

Cooperation and exploitation in symbiosis

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Mitochondria are known as the ‘power plants’ of the cell. About two billion years ago they were ‘autonomous’ bacterial organisms that – at some point – became endosymbiotic partners of other kinds of bacteria. What they brought into this ‘marriage’ may have been their ability to ‘handle’ the highly reactive chemical oxygen. Now mitochondria enable eukaryotic organisms to undergo aerobic cellular respiration. While playing this highly cooperative role as the cells’ energy converters, mitochondria – in certain cases – also perform very selfish acts at the expense of their host organism’s reproductive performance. Endosymbionts can thus cooperate with their hosts and exploit them at the same time; but why does it pay an endosymbiont to damage the organism that will carry it into future generations? Intracellular bacteria of the genus *Wolbachia* – the closest living relatives of mitochondria – teach us an interesting lesson about this issue. Moreover, the most common way in which they exploit their hosts seems to foster host-speciation and may have contributed to the high degree of species diversity found in insects. Small microbes can generate large-scale phenomena.

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