'DIMming' cancer growth -- STAT: Diindolylmethane suppresses ovarian cancer

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Ovarian cancer is a major cause of death worldwide. Approximately 25,000 women will be diagnosed with ovarian cancer this year and 15,000 women will die from it in the United States alone. The novel anti-cancer drug diindolylmethane (DIM) has been shown in laboratory to inhibit the growth of ovarian cancer cells. New research published in BioMed Central's open access journal *BMC Medicine* has looked in detail at the action of DIM and showed that it works by blocking the activation and production of the transcription factor STAT3. DIM also enhances the anti-cancer effect of the platinum-based chemotherapy drug cisplatin.

Scientists from Texas Tech University Health Sciences Center, Amarillo already knew that DIM inhibited the growth of ovarian cancer cells but have now found that DIM causes ovarian cancer cell death (apoptosis). Not only was DIM able to kill cells but it also prevented cell invasion and angiogenesis, both of which are necessary for a cancer to grow.

STAT transcription factors are involved in the growth and survival of cells and are switched on by growth factors and immune system messengers (cytokines) such as IL-6. STAT3 is activated in 90% of ovarian cancers, however DIM was able to inhibit activation of STAT3 by preventing phosphorylation in response to IL-6. In a double whammy DIM also reduced the amount of IL-6 and the growth factor involved in angiogenesis (VEGF) in ovarian cancer cells.

Women with ovarian cancer are often treated with platinum containing

chemotherapy drugs. However patients treated with cisplatin often relapse or fail to respond and cisplatin resistance is known to be associated with an increase in STAT3. In this study the combination of cisplatin and DIM suppressed tumour growth in mice by an extra 50% compared to cisplatin alone.

Prof Sanjay K. Srivastava and Prabodh K. Kandala who performed the research explained, "DIM increases the effect of cisplatin, without being toxic to normal ovarian cells, by targeting STAT3 signaling and increasing apoptosis. Cisplatin is very toxic and has severe side effects. If co-treatment with DIM means that a low dose of cisplatin can be given to patients without the loss of therapeutic effect, but with reduced side effects, it would represent a significant breakthrough in clinical practice."

More information: Diindolylmethane suppresses ovarian cancer growth and potentiates the effect of cisplatin in tumor mouse model by targeting STAT3, Prabodh K Kandala and Sanjay K Srivastava, *BMC Medicine* (in press)

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