Extension of retention time of diacetyl-adaptation by oxygen intermediates in the nematode *Caenorhabditis elegans*

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The chemotactic response of nematodes *Caenorhabditis elegans* pre-exposed to odorant diacetyl was significantly smaller than that of non-exposed control nematodes. The decline in response of pre-exposed nematodes is called as odorant adaptation. When wild-type nematodes were maintained at 20℃, the diacetyl-adaptation continued up to 6-hr after pre-exposure to this chenmical. The adaptation did not continue up to 2-hr in nematodes bred at 15℃, whereas it continued beyond 12-hr in nematodes bred at 25℃. When *isp-1* and *clk-1* mutants, which reduced the rate of physiological processes, were maintained at 20℃ after pre-exposure to diacetyl, the adaptation did not continue up to 6-hr. *gas-1* and *mev-1* mutants, which had a hypersensitive response to oxidative stress, showed a longer retention time of adaptation, that is, the adaptation continued beyond 12 hr. When the wild-type nematodes were maintained in plate included 0.05% α-lipoic acid, which suppressed a production of oxygen intermediates, the retention time of adaptation did not continue up to 6-hr in nematodes bred at 20℃ and not up to12-hr in nematodes bred at 25℃. The results suggest that an increase in the oxygen intermediates are needed for maintaining the adaptation.