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Benefits to timing chemotherapy to body's 'awake' time

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Not a morning person? Neither are your kidneys. Research from the Washington State University College of Pharmacy suggests there may be benefits to timing chemotherapy in cancer patients to the time of day the body is "most awake."

Daniel Sorensen, a doctor of pharmacy student at WSU in Spokane, is studying the commonly used chemotherapy drug cisplatin as part of the college's Pharm.D. honors program. He won a graduate student travel award from the American Society for Pharmacology and Experimental Therapeutics (ASPET) to present the research in San Diego in April.

"Our laboratory is interested in understanding how cancer treatment will be more effective by administering that treatment during certain cycles of circadian rhythms," said Panshak Dakup, a graduate student who works with Sorensen in the lab of assistant professor Shobhan Gaddameedhi.Cisplatin's poisonous effect on the kidneys is one of its major limitations as a chemotherapy drug. Sorensen's project explored the expression levels of both cisplatin transporter molecules and cisplatin-DNA repair activity, which are the key players of cisplatin resistance and toxicity, against a 24-hour cycle in mouse kidney and liver tissues.

"The circadian clock regulates certain signaling pathways that are key for minimizing drug toxicity in normal tissues and increasing anti-cancer therapeutic drug efficacy," said Gaddameedhi.

This means coordinating chemotherapy treatments with the time of day

when a patient's body is at peak expression of drug transporter molecules could help the patient's metabolism fight against drug toxicity and side effects. However, further study will be needed to pinpoint exactly how circadian dosing works before it can be tested in patient treatment plans.

Sorensen's project builds on previous research conducted by Gaddameedhi.

Up to 43 percent of genes in the body are regulated by the circadian clock. Among these are 175 drug targets that are clock-controlled genes and are targets of 56 of the top 100 best-selling drugs in the United States, said Gaddameedhi.

The Pharm.D. honors program provides opportunities for student pharmacists to explore areas of interest through developing and conducting formal research projects. This allows them to strategically align personal pharmacy interests and future career goals by providing deeper expertise in the interest area.

Research at the WSU College of Pharmacy supports the university's land-grant mission to address some of society's most complex issues, specifically WSU's efforts surrounding developing practical solutions to challenging problems in health care delivery, health care access and disease prevention.

Provided by Washington State University

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