

Researchers find gene that turns up effect of chemotherapy

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Chemotherapy is one of the most common treatments for cancer patients. However, many patients suffer from serious side-effects and a large proportion does not respond to the treatment. Researchers from the Biotech Research and Innovation Centre (BRIC) and Center for Healthy Aging, University of Copenhagen, now show that the gene FBH1 helps turn up the effect of chemotherapy.

"Our results show that the gene FBH1 is crucial in order for some chemotherapeutics to become active in the body and kill the [cancer cells](#). If we can find a feasible method to increase the activity of the gene, we can use our cells' own resources to improve [cancer treatment](#), says associate professor Claus Sørensen who has lead the team of researchers behind the results.

Own gene helps chemotherapy fight cancer

The researchers have used a method called [RNA interference](#) to study whether some of the genes in our DNA are important for cancer cells to react to certain chemotherapeutics. "By using the method to remove single genes from cancer cells and then exposing the cells to chemotherapy, we found that FBH1 is important for the effect of the chemotherapy. Actually, the presence of the gene was an absolutely requirement in order to effectively kill the cancer cells with the type of chemotherapeutics we have studied, says postdoc Kasper Fugger who has led the experimental part of the investigation.

Chemotherapy act by exposing cancer cells to a kind of [extreme stress](#) when they divide. The result is detrimental damage to the cells' DNA that cannot be repaired, causing the cells to die. The new results show that it is in fact FBH1 that contributes to the formation of [DNA damage](#) when treating with chemotherapy and this knowledge can be used to optimize [cancer therapy](#).

Selection of patients for chemotherapy

In the last decade it has become clear that targeted treatment to individual [cancer patients](#) is crucial for an effective treatment with least possible side-effects. By assessing the presence of FBH1 in a tumour the doctors can get an indication of whether the patient will benefit from chemotherapy.

"Our results could help indicate that patients with low or no FBH1 in the cancer cells will not benefit from certain types of chemotherapy, but should be administered another type of treatment. So by using the genetic fingerprint of a tumour doctors can adjust the treatment to individual patients, says Claus Sørensen.

The next step - finding the FBH1 volume knob

The next step for the research team is to investigate the presence of changes, so-called mutations in FBH1. Identifying mutations rendering cancer cells resistant to certain [chemotherapeutics](#) can be used to target the treatment even better to individual patients. Another goal for the researchers is to find a way to turn up the activity of FBH1 in cancer cells.

"Our hope is to find a method to boost the activity of the FBH1 gene in cancer cells since this will make them more sensitive to chemotherapy.

Alternatively, we may find a way to simulate an effect similar to that of FBH1, which can be used as additional treatment in order to sensitise cancer cells to chemotherapy. If we achieve this, more patients will benefit from the treatment, says Kasper Fugger.

More information: FBH1 co-operates with MUS81 in inducing DNA double-strand breaks and cell death following replication stress, Kasper Fugger, Wai Kit Chu, Peter Haahr, Arne Nedergaard Kousholt, Halfdan Beck, Miranda J. Payne, Katsuhiko Hanada, Ian D. Hickson, Claus Storgaard Sørensen; *Nature Communications*, January 29, 2013.

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