Novel genetic priority score unveiled to enhance target prioritization in drug development

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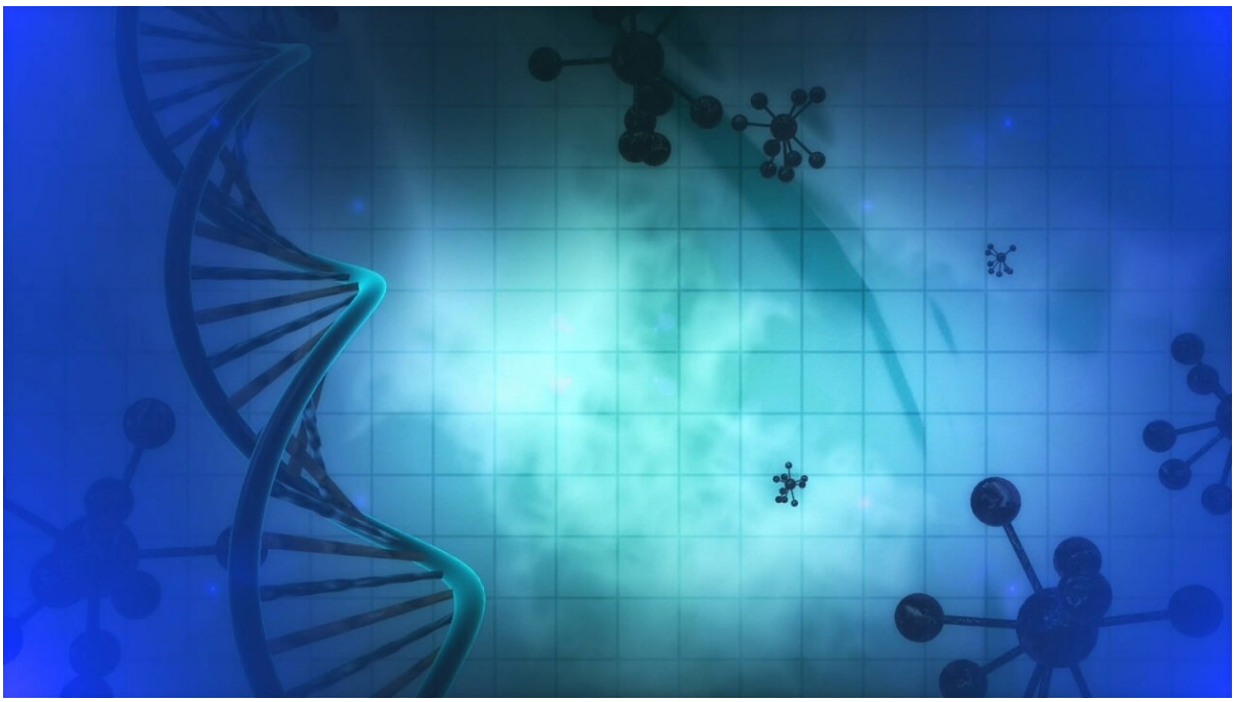

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Driven by the need for a better way to prioritize targets for drug development, the Icahn School of Medicine at Mount Sinai has led the development of a novel "genetic priority score" (GPS) that will integrate various types of human genetic data into a single easy-to-interpret score.

The paper, titled "Development of a human genetics-guided priority score for 19,365 genes and 399 drug indications," is published in the January 3 online issue of *Nature Genetics*.

Studies have shown that drugs have an increased likelihood of success in clinical trials when the genes they target have been demonstrated to have genetic support. The new tool integrates multiple lines of genetic evidence to prioritize these drug targets.

The score measures the general ability of a gene to be targeted by drugs; genes with a high score in the new tool are more likely to succeed as a drug target. The score identifies both known drug gene targets as well as potential novel therapeutic targets.

"We built a genetic priority score that was inspired by the realization that diverse human genetic data provides insights into drug targets, yet there was an absence of a cohesive strategy for integrating these various data types into an easily interpretable score. So we developed a computational score to prioritize drug targets for enhanced drug discovery," says Ron Do, Ph.D., senior study author and the Charles Bronfman Professor in Personalized Medicine at Icahn Mount Sinai. "Remarkably, several genes with high GPS were already known to be targeted by approved drugs, providing validation for the new tool."

The GPS, with its potential to streamline target prioritization, is positioned to have a significant impact on drug development. It offers a valuable resource for researchers seeking to optimize the selection of drug gene targets for enhanced efficiency in the drug development process, say the investigators.

"The rising cost of developing therapeutics, in the billions, is primarily due to high clinical trial failures, underscoring inefficiencies in drug development pipelines. Improving early-stage target prioritization is

critical. Studies consistently show that drug indications with human genetic support are more likely to succeed in trials and gain approval," says study first author Áine Duffy, a Ph.D. candidate in the lab of Dr. Do.

The researchers are encouraged by the developments but emphasize this represents only a first step for prioritization and the need for careful follow-up and further investigation of gene targets with high scores. Next, the investigators plan to refine the model by incorporating additional genetic features and evaluating more sophisticated algorithms for constructing the GPS.

More information: Development of a human genetics-guided priority score for 19,365 genes and 399 drug indications, *Nature Genetics* (2024). DOI: 10.1038/s41588-023-01609-2

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