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Future Perspectives for Controlling Ebola Epidemics

Lu DY[1*], Lu TR[2], HY Wu[2] and Ding J[2]

[1]*Shanghai University, Shanghai, PR China*
[2]*Shanghai Institute of Materia Medica, Chinese Academy of Sciences, Shanghai, PR China*

Abstract

High mortality rate of Ebola infections and less therapeutic options baffle the worldwide scientists and hamper the medical capability against disease spreads or disease-induced deaths and our understanding into this deadest virus. This article is to outline multi-facet factors of causing Ebola epidemics and further discuss several pathways to update present medical capabilities worldwide and solve this enigma forever.

Keywords: Ebola; Antiviral vaccine; Antiviral drugs; Virus epidemics; Ebola transmission; Human genomes; Integrase inhibitors; Traditional chinese medicine; Medical hypotheses

Introduction

Background

Outbreak of Ebola epidemics in West Africa 2014 shocked the world greatly. Despite the gradual control of Ebola epidemics in outbreak regions, factors behind the Ebola outbreak remain elusive. Moreover, the etiological mechanisms of virus-induced death and targeted therapies are still under investigations. Facing this dilemma, creative ideas must be presented, debated and under investigations. Herein, several factors for critical identifications, assessing and verifications, and possible improvements of public health capabilities against Ebola are speculated, reviewed and reemphasized with new twists. We suggest that new initiatives should be promoted for helping the battle with Ebola virus epidemics and racing against times.

Ebola virus, where does it come from?

Known from history, many deadly viruses, such as plague (black deaths) are originally come sources other than human bodies themselves. Most of virus-origins are from animals such as plague from rodents and rabies from cats or dogs. So does avian flu and so on. If we cannot rule out the possibility of Ebola virus spread from living resources, insects or animals into human bodies, we might never have the chance of completely controlling disease epidemics and ready to eliminate Ebola forever. We previously suggest that systematic detections of Ebola virus or other toxic chemicals, heavy metals or biology between insects, animals and living resources are important steps for completely controlling the diseases [1]. Yet, this work is not easily accomplished owing to many current technical weaknesses and so on [2]. More importantly, completely detections and studies of Ebola virus transmission into humans from outside resources are needed because these infectious steps might be multi-factorials or multispecies. Any missing link between promoting environmental factorials and high rates of transmission into human bodies for Ebola might make all previous world efforts fruitless. To accomplish this strategy, long ways might be required.

Look for Ebola-induced pathogenesis pathways in humans

Looking for exact pathogenesis of viruses is the paramount task for the quality of medical care and interventions studied and applied by researchers and practitioners. However, different viruses trigger different virus-copying mechanisms and deadly complications. Apart from commonly met symptoms (bleeding etc), we reiterate herein the importance of investigations for possible virus penetrations into human genomes as the major pathogenesis of treatment failures and relative into patients' deaths [3-6]. As a result, may we use integrase inhibitors as one type of combinative antiviral drugs for Ebola? Different levels of human genome studied will make different impacts on deadly virus outbreak studies and controls, such as HIV/AIDS pathogeneses and patient's deaths [6] (Table 1).

Finding effective therapeutic options other than vaccines and chemical antiviral agent arsenal

After outbreak of new deadly virus epidemics, first reflection for virologists is always the antiviral vaccines. However, the successful stories are very limited. Otherwise, ethical concerns regain its importance in therapeutic studies in normal humans and at least a few months interval must be spent for new vaccine assessments and final manuscript [5-7]. This is usually proved too little and too later for quick control of deadly virus outbreak and save the lives of wide populations.

Different from therapeutic vaccines, quick establishments of antiviral drug development pipelines and arsenals for clinical utilizations ought to be equipped and effective and matured systems should be ready for the times. Further suggestions are given as chemical drug patents, AVI-6002, AVI-7537, AVI-7539, BCX4430, brincidofovir, favipiravir and TKM-100802 etc [8].

Finally, Traditional Chinese medicine (TCM) therapies [9,10] might also be a useful way for its low toxicity and mixture ingredients as drug cocktail suitable for deadly viral infection control and treatments. Of course, the drug combinations of TCM therapy might be slightly changed for a variety of virus infections. It also needs time and paradigms propagations.

Conclusion

Ebola outbreak in the mid of 2014 is a good lesson for us. Worldwide cooperation is strengthened and boosted. At least, some novel researches are initiated. With all these efforts, we feel safer than ever before. We herein call for stronger worldwide cooperation and share medical experience for virus control and treatments between different countries.

***Corresponding author:** Lu DY, Shanghai University, Shanghai, PR China, Tel: +862166163545; Fax: +862166132177; E-mail: ludayong@shu.edu.cn

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Methodologies	Possible evaluation	Similar ref
Biophysically monitor the interactions between pure host DNA or genome and Ebola infections	Integrase inhibitors	3, 6
In vitro pathogenesis and bioinformatics study of Ebola in infected animal and human cells	Biotherapy and other therapy	5
In vivo genomic or bioinformatics study of Ebola and its relationship between viral vaccine/drugs and animal disease progressions and survivals	Different evaluations of vaccines and antiviral drugs	5
Building relationship between Ebola and human genome changes for susceptible and infected patients, especially died patients	Pathogenesis and therapeutic studies	4-6

Table 1: Different levels of genomic study from other disease infection, pathogenesis and therapy.

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