

Mustard and Broccoli Beat Prostate Cancer

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Earlier clinical and laboratory studies have shown that sulforaphane, a compound that occurs in significant quantities in mustard, wasabi (and cruciferous vegetables such as broccoli, Brussels sprouts and others) has unique and highly effective anticancer activities.

Although sulforaphane has shown strong activity against respiratory diseases and malignancies such as cancers of the lung, breast, stomach and colon, the research spotlight has once again focused on its role as a potential treatment and preventive agent for prostate cancer.

Prostate cancer is one of the most prevalent cancers in the west and accounts for the annual death of over 25,000 men in the USA alone. Although early detection and treatment are the mainstays of the management of this scourge, medical scientists are turning their attentions to safe, food based compounds that demonstrate strong cancer fighting properties.

Writing in the journal, *Molecular Cancer*, Scientists at the Norfolk and Norwich University Hospital in the United Kingdom have published a paper that describes the phenomenal ways in which sulforaphane acts against the commonest form of prostate cancer - adenocarcinoma.

How prostate cancer develops

Adenocarcinoma of the prostate develops when epithelial cells of the prostate gland change into pre-cancerous cells. The reason they do so is that the aging prostate cells either drop their **PTEN gene** or lose the ability to activate this important anti-cancer gene; the PTEN gene's vital role is to oppose the cancer promoting **PI3K/AKT enzyme**.

If the PTEN gene is inactivated or damaged during the process of DNA replication, the prostate gland loses its ability to counter the PI3K/AKT enzyme and the pre-cancerous cells progress into full blown cancer cells.

Sulforaphane and prostate cancer

This study has shown us something really interesting - that sulforaphane has almost no activity on healthy prostate cells that have normally paired PTEN genes and full expression (functioning) of these genes.

However, if the PTEN genes become damaged or begin to malfunction only then do they become sensitive to the beneficial effects of sulforaphane. In other words sulforaphane has absolutely no effect on normal prostate tissue and it is only when prostate cells become pre-cancerous or fully malignant that it manifests its cancer fighting properties. This is an attribute known as **pathological-activated-therapy (PAT)** and is a rare and valuable asset when it comes to the search for bioactive compounds with therapeutic potential.

Sulforaphane works its therapeutic magic on abnormal prostate tissue in two ways:

- 1) It stimulates the activation of alternative gene splicing mechanisms so that normal, fully functional PTEN genes can be formed during cell division and the creation of new DNA strands.
- 2) It stimulates the expression of existing PTEN genes that, for various reasons, have been

inactivated.

By means of these two mechanisms this compound has the remarkable ability to actually stimulate the repair of damaged DNA as well as switch on previously inactive cancer-fighting genes.

Sulforaphane has two other attributes that makes the daily consumption of this spice-derived compound an absolute necessity.

- It is a powerful eliminator of heterocyclic amines - these are cancerous compounds produced when meat is cooked at high temperatures that occur when using methods such as grilling or frying. Heterocyclic amines are thought to be one of the main reasons why the incidence of prostate cancer is so high in countries where large quantities of meat (especially beef) are consumed. Although it does not neutralize these compounds directly, sulforaphane accelerates their elimination from the body.
- Although sulforaphane is not an antioxidant itself, it stimulates the production of the body's own antioxidants such as glutathione.

As well as giving us a clearer insight into sulforaphane's anticancer properties this study also underlines the importance of the foods that supply us with this key phytonutrient.

These foods 'cut the mustard'

Whether you have a prostate gland or not, a daily serving of a spice such as mustard, wasabi, horseradish or one or more of the other brassica vegetables (broccoli, Brussels sprouts, cabbage, cress, rocket and others) should be an essential part of your diet.