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Press release

Is the mother's immune system capable of protecting the foetus from cytomegalovirus infection?

An infection from the cytomegalovirus (CMV), a virus belong to the herpesviridae family, usually goes unnoticed in a healthy subject, but in pregnant women, it can be harmful to the foetus. Nabila Jabrane-Ferrat, research officer of the CNRS Physiopathology Centre at Toulouse Purpan (Inserm unit / université Toulouse III – Paul Sabatier / CNRS), working with The "Immunity, Gestation, Therapy" research team led by Philippe Le Bouteiller, an Inserm research director, has demonstrated that certain immune cells from the mother located at the foeto-maternal interface are capable of fighting the infection in order to protect the foetus. This work was published in the review [Plos Pathogens](#) on April 4, 2013.

Pregnancy induces major modifications in the uterus that are necessary to provide the needs of the foetus. Following the implantation of a fertilized egg, the wall of the uterus (the endometrium) is massively infiltrated with a specific population of immune cells known as decidual Natural Killer cells (dNK), that come from the mother.

The functions of these immune cells are finely regulated during pregnancy. In the endometrium, their function is not to kill, but to protect to allow successful implantation of the embryo. dNK cells release soluble factors that help the embryo to implant into the maternal tissue. They contribute to exchanges between the mother and the foetus and are in direct contact with the placenta. By providing an enriched microenvironment, dNK cells play a major part in pregnancy.

The authors of the study published this month wondered whether these cells that are "armed to kill" could have their gregarious instinct aroused in the event of an attack by a pathogenic agent. To this end, they studied the action of the dNK cells when the mother was infected by CMV during pregnancy.

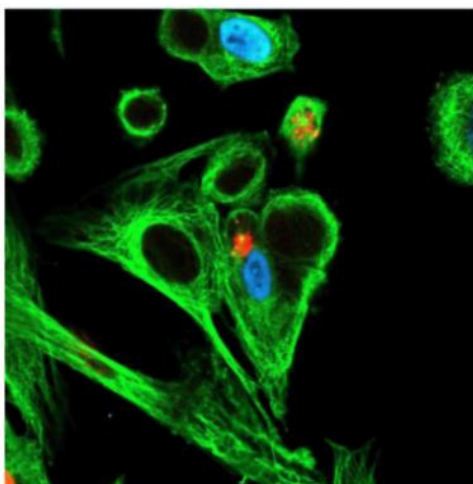
Congenital infection by the CMV is a major public health problem that affects between 0.2 and 0.5 percent of newly-borns in France and is a known cause of foetal fatality. CMV contamination occurs by close contact with affected persons or healthy carriers. Therefore, pregnant women must respect the classic rules of hygiene to avoid infection during their pregnancy, since the risk of foetal contamination is between 30 to 50%.

There are no clinical signs of CMV in a healthy adult; but it is dangerous for the foetus if the mother becomes infected. The virus passes into the mother's bloodstream, crosses the placental barrier and infects the cells in the foetus, causing serious damage, even death to the foetus. Congenital CMV infection induces placental development problems and remodelling of the uterine arteries that can be detected by ultrasound scanning.

Researchers have observed phenotype and functional changes in maternal dNK cells. In addition, analysis of tissues from terminations of pregnancy due to CMV has shown that dNK cells are capable of migrating to the actual site of the infection in the placenta.

Quite unexpectedly, the researchers found that dNK cells become cytotoxic in order to kill off infected cells and fight infection.

These results suggest that dNK cells could protect the foetus from maternal CMV infection. They open the way for the development of new treatments. The next step is to figure out how to trigger a massive cytotoxic reaction by the dNK cells when faced with the virus.



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In red and green above: the NK cells attempting to make their way to the infected cell (in blue and green).

For further information

Source

“Human Cytomegalovirus Infection Elicits New Decidual Natural Killer Cell Effector Functions”

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