



## Carl T. Bergstrom, Ph.D.

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Born in 1971 in St. Louis, Mont., USA  
Studied Biology at Harvard University and Mathematical Evolutionary Theory,  
Population Genetics and Animal Communication at Stanford University

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### PROJECT

## Immune System Evolution and the Information War Between Host and Pathogen

My related personal project of the focus group Evolutionary Medicine is to develop my ideas on how evolutionary biology informs our understanding of the immune system. In particular I am interested in the role of information in the co-evolutionary struggle between hosts who evolve immune systems and pathogens who evolve to avoid these systems. Hosts deploy sophisticated immune mechanisms to detect and respond to pathogen challenge. Pathogens - which can evolve many thousands of times faster than their hosts - devise stratagems by which to deceive their hosts, in order to avoid detection and to exploit the host's metabolic processes. We are developing mathematical models that help us understand how the information war between host and pathogen plays out, and ultimately may help us understand more generally how our immune systems function.

### Recommended Reading

Bergstrom, C. T. and R. Antia. 2006. "How do adaptive immune systems control pathogens while avoiding autoimmunity?" *Trends in Ecology and Evolution* 21: 22-28

Bergstrom, C. T., M. Lo, and M. Lipsitch. 2004. Ecological theory suggests that antimicrobial cycling will not reduce antimicrobial resistance in hospitals. *Proceedings of the National Academy of Sciences USA* 101: 13285-13290.

Mills, C. E., J. M. Robins, C. T. Bergstrom, and M. Lipsitch. 2006. "Pandemic Influenza: Risk of Multiple Introductions and the Need to Prepare for Them." *PLoS Medicine* 3: 6.

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### PUBLICATIONS FROM THE FELLOWS' LIBRARY

Bergstrom, Carl T. (2010)

Making evolutionary biology a basic science for medicine

<https://kxp.k10plus.de/DB=9.663/PPNSET?PPN=769745741>