

FUTURE PROSPECTS AND APPLICATION FOR THE DEVELOPMENT OF ADENOVIRUS-BASED VACCINE

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Ebola viruses (EBOVs) are enveloped, non-segmented, negative-strand RNA viruses belonging to the family Filoviridae. They are known to cause lethal hemorrhagic fever in humans with a mortality rate up to 90%. As an emergency response to the largest Ebola disease epidemic in 2014, several countries had accelerated the process of developing effective vaccines against Ebola.

The vaccine described here, unlike other Ebola vaccine candidates that are under clinical evaluation, is the first Ebola vaccine based on the 2014 Zaire Guinea epidemic strain. This vaccine, Ad5-EBOV, is a replication-defective recombinant human type 5 adenovirus expressing Zaire (Makona, 2014) Ebola virus envelope glycoprotein. A manufacturing process, up to 200L scale, has been developed and optimized. The purified Ad5-EBOV was formulated with the addition of proper stabilizers and lyophilized. The product can be stored at 2 – 8°C for at least one year without losing any infectivity.

The Ad5-EBOV vaccine was tested in guinea pig and non-human primate models. In both cases, it was showed to elicit specific B- and T-cell immunity and conferred 100% protection when animals were challenged with the Ebola virus. Following two successful phase I trials in China, a phase II trial of Ad5-EBOV was conducted in Sierra Leone in 2015 with 500 participants. The results of the trials demonstrated that Ad5-EBOV is safe and highly immunogenic.