



DIVISION OF PEDIATRIC ENDOCRINOLOGY, DIABETES, AND METABOLISM

Mission

The Division of Pediatric Endocrinology, Diabetes, and Metabolism supports the tripartite goals of exceptional teaching, world-acclaimed research, and superb patient care for children with all hormonal disorders, including growth, thyroid, adrenal, gonadal, calcium, diabetes, and carbohydrate-related metabolic disorders. The division's core missions are to:

- Maintain and surpass its record of excellence in patient care
- Teach medical students, residents, and fellows and train the next generation of pediatric endocrinologists
- Conduct state-of-the-art research focused on understanding and treating endocrine disorders and diabetes

FACULTY AND STAFF

Radhika H. Muzumdar, MD
Associate Professor of Pediatrics
and Cell Biology
Chief, Division of Endocrinology
and Diabetes

Natalie Hecht Baldauff, DO
Assistant Professor

Dorothy J. Becker, MBBCh, FCP (paed)
Professor of Pediatrics

Lesli Dahl, PsyD, MSW, LCSW, MDiv
Diabetes Psychologist

H. Henry Dong, PhD
Professor of Pediatrics

Oscar Escobar, MD
Associate Professor of Pediatrics

Amanda Flint, MD
Assistant Professor of Pediatrics

Thomas P. Foley Jr., MD
Emeritus Professor of Pediatrics

Luigi Garibaldi, MD
Professor of Pediatrics
Division Clinical Director

Zhenwei Gong, PhD
Research Assistant Professor

Nursen Gurtunca, MD
Assistant Professor of Pediatrics

Kara Hugan, MD
Assistant Professor of Pediatrics

Heba Ismail, MBBCh, MSc, PhD
Assistant Professor of Pediatrics

Ingrid Libman, MD, PhD
Associate Professor of Pediatrics

Mark A. Sperling, MD
Emeritus Professor of Pediatrics

Pushpa Viswanathan, MD
Assistant Professor of Pediatrics

Selma F. Witchel, MD
Professor of Pediatrics
Director, Pediatric Endocrinology
Fellowship Program

ADVANCED PRACTICE PROVIDERS

Erica Cordell, CRNP

Diana DeArment, PA-C

Tia Fragello, PA-C

Patti Harris, CRNP

Brittaney Moore, CRNP

Haley Sager, PA-C

Elizabeth Smith, CRNP

Kathie Sorkin, CRNP

Kirsten Walther, CRNP

John Weidinger, PA-C

Haley White, PA-C

DIABETES EDUCATORS

Jackie Corcoran, RN, BSN, CDE

Mauri Druash-Gladys, RN, BSN, CDE

Jessica Finney, RN, BSN, CPN

Tracy Jumblatt, RN, BSN

Karen Kelly, RN, BSN, CDE

Terri McGee, MS, RD, LDN, CDE

Christine Moon, RN, BSN, CDE

Donny Swarmer, RN, BSN, CDE

Margaret Young, RN, BSN

DIETICIANS

Allison Caparoula, MS, RD, LDN

Samantha Montgomery, MS, RD, LDN

Cara Reifschneider, MS, RD

ENDOCRINE NURSES/ EDUCATORS

Megan Blass, RN, BSN

Crystal Brown, RN, BSN, CPN

Amy Gilliland, RN, MSN, CDE

Leon Green, RN

Erika McCann, BS, BSN, MS

Shaylyn McDaniel, RN

Cynthia Puchtler, BS

OVERVIEW OF DIVISION

The faculty and fellows continue to be nationally and internationally recognized for their clinical expertise and their research endeavors. Six members of the division were listed again in the survey of “best doctors” in the United States and Pittsburgh. Development of satellite and outreach clinics combined with regional referrals and those from other centers resulted in a steady increase in patient numbers. Members of the faculty and division nurses continue to receive invitations to be speakers and panel members, expert committee members, and journal reviewers. Two new fellows started their clinical and research training in the program this year, and two fellows graduated from the program. Starting July 2018, the number of trainees will increase to three fellows per year.

Radhika Muzumdar is chief of the division and an associate professor of pediatrics and cell biology. Her research focuses on growth hormone (GH); insulin-like growth factors (IGFs) and their binding partners; and the effects of novel

mediators of glucose homeostasis, energy metabolism, and aging. One mediator is humanin, a mitochondria-associated peptide recognized for its effects on cell survival. Muzumdar found that it has a marked effect on insulin sensitivity and that it increases insulin secretion through enhancement of beta-cell glucose metabolism. Her laboratory discovered a role for humanin in regulating hepatic lipid fluxes through the hypothalamus. She continues her studies on humanin, aging, life span, cardiovascular health, and diabetes at Children's Hospital of Pittsburgh of UPMC. She is joined by Zhenwei Gong, a research assistant professor studying the role of humanin in augmenting existing therapies for diabetes and the effects of humanin and analogs on lipid metabolism, cellular processes of autophagy, and oxidative stress. Muzumdar and Gong investigate the role of a novel acyl CoA dehydrogenase enzyme, ACAD10, and an inflammasome-associated protein, Aim 2, on glucose metabolism and energy homeostasis. Muzumdar serves as a standing member on the National Institutes of Health (NIH) Study Section on Aging Systems and Geriatrics, in addition to being a reviewer for international and national granting agencies, including the U.S. Food and Drug Administration.

Dorothy Becker is a grant reviewer and a member of NIH and national diabetes committees. She continues as the principal investigator examining the prediction and prevention of type 1 diabetes in the Research Project Grant (R01) and three multicenter Opportunities for Collaborative Research at the Clinical Center (U01) programs. Becker is the U.S. principal investigator and a member of the International Executive Committee of a large primary prevention diabetes study, "Trial to Prevent Insulin-Dependent Diabetes in the Genetically at Risk: Nutritional Primary Prevention of Type 1 Diabetes (TRIGR)."

Henry Dong is NIH funded to study the role of forkhead box O (FoxO) transcription factors in glucose and lipid homeostasis. He is funded by the American Diabetes Association (ADA) to study the role of hepatic insulin on glucose homeostasis.

Ingrid Libman continues her research of the epidemiology of both type 1 and type 2 diabetes. She explores the complications of type 1 diabetes and the effects of obesity and insulin resistance in children with features of both type 1 and type 2 diabetes. She studies innovative, technology-based approaches to improve care of children with diabetes. Her findings have been the foundation for several awarded grants. She is youth/pediatric diabetes chair, ADA Scientific Sessions Meeting Planning Committee, 2016–2018.

Kara Hughan, through her K23 project, is investigating the mechanisms of macrovascular disease related to insulin resistance. She received the EnVision award from the Cystic Fibrosis Foundation. Becker, Silva Arslanian, Oscar Escobar, Libman, and Selma Witchel were co-investigators on several other NIH- and foundation-supported grants.

Escobar Luigi Garibaldi continues with national GH and gonadotropin-releasing hormone analog studies.

The division has continued its high level of research productivity, with 39 active research studies, sustained by the NIH, foundation grants, and several pharmaceutical grants. The grants have supported the peer-reviewed publications and chapters in textbooks in the appended bibliographic list (2015–2017).

The faculty are recognized for their teaching skills. Mark Sperling has been a very successful editor of the *Pediatric Diabetes Journal*, a journal he established. Sperling, Muzumdar, and Witchel are on the editorial panel of *Frontiers of Pediatric Endocrinology*. In addition, Muzumdar, Becker, Sperling, Dong, Witchel, Libman, and Arslanian have taken part in scientific peer review of NIH grants, have chaired sessions at major scientific meetings, and have been invited to give several national and international lectures. Witchel has been active nationally and internationally on committees related to androgen excess disorders. Muzumdar and Witchel are chairs of the Research Affairs Council and Education Council for the Pediatric Endocrine Society (PES). Hecht-Baldauff and Libman are involved in the Education Council and Diabetes Special Interest Group at the PES.

This year, five trainees participated in the Pediatric Endocrine Fellowship Training Program under the overall directorship of Witchel. The research training portion of the program is supported by a T32 training grant from the NIH and is directed by Muzumdar, who also oversees the David Nicholas Fellowship. Baldauff, Garibaldi, and Escobar assist Witchel with the fellowship clinical education program and teach residents and students. The division's fellows received competitive grants for their research projects and presented their work at national meetings.

CLINICAL ACTIVITIES

Flint, associate clinical director, and Garibaldi have continued to expand the clinical program, adding more satellite and outreach clinics to meet the demands of a growing patient population. They maintain the division's delivery of team care and intensive diabetes therapy in satellite and outreach sites. Libman, as the director of diabetes, and Ismail, as clinical director of diabetes, have continued to expand access to the transition program, which is a vital component of diabetes care for patients who graduate from high school and move on to college or the workforce. The division pioneered and refined the retinopathy screening via fundus photography, which has the potential to become the standard of care.

The Weight Management and Wellness Center has been incorporated into the division of endocrinology. Patients who call for appointments are now triaged more efficiently into regular endocrine clinics, diabetes clinics, or endocrine wellness clinics, which provide intensive nutritional support for patients with weight concerns.

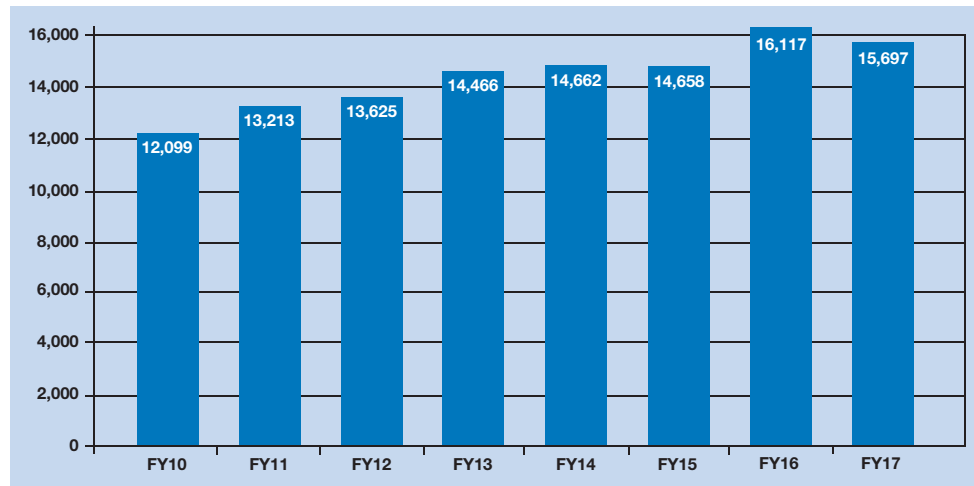
Faculty, fellows, 11 full-time advanced practice providers, and the diabetes team keep pace with the large and ever-increasing outpatient clinical service, as shown in the figure below. The division supports a vibrant inpatient service, including frequent consultations throughout Children's Hospital of Pittsburgh and Magee-Womens Hospital. The number of new diabetes patients, already on the rise over the past decade from about 160 to 250 per year, increased by 20% this year. Patients are educated by the division's superb team of diabetes educators and dietitians. The diabetes educators deliver traditional diabetes teaching for all patients with new-onset type 1 or type 2 diabetes and staff diabetes clinics at all sites. They initiate and provide training with increasingly sophisticated devices, such as insulin infusion pumps and glucose sensors. To meet the needs of patients, the team established a technology clinic, where a diabetes educator with expertise in advances in diabetes technology advises patients and families. The diabetes educators maintain a daytime call-in service for the approximately 2,200 patients with diabetes. The division recently added extended hours of telephone support for the hours from 5 to 11 p.m. This should improve patient care and satisfaction considerably, as evening is a peak time for diabetes-related calls. The division also provides most of the medical staff for the ADA-sponsored diabetes camp each summer.

The endocrine clinical and teaching nurse team has grown to seven full-time nurses to accommodate growing patient numbers and the need for dynamic endocrine testing. The nurses perform more than 1,000 tests per year, by scheduled appointment. Additionally, during the past year, the division introduced same-day testing to offer the advantage of dynamic testing at the time of patient encounter. The nurse team facilitates physician workflow while improving patient satisfaction and quality of care.

The multidisciplinary approach to the care of children with chronic endocrine disorders includes a Diabetes Center led by Libman, Ismail, Muzumdar, and Becker, with the education coordinated by Karen Kelly. In addition to the transition program, the diabetes subdivision offers a specialized diabetes care program, including the recently initiated post-transplant diabetes clinic and program with Garibaldi and Flint, as well as the cystic fibrosis-related program with Hughan, Witchel, and Ismail. The division continues to actively participate in the autologous islet cell transplant program in collaboration with the Transplant Division at Children's Hospital and UPMC Presbyterian Hospital for children and young adults who undergo total pancreatectomy for severe, chronic pancreatitis; this is one of very few such pediatric programs in the United States.

The division offers specialized and disease-focused services as follows: the Growth Center, led by Escobar; the Center for Disorders of Sexual Development, under the direction of Witchel; a multidisciplinary Thyroid Center, under the direction of Pushpa Viswanathan, Witchel, and Gurtunca; a Lipid Clinic, under the direction of Flint; the Pittsburgh Endocrine Gender Center for gender non-conforming youth, under the direction of Witchel; and an endocrine surveillance and follow-up clinic and program for cancer survivors in collaboration with the Division of Oncology/Hematology, under the leadership of Gurtunca.

DIVISION OF ENDOCRINOLOGY, DIABETES, AND METABOLISM ANNUAL OUTPATIENT VOLUME (FY: FISCAL YEAR)



RESEARCH AND OTHER SCHOLARLY ACTIVITIES

Radhika H. Muzumdar, MD

RESEARCH

Muzumdar's research spans the GH/IGF axis in glucose homeostasis, the role of the hypothalamus in regulation of whole-body energy and glucose homeostasis, and the role of a novel mitochondria-associated peptide called humanin in aging and age-related diseases, especially glucose homeostasis and cardiovascular health. Her work has led to important insights on the role of IGFs and IGF binding proteins in insulin sensitivity and regulation of intermediary metabolism by nutrient sensing. Her work on the role of reductions in serum IGF-1 levels on healthspan was published in *Aging Cell* and was selected for F1000Prime as being of special significance in its field. Her work demonstrating that impaired metabolism in states of GH resistance results from direct actions of GH on lipid uptake and *de novo* lipogenesis was published in *Diabetes* and highlighted in the *Year Book of Endocrinology* at the international PES meeting.

Muzumdar has shown that humanin, known for its effects on cell survival in the nervous system, has significant effects on glucose homeostasis; this work is the basis of her NIH R01 funding. Humanin and analogs improve insulin sensitivity through the hypothalamus and increase insulin secretion through enhancement of glucose metabolism in beta cells. She has also won NIH funding to study the role of humanin on beta-cell function in aging. The studies have led her to focus on the synergy between humanin and GLP-1.

Muzumdar has found that humanin analog administered prior to or following ischemia protects the myocardium following ischemia-reperfusion injury and improves cardiac function in mice. Muzumdar has tested the cardioprotective effects of humanin analogs in swine models of ischemia and reperfusion.

The studies, performed in collaboration with David Lefer, director of the National Heart, Lung, and Blood Institute (NHLBI) Consortium for Preclinical Assessment of Cardioprotective Therapies at Louisiana State University Health Sciences Center at New Orleans, demonstrated that humanin offers cardioprotection in swine models of myocardial ischemia and reperfusion. Muzumdar received a grant from the Pittsburgh Foundation to conduct the preliminary studies, which are the basis of an R01 with multiple principal investigators that was submitted this year. She is also collaborating with Eric Goetzman's laboratory to understand the mechanisms behind humanin-mediated cardioprotection, through studies on substrate flux and metabolism.



Radhika H. Muzumdar, MD
Division Chief, Pediatric Endocrinology,
Diabetes, and Metabolism

Ischemia/reperfusion is associated with significant oxidative stress. Recently, Muzumdar's laboratory found that humanin analog protects against oxidative stress through critical upregulation of key antioxidant enzymes in a tyrosine kinase-dependent manner. Because oxidative stress is intimately linked to the cellular recycling process of autophagy, Muzumdar and Gong studied the effects of humanin on autophagy and, particularly, chaperone-mediated autophagy, in collaboration with Ana Maria Cuervo at AECOM. A manuscript describing the observations was recently accepted for publication in the *Journal of Cellular Biology*.

Endogenous levels of humanin decline with age. Humanin and its potent analogs have been shown to have beneficial effects in many age-related diseases, including Alzheimer's disease, stroke, diabetes, myocardial ischemia and reperfusion, atherosclerosis, amyotrophic lateral sclerosis, and certain types of cancer. An association between humanin levels, the GH/IGF axis, and lifespan was demonstrated in various mouse models with mutations in the GH/IGF axis. Muzumdar is currently collaborating with Ghazi's laboratory to study the effects of humanin on healthy aging and lifespan in a *Caenorhabditis elegans* model.

Muzumdar's laboratory also studies the regulation of energy and glucose homeostasis. A knockdown of a gene called *Absent in Melanoma 2 (Aim 2)*, a tumor suppressor gene and a part of the inflammasome, results in spontaneous obesity and impaired glucose tolerance. The effects seem to be mediated through upregulation of ifi202b, an interferon-related protein. The findings are especially significant, as human obesity is associated with upregulation of ifi202b. The studies were funded through a Cochrane Weber grant and are the focus of an R01 submitted with Gong.

In collaboration with Vockley and Goetzman, Muzumdar is studying the role of ACAD 10, a novel acyl CoA dehydrogenase in glucose homeostasis, and has shown that absence of ACAD10 in certain mouse background leads to a phenotype of obesity and insulin resistance. This is interesting, as polymorphisms in the ACAD 10 gene have been reported in Pima Indians, a population at high risk for obesity and type 2 diabetes. Knockout of the gene also results in a novel phenotype of hypoglycemia on fasting, with no evidence of defects in fatty acid oxidation. This collaboration is ongoing and has resulted in publications and funding from NIH, the Endocrine Fellows Foundation, and a Cochrane Weber grant.

In addition to the NIH, Muzumdar has received grant support from multiple funding agencies, including the PES, American Federation for Aging Research (AFAR), Beck Foundation, and Endocrine Fellows Foundation for her work on the roles of GH/IGF/IGFBP-3 in glucose homeostasis, as well as the role of humanin in insulin secretion and myocardial infarction.

She is on several national and international study sections, including the NIH, AFAR research council, United States-Israel Binational Science Foundation, Israeli Science Foundation, Binational Science Foundation between Israel and Italy, Marsden Fund (New Zealand), and Wellcome Trust (United Kingdom). She serves as a standing member of the NIH Aging Systems and Geriatrics Study Section. She chairs the Research Advisory Council of the PES and serves on AFAR's National Scientific Advisory Council. She has chaired sessions and been an invited speaker at national and international endocrine meetings. She is a reviewer for numerous reputed journals and national meetings. She continues to be an active member of the PES, with leadership roles.

Muzumdar is the principal investigator of the Research Training in Pediatric Endocrinology Program. The goal of the T32 training grant is to provide state-of-the-art training in the molecular, cellular, physiologic, genetic, and biochemical aspects of pediatric endocrinology to ensure that the physician-scientists who graduate from the program are well prepared for productive academic careers in translational research related to pediatric endocrinology.

ADVISORY COMMITTEE MEMBERSHIPS/ STUDY SECTIONS

- Chair, Clinical and Translational Research Registry Subcommittee, PES
- Chair, Research Affairs Council, PES
- National Mentoring Initiative, PES
- International Research Collaborations Subcommittee, PES
- Invited member, Research Advisory Council, PES
- Invited member, Committee on National Mentoring Initiative, PES
- Moderator, scientific sessions, ADA
- Ad hoc member, Integrative Physiology of Obesity and Diabetes Study Section, National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), NIH
- Mentor, Endocrine Society
- Standing member, Aging Systems and Geriatrics Study Section, National Institute on Aging, NIH

- Strategic Initiatives Planning Committee, Children’s Hospital of Pittsburgh
- Pediatric Physician Scientist Program Committee, Children’s Hospital of Pittsburgh
- K-12 Advisory Committee, Children’s Hospital of Pittsburgh
- Member, Honors and Awards Committee, PES

EDITORSHIPS

- Editor, *International Journal of Case Reports and Images*
- Associate editor, *Frontiers in Pediatric Endocrinology*

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- Endocrine Society
- ADA
- Society for Pediatric Research
- American Pediatric Society
- PES

Natalie Hecht Baldauff, DO

RESEARCH

Natalie Hecht Baldauff’s research focuses on the role of adiponectin in new-onset type 1 diabetes and noninvasive maximization of fertility in a peri-pubertal population of patients with Klinefelter syndrome.

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- American Academy of Pediatrics
- PES
- Endocrine Society
- International Society for Pediatric and Adolescent Diabetes

Dorothy J. Becker, MBBCh, FCP (paed)

RESEARCH

Dorothy J. Becker’s major interests are the prediction and prevention of type 1 diabetes and its complications. Her efforts are supported by several grants.

Research Training in Pediatric Endocrinology. The goal of the T32 training grant is to provide state-of-the-art training in the molecular, cellular, physiologic, genetic, and biochemical aspects of pediatric endocrinology to ensure that the physician-scientists who graduate from the program are well prepared for productive academic careers in translational research related to pediatric endocrinology. Becker serves as senior transition consultant.

Juvenile Diabetes Mellitus: Epidemiology and Etiology. This is a 37-year study funded by the NIH until this year that evaluates the immunologic, genetic, and environmental determinants of the risk of insulin-dependent diabetes mellitus in children and families of children with probands with type 1 diabetes. It is a prospective biannual study of T-cell markers of autoimmunity and viral infection and assessments of insulin resistance in genetically at-risk, first-degree relatives with islet cell antibodies and diabetes end points. Becker is principal investigator.

TrialNet (Prediction and Prevention of Type 1 Diabetes). TrialNet is an NIH collaborative study (Pittsburgh being one of the original centers) in the United States and Europe to examine the risks and mechanisms of



autoimmune progression. Data will be used to plan and implement intervention strategies to maintain beta-cell function in patients with new-onset type 1 diabetes and to prevent diabetes in first-degree relatives at high risk.

TRIGR. Pittsburgh is a major center and the coordinating center for the United States for this double-blind, randomized, controlled trial involving subjects with an affected first-degree relative and risk-associated human leukocyte antigen genotypes. This is an international, multicenter consortium involving 73 centers in 15 countries; it is funded by the NIH and Canadian Institutes of Health. The six- to eight-month intervention to compare the effects of either hydrolyzed casein or standard cow milk-based weaning formula has been completed. All subjects are being followed for 10 years for measurements of serological markers of intact cow milk exposure, autoantibodies predictive of diabetes (the end point at age 6 years), and the clinical and/or metabolic indices of diabetes (the end point at age 10 years). A large, cross-linked repository of stored sera, DNA, and cryopreserved peripheral blood mononuclear cells allows independently funded ancillary and mechanistic studies related to the natural history of prediabetes and the hypothesis to be tested. Becker is principal investigator.

The Environmental Determinants of Diabetes in the Young. This is an NIH-funded, multicenter, epidemiologic study of the environmental pathogenesis of autoimmunity in first-degree relatives of subjects with type 1 diabetes. Pittsburgh is a satellite. Becker is co-investigator.

Slow or Nonprogressive Autoimmunity to the Islets of Langerhans (SNAIL Study). This multicenter study in the United Kingdom; Germany; Pittsburgh, Pa.; and Denver, Colo., is exploring factors that slow the progression of diabetes autoimmunity from multiple autoantibodies to clinical diabetes.

Adolescents With and Without Diabetes: Transition to Emerging Adulthood. The goal of this NIH-funded research is to examine the impact of insulin-dependent diabetes on quality of life over the transition from adolescence into adulthood as compared to nondiabetic individuals. This study will concentrate on the follow-up of graduates of the diabetes program for analyses of psychosocial behaviors and risk factors and evaluation of their relationship with metabolic control and diabetes-related complications. Becker is co-investigator.

Epidemiology of Diabetes Complications. Led by Trevor Orchard, this long-term study evaluates the risk factors and trajectory of diabetes complications in a long-term

cohort of type 1 diabetes patients who graduated from the program more than 30 years ago.

ADVISORY COMMITTEE MEMBERSHIPS

- Diabetes Advisory Committee, Children's Hospital of Pittsburgh
- National Diabetes Data Group
- Data and Safety Monitoring Board, DirectNet, NIH
- Abstract reviewer, scientific sessions, International Society for Pediatric and Adolescent Diabetes
- Abstract reviewer, scientific sessions, Pediatric Academic Societies

EDITORSHIPS

- Associate editor, *Pediatric Diabetes*
- Associate editor, *Diabetes in America*, third edition
- International Society for Pediatric and Adolescent Diabetes e-learning

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- ADA
- Endocrine Society
- PES
- Society for Pediatric Research
- International Society of Pediatric and Adolescent Diabetes
- European Association for the Study of Diabetes
- American Pediatric Society
- Juvenile Diabetes Research Federation

HONORS

- Best Doctors, *Pittsburgh Magazine*, 2017
- *Best Doctors in America*, Woodward/White, Inc.

H. Henry Dong, PhD

RESEARCH

H. Henry Dong is conducting research focusing on insulin signaling in glucose and lipid metabolism and beta-cell function in obesity and type 2 diabetes.

Mechanism of Beta-Cell Compensation and Beta-Cell Failure.

Type 2 diabetes results from beta-cell failure, culminating in the inability of cells to compensate for insulin resistance in at-risk subjects with obesity. Beta-cell compensation is an adaptive mechanism by which cells increase insulin secretion to overcome insulin resistance or oxidative stress for maintaining euglycemia in obesity. Failure of beta cells to compensate for insulin resistance or oxidative stress contributes to insulin insufficiency and overt diabetes. Likewise, beta-cell compensation, accompanied by increased insulin synthesis and secretion, occurs in women during pregnancy. Impaired beta-cell compensation

predisposes at-risk subjects to develop gestational diabetes. Dong's research is positioned to characterize the genetic factor(s) responsible for coupling beta-cell compensation with nutrient signals to elucidate the underlying mechanism of beta-cell failure in diabetes. His goal is to delineate the insulin-Akt/PKB-FoxO pathway in regulating beta-cell function and mass in obesity and type 2 diabetes. The project is funded by NIH grant R01 NIDDK DK098437.

Pathophysiology of Insulin Resistance and Diabetic Dyslipidemia. Hypertriglyceridemia is a hallmark of metabolic syndrome and is characterized by a triad plasma lipid profile (i.e., increased triglyceride and low-density lipoprotein levels and decreased high-density lipoprotein levels). Due to its proatherogenic potential, hypertriglyceridemia is considered an independent risk factor for coronary artery disease. The pathophysiology of hypertriglyceridemia is incompletely understood. Its close association with adiposity and type 2 diabetes implicates insulin resistance as a causative factor in the development of hypertriglyceridemia. However, factors that mechanistically link insulin resistance to the pathogenesis of hypertriglyceridemia are incompletely characterized. Dong's group has identified FoxO1 as a key player in regulating triglyceride metabolism. FoxO1 regulates triglyceride metabolism via apolipoprotein C-III and microsomal triglyceride transfer protein—two rate-limiting steps in very-low-density lipoprotein (VLDL)-triglyceride hydrolysis and VLDL-triglyceride secretion. This research is funded by NIH grants R01 DK066301 and R01 DK087764. For clinical translation, Dong's team has uncovered two lead compounds via screening 540,000 compounds for FoxO1 inhibitors. His laboratory is poised to validate FoxO1 as a potential therapeutic target for improving lipid metabolism and ameliorating hypertriglyceridemia in obesity and diabetes, with the NIH pending grant 1R01DK100312.

Dong has also received the ADA's Career Development Award.

ADVISORY COMMITTEE MEMBERSHIPS

- Standing member, Cellular Aspects of Diabetes and Obesity Study Section, NIDDK, NIH, 2015–2019
- Standing member, Research Administrative Committee of Children's Hospital of Pittsburgh

EDITORSHIPS

- Editorial Board, *Journal of Biological Chemistry*
- Editorial Board, *Journal of Diabetes and Its Complications*
- Editorial Board, *World Journal of Gastrointestinal Pathophysiology*
- Editorial Board, *Frontiers*

- Editorial Board, *Molecular Metabolism*
- Editorial Board, *Journal of Geriatric Cardiology*
- Editorial Board, *Immunology, Endocrinology, and Metabolic Agents*

MAJOR LECTURESHIPS AND SEMINARS

- "FoxO1 in Insulin Action and Lipid Metabolism," University of California, Berkeley, San Francisco, Calif., April 2017
- "FoxO1 in Insulin Resistance and Diabetic Dyslipidemia" A&M University, College Station, Texas, April 2017
- "FoxO1 in Beta-Cell Mass and Function Regulation" Vanderbilt University, Nashville, Tenn., January 2017
- "What Causes Beta-Cell Failure in Type 2 Diabetes?" University of New Mexico, Albuquerque, N.M., September 2016

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- American Heart Association
- ADA
- New York Academy of Sciences
- American Society of Gene Therapy

Oscar Escobar, MD

RESEARCH

As director of the Growth Center, Oscar Escobar's primary focus is on his clinical research regarding the treatment of growth disorders in children.

National Norditropin Registry. The primary goal of this study is to evaluate the long-term safety and efficacy of Norditropin. The growth-hormone study is based on data collected in an observational setting. The study came to an end in December 2016. Escobar served as local principal investigator.

Central Precocious Puberty Registry: A Multicenter, Observational Study of Pediatric Females With Central Precocious Puberty Receiving Supprelin LA. The primary goal of this study is to categorize the recovery of the hypothalamic-pituitary-gonadal axis after discontinuation of treatment with Supprelin LA, an implantable gonadotropin-releasing hormone analog. The study is based on data collected in an observational setting. Escobar is local principal investigator.

The VELOCITY Clinical Study-14VR4: Versartis Long-Acting Growth Hormone in Children with GH Deficiency. This study is a phase 3, randomized, one-year, open-label, multicenter, noninferiority trial in prepubertal children

with GH deficiency. The primary goal is to assess the efficacy and safety of VRS-317 in prepubertal children with GH deficiency compared to daily GH. It is sponsored by Versartis, Inc.; Escobar is the local principal investigator.

The VISTA Study–13VR3: Vesartris Long-Acting Growth Hormone Somavaratan in Children with GH Deficiency. This is an open-label, long-term safety study of long-acting human growth hormone Somavaratan (VRS-317) in prepubertal children with GH deficiency. It is sponsored by Versartis, Inc.; Escobar is local principal investigator.

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- Endocrine Society
- ADA
- Colombian Association of Endocrinology
- Colombian Association of Pediatric Endocrinology
- PES

HONORS

- *America’s Top Doctors*, Castle Connolly Medical, Ltd., 2017
- Best Doctors, *Pittsburgh Magazine*, 2017

Amanda Flint, MD

RESEARCH

Amanda Flint’s research focuses on type 2 diabetes.

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- Endocrine Society
- PES

Luigi Garibaldi, MD

RESEARCH

Luigi Garibaldi is the local co-principal investigator in the following data-collection studies.

- National Norditropin Registry, sponsored by Novo Nordisk
- Central Precocious Puberty Registry, sponsored by ENDO Pharmaceuticals
- VELOCITY study, sponsored by Versartis Pharmaceuticals
- VISTA study

ADVISORY COMMITTEE MEMBERSHIPS

- Diabetes Advisory Committee, Children’s Hospital of Pittsburgh
- Institutional Data and Safety Monitoring Board, University of Pittsburgh

- 9A leadership group, Division of Pediatric Endocrinology, Diabetes, and Metabolism

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- Endocrine Society
- PES
- Society for Pediatric Research

HONORS

- *America’s Top Doctors*, Castle Connolly Medical, Ltd., 2017
- Best Doctors, *Pittsburgh Magazine*, 2017

Zhenwei Gong, PhD

RESEARCH

Zhenwei Gong’s major research interest is the role of humanin in metabolic disorders, with emphasis on the effects of humanin on lipid metabolism and whole-body glucose homeostasis. Humanin improves whole-body glucose homeostasis by regulating insulin sensitivity and increasing glucose-stimulated insulin secretion from the beta cells. Using a high-fat, diet-induced obesity mouse model, he has demonstrated that treatment with humanin decreases weight gain, visceral fat, and hepatic



triglyceride accumulation. The decrease in hepatic triglyceride accumulation is due to induced activity of hepatic microsomal triglyceride transfer protein and increased hepatic triglyceride secretion. In addition, intracerebroventricular infusion of humanin acutely increases triglyceride secretion from the liver, whereas vagotomy blocks the effects of intracerebroventricular humanin on hepatic triglyceride secretion. Furthermore, vagotomy also blocks hepatic triglyceride secretion induced by intravenous administration of humanin. Finally, he has shown that the central effects of humanin on hepatic triglyceride flux are mediated through the melanocortin system. He continues to define the roles of humanin in central regulation of lipid metabolism.

Gong is also interested in studying the effects of humanin in cardiovascular disease. While studying the mechanisms by which humanin protects cardiomyocytes from stress-induced cell death, he found that humanin activates chaperone-mediated autophagy (CMA). He demonstrated that this effect occurs in cardiomyocytes, fibroblasts, and neuronal cells. Treatment with humanin increases long-lived protein turnover and prevents the cells from oxidative stress-induced cell death. Humanin lost its protective effects on these cells with knockdown of lysosome-associated membrane glycoprotein 2A, suggesting that the protective effect is CMA dependent. His current focus is to identify the underlying mechanisms by which humanin activates CMA.

The third ongoing project for Gong is to study the role of a tumor suppressor, Absent in Melanoma (AIM2), in energy homeostasis. Gong has found that knockout of AIM2 in mice induces spontaneous obesity and insulin resistance. This is at least partially due to the increased adipogenesis in WAT and BAT dysfunction-induced decrease in thermogenesis and subsequently reduced energy expenditure. Notably, he also has found that the effects of AIM2 in energy homeostasis are independent of its role in the inflammasome, as caspase1 activity and serum levels of IL-1 β are not changed in AIM2 $^{-/-}$ mice under physiological conditions when AIM2 inflammasome is inactivated. He is investigating the potential mechanisms by which AIM2 regulates energy metabolism and insulin sensitivity.

EDITORSHIPS

- Review editor, *Frontiers in Pediatric Endocrinology*

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- ADA

LECTURESHIPS AND SEMINARS

- “Role of Humanin in Autophagy,” special seminar in the School of Life Science, Northeast Normal University, Changchun, China, October 2016
- “Mitochondria Signaling, Cellular Homeostasis,” department seminar, Dalian Polytechnic University, Liaoning, China, November 2016

Nursen Gurtunca, MD

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- South African Medical Society
- American Pediatric Society
- PES
- Endocrine Society

Kara Hughan, MD

RESEARCH

Kara Hughan’s translational research is focused on metabolic and hormonal factors associated with cardiometabolic disease.

Nitrite Modulation of Hypertension, Platelet Activation, and Endothelial and Mitochondrial Function. This translational study aims to examine the effects of chronic oral nitrite therapy on blood pressure, endothelial function, and insulin sensitivity and whether it modulates mitochondrial energetics, oxidative stress, and redox signaling in platelets and skeletal muscle. The study is funded by NIH K23 NHLBI grant HL124051-01A1 and the McKamish Family Fund. Hughan is principal investigator.

An Open-Label Study of Oral Nitrite in Adults With Metabolic Syndrome and Hypertension. This study aims to investigate the effects of oral inorganic nitrite on the cardiometabolic and hormonal disturbances in metabolic syndrome and hypertension, targeting a population of overweight/obese adults with metabolic syndrome and hypertension at risk to develop insulin resistance and endothelial dysfunction. The study is supported by a University of Pittsburgh Clinical and Translational Science Institute award; the University of Pittsburgh Vascular Medicine Institute; and McKamish, Inc. Hughan is principal investigator.

Postprandial Glycemia in the Free-Living Condition and Cardiometabolic Risk in Obese Youth. This study aims to assess the relationship between postprandial glycemia in free-living conditions via continuous glucose monitoring and cardiometabolic risk in obese youth. Hughan is principal investigator.

Treatment Options for Type 2 Diabetes in Adolescents and Youth 2 (TODAY2). This is a multicenter, cooperative, NIH-funded trial regarding the treatment of youth with type 2 diabetes. It continues to follow the original TODAY study subjects to understand the persistence of the effects of the different treatment regimens used in TODAY, to track the continued evolution of beta-cell function, and to describe the development of vascular complications and risk factors for complications. Hughan is co-investigator.

Nitrite Benefits to Mediate Fatigability in Older HFpEF Patients. This National Institute on Aging/NIH-funded, randomized, controlled, double-blinded trial of oral nitrite therapy in older (> 70 years) HFpEF patients proposes there are intrinsic physiological components of HFpEF pathophysiology that predispose to fatigability, a concept defined specifically as a deterioration in function over time (performance fatigability) and subjective tiring from an exercise stimulus (perceived fatigability). The study will evaluate the pleiotropic benefits of oral inorganic nitrite, including enhanced performance of skeletal muscle (strength and metabolism) and vasomotor responses (systemic and pulmonary arterial). Hughan is co-investigator.

Cystic Fibrosis (CF) Foundation's EnVision CF: Emerging Leaders in CF Endocrinology Award. This award, funded by the CF Foundation, trains Hughan and 15 other emerging U.S. endocrinologists caring for patients with CF and related endocrine conditions. In addition to Hughan providing designated pediatric endocrine-related patient care within the division's CF Care Center, this proposal includes the opportunity to submit CF and related endocrine disorder research projects. Hughan is principal investigator.

A Randomized, Double-Blind Study With an Open-Label Extension Comparing the Effect of Once-Weekly Dulaglutide With Placebo in Pediatric Patients With Type 2 Diabetes Mellitus (Assessment of Weekly Administration of LY2189265 in Diabetes-PEDIatric Study). This phase III study, sponsored by Eli Lilly and Company, aims to test the hypothesis that dulaglutide (0.75 mg and 1.5 mg, pooled) given subcutaneously once a week for 26 weeks to children and adolescents with type 2 diabetes mellitus who have inadequate glycemic control, despite diet and exercise, with or without metformin or basal insulin, is superior to placebo in the treatment of type 2 diabetes mellitus, as measured by baseline to week 26 change in hemoglobin A1c. Hughan is co-investigator.

An Open-Label, Randomized, Multicenter, Single-Dose, Parallel-Group Trial to Evaluate Pharmacokinetics and Pharmacodynamics of Empagliflozin in Children and Adolescents From

10 to Less Than 18 Years of Age With Type 2 Diabetes Mellitus.

In this phase I trial sponsored by Boehringer-Ingelheim Pharmaceuticals, Inc., Hughan completed eight subjects at Children's Hospital out of the 27 subjects completed internationally. Hughan is site principal investigator.

MAJOR LECTURESHIPS AND SEMINARS

- "Nitrite Modulation of Hypertension, Insulin Sensitivity, and Endothelial Function," Ninth Annual Children's Hospital of Pittsburgh Child Health Research Center K12 Retreat, Pittsburgh, Pa., April 2016
- "Pediatric Endocrine Emergencies," Allegheny Health Network/Drexel University College of Medicine, Emergency Medicine Residency Lectureship, Pittsburgh, Pa., August 2016
- "Mitochondrial Function in Cystic Fibrosis," EnVision webinar program broadcast to EnVision CF trainees and mentors, Cystic Fibrosis Foundation, November 2016
- "Diabetes Through the Ages—Special Consideration in the Care of Infants and Toddlers With Diabetes," American Association of Diabetes Educators Western Pennsylvania Local Networking Group, Pittsburgh, Pa., November 2016
- "Mitochondrial Function in Cystic Fibrosis," Pediatric Endocrine Research Conference, Children's Hospital, Pittsburgh, Pa., February 2017
- "Oral Nitrite Modulation of Hypertension, Endothelial Function, and Insulin Sensitivity in Humans," Nutrition Center and Integrated Health Seminar Series, Division of Gastroenterology, Hepatology, and Nutrition, Children's Hospital of Philadelphia, Philadelphia, Pa., March 2017

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- PES
- ADA
- Endocrine Society
- Vascular Medicine Institute, University of Pittsburgh School of Medicine
- Nitric Oxide Society

ADVISORY COMMITTEE MEMBERSHIPS

- Children's Hospital Pediatric Endocrine Fellowship Curriculum Committee, Accreditation Council for Graduate Medical Education
- Children's Hospital Pediatric Endocrine Fellowship Interview Committee, Accreditation Council for Graduate Medical Education
- Comorbidity Assessment Committee, TODAY2

HONORS

- EnVision CF: Emerging Leaders in CF Endocrinology Program, Cystic Fibrosis Foundation

Heba Ismail, MBBCh, MSc, PhD

Heba Ismail joined the division in December 2017 as the new clinical director of the diabetes program.

RESEARCH

Ismail's research focuses on the pathogenesis and treatment of type 1 diabetes mellitus, with emphasis on the use of technology in the management of type 1 diabetes.

Nutrition Education Through Mobile Gaming for Young Patients With Type 1 Diabetes. This is a study to assess the effect of using a neuropsychology-based gaming application on the food choices and consumption of children with type 1 diabetes as compared to conventional, standard diet teaching. Ismail is principal investigator.

Bridges Education Innovation Project Grant: A Day in the Life of a Patient With Diabetes Mellitus: An Experiential Learning. This is a study to assess an innovative method of education using role-playing as a form of experiential learning. The goal is to familiarize pediatric trainees with diabetes technology as well as enhance a culture of empathy. Ismail is principal investigator.

TrialNet (Prediction and Prevention of Type 1 Diabetes). This is a collaborative study of 14 centers in the United States and five in Europe to plan and implement intervention strategies to maintain beta-cell function in patients with new-onset type 1 diabetes and prevent diabetes in first-degree relatives at high risk. Ismail is sub-investigator.

MAJOR LECTURESHIPS AND SEMINARS

- "Glucose and C-Peptide Secretion Patterns," endocrine grand rounds, Indiana University, October 2017

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- ADA
- Endocrine Society
- PES

HONORS

- Young Investigator Award, TrialNet award in recognition of research efforts

Ingrid Libman, MD, PhD**RESEARCH**

Ingrid Libman's research has focused on the etiology, prevention, and treatment of type 1 diabetes mellitus, with emphasis on the effect of obesity in type 1 diabetes. She directs the Diabetes Transition Program, which aims to provide the best care and to research the best ways to sup-

port and guide successful transition for young patients with diabetes mellitus. She is involved in the development and testing of age-appropriate shared decision-making tools to educate about the importance of prevention and screening for complications of diabetes. She works on numerous multicenter studies of type 1 and type 2 diabetes.

Transition to Adulthood for Adolescent Patients With Type 1 Diabetes Mellitus. This three-year project funded by the Children's Hospital Foundation David Paul Diabetes Transition Care Research Initiative will develop and test a series of educational modules for patients and families as the patient transitions from pediatric to adult care and management of type 1 diabetes. Libman is principal investigator.

Availability of a Program to Screen for Retinopathy in Children With Type 1 Diabetes. Does It Improve Compliance? The overall goal of this project, funded by the Beckwith Foundation, is to design, integrate, and evaluate a shared decision-making approach, including appropriate tools, to engage children with type 1 diabetes in understanding the importance of yearly screening for diabetic retinopathy and what can be done to prevent or delay the complication. Libman is co-principal investigator.

Are Current Screening Guidelines for Complications in Youth With Type 1 Diabetes Appropriate? This study is funded by the University Partnership Program Academic Foundation. Libman is principal investigator.

Novel Biomarkers for Early Diabetic Nephropathy in Children With Type 1 Diabetes. This study is funded by the Cochrane Weber Endowment. Libman is co-investigator.

A Shared Decision-Making Approach to Engage Youth With Type 1 Diabetes in Cardiovascular Disease Prevention. This study, funded by the Cochrane Weber Endowment, aims to design, integrate, and evaluate a shared decision-making approach, including appropriate tools, to engage children with type 1 diabetes in understanding the importance of yearly screening for cardiovascular disease risk factors and what can be done to prevent or delay this complication. Libman is co-principal investigator.

A Day in the Life of a Patient With Diabetes Mellitus: An Experiential Learning. The objective of this proposal, funded by the Bridges Education Innovation Award, is to have residents and endocrine fellows "experience" living with diabetes, using insulin pumps and glucose testing to familiarize themselves with the different clinical scenarios and diabetes technology and ensure a culture of empathy. Libman is co-investigator.

Type 1 Diabetes Exchange Project. This multicenter study funded by the Leona M. and Harry B. Helmsley Charitable Trust aims to create a registry and biobank of individuals with type 1 diabetes mellitus to address pertinent clinical issues and conduct exploratory and hypothesis-generating analyses. Libman is principal investigator at the Pittsburgh center.

Research on Emerging Adults Changing Health. The goal of this NIH-funded research in collaboration with Carnegie Mellon University is to examine the impact of insulin-dependent diabetes on quality of life over the transition from adolescence into adulthood as compared to nondiabetic individuals. The study will concentrate on the follow-up of graduates of the diabetes program for the analyses of psychosocial behaviors and risk factors and the evaluation of their relationship with metabolic control and diabetes-related complications. Libman is co-investigator.

TrialNet (Prediction and Prevention of Type 1 Diabetes). This is a collaborative study of 14 centers in the United States and five in Europe to plan and implement intervention strategies to maintain beta-cell function in patients with new-onset type 1 diabetes and prevent diabetes in first-degree relatives at high risk. Libman is co-investigator.

SNAIL Study. The aim of this multicenter study, funded by JDRE, is to identify and characterize “slow progressors” from several longitudinal studies of type 1 diabetes. Libman is co-investigator.

TODAY2. This is a multicenter, cooperative, NIH-funded trial regarding treatment of youth with type 2 diabetes. It continues to follow the original TODAY study subjects to understand the persistence of the effects of the different treatment regimens used in TODAY, to track the continued evolution of beta-cell function, and to describe the development of vascular complications and risk factors for complications. Libman is co-investigator.

ADVISORY COMMITTEE MEMBERSHIPS

- Youth/pediatric chair, Scientific Sessions Planning Committee, ADA
- Chair, Diabetes in Youth Interest Group, ADA
- Member, Organizing Committee, International Meeting of Pediatric Endocrinology, to be held in Buenos Aires, Argentina, 2021
- Member, Training Council, PES
- Member, Diabetes Special Interest Group, PES
- Invited member, Eunice Kennedy Shriver National Institute of Child Health and Human Development’s Initiative to Advance Pediatric Therapeutics, NIH

- Comorbidity Assessment Committee, TODAY study
- Ancillary Studies Committee, TODAY study
- Member and reviewer, Institutional Review Board, University of Pittsburgh
- Member, Diversity Committee, Institute of Clinical Research Education, Clinical and Translational Science Institute, University of Pittsburgh

EDITORSHIPS

- Editorial Board (international), *Latin ADA Journal*
- International Editorial Board, *Revista Medica de Rosario*

MAJOR LECTURESHIPS AND SEMINARS

- “Double Diabetes or Type 1.5: How Frequent Is It and How to Treat?” invited speaker, International Society for Diabetes in Adolescents and Youth 2016 Congress, Valencia, Spain, October 2016
- “Type 2 Diabetes Mellitus in Children and Youth: Myth or Reality?” invited speaker, Latin ADA Congress, Bogota, Colombia, November 2016
- “Prevention and Treatment of Type 1 Diabetes in Youth: What Is New?” invited speaker, Latin ADA Congress, Bogota, Colombia, November 2016

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- ADA
- Latin ADA
- European Association for the Study of Diabetes
- International Society for Pediatric and Adolescent Diabetes
- Society for Pediatric Research
- PES

HONORS

- Best Doctors, *Pittsburgh Magazine*, 2017
- *Best Doctors in America*, Woodward/White, Inc., 2017
- Outstanding Patient Award, Children’s Hospital, 2016
- *America’s Top Doctors*, Castle Connolly Medical, Ltd., 2017

Pushpa Viswanathan, MD

RESEARCH

As codirector of the Thyroid Center, Pushpa Viswanathan’s primary clinical research focus is treatment of thyroid disorders and thyroid cancers in children. Viswanathan’s current research involves clinical and prognostic evaluation of pediatric thyroid disease.

ADVISORY COMMITTEE MEMBERSHIPS

- Co-chair, Multidisciplinary Thyroid Center, Children’s Hospital of Pittsburgh
- Patient Experience Outpatient Committee, Children’s Hospital of Pittsburgh

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- Endocrine Society
- American Academy of Pediatrics
- ADA

Selma F. Witchel, MD**RESEARCH**

Selma Witchel's research projects address androgen excess, glucocorticoid receptors, and gender questioning in children and adolescents.

Persistent Symptoms of Hyperandrogenism in Girls With a History of Premature Adrenarche or Adolescent Hyperandrogenism. The goal of this project is to ascertain outcome data for girls with a history of premature adrenarche or adolescent hyperandrogenism to test the hypothesis that these girls have an increased risk to develop polycystic ovary syndrome (PCOS). The project has been expanded to include investigation of the novel bioactive adrenal steroid hormones in normal adrenarche, premature adrenarche, adolescent hyperandrogenism, and congenital adrenal hyperplasia.

Substance Use Disparities Among Transgender Youth. The overarching goal of this study is to systematically examine substance use and associated health disparities among transgender and gender-questioning youth.

Noninvasive Maximization of Fertility in a Peripubertal Population of Patients With Klinefelter Syndrome. The goal of this pilot project funded by the Clinical and Translational Science Institute is to determine whether sperm can be detected in the urine or in semen samples of adolescent or young adult patients, as well as whether there is a correlation between the presence of sperm and the physical/endocrine end points routinely assessed in these patients.

Role of Glucocorticoids in Prenatal Brain Development. The goal of this project is to investigate the developmental consequences of premature glucocorticoid exposure on the developing brain. Initial studies have found that dexamethasone exposure alters the development trajectory of the brain.

ADVISORY COMMITTEE MEMBERSHIPS

- Research Advisory Committee, Children's Hospital of Pittsburgh
- Chair, Disorders of Sexual Differentiation Committee, Children's Hospital of Pittsburgh
- Co-chair, Multidisciplinary Thyroid Center, Children's Hospital of Pittsburgh
- CARES Foundation Advisory Board

- Intern Selection Committee, Children's Hospital of Pittsburgh
- Co-chair, Publications Committee, Androgen Excess and PCOS Society
- Chair, Education Committee, PES
- Program chair, Androgen Excess-PCOS Society annual meeting, Lorne, Australia, November 2016

EDITORSHIPS

- Editorial Board, *Journal of Clinical Endocrinology and Metabolism*

MAJOR LECTURESHIPS AND SEMINARS

- "Biology of Gender," Midwest PES meeting, Chicago, Ill., March 2016
- "Sex Steroids and Gender Identity—The Endocrinologists' Perspective," Pittsburgh TransPride Conference, Pittsburgh, Pa., September 2016
- "Biology of Gender," pediatric endocrinology grand rounds, University of Michigan, Ann Arbor, Mich., December 2016
- "Premature Adrenarche and PCOS," Endocrinology Research Conference, University of Michigan, Ann Arbor, Mich., December 2016

PROFESSIONAL AFFILIATIONS/SOCIETY MEMBERSHIPS

- Endocrine Society
- PES
- Society for Pediatric Research
- American Academy of Pediatrics
- ADA
- Androgen Excess and PCOS Society
- European Society for Pediatric Endocrinology

HONORS

- Best Doctors, *Pittsburgh Magazine*, 2017
- *America's Top Doctors*, Castle Connolly Medical, Ltd.

2015

Forno E, Han YY, **Muzumdar R**, Celedon JC. Insulin resistance, metabolic syndrome, and lung function in U.S. adolescents with and without asthma. *J Allergy Clin Immunol*. 2015;136:304-11.

Katari S, Wood-Trageser MA, Jiang H, Kalynchuk E, **Muzumdar R**, Yatsenko SA, Rajkovic A. Novel inactivating mutation of the FSH receptor in two siblings of Indian origin with premature ovarian failure. *J Clin Endocrinol Metab*. 2015;100(6):2154-7.

Tas E, Mahmood B, **Garibaldi L**, Sperling M. Liver injury may increase the risk of diazoxide toxicity: A case report. *Eur J Pediatr*. 2015;174:403-6.

Gong Z, Su K, Cui L, Tas E, Yakar S, **Muzumdar R**. Central effects of humanin on hepatic triglyceride secretion. *Am J Physiol Endocrinol Metab*. 2015 Aug 1;309(3):E283-92.

Nicola JP, Reyna-Neyra A, Saenger P, Rodriguez-Buritic DF, Gamez Godoy JD, **Muzumdar R**, Amzele LM, Carrasco M. The sodium/iodide symporter mutant V270E causes stunted growth but no cognitive deficiency. *J Clin Endocrinol Metab*. 2015;100:E1353-61.

Hughan KS, **Muzumdar R**. Health disparities in cardiovascular disease risk in obese youth. *Endocrine Practice*. 2015;21(2):208-10.

Libman IM, Miller KM, DiMeglio LA, Bethin K, Katz M, Shah A, Simmons J, Haller MJ, Raman S, Tamborlane WV, Coffey J, Saenz A, Beck RW, Nadeau KJ; for the T1D Exchange Clinic Network Metformin RCT Study Group. A randomized trial of metformin as an adjunct therapy for overweight/ obese adolescents with type 1 diabetes. *JAMA*. 2015;314(21):2241-50.

Redondo MJ, Foster NC, **Libman IM**, Mehta SN, Hathway JM, Bethin KE, Nathan BM, Ecker MA, Shah AC, DuBose SN, Tamborlane WV, Hoffman RP, Wong JC, Maahs DM, Beck RW, DiMeglio LA. Prevalence of cardiovascular risk factors in youth with type 1 diabetes and elevated body mass index. *Acta Diabetol*. 2015;100:e1353-61.

Agathis N, **Libman IM**, Moritz ML. Hyponatremia due to severe hypothyroidism in an infant. *Front Pediatr*. 2015;3:96.

Cedillo M*, **Libman IM***, Arena VC, Zhou L, Trucco M, Ize-Ludlow D, Pietropaolo M, Becker D. Obesity, islet cell autoimmunity and cardiovascular risk factors in youth at onset of type 1 autoimmune diabetes. *J Clin Endocrinol Metab*. 2015;100(1):E82-6. (* equal contribution)

Rivera Vega M, Flint A, Winger D, **Libman I**, **Arslanian S**. Obesity and youth diabetes: Distinguishing characteristics between islet cell antibody positive versus negative patients over time. *Pediatr Diabetes*. 2015;16(5):375-81.

Witchel SF, Oberfield S, Rosenfield RL, Codner E, Bonny A, Ibanez L, Pena A, Horikawa R, Gomez-Lobo V, Dipesalema J, Ttayli H, **Arslanian S**, Dabdgao P, Garcia Rudza C, Lee PA. The diagnosis of polycystic ovarian syndrome during adolescence. *Horm Res Pediatr*. 2015;83:376-89.

Lyons SK, Helgeson VS, **Witchel SF**, **Becker DJ**, Korytkowski MT. Physicians' self-perceptions of care for emerging adults with type 1 diabetes. *Endocrine Practice*. 2015;21(8):903-9.

Buryk M, Picarsic J, Creary SE, Shaw PH, Simons JP, Deutsch M, Monaco SE, Nikiforov Y, **Witchel S**. Identification of unique heterozygous germline mutation, STK11 (p.F354L), in a child with encapsulated follicular variant of papillary thyroid carcinoma within six months of completing treatment for neuroblastoma. *Pediatr Dev Pathol*. 2015;18(4):318-23.

Marshall SL, Edidin D, Arena VC, **Becker DJ**, Bunker CH, Gishoma C, Gishoma F, LaPorte RE, Kaberuka V, Ogle G, Sibomana L, Orchard TJ. Prevalence and incidence of clinically recognized cases of type 1 diabetes in children and adolescents in Rwanda, Africa. *Diabet Med*. 2015;32(9):1186-92.

Marshall SL, Edidin DV, Arena VC, **Becker DJ**, Bunker CH, Gishoma C, Gishoma F, LaPorte RE, Kaberuka V, Ogle G, Sibomana L, Orchard TJ. Glucose control in Rwandan youth with type 1 diabetes following establishment of systematic, HbA1c-based care and education. *Diabetes Res Clin Pract*. 2015;107(1):113-22.

Buryk MA, Dosch HM, **Libman I**, Arena VC, Huang Y, Cheung RK, Trucco M, Pietropaolo M, **Becker DJ**. Neuronal T-cell autoreactivity is amplified in overweight children with new-onset insulin-requiring diabetes. *Diabetes Care*. 2015;38(1):43-50.

Nucci AM, Virtanen SM, **Becker DJ**. Infant feeding and timing of complementary foods in the development of type 1 diabetes. *Current Diab Rep*. 2015;15:62.

Helgeson VS, Mascatelli K, Reynolds KA, **Becker DJ**, **Escobar O**, Siminerio L. Friendship and romantic relationships among emerging adults with and without type 1 diabetes. *J Pediatr Psychol*. 2015;40(3):359-72.

Lee S, Rivera-Vega M, Alsayed HM, Boesch C. **Libman I**. Metabolic inflexibility and insulin resistance in obese adolescents with non-alcoholic fatty liver disease. *Pediatric Diabetes*. 2015;16(3):211-8.

2016

Dauber A, Muñoz-Calvo MT, Barrios V, Kloverpris S, Serra-Juhé C, Desikan V, Pozo J, **Muzumdar R**, Martos-Moreno GA, Hawkins F, Domené HM, Jasper HG, Yakar S, Hwa V, Chowen JA, Oxvig C, Rosenfeld RG, Pérez-Jurado LA, Argente J. Mutations in pregnancy-associated plasma protein A2 cause short stature due to low IGF-I availability. *EMBO Mol Med*. 2016;8(4):363-74.

Cobb LJ, Lee C, Xiao J, Yen K, Wong RG, Nakamura HK, Mehta HH, Gao Q, Ashur C, Huffman DM, Wan J, **Muzumdar R**, Barzilai N, Cohen P. Naturally occurring mitochondrial-derived peptides are regulators of physiological processes. *Aging (Albany NY)*. 2016;8(4):796-809.

Hecht Baldauff N, Vargas Trujillo M, Pozgaj Sepec M, Popovic J. Improving the use of medical identification devices (MID) in children with type 1 diabetes (T1DM). *Pediatric Diabetes*. 2016;17(S24):41.

Hecht Baldauff N, Ttayli H, Dong W, Arena VC, **Gurtunca N**, Pietropaolo M, Becker DJ, Libman IM. Relationship of adiponectin and leptin with autoimmunity in children with new-onset type 1 diabetes: A pilot study. *Pediatr Diabetes*. 2016;17:249-56.

Beauchamp G, Boyle C, Tamborlane W, Miller K, **Libman I**, Haller M, Beck R; for the T1D Exchange Clinic Network. Treatable diabetes retinopathy is extremely rare among pediatric T1D Exchange Clinic Registry Participants. *Diabetes Care*. 2016 Dec;39(12):e218-e219.

Escobar O, Viswanathan P, Witchel SF. Chapter 9: Endocrinology. In: Zitelli BJ, McIntire S, Nowalk AJ (Eds.), *Atlas of Pediatric Physical Diagnosis* (7th ed.). Elsevier Inc.; 2016.

Hughan KS, Tfayli H, Warren-Ulanch J, Barinas-Mitchell E, **Arslanian SA**. Early biomarkers of subclinical atherosclerosis in obese adolescent girls with polycystic ovary syndrome. *J Pediatr*. 2016;168:104-11.e1.

Kim JY, Michaliszyn SF, Nasr A, Lee SJ, Tfayli H, Hannon T, **Hughan KS**, Bacha F, **Arslanian S**. The shape of the glucose response curve during an oral glucose tolerance test heralds biomarkers of type 2 diabetes risk in obese youth. *Diabetes Care*. 2016;39:1431-1439.

Lai Y-C, Tabima DM, Dube JJ, **Hughan KS**, Goncharov DA, Vanderpool RR, St. Croix CM, Garcia-Ocaña A, Goncharova EA, Tofovic SP, Mora AL, Gladwin MT. SIRT3-AMPK activation by nitrite and metformin improves hyperglycemia and normalizes pulmonary hypertension associated with heart failure with preserved ejection fraction (PH-HFpEF). *Circulation*. 2016;133:717-731.

Lee PA, Nordenström A, Houk CP, Ahmed SF, Auchus R, Baratz A, Baratz Dalke K, Liao LM, Lin-Su K, Looijenga LH III, Mazur T, Meyer-Bahlburg HF, Mouriquand P, Quigley CA, Sandberg DE, Vilain E, **Witchel S**; and the Global DSD Update Consortium. Global disorders of sex development update since 2006: Perceptions, approach, and care. *Horm Res Paediatr*. 2016 ;85:158-80.

Liu YZ, Cheng X, Zhang T, Lee S, Xiao X, Gittes G, Qu S, Jiang C-L, **Dong HH**. Hypertriglyceridemia in the absence of hyperglycemia and insulin resistance does not cause beta-cell dysfunction in ApoC3 transgenic mice. *J Biol Chem*. 2016;291(28):14695-705.

Liu Z, Cronstein BN, Liu H, **Muzumdar R**, Gong Z, Werner H, Yakar S. IGF-1-independent actions of liver growth hormone receptor in male mice, growth hormone control of hepatic lipid metabolism. *Diabetes*. 2016;65(12):3598-609.

Liu Z, Cordoba-Chacon J, Kineman RD, Cronstein BN, Muzumdar R, **Gong Z**, Werner H, Yakar S. Growth hormone control of hepatic lipid metabolism. *Diabetes*. 2016;65:3598-3609.

Long AE, Wilson I, **Becker DJ**, Libman IM, Wong FS, Steck AK, Rewers MJ, Achenbach P, Williams AJK, Gillespie KM. Is there regulation of the autoimmune response in slow progressors to type 1 diabetes? *Diabetic Medicine*. 2016;33:76-7.

Garibaldi L, **Becker D**. Is the risk of diabetic ketoacidosis modifiable? *J Pediatr*. 2016 Apr;171:10-2.

Nicholson KJ, McCoy KL, **Witchel SF**, Stang MT, Carty SE, Yip L. Comparative characteristics of primary hyperparathyroidism in pediatric patients. *Surgery*. 2016;160(4):1008-16.

Picarsic J, Buryk MA, Ozolek JA, Ranganathan S, Monaco SE, Simons JP, **Witchel S**, Gurtunca N, Joyce J, Zhong S, Nikiforova MN, Nikiforov Y. Molecular characterization of sporadic pediatric thyroid carcinoma with the DNA/RNA ThyroSeq v2 next-generation sequencing assay. *Pediatr Dev Pathol*. 2016;19(2):115-22.

Redondo MJ, Foster NC, **Libman IM**, Mehta SN, Hathway JM, Bethin KE, Nathan BM, Ecker MA, Shah AC, DuBose SN, Tamborlane WV, Hoffman RP, Wong JC, Maahs DM, Beck RW, DiMeglio LA. Prevalence of cardiovascular risk factors in youth with type 1 diabetes and elevated body mass index. *Acta Diabetologica*. 2016;53(2):271-7.

Sereika SM, **Becker D**, Schmitt P, Powell AB III, Diaz AM, Fischl AF, Thurheimer-Cacciotti J, Herman WH, Charron-Prochownik D. Operationalizing and examining family planning vigilance in adult women with type 1 diabetes. *Diabetes Care*. 2016;39:2197-2203.

Tamborlane WV, Haymond M, Dunger D, Shankar R, Gubitosi-Klug R, Bethin K, Karres J, Tomasi P, **Libman I**, Hale P, Portman P, Klingensmith G, Reed M, Dunder K, Blumer J, Giacoia G; for the NICHD Diabetes Working Group. Expanding treatment options for youth with type 2 diabetes: Current problems and proposed solutions: A white paper from the NICHD Diabetes Working Group. *Diabetes Care*. 2016;39(3):323-9.

Yamauchi J, Kim DH, **HH Dong**. FoxO1. In: Choi S (Ed.), *Encyclopedia of Signaling Molecules*. Springer; 2016. ISBN-13: 978-1441904607.

Zhang T, **Dong HH**. FoxO1—A conductor of insulin signaling to glucose and lipid metabolism. In: Ntambi JM (Ed.), *Hepatic De Novo Lipogenesis and Regulation of Metabolism*. Switzerland: Springer International Publishing; 2016.

Liu YZ, Cheng X, Zhang T, Lee S, Xiao X, Gittes G, Qu S, Jiang C-L and **Dong HH**. Hypertriglyceridemia in the absence of hyperglycemia and insulin resistance does not cause beta-cell dysfunction in ApoC3 transgenic mice. *J Biol Chem*. 2016;291(28):14695-705.

Zhang T, Kim DH, Xiao X, Lee S, **Gong Z**, **Muzumdar R**, Calabuig-Navarro V, Yamauchi J, Harashima H, Wang R, Bottino R, Carlos Alvarez-Perez J, Garcia-Ocaña, Gittes G, **Dong HH**. FoxO1 plays an important role in regulating beta-cell compensation for insulin resistance in male mice. *Endocrinology*. 2016;157(3):1055-70.

2017

Bloom K, Mohsen A-W, Karunanidhi A, El Demellawy D, Reyes-Mugica M, Wang, Y, Gonzalez L, Otsuba C, Tobita K, Bertera S, **Muzumdar R**, et al. Investigating the link of ACAD10 deficiency to type 2 diabetes mellitus. *J Inherit Metab Dis*. 2017 Jan 24. Epub ahead of print.

Cheng X, Yamauchi J, Lee S, Zhang T, Gong Z, **Muzumdar R**, et al. APOC3 protein is not a predisposing factor for fat-induced nonalcoholic fatty liver disease in mice. *J Biol Chem*. 2017;292(9):3692-705.

Goetzman ES, Gong Z, Schiff M, Wang Y, **Muzumdar RH**. Metabolic pathways at the crossroads of diabetes and inborn errors. *J Inherit Metab Dis*. 2017 Sep 26. Epub ahead of print.

Gong Z, Tasset I, Diaz A, Anguiano J, Tas E, Cui L, Kuliawat R, Liu H, Kühn B, Cuervo AM, **Muzumdar R**. Humanin is an endogenous activator of chaperone-mediated autophagy. *J Cell Biol*. 2017. PMID: 29187525.

DeArment D, **Muzumdar R**. Endocrine system. In Slota M (Ed.), *AACN's Core Curriculum for Pediatric High Acuity, Progressive, and Critical Care Nursing* (3rd ed.) Springer; 2017.

Baldauff NH, **Witchel SF**. Polycystic ovary syndrome in adolescent girls. *Curr Opin Endocrinol Diabetes Obes*. 2017;24(1):56-66.

Ferrara CT, Geyer SM, Liu YF, Evans-Molina C, Libman IM, Besser R, **Becker DJ**, et al.; Type 1 Diabetes TrialNet Study Group. Excess BMI in childhood: A modifiable risk factor for type 1 diabetes development? *Diabetes Care*. 2017;40(5):698-701.

Bosi E, Boulware DC, **Becker DJ**, Buckner JH, Geyer S, Gottlieb PA, et al.; Type 1 Diabetes TrialNet Study Group. Impact of age and antibody type on progression from single to multiple autoantibodies in type 1 diabetes relatives. *J Clin Endocrinol Metab*. 2017;102(8):2881-6.

Xiao X, Chen C, Guo P, Zhang T, Fischbach S, Fusco JC, Shiota C, Prasad K, **Dong HH**, Gittes GK. FoxO1 inhibits accelerated β -cell aging in pancreas-specific SMAD7 mutant mice. *J Biol Chem*. 2017;292(8):3456-65.

Cheng X, Yamauchi J, Lee S, Zhang T, Gong Z, Muzumdar R, Qu S, **Dong HH**. APOC3 protein is not a predisposing factor for fat-induced nonalcoholic fatty liver disease in mice. *J Biol Chem*. 2017;292(9):3692-705.

Lee S, **Dong HH**. FoxO integration of insulin signaling with glucose and lipid metabolism. *J Endocrinology*. 2017;233(2):R67-79.

Garbacz WG, Jiang M, Xu M, Yamauchi J, **Dong HH**, Xie W. Sex- and tissue-specific role of estrogen sulfotransferase in energy homeostasis and insulin sensitivity. *Endocrinology*. 2017;158(11):4093-104.

Xiao X, Fischbach S, Zhang T, Chen C, Sheng Q, Zimmerman R, Patnaik S, Fusco J, Ming Y, Guo P, Shiota C, Prasad K, Gangopadhyay N, Husain SZ, **Dong H**, Gittes GK. SMAD3/Stat3 signaling mediates β -cell epithelial-mesenchymal transition in chronic pancreatitis-related diabetes. *Diabetes*. 2017;66(10):2646-58.

Bangalore Krishna, K, Pagan P, **Escobar O**, Popovic J. Occurrence of cranial neoplasms in pediatric patients with Noonan syndrome receiving growth hormone: Is screening with brain MRI prior to initiation of growth hormone indicated? *Horm Res Paediatr*. 2017;88(6):423-6.

Hughan KS, Wendell SG, Delmastro-Greenwood M, Helbling N, Corey C, Bellavia L, et al. Conjugated linoleic acid modulates clinical responses to oral nitrite and nitrate. *Hypertension*. 2017;70:634-44. *equal contribution

Garvey KC, Foster NC, Agarwal S, DiMeglio LA, Anderson BJ, Corathers SD, Desimone ME, **Libman IM**, et al. Health care transition preparation and experiences in a U.S. national sample of young adults with type 1 diabetes. *Diabetes Care*. 2017;40(3):317-24.

Ferrara CT, Geyer SM, Liu YF, Evans-Molina C, **Libman IM**, Besser R, et al; Type 1 Diabetes TrialNet Study Group. Excess BMI in childhood: A modifiable risk factor for type 1 diabetes development? *Diabetes Care*. 2017;40(5):698-701.

Helgeson V, Vaughn AK, Seltman H, Orchard T, Becker D, **Libman I**. Relation of parent knowledge to glycemic control among emerging adults with type 1 diabetes: A mediational mode. *J Behav Med*. 2017. PMID: 28918521.

Craig ME, Prinz N, Boyle CT, Campbell FM, Jones TW, Hofer SE, Simmons JH, Holman N, Tham E, Frohlich Reiterer E, DuBose S, Thornton H, King B, Maahs DM, Holl RW, Warner JT. Prevalence of celiac disease in 52,721 youth with type 1 diabetes: International comparison across three continents. *Diabetes Care*. 2017. PMID: 28546222.

Krall J, **Libman I**, Siminerio L. The emerging adult with diabetes: Transitioning from pediatric to adult care. *Pediatr Endocrinol Rev*. 2017;14(Suppl 2):422-8.

Witchel SF. Congenital adrenal hyperplasia. In Levine A (Ed.), *Adrenal Disorders: Physiology, Pathophysiology and Treatment*. Springer Publishers; in press.

Yatsenko SA, **Witchel SF**. Genetic approach to ambiguous genitalia and disorders of sex development: What clinicians need to know. *Semin Perinatol*. 2017;41(4):232-43.

Witchel SF. Puberty: Gonadarche and adrenarche. In Strauss and Barbieri (Eds.), *Yen and Jaffe's Reproductive Endocrinology* (8th ed.) Elsevier Saunders; 2017.

Desai S, Wood-Trageser M, Matic J, Chipkin J, Jiang H, Bachelot A, Dulon J, Sala C, Barbieri C, Cocca M, Toniolo D, Philippe T, **Witchel S**, Rajkovic A. MCM8 and MCM9 nucleotide variants in women with primary ovarian insufficiency. *J Clin Endocrinol Metab*. 2017;102(2):576-82.

Tas E, Sebastian J, Madan-Khetarpal S, Sweet P, Yatsenko AN, Pollock N, Rajkovic A, Schneck FX, Yatsenko SA, **Witchel SF**. Familial deletion of the HOXA gene cluster associated with hand-foot-genital syndrome and phenotypic variability. *Am J Med Genet A*. 2017;173(1):221-4.

Root JM, Vargas M, **Garibaldi LR**, Saladino RA. Pediatric patient with altered mental status and hypoxemia. *Pediatr Emerg Care*. 2017;33(7):486-8.

