Existing anti-parasitic drug could offer treatment for Ebola

August 8 2019

Amid the worsening Ebola outbreak in the Congo, now threatening to spill into Rwanda, a new study suggests that an existing, FDA-approved drug called nitazoxanide could potentially help contain this deadly, highly contagious infection. In meticulous experiments in human cells, led by Boston Children's Hospital, the drug significantly amplified immune responses to Ebola and inhibited Ebola replication.

The study, published in the Cell Press journal *iScience*, also showed how the drug works: It enhances the immune system's ability to detect Ebola, normally impeded by the virus.

Nitazoxanide, or NTZ, is currently used to treat gastrointestinal infections caused by parasites such as Giardia and Cryptosporidium. It has been shown to be safe and even comes in a formulation for children. Study leader Anne Goldfeld, MD, of the Program in Cellular and Molecular Medicine at Boston Children's, hopes that, with further testing and validation, it could be part of the solution for Ebola.

"Currently, there is no easily deployable therapy for Ebola virus," she says. "There are some very promising vaccines, but there is no oral, inexpensive medication available."

Outsmarting Ebola

The Ebola virus caused more than 10,000 deaths in the 2014-2016 West

African epidemic and more than 1,800 lives (as of August 6th) in the current outbreak in the Democratic Republic of the Congo. The virus is very good at evading human immune defenses. Though very small, it has two genes devoted to blocking immune responses.

Goldfeld and collaborators Chad Mire, Ph.D. and Thomas Geisbert, Ph.D. at the University of Texas Medical Branch, Galveston, showed in Biosafety Level 4 laboratory experiments that NTZ inhibits the Ebola virus (isolated from an earlier outbreak). Additional experiments performed in collaboration with Sun Hur, Ph.D. of Boston Children's showed that NTZ works by broadly amplifying the interferon pathway and cellular viral sensors, including two known as RIG-I and PKR. By deleting RIG-I and PKR in human cells through CRISPR editing, Goldfeld and University of Texas colleagues showed that NTZ works through these molecules to inhibit Ebola virus.

"Ebola masks RIG-I and PKR, so that cells don't perceive that Ebola is inside," explains Goldfeld. "This lets Ebola get a foothold in the cell and race ahead of the immune response. What we've been able to do is enhance the host viral detection response with NTZ. It's a new path in treating Ebola."

Goldfeld hopes to move into animal studies soon, especially given that NTZ has already been used in millions of people with minimal side effects. If effective, it could thus be easily repurposed for Ebola treatment or prevention.

More information: Luke D. Jasenosky et al. The FDA-Approved Oral Drug Nitazoxanide Amplifies Host Antiviral Responses and Inhibits Ebola Virus, *iScience* (2019). DOI: 10.1016/j.isci.2019.07.003

Medical Xpress

Provided by Children's Hospital Boston

Citation: Existing anti-parasitic drug could offer treatment for Ebola (2019, August 8) retrieved 26 April 2024 from
https://medicalxpress.com/news/2019-08-anti-parasitic-drug-treatment-ebola.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.