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Stress affects the balance of bacteria in the gut and immune response

New York, 21 March 2011 – Stress can change the balance of bacteria that naturally live in the gut, according to research published this month in the journal *Brain, Behavior, and Immunity*.

"These bacteria affect immune function, and may help explain why stress dysregulates the immune response," said lead researcher Michael Bailey.

Exposure to stress led to changes in composition, diversity and number of gut microorganisms, according to scientists from The Ohio State University. The bacterial communities in the intestine became less diverse, and had greater numbers of potentially harmful bacteria, such as *Clostridium*.

"These changes can have profound implications for physiological function", explained Dr Bailey. "When we reduced the number of bacteria in the intestines using antibiotics, we found that some of the effects of stress on the immune system were prevented", he added. "This suggests that not only does stress change the bacteria levels in the gut, but that these alterations can, in turn, impact our immunity."

"This is the first evidence that the gut microorganisms may play a role in innate immunological stress responses," said Monika Fleshner, Professor of Integrative Physiology at the University of Colorado, Boulder. "The study reveals the dynamic interactions between multiple physiological systems including the intestinal microbiota and the immune system."

Because gut bacteria have been linked to diseases like inflammatory bowel disease, and even to asthma, a future goal of the study is to determine whether alterations of gut bacteria is the reason why these diseases tend to be worse during periods of pressure.

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The research was conducted with colleagues from the Texas Tech University Health Sciences Center and the Research and Testing Laboratories, and was funded by the National Institute of Health.

Notes to Editors:

The original research article is "Exposure to a social stressor alters the structure of the intestinal microbiota: Implications for stressor-induced immunomodulation" by Michael T. Bailey, Scot E. Dowd, Jeffrey D. Galley, Amy R. Hufnagle, Rebecca G. Allen and Mark Lytee; and the brief commentary on it is "The gut microbiota: A new player in the innate immune stress response?" by Monika Fleshner. Please see the articles for the authors' affiliations and disclosures of financial and conflicts of interest. The article appears in *Brain, Behavior, and Immunity*, Volume 25, Number 3 (March 2011), published by Elsevier.

About *Brain, Behavior, and Immunity*

Brain, Behavior, and Immunity, founded in 1987, is the official journal of the Psychoneuroimmunology Research Society (PNIRS). This innovative journal publishes peer-reviewed basic, experimental, and clinical studies dealing with behavioral, neural, endocrine, and immune system interactions in humans and animals. It is an international, interdisciplinary journal devoted to investigation of the physiological systems that integrate behavioral and immunological responses. The journal welcomes original research in neuroscience, immunology, integrative physiology, behavioral biology, psychiatry, psychology, and clinical medicine and is inclusive of research at the molecular, cellular, social, and organismic levels. The journal features online submission and review, leading to timely publication of experimental results. There are no submission fees or page charges for *Brain, Behavior, and Immunity*, which is published eight times a year.

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