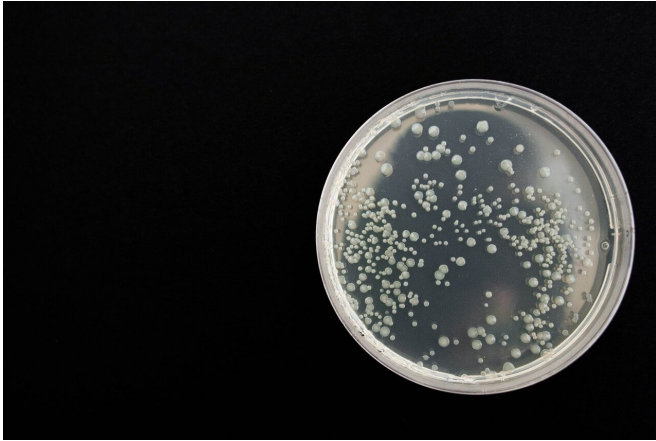


Testing tool can quickly distinguish between viral and bacterial infections

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When patients complain of coughing, runny nose, sneezing and fever, doctors are often stumped because they have no fundamental tool to identify the source of the respiratory symptoms and guide appropriate treatments.

That tool might finally be on its way. In a study proving feasibility, researchers at Duke Health showed that their testing technology can accurately distinguish between a viral and a [bacterial infection](#) for respiratory illness—a critical difference that determines whether antibiotics are warranted. And, importantly, the [test](#) provided results in under an hour.

"This is exciting progress," said study lead Ephraim Tsalik, associate professor in the departments of Medicine and Molecular Genetics and Microbiology at Duke University School of Medicine.

"We've been working on this for over a decade," Tsalik said. "We knew in 2016 that our test worked in the research setting, but it's always been our goal to have a test that could produce results rapidly, while patients are at their doctor's office.

It's important that the distinction can be made quickly to ensure that antibiotics are not inappropriately prescribed."

Tsalik and colleagues published results of their study in the journal *Critical Care Medicine*, which confirm the test's [accuracy](#) with results available in under an hour.

The researchers have developed a gene expression method that diverges from current diagnostic strategies, which focus on identifying specific pathogens. The current tests are time-consuming and can only identify a pathogen if it's specifically targeted by the test in the first place.

Host gene expression, however, looks for a distinct immune signal that is unique to the type of [infection](#) the body is fighting. The [immune system](#) activates one set of genes when fighting bacterial infections and a different set of genes in response to a viral infection. After the team discovered these gene expression signatures for bacterial and viral infection, they collaborated with BioFire Diagnostics, a company that specializes in molecular diagnostics, to develop this first-of-its kind test.

In a multisite study of more than 600 patients presenting to hospital emergency departments with respiratory infections, the tests identified bacterial infections with 80% accuracy and [viral infections](#) with nearly 87% accuracy. The current standard tests have about 69-percent accuracy. Tests provided results in less than an hour, and their accuracy was confirmed retrospectively using two different methods.

"Acute respiratory illness is the most common reason that people visit a [health care provider](#) when feeling sick," Tsalik said. "Patients with these symptoms are inappropriately treated with antibiotics far too often due to challenges in discriminating the cause of illness, fueling antibiotic

resistance. Our study shows that a rapid test to distinguish between these two sources of illness is possible and could improve clinical care."

Tsalik said additional studies are underway to validate this approach in additional groups of patients. The researchers are also working to adapt the technology to produce more specific information, including whether the virus causing [illness](#) is influenza or SARS-CoV-2.

More information: Ephraim L. Tsalik et al, Discriminating Bacterial and Viral Infection Using a Rapid Host Gene Expression Test, *Critical Care Medicine* (2021). [DOI: 10.1097/CCM.0000000000005085](#)

Provided by Duke University Medical Center

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