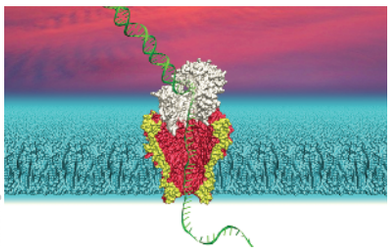

Ian Derrington

Illustration of a nanopore derived from a genetically modified bacterial membrane channel being used to sequence DNA.

provides longer reads that are easier to assemble into a final sequence.

Akeson's lab plans to test how well nanopore sequencing recognizes DNA methylation and other epigenetic modifications in the human and mouse genomes. Changes in the pattern of these modifications can have key roles in cancer—for example, tumor suppressor genes are often heavily methylated in cancer cells. However, standard next-generation methods remove the modifications, Akeson notes.

Shendure's team is developing techniques that fill in information that next-generation sequencing skips. For instance, next-generation sequencing can't reveal the haplotype, or which gene variants occur together on the same chromosome copy.

However, he and his colleagues were able to the reconstruct the haplotype for the entire genome of the famous HeLa cell line by sequencing a library containing large DNA fragments. With their grant, Shendure's team hopes to make techniques like this one cheaper and easier to use. "Thousand-dollar genomes are only 90% complete," he says. "What we are trying to do is get you that last 10%."

NHGRI is planning future grants that could fund more work on DNA sequencing technologies. ■

HPV Testing More Reassuring than Pap

Pap tests have long been the cornerstone of cervical cancer screening in the United States, but a negative test for human papillomavirus (HPV) may better predict a woman's risk for cervical cancer than a negative Pap test, according to a study by NCI researchers published in July (J Natl Cancer Inst 2014;106:dju153).

The researchers analyzed data from more than a million women between ages 30 and 64 in the Kaiser Permanente Northern California health care system. Every 3 years between 2003 and 2012, the women were screened for cervical cancer with Pap and HPV tests. After analyzing the outcomes, the researchers concluded that a woman's 3-year risk of developing cervical cancer following a negative HPV test was just 11 per 100,000, roughly half the 20 per 100,000 for women who'd had a negative Pap test.

The researchers weren't particularly surprised by the results. "We expected to find that HPV testing was superior [to Pap testing] because we know that a persistent infection of cancer-causing types of HPV is the causal agent of cervical cancer," says Julia Gage, PhD, MPH, first author of the study. "In the absence of HPV, a woman's risk of cervical cancer is extremely low."

Currently, the U.S. Preventive Services Task Force and many professional societies recommend two strategies for cervical cancer screening: either Pap tests every 3 years or both HPV and Pap tests every 5 years. Although the optimal screening interval for primary HPV testing has not been determined, based on current screening guidelines, a negative HPV test might provide reassurance against cancer for 5 years, compared to 3 years for a Pap test. Using those intervals, the researchers estimated that in a hypothetical population of 1 million women, changing from giving Pap tests every 3 years to giving HPV tests every 5 years would result in nearly 2 million fewer tests over a 15-year period.

If the interval for primary HPV testing is set at every 3 years, it "might provide as much, if not more, reassurance against precancer and cancer, compared to primary Pap testing every 3 years," the researchers note. Determining the ideal screening interval is a critical next step, they say. ■

NOTED

- **The NIH launched ALCHEMIST (Adjuvant Lung Cancer Enrichment Marker Identification and Sequencing Trials) to identify patients with early-stage lung tumors that harbor genetic changes in *ALK* and *EGFR*** and evaluate whether drugs targeted against those changes can improve survival. Those with the genetic changes will be eligible for one of two treatment trials; all screened participants, regardless of their tumor's mutations, will be followed for 5 years.
- **The FDA issued final guidance on the development, review, and approval or clearance of companion diagnostics,** which are tests used to identify patients who will likely benefit from treatment with a particular drug. The tests are commonly used to detect certain types of gene-based cancers.
- On July 31, **the FDA also notified Congress of its intent to publish a proposed risk-based oversight framework for laboratory-developed tests,** which are designed, manufactured, and used within a single laboratory. The agency must wait at least 60 days from that date to publish the document.
- UK-based **Wellcome Trust announced that it will invest £27 million in a state-of-the-art genome-sequencing hub for Genomics England,** the government's project to decipher 100,000 complete genetic codes. The funding will allow Genomics England to become part of the Wellcome Trust Genomics Campus in Hinxton, which is also home to the Sanger Institute, the European Bioinformatics Institute, and several small biotech companies.
- **The FDA approved Exact Sciences' Cologuard, the first stool-based colorectal screening test** that detects the presence of red blood cells and DNA mutations that may indicate the existence of cancer or a precursor to cancer.
- **Ohio's Cleveland Clinic unveiled plans to build a $276 million, seven-story cancer center,** which will bring all cancer-related services, including imaging, under one roof. The additional space will also allow the institution to increase the number of patients it can accommodate in clinical trials. Groundbreaking was anticipated at the end of September, with completion slated for early 2017.

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