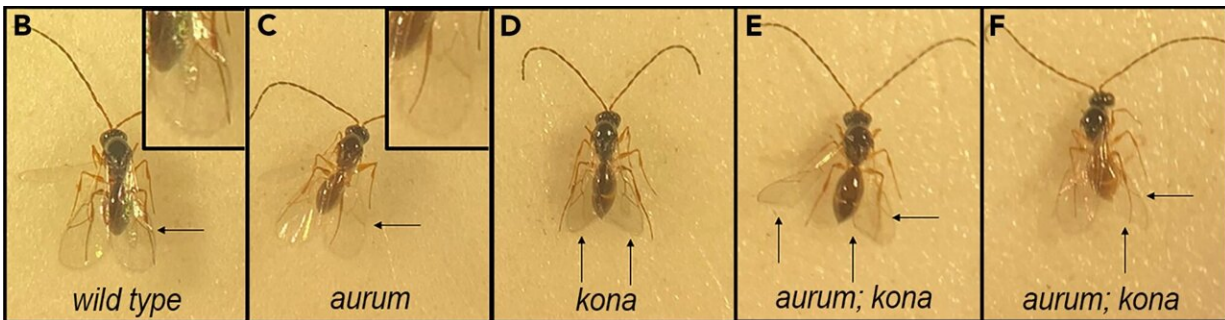


ISS research shows spaceflight affects tumor-bearing fruit fly hosts and their parasites

May 30 2024, by Elizabeth E. Keller



Pigmentation: A side-by-side comparison of wasps shows a clear difference in the melanization of wing veins for wild-type and each mutant. **Blade Shape:** The kona mutant has an angular wing shape in contrast to wild-type's rounded wing blade (vertical arrows in D–F). Credit: S. Govind.

Like humans, fruit flies (a model organism for spaceflight research) also exhibit immune system dysfunction in space. Despite decades of studies on fruit flies and wasps, little was known about how their immune systems interact with natural parasites in space. *Drosophila* parasitoid wasps modify blood cell function to suppress host immunity.

In this [spaceflight study](#) (the Fruit Fly-03 Lab flown to the ISS on SpaceX-14), naive and parasitized ground and space flies from a tumor-free control and a blood tumor-bearing mutant strain were examined. The study is [published](#) in *iScience*.

Surprisingly, the flies without tumors were more sensitive to space than the flies with tumors. Spaceflight increased immune gene activity and made tumors grow more in the flies. The [wasps](#) remained harmful in space, but some developed inheritable physical changes. These changes included "aurum" (altered wing color and veins) and "kona" (altered wing shape). Female wasps with two copies of the "kona" mutation could not lay eggs because of defective egg-laying organs.



Ovipositors from wild-type and mutant wasps. Homozygous kona females with defective ovipositors (used for egg laying) have areas of compromised integrity or have branched ends (arrows) compared to the continuous ovipositors with sharp ends from wild-type control wasps. Credit: S. Govind

This study will improve our knowledge of how parasites and hosts interact. The results show that we need to study more types of organisms, including plants and their natural parasites, in space. This will help us learn more about how hosts defend themselves and how dangerous parasites can be in space, which is important for astronaut health.

Gene expression data from [fruit flies \(OSD-588\)](#) and two types of wasps ([OSD-609](#) & [OSD-610](#)) are publicly available on NASA's Open Science Data Repository. This data is available for anyone to use and compare with other spaceflight studies.

More information: Jennifer Chou et al, *Drosophila* parasitoids go to space: Unexpected effects of spaceflight on hosts and their parasitoids, *iScience* (2023). [DOI: 10.1016/j.isci.2023.108759](https://doi.org/10.1016/j.isci.2023.108759)

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