Everolimus Approved for HR-Positive Breast Cancer

For women with hormone receptor (HR)-positive breast cancer, the go-to therapy for the last decade has been endocrine therapy. However, increasing numbers of women are developing resistance to hormone therapy. Among potential mechanisms for this resistance is overactivation of the mTOR pathway, which regulates cell growth, proliferation, motility, and survival, and is overactive in many forms of cancer.

In July, the U.S. Food and Drug Administration approved the mTOR inhibitor everolimus (Afinitor; Novartis) for the treatment of postmenopausal women with advanced HR-positive, HER2-negative breast cancer in combination with exemestane, after failure of treatment with letrozole or anastrozole.

The decision followed the phase III BOLERO-2 trial, reported in December 2011 and involving 724 postmenopausal women with advanced HR-positive breast cancer. The trial indicated that treatment with everolimus and exemestane extended median progression-free survival to 7.8 months, compared with 3.2 months for exemestane alone.

“This was the first large randomized study suggesting that we may be able to overcome endocrine therapy resistance,” says Ben Ho Park, MD, PhD, associate professor of oncology at the Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, who was not involved in the study.

Without a way to test for mTOR pathway activation, as clinicians do for HER2-positive breast cancer to guide treatment, “we need to be clinically astute,” comments Andrew Seidman, MD, a medical oncologist at Memorial Sloan-Kettering Cancer Center, who also was not involved in the study. “The patients prescribed this drug combination should resemble those in the trial.”

“The long-term challenge is to figure out how to predict who will respond to this combination versus another,” says Park.

Everolimus also has been approved for treating renal cell carcinomas, but it is a first-generation mTOR inhibitor. “It’s not 100% specific to the target and has off-target effects,” says Park. “The toxicity profile is not insignificant.” For patients, agrees Seidman, this drug combination is “often a transition into a world of more toxicity.”

Second-generation mTOR inhibitors now in development may improve efficacy and decrease toxicity. “I don’t think anyone thinks that this is the definitive drug that’s going to overcome all hormone therapeutic-resistant cancers, but it is a step in the right direction,” says Park.

University of Kansas Earns NCI Center Designation

The University of Kansas Cancer Center (KUCC) in Kansas City was named a National Cancer Institute (NCI)–designated cancer center in July, a distinction currently held by just 67 institutions in the United States that exhibit scientific excellence and integrate diverse approaches to cancer research.

Cancer patients in the region now will have access to treatments and clinical trials only available at NCI-designated centers. In addition, KUCC will receive about $7 million from the NCI over the next 5 years, will be able to apply for other federal grants set aside for NCI-designated centers, and can make a stronger case for attracting additional research dollars from private organizations. Private money will be used to fund pilot research projects, purchase advanced technology, and recruit top-notch investigators.

To bolster its application to the NCI, KUCC renovated 170,000 square feet of existing space for basic science research and, separately, 82,000 square feet of space in a building donated for clinical research.

The designation “can have a game-changing effect on the institution,” says KUCC Director Roy Jensen, MD, adding that civic and political leaders embraced the idea of applying for the NCI designation. “It was an opportunity to ‘do good’ and enhance the local economy.”

Hundreds of millions of dollars in philanthropic gifts and money from state and local coffers—including more than $107 million from private...
Researchers at the University of Kansas Cancer Center, including MD-PhD student Anand Venugopal, have uncovered a possible link between the protein RBM3 and stem cell–like characteristics in several types of solid tumors, including colorectal cancer.

**Studying Cost, Efficacy of Cancer Care**

By 2020, annual spending on cancer care is expected to exceed $158 billion in the United States. With an aging population and therapy regimens that often top $100,000 a year per patient, costs are rising at an unsustainable rate, says Scott Ramsey, MD, PhD, a member of the Public Health Sciences Division at the Fred Hutchinson Cancer Research Center in Seattle.

Ramsey, a physician and health economist, has been named director of Fred Hutchinson’s Institute for Cancer Outcomes Research and Evaluation (ICORE), set to officially launch in early 2013. “Our mission is to improve the quality of cancer care and to reduce the cost for patients and the healthcare system,” he says.

The price of cancer drugs, particularly in newer combination regimens, has reached a crisis level, says Ramsey, one example being that “cancer patients have bankruptcy rates 3 to 8 times as high as people in the general population.” He notes that as prices rise, costs will be transferred to patients in the form of higher co-pays.

“We want drug companies to recoup their expenses and make a profit, but it’s society as a whole that will ultimately decide whether it’s worth spending $100,000 to $200,000 to gain an extra month of life,” Ramsey points out.

Overall, ICORE will study outcomes, cost-effectiveness of prevention and early detection and treatment, pragmatic clinical trial design, and health policy.

One important effort will be to examine ways to reduce the use of diagnostics and treatments that appear to offer little to no survival benefit, but are being prescribed widely off-label or against clinical practice guidelines.

Another primary focus of the new Institute will be to reduce disparities in cancer care that are based on socioeconomic or geographical barriers. “In study after study, we find patients with very similar clinical problems who are either not getting the care they need or are receiving care that isn’t shown to be beneficial,” says Ramsey.

The Institute’s efforts will build on collecting and analyzing large volumes of data that are typically in silos, such as cancer registries, electronic medical records, and insurance claims.

“Cancer treatment has traditionally relied on information from clinical trials, but only 3% to 5% of all cancer patients enroll in clinical trials,” notes Ramsey. “The other 95% receive standard care in their communities. Our goal is to try to collect that extra information, link all these databases so that we can get a better picture of cancer patients’ experiences, and make that information available to other researchers.”

**CellMiner Integrates NCI-60 Genomic, Pharmacologic Data**

The cancer field is awash in data capturing the molecular activity of cancer cells and their responses to anticancer compounds. But the resulting databases have become so large and complex that their information may be virtually inaccessible to many researchers trying to understand cancer and develop better treatments.

“There’s been a big barrier between the people who need this information and those trained in bioinformatics who are able to access it,” says William C. Reinhold, a pharmacology researcher at the National Cancer Institute’s (NCI) Center for Cancer Research. “We created a toolkit called CellMiner to help bridge that barrier and make this information readily accessible to any researcher.”

CellMiner, freely available at http://discover.nci.nih.gov/cellminer, integrates tools for analyzing drug activity, gene expression, and microRNA expression in the NCI-60, widely used cancer cell lines developed by the NCI for testing drug candidates.

The suite of Web tools features a pattern comparison tool that identifies statistically significant correlations between gene expression and drug activity profiles, or other patterns of interest, and that also allows input from individual experiments. “This used to be a long, cumbersome process,” says Reinhold, who is first author on a Cancer Research paper describing CellMiner (Cancer Res 2012;72:3499–511). “Now it happens automatically. All you need to know is what you want to compare.”

One prime application will be comparing drugs and genetic targets to identify compounds that could be effective against different forms of cancer. In an example cited in the paper, the researchers looked at colon cancer patterns and found a new compound that potentially may show greater anticancer activity than 3 compounds in clinical trials.

CellMiner currently includes data from 22,379 genes and 360 microRNAs catalogued in the NCI-60 and from 20,503 previously analyzed chemical