

## Transcriptome Sequencing of the Spleens Reveals Genes Involved in Antiviral Response in Chickens Infected with Castv

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**Abstract :** Astroviral infections pose a significant problem in the poultry industry, leading to multiple adverse effects such as decreased egg production, breeding disorders, poor weight gain, and even increased mortality. Commonly observed chicken astrovirus (CAstV) was recently reported to be responsible for "white chicks syndrome" associated with increased embryo/chick mortality. The CAstV-mediated pathogenesis in chicken occurs due to complex interactions between the infectious pathogen and the immune system. Many aspects of CAstV-chicken interactions remain unclear, and there is no information available regarding gene expression changes in the chicken's spleen in response to CAstV infection. We aimed to investigate the molecular background triggered by CAstV infection. Ten 21-day-old SPF White Leghorn chickens were divided into two groups of 5 birds each. One group was inoculated with CAstV, and the other was used as the negative control. On 4th dpi, spleen samples were collected and immediately frozen at -70°C for RNA isolation. We analysed transcriptional profiles of the chickens' spleens at the 4th day following infection using RNA-seq to establish differentially expressed genes (DEGs). The RNA-seq findings were verified by quantitative real-time PCR (qRT-PCR). A total of 31959 transcripts were identified in response to CAstV infection. Eventually 45 DEGs (p-value<0.05; Log2Foldchange>1) were recognized in the spleen after CAstV infection (26 upregulated DEGs and 19 downregulated DEGs). qRT-PCR performed on 4 genes (IFIT5, OASL, RASD1, DDX60) confirmed RNAseq results. Top differentially expressed genes belonged to novel putative IFN-induced CAstV restriction factors. Most of the DEGs were associated with RIG-I-like signalling pathway or, more generally, with an innate antiviral response (upregulated: BLEC3, CMPK2, IFIT5, OASL, DDX60, IFI6, and downregulated: SPIK5, SELENOP, HSPA2, TMEM158, RASD1, YWHAB). The study provided a global analysis of host transcriptional changes that occur during CAstV infection in vivo and proved the cell cycle in the spleen and immune signalling in chickens were predominantly affected upon CAstV infection.

**Keywords :** chicken astrovirus, CastV, RNA-seq, transcriptome, spleen

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