SYMBIOSIS

Squid sort the wheat from the chaff…

Crypts in the light-emitting organ of the Hawaiian squid *Euprymna scolopes* are colonized by the luminous marine bacterium *Vibrio fischeri*. According to a paper published in *Environmental Microbiology*, the maintenance of specificity in the exclusive symbiotic partnership between *E. scolopes* and *V. fischeri* relies on the ability of the symbiont to prevent host haemocyte adhesion and phagocytosis.

Carefully choreographed interactions between symbiotic bacteria and host immune systems are essential to establish and maintain a successful partnership. *V. fischeri* can colonize the light-emitting organ of juvenile *E. scolopes*, whereas other bacteria cannot. Macrophage-like blood cells, known as haemocytes, have been shown to cross the epithelial barrier, enter the crypt spaces and engulf bacteria. The role of this process in the selection of symbionts was examined by Nyholm *et al.*

McFall-Ngai, Nyholm and colleagues used *in vitro* binding assays to investigate interactions between haemocytes and marine bacteria. They found that binding of haemocytes purified from adult *E. scolopes* to *V. fischeri* was reduced compared with binding to several other species of bacteria. However, if squid were treated with an antibiotic to cure them of symbionts, purified haemocytes bound markedly better to *V. fischeri,* whereas no change in binding efficiency to other bacteria was observed. These results suggest that *V. fischeri* alters host haemocyte binding affinity, resulting in a form of immune tolerance. Intriguingly, a mutant strain of *V. fischeri* that cannot produce the outer-membrane protein channel OmpU adhered to adult haemocytes five times more efficiently than wild-type bacteria. However, co-incubation with wild-type *V. fischeri* led to decreased binding of the OmpU mutant. The authors used fluorescence-activated cell sorting (FACS) analysis to show that phagocytosis of bound *V. fischeri* by haemocytes occurred at similar levels to other bacterial species. These data suggest that the crucial event that prevents engulfment of *V. fischeri* is associated with binding to haemocytes and that a factor secreted through the OmpU channel might be important for this process.

Further work to identify the putative secreted factor could shed light on the mechanism by which *V. fischeri* is selected and maintained by its squid hosts.

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ORIGINAL RESEARCH PAPER Nyholm, S. V. *et al.* Recognition between symbiotic *Vibrio fischeri* and the haemocytes of *Euprymna scolopes*. *Environ. Microbiol.* 9 Oct 2008 (doi:10.1111/j.1462-2920.2008.01788.x)