Scientists move closer to predicting who will and will not fight off severe infections

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Why are some people prone to severe infections, while others handle them with less difficulty? A new research report appearing online in the *FASEB Journal* attempts to answer this question by shedding light on the genetic differences that influence our ability to fight off bacterial infections.

In the report, scientists analyzed the diversity (polymorphisms) in the genetic makeup of an immune system mediator called the macrophage migration inhibitory factor, or MIF, which plays an important role in host defenses against infection. By identifying the gene variations in people that influence the likelihood of developing deadly infections, new tools can be developed to help physicians prescribe the best treatment and approach toward conditions ranging from childhood ear infections to post-surgical recoveries.

"We hope that our study will contribute to facilitating the development of novel treatment strategies targeting the mediator MIF in patients with severe infection (i.e., sepsis) or any other diseases in which MIF has been shown to play an important role," said Thierry Calandra, Ph.D., a researcher involved in the work from the Infectious Diseases Service in the Department of Medicine at the Centre Hospitalier Universitaire Vaudois in Lausanne, Switzerland.

To make their discovery, Calandra and colleagues defined the genetic variations of the MIF gene in a group of children with bacterial sepsis and found that a specific variant of the MIF gene was associated with

more severe disease and increased mortality. They also analyzed the transmission of genetic variants of the MIF gene from parents to afflicted children. Results from this family study suggested that one specific variant of the MIF gene protects from meningitis during childhood, while another variant is a risk factor for the development of infection. Considering the existence of a link between variations in the MIF gene, MIF expression, and the development of bacterial sepsis in children, this study data may help identify patients who may benefit from future treatment strategies targeting MIF.

"It's a big step towards personalized medicine. Knowing exactly how the body is programmed to fight infection will prove to be so critical to physicians of the future that new medical school graduates won't be able to imagine how their professors managed without it," said Gerald Weissmann, M.D., Editor-in-Chief of the FASEB Journal. "Here's an analogy: ask a college senior to describe daily life in a world without computers."

More information: Pascal Renner, Thierry Roger, Pierre-Yves Bochud, Tom Sprong, Fred C. G. J. Sweep, Murielle Bochud, Saul N. Faust, Elene Haralambous, Helen Betts, Anne-Laure Chanson, Marlies Knaup Reymond, Elliott Mermel, Veronique Erard, Marcel van Deuren, Robert C. Read, Michael Levin, and Thierry Calandra. A functional microsatellite of the macrophage migration inhibitory factor gene associated with meningococcal disease. *FASEB J.* doi: 10.1096/fj.11-195065

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