Green Tea Associated With Significant Drug Interactions

A review appearing in the July 2025 issue of *Clinical Pharmacology & Therapeutics* outlines several unique and significant drug interactions associated with green tea.

Green tea, a popular beverage worldwide, is growing in popularity in the US due to its purported benefits for weight loss, cancer prevention and cardioprotection, as well as its flavor. Green tea is consumed in many forms, including matcha, sencha, hojicha, brewed tea, and extract in capsule form. It is prepared from *Camellia sinensis* leaves and is rich in polyphenols known as catechins.

Oolong, black, and green tea all come from the leaves of *Camellia sinensis*, but they vary in catechin content due to differences in preparation. Oolong and black tea are fermented, which oxidizes the polyphenols, whereas green tea leaves are not fermented, thereby preserving the polyphenol structures.

Catechins are pharmacologically active compounds, and are now known to alter the activity of drug transporters, drug metabolizing enzymes, and drug solubility. Depending on exposure, the catechins in green tea can substantially affect the absorption of some medications. Factors affecting catechin exposure include formulation (sencha, matcha, brewed tea, extract, etc.), catechin concentration, amount and frequency of ingestion.

The systematic review referenced above examined 17 studies investigating the absorption of single doses in healthy volunteers given various medications with and without green tea in a crossover study design. The results were interesting. Bioavailability (the amount of medication reaching the bloodstream) was reduced by 24% for atorvastatin, 15-20% for rosuvastatin, 33% for digoxin, 70% for fexofenadine, 27-40% for folic acid, 66% for lisinopril, and 85% for nadolol. Conversely, sildenafil bioavailability **increased** by 50% with green tea. Other tested drugs, including fluvastatin, simvastatin, pseudoephedrine, and tamoxifen were **not** affected.

There are several mechanisms by which bioavailability can be affected by catechins:

- Transporter protein inhibition
    - Organic anion transporter peptide (OATP) inhibition in the liver and intestines.
    - P-glycoprotein (P-gp) transporter inhibition
- Altered drug metabolism activity
    - Cytochrome P450 enzyme activity, including CYP2B6, CYP2C8, CYP2C19, CYP2D6, CYP3A
    - Glucuronidation
- Reduced drug solubility

Current research suggests that the majority of green tea/chatechin-mediated drug interactions involve absorption and/or metabolism. Drug elimination does **not** appear to play a major role.

The effect of green tea appears to persist for at least one hour after consumption. Therefore, patients should be cautioned to space any interacting medications a minimum of one hour after green tea ingestion or perhaps avoid green tea products altogether.