Separating Viral vs. Bacterial Respiratory Infections

By Lila Abassi — March 8, 2016

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Doctors are feeling the pressure to hold off prescribing antibiotics to their patients. With inappropriate prescribing being one of the chief reasons behind the global crisis of antibiotic resistance, it seems slamming on the brakes is tough – for many reasons. But maybe this is about to get a little easier.

Pardon the following anecdote, but a pediatrician colleague of mine recently ranted on Facebook about how a father of one of the children she was treating yelled at her for not prescribing antibiotics and proceeded to call his wife, place her on speakerphone, while she also yelled at my colleague for the same reason.

Many people, not just parents, perhaps feel shortchanged if they are not prescribed medicine for their viral illness (which is mainly just supportive therapy). Perhaps they may feel that they are not being taken seriously, or that the physician may doubt their illness.

Why can’t we just appease patients and prescribe them something anyway? Aside from antibiotic resistance, anti-microbials are not pathogen-specific so they are liable to kill off healthy bacteria as well dangerous ones, creating a potentially lethal imbalance in the body’s natural defenses.

Hopefully, some research at Duke University, recently published in *Science Translational Medicine*, brings us one step closer to accurately distinguishing between what is a viral upper respiratory infection, versus a bacterial pathogen causing an upper respiratory infection (URI).

Scientists at Duke are in the process of developing a blood test that can determine the source of the URI – virus or bacteria. Instead of looking for the causative agent, researchers are investigating the host response (what they refer to as “gene expression patterns”) to viral versus bacterial versus non-infectious causes of illness.

“The nature of our reaction or response to a viral infection is different than the way our bodies
react to a bacterial infection,” stated Dr. Ephraim Tsalik [2], an assistant professor of medicine at Duke University Medical Center and the Durham VA Medical Center, and lead author of the study. “We’ve looked at one particular measure of our body’s response – gene expression – and how the genes are being turned on and off.”

Blood samples from 273 subjects with acute respiratory infection (ARI) or noninfectious illness, as well as 44 healthy controls, were obtained and analyzed for gene expression. They developed classifiers for bacterial ARI, viral ARI, or a noninfectious cause of illness using statistical models. Overall accuracy of the test was 87 percent (238 of 273).

The current turn-around time using this test is eight-to-ten hours, and the scientists are making collaborative efforts with two biotech companies to shorten it. This can make all the difference, considering that many patients seeking treatment for their URI are doing so in an acute care facility, thus waiting around may not be an option, or a return visit to the health clinic might not be feasible.

From a clinical perspective, this test could really be the final nail in the coffin with regard to the doctor-patient antibiotic debate.