Life extension in Drosophila by feeding a drug

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A FDA-approved drug, Sodium 4-phenylbutyrate (PBA), which has been known as an inhibitor of histone deacetylases (HDACs), extended the life span of the adult fruit fly *Drosophila melanogaster*. The maximum and mean life spans of the flies were extended by 52% and 33% respectively. Treatment of the drug for a limited period, either early or late in adult life, was also effective. Old flies treated with PBA were more active without diminution of locomotor vigor, resistance to stress, or reproductive ability.

The level of acetylation on histone H4 and H3 of drug-treated adult flies were highly increased compared to the control. To check induction of the genes by drug,The high-density BAC array were screened byusing mRNA probes isolated from the control and drug-treated flies. The drug induced more than 500 genes and repressed about 400 genes. Some genes, which has already reported to be involved in aging such as superoxide dismutase (SOD), molecular chaperons, translation elongation factor 100α, and some more detoxifying enzymes were greatly induced by the drug. The drug also increased the resistance of the treated flies to the several kinds of stresses such as dry, starvation, or oxidative stress caused by the paraguat, a free radical generator. I hypothesized that the induced SOD and the detoxifying enzymes played important role to remove the deleterious free radicals, and the delay in aging may result from the altered physiological state.