

COLLABORATIVE RESEARCH CENTER | SFB 680

Molecular Basis of Evolutionary Innovations

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The functions of the insect serosa

In insect eggs, the yolk and embryo are covered by an extraembryonic membrane, the serosa. It has been hypothesized that the serosa protects against dry terrestrial conditions. However, eggs of the beetle *Tribolium castaneum* hatch normally when their serosa has been removed by RNAi against the gene *zerknüllt*. Furthermore, *Drosophila* has lost the membrane in evolution. This questions the function of the serosa.

First, we tested the classical desiccation hypothesis by subjecting serosa-less *Tribolium* eggs to different humidities and report a dramatic decrease in hatching rates at low humidities, in contrast to control eggs. Furthermore, we show that the serosa secretes a cuticle that protects against desiccation. Second, we tested a novel hypothesis that the serosa plays a role in the innate immune defense. qPCRs reveal that the *Tribolium* egg upregulates several immune genes to comparable levels as adults in response to infection. *Drosophila* eggs and serosa-less *Tribolium* eggs, however, show little to no upregulation of any of the tested immune genes.

In conclusion, the serosa plays a crucial role in the desiccation resistance and immune competence of the insect egg. The humid habitat and extremely rapid development might have allowed the loss of the serosa in *Drosophila*.

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Biocenter, Zülpicher Str. 47b, Seminar room 3.003, 3rd floor

Host: Siegfried Roth

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