

# ASK A PHARMACIST

**Certain citrus fruits may inhibit some liver enzymes.**



## Managing the effects of chemo brain and food-drug interactions

**What techniques can be used to manage the chemotherapy side effect known as chemo brain?**

*Chemo brain* and *chemo fog* are terms used by patients to refer to the cognitive dysfunction that occurs when undergoing chemotherapy. Symptoms include difficulties with memory, attention, and organization and a slowing of information processing. Patients experiencing chemo brain may complain of difficulty multitasking, forgetfulness, disorganization, and slowness in performing cognitive tasks. These symptoms typically begin shortly after initiation of treatment and may persist for years after completing treatment. This effect is noted with cytotoxic chemotherapy as well as hormonal and targeted

treatments, with reported incidence rates ranging from 15% to 70%.

Risk factors for chemo brain are not well established. As these symptoms can persist for years beyond treatment, chemo brain can have a significant effect on long-term quality of life. This subject is increasingly becoming the focus of researchers and patient advocacy groups. While studies are underway, there are currently no medications used to manage chemo brain.

Patients complaining of the above symptoms should be encouraged to discuss these symptoms with their oncologist. Other causes of these symptoms, such as depression, fatigue, and menopausal status, should be ruled out or managed appropriately. Management strategies are tailored to the patient's specific symptoms. Practical measures such as making lists, decreasing distractions during the workday, minimizing multitasking, and improving organization may help to increase functioning.

**I heard that citrus juices can interfere with drug metabolism. What should we tell patients about this potential interaction?**

Certain citrus fruits, including grapefruit, Seville orange, and bitter orange, may inhibit enzymes in the liver that are responsible for drug metabolism. This can result in an accumulation of the drug building up in the body over time. The cytochrome P-450 (CYP) enzyme 3A4

is the most affected; however, CYP1A2, 2C19, and other enzymes are affected to a lesser extent. Enzyme inhibition occurs within 4 hours of ingesting the fruit and can last for 3 to 7 days. Therefore, simply separating consumption of citrus fruits and medications by a few hours does not avoid this interaction.

When advising patients about citrus fruit consumption, their chemotherapy and other medications should be reviewed with a pharmacist to detect potential drug interactions. Patients regularly taking drugs predominantly metabolized by CYP3A4 (also known as 3A4 substrates) are best advised to avoid consuming citrus fruits. Patients who consume citrus fruits with these medications are likely to accumulate higher concentrations of the drug, leading to more adverse effects or toxicity. Examples of this include sedation with benzodiazepines (eg, alprazolam [Alprazolam Intensol, Niravam, Xanax, generics]) or myalgias with HMG-CoA reductase inhibitors (eg, simvastatin [Zocor, generics]). Patients taking 3A4 substrates occasionally may have lower risk for toxicity because there is less chance of accumulation with intermittent dosing (eg, ondansetron [Zofran, Zuplenz, generics] prior to chemotherapy every 3 weeks). That being said, avoidance of citrus juices when taking the substrate is the best practice in case repeat dosing is required (eg, delayed or breakthrough nausea requiring repeat doses of ondansetron). ■



**Lisa A. Thompson, PharmD**

Assistant Professor, Department of Clinical Pharmacy,  
University of Colorado Denver School of Pharmacy, Aurora,  
Colorado.