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Berry Chemoprevention Studies Now Have Human Applications

OSUCCC scientists are known for researching the chemopreventive effects of berries, most notably freeze-dried black raspberries (BRBs), which have been shown in animal studies to help prevent esophageal, colon and oral cancers. These berries contain phytochemicals – or natural compounds such as polyphenols, folic acid, carotenoids and anthocyanins – that inhibit transformation of cells from normal to malignant.

Many OSU animal studies involving BRBs have been conducted in the lab of Gary Stoner, PhD, whose team is now testing the berries' ability to prevent cancer in humans. Stoner's lab recently completed a phase I study to see how people would tolerate the high dietary levels of freeze-dried berries that would be needed for chemoprevention studies. The subjects did well, so the researchers are ready for phase 1-B studies to test anticancer activity of these berries among individuals at high risk for esophageal, colon and oral cancers. The study, funded in part by the U.S. Department of Agriculture, involves subjects with precancerous lesions of the esophagus or oral cavity.

OSUCCC scientists also have shown for the first time that dietary freeze-dried BRBs inhibit tumor formation in the oral cavity. This study, led by Christopher Weghorst, PhD, used as a model the hamster cheek pouch, which mimics the development of human squamous cell carcinoma (SCC) of the oral cavity – a disease linked to long exposure to alcohol and tobacco. A potential application of this and future studies is devising a berry-based food product to prevent premalignant lesions of the oral cavity or to prevent cancer recurrence following removal of a lesion.

Stoner and colleagues in other OSU labs are also trying to determine which BRB compounds are the most effective chemopreventive agents. They have examined organic extracts from the berries and found that some of the extracts inhibit cell transformation and proliferation.

One example is a recent study involving an ethanol-derived extract called RU-Et. This had been shown in previous OSU studies to inhibit transformation of rodent cells, and scientists in the labs of Steven D'Ambrosio, PhD, and Susan Mallery, DDS, PhD, recently tested its anticancer efficacy in human cells isolated from SCC tumors of the oral cavity. Results showed that RU-Et suppresses cell proliferation while retaining cell viabilities, and that it induces apoptosis (natural cell death), an important mechanism for preventing cancer. The researchers thus concluded that RU-Et could prevent progression of a precancerous condition called epithelial dysplasia to oral SCC.

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