetes Susceptibility. Diabetes. 55:3455-3462
28. Sen P, Wallet M, Yi Z, Huang Y, Henderson M, **Mathews CE**, Earp HS, Matsushima G, Baldwin Jr. AS and Tisch R. 2007 Apoptotic cells induce MerTK-dependent blockade of NF-κB activation in dendritic cells. Blood. 109:653-660
29. Gusdon AM, Votyakova TV, Reynolds IJ, **Mathews CE**. 2007 Nuclear-Mitochondrial Interaction Involving *mt-Nd2* Leads to Increased Mitochondrial Reactive Oxygen Species Production. J Biol Chem. 282:5171-517
30. Wallet MA, Sen P, Flores R, Yi Z, Huang Y, **Mathews CE**, Earp HS, Matsushima G, Wang B, Tisch R. 2008 MerTK is required for apoptotic cell-induced T cell tolerance. J Exp Med. 205:219-232.
31. Gusdon AM, Votyakova TV, **Mathews CE**. 2008 $mt\text{-}Nd2^{a}$ Suppresses Mitochondrial Reactive Oxygen Species Production. J Biol Chem. 283:10690-10697.
32. Chen J, Gusdon AM, Thayer TC, **Mathews CE**. 2008 Role of increased ROS dissipation in prevention of T1D: Lessons from the ALR mouse. Ann N Y Acad Sci. 1150:157-166

33. Chen J, Lu Y, Lee C-H, Li R, Leiter EH, **Mathews CE**. 2008 Comparative Genetics of Spontaneous Autoimmune versus Chemically-Induced Diabetes in Mice. Free Radic Biol Med. 45:1263-1270
34. Wallet MA, Flores RR, Wang Y, Yi Z, Kroger CJ, **Mathews CE**, Earp HS, Matsushima1 G, Wang B, Tisch R. 2009 MerTK regulates thymic selection of autoreactive T cells. Proc Natl Acad Sci USA. 106:4810-4815.
35. Gusdon AM, Chen J, Votyakova TV, **Mathews CE**. 2009 Quantification, Localization, and Tissue Specificities of Mitochondrial Reactive Oxygen Species Production. Methods Enzymol. 456:439-457.
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37. Park H-J, Zhang Y, Chuang Du, Welzig CM, Madias C, Naggar I, Georgescu SP, Wang B, Aronovitz MJ, Blaustein RO, Karas RH, Liao R, **Mathews CE**, Galper JB. A New Molecular Mechanism For Diabetic Autonomic Neuropathy: Srebp-1 Regulation Of Parasymapthetic Signaling In The Heart. Circulation Research. 105:287-294
38. Parker MP, Xue S, Alexander JJ, Wasserfall CH, Campbell-Thompson ML, Battaglia M, Gregori S, **Mathews CE**, Song S, Troutt M, Eisenbeis S, Williams J, Schatz DA, Haller MJ, Atkinson MA Immune depletion with cellular mobilization imparts immunoregulation and reverses autoimmune diabetes in NOD mice. Diabetes. 2009, 58:2277-2284
39. Tse HM, Thayer TC, Steele C, Cuda CM, Morel L, Piganelli JD, **Mathews CE**. NADPH oxidase deficiency regulates Th lineage commitment and modulates autoimmunity. J Immunol. 2010, 185:5247-5258. PMID: 20881184
40. Delano MJ, Thayer T, Gabrilovich S, Kelly-Scumpia KM, Winfield RD, Scumpia PO, Cuenca AG, Warner E, Wallet SM, Wallet MA, O'Malley KA, Ramphal R, Clare-Salzer M, Efron PA, **Mathews CE**, Moldawer LL. Sepsis Induces Early Alterations in Innate Immunity That Impact Mortality to Secondary Infection. J Immunol. 186:195-202. PMID: 21106855
41. Chen J, Gusdon AM, Piganelli J, Leiter EH, **Mathews CE**. *mt-Nd2*^{a} modifies resistance against autoimmune Type 1 diabetes in NOD mice at the level of the pancreatic beta cell. Diabetes. 2011, 60:355-359. PMID: 20980458
42. Cuenca AG, Wynn JL, Kelly-Scumpia KM, Scumpia PO, Vila L, Delano MJ, **Mathews CE**, Wallet SM, Reeves WH, Behrns KE, Nacionales DC, Efron PA, Kunkel SL, Moldawer LL. Critical role for CXCL10 (IP-10)/CXCR3 signaling in the murine neonatal response to sepsis. Infect Immun. 2011 Jul;79(7):2746-54. PMID: 21518789
43. Chen J, Grieshaber S, **Mathews CE**. Methods to assess beta cell death mediated by cytotoxic T lymphocytes. J Vis Exp. 2011 Jun 16;(52). pii: 2724. doi: 10.3791/2724. PMID: 21712795
44. Delano MJ, Kelly-Scumpia KM, Winfield RD, Scumpia PO, Cuenca AG, Harrington PB, O'Malley KA, Warner E, Gabrilovich S, **Mathews CE**, Laface D, Heyworth PD, Ramphal R, Strieter RM, Moldawer LL. Neutrophil Mobilization from the Bone Marrow During Polymicrobial Sepsis Is Dependent On CXCL12 Signaling. J Immunol. 2011 Jul 15;187(2):911-918. PMID: 21690321
45. Lightfoot YL, Chen J, **Mathews CE**. Role of the Mitochondria in Immune-Mediated Apoptotic Death of Human Beta□Cells. PLoS One. 2011;6(6):e20617. PMID: 21738580
46. Ize-Ludlow D, Lightfoot YL, Parker MJ, Xue S, Wasserfall CH, Haller MJ, Schatz DA, Becker DJ, Atkinson MA, **Mathews CE**. Progressive Erosion of Beta Cell Function Precedes the Onset of Hyperglycemia in the NOD Mouse Model of Type 1 Diabetes. Diabetes. 2011. PMID: 21659497

47. Thayer TC, Delano MJ, Liu C, Chen J, Padgett L, Annamali M, Piganelli JD, Tse HM, Moldawer LL, **Mathews CE**. Superoxide Production by Macrophages and T cells is Critical for the Induction of Autoreactivity and Type 1 Diabetes. Diabetes. Diabetes. 2011 Aug;60(8):2144-51. PMID: 21715554
48. Chen J, Gusdon AM, **Mathews CE**. Role of *mt-Nd2* in Type 1 Diabetes. Diabetes Metab Res Rev. 2011 Nov;27(8):849-53. PMID: 22069272
49. Glushakova LG, Judge S, Cruz A, Pourang D, **Mathews CE,** Stacpoole PW. Biochemical consequences of pyruvate dehydrogenase complex deficiency. Mol Genet Metab. 2011 Nov;104(3):255-60. PMID: 21846590
50. Wang W, Guo Y, Xu M, Huang H, Novikova L, Larade K, Jiang Z, Thayer TC, Frontera JR, Aires D, Ding H, Turk J, **Mathews CE**, Bunn HF, Stehno-Bittel L, Zhu H. Development of Diabetes in Ncb5or-Null Mice is Associated with Manifestations of Endoplasmic Reticulum and Oxidative Stress in Beta Cells. Biochim Biophys Acta. 2011 Nov;1812(11):1532-1541. PMID: 21839170
51. Xu Y, Lee PY, Li Y, Liu C, Zhuang H, Han S, Nacionales DC, Weinstein J, **Mathews CE**, Moldawer LL, Li SW, Satoh M, Yang LJ, Reeves WH. Pleiotropic IFN-dependent and -independent effects of IRF5 on the pathogenesis of experimental lupus. J Immunol. 2012 Apr 15;188(8):4113-4121. PMID: 22422888
52. Lightfoot YL, Chen J, **Mathews CE**. Oxidative Stress and Beta Cell Dysfunction. Methods Mol Biol. 2012;900:347-62. PMID: 22933078
53. Lightfoot YL, Chen J, **Mathews CE**. Immune-mediated β-cell death in type 1 diabetes. Eur J Clin Invest. 2012;42(11):1244-1251. PMID: 22924552
54. Broniowska KA, **Mathews CE**, Corbett JA. Do β-cells generate peroxynitrite in response to cytokine treatment? J Biol Chem. 2013 Dec 20;288(51):36567-78. PMID: 24194521

Submitted

55. Aaron M. Gusdon, Jenelle Fernandez, Jing Chen, and **Clayton E. Mathews**. Respiration and reactive oxygen species production distinguish mitochondria from brain and liver. BMC Biochemistry. *In Revision*
56. Diego Ize-Ludlow, Lesley G. Ellies, Yaima Lightfoot, Lisa M. Gallo, Rita Bottino, Alberto Riva, and **Clayton E. Mathews**. Solute Carrier Family 7a Member 2 (*Slc7a2*) Is Essential For Arginine Induced Insulin Release Yet Dispensable For Proinflammatory Cytokine-Induced Nitric Oxide Production In Pancreatic Islets. J Biol. Chem. *In Revision.*
57. Xue S, Wasserfall C, Myhr C, Campbell-Thompson M, Mathews CE, Burn P, Rabinovitch A, Savinov A, Schatz D, Haller M, Atkinson M. Combination Therapy Reverses Hyperglycemia in NOD Mice with Established Type 1 Diabetes. J Clin Invest. *Submitted*
58. Li J-W, Cassidy RJ, Liu C, Perry D, Brusko TM, Mathews CE, Chen J. Patients and Individuals At-risk for Developing Type 1 Diabetes exhibit Peripheral T Cell Mitochondrial Inner Membrane Hyperpolarization. Diabetes Care. *Submitted*

Book Chapters, Invited Reviews, and Hypothesis Papers

1. **Mathews CE**. 2002. Rodent Models for the Study of Type 2 Diabetes in Children (Juvenile Diabesity). Pediatric Diabetes 3:163-173.
2. Carroll JA and **Mathews CE**. 2004. Proteomics and Genomics to Detail Responses to Extracellular Stimuli. In: *Genomics And Proteomics In Nutrition*. Berdanier CD and Moustaid-Moussa N, Eds. New York, NY, Marcel Dekker, Inc, p. 331-354
3. **Mathews CE**, Leiter EH. 2004 Rodent models of spontaneous diabetes. In *Joslin's Diabetes Mellitus,* 14th ed. Kahn CR, Weir GC, King GL, Jacobson AM, Moses AC, Smith RJ, Eds. Philadelphia, PA, Lippincott Williams & Wilkins, p. 291-327.

4. **Mathews CE**. 2005. Utility of murine models for the study of spontaneous autoimmune type 1 diabetes. Pediatric Diabetes 6:165-177.
5. Gusdon AM, Corbett JA, **Mathews CE**. 2006 Type 1 diabetes: Islet inflammation- the contribution of cytokines and beta cells. Drug Discovery Today. 3:367-372
6. Corbett JA, **Mathews CE**. 2006 Metabolic Disorders and Inflammation: Introduction. Drug Discovery Today. 3:365-366
7. Piganelli JD, **Mathews CE**. 2007 Autoreactive T Cell Responses: New Technology in Pursuit of an Old Nemesis. Pediatric Diabetes. 8: 249–251
8. Luzardo Y, **Mathews CE**. Attacking the Source: Anti-PDX-1 Responses In Type 1 Diabetes. Lab Invest. 2010, 90:6-8.
9. Thayer TC, Wilson SB, **Mathews CE**. Use of nonobese diabetic mice to understand human type 1 diabetes. Endocrinol Metab Clin North Am. 2010 Sep;39(3):541-561. PMID: 20723819
10. Wasserfall C, Nead K, **Mathews CE**, Atkinson MA. The "threshold hypothesis": solving the equation of nurture versus nature in type 1 diabetes. Diabetelogia. 2011 Sep;54(9):2232-2236. PMID: 21773685
11. Wasserfall CH, **Mathews CE**, Schatz DA. The Use of Leptin as Treatment for Type 1 Diabetes Mellitus. Pediatr Diabetes. 2012 Feb;13(1):74-6. PMID: 21884562
12. Mathews AE, **Mathews CE**. Inherited β-Cell Dysfunction in Lean Individuals With Type 2 Diabetes. Diabetes. 2012 Jul;61(7):1659-1660. PMID: 22723272

Published Abstracts

1993 **Mathews CE**, Wickwire KL, Hathcock-Rice D, Berdanier CD. Effects of menhaden oil on maternal and growth diets of BHE/Cdb rats. *FASEB J.* **7**:A820.

1995 **Mathews CE**, McGraw RA, Berdanier CD. A point mutation in the mitochondria DNA of diabetes-prone BHE/cdb rats. *FASEB J.* **9**: A749.

1996 **Mathews CE**, Berdanier CD, Rose BS, Flatt WP. An indirect calorimetric study comparing BHE/cdb, Sprague Dawley and cross bred rats. *FASEB J.* **10**: A745.

1998 **Mathews CE**, Langley SH, Leiter EH. Alloxan Induced IDDM in ALR & ALS Mice is Linked to Anti-Oxidant Defense Status. *Diabetes*. **47**:A176.

1999 **Mathews CE**, Graser RT, Serreze DV, Leiter EH. ALR/Lt Mice: ß Cell Resistance to Chemical and Autoimmune Attack Associated with Increased Anti-oxidant Defenses. *Diabetes*. **48**:A450.

1999 **Mathews CE** and Berdanier CD. Mitochondrial Mutations Decrease OXPHOS Capacity and ATP Production in NIDDM Prone BHE/Cdb Rats. *Diabetes*. **48**:A451.

2000 **Mathews CE**, EA Johnson, EH Leiter. CTS/Shi mice: T-lymphocytopenia due to a lineage specific defect intrinsic to T cell precursors halting emigration of mature thymocytes. *FASEB J.* **14**:A2151.

2000 **Mathews CE**, Graser RT, Johnson EA, Serreze DV, Leiter EH. Genetic Resistance to IDDM: A Role for ß Cell Expressed Resistance Determinants. *Diabetes*. **49**:A70.

2001 **Mathews CE**, Bagley RJ, Caldwell JW, Leiter EH. NIDDM in a New Mouse Model Elicited by Low Free Radical Scavenging Potential Combined with Behavioral and Dietary Stress. *Diabetes*. **50**:A78

2001 **Mathews CE**, Graser RT, Bagley RJ, Dunn BD, Caldwell JW, Serreze DV, Leiter EH. Genetic Similarities of Free Radical Dissipation and IDDM Resistance in ALR/Lt Mice. Diabetes **50**:A517

2001 Bottino R, Tse H, Balamurugan AN, **Mathews CE**, Trucco M, Piganelli JD. Preservation of Human Islets after Isolation Using a Metalloporphyrin Based Superoxide Dismutase Mimic. Cell Transplantation **10**:538

2001 **Mathews CE**, Langley SH, Leiter EH. New Mouse Model to Study Islet Transplantation in

Insulin Dependent Diabetes Mellitus. Cell Transplantation 10:558

2002 **Mathews CE**, Bagley RJ, Holl T, Serreze DV & Leiter EH. Congenic analysis of H2gx-linked diabetes protection. *Diabetes Metab Res Rev*. 18(S4):S22.

2002 **Mathews CE,** Suarez-Pinzon W, Baust JJ, Rabinovitch A, Leiter EH. Mechanisms underlying resistance of ALR islets to cytokine destruction. *Diabetes Metab Res Rev*. 18(S4):S23.

2002 **Mathews CE**, Pietropaolo SL, Pietropaolo M. Reduced thymic DC expression of Islet antigen contributes to loss of self tolerance. *Diabetes Metab Res Rev*. 18(S4):S31.

2003 Chang Y, Yap S, Piganelli J, Bertera S, Giannokakis N, **Mathews CE**, Trucco M. The Combination of Autoantigen and Immune Regulatory Molecule DNA Vaccines Delays and Reduces T1DM in NOD mice. *Diabetes.* 52(S1):A66

2003 **Mathews CE**, Pietropaolo SL, Pietropaolo M. Reduced thymic DC expression of Islet antigen contributes to loss of self tolerance. *Diabetes.* 52(S1):A7

2004 Tse HM, Bauer L, Piganelli JD, **Mathews CE**. Genetic Ablation of NADPH Oxidase activity blocks T1D development in NOD mice. *Diabetes*. 53(S2):A26

2004 **Mathews CE**, Leiter EH, Spirina O, Bykhovskaya, Y, Gusdon A, Fischel-Ghodsian N. Contribution of the Mitochondrial Genome in Resistance Against both Chemically-Induced Autoimmune Diabetes. *Diabetes*. 53(S2):A30

2004 **Mathews CE**, Votyakova T, Reynolds I. ALR/LtJ mtDNA Provides Protection from Oxidative Stress Induced Mitochondrial Dysfunction. *Diabetes*. 53(S2):A77

2005 Levesque MC, **Mathews CE**. Mutant Cat2 Protects ALR/LtJ Mouse Islets from Cytokine-Induced Beta Cell Destruction. *Diabetes* 54(S1):A77-A78.

2005 Olshansky G, **Mathews CE**. T1D Protective Locus Controls Increased Activity and Stability of Superoxide Dismutase 1. *Diabetes* 54(S1):A391

2005 Ge X, Rudert WA, **Mathews CE**, Piganelli JD, Trucco M. CD8+ Class I MHC H2D^{b}-Restricted CTL Recognizes a GAD65 Peptide. *Diabetes* 54(S1):A309

2005 Chang Y, **Mathews CE**, Pietropaolo SL, Benos PV, Friday RP, Trucco M, Pietropaolo M. Promiscuous Gene Activation (PGA): Reduced Transcriptional Activity of Islet Autoantigen Contributes to Loss of Self-Tolerance. *Diabetes*. 54(S1):A94

2005 Gusdon AM, Olshansky G, Votyakova TV, **Mathews CE**. Novel mt-Nd2 Variant Encoded by the ALR/Lt Mouse Strain Provides Resistance to Free Radical-Induced Mitochondrial Dysfunction. *Diabetes* 54(S1):A81

2005 Ize-Ludlow D, Bottino R, Ellies L, **Mathews CE**. Solute Carrier Family 7 Member 2 (*Slc7a2*) Deficiency Alters First Phase Insulin Release (FPIR). Diabetes 54(S1)

2005 Wallet MA, Sen P, **Mathews CE**, Tisch R. MerTK is Required for Development of Type 1 Diabetes. Diabetes 54(S1)

2005 Park H-J, Zhang Y, Welzig CM, Du C, Aronovitz M, Georgescu SP, **Mathews CE**, Liao R, Blaustein RO, Karas RH, Galper JB. A Mouse Model for Diabetic Autonomic Neuropathy Demonstrates a Decrease in both Parasympathetic Response and Atrial Expression of GIRK1 (Kir3.1) J Am Heart Assoc.

2006 Gusdon AM, Votyakova TV, **Mathews CE**. The NADH Dehydrogenase 2 Subunit (*mt-Nd2*) Allele Encoded by the ALR/Lt Mouse Strain Protects Against T1D but Does Not Alter Basal Mitochondrial Function. Diabetes 55(S1):A42

2006 Ize-Ludlow D, Becker DJ, **Mathews CE**. Endocrine Abnormalities in NOD: a Dilemma of Controls. Diabetes 55(S1):A375

2006 Chen J, Leiter EH, **Mathews CE**. Diabetes Resistance at the ß Cell Level: Searching for Common ALR/Lt Genetic Protection Against Autoimmune and Free Radical-Induced Diabetes. Diabetes 55(S1):A42

2006 Tse HM, Mathews CE, Schreiner S, Milton MJ, Profozich J, Randa G, Piganelli JD. Redox

Modulation Inhibits Diabetogenic T Cell Activation and T1D. Diabetes 55(S1):A89

2006 Park H, Zhang Y, Du C, Aronovitz M, Georgescu SP, Welzig CM, **Mathews CE**, Wang B, Liao R, Blaustein RO, Karas RH, Galper JB. SREBP1 Repairs the Parasympathetic Dysfunction in Atrial Myocytes from Diabetic Hearts. Circulation Research *In Press*

2007 Tse HM, Thayer TC, **Mathews CE**, Piganelli JD**.** Reactive Oxygen Species Generation Is Necessary For Autoimmune T Cell Effector Function. Diabetes 56(S1):A58

2007 Thayer TC, Tse HM, Steele C, Piganelli JD, **Mathews CE**. Critical Role of Superoxide Production in the Pathogenesis of Autoimmune Diabetes. Diabetes 56(S1):A59

2007 Chen J, Leiter, EH, **Mathews CE**. Susceptibility to Free Radical-Mediated and Autoimmune Diabetes is Controlled by Interactions of the Nuclear and Mitochondrial Genomes. Diabetes 56(S1):A64

2007 Kray A, Baust JJ, Vaidya S, **Mathews CE**, Hollinger JO. Defect Bone Health In Mice With The Akita Mutation In *Ins2*. Diabetes 56(S1):A196

2007 Mojaddidi MA, Al-Sunni AA, Goss J, Baust JJ, **Mathews CE**, Malik RA. Islet Cell Transplantation Prevents Myelinated Nerve Fibre Pathology In The C57BL/6-Ins2Akita Mouse. Diabetes 56(S1):A211

2007 Gusdon AM, **Mathews CE**. *mt-Nd2*^{a} Protects Against T1D by Lowering Mitochondrial ROS Production. Diabetes 56(S1):A410

2007 Diego Ize-Ludlow, Bowman TA, Najjar SM, O'Doherty RM, Becker DJ, **Mathews CE**. Endocrine factors protect ALR mice from diabetes. Diabetes 56(S1):A675

2007 Votyakova TV, Chen J, **Mathews CE**. High sensitivity of beta cells to oxidative stress: monitoring mitochondrial (mt) function in live beta cells. Diabetes 56(S1):A686

2008 Chen J, Gusdon AM, **Mathews CE**. *mt-Nd2*^{a} Protects a Beta Cell Line Against Immune- and Free Radical- Mediated Cell Death. *Diabetes*. 57(S1):A80

2008 Tse HM, Thayer TC, **Mathews CE**, Piganelli, JD. Reactive oxygen species generation is necessary for diabetogenic T cell effector function. *Diabetes*. 57(S1):A354

2008 Chen J, **Mathews CE**. Susceptibility to Free Radical-Mediated and Autoimmune Diabetes is Controlled by Retrogenetic Interactions of the Nuclear and Mitochondrial Genomes. *Setting the Pace in Mitochondrial Medicine*. Indianapolis, IN Jun 25-28

2008 Gusdon AM, Chen J, **Mathews CE**. *mt-Nd2*^{c} Increases Susceptibility To Type 1 Diabetes By Increasing Mitochondrial Reactive Oxygen Species Production. Setting the Pace in Mitochondrial Medicine Conference. *Setting the Pace in Mitochondrial Medicine*. Indianapolis, IN Jun 25-28

2009 Chen J, **Mathews CE**. Susceptibility to Free Radical-Mediated and Autoimmune Diabetes is Controlled by Retrogenetic Interactions of the Nuclear and Mitochondrial Genomes. *Diabetes*. 58(S1):A16-A17

2009 Thayer TC, Campbell M, Pliner V, **Mathews CE**. *Suppressor of superoxide production* locus (Susp) increases Superoxide dismutase 1 (SOD1) stability and activity, resulting in altered neutrophil function and T1D resistance. *Diabetes*. 58(S1):A17

2009 Tse HM, Thayer T, **Mathews CE**, Piganelli JD. Inhibition of Superoxide Synthesis Prevents T Cell Autoreactivity. *Diabetes*. 58(S1):A50

2009 Ize-Ludlow D, Luzardo Y, Wasserfall C, Schatz D, Atkinson MA, **Mathews CE**. Progressive Erosion of Beta Cell Function Precedes the Onset of Type 1 Diabetes in the NOD Mouse. *Diabetes*. 58(S1):A327

2009 Luzardo Y, Chen J, Contreras J, Levine F, **Mathews CE.** Potential of βlox5 Cell Line in Cell-Mediated Human Beta Cell Death Assays. Diabetes, *In Press*

2010 Campbell MS, Thayer TC, Liu C, Pliner V, Mathews CE. Suppressor of Superoxide Production Locus Dominantly Prevents T1D as Well as Insulitis and Maps to Ankrd50. *Diabetes*.

59(S1):A34

2010 Parker M, Wasserfall C, Xue S, Campbell-Thompson M, **Mathews CE**, Schatz D, Haller M, Atkinson M. Granulocyte Colony-Stimulating Factor Enhances Both ATG and Anti-CD3 mAb-Mediated Reversal of Type 1 Diabetes in NOD Mice. *Diabetes*. 59(S1):A117

2010 Chen J, **Mathews CE**. mt-Nd2a Allotype Provides on Type 1 Diabetes (T1D) Resistance at Both the Immune and β Cell Levels. *Diabetes*. 59(S1):A330

2010 Thayer TC, Delano MJ, Tse HM, Piganelli JD, Moldawer L, **Mathews CE**. Macrophage and T Cell ROS Production Is Critical for T1D Pathogenesis. *Diabetes*. 59(S1):A361

2010 Luzardo Y, Levine F, **Mathews CE**. Immune Mediators Kill the Human Beta Cell Line βlox5 by Apoptosis and Necrosis. *Diabetes*. 59(S1):A443

2012 Down Regulation of Glucokinase and Mitochondrial ATP Synthase in Islets from Type 1 Organ Donors. Lightfoot Y, Grieshaber S, Wilhem J, Zhang L, Campbell-Thompson M, Schatz D, Atkinson MA, **Mathews CE**. nPOD Annual Meeting, Miami, FL

2012 Ojiaku CA, Annamalai M, Liu C, Chen J, Caldwell JW, **Mathews CE**. NADPH Oxidase 2 is Not Essential for Optimal Glucose Stimulated Insulin Secretion. *Diabetes*. *In Press*.

2012 Lightfoot YL, Chen J, **Mathews CE**. *mt-ND2a* Protects Human β Cells from Immune-Mediated Destruction. *Diabetes. In Press*

2012 Liu C, Thayer TC, **Mathews CE**. Suppressor of superoxide production (Susp) protects NOD mice against type 1 diabetes through modulation of superoxide dismutase 1. Immunology of Diabetes Society Annual Meeting, Victoria, Canada, June, 2012

2012 Chen J, Knapp S, Li J, Zhang S, Leon L, Annamalai M, **Mathews CE**. Idd22 protects against autoimmune diabetes by preventing T cell trafficking to target beta cells. Immunology of Diabetes Society Annual Meeting, Victoria, Canada, June, 2012

2012 Lightfoot YL, Chen J, **Mathews CE**. mt-Nd2a protects human and mouse beta cells against immune-mediated cell death. Immunology of Diabetes Society Annual Meeting, Victoria, Canada, June, 2012

2012 Lightfoot YL, Vendrame F, Grieshaber SS, Wilhem J, Campbell-Thompson M, Schatz DA, Atkinson MA, Burke G, Pugliese A, **Mathews CE**. Markers of Beta Cell Dysfunction and Inflammation Persist in Subjects with Established Type 1 Diabetes. Federation of Clinical Immunologists Society (FOCiS) 2012 Conference. Vancouver, Canada, June, 2012

2012 Li J, Cassidy R, Welch D, **Mathews CE**, Chen J. Mitochondria in T Cells of Type 1 Diabetic patients and at risk individuals exhibit inner membrane hyperpolarization. Federation of Clinical Immunologists Society (FOCiS) 2012 Conference. Vancouver, Canada, June, 2012

2012 Liu C & **Mathews CE**. Indispensable Role of NADPH Oxidase in Cytotoxic T Cell Responses: Consequences for Type 1 Diabetes. Federation of Clinical Immunologists Society (FOCiS) 2012 Conference. Vancouver, Canada, June, 2012

Genbank Entries

1. AY533108 Mus musculus strain NON/Lt mitochondrion, complete genome
2. AY533107 Mus musculus strain NOD/LtJ mitochondrion, complete genome
3. AY533106 Mus musculus strain ALS/Lt mitochondrion, complete genome
4. AY533105 Mus musculus strain ALR/Lt mitochondrion, complete genome
5. AF538059 Mus musculus strain ALR/Lt interleukin-2 (Il2) mRNA, partial cds
6. AF542385 Mus musculus strain CTS/Shi interleukin-2 (Il2) mRNA, partial cds
7. AF542384 Mus musculus strain C57BL/Ks interleukin-2 (Il2) mRNA, partial cds
8. AF542383 Mus musculus strain ALS/Lt interleukin-2 (Il2) mRNA, partial cds
9. AF119254 Mus musculus MHC class II antigen IE alpha (H2-Ea) mRNA, H2-Ea-nb1 allele, partial cds

10. AF119253 Mus musculus MHC class II antigen IE alpha (H2-Ea) mRNA, H2-Ea-nb1 allele, partial cds
11. AF119252 Mus musculus MHC class II antigen IA beta 1 (H2-Ab1) mRNA, H2-Ab1-nb1 allele, complete cds
12. AF119251 Mus musculus MHC class II antigen IA beta 1 (H2-Ab1) mRNA, H2-Ab1-nb1 allele, complete cds
13. AF115771 Rattus norvegicus Sprague-Dawley tRNA-Lys gene, partial sequence; and ATP synthase subunit 8 (atp8) gene and mutant ATP synthase subunit 6 (atp6) gene, atp6-a allele, mitochondrial genes encoding mitochondrial products, complete cds
14. AF115770 Rattus norvegicus BHE/Cdb tRNA-Lys gene, partial sequence; and ATP synthase subunit 8 (atp8) gene and mutant ATP synthase subunit 6 (atp6) gene, atp6-b allele, mitochondrial genes encoding mitochondrial products, complete cds

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PROFESSIONAL ACTIVITIES

Teaching: University of Georgia

1995, 1996 Graduate Teaching Assistant. Nutrition 100. Introduction to Human Nutrition

Teaching: University of Pittsburgh

2002 - 2007 Administrator for a Journal Club focusing on Immunological aspects of autoimmune diabetes

2003 - 2007 INTBP2005 "Foundations of Biomedical Science Conference"

2004 Chemistry 1710 "Undergraduate Research"

2005 - 2007 IMM 3240 "Immunology Grant Writing Course"

2005 - 2007 MSCMP2740 "Molecular Pathobiology"

Teaching: University of Florida

2008-Present ANG6532/ANT4531 "Molecular Genetics of Disease"

2008-Present GMS5905 "Immunology & Microbiology Grant Writing" Course Director

2008-Present GMS 6140 "Principles of Immunology"

2009 GMS 6006 "Fundamentals of Immunology & Microbiology"

2009-Present Co-Director of the Immunology and Microbiology Concentration, University of Florida Interdisciplinary Program in Biomedical Sciences

2012 GMS6382 "Advanced Cellular & Molecular Immunology" Course Director

Graduate Student Committees:

2002 - 2004 Thesis Committee, Grace Olshansky, Program of Immunology
MS Conferred January of 2004, University of Pittsburgh

2003 - 2006 Dissertation Committee, Maria Soledad Santos, Program of Molecular Pharmacology Ph. D. Conferred February of 2006, University of Pittsburgh

2006 - 2010 Dissertation Committee, Terri Thayer, Program of Immunology **Committee Chair**. Ph. D. Conferred October, 2010, University of Pittsburgh

2008 - 2012 Dissertation Committee, Yaima Luzardo, Program of Immunology and Microbiology, **Committee Chair**, Ph. D. Conferred May, 2012, University of Florida

2008 - 2012 Dissertation Committee, Alex Cuenca, Program of Immunology and Microbiology, **Committee Chair**, Ph. D. Conferred May, 2012, University of Florida

2008 - 2011 Dissertation Committee, Daniel Perry, Program of Immunology and Microbiology Ph. D. Conferred June, 2011, University of Florida

2008 - 2012 Dissertation Committee, Dana Catalfamo, Program of Immunology and Microbiology Ph. D. Conferred July 2012, University of Florida

2009 - Present Dissertation Committee, Sindhu Arivazhagan, Program of Immunology and Microbiology

2009 - Present Dissertation Committee, Allison Sang, Program of Immunology and Microbiology

2009 - Present Dissertation Committee, Benjamin Looney, Program of Immunology and Microbiology

2009-Present Dissertation Committee, Young Mee Yoon, Program of Immunology and Microbiology

2010 - Present Dissertation Committee, Chao Liu, Program of Immunology and Microbiology **Committee Chair**

2010 - Present Dissertation Committee, Sofia Appleberg, Program of Immunology and Microbiology

2010 - Present Dissertation Committee, Yiming Yin, Program of Immunology and Microbiology

2011-Present Dissertation Committee, Ramya Sivakumar, Program of Immunology and Microbiology

2011-Present Dissertation Committee, Robert Whitener, Program of Immunology and Microbiology

2012-Present Dissertation Committee, Brittney Newby, UF MD/PhD Program, **Committee Chair**

Mentorship of Students/Fellows:

2012-Present Brittney Newby, MD/PhD Scholar. University of Florida College of Medicine Project Title:

2010 - Present Chao Liu. Graduate Student. University of Florida College of Medicine.

Project Title: Role of Free Radicals in Diabetogenic Immune Activation

2003 - 2008 Aaron M. Gusdon. Undergraduate Student, University of Florida. Project Title:

2008 - 2012 Yaima Luzardo. Graduate Student. University of Florida College of Medicine. Project Title: Transformed human beta cells as targets of autoimmune effectors

2008-2010 Lisa Gallo. Fellow in Pediatric Endocrinology.
Research Fellow of the Lawson Wilkins Pediatric Endocrine Society
Project Title: Role of adhesion molecules in pathogenesis of T1D

2006 - 2010 Terri Thayer. Graduate Student. University of Pittsburgh School of Medicine. Project Title: Identification of *Susp* and the role of *Susp* in T1D-Resistance

2005 - 2007 Jing Chen. Post-Doctoral Fellow. University of Pittsburgh. Project Title: Generation of and Study of Cybrid Cell Lines to Define the Mechanism of T1D Resistance Imparted by a Single Nucleotide Polymorphism in *mt-Nd2*.

2004 - 2007 Diego Ize-Ludlow. Fellow in Pediatric Endocrinology.
Project 1: Role of solute carrier family 7, member 2 in arginine-induced insulin secretion.
Project 2: Accelerator hypothesis and T1D development of the NOD mouse.

2003 - 2008 Aaron M. Gusdon. Undergraduate Student, University of Pittsburgh. Project Title: Contributions of the mt-Nd2 alleles to Type 1 Diabetes Susceptibility/Resistance

2003 Aaron Gusdon. Senior Thesis (Seneca Valley High School). Project Title: Use of Pyrosequencing to Precisely Determine Levels of Mitochondrial Heteroplasmy

1999 Brian D. Dunn. The Jackson Laboratory Undergraduate Summer Program. Project Title: Genetic Similarities of Free Radical Dissipation and IDDM Resistance in ALR/Lt Mice.

1998 Jason W. Caldwell. Burroughs Wellcome Medical Student Research Fellowship. Project title: Reducing Potential And Peripheral Glucose Uptake. Mechanisms Of Free Radical Induced Glucose Intolerance.

Active Grants:

2006-2017 R01 DK074656
Title: mt-Nd2 and Resistance to Autoimmune Diabetes
Project Role: Principal Investigator (40% Effort)
Source: National Institutes of Health (NIDDK/NIAID)
Total Award: $1,665,000 ($225,000/ year Direct)
Objective: Understand the role that the C278A sequence variation in *mt-Nd2* plays in resistance to T1D.

2010-2013 JDRF 25-2010-688
Title: Islet Resistance to T1D (nPOD)

Project Role: Principal Investigator (5% Effort)
Source: Juvenile Diabetes Foundation International
Total Award: $110,000 ($50,000/ year Direct)
Objective: Determine metabolic differences in the pancreatic islets comparing organs from individuals with T1D and those that have circulating autoantibodies to β cell antigens but do not have T1D.

2011-2014 ADA 1-11-BS-104
Title: Idd22 controls resistance to autoimmune diabetes at the beta cell level
Project Role: Principal Investigator (10% Effort)
Source: American Diabetes Assocition (ADA)
Total Award: $313,500 ($95,000/ year Direct)
Objective: Identify Idd22 and the mechanism of β cell resistance.

2013-2015 JDRF 17-2012-595
Title: Lymphocyte Mitochondrial Dysfunction in Type 1 Diabetes
Project Role: Co-Principal Investigator (10% Effort)
Source: Juvenile Diabetes Research Foundation (JDRF)
Total Award: $495,000 ($150,000/ year Direct)
Objective: Identify and determine novel lymphocyte mitochondrial biomarkers associated with Type 1 Diabetes

PENDING Support

R01AI103226-A1 9/1/2013-8/31/2018
Source: National Institutes of Health (NIDDK)
Title: Divergent control of autoimmunity in T1D and SLE through the G-CSF pathway
Project Role: Co-Investigator
Objective: This application will test the hypothesis that the G-CSF signaling pathway is critical to the pathogenesis of T1D and SLE and modulation of this pathway in opposite directions for the two autoimmune diseases will lead to disease prevention.

P01AI42288 (Atkinson, P.I.) Competitive Renewal 9/01/13 – 08/31/18
Source: National Institutes of Health NIAID
Title: Immune Function and the Progression to Type I Diabetes
Role: Co-Principal Investigator Project 2
Objective: To test our overall hypothesis that T1D results from a combination of genetic variants that negatively impact regulatory mechanisms, leading to a tissue-specific break in tolerance and islet β cell dysfunction and death

AN:3525662 9/01/13 – 08/31/18
Source: National Institutes of Health NIAID
Title: Interferon α/β in Type 1 Diabetes Pathogenesis
Role: Principal Investigator (Multi-PI With Michael Clare-Salzler)
Objective: To define the IFN □□□ roles in regulating both acquired and innate responses associated with the pathology and immunogenetics of Type 1 Diabetes

Completed Support

2007-2010 JDRF 1-2007-77

Title: Identification of *Susp* and the role of *Susp* in T1D-Resistance
Project Role: Principal Investigator (20% Effort)
Source: Juvenile Diabetes Foundation International
Total Award: $462,000 ($140,000/ year Direct)
Objective: Define the T1D protective gene that is *Susp*, and examine the role of *Susp* in protection against T1D.

2003-2008 U19 AI056374
Title: Utilization of ALR Derived T1D Resistance Loci to Improve Islet Graft Outcome
Project Role: Principal Investigator
Source: National Institutes of Health (NIAID)
Total Award: $1,480,000
Objective: to determine if the heritable resistance of ALR islets to autoimmunity will extend to a defense against both allo-graft and auto-graft rejection

2000-2007 ERMS# 00035010 (PI: Massimo Trucco)
Title: New Advanced Technology to Improve Prediction and Prevention of Type 1 Diabetes
Project Role: Co-Investigator
Source: Department of Defense
Total Award: $4,936,454 ($715,786/ year Direct)
Objective: To utilize new technology, increasing the speed and relieving economic strain of genetic screening in large populations studies.

2007-2008 Smith and Nephew Diabetes Project (PI: Jeffrey Hollinger, Carnegie Mellon University)
Title: Bone Wound Healing in the Akita model of type 1 Diabetes
Project Role: Subcontract to Clayton E. Mathews
Source: Smith & Nephew Inc.
Direct Cost of Subcontract: $50,000 Annual
Objective: Determine whether "bioactive molecule 1" and "bioactive molecule 2" enhance bone wound healing in the C57BL/6-Ins2^{Akita} model of insulin requiring diabetes.

2006-2007 JDFI 5-2006-232
Title: Generation of Cybrids to Study a mtDNA SNP Associated with T1D
Project Role: Principal Investigator
Source: Juvenile Diabetes Foundation International
Total Award: $108,900 ($100,000/ year Direct)
Objective: To generate and study cell lines with a polymorphism in the mitochondrial DNA polymorphism that is protective against Type 1 Diabetes.

2001-2006 JDFI 2-2001-860
Title: Genetics of Resistance to Immune-Mediated Beta Cell Destruction
Project Role: Principal Investigator
Source: Juvenile Diabetes Foundation International
Total Award: $693,750 ($125,000/ year Direct)
Objective: Fine map Insulin Dependant Diabetes resistance loci and elucidate the molecular basis for the unique resistance of ALR to immune-mediated injury
NOTE: This grant was submitted for renewal July 14th, 2006. Listed as #2 under the Pending Support Section.

1999-2001 NIH F32 DK09865

Title: Mechanisms of susceptibility to alloxan in mice
Project Role: Principal Investigator
Source: National Institutes of Health (NIDDK)
Total Award: $201,600 ($40,000/ year Direct)
Objective: Establish the genetic and biochemical basis for the differential susceptibility of ALR and ALS strains to chemically-induced diabetes.

1999-2002 ADA EHL, Inc.
Title: Molecular genetics of free radical defenses in alloxan resistant (ALR) mice
Project Role: Co-Principal Investigator
Source: American Diabetes Association
Total Award: $333,000 ($100,000/ year Direct)
Objective: Identify both the genetic map location and the function of the gene or genes conferring upon ALR/Lt mice such remarkable resistance to ROS damage.

1999-2001 JDF 1-1999-642
Title: Genetic up-regulation of free radical defenses to prevent IDDM in NOD mice
Project Role: Co-Principal Investigator
Source: Juvenile Diabetes Foundation International
Total Award: $222,000 ($100,000/ year Direct)
Objective: Examine the resistance of ALR islets to autoimmune effector mediated stress.

Seminars and Invited Lectureships

1997

1. **Role of mitochondrial mutations in inherited metabolic diseases**
   The Jackson Laboratory, Bar Harbor, ME. September 30th, 1997
2. **Inheritance of NIDDM in the BHE/Cdb Rat**
   The Jackson Laboratory, Bar Harbor, ME. November 11, 1997

1998

1. **Molecular Characterization of the MHC region of ALR and ALS Mice**
   New England Immunology Society, Woods Hole, MA. Spetember 23, 1998
2. **Genetics of Resistance to Alloxan Induced Diabetes**
   The Jackson Laboratory, Bar Harbor, ME. November 4th, 1998

1999

1. **Importance of ICR Derived Mouse Strains for Diabetes Research**
   The Jackson Laboratory, Bar Harbor, ME. April 23rd, 1999
2. **ALR/Lt Islets Are Remarkably Resistant To Cytokine and Autoimmune Attack**
   4th Immunology of Diabetes Society, November 15th,1999

2000

1. **Why Can't CTS Get an Invitation to the Thymocyte Debutante Ball?**
   The Jackson Laboratory, Bar Harbor, ME. February 4th, 2000
2. **Is it Fate? Can Beta Cells Control Their Own Destiny In Autoimmune Diabetes?**
   The Jackson Labroatory, Bar Harbor, ME. April, 28th, 2000
3. **Does the ß cell play a part in autoimmune diabetes or is it the corpse at a funeral?**
   Corixa Corporation, Palo Alto, CA. May 10, 2000
4. **CTS/Shi mice: T-lymphocytopenia due to a lineage specific defect intrinsic to T cell precursors halting emigration of mature thymocytes**

American Association of Immunologists Annual Meeting, Seattle, WA. May 15, 2000

5. **Genetic Resistance to IDDM: A Role for ß-Cell Expressed Resistance Determinants**
   American Diabetes Association Scientific Sessions, June 5th, 2000
6. **Does the ß cell play a part in autoimmune diabetes or is it the corpse at a funeral?**
   Children's Hospital of Pittsburgh, Pittsburgh, PA. August 29, 2000
7. **Free Radical Scavenging Potential in New Mouse Models of Diabetes Susceptibility and Resistance**
   Roche Symposium for Animals Models of NIDDM, September 19th, 2000
8. **Dissipation is a Good Thing! Genetic Similarities of IDDM Resistance & Free Radical Dissipation in ALR/Lt Mice**
   The Jackson Laboratory, Bar Harbor, ME. December 12th, 2000

2001

1. **Heightened Free Radical Dissipation Ability in a Diabetes-Resistant Mouse Strain**
   Biochemistry Department, University of Maine, Orono, ME. February 2, 2001.
2. **The Alloxan Susceptible Mouse Strain: A New Model for the Study of T2DM**
   The Jackson Laboratory Post-Doctoral Symposium, March 13, 2001
3. **Can Anti-oxidants Dissipate Autoimmune Diabetes? Genetic Similarities of IDDM Resistance & Free Radical Dissipation in ALR/Lt Mice**
   Molecular Genetics and Biochemistry Department, University of Pittsburgh Medical Center, April 22, 2001
4. **Genetic Similarities of Free Radical Dissipation and IDDM Resistance in ALR/Lt Mice.**
   American Diabetes Association Scientific Sessions, June 19, 2001
5. **New Mouse Model to Study Islet Transplantation in Insulin Dependent Diabetes Mellitus**
   Cell Transplant Society, 10th Congress, Keystone, CO. October 17th, 2001
6. **Animal Models for the Study of Autoimmune Diabetes and Islet Transplantation**
   Children's Hospital of Pittsburgh, Pittsburgh, PA. December 12, 2001

2002

1. **Genetic Control of Thymocyte Emigration**
   Children's Hospital of Pittsburgh, Pittsburgh, PA. February 19, 2002
2. **Dietary Components Can Regulate the Penetrance of Autoimmune Diabetes Susceptibility**
   University of Pittsburgh School of Medicine, University Wide Endocrine Conference, March 28, 2002
3. **What Controls End Stage T cell Development? Genetic Analysis of Peripherial T cell Deficiency in the CTS Mouse Strain.**
   Rocky Mountain Labs, Hamilton, MT, August 1st, 2002
4. **Mechanisms Underlying Resistance Of ALR Islets To Cytokine Destruction**
   Immunology of Diabetes Society, Copper Mountain, CO. September 22, 2002
5. **Reduced Thymic DC Expression of Islet Cell Antigen 69 Contributes to Loss of Self Tolerance**
   Immunology of Diabetes Society, Copper Mountain, CO. September 23, 2002
6. **Congenic Analysis of $H2^{gx}$-Linked T1D-Protection**
   Immunology of Diabetes Society, Copper Mountain, CO. September 24, 2002
7. **Thymic Education: What Governs the Change from Thymocyte to T cell?**
   University of Pittsburgh, School of Medicine Immunology Department, October 31st, 2002
8. **Maternal Influence on Resistance to Alloxan-Induced Diabetes**

Children's Hospital of Pittsburgh Diabetes Institute Seminar, Pittsburgh, PA. November 18th, 2002

2003

1. **Enemies at the Gate: Genetic Resistance at the Pancreatic Islet level in Autoimmune Diabetes**
   Children's Hospital of Pittsburgh Molecular Medicine Research Seminar, January 9th, 2003
2. **Lack of Free Radical Scavenging Potential is linked to Diabetes Susceptibility**
   International Group on Insulin Secretion, March 18th, 2003
3. **Disarming the Immune System, Subversive Propaganda, or Molecular Shielding: How do ALR Pancreatic Islets Avoid Autoimmune Destruction?**
   University of Massachusetts Medical Center, Worchester, MA. April 28th, 2003
4. **Debutantes Need the Right Genetics: A locus that Controls Thymocyte Emigration**
   Merck and Company, Rahway, NJ. May 21st, 2003
5. **Association of Monocyte Free Radical Production and Autoimmune Diabetes**
   Children's Hospital of Pittsburgh Diabetes Institute Seminar, Pittsburgh, PA. May 21st, 2003
6. **Novel Variant of mt-Nd2 Provides Protection Against Autoimmune Diabetes**
   Children's Hospital of Pittsburgh Diabetes Institute Seminar, Pittsburgh, PA. June 1st, 2003
7. **Reduced Thymic DC Expression of Islet Cell Antigen 69 Contributes to Loss of Self Tolerance**
   American Diabetes Association Scientific Sessions, New Orleans, LA, June 11th, 2003
8. **ALS/Lt: A New Mouse Model of Diabetes Susceptibility Associated with Low Free Radical Scavenging Potential**
   Lessons From Animal Models of Diabetes, 9th Congress, Bar harbor, ME. June 15th, 2003

2004

1. **Beta Cell Murder or Suicide: Does Autoimmunity Kill beta cells by Necrotic or Apoptotic Mechanisms in T1D**
   Children's Hospital of Pittsburgh Diabetes Institute Seminar, Pittsburgh, PA. march 16th, 2004
2. **Failure of NF-kB Activity in ALR Islets and Resistance to Autoimmunity**
   St. Louis University Biochemistry Department, St. Louis, MO, April 21st, 2004
3. **A Steel Curtain for Beta Cells. Improved Defenses inhibit Autoimmune Killing of ALR Islets.**
   University of Pittsburgh, School of Medicine Immunology Department, May 24th, 2004
4. **Contribution of the Mitochondrial Genome to Resistance Against both Chemically-Induced and Autoimmune Diabetes**
   American Diabetes Association Scientific Sessions, Orlando, FL. June 5th, 2004
5. **What Failure Makes the Beta Cell Fail in Type 1 Diabetes? Failure in Self Defense.**
   American Diabetes Association Scientific Sessions, Orlando, FL. June 5th, 2004
6. **Mitochondrial Sequence Variation Provides Protection from Oxidative Stress Induced Mitochondrial Dysfunction**
   American Diabetes Association Scientific Sessions, Orlando, FL. June 8th, 2004
7. **A Single Nucleotide Polymorphism in the Mitochondrial Gene for NADPH Dehydrogenase Subunit 2 Contributes Resistance to Autoimmune Diabetes**
   United Mitochondrial Disease Foundation Annual Meeting, Pittsburgh, PA. August 6th, 2004
8. **Association of Diabetes with Genetic Variation in the Mitochondrial Genome in Mice and Man**
   University of Pittsburgh Medical Center, University Wide Clinical Endocrinology Conference October 1st, 2004

2005

1. **Genetics of T1D in Animal Models: 20 Years Later**
   Children's Hospital of Pittsburgh, Diabetes Institute Seminar Series, February 16th, 2005
2. **Novel mt-Nd2 Variant Encoded by the ALR/Lt Mouse Strain Provides Resistance to Free Radical-Induced Mitochondrial Dysfunction**
   International Group on Insulin Secretion. Nice, France. March 10th, 2005
3. **Genetics of resistance to immune mediated beta-cell destruction.**
   Juvenile Diabetes Research Foundation Fellows Conference. Chantilly, VA, March 24th, 2005
4. **Animal Models for the Study of Diabetes**
   Pediatric Endocrinology Fellows Conference. Pittsburgh, PA. May 5th, 2005.
5. **Mutant Cat2 Protects ALR/LtJ Mouse Islets from Cytokine-Induced Beta Cell Destruction.** American Diabetes Association Scientific Sessions, San Diego, CA. June 13th, 2005
6. **Islet Insubordination: ALR/LtJ Genes Bestow a Failure to Comply with Autoimmune Stimuli**
   The Jackson Laboratory, November 10th, 2005
7. **Development of Diabetes Complications in diabetic C57BL/6-Ins2^{Akita} Mice**
   The Jackson Laboratory, November 11th, 2005

2006

1. **New Insights into Thymocyte Emigration.**
   Albert Einstein College of Medicine Research Seminar Series, April 3, 2006
2. **Islet Insubordination: ALR/LtJ Genes Bestow a Failure to Comply with Autoimmune Stimuli**
   Children's Hospital of Pittsburgh Molecular Medicine Research Seminar, June 27th, 2006
3. **Positional Cloning of a Locus Controls Thymocyte Emigration**
   University of Pittsburgh, School of Medicine Immunology Department, July 6th, 2006
4. **A Steel Curtain for Beta Cells. Improved Defenses Inhibit Autoimmune Killing of ALR Islets.**
   University of Michigan, Department of Medicine, July 12th, 2006
5. **Global Resistance to Inflammation Results in Resistance to Both Type 1 and Type 2 Diabetes.**
   University of Pittsburgh, School of Medicine, Metabolism Interest Group, August 23rd, 2006
6. **Resistance to Autoimmune Diabetes at the Beta Cell Level: Tales from the ALR Mouse.**
   University of Florida, Department of Pathology, November 15, 2006
7. **Toxin Resistance Yields Clues for Resistance to Autoimmune Diabetes.**
   University of Pittsburgh, Department of Environmental and Occupational Health, December 7, 2006.

2007

1. **Nuclear-Mitochondrial Interactions Affect Electron Transport Chain ROS production.**
   Children's Hospital of Pittsburgh, Diabetes Institute Seminar Series, Pittsburgh, PA , February 16th, 2005
2. **Solute Carrier Family 7 Member 2 (*Slc7a2*) is critical for Arginine-Stimulated Insulin Release**. International Group on Insulin Secretion. Nice, France. March 10th, 2007
3. **Genetics of Mitochondrial Contribution to Beta Cell Susceptibility to Autoimmune-Mediated Destruction.** American Diabetes Association Annual Scientific Sessions, Chicago, IL. June 24, 2007

4. **Benign Symbiotes or Rebellious Subjugates: Novel Roles for Proteins Encoded by the Mitochondrial Genome.** Symposium for the Use of Animal Models for Understanding the Pathogenesis of Diabetes, Boston, MA. July 26, 2007
5. **Inbred strain variations in glucose tolerance and resistance to metabolic stress.** Discovery Strategies Conference: Modeling Human Metabolic Syndrome and Type 2 Diabetes in Rodents, Bar Harbor, ME. August 6, 2007

2008

1. **Role of mitochondria in autoimmune-mediated destruction of beta cells.** 8th Annual Rachmiel Levine Symposium, Translational Research in Type 1 Diabetes: Beyond Insulin and the Edmonton Protocol, Newport Beach, CA. January 13, 2008
2. **New models to test old hypotheses in mitochondrial biology** University of Florida, Mitochondrial Interest Group, June 11, 2009
3. **Genetic variation in the mitochondrial genome & diabetes** Department of Food Science and Human Nutrition, University of Florida, October 9, 2009
4. **mt-Nd2 and Resistance to Autoimmune Diabetes** National Institutes of Health, NIDDK, November 17, 2009

2009

1. **Prevention of T1D by blocking beta cell death: Lessons from the ALR mouse.** Department of Pathology, Immunology, and Laboratory Medicine, work in progress seminar series, January 5, 2009.
2. **Susceptibility to spontaneous autoimmune and free radical-mediated diabetes is controlled by interactions of the nuclear & mitochondrial genomes** The Burnham Institute, Orlando, FL. February 13, 2009
3. **Prevention of Beta Cell Destruction Prior to and After Onset of Type 1 Diabetes** Grand Rounds, Department of Pathology, Immunology, and Laboratory Medicine, University of Florida
4. **Superoxide Alters the Texture of Inflammation** University of Alabama, Birmingham, AL, September 17, 2009
5. **Intergenomic Interactions between the Nuclear & Mitochondrial Genomes Control Susceptibility to Diabetes** LSU Health Sciences Center, Shreveport, LA, October 8, 2009

2010

1. **A Little Dissipation is a Good Thing** University of South Alabama, Mobile, AL, January 2010
2. **Diabetes Research in the Swamp** The Jackson Laboratory, Bar Harbor, ME, August 16, 2010

2011

1. **Dissipating Autoimmunity: Role of Reactive Oxygen Species in Adaptive Immune Effector Function** Rheumatology, work in progress seminar series, University of Florida, January 5, 2011.
2. **Mitochondria, Oxidants, Beta Cells, and Diabetes** Experimental Biology, Washington, DC, April 12, 2011
3. **Beta Cell Dysfunction and Type 1 Diabetes** Endocrinology Conference, University of Florida, July 19, 2011
4. **Autoimmune Diabetes** HHMI Seminar Series, University of Florida, September 20, 2011
5. **Personalization of Immunotherapy for Type 1 Diabetes Using Metabolic Markers**

Program in Personalized & Genomic Medicine Seminar Series, University of Maryland School of Medicine, November 9, 2011

2012

1. **New developments in beta cell participation in type 1 diabetes**
   Diabetes Care Program, Gainesville, FL, January 20, 2012
2. **Wassup in type 1 diabetes research**
   Department of Pathology, Immunology, and Laboratory Medicine, work in progress seminar series, January 5, 2012.

Committees

2001-2007	Director of the CHP Diabetes Institute Small Animal Core
2001-2007	Director of the CHP Diabetes Institute Journal Club
2003-2007	Children's Hospital Animal Care and Use Committee
2003-2007	Oversight of the Rangos Research Animal Facility: Chair (2006-2007)
2003-2007	Molecular Medicine Research Seminar Series Committee
2008 & 2010	Department of Food Science and Human Nutrition Department, University of Florida, Search and Screen Committee, Assistant Professor
2008-2009	NIH-NIDDK Diabetes Research Strategic Plan, Autoimmunity/T1D Sub-group
2008-Present	Advisory Board, Medical Science Training Program, University of Florida College of Medicine, Interdisciplinary Biomedical Graduate Program
2009 & 2010	Department of Pathology, University of Florida, Search and Screen Committee, Assistant Professor
2009-2010	Admissions Committee, University of Florida College of Medicine, Interdisciplinary Biomedical Graduate Program
2009-Present	Advisory Board, University of Florida College of Medicine, Interdisciplinary Biomedical Graduate Program
2011-2012	American Diabetes Association, Research Grant Review Committee, Vice Chairman
2012	American Diabetes Association, Research Grant Review Committee, Chairman Elect
2012-Present	American Diabetes Association, Research Grant Review Committee, Chairman

Study Sections:

2003	Telethon /JDRF Diabetes Research Centers
2004	NIH/CSR: Diabetes & Obesity Model Systems (Ad Hoc)
2005-Present	JDRF Islet Biology Study Section
2005-Present	JDRF Angiogenesis Study Section
2005-Present	American Diabetes Association: Immunology and Complications
2011-2014	Chair, American Diabetes Association: Immunology and Complications Study Section
2006	RFA-06-002: Biomarkers of Autoimmunity in Type I Diabetes
2007	NIH/CSR: Endocrinology, Metabolism, Nutrition & Reproductive Science (EMNR) IRG. Ad Hoc
2007	JDRF Autoimmunity and Prevention Center
2007	Belgium Diabetes
2007-2008	NIH/CSR: Genes, Genomes, and Genetics (GGG) IRG. Ad Hoc
2008	AAAS: Life Sciences Discovery Fund
2008-2010	JDRF Group 1 (Autoimmunity) Study Section

2009-2010	NIH/SCR: SEP Autoimmunity PPG ZAI1-SV-I-(S1)
2009	NIH/CSR: Challenge Grant Review Panel
2009-2010	Univ Alabama-Birmingham-DRTC Pilot and Feasibility Grant Reviewer
2009-2012	Endocrine Fellows Foundation Review Panel
2010	NIH/CSR: Cellular Aspects of Obesity and Diabetes (CADO). Ad Hoc
2011	NIH: Hypersensitivity, Autoimmune and Immune-mediated Diseases (HAI). Ad Hoc
2012	NIH/CSR: Comparative Medicine (CMRC). Ad Hoc
2012	NIH/CSR: Cellular Aspects of Obesity and Diabetes (CADO). Ad Hoc
2012	ISF-JDRF Collaborative Grants Joint Program in Type I Diabetes Research

Journal Editorship:
Associate Editor for European Journal of Clinical Investigation
Editorial Board Diabetes
Section Editor for Drug Discovery Today

Journal Referee for:
American Journal of Physiology
American Journal of Transplantation
Apoptosis
Cell Biology and Toxicology
Diabetes
Diabetes/Metabolism Research & Reviews
Diabetes Research and Clinical Practice
Diabetologia
Endocrinology
European Journal of Clinical Investigation
Free Radical Biology and Medicine
Genetic Testing and Molecular Biomarkers
International Journal of Experimental Diabetes Research
Journal of Autoimmunity
Journal of Biological Chemistry
Journal of Clinical Investigation
Journal of Immunology
Laboratory Investigation
Life Sciences
Nature
Nature Genetics
Pediatric Diabetes
Physiological Genomics
PNAS USA
Public Library of Science: Medicine
Public Library of Science: One
Yonsei Medical Journal

Current Research Interest:
1. Genetic Resistance to Autoimmune Diabetes
2. Mechanisms of beta cell destruction and beta cell functional inhibition relevant to type 1 diabetes

3. Mitochondrial ROS production in Health and Disease
4. Transplantation Immunology