Medical Xpress

New cancer biomarker may herald personalised medicine

March 23 2010

(PhysOrg.com) -- Scientists at Oxford University have led a study that shows how simple diagnostic tests to identify which patients will respond to which cancer drugs can be developed, potentially ushering in a new era of personalised cancer medicine.

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The Oxford researchers, with colleagues at the MD Anderson Cancer Center at the University of Texas, Houston, confirm their approach works in results published in the journal *PNAS*. They show that a specific protein can be used as a 'biomarker' to identify which patients with a rare type of non-Hodgkin lymphoma would benefit from a new class of cancer drug.

'This is the first report of a biomarker that predicts how a patient's cancer will respond to a cancer drug,' says Professor Nick La Thangue of Oxford University, who led the research. 'The presence or absence of the biomarker can now be used as a diagnostic test to identify which patients will benefit from this drug.

'It's one of the first examples of being able to personalise cancer medicine and tailor treatment for the individual patient,' he adds.

Biomarkers also have implications for reducing the cost burden of introducing new cancer drugs on the NHS, as only the subset of patients that would see a benefit would receive the treatment.

'New cancer drugs would be more likely to gain approval from the National Institute for Health and Clinical Excellence where biomarkers exist to identify the appropriate patient group,' believes Professor La Thangue, as their analyses of how well the treatment works in relation to how much it costs the NHS would improve.

Cancer drug discovery and development has changed significantly with greater understanding of what goes wrong in biological processes within cancer cells. New drugs target a variety of these cellular processes, but they will often only be effective in a subset of patients according to the profile of their particular cancer.

For example, trastuzumab (Herceptin) is an effective drug against breast cancer but only among those patients with cancers that express the protein which the drug targets. Patients without that protein see no benefit from the drug.

A biomarker is something that can be measured to predict whether a particular cancer will respond to treatment with a particular drug. Simple diagnostic tests based on the level of biomarker present can then flag up patients that will respond to that drug.

The Oxford and Texas team focussed on a new class of cancer drug called HDAC inhibitors because they stop the action of the protein histone deacetylase. SAHA (Vorinostat or Zolinza) was the first drug of this class to gain regulatory approval, and can be used in the treatment of a rare type of non-Hodgkin lymphoma known as cutaneous T-cell lymphoma, or CTCL.

The researchers used a whole-genome screen to identify those genes active in CTCL cells that govern whether the cancer cells respond to the drug SAHA or not. The screen works by silencing each gene in turn to assess its effect on how well the drug works. HR23B was found to determine the CTCL cells' sensitivity to SAHA.

The scientists now report that HR23B works as a biomarker in a clinically relevant setting. The presence of HR23B in biopsies from patients with CTCL predicted who would respond to the treatment 71.7% of the time.

With this first demonstration of a predictive biomarker for a cancer drug, the approach using a whole-genome screen can be done again and again to find biomarkers for different cancers and different drugs. The hope is that the identification of new biomarkers can become routine.

'This new work validates our approach for identifying biomarkers,' says Professor La Thangue of the Department of Clinical Pharmacology. 'It should be possible to find biomarkers for every drug on the market and every drug in development and truly personalise cancer medicine.

'You can imagine in the future a biopsy will be taken of a patient's tumour and screened for the presence of a hundred different biomarkers. They'll then be given a cocktail of drugs that is tailored for the profile of their particular cancer,' he adds.

More information: PNAS - www.pnas.org/

Provided by Oxford University