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Functional Analysis of a Novel gene, *Femcoat*, by Double Stranded RNA Interference

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In *Drosophila* oogenesis, follicle cells derived from somatic tissue surround the oocyte and play key roles in generating properly polarized oocytes. During the later steps of oogenesis, follicle cells are involved in secretion of proteins that make the eggshell, an essential protective layer for the oocyte. Although studies on the signaling processes to make polarized oocytes have been progressed very far, studies on the mechanisms for eggshell formation is not clear yet. To elucidate the underlying mechanism in eggshell formation, we used a differential display screen to isolate genes that are specifically expressed during the later stages of oogenesis, and isolated a novel gene, *Femcoat*. *Femcoat* encodes a putative endochorion membrane protein that contains many highly charged residues and has a putative signal peptide. Femcoat protein is expressed specifically in the follicle cells with a punctate staining pattern typical of secreted proteins, and becomes cross-linked heavily at the final steps of oogenesis. To identify the developmental role of *Femcoat* in eggshell formation, we performed an inducible double stranded RNA mediated interference (dsRNAi) method to specifically reduce *Femcoat* expression during oogenesis in adult flies. Electron microscopy analysis of egg chambers from these flies showed defects in endochorion formation. These pieces of evidence demonstrated that *Femcoat* is necessary for eggshell formation, especially during endochorion synthesis.