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The peculiar extra-acrosomal structure of the Collembola (Hexapoda) spermatozoa

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Highlights

- The origin and structure of the extra-acrosomal structure of the Collembola sperm are described.
- The outer envelope of the structure consists in a layer of filaments with orthogonal array.
- The inner content of the EAS can be variable in structure according to the systematic of the group.
- Fluorescence and electrophoretic analyses indicate that the EAS contains glycoproteins.

Abstract

The springtail Collembola are characterized by having rolled spermatozoa, with a long cylindrical extracellular structure adhering to the acrosome. This structure is produced by the secretory activity of the testes epithelial cells at almost the end of spermiogenesis. At the beginning of its formation, it is a thin extension with a helical wall and a dense axial region. Later the cylindrical structure shows an inner organization which is different in the several species examined: species of Entomobryidae contain material with a paracrystalline structure, whilst some of Symphypleona contain ovoid structures. The outer envelope of the extracellular structure consists of two overlapped layers orthogonally arranged, clearly identified by cryo-preparations. Immunoblot analysis and lectin stainings have indicated that the cylindrical structure has a glycoproteic composition. As the structure is no longer visible after the sperm transfer into the female spermatheca, it is suggested that it

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