How To Activate Cancer-Preventing Protein NRF2

Zhang D.D., Chapman E. "The role of natural products in revealing NRF2 function." *Natural product reports* vol. 37,6 (2020): 797-826. doi:10.1039/c9np00061e. Southwest Environmental Health Science Center. Summary by Devin Ritter.

NRF2 is a protein found naturally in your body. It helps protect your body from oxidative damage, which can include degraded cell tissue and DNA damage. For a long time, NRF2 has been intentionally activated by medications to prevent cancer and tumors. However, recent findings suggest that constant, high levels of NRF2 have negative effects on the body. This can lead to problems like diabetes and an increased risk of cancer.

This study, conducted by Dr. Zhang and Dr. Chapman from the University of Arizona, describes how NRF2 is activated in the body and reveals some negative effects of NRF2 activation. In this study, researchers found that animals exposed to NRF2 activators were less likely to develop cancerous tumors. This is consistent with previous research showing the chemopreventive properties of NRF2.

There are multiple ways to "activate" NRF2. Some of these activation methods include exercise, fasting, and eating foods that contain NRF2 activators. These foods are generally natural products like plants. Broccoli, kale, and cabbage are excellent examples of such plants. This is because they all contain the compound Sulforaphane, which is the most potent and effective NRF2 activator. Turmeric also activates NRF2, although it is weaker because it contains the compound Curcumin instead of Sulforaphane.

Meet the Researchers

Dr. Donna Zhang is a professor of Pharmacology and Toxicology at the University of Arizona. In her lab, she studies how NRF2 functions in the human body and aims to design medications that target NRF2 if activation levels are too high.

Dr. Eli Chapman is an associate professor of Drug Discovery & Development at the University of Arizona. One of the goals of his chemical biology lab is to target NRF2 in the hopes of preventing cancer.

Although NRF2 has many benefits, it can also be detrimental to health when too much of it is activated too often. In fact, NRF2 has been proven to be at the heart of many neurological diseases. This is because the protective properties of NRF2 can be taken over by malignant cells, giving these malignant cells the ability to survive in tough conditions. With this survival, these cells can then mutate and begin cancerous growth. Therefore, it is important to study NRF2 inhibitors to prevent and treat neurological diseases caused by excessive activation of NRF2.

Links: The Role of Natural Products in Revealing NRF2 Function (nih.gov)

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