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アドバンス生命理学特論 Topics in Advanced Biological Science

The role of commensal microbes in the lifespan of *Drosophila melanogaster*

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Commensal microbes have mutualistic relationships with their host and mainly live in the host intestine. There are many studies on the relationships between commensal microbes and host physiology such as on the effects of relationships on metabolism, immunity, development rate, and aging. However, there are inconsistent results regarding the effects of commensal microbes on host lifespan. To clarify this controversy, we generated axenic flies by using two controlled methods and investigated the relationship between commensal microbes and host lifespan in *Drosophila melanogaster*. Bleaching of eggs reduced fly lifespan, whereas the next generation of flies from bleached eggs had a longer lifespan than conventional flies. Antibiotic (AB) treatment did not affect conventional fly lifespan at an AB dose that shortened the lifespan of axenic flies. However, the AB dose without a lifespan-shortening effect on axenic flies increased the lifespan of conventional flies. Furthermore, the strain of flies colonized with a higher load of microbiota showed a greater effect on lifespan extension when the microbes were eliminated, suggesting that commensal load abundance may be a critical determinant of host lifespan. Consistent with those observations, microbial flora of aged gut significantly decreased axenic fly lifespan via increased bacterial load rather than through a change of bacterial composition. Our elaborately controlled experiments showed that elimination of commensal microbes without detrimental side effects increased fly lifespan, and that bacterial load was a significant determinant of lifespan. Furthermore, our results indicate that the presence of a deterministic connection between commensal microbes and host lifespan.

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E131 room, Science E Building

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