Bisphenol A-feeding differentiates to breed hyperactive fruit flies having PERIOD isoform with shortened Gly-Thr repeat

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Bisphenol A (BPA), a low molecular weight endocrine disruptor, exerts an adverse influence on the human central nervous system. We previously found that the *in vivo* multi-generation propagation assay by BPA-feeding induces the hyperactivity in *Drosophila* fruit flies. As a result, two different kinds of hyperactive flies were isolated and characterized; *i.e.*, flies hyperactive in light period and ones in both light and dark periods. In the present study, we analyzed cDNA structures of the clock gene *period* mRNA extracted from the heads of these hyperactive flies. It was found that, although wild-type PERIOD protein consists of either 20 or 23-Gly-Thr (GT) repeat, PERIOD of hyperactive flies bred by BPA-feeding contains only shortened repeat. The results clearly indicated that the region coding GT repeat in PERIOD was strongly involved in the control of circadian rhythms, and suggested that BPA was involved in a mechanism in which only PERIOD with shortened GT repeat is in operation.