Study explores most commonly transmitted mother-to-child infection

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Lead investigator Dr. Amitinder Kaur led a study tracing how cytomegalovirus moves through the placenta during pregnancy and shapes outcomes for the developing fetus.

Researchers at the Tulane National Biomedical Research Center have published a study that closely follows how cytomegalovirus, or CMV, crosses the placenta during pregnancy and reaches the developing fetus. The findings, published in *Communications Biology,* may help inform strategies to prevent congenital CMV, the

most commonly transmitted mother-to-child infection worldwide and a leading cause of hearing loss and neurodevelopmental problems in infants.

CMV is a very common virus. Most people are exposed to it during their lifetime, often without symptoms and without ever knowing they have had it. In healthy children and adults, CMV infections are typically mild or unnoticed. The concern arises when someone who has never had CMV before experiences a first infection during pregnancy, because the virus can cross the placenta and affect the developing fetus.

Because the virus passes through the placenta and interacts with an active immune system during pregnancy — a process best understood in a living system — researchers used a nonhuman primate model that closely mirrors human pregnancy.

To better understand how the virus reaches the fetus, the research team, led by Dr. Amitinder Kaur and first author Tabitha Manuel, together with collaborators from several partner institutions, observed pregnancies in nonhuman primates that had not been exposed to CMV before pregnancy and encountered the virus for the first time during the second trimester.

Researchers monitored the pregnancies over time, collecting routine maternal and pregnancy-related data and later evaluating the placenta and fetus at delivery.

The study showed that CMV affects pregnancies in different ways. Some pregnancies had only brief or low-level signs of the virus, while one showed more extensive involvement. Others had little to no virus detected.

Across nearly all pregnancies, CMV was present in the placenta, even when the fetus itself did not show signs of infection. Pregnancies with higher amounts of virus in placental tissues tended to have smaller fetuses at delivery, suggesting that placental infection alone may influence growth. The study also identified differences in maternal and fetal immune markers that may help identify pregnancies at higher risk for transmission.

“These findings give us a rare chance to trace how CMV moves through each phase of pregnancy,” said Dr. Kaur. “We’re seeing that the virus may influence fetal development more than previously recognized, even when there are no obvious signs of infection. This model helps guide future work toward identifying higher-risk

pregnancies and developing vaccines to prevent congenital CMV.”

The study was conducted in collaboration with Weill Cornell Medicine, Duke University School of Medicine, the University of Massachusetts Chan Medical School, and the Oregon National Primate Research Center, and was supported with resources from the National Institutes of Health, P51OD011104 and program project P01AI129859.