

Broad spectrum antivirals

Leyden Labs plans to protect against viral infections

Developing a universal vaccine for influenza has often been described as the ‘holy grail’ of medicine. Regrettably, this grail is still out of reach. But a vaccine may not be the only way of preventing viral infections or, indeed, stopping a future pandemic.

Leyden Laboratories NV of the Netherlands, founded in early 2020, has a different idea. This is to develop a broad spectrum antiviral that would target ‘commonalities’ of viral families generated from around the world to protect against many viruses simultaneously. The company was founded by Koenraad Wiedhaup, a former partner at McKinsey & Co, and three previous executives of Crucell, the Dutch vaccine company that is now part of Johnson & Johnson Inc.

In late March, Leyden Labs closed a €40 million Series A financing round, led by GV (formerly Google Ventures) with participation from F-Prime Capital, Casdin Capital LLC and Brook Byers. The funding will support the development of a portfolio of intranasal prophylactic medicines to prevent infection from multiple virus families, including coronaviruses and influenza viruses.

In an interview, Mr Wiedhaup, who is now Leyden Lab’s chief executive, explained how the company got started, and why its approach is different from the universal flu vaccine concept. “We are looking at different molecules that directly attack viruses. So unlike a vaccine which gears up the immune system, we would be attacking the viruses directly,” he said. The company hasn’t yet disclosed whether its portfolio consists largely of biologics or a combination of biologics and small molecule drugs.

However in terms of function, the medicines are intended for prophylactic use to prevent infection and possibly to stop transmission as well. “We are cold testing this [transmission],” Mr Wiedhaup said. The molecules would be self-administered by a nasal spray. This has the benefit of ease of use. But there is the larger medical issue of stopping the virus at its point of entry into the nasal area and preventing its spread to the lower respiratory tract and lungs. “We took the intranasal route in order to attack the virus directly where it attacks humans,” the executive commented.

The garden meeting

The idea for Leyden Labs arose during a conversation among Mr Wiedhaup and former executives of Crucell, including the previous CEOs Dinko Valerio and Ronald Brus. It was the start of the pandemic in early 2020 and the Netherlands had imposed its first lockdown. The friends met in Dr Valerio’s garden in Oegstgeest, just outside of Leiden. “We came together to discuss how we can make sure that these pandemics never happen again,” Mr Wiedhaup recalled. The friends had different perspectives on the matter. Dr Valerio was a founder of Crucell and led the company as CEO for 11 years until 2004. He was succeeded by Dr Brus who was Crucell’s CEO for seven years until 2011 when J&J took the company over. J&J had a strategic collaboration with Crucell

prior to the acquisition. During this period, Crucell and J&J were understood to have been working on a joint project to develop a universal monoclonal antibody product to protect against influenza.

The former Crucell executives had depth of experience. Mr Wiedhaup, by his own account, had ambition. “This was the opportunity I had been waiting for, to start a biotech myself,” he recalled. At McKinsey, Mr Wiedhaup advised both large pharma companies in Europe and the US, and smaller biotechs. His father had been head of R&D at Organon, a specialist reproductive medicine company. Pharmaceutical R&D was part of his upbringing.

The question was: could the group put it all together? An important feature of Leyden Lab’s launch, and its successful Series A fundraising in March, was technology. Mr Wiedhaup said the company is using artificial intelligence and other technologies to design its molecules and to target ‘commonalities’ of virus families.

Commonalities of viral families

The commonalities are the conserved parts of a virus that are the same across different species. “What we are doing is looking within the virus families, and broader, to [discover] conserved regions and to target those with our molecules directly to be sure that in that way we eliminate the virus, or at least make it possible for the virus not to replicate in the cell,” the executive said.

Just as the pandemic has upended the way people socialise, it has also changed the way entrepreneurs think about the applications of their products. Mr Wiedhaup sees the Leyden Labs intranasal sprays as being used during a future pandemic ahead of the development of a vaccine, or in conjunction with a vaccine.

“In the beginning of a pandemic, if we take ourselves back to the beginning of last year, we [theoretically] could have used it before there were any vaccines against the specific [coronavirus] strain. And also later on, when there are vaccines, you could use it on top of a vaccine to give protection to people with a weakened immune system or people who are older where their immune system is not functioning that well,” he said.

Leiden Labs has both a technology platform and a pipeline of preclinical products of which there are a few lead candidates. The recent financing will enable the company to progress the lead molecules into the clinic and further develop the platform. “The goal of course is to develop these products so that people can live their lives freely, hug their grandchildren, and go to restaurants, knowing they are still protected,” the executive said.

This article was written by the *MedNous* editor on the basis of an interview with Koenraad Wiedhaup, chief executive of Leyden Laboratories BV.