100%. Additionally, the pharmacokinetics of the nanoparticle-encapsulated drug were similar in mice, rats, and monkeys, a good sign that the drug will behave the same way in humans.

At the core of the drug is a polymer sphere loaded with docetaxel. Jutting from the surface is a coating of polyethylene glycol molecules, which serves 2 purposes. The polymer coating helps the drug circulate in the bloodstream. Also, at the tips of some of these polyethylene glycol molecules are ligands that bind tightly and specifically to PSMA, which is found on prostate tumor cells and on their vasculature.

BIND Biosciences combinatorially creates large libraries of nanoparticle-encapsulated drugs, each with slightly different properties. Researchers then test the resulting designs in rodents, and iteratively redesign the ones that perform the best, until a drug with good performance emerges.

With BIND-014's basic nanoparticle-encapsulated delivery structure in place, the company expects to develop targeted therapies for other diseases in fewer steps, by plugging in different drugs and cell-targeting molecules.

The potential benefits of nanomedicine "are vast but the complexity of the system can be vast, too," says Sara Hook, PhD, a projects manager in the National Cancer Institute's office of Cancer Nanotechnology Research. There are many parameters to tune—for example, how hydrophobic, rigid, big, or small the particle is; how it's attached to the drug; and how it will bind to target cells. It's also difficult to predict how changing each of these properties will affect a nanoparticle drug's behavior in the body.

The positive early results with BIND-014 demonstrate the promise of BIND Bioscience's approach in addressing these challenges, Hook says. ■

## BEAUTY Combines Sequencing, Avatars

Researchers at the Mayo Clinic Cancer Center in Rochester, MN, have launched a clinical study that pairs whole-genome sequencing with mouse "avatars" in an effort to bring clinical care closer to individualized treatment.

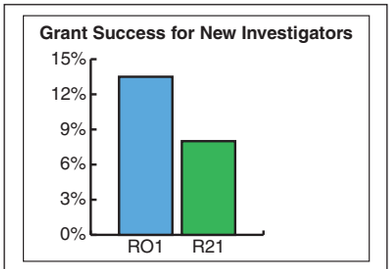
The Breast Cancer Genome Guided Therapy (BEAUTY) study involves 200 women with nonmetastatic breast cancer receiving chemotherapy prior to surgery. Before starting chemotherapy, investigators will sequence both cancerous and healthy cells to identify tumor-specific changes for each patient. For patients with disease that is resistant to standard chemotherapy, tumor cells will also be sequenced to determine which mutations helped them survive.

Study co-leaders, Judy Boughey, MD, a breast surgeon, and Matthew Goetz, MD, an oncologist, expect to find known mutations for which drugs already exist as well as targets for new drugs.

In parallel, the investigators will implant tumor samples taken before and after chemotherapy into 2 immunosuppressed mice, creating individualized mouse avatars, or stand-ins, that represent each patient. The avatars immortalize the tumors in live animals to factor in complexities such as the role of the microenvironment in the progression and metastatic potential of a cancer cell.

For a patient with recurring disease, the researchers plan to increase the number of avatars so that they can test multiple drug candidates at once. Further, if a new drug emerges in the future, it can also be tested in that patient's avatars.

"We're not ready yet to introduce tumor genome sequence-based selection of drugs into the neoadjuvant setting, but the avatars give us a way to prospectively study these patients and rationally move towards more individualized therapy," says Goetz. ■




National Cancer Institute funding approval rates for applications during fiscal year 2011 for RO1 and R21 grants. The R21 exploratory/developmental research grants are limited up to 2 years and typically to $275,000 for direct costs. The striking difference in success rates is because these investigators are given preferential consideration over existing investigators for RO1s, NCI says.

For more news on cancer research, visit *Cancer Discovery* online at http://CDnews.aacrjournals.org.

## NOTED

- **The NIH extramural budget will drop by 11.1% ($2.8 billion) in January 2013 if the Budget Control Act of 2011's "sequestration" mechanism kicks in,** suggested an analysis from the Federation of American Societies for Experimental Biology.
- The U.S. **Food and Drug Administration (FDA) approved the antiangiogenesis agent pazopanib (Votrient; GlaxoSmithKline) for the treatment of patients with advanced soft tissue sarcoma.** "The approval of pazopanib for this general class of tumors is the first in decades," noted Dr. Richard Pazdur, director of the Office of Hematology and Oncology Products in the FDA's Center for Drug Evaluation and Research.
- **Women have a 30% relative advantage over men in all aspects of the progression of localized melanoma,** in an analysis of 2,672 patients (J Clin Oncol online ahead of print 2012 Apr 30).
- As Congress studies reauthorization of the Pediatric Research Equity Act, **the Alliance for Childhood Cancer has asked that the revised bill require pediatric oncology studies** when a relevant target or pathway is explicitly included in the product label for a new adult oncology drug and is highly relevant to any pediatric cancer.
- **The European Patent Office has awarded Rosetta Genomics of Philadelphia, PA, a patent covering the use of the microRNA miR-34a in drugs for treating p53-negative cancers.** The company says that miR-34a is a direct transcriptional target of p53 and that perturbation of miR-34a expression may contribute to tumorigenesis.
- **"Investigators with a PhD have a slightly lower [NIH] funding rate than those with medical degrees,"** noted Sally Rockey, PhD, NIH's Deputy Director for Extramural Research. "To keep these data in context, remember that about 30% of principal investigators hold MDs or MD/PhDs."
- Turning data from cancer research into discoveries will require fundamental changes in the way researchers share data, access patient samples, and gather informed consent, remarked John Quackenbush, PhD, of Dana-Farber Cancer Institute at the Bio-IT World Conference and Expo 2012 in Boston in April. **"The biggest barriers are not technical or intellectual; the biggest barriers are cultural,"** said Quackenbush.



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