

98.6 degrees Fahrenheit ideal temperature for keeping fungi away and food at bay

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Two researchers at Albert Einstein College of Medicine of Yeshiva University have found that our 98.6° F (37° C) body temperature strikes a perfect balance: warm enough to ward off fungal infection but not so hot that we need to eat nonstop to maintain our metabolism.

"One of the mysteries about humans and other advanced mammals has been why they are so hot compared with other animals," said study co—author Arturo Casadevall, M.D., Ph.D., professor and chair of microbiology & immunology at Einstein. "This study helps to explain why mammalian temperatures are all around 37° C." Dr. Casadevall also holds the Leo and Julia Forchheimer Chair in Microbiology and Immunology.

The research builds upon earlier work by Dr. Casadevall showing that the number of fungal species that can thrive and therefore infect an animal declines by 6 percent for every 1° C rise in temperature. This means that tens of thousands of fungal species infect reptiles, amphibians and other cold—blooded animals, but only a few hundred harm mammals. Such protection against fungal infection, Dr. Casadevall has speculated, could have been crucial for the triumph of mammals following the age of dinosaurs.

In this study, Dr. Casadevall and his Einstein coauthor, Aviv Bergman, Ph.D., professor and founding chair of systems & computational biology, devised a mathematical model that analyzed the benefits gained by body temperatures that protect against [fungi](#) versus the costs (in terms

of extra [food](#) consumption) required to maintain body temperatures between 30° and 40° C. The optimal temperature for maximizing benefits while minimizing costs was found to be 36.7° C, which closely approximates normal body [temperature](#).

"This study is a good example of how mammalian evolution has been driven by both external biological factors and internal physiological constraints," said Dr. Bergman.

The paper, "Mammalian Endothermy Optimally Restricts Fungi and Metabolic Costs," appeared in the November 9 edition of *mBio*.

Provided by Albert Einstein College of Medicine

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