Tracking tuberculosis: pinkRF knows precisely *how, when* and *where*

Viral diseases can radically change the world as we know it, with a huge impact on society. If anything, the COVID-19 pandemic taught us that. Yet there are several infectious diseases that still require better treatments and procedures for diagnosis. One of them is tuberculosis: in 2020 the second leading infectious killer after COVID-19, according to the World Health Organization (WHO).
Even though we can already treat the symptoms of tuberculosis with antibiotics, there are still challenges when it comes to preventing it from spreading. Klaus Werner however, CEO and co-founder of pinkRF, plans on changing that.

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"One of the reasons why we don't have effective techniques for diagnosing yet, is the lack of urgency," says Klaus. "With covid, we witnessed how an enormous effort to speed up testing and the development of diagnostics and treatments made a difference. Tuberculosis is a very stable bacterial disease that's hard to eradicate once and for all. It's prevalent in developing countries, where people often work and live in poorly ventilated and overcrowded conditions. In Western countries, the disease is less common, making it difficult to get attention and resources to fight the disease."

It's not all bad, though; the covid pandemic did illustrate the benefits of testing and tracking diseases. A process with a lot of potential for improvement, especially when emerging technologies like pinkRF's are applied.

A cough is all it takes

The current process of diagnosing tuberculosis has its flaws. Currently, skin and blood tests are used to determine whether a patient has tuberculosis. With this method, it can take up to a day to get a definitive result. "People living in developing countries, where the disease is prevalent, often have to travel quite far to reach a testing facility. When they are done testing, they go home, as they don't want or can't wait a full day for the results. In addition to that, they often don't have a cell phone or signal when they get back home."

People going home to wait for their test results is a serious issue, says Werner. "When it turns out a patient has tuberculosis, they need to go into isolation to prevent spreading the disease. But if they go back to their families and engage in social activities while waiting, they can infect others by just coughing."

Let's heat things up

PinkRF takes part in developing new methods of diagnoses, mainly because of this urgency to speed up the process. "A company that develops a new type of tuberculosis test reached out to us. The basic principle is quite similar to a covid test. You use a cotton swab to extract saliva and mix this with a solvent." The key difference with covid tests, says Werner, is that the solvent that is mixed with saliva has to be heated, to break down the cells and extract the DNA from which a diagnosis can be made. A process that requires quick heating in specific places."

PinkRF´s technology does precisely that. It can be compared to the heat generated by a microwave. But Werner explains it's much more effective at its job. "Regular radio frequency is not very subtle. We needed a lot more precision than a microwave to heat." They achieved this by using solid-state generated RF power. Its biggest advantages? Precision and speed. "A microwave spills a lot of heat or overheats certain parts. If you have all the time in the world, you can 'slow-cook' almost anything to the desired temperature. But there are many instances where you don't have that time. With our technology, we can heat up to higher temperatures, which means it takes less time to warm something." As long waiting times to get test results are problematic with tuberculosis, this newfound speed is of incredible value.

Let's speed things up

"Saving an extra minute means saving extra lives," Klaus emphasises. "The significance of diagnosing more quickly is truly a big deal. With this technology, we can diagnose accurately within half an hour. People won't go home and infect others but quickly enter isolation when necessary." It's the aspect of fighting tuberculosis that has long been the biggest issue. Treating the symptoms can be done effectively using antibiotics, but diagnosing quickly has been a hard nut to crack. PinkRF's technology is already integrated into prototype tests that work.

> ***SAVING AN EXTRA MINUTE MEANS SAVING EXTRA LIVES***

The next step towards applying this innovative solution, is clinical testing. "Independent parties have to assess its effectiveness. What's exciting, is that these tests will be performed side to side with current testing methods, in developing countries. If it proves to do what we claim it does – and we're sure it will – authorities like the Food and Drug Administration (FDA) in the United States still have to approve its use." The path from coming up with a new technology to the point of it being approved and applied, is long. "The medical world is brimming with rules and regulations. There's a lot of testing and paperwork involved, which means developing a new treatment often takes years."

Diseases unravelled

Despite its potential, Werner believes it will take another one to two years before their product will be rolled out worldwide. And that's not the end of the story, as the fight against other diseases may also benefit from the technology that is now being developed. "Think of what this can do trying to prevent and fight other diseases. The prospect of applying this to more diseases is fascinating." This may require some patience as well, according to Werner. "We can't just apply the same recipe to other diseases. Apart from having to go through the whole testing and approving cycle, each disease has its secrets that we'll have to unravel before applying our technology."