Mitochondrial count in oviduct of laying hens challenged with infectious bronchitis virus

**Samiullah Khan1,2\*, Shu-Biao Wu1, Juliet Roberts1 and Kapil Chousalkar2**

1Animal Science, School of Environmental and Rural Science, University of New England, Armidale, New South Wales, 2351, Australia

2School of Animal and Veterinary Sciences, The University of Adelaide, Roseworthy, South Australia, 5371, Australia

\*To whom correspondence should be addressed: samiullah01@adelaide.edu.au

**Abstract**

The four main segments of the oviduct of the laying hen that are involved in egg formation are infundibulum, magnum, isthmus and shell gland (uterus). The isthmus and shell gland are involved primarily in eggshell formation. Among the internal contents, albumen is secreted by the magnum. Mitochondrial level was determined in relation to time-points post-oviposition of egg formation in three different segments of the oviduct of laying hens 9-10 days following challenge with infectious bronchitis virus (IBV) T strain. qPCR approach was followed to study the mean mitochondrial level in three different segments of the oviduct at two time-points of egg formation. In the shell gland, the mitochondrial level shown as the number of mitochondria counts per cell was significantly lower (P<0.05) in the challenged group compared with the control group. However, it did not vary significantly between the control and IBV challenged groups in the isthmus and magnum regions of the oviduct. The relative expression levels of genes encoded by nuclear DNA and involved in mitochondrial biogenesis and fission were determined in the shell gland tissue of IBV challenged and control groups at different time-points of eggshell formation. No significant differences in expression level of any of the genes were observed between the control and IBV challenged groups. Differences were detected between time points on the other hand. The expression levels of *CS*, *CYC, S* and *Na+-K+ ATPase* genes were significantly higher, while those of *SDHA* and *Drp1* genes were significantly lower at 15 hr compared with 5 hr time-point. The expression level of *PGC-1α*, a master regulator of mitochondrial biogenesis, was not significantly affected by time-point.

It can be concluded that IBV T strain infection in laying hens reduced the mean mitochondrial count per cell only in the shell gland region of the oviduct. The genes involved in mitochondrial biogenesis or function showed no clear pattern of expression that correlates with the mitochondrial count per cell in the shell gland of oviduct of hens challenged with T strain infectious bronchitis virus.