

Understanding robustness in organisms -- a potential weapon against infectious diseases

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"Robust" is an adjective appreciatively applied to certain vintage wines, but when describing viruses and pathogens, robustness is a property that may be much less desirable. It evokes drug resistant microbes and other superbugs that can wreak havoc as researchers struggle to deal with new pandemics. How can we undercut this robustness?

A study in the journal [Chaos](#), which is published by the American Institute of Physics, examines the ability of organisms to survive and sustain themselves in the face of various kinds of change. C. Brandon Ogbunugafor and his team at Yale University looked at new and existing data to determine the strengths and weaknesses of the study of robustness as a formal concept and its application in infectious systems.

They found that while one must be careful in defining and applying the premise of robustness, the infectious disease paradigm was full of examples where further application might be useful. While preliminary, Dr. Ogbunugafor's work could have far-reaching implications in a world with increasing numbers of drug-resistant strains of disease.

"We believe that further application of the robustness concept, with experiments designed to test it in other systems, might aid in how we study and treat [infectious diseases](#) of various kinds," Ogbunugafor says. "This is quite exciting, as it uncovers fertile ground for the application of an exciting concept in the context of infectious diseases that is highly relevant to everyday life."

While there are still a number of unanswered questions, researchers are hopeful that the application of this concept could help predict how organisms evolve. Ultimately, Ogbunugafor predicts that the application of the robustness concept could serve as a "Rosetta Stone" for predictive evolution, which might constitute the next paradigm shift in [evolutionary biology](#). "Perhaps by understanding how robustness manifests in diseases like influenza and malaria, for example, we'll be better able to predict drug resistant variants before they arise and stay a step ahead of the enemy in the ubiquitous arms race between us and the microbes that threaten our well-being," he says.

More information: The article, "On the Possible Role of Robustness in the Evolution of Infectious Diseases" by C. Brandon Ogbunugafor et al will appear in Chaos: An Interdisciplinary Journal of Nonlinear Science. Chaos.aip.org/

Provided by American Institute of Physics

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