Almost half of all cancer patients receive radiation therapy as a form of treatment. Nearly all these people experience damage to healthy tissue as well as their cancerous tissue. This damage is caused by the ionizing radiation used in cancer treatment. Ionizing radiation can cause a variety of issues, ranging in severity from mere discomfort to serious tissue damage. One such issue is radiation-induced dermatitis. Dermatitis is often compared to eczema, and is a condition where the skin becomes red, swollen, and blistered. This condition can greatly reduce the quality of life for cancer patients. It is currently treated only with saline soaks and topical creams, which reduce pain but do not prevent the condition from happening.

In this study, researchers wanted to test how NRF2 prevents radiation-induced dermatitis by protecting skin cells. NRF2 is a protein that tells a cell when oxidative damage is happening. NRF2 then activates genes which cause the cell to produce antioxidant molecules. These antioxidant molecules help stop the oxidative damage from happening to the cell. Studies show that because of this process, NRF2 helps protect skin cells from damage.

**Diet and NRF2:**

You can support the activation of NRF2 in your body partially through your diet. Foods like olive oil or the purple sweet potato are high in NRF2 activators.

Researchers examined the effect of NRF2 on radiation damage by comparing two mice in a lab. One of the mice had the NRF2 protein while the other did not. Results showed that the mouse without the NRF2 protein had much more tissue damage from radiation-induced dermatitis than the mouse with the protein.

Next, researchers tested how bixin, which was applied topically to skin, helped prevent further damage. Bixin is an organic compound found in annatto seeds. It is known for its ability to help activate the NRF2 protein. Results of this experiment showed that the application of bixin to skin helped stop dermatitis from occurring. This is very important to the future of cancer treatment because this is the first confirmed use of bixin to help prevent radiation-induced dermatitis. Reducing the tissue damage from radiation cancer treatment would hugely improve the quality of life of many cancer patients.

Links: https://doi.org/10.1016/j.redox.2020.101714

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