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Oncologists Partner with Watson on Genomics

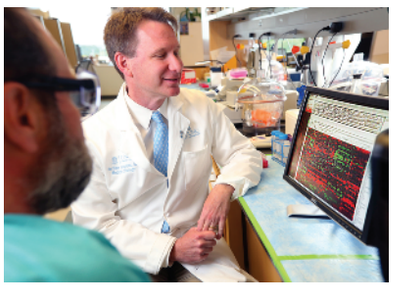
Genetic sequencing has become increasingly affordable and accessible for cancer patients, but the complexity of processing and analyzing the data—and the time that that takes—means that relatively few patients truly benefit from the effort. That may soon change under a new collaboration between cancer centers and IBM's Watson, a powerful cognitive computing program capable of reviewing reams of data and pinpointing potential treatment options within minutes.

"With Watson, oncologists can quickly identify the most likely driver alterations that are causing the cancer and which drugs they should be thinking about for that patient," says Steve Harvey, vice president of IBM Watson Health. "Our system is doing in a few minutes what it would take days or weeks to do manually."

Participants in the program, which is available to subscribers, upload patients' sequencing data into the Watson Health Cloud platform, where it is analyzed by Watson Genomic Analytics. The program searches for actionable mutations and reviews the most-current evidence-based guidelines, clinical trials, journal articles, and patient outcomes. It then produces a report for the oncologist, listing potential treatment options alongside supporting evidence.

So far, 14 cancer centers have joined the project and are helping to expand Watson's capabilities by uploading clinical data and providing feedback on the quality of the results. For example, the University of North Carolina (UNC) Lineberger Comprehensive Cancer Center in Chapel Hill contributed anonymized sequencing data and patient outcomes from 1,800 cases reviewed by its Molecular Pathology Tumor Board. The board meets weekly to consider the mutations found in patients' tumors and identify potential targeted treatment options.

"We wanted to find out if Watson, presented with the same data, would make the same call as our tumor board," says Norman Sharpless, MD, the center's director. "Right now, Watson isn't as good as people at deciding which mutations are actionable in a tumor, but I think we can fix that within a year by refining the algorithms it uses to analyze information."



Jared Lazarus/Feature Photo Service for IBM

Norman Sharpless, MD, director, University of North Carolina Lineberger Comprehensive Cancer Center examines DNA sequencing data. Lineberger is one of 14 cancer centers collaborating with IBM to apply Watson to the analysis of DNA data from patients with cancer.

Sharpless then plans to conduct a clinical trial in which oncologists would receive two sets of recommendations for a patient—one from the molecular tumor board and another from Watson. The goal is to determine how often those two lists agree and, if they differ, which one is better at helping clinicians make treatment decisions.

Training Watson to select potentially effective drugs is by far the most challenging aspect of the project, says Sharpless.

"Ingesting the medical literature and keeping abreast of the field is a very powerful advantage of Watson," he says. "But picking a drug based on that information isn't easy. Some of the best drugs we have—such as Taxol and platinum—aren't easily identifiable and what makes patients respond to those agents isn't always clear."

Tackling the problem will require training Watson on a very large set of clinically annotated genomic data, which does not currently exist at any single institution, he says. Several large private and public organizations are working toward that goal, including IBM, Flatiron Health, Google Genomics, and the American Society of Clinical Oncology, as well as major health insurers.

Watson doesn't replace humans, but it is helping clinicians to work more efficiently and to conduct genomic sequencing and analysis on a much larger scale, says Sharpless.

"Today, sequencing doesn't help most patients, but I'm very optimistic that with the help of cognitive computing systems like Watson, the percentage will go from about 5% today to 50% or higher," he says. "We will get much better at using genomic information to pick therapies that are beneficial." ■

Committee Approves Bill to Boost NIH Funding

A bill aimed at boosting federal funding for biomedical research and streamlining the drug approval process has been introduced into the U.S. House of Representatives after being unanimously approved in committee.

The 21st Century Cures Act would increase annual funding for the NIH by 3%, or $1.5 billion total over the next 3 years, and provide an additional $10 billion spread over 5 years for an Innovation Fund to support promising research initiatives focused on precision medicine. The bill would also boost FDA funding by $550 million spread over 5 years and instruct the agency to expand the scope of the data it uses during the drug approval process.*

"For many years, we have been going through an incredibly exciting time in cancer research, yet the funding has not kept up with the scientific opportunity," says George Weiner, MD, director of the Holden Comprehensive Cancer Center at the University of Iowa in Iowa City and president of the Association of American Cancer Institutes. "We're very excited about the bill, and the fact that it was developed in a bipartisan manner is very encouraging."

The bill would also make deidentified data from NIH-supported clinical trials more available to biomedical researchers. The provision is in line with earlier proposals by the NIH calling for researchers to publish results from early-phase trials and those involving unapproved drugs.

"The scientific community and the public expect data generated with federal funds will be shared to enable further insights to be gained, to help enhance the quality of research, to increase transparency in federal research spending, and to improve the return on investment in research,"

*At press time, the full House of Representatives approved $8.75 billion over 5 years for the NIH and precision medicine. Funding for the FDA did not change.

AACR American Association for Cancer Research

CANCER DISCOVERY

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