

Team develops AI model to improve patient response to cancer therapy

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Dr. Danh-Tai Hoang. Credit: The Australian National University (ANU).

A new artificial intelligence (AI) tool that can help physicians to select the most suitable treatment for cancer patients has been developed by researchers at The Australian National University (ANU).

DeepPT, developed in collaboration with scientists at the National Cancer Institute in America and pharmaceutical company Pangea Biomed, works by predicting a patient's messenger RNA (mRNA) profile. This mRNA—essential for protein production—is also the key molecular information for personalized cancer medicine.

The work appears in *Nature Cancer*.

According to lead author Dr. Danh-Tai Hoang from ANU, when combined with a second tool called ENLIGHT, DeepPT was found to successfully predict a patient's response to cancer therapies across multiple types of cancer.

"We know that selecting a suitable treatment for [cancer patients](#) can be integral to patient outcomes," Dr. Hoang said. "DeepPT was trained on over 5,500 patients across 16 prevalent cancer types, including breast, lung, head and neck, cervical and pancreatic cancers. We saw an improvement in patient response rate from 33.3% without using our model to 46.5% with using our model."

DeepPT builds on previous work by the same ANU researchers to develop a tool to help classify [brain tumors](#).

Both AI tools draw on microscopic pictures of patient tissue called histopathology images, also providing another key benefit for patients.

"This cuts down on [delays](#) in processing complex molecular data, which can take weeks," Dr. Hoang said. "Any kind of delay obviously poses a real challenge when dealing with patients with high-grade tumors who might require immediate treatment. In contrast, histopathology images are routinely available, cost-effective and timely."

More information: A deep-learning framework to predict cancer

treatment response from histopathology images through imputed transcriptomics, *Nature Cancer* (2024). [DOI: 10.1038/s43018-024-00793-2](https://doi.org/10.1038/s43018-024-00793-2)

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