



## Revealing Probiotic Benefits for Healthy Aging Through Caenorhabditis elegans

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## Abstract:

Over the last 20 years, scientific research has increasingly focused on the beneficial effects of probiotics, particularly in maintaining a healthy intestinal microbiota and their clinical benefits. This interest is evidenced by the exponential growth in the number of scientific articles dedicated to the study of probiotics since 2000.

Traditional experimental models, such as *in vitro* systems, cell cultures, and mouse models have provided ample insights into the beneficial properties of probiotic strains; however, each of these models have technical, economic or ethical limitations.

Here, we employed the powerful model organism *Caenorhabditis elegans* to study and compare the effects of different bifidobacteria and lactic acid bacteria (LAB) strains, owned by SynBalance S.r.I., on aging. This model offers the advantages of a complete model organism combined with rapid experimental procedures. Moreover, the maximum lifespan of about three weeks of this bacteriophage organism makes it an ideal system for aging studies.

All these features enabled us to compare the effects of six different probiotic strains on *C. elegans* health span during aging. Using a N2 wild-type strain fed with living LAB at OD<sub>600</sub>=1, we first assessed the effects on lifespan parameters and movement. Based on these results, we selected three strains that significantly improved either maximum lifespan and/or movement for further characterization of their antioxidant effect and impact on neuronal functions. Among the three chosen strains, two reduced total ROS levels during aging, although none enhanced the synaptic transmission. Further investigations will be performed to assess cognitive effects and to identify the molecular pathways by which LAB strains ameliorate *C. elegans* aging.