**Abstract**

**Objective:** A review of current studies on the efficacy of favipiravir as a treatment option for Ebola and Marburg viruses.

**Methods:** Studies were gathered from several sources, including PubMed, JSTOR, and Science Direct. The search was limited to experiments that tested the effectiveness of favipiravir as a form of treatment for filoviruses.

**Results:** Favipiravir worked to repress viral replication and mortality rates associated with filoviruses. The small animal models showed a strong correlation between favipiravir treatment and reduction in overall mortality rate. Non-human primate models and the single human trial's results were less clear and showed lower survival rates than small animal models.

**Conclusion:** Favipiravir was shown to be a strong possibility for treatment of filoviruses such as Ebola and Marburg viruses. However, more research is needed to fully understand how favipiravir not only inhibits filoviruses, but also its impact on the human body.

**Introduction**

Filoviruses, including Ebola (EBOV) and Marburg (MARV), are the cause of hemorrhagic fever epidemics in both humans and large primates in Africa. In humans, the highest mortality rate for EBOV is about 90% and the lowest, being Marburg, is at about 24%-65%. Lack of viable treatment options is a major contributing factor for the high mortality rates associated with filoviruses. Research into the RNA polymerase inhibitor, favipiravir, has shown promising results in treating both EBOV and MARV. Favipiravir has been shown to decrease the fatality of EBOV and MARV in several small animal (SA) trials and several non-human primate trials (NHP). By inhibiting viral RNA polymerase, favipiravir reduced the amplification of the virus, which then reduces the overall symptoms that develop. An increased understanding of the RNA polymerase repressor function associated with favipiravir could create a standardized form of treatment for filoviruses as well as other viral infections, such as influenza and covid-19.

**Methods of Testing Favipiravir**

**Small Animal Models**

- Oral favipiravir (suspended in 0.4% carboxymethylcellulose (CMC) dissolved in deionized water) administered once or twice daily (300, 150, 75, and 37.5 mg/kg/day) 24 h prior to infection.  
- Tissue analysis showed increase in favipiravir-RTP levels (21 to 112 pmol/10⁶ cells)  
- Different conversion from inactive to active forms noted in different tissues  
- Protective doses between 8 mg/kg/day and 1.6 mg/kg/day  
- Oral favipiravir (150 mg/kg) was administered post infection (p.i.) for 7 days.  
- Mice treated 8 days p.i. showed no significant impact on viral titre.  
- Mice treated 6 days or less p.i. showed a lower peak of viremia (P=0.004)  
- Vero E6 cells and IFNAR/- mice were administered 300 mg/kg x d of favipiravir (suspended in 0.5% CMC) twice daily starting 6 days p.i.  
- Repression of viral replication by 4 log10 units and reduction of viral titre by 50%  
- Reduced elevation of aspartate and alanine aminotransferase levels  
- EBOV-specific antibodies present in mice 3 weeks p.i.  
- Vero E6 cells infected with MARV showed a repression by ~log3 units.

**Non-human Primate Models**

- Favipiravir administered intravenously twice daily (100, 150, and 180 mg/kg) within 10 days p.i.

- 150 and 180 mg/kg/day had survival rates of 40% and 60% on day 21 p.i.

- An increase in viral mutagenesis was noted at the end of the study.  
- Protective doses between 8 mg/kg/day and 1.6 mg/kg/day  
- A reduction in EBOV viremia by ~50% was seen in both SA and NHP models, with MARV seeing similar results.

**Discussion**

While this review suggests that favipiravir is a good candidate as a form of treatment for filoviruses such as EBOV and MARV, it has a relatively small window to be administered p.i. for it to be effective. While continued research into favipiravir would be useful in describing its ability to inhibit viral infections in host organisms, other forms of treatment for EBOV and MARV may have the potential to be more beneficial if used in tandem with favipiravir.

**References**