

Immune responses during pregnancy linked to schizophrenia among offspring

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(PhysOrg.com) -- According to research by Temple psychologist Lauren Ellman, exposure during pregnancy to immune proteins leads to increased risk for brain abnormalities associated with schizophrenia in offspring.

Infections like the flu are common occurrences during pregnancy, and research has shown that children born to mothers who suffered from flu, viruses and other infections during pregnancy have about a 1.5 to 7 times increased risk for schizophrenia. A new study out of Temple University examines what's behind that link.

In a study published this month in *Schizophrenia Research*, Temple University psychologist Lauren Ellman found that exposure during pregnancy to certain immune proteins, such as those produced in response to the flu, leads to increased risk for [brain abnormalities](#) associated with schizophrenia in [offspring](#).

The good news, says Ellman, is that not all of the women in the study who showed an increase in immune proteins gave birth to offspring who developed brain alterations. "This tells us that some other factor — perhaps a genetic vulnerability or something from the environment — must also be present for the increased immune protein levels to lead to the brain alterations we identified," she said.

Previous studies, including one by Ellman, have already established a link between maternal exposure to flu and increased risk for

schizophrenia in offspring, but it was not clear why the link existed, because most infections do not cross the placenta. Researchers then began to look at maternal immune responses to infection as the possible cause for the increased risk.

Of particular interest to the researchers were proteins termed proinflammatory cytokines, which are produced by the body in response to infection.

"Now, it appears that the damaging effects to the fetus are related to these maternal responses to infection during pregnancy rather than to the infections themselves," Ellman said.

Ellman's study was conducted on archived [blood samples](#) drawn during the 1950s and 1960s from a group of approximately 12,000 pregnant women during each trimester of their pregnancies. The women and their offspring were followed after delivery, so those whose children had developed schizophrenia could be easily identified.

Her study showed a direct correlation between structural brain changes among offspring diagnosed with schizophrenia and increases in maternal levels of interleukin-8 (IL-8), one of the proinflammatory cytokines produced when fighting infection during pregnancy.

"The brain abnormalities we found are ones consistently linked with schizophrenia, suggesting that an elevated immune response during pregnancy might contribute to some of the brain abnormalities associated with the disorder," Ellman said.

Maternal IL-8 levels were not related to any brain changes among a control group of offspring, indicating that vulnerability to schizophrenia needed to be present for the fetal brain to be affected, she said.

"Our findings underscore the potential importance of prenatal contributions to [schizophrenia](#), with implications for prevention, early intervention, and treatment strategies," said Ellman.

Ellman is uniquely positioned to answer questions related to pregnancy and fetal development. An assistant professor of psychology in Temple's College of Liberal Arts, she examines how maternal stress and immune functioning during pregnancy impact fetal brain development.

"I set out to study the impact of stress during pregnancy, and it became clear pretty quickly that you couldn't study the impact of stress without looking at the immune system," she said. "The two are completely intertwined."

According to Ellman, one of the main ways pregnancy makes women susceptible to infections is that changes in the immune system during [pregnancy](#) reduce some of the body's key defenses. In addition, maternal emotional states, like stress, can alter immune functioning. This increased vulnerability to infection comes at a time when the fetal brain is experiencing enormous growth.

"In light of our study, which calls attention to a pregnant woman's increased susceptibility to infection and the potential risks to her developing fetus, it is easy to see why the medical community routinely recommends that women who are pregnant or planning to become pregnant take special precautions to prevent infection, such as getting vaccinated," she said.

Provided by Temple University

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