




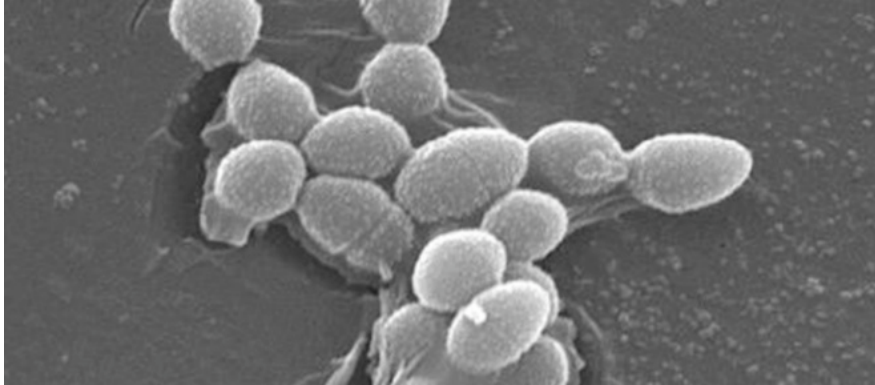
All Wired



« [LHC to Begin Collisions in Fall... Right?](#) | [Main](#) | [Latest Celebrity Rant: Conan Goes Off on Boron](#) »

Gut Bacteria Affect Almost Everything You Do

By Brandon Keim  February 09, 2009 | 5:18:05 PM Categories: [Bacteria](#), [Biology](#), [Health](#)



Bacteria living symbiotically inside human bodies may have an unexpectedly profound and wide ranging effect on basic biological functions such as development, reproduction and immunity.

In a comparison of blood from germ-free and regular mice, researchers found large differences in molecules that affect just about everything involved in living.

"I expected to find a couple of differences," said study co-author [Bill Wikoff](#), a Scripps Research Institute biophysicist. "When we came back with hundreds of changes, it was a big surprise."

The human body contains 10 times more bacteria than human cells, with 50 trillion microbes living in the average digestive tract alone. The study of these internal bacteria is in its infancy: the [Human Microbiome Project](#), launched to catalogue our bodies' bacterial inhabitants, started last October.

All these microbes are not just along for the ride, say scientists, but have co-evolved with human beings, providing important biochemical services in exchange for their home. Imbalances in gut bacteria have already been linked to [obesity](#), [cancer](#), [asthma](#) and a host of autoimmune diseases.

Though marketers of what are known as probiotics have [had some success](#) in using bugs to treat allergies and irritable bowel disease, the causal links between bacteria and disease remain largely unspecified.

"If you want to use bacteria in an intelligent way, you really need to know what affect bacteria have on the biochemistry of a person," said Wikoff.

A critical first step in figuring them out is linking bacteria to cellular processes, known broadly as metabolites. The study of metabolites is also just getting off the ground. Some are cellular byproducts, while others are physiologically critical. But though the first draft of the [human metabolome](#) — the biochemical analogue of the human genome — was completed just two years ago, scientists know it's important.

In the new mouse comparison study, published Monday in the *Proceedings of the National Academy of Sciences*, some metabolites were found only in germ-free mice. Others were found only in regular mice. Some were found in both, but in subtly different forms. The hodgepodge of results suggests that various bacteria break down, produce or otherwise tweak biochemicals.

The study "provides evidence of the profound effects of the microbiome on mammalian metabolism," said New York University microbiologist Martin Blaser. "Although the study was done in mice, the conclusions are largely generalizable to humans."

Wikoff's team didn't concentrate on specific metabolites, but a few stood out. Levels of the mood-regulating transmitter serotonin were altered, as were metabolites involved in processing drugs. The latter finding suggests that gut bacteria could be involved not just in maintaining health and disease, but processing drugs — helping to explain, perhaps, why drugs affect people in different ways.

Another tantalizing find in the bacteria-rich mice was indole-3 propionic acid, an antioxidant thought to have potential in treating Alzheimer's.

As the microbiome and metabolome projects continue, the links are likely to become clearer.

"What we've done here is just a first step," said Wikoff.

Citation: "Metabolomics analysis reveals large effects of gut microflora on mammalian blood metabolites." By William B. Wikoff, Andrew T. Anfor, Jun Liu, Peter C. Schultz, & Scott A. Leshay, Eric C.

 **WIRED Science RSS Feed**
And don't forget all the other [Wired feeds](#).



Subscribe now for
**JUST \$10 AND
GET A FREE GIFT!**
Subscribe to WIRED
Renew
Give a gift
Customer Service

TEAM

EDITOR: Betsy Mason | [email](#)
STAFF WRITER: [Alexis Madrigal](#) | [email](#) | [Twitter](#)
CONTRIBUTOR: [Brandon Keim](#) | [email](#) | [Twitter](#)
CONTRIBUTOR: [Clara Moskowitz](#) | [email](#)
CONTRIBUTOR: [Aaron Rowe](#)
CONTRIBUTOR: [Michael Wall](#)
CONTRIBUTOR: [Adam Rogers](#)

MOST RECENT ENTRIES

[What Makes Us Human? Neanderthal Genome Holds Clues](#)

[Wired Science Reports Live From World's Largest Popular Science Conference](#)

[Orbiting Carbon Lab to Provide Missing Climate Data](#)

[At 200, Darwin Evolves Beyond Evolution](#)

[Biggest Solar Deal Ever Announced — We're Talking Gigawatts](#)

[Planet-Hunting Space Telescope Readies for Launch](#)

[New Wrinkly Dog Breed Makes Westminster Debut](#)

[Google Smart Meter App Not Ready for Finals](#)

[Latest Celebrity Rant: Conan Goes Off on Boron](#)

[Gut Bacteria Affect Almost Everything You Do](#)

February 2009

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

HOTTEST STORIES

[Suntan Drug Greenlighted for Trials](#)

While a compound that darkens the skin from the inside-out is headed towards clinical trials to treat actual skin diseases, thousands of people are already experimenting with the drug, thanks to the pharmacy we call the Internet.

[Melting Arctic Prompts Calls for 'National Park' on Ice](#)

The chunks of the arctic that will retain ice in a warming climate need to be preserved for wildlife, say some scientists.

[Autonomous Robots Invade Retail Warehouses](#)

I, for one, welcome our new Gap.com robot overlords.

[Top 5 Most Extreme Exoplanets](#)

While astronomers haven't found an exoplanetary fit for life yet, they have found plenty that are too big, too hot, too cold, too dense, too close to their star, or too distant.

[Clever Critters: 8 Best Non-Human Tool Users](#)

Not every tool user needs opposable thumbs or even hands at all. Of course, they don't have to deal with the iPhone touch screen.

CATEGORIES

[ANIMALS](#)

[BIOTECH](#)

[BRAIN AND BEHAVIOR](#)

[EARTH SCIENCE](#)

[ENERGY](#)

[ENVIRONMENT](#)

[FOOD](#)

[GENETICS](#)

[GOVERNMENT](#)

[HEALTH](#)

[MEDICINE](#)

[PHYSICS](#)

[SPACE](#)

[VIDEO PODCAST](#)

✉ [SEND US A TIP!](#)

BLOG ROLL

art : [WMMNA](#)

big pharma : [In the Pipeline](#)

bioethics : [blog.bioethics.net](#)

biology : [Not Exactly Rocket Science](#)

brain science : [Mind Hacks](#)

chemistry : [The Chem Blog](#)

clean tech : [Earth2Tech](#)

climate : [Dot Earth](#)

energy : [The Oil Drum](#)

general science : [3quarksdaily](#)

general science : [The KSJ Tracker](#)

geological speculation : [BLDGBLOG](#)

neuroscience : [Of Two Minds](#)

new medicine : [Science Roll](#)

physics : [physics arXiv blog](#)
space : [Bad Astronomy](#)

[Corrections](#) | [Sitemap](#) | [FAQ](#) | [Contact Us](#) | [Wired Staff](#) | [Advertising](#) | [Press Center](#) | [Subscription Services](#) | [Newsletter](#) | [RSS Feeds](#) 



web sites:

[Webmonkey.com](#) | [Reddit.com](#) | [ArsTechnica.com](#) | [Epicurious.com](#) | [NutritionData.com](#) | [Concierge.com](#) | [HotelChatter.com](#) | [Jaunted.com](#) | [Style.com](#) | [Men.Style.com](#) | [Flip.com](#)

Subscribe to a magazine:

Condé Nast web sites:

© 2008 CondéNet, Inc. All rights reserved.
Use of this site constitutes acceptance of our [User Agreement](#) and [Privacy Policy](#)