UF researchers find bacterial imbalances linked to deadly disease that strikes infants

New findings by the University of Florida may help lead to a cure for a deadly disease that primarily afflicts premature newborns.

By Robert H. Wells 6 Jul 2011

Necrotising enterocolitis, or NEC, is the death of tissue in the bowels that causes inflammation, abdominal distention, bleeding, and in about 25% of the cases, mortality. It most often occurs in newborns during the first weeks of life.

Current treatments for NEC depend on the severity and include surgical and non-surgical techniques. Medical care for infants with NEC is estimated to cost up to $1 billion each year in the United States.

The cause of NEC is unknown, but in a new study UF researchers have pinpointed bacterial imbalances associated with the onset of the disease, as well as a potentially new pathogen that may also be connecte

Their findings are published this month in the online journal *PLoS ONE.*

"Understanding what causes the disease will potentially lead us to better ways of preventing and treating it said Volker Mai, an author on the study and a microbiologist with UF's Institute of Food and Agricultural Sciences and Emerging Pathogens Institute.

Treatments could include antibiotics or bacteriophage therapy

"Our findings would also potentially lend themselves to early diagnosis of the disease, which again could b followed up by appropriate treatment, which hopefully would result in a reduction of the disease incidence, he said.

Examples of treatments, he said, could include antibiotics or bacteriophage therapy in which viruses harmless to humans are used to attack bacteria.

In the study, the microbiological composition of stools from nine very low-birth weight infants with NEC wa compared to stools from nine healthy infants. Samples were collected both one week before the onset of NEC and three days before the disease appeared.

The researchers used a cutting-edge DNA examination technique known as high-throughput sequencing t better identify more types of micro organisms than ever before, including a possibly new type of bacterium that increased in the week prior to diagnosis.

Also unique to this study, Mai said, was an examination of the micro organisms before the disease developed because previous studies only looked at them after diagnosis.

The big advantage

"The big advantage of our study is that we are utilising the prospective approach that means we are collecting samples from these pre-term infants before they get sick and can thus look at the micro

organisms that colonise their guts before these children got a disease," Mai said.

Dr. Josef Neu, a paediatrics professor in UF's College of Medicine, was principal clinical investigator on th study.

He said the study also found some possibly predictive biomarkers, or proteins that can be derived from a gentle swab of the baby's cheek, that are different from those found in babies who didn't get the disease. This field of study is known as proteomics.

"Much more work needs to be done to validate these results, but we are still collecting samples and will repeat these studies on a much larger sample," Neu said.

"But looking closely at the microbes in the gastrointestinal tract using state-of-the-art microbial sequencing technology and proteomics should help us potentially find a better treatment for the disease or be able to determine which babies are at greatest risk for development of the disease, so we can better target our therapies," he said.

The research was funded by the National Institutes of Health, or NIH, and is part of NIH's Human Microbio Project. The project aims to explore and understand micro organisms that live in and on healthy and sick humans.

Source: University of Florida