

Author's Accepted Manuscript

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www.elsevier.com/locate/jtherbio

PII: S0306-4565(16)30284-4
DOI: <http://dx.doi.org/10.1016/j.jtherbio.2016.12.002>
Reference: TB1856

To appear in: *Journal of Thermal Biology*

Received date: 13 September 2016
Revised date: 1 December 2016
Accepted date: 5 December 2016

Cite this article as: Iwona Wojda, Temperature stress and insect immunity, *Journal of Thermal Biology*, <http://dx.doi.org/10.1016/j.jtherbio.2016.12.002>

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ABSTRACT

This mini-review summarizes the recent knowledge concerning the role of temperature in the immune response of insects. The heat-shock is described as a common phenomenon in both homotherms and poikilotherms, and the role of heat-shock proteins in innate immunity is recalled taking into account its evolutionary aspects. Similar to homothermic animals, which show a febrile reaction to infection, poikilothermic invertebrates such as insects develop behavioural fever as part of their immune response. It can be elicited not only by the presence of the pathogen itself but also by injection of immune stimulators i.e. components of the microbial cell wall. In analogy to fever in homotherms, this process seems to be regulated by the prostaglandin/eicosanoid biosynthesis pathway. The positive effects of temperature change on insect immunity are presented in the paper.

Keywords: heat shock, innate immunity, insects, poikilotherms, behavioural fever

1. Introduction

Temperature and infection are two of the most common factors exerting selective pressure on all organisms including insects (Johnston and Bennett, 1996; Thomas and Blanford, 2003). While experiencing simultaneous or consecutive effects of stress factors, insects can evolve mechanisms to react efficiently to both of them. These include common components activated in both conditions as well as synthesis of compounds that play a protective function under different conditions (Sinclair et al., 2013). Ambient temperature has an influence on host-pathogen interactions. It can affect the efficiency of insect reaction to pathogen invasion and has a direct influence on the infecting microorganism (Arthurs

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