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RNA-Seq analysis of the shell gland region of oviduct in laying hens challenged with infectious bronchitis virus**Samiullah Khan**

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In this study, brown egg laying hens were challenged with IBV T strain and shell gland tissue was collected at day 10-11 post infection. RNA-sequencing was performed on shell gland tissue samples collected at 5 and 15 hours post-oviposition time from infected and control groups of hens. Functional analysis was performed in cytoscape plugins clueGO using Gene Ontology (GO) terms in biological process, molecular function and cellular component specific for *Gallus gallus*. Comparing the samples at 5 and 15 hour time-points, 1953 and 1678 differentially expressed genes (adjusted p value < 0.05; fold change > 1.5) were identified, respectively. There was no significant effect (adjusted p value > 0.05) of virus challenge on the genes involved in eggshell formation and the immune system. There was a significant effect of time-points on the expression of genes involved in eggshell formation. The two most enriched GO terms appearing at the 5 hour time-point were T cell homeostasis and signal release. The most enriched genes at the 5 hour time-point in T cell homeostasis were ACE, P2RX7 and SLC13A2. Similarly, the most enriched genes in GO term signal release were C2CD4C, P2RX7 and SYT15. At the 15 hour time-point, the two most enriched GO terms were regulation of calcium ion dependent exocytosis and response to organonitrogen compound. The most enriched genes in regulation of calcium ion dependent exocytosis were LOC427491, RIMS1, SYT16 and TC2N. Similarly the most enriched genes in response to organonitrogen compound were AGTR2, BAIAP2L2, CISH, GNRHR, HTR1B and INHBB. This study provides detailed descriptions of the shell gland genes that are over-expressed when the egg shell is in the oviduct but not in the shell gland or when the egg shell is mineralizing. It can be concluded that the two time-points of eggshell formation showed significant differences in expression profiles for transcripts involved in egg shell formation. Some of the novel genes identified in the current study, that are involved in the supply of minerals, may be potentially useful biological markers for the genetic improvement of egg shell quality.

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