OCRC
OVARIAN CANCER RESEARCH CENTER

Penn Medicine

AUTUMN 2016

Director's Message

I would like to introduce myself as the new Director of Penn Medicine's Ovarian Cancer Research Center (OCRC). This year my family and I relocated from Boston and we could not be happier to be here in Philadelphia.

September is Ovarian Cancer Awareness Month! The goal of September is to raise awareness, provide education, and learn about cutting-edge research directed at the early detection and eradication of ovarian cancer. To kick off this important month, the OCRC is launching this biannual newsletter to keep you up-to-date on all of the amazing researching happening at the OCRC.

Therapy for ovarian cancer has not improved dramatically in thirty years – but this is going to change. My goal, and that of every member of the OCRC, is to translate scientific discoveries made in the lab into useful diagnostic and therapeutic tools. We do this by working closely with our clinical colleagues in Gynecologic Oncology, under the incredible direction of our Division Chief, Dr. Mark Morgan, and with research collaborators throughout the Penn campus. Our critical scientific advancements are not possible without the support of our generous philanthropic community.

In this first addition of the OCRC Newsletter is a Q&A with Dr. Andrea Facciabene, a Research Assistant Professor at the Ovarian Cancer Research Center who will give an insight into his exciting and novel work, and an inspirational story of the Sandy Rollman Ovarian Cancer Foundation and the impact of their generous support of the OCRC over the years.

I look forward to sharing our many successes with you in the coming years.

Ronny Drapkin, MD, PhD
Director, Penn Ovarian Cancer Research Center
Franklin Payne Associate Professor of Pathology in Obstetrics and Gynecology

The Penn Ovarian Cancer Research Center (OCRC), established in 2006, serves as a catalyst to promote comprehensive and interdisciplinary research on ovarian cancer in collaboration with the Jordan Center for Gynecologic Cancer, Abramson Cancer Center, Basser Center for BRCA, Wistar Institute, and Penn's Immunotherapy Program, as well as numerous local, national and international investigators and clinicians.

Our goals are:

- Develop new methods for early detection of ovarian cancer
- Develop a comprehensive understanding of ovarian cancer pathogenesis
- Characterize the genetic factors that drive the development of hereditary and sporadic forms of ovarian cancer
- Develop new approaches to prevent and treat ovarian cancer
- Support clinical trials to assess safety and efficacy of new treatments

NEWS

THE PENN OVARIAN CANCER RESEARCH CENTER HAS NEW LEADERSHIP

Dr. Ronny Drapkin recently joined Penn as a tenured faculty member and the new Director of the Penn Ovarian Cancer Research Center. Dr. Drapkin spent most of his career at Harvard Medical School where he did his residency and fellowship in pathology and then led the effort in ovarian cancer research at the Dana-Farber Cancer Institute and Brigham and Women's Hospital. His research focuses on understanding the pathogenesis of gynecologic cancers and integrating genomic findings into novel experimental model systems developed in his laboratory to identify new biomarkers and drug targets.

THE CENTER EXPANDS ITS RESEARCH REPERTOIRE TO FIGHT OVARIAN CANCER

The OCRC realizes that the fight against cancer cannot be one dimensional. Rather, it requires interdisciplinary collaboration within the Center and beyond. Dr. Fiona Simpkins, a gynecologic oncologist and researcher, was recently recruited from the University of Miami to lead our effort in preclinical drug development. Dr. Simpkins' laboratory has created a series of new animal models that are more representative of human tumors than prior cell-based models. These animal models, called patient-derived xenografts (PDXs), have been extensively characterized and are allowing scientists to choose therapies and exploit the unique biology of each tumor. For example, after ovarian cancer surgery, the tumor is transplanted into the ovaries of several mice. Once these tumors grow in the mice they serve as 'avatars' of the patient's tumor and can be used for testing new drugs in clinical trials. Remarkably, these PDX models retain all the biological and genomic features of the original patient tumor and are thus good models to study therapeutics and drug resistance before use in patients. Dr. Simpkins is now using these models to study BRCA mutated ovarian cancers to investigate their response and resistance to PARP inhibitors.

An Interview with Andrea Facciabene, PhD

Research Assistant Professor

Explain your research and its impact on ovarian cancer?

I use a two-pronged approach to fight gynecologic cancers. The first approach targets tumor vasculature (blood supply), which brings oxygen and food to the tumor. I am looking to implement a cellular tumor vaccine that targets the structure of the vasculature to suffocate the tumor using a tumor's mitochondria. Mitochondria are organelles in the cell that produce energy or act as the cell's powerhouse. This approach has been effective not only in ovarian cancer, but in several others cancers too. The second approach uses the gut microbiomes, the bacteria in our gut, to attack tumors. By targeting these cells in the gut, we can redirect the immune system to attack the cancer. The gut microbiomes work with the immune system to elicit a systemic anti-tumor response.

As a scientist what does an average day look like?

An average day for me is 12 hours at the OCRC; working in the lab and on grant submissions. There is not enough time in the day, but my research is more of a hobby and a passion, so it doesn't feel like work. Fortunately, I enjoy what I do, and my 12 hour days feel shorter than other people's 8 hour days.

How did you get into gynecologic oncology research?

I have become extremely invested in gynecologic cancer research because it is a silent killer and I want to help change that. 70% of patients are diagnosed at a late stage and the five year survival rate is less than 20%. There are no effective early-detection methods and the current therapies are sub-optimal. We must change these statistics. This disease affects all women. I have a daughter and three sisters, and they fuel my passion to find a cure.

How long have you been at OCRC?

This is my tenth year at the OCRC, I arrived when it opened in 2006. Penn is one of the best Universities in the world, and I was recruited here to be on a team with the best gynecologic oncologists and researchers.

Who have been your most influential mentors in your career so far?

When I was in Italy, my mentors were Vincenzo Bronte and Nicola Monica. We started to work in the field of immunotherapy for cancer. I moved to the United States 11 years ago, and since then two of the most influential mentors in my career have been Drs. George Coukos and Mark Morgan. Dr. Ronny Drapkin, in the short time that he has been the Director of OCRC, has been an incredible mentor, especially in how he helps foster a collaborative environment.

What is your proudest moment or greatest achievement so far in your career?

I am incredibly proud to be a leader on the novel concept of utilizing the mitochondria to target the tumor with immunotherapy. I am also proud of my first paper that was published in 2002, where I demonstrated for the first time that we can use a virus as a vector for immunization.

What is your hope for the future of Gynecologic Oncology research?

First of all, I am an optimist. I believe that immunotherapy is going to make a big difference in the fight against gynecologic cancers. Immunotherapy has already made a huge difference in other disease areas and our capability to treat cancer continues to grow as we learn more about how to use the immune

system to fight cancer. Over the next 5-10 years we are going to take significant steps in the treatment of gynecologic cancers. Equally important, early detection remains critical and the capability to identify these tumors before they grow and metastasize is key. 95% of women who are diagnosed with ovarian cancer in stage 1 are still alive in 5 years. Our research in early detection and immunotherapy is critical to the future of gynecologic oncology.

When you are not in your lab, what are your hobbies?
I like to stay active, and am an avid fisherman; I also like to run and swim. My daughter, Eva, is 7 years old and she keeps me busy. I read to Eva and we go fishing together. I travel as much as I can and I love to experience new cultures.

Sandy Rollman Ovarian Cancer Foundation

In 2000, the **Sandy Rollman Ovarian Cancer Foundation** was founded in memory of Sandy Rollman by her sister, Adriana Way, and her oncology nurse, Robin Cohen. Sandy Rollman succumbed to stage 4 ovarian cancer at the age of 33, only six months after her diagnosis. The foundation's passion to give back is matched in their mission to support better treatment options and screening methods for women with ovarian cancer. As Robin Cohen says, "If the foundation's efforts help one woman going through ovarian cancer diagnosis and treatment, then something good would come out of such a devastating loss."


Penn OCRC team members at this year's Sandy Sprint event.

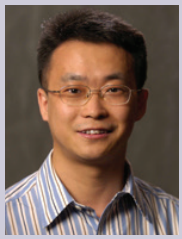
The Sandy Rollman Ovarian Cancer Foundation was initially connected to Penn through their grant application program, and since 2008 has given more than $400,000 to support Penn Medicine's Ovarian Cancer Research Center (OCRC). The Foundation's priority is to support Philadelphia-based scientists, however the foundation acknowledges that any breakthrough that results from their funding will help women everywhere, so they have expanded their support to include medical institutions and other foundations across the nation. In addition, the Foundation has a supportive, peer-to-peer program that connects newly diagnosed women with a survivor in the Philadelphia region.

Each year, the Foundation hosts the Sandy Sprint Superhero, a 5k/10k walk at the Philadelphia Museum of Art, and a Teal Gala in the fall to raise funds for research. This year's gala will be held on September 24th at Beat Street Station in Manayunk and will feature a Teal Saloon country theme complete with line dancing and a blue grass band. Last year's gala honored Daniel J. Powell, Jr., PhD, Associate Professor of Pathology and Laboratory Medicine at the OCRC, for his ground-breaking ovarian cancer immunotherapy research. On August 13th, the Foundation hosted their first Sandy Sprint 5k & Family Walk in Sea Isle, NJ. In support of Ovarian Cancer Awareness Month, the actors of General Hospital are joining together with the Sandy Rollman Ovarian Cancer Foundation on September 17th at Helium Comedy Club in Philadelphia for a fan event in which the proceeds will fund a research grant at OCRC. To purchase tickets, please visit www.ghphilly.kintera.org.

With the support of the Sandy Rollman Ovarian Cancer Foundation, OCRC scientists are able to translate novel ideas from the lab into treatment options for women with ovarian cancer. To learn more about the Sandy Rollman Ovarian Cancer Foundation, please visit www.sandyovarian.org.

NEWS

IT'S NOT JUST ABOUT PROTEINS!



Protein molecules are essential to us in a variety of different ways. Much of the fabric of our body is constructed from protein molecules, including muscle, cartilage, skin, hair, and ligaments. In addition to these large structures that hold us together, there are many other smaller proteins that keep our bodies working properly. These include hemoglobin, hormones, and antibodies. However, protein-coding genes make up only 2% of the human genome! The remaining 98% of our DNA was, until recently, considered the 'dark matter' of the genome because we did not understand what it does. However, recent studies indicate that our vast genome desert is not devoid of function. In fact, it encodes a myriad of RNA molecules that regulate a variety of biological processes.

An international team led by OCRC's Lin Zhang MD, the Harry Fields Associate Professor of Obstetrics and Gynecology, is leading the charge to understand the function of certain RNA molecules called long non-coding RNAs (lncRNAs). Dr. Zhang and his team have mined these RNA sequences carefully to identify non-protein coding segments whose expression is linked to 13 different types of cancer with a major focus on ovarian cancer. "With non-coding RNA sequences constituting almost three quarters of the human genome, there is a great need to characterize the genomic, epigenetic, and other alterations of long non-coding segments," Zhang said. The team analyzed lncRNAs in over 5,000 tumor specimens across 13 cancer types and in 935 cancer cell lines. They found that lncRNA alterations are highly tumor- and cell line-specific compared to protein-coding genes. "We believe that the results from this multidimensional analysis provide a rich resource for researchers to investigate the dysregulation of lncRNAs and to identify lncRNAs with diagnostic and therapeutic potential," Zhang said.

A ***SHOUT OUT*** to the Next Generation of Scientists!

Mentoring and educating the next generation of scientists is a major focus of the Ovarian Cancer Research Center. Success in this endeavor can be measured in many ways including fellowship awards and invitations to present at national meetings. We are pleased to share some of our trainees recent successes with you:

Alba Rodriguez-Garcia, a postdoctoral fellow in the Powell lab, is the recipient of a research grant from the Sandy Rollman Ovarian Cancer Foundation.

Anna Budina-Kolomets, a postdoctoral fellow in the Drapkin lab, was recently awarded the Penn Presbyterian Harrison Fund for Research in Obstetrics and Gynecology.

Erin George, a gynecologic oncology fellow and postdoc in the Simpkins lab, was recently awarded the Marsha Rivkin Scientific Scholar Award.

Jenessa Smith a recent graduate of the Powell lab, was a Research Grant Award Recipient at the 2nd Annual Immuno-Oncology Young Investigator's Forum.

Jessica Chacon, a postdoctoral fellow in the Powell lab, was recently awarded the Ovarian Cancer Research Foundation Ann Schreiber Mentored Investigator Award and the American Society of Immunology Trainee Abstract Award.

Congratulations to our trainees!

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Department of OBGYN
University of Pennsylvania • Biomedical Research Building
421 Curie Blvd., Rm. 1215 • Philadelphia, PA 19104

215.746.3973 • rdrapkin@mail.med.upenn.edu

Please consider becoming a philanthropic partner!
To support PENN'S Ovarian Cancer Research Center
please contact Carolyn Brown at 215-573-0550 or browncа@upenn.edu.