3.4 A Drug Treating an Age-Related Pathology is not an "Anti-Aging" Drug

All people age but they do not all suffer from the same age-related pathologies. For instance, obesity and cardiac diseases are often age-linked but many people are spared from these illnesses. Therefore, a treatment improving health and increasing lifespan in sick animals because it is a cure for this disease is not necessarily able to delay aging and increase longevity in healthy animals. This is what we can conclude from the story of resveratrol, a polyphenol found in grapes and red wine, for instance.

In 2004, an article reported that resveratrol increased lifespan in *C. elegans* and in *D. melanogaster* flies, provided these flies were diet-restricted, and the title of this article thus claimed that resveratrol delays aging.[54] The lifespan results on flies were confirmed[55] or not[56] and those on *C. elegans* were also poorly confirmed[56,57] or not at all.[58] In mice, resveratrol increased lifespan of animals living on a shortening lifespan high-calorie diet,[59] but not of those feeding on a normal diet.[60–62] Thus, resveratrol helped to recover normal longevity in animals living shorter because of a bad diet but had no effect in animals living in better conditions. A similar result was shown in *D. melanogaster* because resveratrol increased the lifespan of flies feeding on a shortening lifespan medium but had no effect if the medium provided a normal lifespan.[63] A possible consequence of these results is that resveratrol could eventually become a therapy for people living less because of obesity or cardiovascular diseases linked to an inappropriate diet, but would be of no help to other people with no metabolic diseases and a normal lifespan, as it seems to be the case.[64,65] This is exactly the definition of a drug: a molecule that fights a disease but should not be used by healthy people. Therefore, the biochemical pathways targeted by resveratrol probably have no role in the aging process and resveratrol is thus not the magic pill aggressively advertised on internet to delay aging in all people. In any case, even if resveratrol became a therapy against obesity, one might feel that eating a magic pill to circumvent the deleterious effects of a bad diet is not a good idea because the most efficient solution would obviously be modifying feeding habits.

To sum up, any product helping animals with short lives because of bad diet, disease, and so on to reach a normal lifespan should not be considered as an "anti-aging" drug able to delay aging and increase lifespan, for the same reason that the bacillus Calmette–Guérin vaccine that strongly increased lifespan during the last century, because people did not longer die at young or middle age from tuberculosis, was not an "anti-aging" vaccine.

3.5 Conclusions

Searching for new means to improve the lifespan of elderly people is a respectable endeavour. Some of these means, beside quitting smoking, taking exercise, avoiding junk food, and so on, could be new drugs helping either to protect from age-related ailments (*e.g.* hearing loss, cataracts) or diseases