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Uninfected individuals born to mothers living with HIV at risk of obesity and asthma

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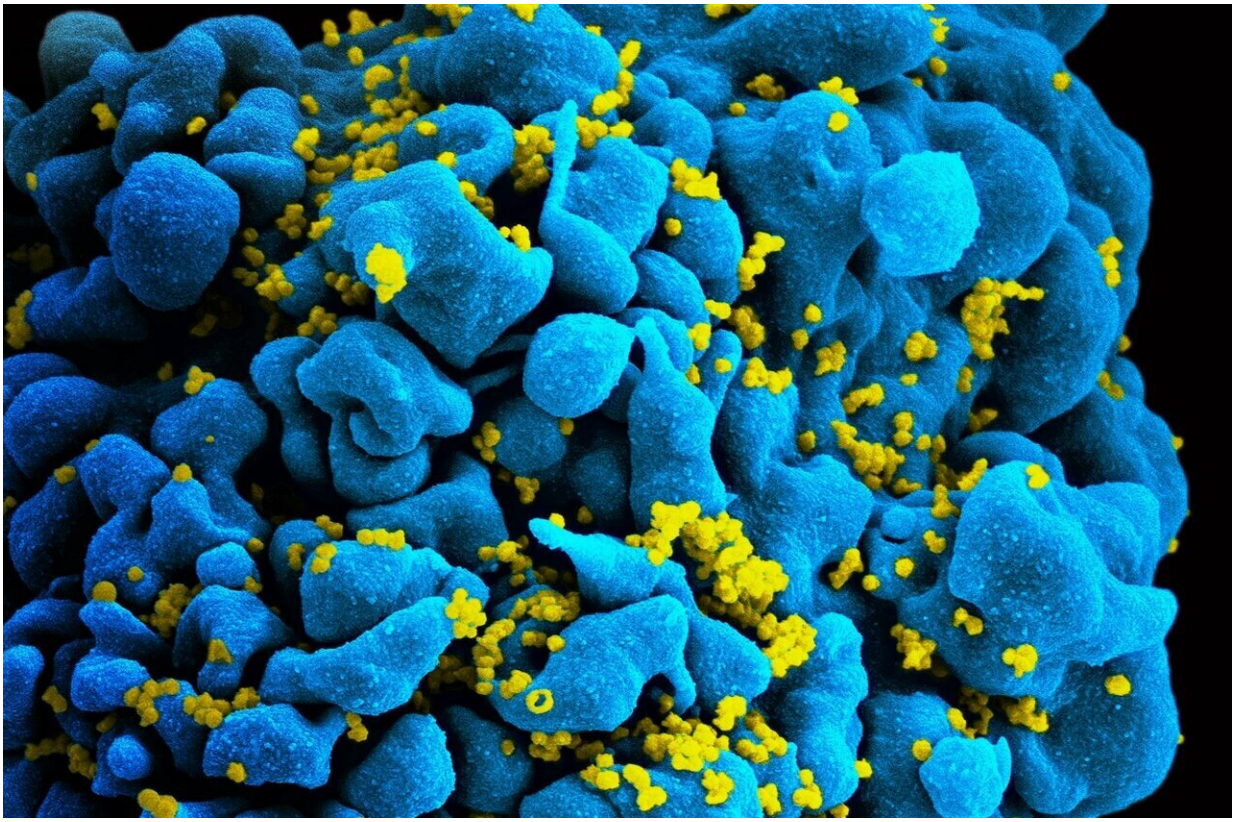

Scanning electromicrograph of an HIV-infected T cell. Credit: NIAID

Adolescents and young adults who were born to mothers with HIV but remained uninfected themselves still face a greatly heightened risk of obesity and asthma-like symptoms, researchers from Massachusetts

General Hospital (MGH) have found. In a study published in *Journal of Acquired Immune Deficiency Syndromes (JAIDS)*, the team revealed for the first time that HIV-negative teens and young adults with a history of in utero HIV exposure showed more than fourfold increased odds of obesity and asthma-like symptoms compared to their unexposed peers.

"Our study found that there are metabolic and immune consequences to being exposed to HIV in utero," says Lindsay Fourman, MD, of the Metabolism Unit, Department of Medicine, MGH, and lead author of the study. "These results underscore the need for all children of mothers with HIV—even those who are HIV-negative—to be screened and continually monitored over their lifetimes by clinicians attuned to their health risks. Too often, their exposure to HIV is lost from their medical records after they are found to be HIV-negative."

Globally, more than one million babies are born each year to mothers with HIV. With the scale-up of prenatal antiretroviral therapy to prevent maternal transmission during pregnancy, up to 98 percent of these infants may be HIV-exposed but uninfected (HEU). While understanding the short-term health consequences of intrauterine HIV exposure has been actively investigated, the long-term health outcomes of uninfected individuals into adolescence and adulthood remain largely unknown.

The MGH researchers shed light on the subject by looking at the mother's level of immune cells—known as CD4 T cells—during the last trimester of pregnancy. They found that lower maternal CD4 T cell count was strongly associated with increased body mass index (BMI), a measure of body fat based on height and weight, in their uninfected, adolescent offspring. Lower CD4 T cell count is also associated with more severe HIV infection during pregnancy. "These linkages suggest the need for good immune system control during the mother's pregnancy," emphasizes Steven Grinspoon, MD, chief, Metabolism Unit

at MGH and study co-author. "Improved immune regulation may not only be good for the mother during pregnancy, but for her child over the long-term."

The comprehensive study drew on a cohort of 50 adolescents and young adults (ages 13 to 28 years old) who were HIV-exposed but uninfected (HEU), and 141 of their peers not exposed to HIV during pregnancy. All were part of the Research Patient Data Registry that includes patients from MGH, Brigham & Women's Hospital, and other affiliated hospitals. The researchers found that obesity was present in 42 percent of the HEU adolescents and young adults compared to 22 percent of their unexposed counterparts.

"It's well known that obesity in all segments of the population is associated with high blood pressure, high cholesterol and insulin resistance," notes Fourman, adding that an estimated 18 million HEU individuals younger than 15 years old currently exist throughout the world. "And studies have shown that 80 percent of obese adolescents remain obese as adults." The MGH study further showed that asthma-like symptoms occurred in 40 percent of the HEU group compared to 23 percent of its peers.

More broadly, the MGH study could help scientists gain insights into the role of the intrauterine environment in modulating the long-term health of individuals exposed in utero to a wide range of maternal conditions. For example, points out Grinspoon, "fetal exposure to maternal obesity or gestational diabetes has been linked to obesity, insulin resistance, asthma and autoimmunity later in life. The findings from our study could teach us about the effects of inflammation during pregnancy on long-term health outcomes. This is a fertile area for further investigation."

More information: Fourman, Lindsay T et al. Association of In Utero

HIV Exposure with Obesity and Reactive Airway Disease in HIV-Negative Adolescents and Young Adults. *JAIDS: Journal of Acquired Immune Deficiency Syndromes* November 14, 2019 - Volume Publish Ahead of Print
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