

RSV may hide in the lungs, lead to asthma, researchers report

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Conventional wisdom has been that respiratory syncytial virus (RSV) – a common virus that causes infection in the lungs – comes and goes in children without any long lasting impact.

A study conducted in mice by UT Southwestern Medical Center researchers, however, suggests that RSV may hide in the lungs even after other symptoms abate, ultimately resurfacing to cause recurrent wheezing and chronic airway disease.

"This research suggests that there's a potential new mechanism for asthma related to viral infections in children that could be associated with RSV," said Dr. Asuncion Mejias, assistant professor of pediatrics at UT Southwestern and senior author of a study available online and in the Nov. 15 issue of the *Journal of Infectious Diseases*. "These findings could aid in the development of preventive and therapeutic interventions for children with recurrent wheezing due to a virus such as RSV."

RSV is the leading cause of viral respiratory infections and hospitalizations in infants and children worldwide. Half of all babies develop an RSV infection within the first year of life and practically all have had at least one RSV infection by age 3, said Dr. Octavio Ramilo, professor of pediatrics at UT Southwestern and study co-author. About 3 percent to 10 percent of infants with RSV infections develop severe bronchitis and require hospitalization.

Most children recover within a week, but RSV can cause repeated

infections throughout life. There is currently no vaccine available.

Dr. Ramilo said the team's findings contradict the current thinking that ribonucleic acid viruses like RSV are easily destroyed. "Whether RSV persists in children remains to be seen, but the fact that the virus persists in mice is amazingly powerful," he said.

The most striking finding, Dr. Mejias said, is that the amount of virus detected in the lungs of the mice directly correlates with the severity of airway hyperreactivity. Airway hyperreactivity, or episodes of bronchospasms in humans, is the main characteristic of asthma.

Doctors at UT Southwestern have previously shown that RSV infection could increase the risk of developing asthma. In 2004, researchers including Drs. Mejias and Ramilo monitored mice infected with RSV and found that infected mice were more likely to develop chronic lung disease than healthy mice. They also found that infected mice treated with an anti-RSV antibody had less virus in the lungs and not only showed improvement during the acute disease, but also developed significantly less airway hyperreactivity and lung inflammation during the chronic phase of the disease.

"If you use an antibody against RSV, you not only prevent acute disease from the infection but you can also prevent the development of the asthma phenotype, indicating that early interventions against the virus can have a long-term benefit," Dr. Mejias said.

To determine whether RSV persisted in the lungs, UT Southwestern researchers infected mice with live RSV, ultraviolet-light-treated RSV or heat-inactivated RSV. They then monitored the mice for 42 days, checking their pulmonary function and respiratory rate at set intervals. At the end of the study, the researchers found evidence of the virus in every mouse infected with live RSV, but not in the other groups.

While studies of adults with chronic obstructive pulmonary disease have suggested that RSV may persist, this is the first study to test the hypothesis in this animal model of RSV-induced asthma. The persistence of the virus in children has not been extensively researched, Dr. Ramilo said.

Dr. Mejias said the next step is to determine whether RSV persists in children.

"We are currently doing a study in which we are treating kids with a new antibody that is very potent," she said. "The plan is to follow them for a year to see if aggressive treatment against the virus can prevent wheezing."

Source: UT Southwestern Medical Center

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