

## GLUTATHIONE & CANCER

Cancer cells and normal cells are known to respond differently to nutrients and drugs that affect glutathione status.

Numerous studies have shown that tumor cells have elevated levels of glutathione levels, which confers resistance to chemotherapy drugs.

One of the challenges of cancer therapy is how to deplete tumor cells of glutathione, so as to make them more vulnerable to the effects of chemotherapy drugs, while at the same time allowing normal cells to remain relatively unaffected by chemotherapeutic drugs.

A number of new findings have emerged that take into consideration the role of glutathione in pathways that promote programmed cell death (apoptosis) in cancer cells.

A German study has reported that glutathione (GSH) plays a critical role in cellular mechanisms that result in cell death. The study found that cancer cells resistant to apoptosis had higher intracellular GSH levels.

Depletion of glutathione in these tumor cells made them more vulnerable to the effects of anticancer drugs or the gene that promotes apoptosis (CD95 or APO-1/Fas). The researchers concluded that apoptosis resistance in tumor cells depends, at least in part, on intracellular GSH levels. (1)

In another study conducted in Spain, researchers found that lowering GSH concentration may be convenient not only for the efficiency of chemotherapy, but also to induce a rather fast and direct apoptosis mechanism in tumor cells. (2)

Based on that premise that the glutathione-S-transferase enzyme is expressed at high levels in many tumors, researchers at the Fox Chase Cancer Center in Pennsylvania, went on to design a novel prodrug (PABA/NO).

The glutathione-s-transferase in tumor cells converts PABA/NO to lethal nitric oxide, resulting in death of the tumor cell. The prodrug was shown to have antitumor effects in an animal model for human ovarian cancer. (3)

In the fourth study, Polish researchers found that ingesting a selenium supplement is beneficial, as a supportive element in chemotherapy. (4)

Selenium is a co-factor of the enzyme glutathione peroxidase [GSH-P(x)] and was found to significantly increase the activity of GSH-P(x) in patients receiving the supplement.

A previous clinical study by the same researchers recommended the administration of selenium in patients with ovarian cancer undergoing multi-drug chemotherapy. (5)

Another interesting study by researchers in Texas showed that your chances of surviving a type of brain cancer, called primary malignant glioma, could depend on the type of glutathione-s-transferase (GST) gene you were born with.

Having a combination of a two specific variants of GST (germ-line GSTP1\*A/\*A and GSTM1 null genotype) confers a survival advantage in some types of brain cancers, but also comes with an increased risk of adverse events related to chemotherapy. (6)

There is compelling evidence to suggest a crucial role for glutathione and substances that target glutathione metabolism in the prevention and treatment of cancer.

Un-denatured whey protein is one of the natural foods known to selectively deplete cancer cells of their glutathione, thus making them more susceptible to such cancer treatments as radiation and chemotherapy. (I – Rebecca Montrone – use S-acetyl-l-glutathione, which has been studied and demonstrated to be better absorbed intracellularly than even IV glutathione treatments).

Disclaimer: The information here is not provided by medical professionals and is not intended as a substitute for medical advice. Please consult your physician before beginning any course of treatment.

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#### About The Author

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