

Chitin synthase dynamics in the *C. elegans* embryo

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Chitin is, after cellulose, the second most abundant biopolymer in nature. The structure of chitinous materials and their interacting molecules is important in many biological processes, for example, the generation of a chitinous eggshell that protects the nematode embryo in its early development. How chitin is synthesized, secreted, and organized to form a shell that is both soft and protective remains poorly understood. Here, we use ex utero spinning disc microscopy to investigate how the chitin layer of the *C. elegans* eggshell is generated. We report how chitin synthesis leads to chitin synthase self-propulsion in the membrane of the zygote, and we characterize how the internalization of chitin synthase for ending chitin secretion is coordinated with the process of cortical granule exocytosis. In conclusion, our work sheds light on the physical mechanisms that contribute to the generation of the chitinous *C. elegans* eggshell.