AACR Annual Meeting 2015

18–22 April 2015
Pennsylvania Convention Center
Philadelphia, PA
Attendees: >18,000

The American Association for Cancer Research (AACR) Annual Meeting 2015 convened investigators from all over the world to highlight recent progress in cancer research. The meeting's program committee chose a theme that acknowledges the vital link between investigation and treatment: "Bringing Cancer Discoveries to Patients." Precision medicine is poised to be a key strategy in achieving that objective. In this emerging approach to disease prevention and treatment, therapeutic choices are tailored to an individual's specific characteristics such as genotype and other molecular and cellular profiles. Precision oncology is rooted in the fact that cancer is not a single disease, but rather a group of more than 200 different diseases. Characterizing the various subtypes of cancer at the molecular and biochemical levels is essential to the success of precision medicine in cancer treatment. Diagnostic screening, including molecular profiling and imaging, is used to describe an individual's specific disease and to classify patients into subpopulations according to their disease susceptibility, biology, prognosis or outcome. Physicians can use this information to guide selection of the medical interventions most likely to deliver the desired results for each individual. This approach has been successful for certain types of cancer, and many oncology researchers are working to extend its use.

Several sessions at the AACR Annual Meeting 2015 had a keen emphasis on precision medicine, including a plenary session on Monday, 20 April, titled "Precision Medicine Comes to Cancer Prevention and Screening" and chaired by Andrew Dannenberg (Weill Medical College of Cornell University, New York, NY). David Ahlquist (Mayo Clinic, Rochester, MN) discussed the use of multitarget testing of stool DNA as a screening tool for colorectal cancer. Its high sensitivity and specificity, non-invasive nature and high incidence of patient compliance contribute to its potential to improve screening outcomes in certain patient populations. Andrew Chan (Massachusetts General Hospital, Boston) explained his ongoing efforts to understand the chemopreventive properties of aspirin and to pinpoint the molecular endpoints and pathways that distinguish those patients most likely to respond to aspirin therapy. Anna Mae Diehl (Duke University School of Medicine, Durham, NC) spoke about the carcinogenic potential of liver injury (cirrhosis) and the molecular events that accompany cirrhotic oncogenesis. Douglas Lowy (recently named Acting Director, National Cancer Institute, Bethesda, MD) reviewed the potential of primary (vaccine) and secondary (screening) prevention measures to reduce the incidence and mortality of cancers related to the human papillomavirus. Human applications of precision medicine were also discussed in the minisymposium "Precision Medicine in the Clinic" chaired by Pasi Jänne (Dana-Farber Cancer Institute, Boston, MA) and David Solit (Memorial Sloan Kettering Cancer Center, New York, NY) on Tuesday, 21 April. Presenters reported on the use of genetic sequencing to classify various tumor types in patient populations and on new profiling techniques including chemical biology fingerprinting and three-dimensional tumor spheroid modeling.

Despite these and other advances in precision oncology, successful treatment is still limited for many cancer subtypes. Animal research can yield valuable information that might help close these gaps. Models that recapitulate the complexity of human cancer, such as patient-derived xenografts and genetically engineered mice, are particularly valuable, especially if their accuracy and reproducibility can be improved. An educational session on Saturday, April 18, titled "Translating Insights from Mouse Cancer Models to Therapeutic Targeting" and chaired by Terry Van Dyke (Frederick National Lab, MD) addressed the challenge of improving preclinical research models to better predict therapeutic efficacy in the clinical context. "Mouse Models of Human Cancer" also filled a minisymposium on Monday, April 20, chaired by Anton Berns (Netherlands Cancer Institute, Amsterdam) and Lewis Chodosh (University of Pennsylvania, Philadelphia). Speakers described mouse models of colorectal cancer, medulloblastoma, myeloid leukemia, HER2/neu and triple-negative breast cancers and malignant pleural mesothelioma.

Precision medicine involves vast amounts of clinical data and sophisticated analysis. Obtaining and processing these data require large sums of money and numbers of participants. In January 2015, US President Barack Obama allocated $215 million to a Precision Medicine Initiative. In early June 2015 at a meeting of the American Society of Clinical Oncology in Chicago, IL, representatives of the US National Cancer Institute announced the launch of three large trials to test the ability of precision medicine to improve cancer diagnosis and treatment. The largest will enroll as many as 3,000 people and is expected to cost $30–40 million.