

Allergies? Your sneeze is a biological response to the nose's 'blue screen of death'

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Who would have thought that our noses and Microsoft Windows' infamous blue screen of death could have something in common? But that's the case being made by a new research report appearing online in *The FASEB Journal*. Specifically, scientists now know exactly why we sneeze, what sneezing should accomplish, and what happens when sneezing does not work properly. Much like a temperamental computer, our noses require a "reboot" when overwhelmed, and this biological reboot is triggered by the pressure force of a sneeze. When a sneeze works properly, it resets the environment within nasal passages so "bad" particles breathed in through the nose can be trapped. The sneeze is accomplished by biochemical signals that regulate the beating of cilia (microscopic hairs) on the cells that line our nasal cavities.

"While sinusitis rarely leads to death, it has a tremendous impact on quality of life, with the majority of symptoms coming from poor clearance of mucus," said Noam A. Cohen, M.D., Ph.D., a researcher involved in the work from the Department of Otorhinolaryngology-[Head and Neck Surgery](#) at the University of Pennsylvania in Philadelphia. "By understanding the process by which patients with sinusitis do not clear mucus from their nose and sinuses, we can try to develop new strategies to compensate for their poor mucus clearance and improve their quality of life."

To make this discovery, Cohen and colleagues used cells from the noses of mice which were grown in [incubators](#) and measured how these cells cleared mucus. They examined how the cells responded to a simulated

sneeze (puff of air) by analyzing the cells' biochemical responses. Some of the experiments were replicated in human sinus and nasal tissue removed from patients with and without sinusitis. They found that cells from patients with sinusitis do not respond to sneezes in the same manner as cells obtained from patients who do not have sinusitis. The researchers speculate that sinusitis patients sneeze more frequently because their sneezes fail to reset the nasal environment properly or are less efficient at doing so. Further understanding of why sinusitis patients have this difficulty could aid in the development of more effective medications or treatments.

"I'm confident that modern biochemical studies of ciliary beating frequency will help us find new treatments for chronic [sinusitis](#)," said Gerald Weissmann, M.D., Editor-in-Chief of The [FASEB Journal](#), "I'm far less confident in our abilities to resolve messy computer crashes. We now know why we sneeze. Computer crashes are likely to be a mystery forever."

More information: Ke-Qing Zhao, Andrew T. Cowan, Robert J. Lee, Natalia Goldstein, Karla Droguett, Bei Chen, Chunquan Zheng, Manuel Villalon, James N. Palmer, James L. Kreindler, and Noam A. Cohen. Molecular modulation of airway epithelial ciliary response to sneezing. *FASEB J.* [doi:10.1096/fj.11-202184](https://doi.org/10.1096/fj.11-202184)

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