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## PERSONALIZING THE APPROACH TO CANCER TREATMENT **DAVID SIDRANSKY, MD**

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### **How You Are Your Own Best Champion**

All cancer diagnoses are daunting, but every patient is unique. While cancer drugs and treatment regimens are generally prescribed based upon large swaths of the patient population, the key issue in oncology today is determining how to personalize or individualize treatment. After hearing the words “you’ve got cancer,” most patients are given a drug or combination of agents according to guidelines or standards of care. These treatments, in the oncologist’s best judgment, are considered most likely to work based on the results of clinical studies in patients with similar tumor types.

However, cancer patients often require several courses of drugs and regimens before doctors can identify the optimal therapy. In the meantime, precious time is lost; patients may suffer unpleasant side effects while tumors may continue to grow and mutate. Eventually tumors can become resistant to therapies, further reducing the future effectiveness of other anti-cancer agents. Current cancer drugs are also increasingly expensive; when patients undergo several essentially ineffective courses of therapy, costs mount unnecessarily.

Given the toxicity and side effects of certain treatments, and that only a fraction of patients may benefit from these drugs, an informed patient is his or her own best champion. In the performing arts, the saying goes that the best actors are the best listeners. In medicine, too, listening is one of the most important skills a physician can develop. Working with patients over the years—hearing them air their questions, concerns, and fears—has enabled me to identify five important steps any recently diagnosed cancer patient should take:

#### **Step 1: Establish an Advocate**

A patient advocate, who acts as a witness and recorder of events, helps the patient to recall information whenever necessary, and to identify areas where more information or clarification is needed.

#### **Step 2: Keep Good Records**

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Many patients feel overwhelmed upon first hearing their diagnosis. Maintain thorough notes and records from your first diagnosis forward. It is difficult to remember everything one hears in a doctor's office, much less to process and understand it all.

### **Step 3: Ask Questions**

Patients should ask questions in terms of their specific diagnosis or situation and ask about alternate options. Questions should be written down ahead of time, as they might be forgotten upon meeting with the physician. In fact, patients should keep a running list of any questions they might have. Patients should prioritize this list starting with the most important questions to ask in case time with the physician is limited. Patients should also ask to consult with other physicians and gather as many opinions as they feel necessary. Some basic questions you will want your doctors to answer include:

- \* What are the cell type, grade, and stage of my cancer? What does that mean in my case?
- \* What treatment options are there? What do you recommend for me? Why?
- \* What is the goal of this treatment?
- \* Based on my cancer as you see it, what are my chances of survival? How long would you expect me to survive?
- \* What are the risks or side effects that I should expect? What can be done to mitigate these?
- \* What are the chances my cancer will return with the treatment we have discussed and what would be the next step?
- \* What should I do to ready myself for treatment? Should I follow a special diet? A special exercise regimen?
- \* How much will this treatment cost me out of pocket?
- \* Are there clinical trials available for my cancer?
- \* What cutting edge therapies are available?
- \* What complementary and alternative treatments would be potentially beneficial for me?

### **Step 4: Stay Informed and Empowered**

Newly diagnosed cancer patients must remember that they are the decision maker, not the physician. There are things a doctor may not know. For example, the information required may not be readily available to him or may not fall within the treating physician's specialty or field of expertise. There are many treatment options to evaluate, and advances in multiple disciplines that patients and physicians will want to consider.

### **Step 5: Avoid "Analysis Paralysis"**

In other words, try not to grow overwhelmed with the myriad details of options or recommendations. Establish and agree upon set goals with your doctors. Discuss risks and benefits with your treating physicians and those close to you. Becoming an informed

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patient and an empowered self-advocate is an important step for newly diagnosed patients. Patients should understand that there might be differences of opinions and conflicting information. Look to trusted physicians and advisors to guide you toward making the best decisions for treating your specific disease. However, as soon as possible, pick the physician who will supervise and manage all of your care –“the quarterback.”

### **The Future of Personalized Oncology**

Fortunately, the future of personalized oncology medicine looks brighter every day. The rapidly developing field of genomics -- the study of genes and their function -- has expanded the playing field in cancer as well as in a number of other medical conditions. Significant development of the practice of personalized oncology is a direct outgrowth of the Human Genome Project, a thirteen-year project completed in 2003 that resulted in the precision mapping of human genetic information and deepened our understanding of how cancer grows.

The project and other medical advancements have provided doctors with knowledge about genetics and mutations, helping them specifically target therapies in a direct way. Doctors can use genetic information -- obtained from the tumor itself -- to help determine what chemotherapeutic agents will and won't work in a specific individual. As these cancer treatments become more targeted, cancer patients will benefit from them in terms of outcome, costs, and quality of life.

Capitalizing upon this research, the promise exists that oncologists will be able to develop processes that enable us to better evaluate the effectiveness of anti-cancer agents before they are administered to patients. One such process involves the implantation of primary human tumors in immune deficient mice followed by growth and propagation of the resulting engraftments (“Tumorgrafts”), closely preserving the biological characteristics of the original human tumor. Treatment drugs are then administered to evaluate the Tumorgraft's sensitivity or resistance to each drug.

Putting this model into practice, recently I worked with a lung cancer patient who arranged to have his tumor implanted into a mouse that was then propagated for specialized drug testing using this platform. A large number of different anticancer agents were tested against the patient's specific tumor in the Tumorgrafts. Testing with a triple regimen of Irinotecan, sorafenib, and bevacizumab resulted in substantial tumor growth inhibition. The tumors growing in the mice responded well to this combination of anticancer drugs. Considering the Tumorgraft results, the patient's physician chose to administer this triple therapy to the patient. The patient's response was similarly positive, with a long tumor remission that demonstrated the predictive nature of this treatment approach.

This predictive model, which enables us to discover genetic markers in tumors and correlate these markers with treatment response, will help in new drug development and may also enable the development of personalized vaccines directly from the patient's

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tumor. Ongoing studies in these models could bring the oncology community one giant step closer to its ultimate goal: enabling us to isolate the right treatment, for the right patient, at the right time.

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**Dr. David Sidransky** cofounded and serves as Chairman of the Board of Directors of [Champions Biotechnology](#), a company engaged in the development of advanced preclinical platforms and tumor specific data to provide personalized oncology services and to enhance the value of oncology drugs. Dr. Sidransky is a renowned oncologist and research scientist named and profiled by *TIME* magazine in 2001 as one of the top physicians and scientists in America, recognized for his work with early detection of cancer. Since 1994, Dr. Sidransky has been the Director of the Head and Neck Cancer Research Division at Johns Hopkins University School of Medicine and Professor of Oncology, Otolaryngology, Cellular & Molecular Medicine, Urology, Genetics, and Pathology at John Hopkins University and Hospital. Dr. Sidransky is one of the most highly cited researchers in clinical and medical journals in the world, in the field of oncology during the past decade, with over three hundred peer-reviewed publications. He has contributed more than forty cancer reviews and chapters. Dr. Sidransky is a founder of a number of biotechnology companies and holds numerous biotechnology patents. He has served as Vice Chairman of the Board of Directors, and prior to its acquisition by Eli Lilly, Inc. was a director of ImClone Systems, Inc., a global biopharmaceutical company committed to advancing oncology care. He is the Chairman of Alfacell Corporation and has served on the Board of Directors of Xenomics. He is serving and has served on scientific advisory boards of MedImmune, Roche, Amgen and Veridex, LLC (a Johnson & Johnson diagnostic company), among others. Dr. Sidransky serves as Director (2005-2008) of American Association for Cancer Research (AACR). He was the chairperson of AACR International Conferences (2006 and 2007) on Molecular Diagnostics in Cancer Therapeutic Development: Maximizing Opportunities for Personalized Treatment. Dr. Sidransky is the recipient of a number of awards and honors, including the 1997 Sarstedt International Prize from the German Society of Clinical Chemistry, the 1998 Alton Ochsner Award Relating Smoking and Health by the American College of Chest Physicians and the 2004 Hinda and Richard Rosenthal Award from the American Association of Cancer Research. Dr. Sidransky received a B.A. from Brandeis University and M.D. from the Baylor College of Medicine.