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Nanotech Microchip Test Detects Type-1 Diabetes

An inexpensive, portable, nanotech microchip-based test for diagnosing type-1 diabetes has been invented at the Stanford University School of Medicine. It is believed that this innovation could go a long way in improving care for diabetes patients worldwide and enable researchers and medical professionals to better understand the disease.

The revolutionary test employs nanotechnology and is especially designed to detect type-1 diabetes outside hospital settings. This little device is capable of distinguishing between the two primary forms of diabetes mellitus. While both are characterised by high blood-sugar levels, the underlying causes and treatments are different for each. Type 1 diabetes is an autoimmune disease that is primarily caused by an inappropriate immune system attack on healthy human tissue. Patients suffering from type-1 diabetes stop making insulin because the patient's antibodies start attacking the insulin-producing cells in the pancreases. In type-2 diabetes, these auto antibodies are not present.

There was a time when the prevalence of type-1 diabetes was more dominant in children, whereas the type 2 was prevalent in middle aged, overweight adults, but now this distinction no longer exists. Nearly a quarter of newly diagnosed children today suffer from type-2 diabetes and an increasing number of newly diagnosed adults have type-1 diabetes.

To date, the type-determining test available is quite expensive and can only be used in a sophisticated healthcare setting. According to Brian Feldman, MD, PhD, assistant professor of paediatric endocrinology and the Bechtel Endowed Faculty Scholar in Pediatric Translational Medicine, the senior author of this paper and the pediatric endocrinologist at Lucile Packard Children's Hospital Stanford, "With the new test, not only do we anticipate being able to diagnose diabetes more efficiently and more broadly, we will also understand diabetes better - both the natural history and how new therapies impact the body."

Early detection and diagnosis of diabetes is essential in order to be able to treat the disease efficiently. If patients are treated aggressively and effectively at the early stage, there is a possibility that the autoimmune attack on the pancreas can be stopped and the body's ability to make insulin preserved. However, the tests that are currently available can only be performed with a trained staff and are costly. They also take several days to determine the form of diabetes. By using this new microchip test, the result is available within minutes and at approximately $20 per chip, which can be used for up to 15 tests, it is inexpensive to use . Only a minimal amount of blood is required and the test can be performed with blood from a finger prick.

The nanotech microchip uses a fluorescence based method for detecting antibodies. Glass plates form the base of each microchip and are coated with nanoparticle-sized islands of bold. These intensify the florescent signal and enable reliable antibody detection. The team at Stanford University has filed a patent for the microchip and once it is approved by the FDA, it is strongly believed that this little invention will definitely fulfil the global need for a better diabetes diagnostic device.

Source: Stanford School of Medicine

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