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TEMPORAL EXPRESSION OF HEN UTERINE TRANSCRIPTS AT KEY STEPS OF SHELL MINERALIZATION

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The chicken eggshell is made of 95% of calcium carbonate on calcitic form and 3.5% of matrix organic. The latter determines its ultrastructure and consequently its biomechanical properties. Four major events of the shell formation were described as: (1) deposition and accumulation of metastable amorphous calcium carbonate (ACC) over the eggshell membrane surface, (2) rapid evolution and redistribution of ACC on specific nucleation sites to form calcite aggregates, (3) enlargement of calcite aggregates in larger calcite crystals, and (4) development of column of crystals with a preferred orientation perpendicular to the surface. We used RNA-sequencing method to determine overexpressed hen uterine transcripts at the same key mineralization stages. 4502 differentially expressed transcripts representing 3766 different genes were obtained and grouped in 14 clusters of transcript abundance throughout the calcification process. Gene ontology functional analysis establish a list of 223 enriched GO terms belonging to 38 functional groups. Amongst these transcripts, 718 corresponded to potentially secreted proteins and 503 of them were previously identified in eggshell matrix and uterine fluid. This study is a major contribution to the characterization of genes and related proteins involved in the eggshell fabric. They could be used as potential biological markers of eggshell biomechanical properties.

Keywords (maximum 5): Eggshell quality; biomineralisation; RNA-Seq; Transcripts; Functional analysis

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