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Traits related to egg resistance to desiccation in Hexapoda: the roles of lipids in the beetle *Tribolium castaneum* and blastodermal cuticle in the springtails *Folsomia candida* and *Orchesella cincta*

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In insects, the egg stage is susceptible to water loss. During early embryogenesis, the uniform blastoderm differs in serosa, amnion and embryonic anlages. Serosal cells wrap the embryo and synthesize the serosal cuticle (SC) that gives further desiccation protection to the egg, in addition to the protection provided by the maternally-derived eggshell layers. SC contains chitin and molecular evidence suggests the presence of lipids in it. We hypothesize that *elovl* genes are related to lipids synthesis in the SC. Unlike insects, Collembola have a blastodermal cuticle (BC) synthesized by cells of the differentiated blastoderm. After BC formation, the maternal eggshell breaks and the cuticle becomes the sole structure surrounding the embryo but is unknown if BC formation increases egg resistance to desiccation (ERD), like SC does in insects. Here, we aim to better understand the ERD in Hexapoda by: 1) Determining the role of lipids in ERD and their presence in *Tribolium castaneum* SC and 2) Investigating blastodermal cuticle formation and its role in ERD during the embryogenesis of the species *Folsomia candida* and *Orchesella cincta*. The parental RNAi was used to show the importance of *Tc-elovl* genes. Only *Tc-elovl04* RNAi decreased egg viability under desiccating conditions. RT-PCR assays showed *Tc-elovl04* RNAi did not decrease the *Tc-elovl04* expression level eggs but, surprisingly, it increased the expression of different elongases during embryogenesis. Two hypotheses arises: 1) we silenced a maternal *Tc-elovl04* expression involved in choriogenesis; 2) the increased lipid production decreased the capacity of the egg to control water loss. In Collembola, before BC formation the springtails eggs shrivel and die after 15 minutes in a dry environment but after BC formation eggs don't shrink and survive in the same condition. *Orchesella cincta* eggs resist more to desiccation than *F. candida* eggs. This difference might be explained by BC structural differences: the *O. cincta* one is well-structured when compared to the *F. candida* BC. Results in *T. castaneum* are similar to what occurs in plants and mammals: elongases are related to water loss protection. Results in springtails show that the role of a post-zygotic cuticle in ERD is conserved during Hexapoda evolution.

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