ABSTRACT

Egg drop syndrome is a disease of recent origin in the polutry. Though not fatal, the economic consequences of the onset of this disease is quite significant. There are reports of a fairly widespread etiology of the disease worldwide. The egg drop syndrome virus (EDS 76) is an adenovirus and shares a common group specific antigen with fowl adenoviruses. A diagnostic characteristic of the EDS-76, is its specific hemagglutination (HA) of chicken erythrocytes and a specific hemagglutination inhibition (HI) test. The disease has been reported to have vertical transmission. In addition, infected birds are known to shed virus in the dropping and therefore area potential source for the lateral transmission of the disease.

The objective of this study was to undertake a systematic study on the molecular biology of an indigenous strain of the egg drop syndrome virus (EDS 76), in order to arrive at a more meaningful diagnostic kit or a vaccine for early detection/prevention of the disease.

The EDS 76 virus from the allantoic fluid was purified on a Cesium chloride density gradient . Three types of particles B1,B2 and B3 with densities 1.32, 1.30 and 1.28 g/ml were separated. The B1 particles were hemagglutinating

but not infectious while B3 particles were only infectious. We speculate that B2 particles are whole virions while B1 particles are ghost virus particle. Since B3 particles are only infectious and *in vitro* studies have shown that this could be defective virus particle or DNA protein complexes.

The hemagglutinin have been implicated to play a major role in the infection of adenoviruses. In order to elucidate the nature and function of the hemagglutinin we have attempted purification of this polypeptide. Recorded evidences showed that two types of hemagglutinin occur:i) hemagglutinin which forms the vertex of an adenovirus capsid and ii) the soluble hemagglutinin . We have purified the soluble hemagglutinin and no functional difference is seen between the particle hemagglutinin and soluble hemagglutinin. Evidences are presented to show that the hemagglutinin of EDS 76 are possibly glycosylated.

In the second part of the thesis, with a view to clone and express any one of the major immunogen for diagnostic and or vaccine. The genomic bank of EDS 76 was constructed in various plasmid vectors like pUN121, pUC19 and pGEM 3Z. Two of the clones pVG C10 ad pVG C23 exhibited feeble immunoreactivity against viral antisera in dot blot ELISA. To stabilise and over express this antigen, the T7 RNA polymerase system was used. Under our experimental condition,

we were able to enhance expression of a 48 kDa peptide encoded by the 2 kb fragment of EDS-76 DNA cloned into the pGEM system.

In order to establish alternative sources of antigen and to study the pathobiology of EDS infection in a *in vitro* system we have developed a simple and easy method of establishing a duck embryo fibroblast. The DEF system is permissible to EDS virus and serve as an alternative source of antigen for the development of a meaningful diagnostic kit.

In summary, this thesis contains the following observations and claims.

* Purification and biochemical characertization of EDS 76 isolate.
* Partial purification of the soluble hemagglutinin.
* Cloning and expression of a 48 kDa viral antigen in *E.coli* using the T7 polymerase system.
* Establishment of an inexpensive and simple *in vitro* system for the propagation of EDS 76.
* The observation that a DNA-protein complex may be involved in the process of infection.