The Division of Pediatric Genetics and Metabolism, under the direction of Ralph DeBerardinis, M.D., Ph.D., is responsible for the evaluation, diagnosis, and treatment of children with genetic disorders, including birth defects, malformation syndromes, genetically-defined developmental delays, and inborn errors of metabolism. Approximately one in four admissions to tertiary care in pediatric hospitals results from conditions with a genetic basis. Although many genetic conditions are rare, there are hundreds of these diseases and they collectively account for a disproportionate amount of illness and death in children. Furthermore, identifying the genetic basis of rare conditions often leads to specific treatments that dramatically improve the health of the patient.

There are three major components to the Division’s mission: Patient Care, Research, and Education.

Patient Care

With a large and growing team of physicians, genetic counselors, nurse practitioners, dieticians, and social workers, we are a major regional resource for children and families with genetic diseases. Our team evaluates more than 250 patients each month with known or suspected genetic diseases. Particular strengths of our clinical program include:

- We have the largest regional practice specializing in the diagnosis and treatment of children with inborn errors of metabolism.
- We provide 24/7 coverage for our patients, with a M.D. Medical Geneticist on call at all times.
- We have several clinics specializing in malformation syndromes and genetic forms of developmental delay.
- We are experts in the use and interpretation of advanced genetic diagnostics, including tests involving next-generation sequencing.
- We are the only clinic in Dallas that accepts referrals from the Texas Department of Health's newborn screening program for biochemical disorders.
- We participate in multidisciplinary clinics specializing in relatively common disorders such as Down Syndrome and 22q11.2 deletion syndrome.

Research

Our clinical team is unique in that it is fully synchronized with a state-of-the-art research program in the Children’s Research Institute (CRI), a joint venture between UT Southwestern and Children’s Health. The Genetic and Metabolic Disease Program (GMDP) within the CRI is comprised of a team of scientists dedicated to identifying new genetic diseases and developing new ways to treat children with genetic disorders. We use advanced technologies to evaluate each patient’s genetic and metabolic individuality. Laboratory-based approaches in cellular and molecular biology are then used to understand the precise consequences of the DNA mutations identified in our patients. Our research team is funded through federal, state, and private grant support. Specific research goals within the GMDP include efforts to:

- Discover new genetic causes of childhood diseases.
- Understand the genetic basis of metabolic diversity and its relationship to health and disease in children.
- Develop new diagnostic methods to detect genetic diseases in patients.
- Develop imaging techniques to monitor metabolic states non-invasively in patients.
- Establish clinical trials to assess the effect of new treatments.
- Construct new disease models using genetically-modified mice, and use these models to test the effect of experimental therapies.
• Use multidisciplinary approaches (chart review, public health databases, 2- and 3-dimensional image analyses, etc.) to identify and characterize novel malformation syndromes.

Education

We are a vital part of UT Southwestern Medical Center’s mission to train medical students, residents, fellows, and allied health professionals in pediatrics, genetics, and metabolism. We teach medical students and pediatric residents throughout their training, manage an accredited residency program to train the next generation of physicians in Medical Genetics, co-direct a fellowship program in Laboratory Genetics and Genomics, and provide continuing medical education in genetics and metabolism to the Dallas-Fort Worth medical community.

Faculty

The Division has four full-time faculty members, all with interests in the diagnosis and management of a variety of genetic conditions such as inborn errors of metabolism, newborn screening, lysosomal storage disorders, craniofacial malformation syndromes, and incontinentia pigmenti.

Honors / Awards

Best Pediatric Specialists, D Magazine

• Ralph DeBerardinis
• Garrett Gotway
• Angela Scheuerle
• Luis Umaña

Texas Super Doctor, Texas Monthly

• Angela Scheuerle

Ralph DeBerardinis

• Member, The Academy of Medicine, Engineering and Science of Texas (TAMEST)
• 2021 Memorial Sloan Kettering Paul Marks Prize for Cancer Research

Invited Lectures

Ralph DeBerardinis

• Keystone Symposium, Metabolic Decisions in Development and Disease – Virtual, March, 2021
  o “Metabolic transitions and anomalies in development.”
• University of Pittsburgh Hillman Cancer Center – Virtual, December, 2021
  o “Metabolic reprogramming in human disease.”
• National Cancer Institute Metabolism Interest Group – Virtual, December, 2021
  o “Metabolic reprogramming in cancer and other diseases.”
• EMBO Workshop on Cancer Immunometabolism – Sitges, Spain, December, 2021
  o “Cancer metabolism in patients: what can we learn from in vivo analysis?”
• Pediatric Heme/Onc Research Seminar Series, Boston Children's – Virtual, January, 2021
  o “Metabolic phenotypes and liabilities in human disease.”
• Keystone Symposia on Tumor Metabolism and the Microenvironment – Virtual, January, 2021
  o “Compartmentalized Metabolism in Physiological States of Growth”
• Sidney Kimmel Cancer Center at Thomas Jefferson University Grand Rounds, Philadelphia, PA – Virtual, February, 2021
  o “Metabolic Reprogramming in Human Tumors In Vivo.”
• Stanford University Frontiers in Biology Seminar Series, Stanford, CA – Virtual, March, 2021
  o “Metabolic perturbations and their role in human disease.”
• ASCI/AAP Disrupting the Science of Medicine, Chicago, IL – Virtual, April, 2021
  o “Assessing cancer metabolism in human tumors in vivo.”
• Pfizer Frontiers in Human Disease Symposium 2021 – Virtual, April, 2021
  o “Understanding Metabolism to Treat Human Disease.”

Garrett Gotway

• Research Advocacy Network, April, 2021
  o “Mock Tumor Board”

Angela Scheuerle

• Webinar February 2021
  o “Is it Safe? Safety Surveillance through the Antiretroviral Pregnancy Registry.”
• Texas Health Dallas Pediatric Grand Rounds, July 2021
  o “Genetic Testing Boot Camp.”
• Eswatini MOH BD Surveillance Training for DTG study, (Virtual), August 2021
  o “Identifying and Recording Birth Defects.”
• Dept of Pediatrics Faculty Research Conference. UT Southwestern, August 2021
  o “Population-based evaluation of congenital anomaly co-occurrence patterns”
• AAP National Conference & Exhibition (NCE), October 2021
  o “Genetic Testing Boot Camp.”

Luis Umaña

• Pediatric Grand Rounds St Barnabas Hospital Affiliated to Albert Einstein College of Medicine, New York, NY, February 2020
  o Mysterious lands: Inborn Errors of Metabolism ”
• Pediatric Grand Rounds UT Southwestern Medical Center,Dallas, TX, April, 2021
  o “Phenylketonuria: the disorder that keeps opening doors”

Conferences

Conference on Retroviruses and Opportunistic Infections (CROI), (Virtual), March, 2021.

Albano JD, Short WR, Scheuerle AE, Beckerman K, Mofenson L, Vannappagari V.
Platform Presentaiton, “The Antiretroviral Pregnancy Registry: 30 years of monitoring for congenital anomalies.”
Albano JD, Short RW, Scheuerle AE, Beckerman K, Mofenson L, Vannapagari V.
Poster Presentaiton, “The Antiretroviral Pregnancy Registry: 30 years of Monitoring for Congenital Anomalies. Conference on Retroviruses and Opportunistic Infections”

**Society for Birth Defects Research and Prevention. Virtual meeting July 24-29, 2021.**

Platform Presentation, “Co-occurring birth defects in children with non-syndromic anotia or microtia.”

Scheuerle AE.
Platform Presentation, “Criteria used for classifying abnormalities identified in the Antiretroviral Pregnancy Registry.”

**Other Conferences**

David W Smith Workshop on Malformations and Morphogenesis, Stevenson, Washington, September 2021
Platform Presentation, “Population-based analysis of common defect cooccurrence patterns with notable association of thoracic vertebral and conotruncal heart anomalies.”

Vannapagari V, Albano JD, Ragone L, Cook T, Scheuerle AE, Short WR, Thorne C, Beckerman K, Chakhtoura N, Mofenson L.
The Antiretroviral Pregnancy Registry (APR) IDWeek 2021, San Diego, California, September/October 2021
Platform Presentation, “Maternal Dolutegravir (DTG) use during pregnancy and birth outcomes”

American Academy of Allergy, Asthma & Immunology – AAAAI Meeting, (Virtual), February/March , 2021.
Poster Presentaiton, “Pregnancy and infant outcomes among pregnant women with Chronic Spontaneous Urticaria (CSU) treated with omalizumab: a descriptive analysis from the EXPECT pregnancy registry. “

Renwick A, Schraw JM, Desrosiers TA, Janitz AE, Scheurer ME, Canfield MA, Langlois PH, Scheuerle AE, Plon SE. Lupo PJ.
American Association for Cancer Research - AACR Annual Meeting, (Virtual), April/May, 2021
Poster Presentaiton, “A Population-Based Assessment of Cancer Risk in Children with VACTERL. “

Lancaster K, Scheuerle AE, Wilson K.
American College of Medical Genetics, (Virtual) April, 2021
Poster Presentaiton, “Cytogenetic microarray copy number variants in patients with non-syndromic, single suture craniosynostosis.”

European League Against Rheumatism (EULAR) (Virtual), June, 2021
Poster Presentation, “Pharmacovigilance pregnancy data in a large population of patients with chronic inflammatory disease exposed to certolizumab pegol: pregnancy outcomes and confounders.”

Poster Presentation, “Pharmacovigilance Data on Pregnancy Outcomes in Women with Psoriatic Disease Exposed to Certolizumab Pegol”

Poster Presentation, “Multiple de novo copy number variant (MdnCNV) mutagenesis: genomic insights into organixmal mutations and CNV driven mirror traits.”

Poster Presentation, “Pharmacovigilance data on pregnancy outcomes in women with Crohn’s disease exposed to certolizumab pegol.”

Education and Training

The Division of Pediatric Genetics and Metabolism is committed to providing quality medical education for medical students, residents, and fellows.

Medical Student Education

Genetics is an essential component of all facets of medicine, and the Division of Pediatric Genetics and Metabolism is proud to take a major role in the education of medical students and other trainees within the UT Southwestern system.

First-Year Medical Students

We are highly involved in the first year medical school curriculum, including:

- Tissues Course: protein and amino acid metabolism, hyperammonemia and urea cycle defects, defects in amino acid metabolism (PKU, MSUD, etc.), purine and pyrimidine metabolism, and treatment of inborn errors of metabolism

Third-Year Medical Students

Third-year medical students participate in pediatrics rotations involving:

- Case studies in clinical genetics
- Genetics clinic outpatient rotations
- Clinical genetics consultations
**Fourth-Year Medical Students**

We offer an elective in clinical genetics to fourth-year medical students involving outpatient genetics clinics and inpatient genetics consultations.

**Medical Genetics Interest Group**

We provide mentorship to UT Southwestern medical students considering a career in Medical Genetics. This highly successful interest group meets periodically to discuss new developments in clinical and research-based genetics. We seek to provide an environment to educate students about career opportunities in this exciting and rapidly expanding area of pediatrics.

**Summer Genetics Fellowship**

Starting summer 2020, we have offered two rising second-year medical students the opportunity for a clinical experience in Genetics and Metabolism. This is a paid fellowship covering two months. It includes clinical observation, experience in the clinical laboratories, and a series of lectures. We plan to offer this course again in 2022, having negotiated to align budgetary and administrative constraints with the Texas Department of Health and UT Southwestern administration.

**Resident Education**

We play a major role in the education of residents at UT Southwestern. Some of our activities include:

**Medical Genetics Residency Program**

The Department of Pediatrics, through the Division of Pediatric Genetics and Metabolism, is the sponsoring clinical department for our ACGME certified training program in Medical Genetics. Medical Genetics is a specialty of its own, rather than being a subspecialty of Pediatrics, Internal Medicine, or Obstetrics/Gynecology. The training program encompasses many clinical departments at UT Southwestern, including Pediatrics, Internal Medicine, Obstetrics/Gynecology (prenatal diagnosis), Neurology, and Pathology (Clinical Molecular Genetics, Cytogenetics, and Biochemical Genetics), among others. The program is directed by Garrett Gotway, M.D., Ph.D., a board certified pediatrician and medical geneticist. Given its interdepartmental nature, the residency is managed through the McDermott Center for Human Growth and Development, the Human Genetics Center of UT Southwestern. Learn more about the Medical Genetics program.

**Pediatrics**

The Division provides didactic teaching for the pediatric residents, including but not limited to:

- Clinical dysmorphology
- Teratology
- Cause and evaluation of birth defects
- Common chromosome anomalies
- Newborn screening
- Acute metabolic disorders
- Genetic storage disorders
We provide direct teaching for the residents in the regular departmental clinical conferences, as well as part of our inpatient consultation service.

Finally, there is a Clinical Genetics elective available for second- and third-year pediatric residents. The residents see outpatients in our clinics and inpatients for consultation services under the supervision of one of the members of the Division faculty. We encourage the residents to participate in clinical research projects if they are interested.

Other Specialties

Trainees in other departments also spend time in our clinics. Residents in Neurology and other specialties may receive some of their training through our Division. This includes the Laboratory Genetics and Genomics Fellow in the Department of Pathology, who has dedicated clinical rotations in both Metabolic Genetics and General Genetics.

Graduate Student and Postdoctoral Fellow Education

We teach a variety of courses to students pursuing Ph.Ds. and post-doctoral training, including seminars on:

- Human genetics and genomics
- Mendelian genetic diseases
- The use of metabolic tracers and metabolomics in the evaluation of human diseases
- Cancer metabolism
- Regulation of metabolic pathways in health and disease
- Informatic analysis of high-content genomic and metabolomic data sets

The clinical genetics division is an important component of the Laboratory Genetics and Genomics (LGG) fellowship in the Department of Pathology. The fellow is required to spend a total of six weeks in clinical genetics and biochemical genetics (in addition to rotations in cancer and prenatal genetics). Previously, the fellow would spend a dedicated month in clinic with us. The disadvantages to that are the repetition of same patient types and spending time with case that are not relevant to the fellow’s training agenda. This year, we are notifying the fellow when specific patients of interest are due in clinic so that she may be present either in person or virtually as appropriate. This has the advantage of allowing the fellow to concentrate on patients with cytogenetic or molecular diagnosis, testing, and counseling, thus providing a better, broader, and more relevant, clinical experience for her. It also helps with the overall LGG program scheduling.

Residents

Training in genetics crosses departmental lines and is considered a residency rather than a fellowship. The Department of Pediatrics is the sponsoring clinical department, and the residency is managed through the McDermott Center for Human Growth and Development, the Genetics Center at UT Southwestern.
Research Activities

Our faculty are involved in clinical, translational, and basic research projects. Our over-arching goal is to better understand the genetic basis of human disease, and to advance new knowledge into new approaches to diagnose and treat our patients. Our large and varied patient population inspires research in numerous areas.

The laboratory of Dr. DeBerardinis is interested in understanding the metabolic activities that support cell growth and proliferation in normal cells and in cancer. In order to produce daughter cells, which occur with each round of the cell cycle, cells need to double their biomass (proteins, lipids, and nucleic acids). This is a tremendous challenge requiring energy, building blocks, and the coordination of a large number of metabolic pathways. Dr. DeBerardinis is exploring the idea that these metabolic activities are orchestrated by growth factor-stimulated signal transduction pathways, which direct cells to take up abundant nutrients and allocate them into the proper metabolic pathways. He wants to understand how signal transduction impacts metabolic fluxes during physiologic states of cell proliferation (e.g., embryogenesis, wound healing, activation of the immune system) and during pathological states (e.g., cancer).

To do this, the DeBerardinis Lab uses a combination of techniques in molecular biology, cell biology, and biochemistry, coupled with metabolic flux analysis using mass spectrometry and nuclear magnetic resonance, and animal models of metabolism and cancer. Current projects include developing imaging probes to identify abnormal metabolic activities in tumors and in children with metabolic diseases and using metabolomics and genomics to identify new disease genes.

Dr. Gotway is collaborating with the McDermott Center for Human Growth and Development to enhance the discovery of new gene – disease associations in patients with novel clinical presentations. The Human Gene Discovery Laboratory will analyze whole exome and genome data from patients with unknown clinical syndromes to identify variants in novel genes that will expand our knowledge and understanding of human genetics.

Dr. Scheuerle is a co-investigator on Dr. A.J. Agopian’s study from the University of Texas School of Public Health entitled A Multidisciplinary Approach for Identifying and Characterizing Novel Congenital Malformation Syndromes (NIH 1R01HD093660-01A1). This study uses a combination of Texas Department of State Health Services Birth Defects Registry data and chart review with the goal of identifying previously unrecognized malformation associations. Additionally, this study links birth defects with other health databases, such as cancer, to evaluate potential associations. Dr. Scheuerle is also involved in research exploring the VATER/VACTERL association (a collaboration with Dr. Agopian); the developmental consequences of ribosomal dysfunction (collaboration with Dr. Michael Buszczak in the Department of Molecular Biology); and Incontinentia Pigmenti, particularly elucidating the adult phenotype and advancing understanding of the molecular and clinical aspects of this disease.
**Clinical Activities**

We accept referrals from all pediatricians and children's hospitals in the Dallas/Fort Worth metroplex, as well as from more distant areas within and beyond Texas. The Division's clinical activities at Children's Medical Center are focused in the following areas:

**Metabolic Disease Clinics**

The Metabolic Diseases Clinic provides evaluation and testing for children with known or suspected inborn errors of metabolism (IEMs). IEMs are a family of hundreds of rare diseases caused by mutations in the genes that allow the body to produce energy and grow. We are a regional center of excellence in these diseases, establishing the diagnosis in affected children, counseling and educating their families about these conditions, and optimizing therapy tailored to the needs of each child. Blood, urine, enzyme, and DNA analyses are performed for diagnosis. Patients with a confirmed diagnosis are then provided with nutritional evaluation, genetic counseling, and psychosocial assessment as well as long-term care.

The Metabolic Disease Clinic is closely associated with the Newborn Screening Clinic. We are a major referral center for the Texas Newborn Screening Program. This statewide program seeks to identify newborn babies with any of over 30 different treatable diseases, many of which are genetic/metabolic in nature. A large fraction of the approximately 400,000 babies born in Texas each year are evaluated through our Division. When a baby in North Texas is found to have a metabolic abnormality on the newborn screen, the family is referred to our team for definitive diagnosis, treatment, and long-term care if necessary. Through the Texas Newborn Screening Program, more than 75 children with genetic metabolic diseases are identified each year, and the coordinated care of these children by the Metabolic Disease Clinic at Children’s significantly improves their development and survival. Efforts in newborn screening are led by Dr. Luis Umaña.

A dedicated clinic is also provided for teenagers with IEMs transitioning into adult medicine. This clinic at Children’s is staffed by Dr. Markey McNutt, who is board certified in both Medical Genetics and Internal Medicine, and follows these patients after age 18 at a clinic in the Aston Center.

**Genetics/Dysmorphology Clinic**

Children with conditions involving birth defects, developmental delay or mental retardation, or other known or suspected genetic disorders receive evaluation and testing in the Genetics/Dysmorphology Clinic. Chromosomal and DNA analysis for diagnosis of genetic disease is provided, as well as psychosocial assessment, counseling, and comprehensive case management with referral to medical specialists, community resources, and support groups. Family history analysis and risk counseling to discuss reproductive options also are available through a team of board-certified genetic counselors. As of August 2016, this clinic has been available at the Children’s Specialty Center at THR Presbyterian in addition to the Children’s Health Dallas campus, though it is on hold right now due to COVID restrictions and space limitations at that site.

**Down Syndrome Clinic**

Faculty and staff with the Down Syndrome Clinic have decades of experience in caring for children with Down Syndrome and provide comprehensive treatment for children and their families, including medical management, genetic counseling, physical, speech, and motor development evaluation and recommendations, psychosocial support, screening and referral for behavioral and psychiatric problems, and referral to community agencies for educational intervention or therapies. New patients are seen at the Children’s Health Dallas campus with follow up available both there and at the Legacy campus.
Interdivisional and Interdepartmental Collaborations

The genetic basis of many human diseases, and the broad utility of genetic testing across numerous subspecialties of Pediatrics and Internal Medicine, make the consultative services of our physicians essential to the clinical and academic missions of UT Southwestern.

In 2021, the Division of Pediatric Genetics & Metabolism led an effort to have UT Southwestern be designated as a Rare Disease Center of Excellence (COE) by the National Organization of Rare Disorders (NORD). NORD advocates for patients of all ages suffering from about 7,000 rare diseases, many of which have genetic causes and manifest in childhood. UT Southwestern is among an inaugural group of 31 medical centers participating in this network. The new COE will be directed by Dr. Angela Scheuerle and involves over 30 physicians from seven clinical departments. The COE designation recognizes UT Southwestern’s long-standing excellence in both clinical care and research in rare disorders, and is expected to attract patients seeking advanced treatment for these diseases. The designation will also boost our efforts to recruit the best clinicians and trainees in Medical Genetics and related specialties.

Dr. Scheuerle sees adult patients as referred from both UTSW and community obstetricians and maternal fetal medicine specialists. These are coordinated through the Children’s Fetal program. She continues on the Parkland Hospital Stillbirth Committee, an organ of the Obstetrics & Gynecology department that reviews all the Parkland Hospital stillbirths. Previous discussions with Obstetricians and Neonatologist at Clements University Hospital have resulted in increased referrals for prenatal counseling as well as establishment of the Genetics eConsult availability at that hospital.

The 22q11.2 multidisciplinary clinic continues and is growing. We have modified the criteria for managing patients that are new to the Genetics & Metabolism Division. If the patient is less than a year from diagnosis (regardless of age), they will be seen as a separate new patient visit in Genetics clinic. If the patient is more than a year from diagnosis, their first visit will be with the 22q11.2 multidisciplinary clinic on the second Wednesday afternoon of the month. All established patients will continue to be seen in the multidisciplinary clinic at defined follow-up time intervals. A separate appointment in Genetics clinic will be arranged for any patient/parent who requests it or who would benefit from it.

Current Grant Support

Ralph DeBerardinis

Grantor: Cancer Prevention and Research Institute of Texas – (CPRIT) MIRA
Title of Project: Mechanisms of Melanoma Metastasis
Role: Co-investigator (Overall PI: Sean Morrison)
Dates: 12/2016 – 11/2022

Grantor: Cancer Prevention and Research Institute of Texas - (CPRIT) RP180778
Title of Project: Metabolic Enablers of Melanoma Progression
Role: PI of Project 3 and Metabolism Core (Overall PI: Sean Morrison)
Dates: 08/2018 – 08/2022

Grantor: Howard Hughes Medical Institute
Title of Project: HHMI Investigator Program
Role: Principal Investigator
Dates: 09/2018 – 08/2025

Grantor: Lawrence Steinberg Endowment
Title of Project: Joel B. Steinberg, M.D. Chair in Pediatrics
Role: Principal Investigator
Dates: 12/2018 – Ongoing
**Grantor:** NIH-National Cancer Institute - 2P50CA070907-21A1
**Title of Project:** The University of Texas SPORE (Special Program of Research Excellence) in Lung Cancer
**Role:** PI of Project 1 (Overall PIs: John Minna and Jack Roth)
**Dates:** 09/01/20-08/31/25

**Grantor:** NIH-National Cancer Institute
**Title of Project:** Metabolic Regulators of Tumor Growth and Progression
**Role:** Principal Investigator
**Dates:** 09/01/17-08/31/24

**Grantor:** NIH-National Cancer Institute
**Title of Project:** Dissecting Fatty Acid Metabolism in Clear Cell Renal Cell Carcinoma (ccRCC)
**Role:** Principal Investigator
**Dates:** 04/01/19-03/31/22

**Grantor:** NIH-National Cancer Institute
**Title of Project:** Identifying factors regulating cancer metabolism in vivo
**Role:** Principal Investigator
**Dates:** 04/01/20-03/31/24

**Grantor:** NIH-National Cancer Institute
**Title of Project:** Targeting a Kynurenine-Driven Autocrine Loop to Block Triple-Negative Breast Cancer Metastasis
**Role:** Principal Investigator
**Dates:** 09/01/17-08/31/22

**Grantor:** NIH-National Cancer Institute
**Title of Project:** Investigating the Role of Metabolic Reprogramming in Cancer Cell Death Sensitivity
**Role:** Principal Investigator
**Dates:** 04/03/20-03/31/24

**Grantor:** NIH-National Inst of Child Hlth & Hmn Dev
**Title of Project:** The consequences of human inborn errors in mitochondrial lipoic acid metabolism
**Role:** Co- Principal Investigator
**Dates:** 04/03/20-03/31/24

**Grantor:** NIH-National Institute of DDK Diseases
**Title of Project:** The inflammasome in the regulation of intestinal glucose homeostasis, microbiota and inflammation
**Role:** Co-Investigator
**Dates:** 03/09/21-02/28/25

**Grantor:** National Institutes of Health/National Cancer Institute – R35
**Title of Project:** Metabolic Regulators of Tumor Cell Growth and Progression
**Role:** Principal Investigator
**Dates:** 09/2017 – 08/2024

**Grantor:** NIH – Project 3 (1 P50 CA196516-01A1)
**Title of Project:** UTSW SPORE in Kidney Cancer
**Role:** Principal Investigator of Metabolomics Project (Overall PI: James Brugarolas)
**Dates:** 08/2016 –07/2021
Grantor: Robert L. Moody, Sr. Faculty Scholar Endowment  
**Title of Project:** Moody Faculty Scholar  
**Role:** Principal Investigator  
**Dates:** 10/2018 – Ongoing

**Angela Scheuerle**

Grantor: National Institutes of Health/National Institute of Child Health and Human Development (R01)  
**Title of Project:** A Multidisciplinary approach for identifying and characterizing novel congenital malformation syndromes  
**Role:** Co-Investigator – Local/UTSW Principal Investigator  
**Dates:** 9/2018 – 9/2023

**Peer-Reviewed Publications**


