

## Study finds low birth weight may cause lifelong problems processing medications

November 10 2010

---

New research has found that a mother's poor nutrition during pregnancy and nursing can cause problems for her offspring's ability to process medications, even well into adulthood.

The results of the study, by Oregon State University researchers, suggest that in the future physicians prescribing drugs ranging from Tylenol to cancer chemotherapies may need to factor birth weight along with [body weight](#) into dosing decisions for their patients.

In this laboratory study, the kidneys of underweight animals born to mothers fed low-protein diets during pregnancy and nursing had significantly less ability to process and transport drugs than animals whose mothers had adequate protein. This finding suggests that low birth weight may hinder the body's ability to process [therapeutic drugs](#), thereby jeopardizing their effectiveness.

The culprit appears to be a protein called a "drug transporter," said Ganesh Cherala, an assistant professor in the OSU College of Pharmacy.

"These transporters, which sit on the [cell membrane](#), grab the [drug molecules](#) from the blood and put them into the cell," he explained.

"Then a second set of transporters grab the drug from the cell and dump it into the urine."

In the low birth-weight animals, the transporters Cherala looked at – called OAT 1 (Organic Anion Transporter) and Pgp (P Glycoprotein) –

were anywhere from two to 50 times less prevalent than in the normal birth-weight animals, depending on age and transporter type. The gap showed up across genders, although females showed a greater deficit over time.

Fewer kidney transporters mean that less medication can be excreted out of the body, according to Cherala. The harmful results can range from toxic buildup of drugs in the blood to inadequate therapeutic benefits from the medication prescribed.

There are several ironies in this finding, Cherala pointed out. First, scientists know that low birth weight increases risks for diabetes in humans, as well as cardiovascular disease and metabolic syndrome (high levels of cholesterol, blood sugar and blood pressure). Thus, low birth-weight patients are more likely than normal birth-weight people to need medication during their lifetime. Yet these same subjects may be less able to process the drugs they need.

Second, researchers have found a link between low birth weight and adult obesity in humans. Because current weight is a major determiner of drug dosages (along with height, age and gender), obese patients typically get higher doses from their doctors than non-obese patients. But if a patient's obesity stems from low birth weight, the higher dose may be more than his or her body can process.

"Let's say I'm low birth weight, and because of that I become obese," said Cherala, who works at the OSU College of Pharmacy's Portland laboratory at the Oregon Health Science University downtown waterfront facility. "If you dose me because of that higher body weight, you're actually compounding the problem. You're making the assumption that if you're higher body weight, you have more transporters. Actually, it's exactly the opposite."

The findings will be presented on Nov. 16 at the annual meeting of the American Association of Pharmaceutical Scientists in New Orleans.

"The main goal of our lab is to discover how we can use [birth weight](#) to optimize the dose and personalize the dosing regimen," Cherala said.

Provided by Oregon State University

Citation: Study finds low birth weight may cause lifelong problems processing medications (2010, November 10) retrieved 19 April 2024 from <https://medicalxpress.com/news/2010-11-birth-weight-lifelong-problems-medications.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.