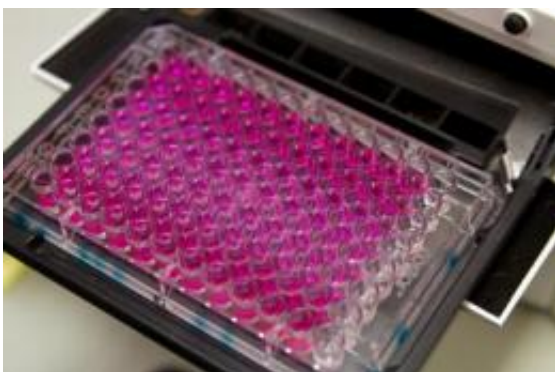


Web-based tools facilitate matching cancer drugs with gene targets

July 16 2012



This is a cell plate with cell lines from the NCI-60. Credit: NIH/National Cancer Institute

A new study details how a suite of web-based tools provides the research community with greatly improved capacity to compare data derived from large collections of genomic information against thousands of drugs. By comparing drugs and genetic targets, researchers can more easily identify pharmaceuticals that could be effective against different forms of cancer.

The newly updated software, called CellMiner, was built for use with the NCI-60, one of the most widely utilized collections of cancer cell samples employed in the testing of potential anti-[cancer drugs](#). The tools, available free, provide rapid access to data from 22,379 genes catalogued in the NCI-60 and from 20,503 previously analyzed [chemical](#)

[compounds](#), including 102 U.S. [Food and Drug Administration](#)-approved drugs.

The study, written by the scientists that developed the tools at the [National Cancer Institute](#) (NCI), part of the National Institutes of Health, appeared in the July 16, 2012, issue of [Cancer Research](#).

"Previously you would have to hire a bioinformatics team to sort through all of the data, but these tools put the entire database at the fingertips of any researcher," explained [Yves Pommier, M.D., Ph.D.](#), of the NCI's [Center for Cancer Research](#). "These tools allow researchers to analyze drug responses as well as make comparisons from drug to drug and gene to gene."

Figure 1

A.



B.



Step 1: Select analysis type

☐ 2-score comparison

☐ Gene-to-drug score (input HUGO names) ☐ Drug-to-drug score (input NCI60)

☐ Gene-to-drug comparison

☐ Gene-to-drug comparison for specific drug

☐ Pattern comparison

☐ Gene (HUGO name) ☐ Gene (NCBI) ☐ Drug (NCI) ☐ Pattern (in 60 element array)

Step 2: Input identifiers

☐ Input list ☐ Upload file

Input the identifiers:

Step 3: Your E-mail Address

Your results will be emailed to you when they are complete.

The CellMiner software suite, developed by the National Cancer Institute, provides the research community with greatly improved capacity to compare data derived from large collections of genomic information against thousands of drugs. By comparing drugs and genetic targets, researchers can more easily identify pharmaceuticals that could be effective against different forms of cancer. The newly updated software, called CellMiner, was built for use with the NCI-60, one of the most widely utilized collections of cancer cell samples employed in the testing of potential anti-cancer drugs. Credit: National Cancer

Genomic sequencing and analysis have become increasingly important in [biomedicine](#), but they are yielding data sets so vast that researchers may find it difficult to access and compare them. As new technologies emerge and more data are generated, tools to facilitate the comparative study of genes and potentially [promising drugs](#) will be of even greater importance. With the new tools, available at discover.nci.nih.gov/cellminer, researchers can compare patterns of drug activity and [gene expression](#), not only to each other but also to other patterns of interest. CellMiner allows the input of large quantities of genomic and drug data, calculates correlations between genes and drug activity profiles, and identifies correlations that are statistically significant. Its data integration capacities are easier, faster, and more flexible than other available methods, and these tools can be adapted for use with other collections of data.

Researchers looking at a particular drug can use the tools to access data from previous experiments done on that drug and analyze how the drug relates to other drugs and various gene profiles. As a case example for this study, the researchers compared drug activity levels and gene expression patterns from previous research to identify an investigational compound, called NSC732298, which is not currently being studied for colon cancer, but could be a potential therapy for the disease based on a CellMiner gene-drug match. In the same exercise, the researchers were able to identify that a second investigational drug that is being tested for colon cancer, called selumetinib, might also be effective against melanoma.

"We're looking forward to seeing how other people are going to use this tool to look at gene co-regulation, regulation of gene expression, and the

relationship between gene expression and cancer," said Pommier.

Provided by National Cancer Institute

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