The Center for Reproductive Medicine (CRM) holds a unique foothold in the country, as no other institution encompasses such an innovative range of expertise focused on cross-collaboration, scientific knowledge, clinical care, community and outreach efforts, and educational and training programs—across the spectrum of reproductive biology and medicine.

Building upon its momentum every year, the CRM’s journey over the last seven years has been filled with incredible strides. Among its notable achievements, the Center has surpassed 250 members, hosted its largest Reproductive Health Research Day with 158 attendees, held over 85 research and educational seminars, workshops, and community outreach activities, and has accumulated over 60 awards and appointments within its faculty, post-doctoral, and trainee membership base! Collaborating across Baylor, Texas Children’s Hospital, and other Texas Medical Center institutions, CRM members have built an impactful fertility preservation plan—leading to increased prevention efforts by patients over the last few years. Additionally, the CRM houses two National Academy of Science recipients—Drs. Martin Matzuk and Bert O’Malley—both innovative leaders in their respective fields.

We have garnered national and international recognition with our break-through science, along with dedicated engagements to trainee mentorship and community outreach. This includes National Infertility Awareness Week, Saturday Morning Science 2 (SMS 2), and the Summer Medical Research and Training (SMART) program.

These popular efforts showcase the strong commitment CRM members have to the future of our youth and public community. Their involvement leads the next generation on a fulfilling path to become cutting-edge healthcare and science leaders, and brings educational resources to communities where living a healthy and empowering lifestyle is in fact, attainable.

To be on this journey with you, and see each of you push through the boundaries of innovative science and make these amazing achievements in research, patient care, and mentorship has been remarkable. As my departure from Baylor approaches, it has been my pleasure to share the dedication of the CRM with you over the years.

DORRIE
Recap:

CRM New Year's Membership Meeting and Reception

January 11, 2018

Dr. Dolores J. Lamb shared the CRM's achievements in 2017 including reaching 251 members, its highest membership number yet, school updates, and notable accomplishments in research, education, and community outreach. Darius Devlin, from Dr. Martin Matzuk's Lab, provided developments on their research in male contraception.

HIGHLIGHTED TALK

“Harnessing the Importance of Sperm Acrosome Proteins in Male Fertility for Novel Contraception Development”

DARIUS DEVLIN
Predoctoral Fellow, Department of Pathology and Immunology, Lab of Dr. Martin Matzuk

The mouse knockout of SPAR1 causes globozoospermia (globe-headed, infertile sperm due to acrosome loss), however, the protein function is unknown. Our new data suggest that SPAR1 is important for mediating binding of the acrosome to the nucleus. We have also generated new knockout mice for the paralog genes Fam170a and Fam170b to study their impact on the acrosome. Further mechanistic studies will aid in drug discovery for SPAR1 and potentially the FAM170 paralogs.

CRM MEMBER ACTIVITIES IN THE FIELD

UPCOMING TEXAS MEETINGS:

2018 TEXAS FORUM FOR REPRODUCTIVE SCIENCES
April 5 - 6, 2018 | MD Anderson Onstead Auditorium | Houston, TX

Taking place right here in the Texas Medical Center, the Texas Forum for Reproductive Sciences (TFRS) brings together all basic and clinical scientists interested in female and male reproductive systems. The 24th annual meeting will honor Dr. Barbara Sanborn.

This is a great opportunity to foster collaborations with other Texas reproductive scientists and for those in training to present their work. Short talks and poster sessions will be presented by students, fellows, and junior faculty, along with two excellent plenary lectures given by: Dolores J. Lamb, Ph.D., HCLD, Center for Reproductive Medicine, Baylor College of Medicine, and Mala Mahendroo, Ph.D., University of Texas Southwestern Medical Center.

REGISTRATION IS $50. For schedule, abstract submissions, and registration: bcm.edu/reproductivemedicine/meetings/texas-forum-reproductive-sciences.

45TH ANNUAL MEETING OF THE TEXAS GENETICS SOCIETY
March 22 - 24, 2018 | College Station, TX

The Texas Genetics Society fosters the development of all aspects of genetics, to promote the exchange of research results and the teaching of genetics, and to provide a forum for discussion of matters of interest to all geneticists. For 2018 Keynote Speakers, registration, and additional details: texasgeneticssociety.org.

Human SPAR1 and FAM170B tertiary structure prediction by I-TASSER

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170 aa, 19.6 kDa

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283 aa, 32.1 kDa
With interests in cancer and genetic epidemiology, the overlap between genitourinary (GU) defects and childhood cancer, and late effects in cancer survivors, PHILIP J. LUPO, PH.D., states the purpose of his research is to “influence screening and surveillance strategies in children most likely to develop cancer.” Dr. Lupo highlights his research linking GU defects to childhood cancer, the importance it plays in precision medicine efforts and patient care, and how Baylor and the CRM have grown his science.

Q| Can you provide a brief description of what “molecular epidemiology” is, for those that maybe unfamiliar with the field?
A| The “textbook” definition of epidemiology is the study of the distribution and determinants of disease in human populations. In molecular epidemiology, we utilize biological information (e.g., genomics, epigenomics, biomarkers of exposure) in our population- and clinic-based studies to better characterize disease risk. In short, we try to break the black box that often underlies exposure-disease associations by leveraging emerging biological technologies.

Q| Describe your current research linking genitourinary defects to childhood cancer. How does this congenital disorder lead to cancer, and what are the chances of a child developing cancer from it?
A| We have been linking population-based birth defects registries and cancer registries in several states (Texas, Arkansas, Michigan, and North Carolina) over the past few years to better understand the risk of childhood cancer among children with structural birth defects. Through these efforts, we have seen that children with genitourinary (GU) defects have a twofold risk of developing cancer compared to children who do not have GU defects. The types of cancer seen in these children include germ cell tumors, Wilms tumor, and hepatoblastoma. It is not clear why these associations exist. Potential explanations include prenatal exposures that lead to both the GU defect and cancer, early-life treatment exposures in children with structural birth defects that—

—predisposes them to cancer, or mutations in key developmental genes that lead to both outcomes.

We are currently exploring shared genetic underpinnings through our CPRIT-funded study. In that assessment, called the Genetic Overlap between Cancer and Anomalies in Kids (GOBACK) Study, we have been recruiting families at Texas Children’s Hospital, as well as through state-based cancer registries, to conduct genomic sequencing among children who have a structural birth defect and cancer.

THE INFLUENCE OF GENITOURINARY DEFECTS IN CHILDHOOD CANCERS

Results from the first maternal GWAS of acute lymphoblastic leukemia which indicated that genes involved in maternal glucose metabolism are associated with leukemia risk in offspring.
Q| How does your research impact patient care or initiate childhood cancer prevention efforts?
A| Several cancer centers, including Texas Children’s have initiated high-risk cancer screening clinics. Our research efforts are meant to influence screening and surveillance strategies in children most likely to develop cancer.

Q| Where would you like to see your research go?
A| It is my hope that our work will not only influence cancer surveillance and prevention efforts in children, but also inform precision medicine efforts. I think there is a growing awareness that advances in characterizing the genomes of patients with birth defects and cancer must be coupled with more sophisticated phenotyping. Precision medicine should be guided by both of these features.

Epidemiologists can aid in this work by systematically collecting and analyzing this information in a way that can be used to identify the subsets of individuals who have consistent disease patterns.

Q| How has being at Baylor and the Center for Reproductive Medicine helped advance your career and your research?
A| I can’t underestimate the advantages I have had by being at Baylor and the Center for Reproductive Medicine. Coming from a School of Public Health, there were far fewer resources in terms of basic research and clinical science. Now, rather than being at a table with other public health scientists, I am at the table with molecular biologists, biochemists, geneticists, and clinician scientists (just to name a few), as well as other public health scientists. These resources and access to this talent has helped me expand my research in new and exciting ways.

And I believe my research continues to evolve. Let me give an example. I am currently working with pediatric oncologists, developmental pediatricians, geneticists, and bioinformaticians to understand the risk of acute leukemia in children with Down syndrome—and these people are all leaders in their respective fields. I think there are very few places where I could have access to resources like this.

Additionally, working with a wide array of trainees (e.g., graduate students, residents, clinical fellows) has helped me grow in the educational aspects of my professional life.

Genetic architecture of children with leukemia who are Hispanic—there is a great deal of variability across populations who identify as Latino. Hispanics from Texas (represented by yellow) are seen to the left of the figure indicating greater European ancestry. The Latinos from Guatemala (an admixed population similar to Hispanics in the US and represented by blue) overlap the Hispanic population from Texas. Finally, indigenous cases from Guatemala (represented by red) have the greatest proportion of Native American ancestry and cluster to the right of the figure.
Faithful chromosome segregation into sperm and eggs requires crossover recombination between parental homologs. We investigate a failure to ensure crossovers in juvenile male mice. By monitoring recombination genome-wide using cytological assays and at hotspots using molecular assays, we show that juvenile mouse spermatocytes have fewer crossovers relative to adults. Analysis of recombination in the absence of MutLgamma provides evidence for greater use of alternative repair pathways in juvenile mouse spermatocytes, which can act upon crossover precursors to generate noncrossovers instead. We propose that designated crossover sites fail to mature efficiently in juveniles owing to inappropriate activity of these alternative repair pathways, leading to chromosome mis-segregation. We also find lower MutLgamma focus density in juvenile human spermatocytes compared to adults, suggesting that weaker crossover maturation efficiency could explain why younger men have a higher risk of fathering children with Down syndrome.

FRANCESCA COLE, Ph.D.
Assistant Professor, CPRIT Scholar in Cancer Research,
R. Lee Clark Fellow, Department of Epigenetics and Molecular Carcinogenesis, UT MD Anderson Cancer Center

February 8, 2018
“Sex Dimorphism in Developmental Programming of Health and Disease”

Many of the metabolic diseases, such as hypertension and diabetes, are few of the interrelated diseases that are traditionally attributed to lifestyles involving obesity, exercise, etc. Recent discoveries show that these diseases may also be programmed in-utero, as a result of sub-optimal in-utero environment. Maternal nutrition, including calorie intake and protein content in the diet, may significantly contribute to the offspring disease when they become adults. The presentation by Dr. Yallampalli on February 8th highlighted the consequences of a low protein diet intake by the mother during pregnancy on the hypertension in their progeny. The presentation highlighted the sex-dimorphism in the hypertension of the pregnancy; the onset is earlier in life and more severe in males compared to females. Moreover, the initial vascular mechanisms that lead to the hypertension also differs between sexes. However, the final common pathway that leads to hypertension appears to be through the regulation of renin-angiotensin-system (RAS) in both male and female progeny from with in-utero low protein programming.

CHANDRA YALLAMPALLI, DVM, Ph.D.
Professor, Department of Obstetrics and Gynecology
Baylor College of Medicine

UPCOMING EVENT
CRM and MCB R&D Workshop Series
In vivo Functional Imaging of Mouse Reproductive Processes

IRINA V. LARINA, Ph.D.
Assistant Professor, Co-Director, Optical Imaging and Vital Microscopy Core, Department of Molecular Physiology and Biophysics, Baylor College of Medicine

THURSDAY, APRIL 12, 2018
12 - 1 p.m.
DeBakey Building, Room M616

GRANT OPPORTUNITY
The 2018 Chao Physician-Scientist Award

Amount: The ICTR seeks applications for one-year awards (up to $100,000).
Deadline: April 12, 2018 (6 p.m. CST)

The purpose of this award is to provide funding for young investigators who are beginning their independent research careers. The award will support promising junior faculty members who are in the process of securing K08 or K23 grants but need interim funding. Applicants must be physicians who hold a primary full-time appointment in a BCM department. There is no restriction on research focus; basic, clinical, and translational research projects will all be considered.

For full details:  
orit.research.bcm.edu/R5T80IF3WH2/ChaoAward/Default.aspx
Embarking on his career, initially as a medical student at Baylor College of Medicine, on to his residency in Pathology, and then to accepting his first faculty position in 1981, THOMAS WHEELER, M.D., has spent his entire medical career at Baylor (except for a two year hiatus in private practice, 1989-91) and risen through the ranks to now hold the W.L. Moody, Jr. Chair in Pathology, and is Professor of Pathology & Immunology and Urology. Throughout his career, Dr. Wheeler has looked upon the great skills and knowledge he obtained from his mentors at Baylor. As a successful physician and mentor himself now, Dr. Wheeler continues to pass down his knowledge through clinical care, training, and ongoing endeavors. Here, Dr. Wheeler has provided an insightful look into being a part of Baylor throughout the years, especially in an era of innovative advancements in heart and cardiovascular surgery, and how Baylor has shaped his career.

Q: How did your medical school training at Baylor prepare you for your career?
A: Baylor, even back then, had top tier recognition as a great medical school, certainly in Texas and around the Southwest. When I applied, I got accepted to all the University of Texas schools and Baylor; of course, I chose Baylor. I knew it would give me the best all-around education, and it was the best regarded school at that time. Baylor was known to have excellent clinical teaching facilities for medical students. It had in excess of 4,000 patient beds where medical students could rotate through. Because there was so much work to be done, there was an old saying at Baylor, that you would, “See one, do one, and teach one.” For example, medical students got to deliver babies, even unassisted, I delivered 28.

We were given a lot of autonomy because of the tremendous patient load and work to be done within the county hospital, since we were their primary doctors. It was a great experience due to the wealth of clinical material, the great teachers, as well as the backdrop of the great science that was being done at Baylor.

Q: Can you describe one or two fond memories you had from your time here as a medical student at Baylor?
A: The most memorable was my rotation in surgery. In those days, we didn’t actually rotate among the public and private hospitals. Your core rotation was assigned at either a private or public hospital—with the private being St. Luke’s or Methodist, or the public hospital being the Veterans Affairs (VA) Medical Center or Ben Taub. I was assigned to Methodist and to Dr. George P. Noon, chief associate of—
—Dr. Michael E. DeBakey, and a Professor of Surgery. For three months, I saw everything one could imagine in heart and vascular surgery. It was not like today where some community hospitals have advanced heart surgery – patients at that time came from all over the world to the Texas Medical Center (TMC) to be operated upon.

To experience that in an era where cardiovascular surgery and all the new developments were being done in the TMC, and to be a part of it by seeing it all first-hand, was really a great opportunity for me.

I remember also the wealth of experience given to me by the total number of faculty to whom I was exposed in all imaginable disciplines of medicine. Within that group of faculty, there were individuals who stood out for their diagnostic skills, clinical acumen, or their compassion. We saw so many clinicians in practice, and in the learning environment—each of whom had a different skill set, and a different set of qualities. During the passage through medical school rotations, one was able to glean the very best of those qualities from a lot of different individuals.

Q: What are some of your contributions to reproductive medicine?
A: My focus academically has been in prostate cancer, biomarkers, and clinical pathologic correlations. However, I have worked closely with Dr. Larry Lipshultz over the years in testicular biopsies for infertility. Some of the fellows who trained under Dr. Lipshultz many years ago, and are now all over the country, still send me some of their testicular biopsies to review. These biopsies are not done very frequently, and a lot of pathologists in small communities don’t really see them, so I’ve maintained some of those contacts over the years.

Q: What advice do you have for a starting physician, scientist, or anyone pursuing a medical/science profession?
A: It’s a wonderful profession that will provide both for a good living and at the same time also to meet one’s personal goals for oneself and family.

One must keep in mind that, as you go through your training, learn to become a doctor, and after you enter practice, the patient’s interests are always first—you make that a priority.

There will be a lot of forces that try to break apart the physician-patient relationship, but one always has to come back to one’s primary responsibility, which is attending to the best interest of the patient. A physician must always have that as a fundamental guiding principal throughout their career.

Q: What have been some of your greatest achievements?
A: Looking back thirty six years in my career, my greatest accomplishment was being chosen as Chair of the department where I had spent my entire career. This was during a very difficult and tumultuous time when Baylor and Methodist separated. During that time, we lost nearly all of our adult clinical faculty who stayed at Methodist. We also lost nearly all of our residency program directors and about 80% of our clinical revenue stream. We had to reinvent ourselves under great adversity. That said, we are stronger now than our combined department in the Baylor Methodist era. This has been my greatest achievement.

Q: Anything you would like to add about your experience at Baylor?
A: Baylor is a wonderful institution that has a very fine tradition and history. The greatest privilege of my professional life is having been a student and then resident at Baylor, followed by becoming a faculty member there. Those experiences at Baylor have shaped every aspect and touched every corner of my life.

Dr. William Butler has written the history of Baylor College of Medicine—a five volume series. One day, the part that we experience in this short time as a faculty member will be part of a chapter or two in that long legacy and it’s a great honor indeed to have been a part of that great show.

It is so very rewarding to be able to comfort and take care of someone’s medical needs at the same time. Not many professions allow you to have the opportunity to do both—we’re in a very unique position in medicine.

Dr. Wheeler praises Dr. Janet Butel for being a “great mentor” during a ceremony honoring Dr. Butel’s significant contributions to Baylor in January 2017.
SATURDAY MORNING SCIENCE 2
FALL 2017

Fifty one students from underserved Houston-area high schools joined the fall 2017 Saturday Morning Science 2 (SMS 2) program hosted by the CRM, in conjunction with the Office of Institutional Diversity, Inclusion and Equity.

Over the course of four Saturdays, students were met with a range of advanced concepts in reproductive biology and science. Experts delivered lectures on pediatric urology, genetic disorders, male infertility, cervical cancer, kidney disease, and many others. Mentors, including Dr. James Phillips, special lecturers, and Teaching Assistants provided students with guidance on achieving their educational and career goals, and what it takes to become a successful scientist and/or physician.

Coursework During the Fall:

“Genetics and Genomics in Kidney Diseases”

§ Reza Bekheirnia, M.D.

“What Genetics Can Tell Us About Male Infertility”

§ Dolores J. Lamb, Ph.D., HCLD

“Why Pediatric Urology?”

§ Abhishek Seth, M.D.

“What Genetics Can Tell Us About Reproductive System Cancers: Gene-virus Interactions in Cervical Cancer”

§ Michael Scheurer, Ph.D., M.P.H.

ANNUAL APHRODISIAC LUNCHEON
FEBRUARY 14, 2018

“In general, if you think about it, many aphrodisiac foods are from folklore, but some are considered to be aphrodisiacs because of their texture—oysters for example. And they are also rich in Zinc which is very good for manhood. Hot peppers get the endorphins going and send a chill up your spine...a tingly sensation when you eat them.”

- Dr. Lamb to TMC News

In its 18th year, Dr. Lamb’s Laboratory for Male Reproductive Research and Testing (LMMRT) cooked up another batch of delicious aphrodisiac dishes including Dr. Lamb’s famous “Love Chili,” avocado and arugula toast, strawberry chocolate mousse, meatballs, honey butter, and other savory and sweet dishes.

Boasting 11 aphrodisiac ingredients the Penne a la Vodka Pasta prepared by Jeff White, M.D., Clinical Postdoctoral Fellow, Department of Urology won Most Aphrodisiac Ingredients; while the Best Tasting Aphrodisiac Dish went to the Hot and Saucy Meatballs made by Lucy Gonzalez, Senior Administrative Coordinator, Department of Urology. Aphrodisiac ingredients such as raspberry, honey, pepper, garlic, and basil were stirred into their tasty dishes.

See the day in action with TMC News and the March 2018 edition of BCM Family.

Image: Members of the CRM and LMMRT celebrate Valentine’s Day on February 14, 2018 with a bittersweet Aphrodisiac Luncheon—Dr. Lamb’s last one at Baylor.