

Think again about keeping little ones so squeaky clean

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A new Northwestern University study suggests that American parents should ease up on antibacterial soap and perhaps allow their little ones a romp or two in the mud --- or at least a much better acquaintance with everyday germs.

The study is the first to look at how microbial exposures early in life affect inflammatory processes related to diseases associated with aging in adulthood.

Most provocatively, the Northwestern study suggests that exposure to infectious microbes early in life may actually protect individuals from cardiovascular diseases that can lead to death as an adult.

"Contrary to assumptions related to earlier studies, our research suggests that ultra-clean, ultra-hygienic environments early in life may contribute to higher levels of inflammation as an adult, which in turn increases risks for a wide range of diseases," said Thomas McDade, lead author of the study, associate professor of anthropology in Northwestern's Weinberg College of Arts and Sciences and a faculty fellow at the Institute for Policy Research.

Relatively speaking, humans only recently have lived in such hyperhygienic environments, he stressed.

The research suggests that inflammatory systems may need a higher level of exposure to common everyday bacteria and microbes to guide their



development. "In other words, inflammatory networks may need the same type of microbial exposures early in life that have been part of the human environment for all of our <u>evolutionary history</u> to function optimally in adulthood," said McDade, also a member of Northwestern's Cells to Society (C2S).

The Northwestern study is the first research on microbial effects on inflammatory systems in infancy that relate in later life to diseases associated with aging. Advancing the scientific literature on the developmental origins of disease, the study arguably is the most significant research on long-term effects of early environments on human physiological function and health in adulthood.

The research took advantage of a longitudinal study of Filipinos, following participants in utero through 22 years of age, to get a better understanding of how environments early in life affect production of Creactive protein (CRP) production in adulthood.

Levels of the protein rise in the blood due to inflammation, an integral part of the immune system's fight against infection. CRP research mostly has centered on the protein as a predictor of heart disease, independent of lipids, cholesterol and blood pressure, though researchers still dispute that association. Researchers have been looking at excess body fat as a primary source of pro-inflammatory cytokines that produce CRP and behavioral factors related to diet, exercise and smoking. And the CRP research largely has been conducted in relatively affluent settings, such as in the United States, with low levels of <u>infectious</u> diseases.

The Northwestern researchers were interested in what CRP production looks like in the Philippines, a population with a high level of infectious diseases in early childhood compared to Western countries. Relative to Western countries, the Philippines also has relatively low rates of obesity



and cardiovascular diseases, consistent with the Northwestern research findings.

Blood tests showed that C-reactive protein was at least 80 percent lower for study participants in the Philippines when they reached young adulthood, relative to their American counterparts, though the Filipinos suffered from many more infectious diseases as infants and toddlers. Filipino participants in their early 20s had average CRP concentrations of .2 milligrams per liter -- five to seven times lower than average CRP levels for Americans. CRP concentrations for Americans in their early 20s were on average around 1 to 1.5 milligram per liter.

"Early Origins of Inflammation: Microbial Exposures in Infancy Predict Lower Levels of C-reactive Protein in Adulthood," will be published online December 9 in the journal *Proceedings of the Royal Society B: Biological Sciences*. Besides Northwestern's McDade, the co-authors are Julienne Rutherford, University of Illinois at Chicago; Linda Adair, University of North Carolina, Chapel Hill; and Christopher Kuzawa, associate professor of anthropology in Weinberg at Northwestern.

The Northwestern study drew its data from a longitudinal study that began in the early 1980s with 3,327 Filipino mothers in the third trimester of pregnancy. The mothers were interviewed for behaviors related to care giving, and breast feedings were recorded. The household environment was assessed in terms of socioeconomic resources, hygiene (whether domestic animals, such as pigs and dogs, roamed freely) and density of inhabitants.

Researchers visited with the mothers at the delivery of their infants and subsequently every two months for the first two years of the children's lives. Thereafter, the researchers followed up with the children every four or five years until they reached their early 20s. The records they kept on the children include data on infectious diseases, growth in height



and weight.

"In the U.S we have this idea that we need to protect infants and children from microbes and pathogens at all possible costs," McDade concluded.

"But we may be depriving developing immune networks of important environmental input needed to guide their function throughout childhood and into <u>adulthood</u>. Without this input, our research suggests, <u>inflammation</u> may be more likely to be poorly regulated and result in inflammatory responses that are overblown or more difficult to turn off once things get started."

Source: Northwestern University (<u>news</u> : <u>web</u>)

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