# Construction of *Eimeria* artificial chromosome and its effect as an antigen expression platform

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**Abstract:** VP2 protein derived from infectious bursal disease virus has good immunogenicity and is widely used in infectious bursal disease vaccines. Construction of various recombinant plasmids containing VP2 gene and transfected into *Eimeria* as vaccines have provided some protection to chickens after immunization, but the effect has not yet reached an ideal level. The basic functional elements of artificial chromosomes include replication origin, centromere, and telomere. These natural fragments can exist for a long time after entering the sporozoite, and have a strong protective effect on the target gene. With the rapid development of sequencing technology, the quality of genome sequencing has been rapidly improved. Through whole genome sequencing, we assembled 14 chromosomes of *Eimeria acervulina*. Through TRF analysis, we obtained the telomere sequence consisting of 367 to 957 5 '- AAACCCT-3' repeat tandem sequences; the centromere has the characteristics of high AT content and contains repetitive sequences. Using Python to calculate the content of chromosomal bases in a unit of 1 kb, we obtained 95 segments with high AT (>90%) content, and screened the segments with repetitive sequences through TRF. We will use DNA recombination technology to isolate these basic functional elements of chromosomes, insert VP2 expression frame, and construct artificial chromosomes of *Eimeria acervulina*. We will further study its improvement in the expression level of exogenous antigens and immune protection effects. Our strategy would provide a theoretical basis for the improvement of recombinant vaccines based on Eimeria parasites as vaccine vactors.

**Keywords:** *Eimeria acervulina*; Artificial chromosome; VP2 protein

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