

# Research examines what made the COVID pandemic end so abruptly

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During the winter of 2020 and 2021, the US saw deaths from COVID-19 reach 250,000. The following year, this number surged by a third to 330,000. But from August 2022 to March 2023, the number of deaths

related to COVID-19 deaths plummeted to just 80,000, abruptly ending the COVID pandemic. This dramatic decline couldn't be attributed solely to vaccines, which had already been widely available since spring 2021.

New research [published](#) in *The European Physical Journal B* by Marcelo Moret of CIMATEC in Brazil, together with James Phillips at Rutgers University, New Jersey, suggests that a phase transition in the molecular structure of the COVID-19 spike protein made the [virus](#) less likely to cause severe infections. Their results offer important insights into how the [pandemic](#) ended so quickly, and could help us to prepare for future pandemics.

The spike protein protrudes from the surfaces of viruses like COVID-19, and facilitates entry into host cells by binding to specific receptors on cell membranes. As the virus mutates, these proteins can change rapidly: improving the virus's ability to bind to receptors, but in some cases, making it less deadly.

In their study, Moret and Phillips examined the link between mutations and [death rates](#). They discovered that a phase transition in the [spike protein](#)'s molecular structure—comparable to transitions between phases of matter in physics—could be directly responsible for the sudden drop in fatalities. This phase transition occurred in new strains of the omicron variant which emerged in 2023, which featured just 5 additional mutations from the original omicron variant.

The duo's study suggests that this transition altered the virus's binding mechanisms in the [upper respiratory tract](#)—the passages connecting the nose, mouth, and throat—making severe infections less likely. This insight not only enhances our understanding of COVID-19's evolving contagiousness but also offers valuable lessons for preparing for future pandemics. Through future research, Moret and Phillips hope to further

solidify these theories, providing deeper insights into how future pandemics may evolve.

**More information:** Marcelo A. Moret et al, Why and how did the COVID pandemic end abruptly?, *The European Physical Journal B* (2024). [DOI: 10.1140/epjb/s10051-024-00733-0](https://doi.org/10.1140/epjb/s10051-024-00733-0)

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