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Black raspberries show potential against cancer

By Stephen Daniells, 28-Aug-2008

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Concentrated freeze-dried extracts from black raspberries may help prevent certain cancers by acting on multiple gene targets, suggests a new study with rats.

Over 2,000 genes were affected in the oesophagus of animals when they were exposed to a carcinogen, but normal function was restored in 462 genes after supplementation with freeze-dried black raspberries, researchers from Ohio State report.

Reporting their findings in the journal *Cancer Research,* the researchers state that 53 of these genes may be especially important in the development of cancer.

"We have clearly shown that berries, which contain a variety of anticancer compounds, have a genome-wide effect on the expression of genes involved in cancer development," said lead researcher Gary Stoner.

"This suggests to us that a mixture of preventative agents, which berries provide, may more effectively prevent cancer than a single agent that targets only one or a few genes."

The researcher added that the fruit contain many different types of nutrients, including vitamins, minerals, phenols and phytosterols, many of which individually have been reported to prevent cancer in animals.

"Freeze drying the berries concentrates these elements about ten times, giving us a power pack of chemoprevention agents that can influence the different signalling pathways that are deregulated in cancer," added Stoner.

Study details

The Ohio-state researchers fed rats a standard diet or the diet supplemented with five per cent black-raspberry powder. After three weeks they were exposed to the compound N-nitrosomethylbenzylamine (NMBA), which is known to cause cancer. This led to a change in 2,261 genes in the oesophagi of the rats.

"These changes in gene expression correlated with changes in the tissue that included greater cell proliferation, marked inflammation, and increased apoptosis," explained Stoner.

However, in the animals fed the raspberry powder, 462 of these genes showed near-normal levels of activity, compared with controls. The tissue also appeared more normal and healthy, said the researchers.

Moreover, of these 462 genes restored to normal, 53 of them were the same as observed in an earlier study that used dietary phenylethyl isothiocyanate (PEITC), a compound found in cruciferous vegetables.

"Because both berries and [PEITC] maintain near-normal levels of expression of these 53 genes, we believe their early deregulation may be especially important in the development of oesophageal cancer," said Stoner.

"What's emerging from studies in cancer chemoprevention is that using single compounds alone is not enough," he added. *"And berries are not enough. We never get 100 percent tumour inhibition with berries. So we need to think about another food that we can add to them that will boost the chemopreventive activities of berries alone."*

The study was funding by the National Cancer Institute.

The study taps into the growing field of nutrigenomics, seen by many as the future of nutrition. Nutrigenomics is defined as how food and ingested nutrients influence the genome (personalised nutrition). Nutrigenetics is defined as how a person's genetic make-up affects a response to diet (individual nutrition). The difference between the two is important.

Source: *Cancer Research*
Volume 68, Pages 6460-6467
"Carcinogen-Altered Genes in Rat Esophagus Positively Modulated to Normal Levels of Expression by Both Black

Raspberries and Phenylethyl Isothiocyanate"
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