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It has been proposed the hypothesis that uric acid is an important scavenger of deleterious oxygen species in biological systems. Xanthine dehydrogenase (XDH) catalyzes the oxidation of xanthine to uric acid with concomitant reduction of NAD to NADH. The rosy (ry) gene in Drosophila melanogaster encodes to the XDH. Here, we investigated the oxygen defense role of XDH by examining the sensitivity of ry mutants of Drosophila to reactivr oxygen species (ROS) producing stress (wound, starvation, UV irradiation and NO stress). Our results demonstrate that XDH plays an important role in oxygen defense in vivo system.

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Transcriptional Regulation of *Drosophila-raf* Proto-oncogene by Escargot, a Zinc-finger Protein

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The Raf, a cytoplasmic serine/threonine protein kinase, acts as an important mediator of signals involving cell proliferation, differentiation and development. In previous study, through the yeast one hybrid screening for transcriptional regulator of the *D-raf* proto-oncogene, several cDNA clones including Escargot were isolated. Escargot is a zinc-finger type transcription factor with high affinity for G/ACAGGTG. Escargot is known to be required to maintain a high level of G_2/M that actively inhibits the entry into S phase. In this study, whether Escargot really binds to *D-raf* promoter region and regulates the expression of *D-raf* gene were examined. Gel mobility shift assays using glutathion *S*-transferase fusion proteins and Kc cell nuclear extracts showed that Escargot actually binds to *D-raf* promoter region. Increase of *D-raf* promoter activity by Escargot were demonstrated *in vitro* and *in vivo*. Our data suggest that the expression of *D-raf* gene is regulated by transcription factor Escargot.

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Nitric Oxide Downregulates the Expression of Cell Proliferation-Related Genes, PCNA and E2F in *Drosophila* Gut

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Nitric Oxide (NO) is a diffusible multifunctional second messenger that has been implicated in numerous physiological function in mammals, ranging from dilation blood vessels to immune response and potentiation of synaptic transmission. NO has been reported both to inhibit and to promote cell preliferation. Here we investigated effect of NO on the expression of cell proliferation-related genes PCNA and E2F which are expressed in proliferating cells and repressed in quiescent cells. For this purpose, we first examined the expression patterns of PCNA and E2F genes in gut using transgenic *lacZ* reporter lines. And we examined effects of NO on the expression of PCNA and E2F through X-gal staining of NO treated gut of larvae and adults and CPRG assay. Our results show that nitric oxide downregulates the expression of cell proliferation-related genes PCNA and E2F