Why do infants get sick so often? Researchers reveal cell signaling prevents growth of essential immune cells

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Researchers at the University of Michigan Health System are helping to quell parents' worry about why infants seem to get sick so often.

It's been believed that, like walking and talking, fighting viral infections is something children will develop when they get older. But a U-M study suggests the natural ability to fight infection is there early on.

Scientists learned key cell signals inhibit the growth of essential immune cells early in life. Blocking this signaling could lead to improving an infant's response to infection, according to the study published online ahead of print in *Nature Immunity*.

"What happens at early age is that natural killer cells, like many other immune cells, do not complete their functional maturation until adulthood," says study senior author Yasmina Laouar, Ph.D., assistant professor in the U-M Department of Microbiology and Immunology.

"During this time we are left with an immature immune system that cannot protect us against infections, the reason why newborns and infants are more prone to infection," she says.

There is a large gap in understanding infant immunity, specifically why the natural killer cell responses are deficient. The study by immunologists at the U-M demonstrates the role of a cell called transforming growth factor beta that can explain why.

The study showed the production of natural killer cells is controlled by TGF-?, which is produced in the bone marrow. In infant mice, the maturation of natural killer cells progressed faster in the absence of TGF-? signaling.

By adulthood, mice had 10 times more mature natural killer cells if TGF-? signaling was blocked.

"Our overall goal was to determine the factors that constraint the production and maturation of natural killer cells early in life," says Laouar. "To our surprise, we discovered that natural killer cells can complete maturation as early as 10 days of age if TGF-? signaling is blocked."

Authors say it's tempting to propose the functional inactivation TGF-? signaling as a strategy to reverse the deficit of natural killer cells early in life. Additional testing will be required.

More information: "TGF-? is responsible for NK cell immaturity during ontogeny and increased susceptibility to infection during mouse infancy," *Nature Immunity*, doi: 10.1038/ni.2388

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