CUSTOMER SPOTLIGHT

Expertise In A Box: How OncoDNA Partnered With Twist Bioscience To Improve Tumor Sequencing

Mining the tumor genome for useful information is becoming an integral part of modern cancer care, but it's a task that's easier said than done.

The genetic mutations and patterns that help define tumor subtypes, expose therapeutic weaknesses, and forecast disease progression may be distributed throughout the genome's 3.2 billion bases. Finding these informative mutations across such a vast sequence space requires a breadth and depth of sequencing that is too costly for most laboratories. Because of this, many rely on a more targeted approach, wherein resources are conserved by only sequencing and analyzing select portions of the genome. Such a targeted approach has proven to be informative and cost effective, yet many hospitals lack the tools and expertise needed to effectively use it.

This is where companies like Twist Bioscience and OncoDNA can help. Founded in 2012, OncoDNA set out to improve outcomes for patients with late-stage disease. By combining its deep subject matter expertise with advanced molecular tools, the OncoDNA team generates a detailed report for oncologists that describes each patient's tumor, including a breakdown of potential therapeutic options based on the tumor's molecular profile.

OncoDNA has gained experience over the past decade of processing many tens of thousands of samples and has used this to refine its approach, optimizing for scale, accuracy, and information density. One such refinement included the adoption of targeted sequencing with Twist reagents. We recently spoke with **Koenraad Eycken, Chief Product Officer at OncoDNA**, to learn more about the company's evolution and how their collaboration with Twist is helping hospitals around the world.

TWIST BIOSCIENCE

What problem does OncoDNA solve?

In short, we help hospitals perform in depth analyses of tumor samples for clinically relevant information. We started off primarily working with late-stage cancer patients who had run out of treatment options. Oncologists would send us their samples and then we would undertake a complete analysis in our labs using next generation sequencing (NGS), immunohistochemistry (IHC), and other methods that could help to profile the cancer. We would then create a report for the oncologist guiding them to possible treatments and clinical trials that are available, as well as a breakdown of how various therapeutics are likely to affect the patient.

That's still true today, only now we're receiving samples from all over the world representing a wide range of cancer types and stages. In recent years, we've gained the ability to help hospitals gather some of this data on their own (using their own sequencing facilities, for example). In these cases, we equip them with bioinformatic tools and reporting software to facilitate data collection, as well as support with data analyses.

So, at a high level, we're helping oncologists and their patients get a better picture of what they're dealing with and what their options are.

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– Koenraad Eycken, Chief Product Officer at OncoDNA

As hospitals often have their own in-house laboratories, what unique value does OncoDNA provide?

There are a couple factors to keep in mind here. First, not every hospital around the world is well equipped with the technology and capacity to handle these kinds of analyses. Second, having the technology is not the same as knowing how to get the information you need from it.

Developing the infrastructure, in-house expertise, and optimized workflows that allow you to extract valuable information from the tumor genome is not trivial and can be a big barrier for care providers. That's why they work with us: we provide the means to get molecular data from patient samples and the expertise to know what it means.

For example, we've designed a sequencing panel to assess specific genes associated with solid tumor characteristics, using custom panels from Twist. It takes expertise to know which genes to focus on and how to get reliable data for complex mutations. We have put extra effort together with this to make sure we detect everything we need to detect. Analysing that data requires its own expertise, especially when working with challenging sample types like formalin-fixed and paraffin-embedded tissues. Lastly, the expertise also comes in at the reporting stage and knowing which variants should be reported.

Can you briefly describe how Twist is enabling your work?

Targeted sequencing is an important part of tumor analysis because it allows us to search for key mutations that might aid in diagnosis, prognosis, or therapeutic decision making.

When OncoDNA was founded, the best reagents for this were only available with amplicon-based sequencing. Using amplicons, we could sequence specific genes that are known to be associated with tumor types or therapeutic responses. But the list of genes that we wanted to target quickly outgrew what can be reasonably done with amplicons.

Then in 2020, our colleagues at another lab told us about Twist's high quality target capture reagents. So, we contacted Twist and together we designed a new, 638 gene panel. This allows us to target and analyze many more genes, casting a wider net when looking for mutations without the costs that come with other methods (such as whole genome or whole exome sequence). Reliably targeting these 638 genes would have been impossible with amplicon-based sequencing.

Has the adoption of Twist products opened any new doors for OncoDNA?

Yes, our switch over to capture-based sequencing using Twist's reagents has opened up new opportunities for us.

As I mentioned, when OncoDNA started, samples would have to be sent to our labs for processing. However, shipping samples to our lab could be problematic for hospitals that prefer to keep sample processing in-house. Plus, in Europe, it's very difficult to send samples to commercial companies across borders. So, in requiring that samples get sent to us, our market reach was very limited.

When we switched over to a capture-based approach, however, we saw potential to change things up. We still receive and process samples in our lab. But for hospitals that would rather do the sequencing in their laboratory, we can now provide them with the OncoDEEP kit, which includes Twist reagents and an optimized protocol for targeted sequencing.

Now, when hospitals need our expertise in-house, they can order the OncoDEEP kit. We'll train them to make sure they can execute the protocols correctly; they do the sequencing in their lab and upload the data to our servers; and then we do a complete bioinformatics analysis, conduct multiple quality reviews, and ultimately generate a report. Once this is finalized, they can log into a web-based platform where they see the finalized report as well as all the raw data that led to it.

So this has become a new business line for us, and I think the success of this project is really because both companies—OncoDNA and Twist—believed in it. The support we get from Twist is really key. Setting up a new business model takes a lot of time and energy, and Twist took away a lot of the hassle.

Image courtesy of OncoDNA.

> **"It takes expertise to know which genes to focus on and how to get reliable data for complex mutations."**
>
> – Koenraad Eycken, Chief Product Officer at OncoDNA

What key benefits do you find in Twist products?

The high accuracy, uniformity, and capture efficiency of Twist's capture panel is critical. It's a domino effect that really starts with Twist: High quality capture reagents make it possible to generate high quality data, which makes bioinformatic analyses better. This is why we can generate high-quality reports for the oncologist.

It's not just the quality of the capture reagents, though, Twist's support with logistics and OEM solutions—aiding in the design and manufacture of the kit's box, for example—has also been a critical factor for us, because the kit basically arrives and it works. That's simple to say, but it's not a given. The collaborative way we work with Twist has been a real benefit.

Lastly, it's also Twist's reputation that's helped. We secured one of our biggest customers in the UK, in part, because they were already familiar with Twist reagents and recognized the quality that comes with them. This made the adoption process much easier for them. From a workforce point of view, our collaboration with Twist has meant that busy labs who are struggling to recruit and retain workforce have now got a lean NGS workflow for their solid tumor testing, which means that they can reduce some of the testing burden on their own staff, particularly around their bioinformatics piece.

So, I think we, as two businesses, really complement one another in the context of a busy NGS laboratory.

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What can we expect from OncoDNA in the near future?

Demand for liquid biopsy panels is growing, so we're now working with Twist to develop a liquid biopsy panel as well as two minimal residual disease (MRD) tests. The idea is really to have tests that cover the patient journey, from treatment selection to monitoring disease recurrence. Together with Twist we are providing products that make the most of liquid and solid tissue samples.

Note: this interview was edited for length and clarity.

Results are specific to the institution where they were obtained and may not reflect the results achievable at other institutions.

Image courtesy of OncoDNA.

Helpful links

CUSTOM PANEL WEBSITE
twistbioscience.com/products/ngs/custom-panels

CANCER RESEARCH SOLUTIONS
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PRODUCT SHEET
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DECISION GUIDE
View here

MATCH WITH AN EXPERT
Want to schedule 30 minutes with an NGS expert who can help jump start your unique custom panel project? Schedule a meeting and select Scientific Discovery Call.
Schedule a meeting here

Twist products are for research use only, not for diagnostic procedures.