Improved prostate screening to help men live long and prosper

Prostate cancer is the second most common cancer in men, killing hundreds of thousands each year. However, the current routine screening method for checking prostate-specific antigen (PSA) levels generates false positives in an alarming number of cases, leading to thousands of unnecessary biopsies each year. To combat this, Life Length has developed ProsTAV®, a state-of-the-art *in vitro* diagnostic test that uses telomere-associated variables to identify patients with a higher risk of prostate cancer, aiding screening initiatives and reducing the number of unnecessary biopsies.

The current standard of care used worldwide to screen patients for prostate cancer risk is by measuring their PSA levels, referring individuals with high concentrations for a biopsy. This procedure is not only invasive, painful and costly, it is often unnecessary. In fact, over two thirds of men who undergo a biopsy do not actually have cancer, highlighting the need for complementary tools to more accurately predict the risk of prostate cancer before biopsy. The use of telomeres as predictive and prognostic markers for oncological diseases is a rapidly expanding research area. Life Length is an innovative biotech company that was spun out of the Spanish National Cancer Research Center in 2010, and has since gone on to become a world leader in telomere diagnostics and measurement. Its biomarker technologies are now being used in everything from biotechnology and pharma to cosmetics and veterinary applications.

The implementation of Tecan automation solutions has helped to maximize the use of technicians' time

Life Length was part of the Horizon 2020 funded ONCOCHECK project to clinically validate the use of telomere-associated variables (TAVs) as biomarkers for different cancer types. The project was particularly successful at identifying lung and prostate cancers, and the results from 1,200 biopsied patients allowed the company to develop highly precise and predictive algorithms to determine a patient's risk of prostate cancer. This approach has since been developed into ProsTAV, a state-of-the-art *in vitro* diagnostic test to identify patients with an elevated risk of suffering from aggressive prostate cancer.

The company uses its proprietary algorithm and machine learning techniques to analyze a combination of the patient's age, PSA level, prostate exam results and TAVs, generating a prostate cancer risk score between zero and 100. The patient's urologist can then use this score, in combination with other factors, to decide whether to refer the individual for biopsy. Stephen Matlin, CEO of Life Length, commented: "The objective of ProsTAV is to reduce

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the number of unnecessary biopsies in men with elevated PSA levels. PSA testing leads to almost two million prostate biopsies a year, of which around 1.4 million end up testing negative. This highlights how inefficient PSA testing is; it frequently leads to extremely unpleasant biopsy procedures being performed on men that do not actually need it. Our objective with ProsTAV is to eliminate a significant number of these biopsies by replacing them with a combination of tests, including our sensitive telomere-based method. In fact, we recently received approval for the use of ProsTAV from AEMPS – the Spanish equivalent of the FDA – underlining the effectiveness of our approach.”

Life Length has recently invested in a number of Tecan laboratory automation solutions to improve its workflow and increase efficiency. “We prepare virtually all of our assays using our Fluent® and Freedom EVO® platforms, and the precision and flexibility of these solutions allow us to automate even our most complex tasks,” Stephen explained. “For example, our workflow includes a series of washes to remove cellular membranes while keeping the nuclei of the cells intact. It is a very delicate process to avoid damaging the chromosomes, while removing everything else, but our Tecan instruments make it possible to do this in a completely automated fashion. The 384-channel pipetting head of the Fluent platform’s Multiple Channel Arm™ delivers superior repeatability over manual and semi-automated methods, while the Freedom EVOware® Sample Tracking software provides complete traceability of every sample prepared on the Freedom EVO platform. This combination of repeatability and traceability is essential in a diagnostic laboratory like ours, ensuring that samples are accurately processed and linked back to the correct patient.”

The success of the initial instruments has led to Life Length recently taking delivery of another pair of Fluent and Freedom EVO platforms to increase its output further. Stephen continued: “These additional workstations will significantly increase our efficiency; we can now run a set of tests on one pair of platforms while we write scripts and prepare the next set of tests on the second pair. This will not only maximize the use of our technicians’ time, but will also allow us to run more samples in a day, increasing our throughput.”

“The decision to purchase Tecan liquid handling systems was simple, thanks to Tecan’s unrivaled support and service infrastructure in Spain,” Stephen added. “It was critical for us to have a local support network as, if a platform develops a problem, we need to be able to get support and source replacement parts quickly, without causing unnecessary delays to patients, who are waiting for extremely important – and potentially life-changing – test results. It simply wasn’t an option to purchase solutions from other OEMs who don’t have a strong local presence.”

Stephen concluded: “With ProsTAV, we’re seeking to reduce the number of prostate biopsies by more than a third, eliminating unnecessary procedures. This will generate a significant clinical benefit for patients, and also provide substantial economic savings for both public and private healthcare systems. Now that our workflow has the precision and flexibility afforded by our Tecan platforms, we are aiming to become an essential service for urologists wanting to improve their diagnostic procedures.”

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To find out more about Tecan’s liquid handling solutions for clinical applications, visit diagnostics.tecan.com/products/liquid_handling_and_robotics

For more information about Life Length and its service, visit lifelength.com