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Premature babies harbor fewer, but more dangerous microbe types

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One of the most comprehensive studies to date of the microbes that are found in extremely low-birthweight infants found that hard-to-treat Candida fungus is often present, as well as some harmful bacteria and parasites.

Researchers at the Duke University Medical Center and Nicholas School of the Environment looked at the microbes in 11 premature infants and found much less diversity than in full-term infants.

"The babies' guts were taken over by microbes we know are dangerous if they get into the blood," said senior author Patrick Seed, M.D., Ph.D., assistant professor of pediatrics at Duke. "Even after the babies were no longer on antibiotics, healthier bacteria didn't appear in the babies very quickly. This may be one reason why premature babies are so vulnerable to infections."

All of the premature children were placed on antibiotic treatments after birth, which would wipe out some types of bacteria and yeast, but once they were off the antibiotics and taking food, the researchers expected to see more diversity of bacteria in the babies' developing digestive systems than they found.

The findings were published in PLoS One open-access journal on Dec. 8.

Five infants had blood infections while three had necrotizing

enterocolitis, an infection-related death of bowel tissue, said Seed, who is also with the Jean and George Brumley Jr. Neonatal-Perinatal Research Institute and the Duke Center for Microbial Pathogenesis.

Seed said that while the study babies mainly were colonized mainly by organisms that were found in stool specimens, in some cases they also had infections with Staphylococcus epidermidis, a form of staph infection, that was abundant in many of the babies' digestive tracts.

The bacteria and yeast in the premature babies' digestive tracts are known causes of devastating infections in these babies. The gut seems to be a reservoir for some organisms that form infections, Seed said. Previous to this work, "we only knew the tip of the iceberg," he said.

The researchers used genomic (DNA) typing of the bacteria, fungi and parasites to determine which types were present.

It's not clear if the newborns are picking up these early infections from their mother's milk, blood, or in other ways, or if the pathogens are from the environment surrounding the infants.

"It's important to know where these pathogens come from so that doctors can possibly manipulate the babies' environment or their digestive systems," Seed said. He noted that other studies had shown value for giving babies probiotic substances to tip the internal balance toward more favorable bacteria, necessary for immunity and better health.

Seed stressed that certain bacteria and other microbes are helpful for growing babies and their immune systems, so it is important not to do any damage by creating an antiseptic environment.

"It's a question of balance," Seed said. "As vulnerable as these babies are, we still wouldn't want to wipe out all of the bacteria, even all of the

potentially harmful bacteria."

Provided by Duke University Medical Center