Stinging nettle chemical improves cancer drug

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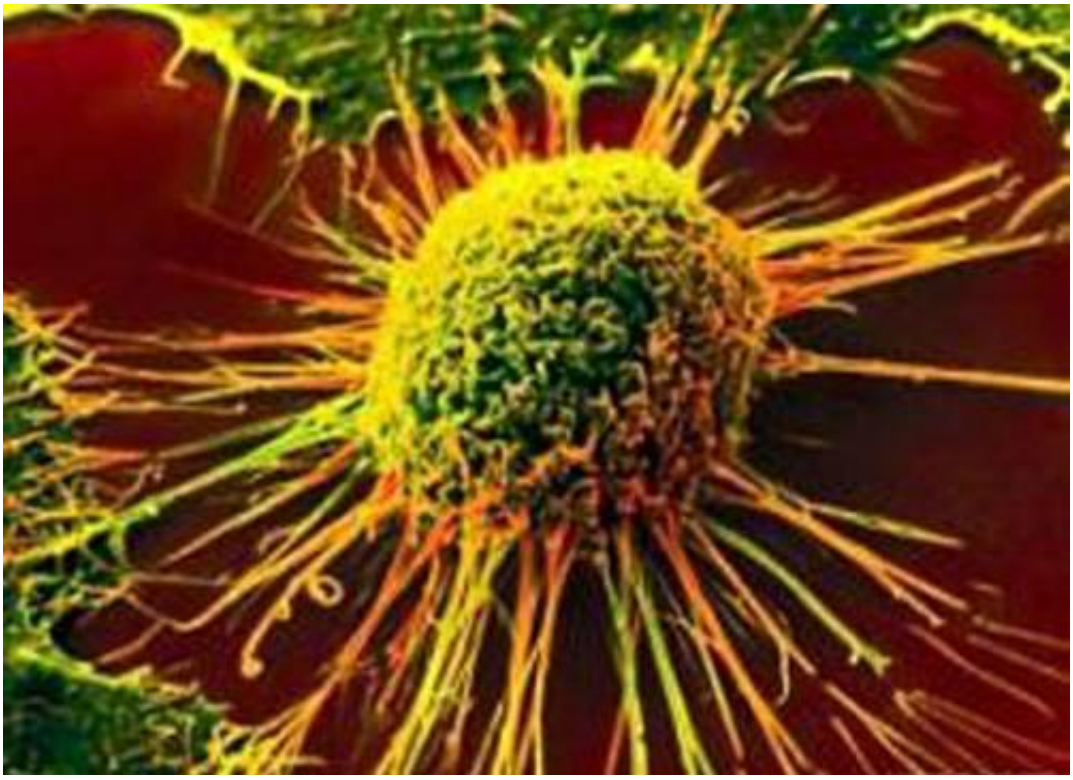

A cancer drug could be made 50 times more effective by a chemical found in stinging nettles and ants, new research finds.

Researchers at the University of Warwick found that when the chemical, Sodium Formate, is used in combination with a metal-based cancer

treatment it can greatly increase its ability to shut down cancer cells.

Developed by Warwick's Department of Chemistry, the drug, a compound of the metal ruthenium called JS07, is capable of exploiting a cancer cell's natural weaknesses and disrupts its energy generation mechanism.

Laboratory tests on ovarian cancer cells have shown that when used in combination with Sodium Formate JS07 is 50 times more effective than when acting alone.

Derived from formic acid which is commonly found in a number of natural organisms including nettles and ants, Sodium Formate (E-237) is more commonly used as a food preservative.

The Warwick researchers developed a novel method for binding Sodium Formate with JS07 to form a more potent form of the drug.

The researchers subsequently found that the potent form of JS07 acts as a catalyst when it interacts with a cancer cell's energy-generating mechanism. This interaction disrupts the mechanism, causing the cell's vital processes to cease functioning and for the cell to shut down.

Lead-researcher Professor Peter Sadler explains:

"Cancer cells require a complex balance of processes to survive. When this balance is disrupted the cell is unable to function due to a range of process failures and eventually shuts down. The potent form of JS07 has proven to be very successful when tested on ovarian cancer cells".

The combination of Sodium Formate and JS07 provides a number of potential benefits to cancer patients, including a reduction in the negative side-effects compared with other traditional cancer treatments:

"By itself, JS07 is capable of shutting down cancer cells but when used in combination with Sodium Formate this ability is significantly increased. As a result, lower doses would be required to target cancer cells - reducing both the drug's toxicity and potential side-effects.", says Professor Sadler.

A further benefit is that once the potent form of JS07 has interacted with a cell's energy generation mechanism the remaining non-potent JS07 molecules can then be reused in combination with a fresh supply of Sodium Formate.

"When the potent form of JS07 interacts with a cell's energy generation mechanism, the Sodium Formate is used up in the process, but the JS07 itself is still viable to be used again. When it comes into contact with fresh supply of Sodium Formate it can again become potent, making this an efficient potential treatment".

The research could also lead to substantial improvements in cancer survival rates. Co-researcher Dr Romero-Canelon says:

"Current statistics indicate that one in every three people will develop some kind of cancer during their life time, moreover approximately one woman dies of ovarian cancer every two hours in the UK according to Cancer Research UK. It is clear that a new generation of drugs is necessary to save more lives and our research points to a highly effective way of defeating cancerous cells"

The research, Transfer hydrogenation catalysis in cells as a new approach to anticancer drug design, is published by *Nature Communications*.

Provided by University of Warwick