



**Research Round-Up: AACR Annual Meeting 2018  
Driving Innovative Cancer Science to Patient Care  
April 14-18, 2018, Chicago, Illinois**

**By Ovarian Cancer Survivors and Research Advocates  
Marcie Paul, OCRFA Advocate Leader,  
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Annie Ellis, OCRFA Scientific Advisory Committee Member**

Ovarian cancer was well represented at the 2018 AACR Annual Meeting by 3 OCRFA research advocates that participated in the 20<sup>th</sup> anniversary class of the [Scientist->Survivor Program](#) (SSP). The SSP is designed to build enduring partnerships among the leaders of the scientific and patient advocacy communities worldwide. The program provides advocates with special lectures, small group discussions, and other opportunities to exchange information on key aspects of research, survivorship, and public policy. The selected advocates are required to create a [poster session presentation](#), complete an assigned group presentation and submit a report about how the AACR experience will be utilized in each participant's future advocacy efforts.

Following are highlights of some of the prevailing themes of the 5-day Annual Meeting. As most presentations involved preclinical findings that are not yet published or actionable, this report provides only a brief overview.

### **Precision Oncology**

This was a consistent topic throughout the meeting – not only in relation to cancer biology, therapeutics and technological innovations, but also policy and regulatory issues, and healthcare disparities. While there was debate whether the actual pace of advancement is living up to the excitement, precision medicine has incited innovations and progress in genetics, sequencing, and clinical trial design, to name a few.

In a special session for SSP Jerry Lee, NCI Deputy Director, Center for Strategic Scientific Initiatives, spoke about managing the Cancer Genome Project and Cancer Moonshot Task Force. He highlighted how rapid advances have been in the last 2-3 years and are accelerating, yet also acknowledged that genomics alone is not enough to fully understand the molecular complexity of cancer. Work is moving beyond the genome to the epigenome, where all genes, including oncogenes are switched on or off, and to the proteome, the complete set of proteins a patient or cancer expresses. Epigenetics, proteomics and even metabolomics are now additional tools for precision therapeutic advancements, such as ovarian cancer researchers investigating epigenetic HDAC, BET and DNMT inhibitors.

Dr Edward Chu of the University of Pittsburgh Medical Center presented data from the NCI MATCH Trial, SHIVA Trial and other trials aimed at treatments based on the tumor's molecular profile rather than cancer site. Early results in 2015 showed highly successful genetic sequencing rates (93%), but considerably lower actionable targets and the patients matched to a treatment was lower still at 3% for one trial and 5% for another. Although sequencing technology still outpaces drug development, those first trials had 10 available drugs for genomic matching but by 2017 had 30. The rate of patients matched to a treatment went from 3% to 20%-25% in 2 years, with future improvements expected to accelerate similarly. Yet challenges remain in understanding the multiple pathways of activation and identifying the key drivers for tumor growth. Future directions include combination therapies, and due to close interactions between the genome and the immunome, next generation sequencing could help identify the patients most likely to benefit from immunotherapy.

### **Clinical Trial Design**

In a special session with Dr. Richard Pazdur, Director of the [FDA Oncology Center of Excellence](#) and another with Dr Chris Takimoto, Chief Medical Officer at Forty Seven, Inc, both the regulatory and industry perspectives on drug development were presented. They discussed how due to recognizing cancer heterogeneity clinical trial design is shifting from one size fits all to genotype matched trials. Umbrella Trials test the effect of different drugs on different mutations/molecular alterations in a single cancer type and Basket Trials test the effect of a single drug on a single mutation or molecular alteration in wide range of cancers. With an Adaptive Trial design new drugs targeting novel mutations or molecular alterations can be included as they're identified during an ongoing trial and a seamless phase trial is an adaptive trial that moves from one phase to another without stopping the accrual process. Both the FDA and the industry representative stressed that genotype matched trials offer a higher likelihood of antitumor response in early phases as well as significant benefits for rare cancers because the typical barrier of needing large disease specific cohorts isn't relevant.

### **FDA and NCI special sessions**

The FDA team also highlighted their improvements such as recognizing PFS as clinical trial endpoints and the importance of Patient Reported Outcomes. They discussed how future trials should become more available, easier to access and nearly "virtual" as electronic medical records and technology advances. To highlight how the pace of drug development has accelerated, they noted that from 2000 to 2008 eight new chemotherapies came to market. In the same amount of time since then there have been 31 new targeted therapies. To close the session a handout was distributed listing [patient engagement opportunities](#), like those below, and other information resources.

The new NCI Director, Dr Ned Sharpless also [addressed SSP participants](#) in another special session that was mostly q & a. Topics discussed included the need for survivorship research, improvements in liberalizing criteria for clinical trial eligibility and how funding totals for each cancer site don't include funds for the Division of Cancer Biology which benefits all cancers. The importance of patient engagement was also stressed, and Amy Williams, Director of the [Office of Advocacy Relations](#), was introduced.

### **Liquid Biopsies**

Peter Kuhn, PhD, from the USC Michelson Center for Convergent Bioscience presented his work developing the Liquid Biopsy. By utilizing a simple blood draw or bone marrow biopsy for obtaining bio-specimens, this innovation is a non-invasive alternative to surgical biopsies. Yet more significantly, the

sequencing of circulating tumor cells (CTC), ctDNA, ctRNA and exosomes in the blood is more comprehensive than using tissue samples. It can improve disease stratification, treatment monitoring and even early detection because by the time a tumor can be viewed in a scan, the blood contains over 1 billion CTC's and other tumor cell derivatives. Furthermore, understanding CTC's can provide insight into metastasis. For all these reasons, the liquid biopsy is generating significant buzz for its potential breakthroughs in both diagnostics and therapeutics.

## **Ovarian Cancer**

There were several presentations on ovarian cancer over the course of the meeting.

- During the Opening Plenary session, Dr. George Coukos of the Ludwig Center for Cancer Research in Lausanne, Switzerland, presented “Mobilizing immunity against ovarian cancer.” Systems immunology is needed to understand the complex biology of ovarian cancer and his team is working on a personalized vaccine.
- An entire session was devoted to an overview of Ovarian Cancer Metastasis and included:
  - Dr. Dineo Khabele of the University of Kansas Medical Center discussed the role of tumor associated macrophages (TAMs) and a study of a BET inhibitor combined with a PARP inhibitor to target TAMs.
  - Dr. Ahmed Ahmed of the University of Oxford in the UK presented “New tools to study ovarian cancer micrometastasis”
  - Dr. Anil Sood of MD Anderson spoke about “Targeting the tumor microenvironment” and the innovative methods to target underlying processes that drive metastasis. He also spoke about analyzing metabolites (small molecule metabolic products) as molecular biomarkers of residual disease.
- During a plenary session highlighting new technologies, Dr. Samuel Achilefu of Washington University in St. Louis, Missouri discussed real-time augmented reality for surgery including folate receptor-targeted image guided surgery. These innovations may help surgeons obtain clean margins and identify lymph nodes with disease.
- Dr. Kunle Odunsi of Roswell Park Cancer Center in Buffalo, New York’s Meet the Professor session focused on “Reprogramming the tumor microenvironment to enhance Next-Generation adaptive cellular therapy” to overcome immunotherapy resistance mechanisms.
- Dr. Elizabeth M. Swisher from the University of Washington in Seattle, presented “Predicting PARP Inhibitor Resistance,” work supported by the SU2C-Ovarian Cancer Research Fund Alliance-National Ovarian Cancer Coalition Ovarian Cancer Dream Team.
- Dr. Dong-Joo Cheon of Albany Medical College gave the Gertrude B. Elion Cancer Research Award Lecture on upregulation of mitochondrial fatty acid beta-oxidation (FAO) interaction with collagen type XI alpha1 (COL11A1) in platinum resistant ovarian cancer.

## **Big Data in Cancer and Convergence**

Genomic sequencing data sets, clinical data from electronic medical records and personal data from digital devices are just part of the creation of a “data tsunami.” Collaboration across institutions is needed to turn the massive amount of data into usable information and, ultimately, knowledge to bring effective precision medicine to patients. To date, only 1-2% of big data in oncology has been analyzed and meaningful analysis will require more than oncology cross-collaboration. “Convergence” was the buzz word at this year’s annual meeting. Convergence teams include mathematicians, physical scientists and artificial intelligence experts to work together with oncology experts from all disciplines on large-

scale analytics. It is important to note that patient advocates need to be included to help determine relevant questions and address security and privacy issues. Two articles that describe this issue are Big Data: [Sharing Information to Improve Patient Care](#), and [Big Data and the Big C](#).

### **Survivorship**

During a special panel on The Cancer Survivorship Landscape: Potential Focus Areas for the Future in memory of Jimmie C. Holland MD, several cancer survivors and leaders in the survivorship field discussed the special needs of the growing numbers of cancer survivors. It was noted that the population of cancer survivors was expected to grow to 20 million by 2026. Dr. Julie K. Silver of the Spaulding-Framingham Rehabilitation Center in Massachusetts discussed the use of prehabilitation to avoid preventable suffering. Prehabilitation is the use of rehabilitation services and physical therapy to help make patients stronger before receiving treatment.

Other experts in the field of cancer survivorship called on increased medical research to study the long-term effects of cancer treatments on survivors. Although medical treatments are extending patient's lives, Shelley Fuld Nasso, CEO of the National Coalition for Cancer Survivorship in Washington, D.C. noted, gaps persist in delivering supportive models of care to meet the needs of cancer survivors.

All panelists agreed more work needs to be done to ensure cancer survivorship care plans are implemented to help survivors transition from their oncologist to their primary care practitioner with ease and limited anxiety.

### **For more information**

Cancer Today: AACR's magazine for survivors, caregivers and advocates:

<https://www.cancertodaymag.org/>

To see a list of all speakers and presentations in the AACR 2018 Program Guide:

[http://www.aacr.org/Documents/canprog18\\_All.pdf](http://www.aacr.org/Documents/canprog18_All.pdf)

For information about research advocacy and to get involved, please see:

<https://ocrfa.org/advocacy/research-advocacy/>

For information about patient engagement at the NCI and FDA:

<https://www.cancer.gov/about-nci/organization/oar>

<https://www.fda.gov/ForPatients/PatientEngagement/default.htm>

For more information about finding a clinical trial: <https://ocrfa.org/patients/clinical-trials/look-clinical-trial/>



# Germ Cell Ovarian Cancer

Rebecca Esparza, MBA

Stage IV Germ Cell Ovarian Cancer Survivor and Patient Advocate



## Introduction

In 2018, over 22,000 women will be diagnosed with ovarian cancer in the United States. More than 14,000 will die from the disease and it is the 5<sup>th</sup> cause of cancer-related death in women. 4 out of 5 ovarian cancer patients are diagnosed once the disease has spread, making it much harder to treat and cure.

A major research priority is finding a way to diagnose ovarian cancer in the early stages, where the survival rate can reach 90%. There is no detection tool to diagnose ovarian cancer.<sup>1</sup>

## What is Ovarian Cancer?

Ovarian cancer is a growth of abnormal malignant cells that begins in the ovaries (women's reproductive glands that produce eggs), fallopian tubes (and then migrates to the ovaries), or the peritoneum.

Ovarian tumors can be benign (noncancerous) or malignant (cancerous). Malignant cancer cells in the ovaries can metastasize in 2 ways:  
1. directly to other organs in the pelvis and abdomen (the more common way)  
2. through the bloodstream or lymph nodes to other parts of the body<sup>2</sup>

## Germ Cell Ovarian

Germ Cell Ovarian tumors are rare and account for less than 5% of all diagnosed cases of ovarian cancer. It is akin to testicular cancer in men and usually treated with the same chemotherapy.

Germ cell tumors begin in the reproductive cells of the body. Ovarian Germ Cell tumors usually occur in teenage girls or young women, but have transpired in women of all ages, from 6 months to 86 years.<sup>3</sup>

## Ovarian Cancer Symptoms

A pap smear does not detect ovarian cancer. There is no early detection tool for ovarian cancer, so until there is a test, awareness is best. There are signs and symptoms, including:

- Bloating
- Pelvic or abdominal pain
- Difficulty eating or feeling full quickly
- Urinary symptoms (urgency or frequency)

Women are advised to see a doctor, preferably a gynecologist, if these symptoms persist more than 12 times during the course of one month and the symptoms are new or unusual.<sup>2</sup>

## Germ Cell Research

Due to the rarity of germ cell ovarian cancer, research has been limited. In recent years, major cancer institutions have begun studying germ cell tumors. There is a major study of rare cancers, which includes Germ Cell Ovarian, at Memorial Sloan Kettering Cancer Center in New York City. Led by Dr. David Solit, the Make-an-IMPACT initiative provides individuals with rare cancers the chance to receive genomic testing at no cost to the patient.<sup>4</sup>



Figure 1. Dr. David Solit, Memorial Sloan Kettering Cancer Center

The primary purpose of the Make-an-IMPACT initiative is to understand why these rare cancers occur and to accelerate the development of new therapies for these diseases. Currently, the Make-an-IMPACT initiative is recruiting patients with Germ Cell Ovarian Cancer.

## Patient Advocacy

For many cancer patients, participating in cancer advocacy projects gives them a sense of empowerment over their disease. There are a myriad of organizations where cancer survivors can help fellow survivors and be a powerful voice for anyone whose life has been touched by cancer, such as the Ovarian Cancer Research Fund Alliance and the American Association for Cancer Research, among others.



Figure 2. Patient advocate works the Soil Lab at Memorial Sloan Kettering Cancer Center

## References

1. Cancer Facts and Figures 2018, American Cancer Society
2. Ovarian Cancer Research Fund Alliance (OCRFA)
3. National Cancer Institute (NCI)
4. Dr. David Solit, Memorial Sloan Kettering Cancer Center
5. Photos of Cancer Survivors Courtesy Facebook Germ Cell Ovarian Support Group.

## Germ Cell Ovarian Cancer Survivors From Around the World!



# Ovarian Cancer Research Fund Alliance

## Advocate Leaders: Advocate Driven Action

Marcie Paul, Scientist Survivor Program

### ADVOCATES

are the collective voice for families impacted by cancer and the researchers searching for cures on Capitol Hill, in statehouses nationwide, and within federal agencies. When organized advocacy networks work with coalition partners and the scientific community, their message is amplified and more effective. These collaborations provide the best opportunity to secure federal research funding and foster an inclusive public policy agenda that puts the patient first.



### OVARIAN CANCER RESEARCH FUND ALLIANCE

OCRFA is the largest global organization dedicated to fighting ovarian cancer and the largest non-government funder of ovarian cancer research in the U.S. The mission is to promote, advocate for and support scientific research as it relates to the causes, prevention, diagnosis, treatment, and cure for ovarian cancer; to provide education about ovarian cancer; to promote, advocate for and provide supportive services to persons affected by ovarian cancer; and to foster alliances to further those purposes. OCRFA works to secure federal resources to support ovarian cancer research and education - more than \$2 billion since 1998 - and for policies that help women receive high quality, affordable care.



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DoD OCRP Consumer Reviewer  
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Karmans Cancer Institute  
Michigan Cancer Consortium

### ADVOCATE LEADERS

play a critical role in helping to secure nearly \$170 million in federal funding annually for ovarian cancer research and education. Since 2012, the program has engaged survivors and caregivers from across the nation and trained them to advocate on behalf of the ovarian cancer community.

#### A Nationwide Grassroots Network

- The Advocate Leaders:**
- Meet with members of Congress twice a year
  - Develop relationships with legislators and policymakers on the state and federal levels
  - Advocate for action on relevant issues
  - Work in coalition with other organizations and the scientific community
  - Raise awareness through traditional and social media
  - Build and mobilize local networks of activists

75 Advocate Leaders have represented 35 states since 2012



### CONTEXT

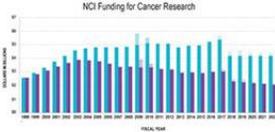
Although the incidence of ovarian cancer is low, the mortality is high. This relative rarity adds to the formidable challenge of influencing public health policy and generating research funds. In response, the Advocate Leaders function as a nationwide force of skilled advocates organized for maximized impact.

**#1** cause of gynecologic cancer deaths **5<sup>th</sup>** cause of death from cancer in women **2.3%** of all cancers in women<sup>1</sup>

The overall survival rate for ovarian cancer has barely improved in the last 40 years

### FEDERAL FUNDING CHALLENGES

From FY 2003 to 2015, the NIH lost over 20% of its funding for research due to budget cuts, sequestration, and inflation.<sup>2</sup> Recent budget increases of \$2 billion in both FY 2016 and FY 2017 are steps in the right direction.



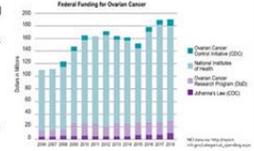
Funding for ovarian cancer research has been similarly impacted. Furthermore, a recent report from the 2018 Society of Gynecologic Oncology meeting confirmed that on a funding-to-lethality score, **gynecologic cancers are disproportionately underfunded compared to most other types of cancer.**<sup>3</sup>

1. NCI. (2018). Cancer Facts and Figures. Bethesda, MD: National Cancer Institute. <https://www.seer.cancer.gov/cancer/factsheets/>  
2. NIH. (2016). Budget Request for Fiscal Year 2017. Washington, DC: Department of Health and Human Services. <https://www.hhs.gov/budget/2017/>  
3. Society of Gynecologic Oncology. (2018). Gynecologic Cancer Research Funding Report. <https://www.sgo.org/2018/08/22/gynecologic-cancer-research-funding-report/>

### ADVOCATE IMPACT

is reflected in funding increases for ovarian cancer research and education, as well as other initiatives including:

- Generated a FY2019 Congressional appropriations request for NCI report on gynecologic clinical trials
- Established the Ovarian Cancer Caucus in 2015
- Initiate an annual Congressional resolution for Ovarian Cancer Awareness Month since 1999
- Lead Johanna's Law recertification efforts



#### Coalition efforts:

- Defeated several legislative attempts to eliminate many of the Department of Defense medical research programs
- Advocate for oral chemotherapy parity legislation on the federal and state levels - with laws successfully enacted in 43 states
- Defend the Affordable Care Act and patient protections such as no discrimination for preexisting condition and improved networks
- Advocate for Medicaid expansion and improved access to care
- Assert patient protections including regulation of laboratory tests, access to genetic sequencing, and genetic non-discrimination

Compelling patient voices can drive legislative action

### EXCEPTIONAL IMPACT

#### JOHANNA'S LAW THE GYNECOLOGIC CANCER EDUCATION AND AWARENESS ACT

There is no screening method for ovarian cancer, therefore 80% of patients are diagnosed in late stages<sup>4</sup>

In 2002 a determined advocate from Michigan, Sheryl Silver, who lost her sister to stage 4 ovarian cancer originated this legislation. Her intention was help give others a better chance at an earlier diagnosis. She activated survivors, family members, health care professionals, OCRFA and other patient advocacy organizations to ensure it passed in both chambers of Congress by unanimous consent.

Enacted in 2007 in memory of Johanna Silver Gordon, *The Gynecologic Cancer Education and Awareness Act, or Johanna's Law*, authorizes the CDC to implement public awareness initiatives, such as the *Inside Knowledge Campaign*. The multiyear, multimedia campaign is designed to improve early detection and save lives by educating women and health care providers about the symptoms of the 5 main gynecologic cancers. By 2016, this nationwide effort generated over 6.5 billion audience impressions.<sup>5</sup>

4. American Cancer Society. (2018). Ovarian Cancer Facts and Figures. <https://www.cancer.org/cancer/ovarian-cancer/about-ovarian-cancer/ovarian-cancer-facts-and-figures.html>  
5. Inside Knowledge Campaign. (2016). Inside Knowledge Campaign Report. <https://www.insideknowledge.org/inside-knowledge-campaign-report/>