

Dangerous pregnancy complications linked to COVID-19

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DNA changes consistent with life-threatening pregnancy complications have been found in the placentas of pregnant women infected by COVID-19, according to University of Queensland researchers. Their [research paper](#) is published in *Clinical and Translational Immunology*.

Dr. Arutha Kulasinghe from UQ's Frazer Institute led a study that compared placental tissue from unvaccinated women who'd tested positive to SARS-CoV-2 within 15 days of giving birth with the placentas of women who had not been vaccinated or infected with the virus.

"We know [viral infections](#) in pregnancy can disrupt placental function and increase the likelihood of late-onset preeclampsia, [preterm birth](#) and stillbirth," Dr. Kulasinghe said. "However, the mechanism through which COVID-19 predisposes pregnancies to these conditions has been unclear.

"Using digital spatial profiling, we discovered the virus disrupts placental function by altering the genomic architecture of the cells critical to providing nutrients and [blood supply](#) to unborn babies. We also found the DNA fingerprints of poor placental oxygenation, stress and pre-eclampsia in the COVID-19 patients."

Co-authors QUT researcher Dr. Nataly Stylianou and UQ's Dr. Ismail Sebina said the research will enhance understanding about the impact of respiratory viruses on pregnancy health.

"We went down to the gene level to see what happens to the [placenta](#) when a woman gets COVID-19 during pregnancy," Dr. Stylianou said. "The placenta struggles and kicks into recovery mode."

Dr. Sebina said infections in pregnancy have always been linked with complications.

"We know a lot about viruses like HIV, Hepatitis B and CMV, but it wasn't clear how a respiratory virus in pregnancy could impact a baby in utero," he said.

"We found strong links between COVID-19 in pregnancy and the

pathophysiology of preeclampsia, a severe and common pregnancy complication. We have identified molecules in the placenta that could be the targets of future research to understand the underlying biology of this association. This is significant because we could predict which pregnancies are likely to progress towards preeclampsia—and intervene before it happens."

The research began at the start of the pandemic in 2020 and was carried out in collaboration with QUT, Mater Research and hospitals in Brazil.

Dr. Kulasinghe had previously led studies mapping the impact of the virus on the heart and lungs. Associate Professor Fernando Guimaraes and Professor Gabrielle Belz from UQ's Frazer Institute also made significant contributions to the research.

More information: Nataly Stylianou et al, Whole transcriptome profiling of placental pathobiology in SARS-CoV-2 pregnancies identifies placental dysfunction signatures, *Clinical & Translational Immunology* (2024). [DOI: 10.1002/cti2.1488](https://doi.org/10.1002/cti2.1488)

Provided by University of Queensland

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