

Environmental changes can elicit fast changes in pathogens

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Changes in environmental conditions may affect epidemics not only by altering the number of free-living pathogens but also by directly increasing pathogen virulence with immediate changes in the physiological status of infecting bacteria.

Pathogens' abilities to cause infections is often considered to be consequence of long term selection pressures with their hosts. However, changes in [environmental conditions](#) could affect epidemics by altering the number of free-living pathogens but also by directly increasing [pathogen virulence](#) with immediate changes in the physiological status of infecting bacteria.

Researchers tested if short-term exposure to different outside host resource types and concentrations affect *Serratia marcescens* –bacterium's [virulence](#) in *Galleria mellonella* –moth. *S. marcescens* is an environmentally growing opportunistic pathogen that can infect a wide range of host, including immunocompromised humans. As expected, severity of the infection was mostly dictated by the bacterial dose, but researchers also found a clear increase in virulence when the bacterium had inhabited a low (vs. high) resource concentration, or animal based (vs. plant based) resources 48 hours prior to infection.

The findings suggest that depending on the exposure to different food sources prior infection, even genetically similar bacteria can differ in their virulence.

"Based on these results one could say that depending on if a single genetically similar bacterial cell originates from a piece of meat, instead of a plant, the virulence is higher. Such changes in virulence could stem from commonly observed resource dependent upregulation of genes that are known to regulate important virulence factors," says Academy Research Fellow Tarmo Ketola.

More information: Ketola T., Mikonranta L., Laakso J. & Mappes J.: Different food sources elicit fast changes to bacterial virulence. *Biology Letters*, 2016. 12: 20150660. [dx.doi.org/10.1098/rsbl.2015.0660](https://doi.org/10.1098/rsbl.2015.0660)

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