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Sample

Role of endosymbionts for the survival fitness of insects

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Abstracts

Symbiotic bacteria are omnipresent in nature, having a significant impact on eukaryotic evolution and diversity. Some symbiotic bacteria are harmful or even lethal and referred to as parasites or pathogens, while others play a pivotal role in hosts and are known as mutualists. Among the great diversity of symbiotic association, the most cohesive forms are found in “endosymbiosis”, where symbiotic bacteria live inside the host body allowing for spatial intimate interactions between partners. The Order Insecta, composed of over 1,200,000 species, is regarded as the most diverse animal group. Approximately half of all insects are estimated to harbour endosymbiotic bacteria (A. E. Doglas, 2011). Insects that depend exclusively on nutritionally restricted diets such as plant sap, vertebrate blood and woody material, commonly possess obligate mutualistic symbionts involved in the provision of essential nutrients or the degradation of food materials (C. Dale and N. C. Moran, 2006). A typical, yet fascinating, example of such an obligate endosymbiosis is found within aphids. Almost all aphids harbour endosymbiotic bacteria, *Buchnera*, in huge specialized host cells called “bacteriocytes”. The symbionts are maternally inherited by an elaborate mechanism known as “transovarial transmission”, where the symbiont directly infects the embryos within the maternal body. Genome sequencing projects on obligate endosymbionts, including *Wigglesworthia* in tsetse flies, *Blochmannia* in carpenter ants and *Baumannia* in sharpshooters as well as *Buchnera* in aphids, have cast light on genomic adaptations of symbiotic bacteria to the biology and ecology of their hosts.

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