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PARASITOLOGY

Pavlov's fly

> both gene expression and protein content were substantially decreased in the salivary glands of the infected flies.

Vector-borne parasites often increase their chances of transmission by altering phenotypic traits of their insect vectors in a way that favours greater contact between the vector and the mammalian host. Van Den Abbeele *et al.* now show that *Trypanosoma brucei* alters the protein composition and antihaemostatic activity of tsetse fly saliva, leading to changes in feeding behaviour.

During feeding, the tsetse fly proboscis is partially withdrawn from the pierced skin of the host before being inserted again at a slightly different angle, allowing the fly to probe for a blood vessel and creating space for blood pool formation. During probing, salivary proteins are released to combat the haemostatic reactions that would lead to blood coagulation and vasoconstriction in the host. The authors began by investigating whether *T. brucei* infection of the tsetse fly salivary gland altered the efficiency of feeding. They observed that blood meal acquisition was significantly slower in infected flies than in uninfected flies as a result of prolonged probing behaviour. The authors reasoned that this delay may be due to modification of the fly saliva composition by the infecting parasite. In agreement with this idea, both gene expression and protein content were substantially decreased in the salivary glands of the infected flies. Analysis of salivary proteins with known antihaemostatic roles indicated that their activities were significantly decreased in the saliva of infected flies. Furthermore, a 3-fold reduction in platelet-aggregating capacity and a 16-fold to 32-fold reduction in anticoagulant activity were observed *in vitro* in human plasma.

The authors could not monitor the effect of prolonged feeding time on parasite transmission in a natural setting. However, reducing the feeding efficiency by blocking the antihaemostatic action of the saliva would probably result in contact with multiple hosts and thus favour transmission of the parasite in the host population. The mechanism by which *T. brucei* modulates gene expression in the tsetse fly salivary gland remains to be determined; however, the authors speculate that a population of metabolically active parasites in the salivary gland may trigger a stress response that results in decreased gene expression.

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ORIGINAL RESEARCH PAPER Van Den Abbeele, J. *et al. Trypanosoma brucei* modifies the tsetse salivary composition, altering the fly feeding behavior that favors parasite transmission. *PLoS Pathog.* **6**, e1000926 (2010)