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Indonesia develops biosensor-based tool for detecting neurological disorders

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NeuroCube is supported by increasingly innovative machine learning technology

A team of students from Institut Teknologi Sepuluh Nopember (ITS), Indonesia has created an innovative Rapid Diagnostic Microfluidic Biosensor detection tool called NeuroCube which is capable of detecting neurological disorders or disorders of the central nervous system and peripheral nervous system.

The idea to develop this biosensor began with awareness of the increasing cases of mental disorders among students. Apart from that, the complexity of diagnosing mental illness and the tendency of patients to give answers that are not appropriate to their condition when seeing a psychologist is a matter of concern.

This biosensor is inspired by the concept of litmus paper which can change colour when it reacts with acids or bases. This concept was then applied to neurotransmitter compounds such as dopamine, glutamate, and Nicotinamide Adenosine Dinucleotide Hydrogen (NADH) in urine samples.

From the samples that have been obtained there will be a colour change which can provide an indication of the concentration level of compounds that can detect six neurological disorders. These disorders include dementia, obsessive–compulsive disorder (OCD), Attention Deficit Hyperactivity Disorder (ADHD), bipolar disorder, schizophrenia and Alzheimer's.

In its development, the team was able to combine four important components, namely microfluidic biosensor paper, Raspberry Pi miniprocessor, Liquid Crystal Display (LCD) touch screen, and LED lights into a tool called NeuroCube. This innovation is ultimately claimed to be able to detect neurological disorders in a person using a simple method, namely colorimetry. For example, dopamine which will change colour from clear to yellow to red according to the concentration of the compound.