Affordable genetic diagnostic technique for target DNA analysis developed

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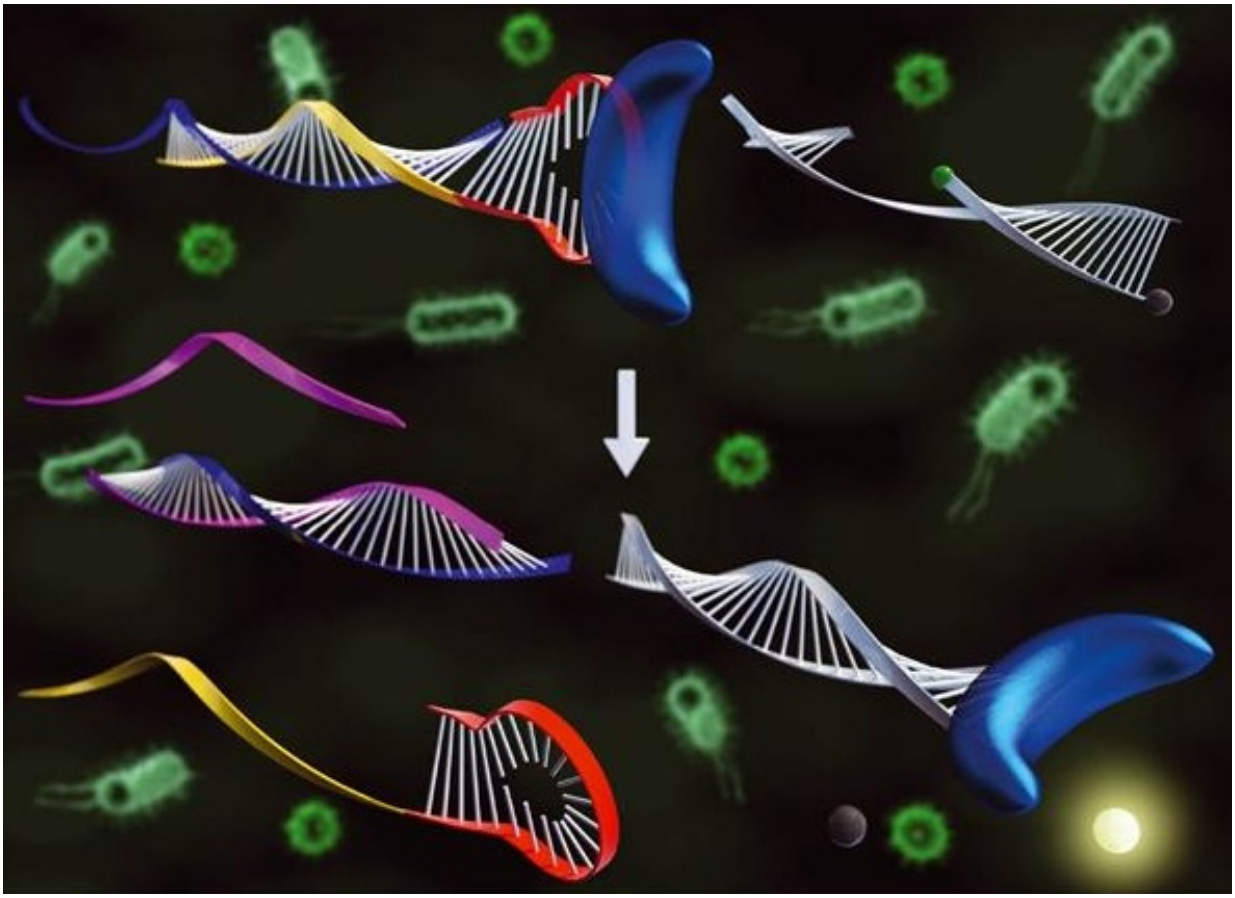

A schematic image of target nucleic acid extracted through the activation and deactivation of DNA polymerase. Copyright : KAIST

Professor Hyun-Gyu Park of the Department of Chemical and

Biomolecular Engineering at Korea Advanced Institute of Science and Technology (KAIST) has developed a technique to analyze various target DNAs using an aptamer, a DNA fragment that can recognize and bind to a specific protein or enzyme. This technique will allow the development of affordable genetic diagnosis for new bacteria or virus, such as Middle Ease Respiratory Syndrome (MERS). The research findings were published in the June issue of *Chemical Communications*, issued by the Royal Society of Chemistry in the United Kingdom. The paper was selected as a lead article of the journal.

The existing genetic diagnosis technique that is based on molecular beacon probes requires a new beacon probe whenever a target DNA mutates. Therefore, it was costly to analyze various target DNA fragments. To address this problem, Professor Park's team designed an aptamer that binds and deactivates DNA polymerase. The technique was used in reverse, so that the aptemer does not bind to the polymerase, maintaining its activated state, only if the target DNA is present.

The controlled activation and deactivation of DNA polymerase enables nucleic acid to elongate or cut down, making it possible to measure fluorescence signals coming from TaqMan probes. This same probe can be used to detect various target DNAs, leading to the development of a new and sensitive genetic diagnostic technique.

Unlike the existing molecular beacon probe technique requiring a new probe for every target DNA, this new technique uses the same fluorescent TaqMan probe, which is cheaper and easier to detect a number of different target nucleic acid fragments. The application of this technique will make the process of identifying and detecting foreign DNAs, from pathogens such as virus and bacteria, more affordable and simple.

Professor Park said, "This technique will enable us to develop simpler

diagnostic kits for new pathogens, such as MERS, allowing a faster response to various diseases. Our technology can also be applied widely in the field of genetic diagnostics.

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