Ovarian cancer researchers bring natural product β-escin to the fore

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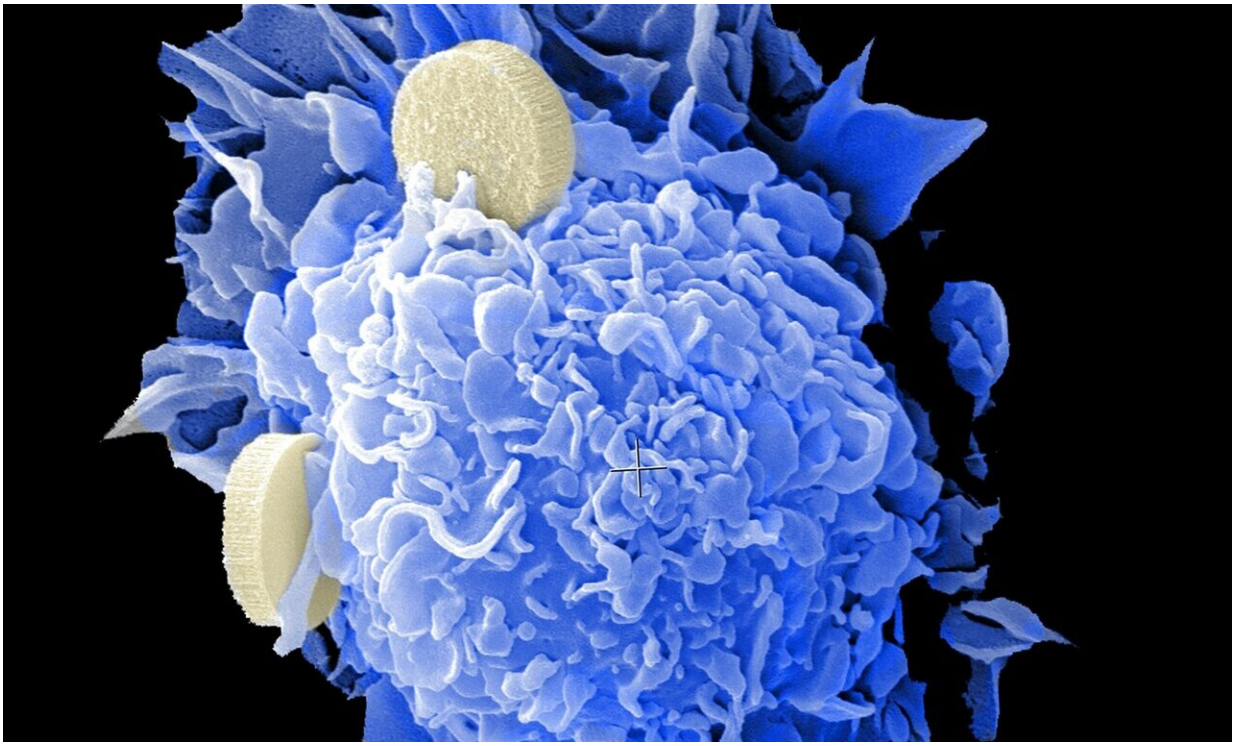

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For women with ovarian cancer, there is a high rate of mortality, in part due to the ease of cancer cell spreading, or metastasis, in the abdominal cavity. Current treatments can be expensive and have proven to be ineffective against long-term survival in these patients. It's one of the reasons many researchers have sought to identify natural products and

synthesized compounds with pharmacological effects against cancer cells.

Researchers at the University of Chicago Medicine Comprehensive Cancer Center recently published a study in the journal *Cancers* uncovering the effects that a natural product has on ovarian cancer metastasis. Hilary Kenny, Ph.D., and Ernst Lengyel, MD, Ph.D., lead the Ovarian Cancer Research Laboratory in the Department of Obstetrics and Gynecology. The lab's expertise in ovarian cancer biology is strengthened further by collaborations formed with other research groups.

Several years ago, the ovarian cancer researchers first began working with the National Center for Advancing Translational Science (NCATS), which provided high-throughput screening (HTS) facilities. HTS allows scientists to test simultaneously how well hundreds (or even thousands) of drug compounds work against cancer cells.

"We aimed to mimic the human situation by using primary human cells to reconstruct the lining of the abdominal cavity, where ovarian cancer cells metastasize," Kenny said.

Using a three-dimensional model, they examined the cross-communication of cancer cells with the abdominal cavity microenvironment and identified compounds that inhibited this interaction.

After HTS of more than 2,000 drugs using this cell-level model, Kenny and her colleagues identified the compound β-escin as a promising "hit" for ovarian cancer metastasis. β-escin is a chemical extracted from the horse chestnut seed. The results were published in a 2015 *Nature Communications* article.

For their recent paper, the researchers set out to learn more about how β-escin works in the context of ovarian cancer metastasis. Strikingly, their study found that β-escin reduced the metastatic spread of ovarian cancer cells when given either before or after the start of tumor growth in mice.

In the hands of other research groups who have investigated different types of cancer, β-escin has also shown beneficial anti-tumor growth effects. Although the exact target of β-escin remains unclear, the researchers explored the biological effects of the compound, which reinforces its strong efficacy in mouse models.

"The thing that was really exciting for us is that multiple independent investigators have identified the potential therapeutic effect of β-escin in different cancers," Kenny said. "Although recently there have been a number of drugs approved for ovarian cancer therapy, none has shown a significant benefit in overall survival."

The natural question, of course, is whether clinical trials have been carried out to investigate β-escin in humans. It turns out that there is only limited data in thyroid cancer patients; however, trials testing cardiac glycosides, which are similar compounds, are currently ongoing.

While the researchers are focused on ovarian cancer, Kenny would love to see a clinical trial in any cancer type testing the therapeutic potential of β-escin in cancer patients. Kenny believes that data from this study and others could build the case for translating β-escin as a potential new anti-cancer therapy.

More information: Hilary A. Kenny et al, The Natural Product β-Escin Targets Cancer and Stromal Cells of the Tumor Microenvironment to Inhibit Ovarian Cancer Metastasis, *Cancers* (2021). DOI: 10.3390/cancers13163931

Hilary A. Kenny et al, Quantitative high throughput screening using a primary human three-dimensional organotypic culture predicts in vivo efficacy, *Nature Communications* (2015). DOI: 10.1038/ncomms7220