

Flaxseed-fed chickens shed light on ovarian cancer

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This University of Illinois chicken is being used as a model to study ovarian cancer. U of I researchers have discovered that a diet enriched with flaxseed decreases the severity of ovarian cancer and increases survival in hens. Credit: © UIUC-ACES-ITCS: Riecks

In the race to find answers about ovarian cancer, researchers now have something to cluck about. For five years, University of Illinois researchers have been using the chicken as a model to study this deadly disease and have recently discovered that a diet enriched with flaxseed decreases severity of ovarian cancer and increases survival in hens.

Flaxseed is the richest plant source of alpha-linolenic acid, one type of omega-3 fatty acid. Several studies have already shown that [flaxseed](#) inhibits the formation of colon, breast, skin and lung tumors.

For these reasons, it was logical to study how omega-3 fatty acids affect ovarian cancer as there continues to be no effective treatment at this time, said Janice Bahr, a professor emerita in the U of I Department of Animal Sciences and one of the nation's leading poultry researchers.

According to Bahr, 25,000 women are diagnosed with ovarian cancer each year and 15,000 die. The incidences of death in other cancers have dropped recently, but ovarian cancer death rates have remained the same.

"The chicken is the only animal that spontaneously develops ovarian cancer on the surface of the ovaries like humans," Bahr said. "In this study, we evaluated how a flaxseed-enriched diet affected 2-year-old laying hens (hens that have ovulated as many times as a woman entering menopause)."

The results showed that hens fed a flaxseed-enriched diet for one year experienced a significant reduction in late-stage ovarian tumors.

"Most women diagnosed with ovarian cancer have a very poor prognosis because they are not diagnosed until stage 3 or 4 when the cancer has metastasized and spread to other parts of the body," Bahr said.

Hens fed the control diet had significantly more late-stage tumors that presented with fluid and metastases as compared to the hens fed a flaxseed diet. Though hens fed the flaxseed diet did not have a decreased incidence of ovarian cancer, they did experience fewer late-stage tumors and higher survival rates.

"In hens fed flaxseed, we found that more tumors were confined to the ovary and they had less metastatic spread," she said. "This is an important finding as the metastases that accompany late-stage ovarian cancer are the main cause of death from this disease. If the cancer is found at an early stage, when the tumor is still confined to the ovary, women have a much better prognosis and more treatment options."

In addition, researchers found that hens fed the flaxseed diet had better weight control which is important because obesity increases cancer risk. Both diets had equal caloric content, however the flaxseed-fed hens weighed less at six months than the control-fed hens. But at 12 months, the flaxseed-fed hens were the same weight and the control-fed hens had lost significant weight, which was indicative of their failing health. Ultimately, the flaxseed-enriched diet helped the birds maintain a healthy weight and resulted in less sickness and death.

"Through this research, we have proven that flaxseed supplementation for one year is able to reduce the severity of ovarian cancer in hens," she said. "These findings may provide the basis for a clinical trial that evaluates the efficacy of flaxseed as a chemosuppressant of ovarian cancer in women."

The cause of ovarian cancer remains unknown, but one of the most prevalent theories is the "incessant ovulation hypothesis," proposed by MF Fathalla in 1971. He suggests that inflammation associated with continuous ovulation leaves ovarian surface epithelial cells susceptible to malignant transformation. The observation that egg-laying domestic hens frequently develop ovarian cancer supports this hypothesis.

Bahr believes this hypothesis is valid and is currently in the middle of a four-year study to determine if long-term dietary intervention with flaxseed will reduce the incidence of [ovarian cancer](#) development. The hens started the flaxseed-supplemented [diet](#) at 22 weeks of age, as soon

as they commenced egg laying and before damage from ovulation had accumulated.

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