HEALTHTECH

Oxford Immune Algorithmics develops personalised, predictive healthcare

The company uses artificial general intelligence to enable precision and predictive healthcare to eradicate disease.

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If we were to look at the future of healthcare purely on buzzwords, here's what's in vogue: precision medicine, personalised, and digital. Add AI to the mix, and you've got the ultimate cutting-edge approach to how we understand, monitor, and treat illness and deliver medical services.

Oxford Immune Algorithmics (OIA) is a UK healthcare startup spun out of the University of Oxford.

The company is on a mission to advance towards predictive precision medicine.

It recently spoke to Dr. Hector Zenil, founder of Oxford Immune Algorithmics, of **IFA**, Germany's consumer electronics trade show.

He explained:

> *"Algorithmic learns from the user and builds a haematological digital twin over time, a version of the individual's baseline health data against which to track deviations from their personal optimal health remotely and in a timely fashion."*

Besides the digital platform, which is currently able to deliver, process and interpret data from its own lab partners, OIA is developing handheld devices that allow people to monitor their patients' physical condition through at-home blood tests.

Each test on the Algorithmic device will use a different cartridge, each requiring a small blood sample. The device will also allow people to get results on the spot, starting with a complete blood count test, the most commonly conducted medical test.

By combining medical data and both genetic and phenotypic data, OIA wants to develop a generalisation of AI capable of reasoning like scientists from the user's patient's data regularly to understand their personal health dynamics.

The importance of immune cell changes in health

The company was founded in 2018 and is underpinned by an increasing recognition that the immune system plays a much larger role in the pathogenesis of most, if not all, diseases. Analysis of the immune system using AI, will enable more targeted and personalised treatments.

Understanding immune cell changes also has implications for cancer treatment with over time. "We monitor the monitors to help people live healthier longer", said Dr. Zenil.

OIA contends that there is a general lack of understanding of what "normal" is relating different immune cell types (immunophenotypic cell surface markers) and their associated change over time as they transit moving from a healthy to unhealthy states – such as individual diseases, or groups of diseases (say inflammatory ones) or to ageing.

Algorithmic endeavours to match the immune system's complexity in understanding how individuals transition from health to disease. A blood test is one of the first lines of investigation to assess the immune system performance.

However, clinical research has demonstrated that variations in immune-related cells within the blood can provide some important health implications, especially those that are rapid.

In one study, the total white blood cell (WBC) count in 'healthy' individuals was found to be as low as half or as high as twice the normal WBC count in the abnormal category, dramatically simplifying into a binary "healthy/unhealthy" or "disease/not disease" at a person. If you fall within that range, you are considered healthy.

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Another study found that those with a high 'normal' WBC were almost three times more likely to die within six months than those with a lower 'normal' WBC.

From the lab to the customer

I was curious to learn how OIA would gain traction with doctors who are often hesitant to adopt new subscriber digital platforms, SaaS, and various predict platforms.

According to Dr. Zenil, efficiency is key. He explained:

> *"Our solution can, for example, reduce the 23 to 50 percent of cancer patients that are lost to follow-up in their tumour growth but because of an infection whose symptoms were confused with the adverse effects of chemotherapy.*
>
> *The solution is to monitor these patients more closely to learn what are the subtle differences in the signature of each of the infections. This will be a new standard of care".*

Dr. Zenil predicts that changes will most likely come from three different forces:

- The healthy consumer dissatisfied with their current standard of care, huge waiting lists and dangerous backlogs.
- Public and private insurers that find healthcare costs are growing more expensive than proactive health care.
- Life science companies, wishing to push medical services to people's homes with the right incentives will help them with current issues related to adherence and penetration.

Dr. Zenil explained:

> *"For example, there are fantastic viral drugs in the market, but they are heavily under-prescribed in favour of antibiotics because bacterial infections are more opportunistic and antibiotics have dominated the market to the detriment of large numbers of patients suffering from viral infections who have limited access to proper diagnosis."*

OIA works very closely with the NHS.

In a large NHS GP practice survey by the company, doctors and nurses said they could free up to 15 hours per week of administration for patient triaging and patient analysis like Algorithmic, and 17% of respondents indicated different SaaS solutions or platforms.

As a tech journalist, I hear about startups and blood testing, and of course, my brain immediately thinks "Theranos". The bad rap the company has found way less backlash than patients feeling that they have become highly risk-averse after Theranos.

> *"Patients usually rely, for better or worse, on regulatory approvals. We are focused on validating our technology in the medical space and hold ourselves to the highest standards having already achieved ISO certification and early CE and UKCA accreditation for our software and algorithm.*
>
> *Our partners and stakeholders rely on the experience and credentials of our highly qualified team, who are world experts in their fields."*

Hardware is hard

Ok, I'm never going to stop saying "hardware is hard". Or to put it differently, highly ambitious, especially when you are offering a consumer device.

Dr. Zenil explained:

> *"There is no other device that performs sophisticated blood testing other than rather simple tests based on single biochemistry markers such as glucose metres.*
>
> *By tackling a much more sophisticated medical test, we know we can rapidly expand to the season and have become nothing of key panels to better assess a patient or user health.*
>
> *But we also integrate with other devices and data streams. Our AI platform is agnostic and works with file standards like HL7 widely used by laboratories and other devices."*

OEA's solution will be launched in stages as the company strives to keep innovating. The medical instrument will come next year, and it will launch most of its technology based on the AI platform by the next quarter.

Lead image via **Oxford Immune Algorithmics**. *Photo Uncredited*

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