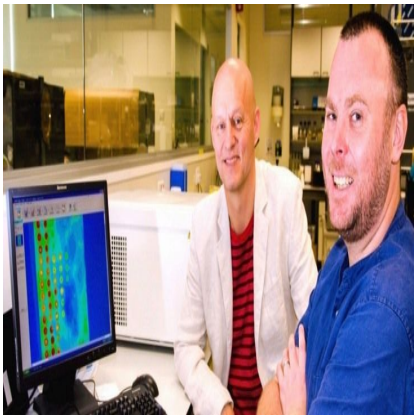
ICU
MANAGEMENT & PRACTICE

# New Technique Shows If Drugs Have Reached Intended Target



*Scientists at the Nanyang Technological University Developed innovative technique that can tell if drugs have hit their target in the human body. (Image courtesy of Nanyang Technological University)*

The search for new drugs, including those for cancer, is set to speed up thanks to a new research technique invented by scientists at the Nanyang Technological University (NTU).

Named the “Cellular Thermal Shift Assay” (CETSA), scientists can now know for sure if a drug had reached its target protein in the body, which is a critical step in determining the effectiveness of most medicines.

Presently, scientists can only hypothesise if a drug has indeed reached its target protein, leading to expensive and prolonged drug development process. CETSA will help scientists take out much of the usual trial-and-error guesswork from the drug development equation.

This research breakthrough was recently published in Science, one of the world’s top scientific journals.

Most drugs operate by binding to one or more proteins, which ‘blocks’ the proteins’ function. Scientists around the world face two common bottlenecks: how to identify the right proteins to target and how to design drug molecules which are able to efficiently seek out and bind to these proteins.

CETSA’s inventor, Professor Pär Nordlund from NTU’s School of Biological Sciences, said their new method will not only ease the two bottlenecks, but also has important applications in monitoring a patient’s progress, for example, during cancer treatment.

“With CETSA, we can in principle determine which drug and treatment regime is most effective at targeting the proteins in the tumour in cancer patients, and monitor when resistance is developing,” says Prof Nordlund.

**How CETSA works**

When drugs react with target proteins in a cell, the proteins are able to withstand higher temperature before unfolding and precipitating, that is, turning solid. An example of protein precipitation is when liquid egg white (which is protein) is cooked (turning solid) at high heat.

“By heating protein samples and finding out which proteins are ‘cooked’ and which are left ‘uncooked’ due it being more heat resistant, we are able to know if the drugs had reached their target cells and if it had caused the desired binding to the proteins, blocking its functions,” added Prof Nordlund, who is also a Professor of Biophysics at the Karolinska Institutet, one of Europe's most prestigious medical universities, located in Sweden.

“With CETSA, costly and challenging drug development cycles can potentially be made more efficient, as the method can be used as a stringent control step at many phases of the process. Other methods are available for indirect measurements of drug binding but they are often less accurate, and CETSA will be a valuable tool to complement these technologies,” said the Swedish professor.

This project took Prof Nordlund’s team three years and they are now in the process of developing a prototype device. They are also in talks with pharmaceutical companies who are interested to collaborate in research.

Prof Nordlund is a leading structural biologist instrumental in establishing the laboratory of the Structural Genomics Consortium at Karolinska Institutet (Stockholm), and had received the prestigious Göran Gustafsson prize in chemistry from the Swedish Academy of Sciences in 2001.

He is also a member of the Nobel Assembly at the Karolinska Institutet and the Chemistry Class at the Swedish Academy of Science, as well as a Reviewing Editor at Science Magazine. In addition, he is the co-founder of three biotech companies Evitra Proteoma, Sprint Biosciences and Pelago Bioscience.

Source: Nanyang Technological University

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