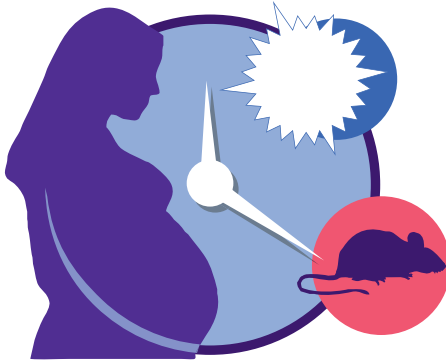


Is it possible that when we prefer to sleep—or when we find time to sleep—could be a key factor in preterm birth? It's one of the questions that scientists at Washington University in St. Louis will attempt to answer during their research into the potential role of circadian rhythms in preterm birth.

It's well known that our sleep schedules—as well as other activities such as when we tend to eat or prefer to exercise—are dictated by our circadian rhythms (circa = about + dia = day). These rhythms are influenced by the intervals of light and dark over 24 hours and other biological and environmental cues.

Circadian rhythms have wide-ranging influences on metabolism, mood, addictive behaviors, and the immune system. Even the onset of labor has a circadian rhythm—most women go into spontaneous labor between late night and early morning hours. Some studies have shown that altering maternal circadian rhythms can disrupt fetal development and lead to a condition in which a baby in the womb fails to grow at the expected rate.



Theme three will investigate whether disruption of circadian rhythms (termed “chronodisruption”) is a risk factor in preterm birth.

“Our hypothesis is that circadian rhythms in the mother, the fetus, or both, regulate timing of parturition (giving birth) and, when disrupted, may lead to preterm birth,” says Dr. Erik Herzog, Ph.D., in the Department of Biology

at Washington University in St. Louis. “We call this chronodisruption and it can be brought on by exposure to artificial light cycles, shiftwork, and by irregular meal and sleep times. Our goal in Theme Three is to determine the influence that disruptions of circadian rhythms can have on the risk for preterm birth.”

Other leaders working on this theme include Emily Jungheim, M.D., M.S.C.I and Sarah England, Ph.D., both in the Department of Obstetrics and Gynecology at Washington University in St. Louis, and Justin Fay, Ph.D., in the Department of Genetics.

THE RESEARCH GOALS OF THEME THREE ARE TO DETERMINE:

1. Whether genetic or environmental disruptions of circadian rhythms in mice lead to an enhanced risk of preterm birth. This will be achieved by measuring gestational length and daily activity with variations in genes that control circadian rhythms.
2. Based on the hypothesis that disruption of circadian rhythms in women with certain chronotypes (e.g., larks or owls) can increase their risk of preterm birth, the team will use various techniques to monitor and test 100 women pre- and post-conception in a pilot study. It will then be extended to a larger study of 1000 women.

FIRST USE OF MUNICH CHRONOTYPE QUESTIONNAIRE (MCTQ) IN PREGNANT WOMAN

In a novel development, Washington University in St. Louis scientists will employ the MCTQ, a questionnaire that rapidly and accurately captures chronotype and social jetlag. These results will be combined with urinary melatonin and cortisol excretion and data collected from activity watches that women will wear throughout pregnancy.

Once a woman delivers, data will be collected from the watches and analyzed for chronotype and chronodisruptions. This will determine whether there are some specific changes in sleep patterns, aside from those normally experienced during pregnancy, that carry a risk of preterm delivery.

“We also plan to correlate these data with genetic variation so that any outcome can be traced to a biological explanation,” adds Dr. Justin Fay. “We will investigate whether polymorphisms in genes known to influence circadian rhythms lead to greater susceptibility of preterm birth.”

“What’s exciting about this work,” adds Dr. Herzog, “is the transdisciplinary approach made possible with help from the March of Dimes. We are combining obstetrics and gynecology with biology and genetics, and working with the other centers.

This research study will determine whether our daily circadian rhythms may play a key role in bringing babies to term.

Moms and babies in the U.S. are facing an urgent health crisis:

- In this country 1 in 10 babies is born prematurely each year
- Worldwide 15 million babies are born prematurely each year.
- Premature birth and its complications are the largest contributors to infant death in the United States and globally.
- More than 380,000 babies are born prematurely in the U.S. each year.
- In addition to the human toll, the societal cost of premature birth is more than \$26 billion in the U.S. per year.
- Women of color are up to 50 percent more likely to give birth prematurely and their children can face a 130 percent higher infant death rate.
- In this country black women have maternal death rates over three times higher than women of other ethnicities.
- More than 20 percent of premature babies are born to black women—that's 1 in 5 babies.
- Employers pay 12 times as much in health care costs for premature/ low birthweight babies compared to babies born without these complications.

Because premature birth has many possible causes, each PRC is charged with exploring a different transdisciplinary research target that is likely to be crucial to the prevention of premature birth. Washington University in St. Louis have unique strengths in studying the following areas: sleep patterns, the role of the cervix, and building an imaging device to analyze uterine contractions—all to understand how to predict and prevent preterm birth.

“We are hopeful that our research will lead at some point to simple, low-cost prevention strategies: ensuring strict schedules based on a woman’s chronotype, or using melatonin or bright light therapy to regulate sleep. It’s a very hopeful time in research to prevent preterm birth.”

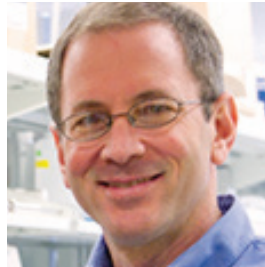
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For more information on how you can be a part of this effort please contact: 914.997.4492

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