

Proteomic Analysis of Wolbachia Symbiosis within the Drosophila

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Wolbachia pipientis are bacterial endosymbionts of arthropods and in some filarial nematodes. *Wolbachia* are of particular interest because nematode *Wolbachia* have been shown to cause the diseases African river blindness and Lymphatic Filariasis. Doxycycline can be used to eliminate nematode *Wolbachia*, however, more efficient treatments are needed. Ideally, we would like to repurpose another FDA approved drug that helps to shorten treatment duration. Vitamins are one of the best classes of FDA approved compounds, generally recognized as safe. Interestingly, prior work by Serbus and colleagues found that dietary yeast, which is highly enriched in vitamins, dramatically reduces *Wolbachia* titer in *Drosophila melanogaster* ovarian tissue. Imaging data indicated that the *Wolbachia* nucleoids were disrupted in response to yeast. This raised the possibility that yeast cells contain a bio-reactive, anti-*Wolbachia* compound. Our close examination of yeast nutritional information identified which vitamins are most highly enriched in yeast. We then administered several of these to *D. melanogaster*, and saw that two of these led to reduced ovarian *Wolbachia* titers, analogous to yeast-fed flies. This was especially interesting, as both vitamins are critical for functioning of the same biochemical pathway. We used retested effect of one of these vitamins in oogenesis by performing a dilution series, and achieved positive correlation from this dilution series. This opens up the avenue for clarifying the mechanism of how vitamins suppress *Wolbachia* titer, and for testing enhancement of Doxycycline, to hopefully provide faster, more affordable treatment for millions of patients.