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Ebola vaccine 2014: remained problems to be answered

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ABSTRACT

Ebola virus outbreak in Africa in 2014 is a big global issue. The vaccine is the hope for management of the present outbreak of Ebola virus infection. There are several ongoing researches on new Ebola vaccine. In this short manuscript, we discuss and put forward specific remained problems to be answered on this specific issue. Lack for complete knowledge on the new emerging virus, concern from pharmaceutical company and good trial of new vaccine candidates are the remained problem to be further discussed in vaccinology.

1. Introduction

Ebola virus is a filovirus that can cause fatal infection in human beings. Ebola virus outbreak in Africa in 2014 is a big global issue. Thousands of local Africans get infections and the disease has already spread out of Africa. The vaccine is the hope for management of the present outbreak of Ebola virus infection[1,2]. There are several ongoing researches on new Ebola virus vaccine. The trials for many newly developed vaccine candidates are planned[3]. In this short manuscript, we discuss and put forward specific remained problems to be answered on this specific issue.

2. Points to be discussed

As a new emerging infectious disease, the development of Ebola virus vaccine is a challenge. Finding for pandemic vaccine has to be rapidly done and this is usually questionable for the effectiveness and safety, similar to the situation of the previous 2009 swine flu

outbreak[4].

First, the basic search for immunological epitope and further peptide candidate development can be done with the help of advanced bioinformatics and biotechnology in the present. The *in silico* computational process can be helpful. There are many newly developed vaccine candidates and ongoing researches on Ebola vaccine development. The great consideration is on the knowledge of the virus and its immunological biological system. It is not fully known and further basic medical science research is still needed[5]. Interestingly, most vaccine researches on the present Ebola virus outbreak use the accumulated data from previous small outbreaks. The present 2014 African Ebola virus outbreak has some new clinical features which might relate to the difference in basic genetic composition of the virus[6]. The realization on the new virus and its immunological aspects is very important and this is the first step for success in vaccine search and development. Hence, the vaccine candidates that were developed based on old viral data are questionable for the effectiveness.

Second, since the present outbreak occurs at a poor region of the world, West Africa, the limitation of local facilities corresponding to medical research can be expected. In addition, the interest on vaccine development by the main pharmaceutical company of the world might not be much at the early phase of outbreak. For sure, many tropical infectious diseases in poor tropical countries usually

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get less interest on funding and research for vaccine development by pharmaceutical company[7]. Indeed, Ebola virus has been detected for many decades but it seems to be a neglected tropical disease[8]. As noted by Geisbert and Jahrling, small global market has generated little commercial interest for developing an Ebola virus vaccine[9]. There are very few medical developments on this infection before there is a present concern on its possible worldwide pandemic. Call for urgent international collaboration to find new drug and vaccine is the present need[10]. Funding for more research and development in new drug discovery and vaccines is the urgent requirement as suggested by Tambo *et al*[11].

Third, for the already newly developed vaccine candidates, the remained problem is the vaccine trial. Since the required vaccine is the pandemic vaccine, the complete process of vaccine trial is impossible. Although there have been some previous reports on Ebola vaccine trials in animal model, those vaccines cannot correspond to the present new emerging problems[12,13]. The clinical trial in human beings without data in animal test becomes a widely discussed ethical issue[14,15]. Focusing on the present human trial, most trials are only in phase I and it is still a long way to get the completely guaranteed vaccines[16]. The availability of the new vaccine might be late to correspond the present rapidly spreading of the infection. Hence, there is no doubt that the national health policies of many countries promote the urgent trail of the new vaccine[17,18].

3. Conclusion

Conclusively, the Ebola virus vaccine is the hope for management of the present outbreak of Ebola virus infection in Africa. However, the effective vaccine is still no available. There are several remained problems for the vaccine development. Lack for complete knowledge on the new emerging virus, lack for concern from pharmaceutical company and lack for good trial of new vaccine candidates are the remained problems to be further discussed in vaccinology.

Conflict of interest statement

We declare that we have no conflict of interest.

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