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New renal probe can help detect acute kidney failure earlier

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Natanael Melchor/Unsplash

Newly developed imaging probes could be used in an intensive care unit setting, where early detection of acute renal failure is crucial to a patient's survival.

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SINGAPORE — Scientists from the Nanyang Technological University (NTU) have developed a new imaging probe that could help with the earlier detection of acute kidney failure.

The renal probes are injected into the bloodstream and they light up when they detect molecular changes caused by the onset of acute kidney failure.

The probes could also potentially be used in urine test strips, making it a non-invasive method of detecting acute kidney failure.

At present, diagnostic platforms are unable to detect early-stage changes that underlie acute renal failure or the changes before the disease occurs.

In contrast, the probe developed by the NTU team is sensitive enough to track changes in the biological processes triggered by the onset of the condition.

When it was tested on mice models with drug-induced acute kidney failure, the probe detected the onset of the disease one-and-a-half days earlier than current molecular imaging procedures.

The probe was developed by Associate Professor Pu Kanyi and a team from NTU, a press release from the university said on Thursday (July 11).

Assoc Prof Pu said that he envisions the use of these probes in an intensive care unit setting, where early detection of acute renal failure is crucial to a patient's survival.

The kidney disease usually "occurs in a few hours or a few days", and is most common among patients who are critically ill.

Assoc Prof Pu, who is from the NTU School of Chemical and Biomedical Engineering, said: "For patients who are critically ill, like those in the intensive care unit, every minute is precious in reversing a condition like acute kidney failure, which can cause a patient's health to deteriorate rapidly."

He added that as the molecular renal probes follow the body's subtle changes "at the molecular level", this could help to arrest the development of the disease before it is too late, which is something existing diagnostic methods are unable to do.

Moving forward, the team plans to focus on refining the probes with urine samples from critically ill patients.

"We plan to do this by collaborating with medical institutions both in Singapore and overseas," Assoc Prof Pu said.

The team has filed a Singapore patent on this technology.