SkQ1 failed to increase the lifespan of the wild-type *C. elegans* (A. P. Grigorenko, unpublished observation), but curcumin extended the lifespan of *C. elegans* and reduced lipofuscin levels during aging. The effect was attributed to ROS quenching and to the antioxidant activity of curcumin, but not to its antimicrobial properties.[98] It is therefore possible that mitochondrially targeted derivatives of 2-demethylplastoquinone (a compound abundant in black cumin) that have a significantly larger window between anti- and pro-oxidant concentrations compared to SkQ1 [94] might be more efficient.

D. melanogaster is a recognized and well-established model system for gerontological studies. Flies are easily maintained on a controlled food under established temperature and light regimens, they have a short lifespan compared to vertebrates, and numerous genetically well characterized lines are readily available for research purposes. Experiments with *D. melanogaster* were used to investigate the consequences of diet supplementation with SkQ1 on aging, lifespan and correlated life-history traits.

9.4.2 SkQ1 Affects Early Survival and Aging in Unmated Flies

Genetically identical unmated flies of an isogenic line marked by w^{1118} mutation were selected for experiments. SkQ1 prolonged lifespan in both males and females when 100 μl of 20 pM to 20 nM SkQ1 solution was applied to the food surface once a week throughout life. 20 μM solution decreased lifespan.[99] The average SkQ1 effect was approximately 10% of the mean lifespan, and it was more prominent at early ages, increasing the survival of juveniles, mostly in females. Indeed, a significant positive effect on female survival was observed in the first 25% of the population, whereas the longevity of the longest-living 10% of the population was not affected.[100] Moreover, the survival of flies receiving SkQ1 during the first week of life was the same as the survival of flies receiving the drug lifelong.[99] Comparison of the Gompertz function parameters showed that in SkQ1-treated females, the initial level of mortality was substantially lower; this effect was less pronounced in males. Reducing early mortality led to an increase in the mean and median lifespan, but this had almost no effect on maximum lifespan.[100] These observations indicated that the drug, like many other antioxidants,[101,102] acted mainly on the short-lived part of the population, and its geroprotective effect was directed primarily at improving the quality of life, not its maximal extension. In addition, the variance of lifespan in flies treated with SkQ1 was smaller than that in control flies, confirming that SkQ1 affected the quality of life.[100] At the same time, analysis of a correlation between the parameters of a Gompertz function in normal physiological conditions (the Strehler–Mildvan correlation, which reflects the rate of loss of "vitality" in aging organisms[103]) allowed us to suggest that SkQ1 reduced the rate of the age-related decrease in fly vitality and, consequently, slightly slowed aging both in males and in females.[100]

To confirm these results, we assessed the effects of SkQ1 on general locomotor activity, which is often considered a marker of vitality and age (see ref. 104 for a review). Unmated females fed SkQ1 were characterized by an