

University of Massachusetts Medical School

eScholarship@UMMS

UMass Center for Clinical and Translational
Science Research Retreat

2016 UMass Center for Clinical and
Translational Science Research Retreat

May 20th, 12:30 PM

Terpenes as ‘resistance-busting’ anthelmintic drug


Zeynep Mirza

University of Massachusetts Medical School

Et al.

Let us know how access to this document benefits you.

Follow this and additional works at: https://escholarship.umassmed.edu/cts_retreat

 Part of the [Chemical and Pharmacologic Phenomena Commons](#), [Chemicals and Drugs Commons](#), [International Public Health Commons](#), [Medicinal-Pharmaceutical Chemistry Commons](#), [Parasitic Diseases Commons](#), and the [Translational Medical Research Commons](#)

Mirza Z, Koch D, Nguyen T, Hu Y, Aroian RV, Ostroff GR. (2016). Terpenes as ‘resistance-busting’ anthelmintic drug. UMass Center for Clinical and Translational Science Research Retreat. Retrieved from https://escholarship.umassmed.edu/cts_retreat/2016/posters/56

Creative Commons License



This work is licensed under a [Creative Commons Attribution-NonCommercial-Share Alike 3.0 License](#).

This material is brought to you by eScholarship@UMMS. It has been accepted for inclusion in UMass Center for Clinical and Translational Science Research Retreat by an authorized administrator of eScholarship@UMMS. For more information, please contact Lisa.Palmer@umassmed.edu.

Terpenes as ‘resistance-busting’ anthelmintic drug

Zeynep Mirza, MS, David Koch, Thanh Nguyen, Yan Hu, PhD, Raffi Van Aroian, PhD, Gary Ostroff, PhD.

Program in Molecular Medicine, University of Massachusetts Medical School

There is an urgent need for new therapies for parasitic helminthic diseases affecting 1.5-2 billion people worldwide due to the threat of wide-spread resistance development to existing treatments and due to problems of incomplete efficacies.

Terpenes are plant secondary metabolites and major essential oil constituents. Historically, the terpene thymol was successfully used to cure hookworm infections in the 1900's. Although effective, large doses were needed and thymol treatment had significant side effects. Because free terpenes are absorbed in the stomach, less than 10% of oral terpenes entered the site where the parasites live. To overcome these problems we have developed microparticle encapsulated terpenes and enteric coated terpene capsules.

We screened 20 terpenes for anthelmintic activity *in vitro* against adult stages of the hookworm and whipworm parasitic nematodes *Ancylostoma ceylanicum* and *Trichuris muris*. Here we will present results of this work, which shows the promising potential for some terpenes as pan-nematode anthelmintics. This work has allowed us to classify terpenes into at least two groups based on their *in vitro* killing kinetics. We have also shown that some terpenes are effective against an albendazole-resistant *Caenorhabditis elegans* strain suggesting that terpenes may play an important role in overcoming helminthic drug resistance. We will also present our work on optimizing lead terpene formulations *in vitro* and *in vivo* in animal models of parasitic nematode infection in order to overcome the challenges and realize the potential of “resistance-busting” terpene-based anthelmintic therapies.

Zeynep Mirza

phone: 508-856-1930

email: Zeynep.Mirza@umassmed.edu