Researchers work on vaccine to improve immune system in newborns

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As soon as babies are born, they are susceptible to diseases and infections, such as jaundice and e-coli. For up to a month, their immune systems aren't adequately developed to fight diseases. Although these infections are often minor, they can lead to serious problems if left untreated. To help strengthen newborns' immune systems, University of Missouri researchers have pinpointed a group of depleted white blood cells, which might lead to an immune-strengthening vaccine.

"We're trying to improve the immune system of newborns to make them more like adults' immune systems and, therefore, less susceptible to diseases," said Christine Hoeman, doctoral student in the MU School of Medicine. "Although our testing has only been on animal models thus far, our ultimate goal is to create better pediatric vaccines for humans to improve the balance within the immune system."

Hoeman and Habib Zaghouani, professor of molecular microbiology and immunology and child health at the MU School of Medicine, have found that newborns have an imbalance of two different groups of T-helper cells (TH cells), which are white blood cells and the main fighters in the immune system. Newborns have a large amount of TH2 cells, a group of white blood cells that mediate allergic reactions, but not enough of TH1 cells, a group of white blood cells that fight infections.

Environmental factors also affect the imbalance of these two groups of T-helper cells. The first time newborns are exposed to an antigen, or a foreign substance that illicits a response in the immune system, their

white blood cells are balanced, but the second time they are exposed to the antigen, they create too much of TH2 and not enough of TH1. This imbalance is what leads to possible infection and allergic reactions.

"What's happening is that the TH2 cells are killing the TH1 cells, creating the imbalance," Hoeman said. "Once we know more about the timeline of the imbalance, we can start to develop the vaccine, which would increase the levels of TH1 and would ideally be administered in newborns soon after they're born."

More information: Hoeman and Zaghouani's research has been published in *The Journal of Environmental Medicine and Trends in Immunology.*

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