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Short Communication

Microbial Pathogenesis and Photobiology

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INTRODUCTION

Many creatures utilise light as a signal to determine the state of their surroundings. All kingdoms of life have acquired the ability to detect and respond to wavelengths in the visible range. Light has long been associated to disease, but the processes underlying many of these findings remained unknown? In both pathogenic bacteria and fungi, a clear relationship has recently been demonstrated between particular protein photosensors and the capacity to cause illness [1], implying that some pathogens require these photosensors for complete virulence. A function for photoperception in microbial pathogenesis is expected to emerge as a recurrent theme.

Sensory proteins in microbes can detect a wide variety of energy spanning the visible spectrum, as well as ultraviolet (UV) and infrared wavelengths [2]. The chromophore that these protein photosensors bind, i.e. the cofactor that really accomplishes the light detecting, divides them into several groups. Phytochromes, cryptochromes, rhodopsins, photoactive yellow protein, and flavoproteins with BLUF (blue light sensing utilising FAD) or LOV (light, oxygen, or voltage) domains are examples of microbial photosensors.

Swartz and colleagues revealed that exposure to visible light is required for growth of the Gram-negative pathogen Brucella abortus in a macrophage infection model, which is perhaps the most unexpected example of photoregulation of bacterial pathogenicity.

Fungal genomes encode potential photosensory proteins with the rhodopsin, phytochrome, cryptochrome, and LOV domains, according to sequencing efforts.

There are just three instances of photoreceptors affecting virulence specifically, and the underlying processes are unclear; hence, further research is needed. See if your favourite microorganism behaves differently in the light and in the dark. Alternatively, scan the genome sequence for possible photosensors, alter these genes, and evaluate the mutant strains' capacity to induce disease.

When evaluating the impact of light on virulence, other factors to consider include the logistical challenges of regulating the light environment in specific plant and animal facilities, as well as the potential that light alters host defences against microorganisms [3]. Despite these experimental difficulties, the global impact of illnesses, the increase in antibiotic resistance, and the introduction of novel pathogens highlight the need for a deeper knowledge of the underlying mechanisms of microbial pathogenesis. It's time to shine a light on microbial light sensing [4].

REFERENCES

1. Swartz TE, Tseng T-S, Frederickson MA, Paris G, Comerci DJ, et al. Blue-light-activated histidine kinases: two-component sensors in bacteria. Science. 2007;317:1090–1093.
2. Gomelsky M, Klug G. BLUF: a novel FAD-binding domain involved in sensory transduction in microorganisms. Trends Biochem Sci. 2002;27:497–500.
3. Roberts MR, Paul ND. Seduced by the dark side: integrating molecular and ecological perspectives on the influence of light on plant defence against pests and pathogens. New Phytol. 2006;170:677–699.
4. Sleijffers A, Garssen J, Van Loveren H. Ultraviolet radiation, resistance to infectious diseases, and vaccination responses. Methods. 2002;28:111–121.

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