

MEDICAL BREAKTHROUGHS **RESEARCH SUMMARY**

TOPIC: CHEMO BRAIN: BATTLING THE RED DEVIL
REPORT: MB #4846

BACKGROUND: Doxorubicin is a cytotoxic chemotherapy drug and an antitumor antibiotic in the anthracycline group. Doxorubicin is semi-synthetically produced and is the optimum treatment for many different kinds of cancers including breast, ovarian, leukemia, lymphoma, Wilms tumor, neuroblastoma, and sarcoma. The most notable visual attribute of this chemotherapy agent is its bright red color. Administration schedules vary depending on diagnosis as each cancer will require a different number of cycles. The side effects of this drug can vary widely. Other side effects can include red streaking or a flare-up type reaction along the vein of infusion or facial flushing.

(Source: <https://voice.ons.org/news-and-views/outpatient-oncology-drug-series-doxorubicin-is-the-infamous-red-devil>)

DIAGNOSING: Another lesser-known side effect of chemotherapy is neurotoxicity causing cognitive dysfunction, commonly called "chemo brain." It affects up to 75 percent of cancer patients. However, physicians have only recently begun to recognize this consequence of treatment. Patients have reported symptoms of fatigue, memory loss, depression, anxiety, and increased stress. Through MRI imaging studies, researchers concluded that chemotherapy does have an effect on cognitive function in some patients. In an animal study, researchers found very selective changes in the functioning of animals that can't be written off as a side effect of chemotherapy. Similar evidence in human observance indicates that chemo brain is a real toxicity of the chemotherapy agents.

(Source: <https://www.brainandlife.org/articles/cognitive-problems-after-cancer-treatment-are-not-imaginary/>)

NEW RESEARCH: Researchers at UCF College of Medicine have received a \$3 million grant from the NIH to study doxorubicin, one of the most commonly used chemotherapy drugs, and its harmful effects on the heart and muscles. It was during this research that they discovered cell death in brain cells exposed to doxorubicin indicating neurotoxicity. Dinender Singla, PhD, lead researcher, theorized that exposure to doxorubicin causes "chemo brain" and later in life may cause Alzheimer's and dementia. Singla said, "This is caused by various neurochemical alterations, oxidative stress and abnormalities in the brain which is linked to cell death and dysfunction." To confirm the theory, they received an additional \$370,000 grant. In preliminary studies, it was noted that exposure to the doxorubicin treatment causes a "tangling" of neurons, vacuoles, or holes in brain cells and the presence of Hirano bodies which are proteins typically found in the nerve cells of Alzheimer's patients. Knowing the mechanisms of doxorubicin's effect on the brain is now helping these researchers develop potential solutions like targeted stem cell therapies.

(Source: <https://med.ucf.edu/news/ucf-researcher-tackles-chemo-brain/>)

FOR MORE INFORMATION ON THIS REPORT, PLEASE CONTACT:

SUHTLING WONG-VIENNEAU

SWONGVIE@UCF.EDU

If this story or any other Ivanhoe story has impacted your life or prompted you or someone you know to seek or change treatments, please let us know by contacting Marjorie Bekaert Thomas at mthomas@ivanhoe.com