Chemotactic response of the nematode *Caenorhabditis elegans* to sodium acetate was enhanced by pre-exposure to the same chemical

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We investigated the chemotactic response of a wild-type nematode (*Caenorhabditis elegans*) to water-soluble sodium acetate (Na-Ace) after pre-exposure to this attractant. The response to 1.0 M Na-Ace of the non-exposed control nematodes was significantly lower than that of the nematodes that were pre-exposed to 1.0 M Na-Ace for 90 min. The increase in the response to Na-Ace was observed up to 6 hr but not at 12 hr after exposure. To clarify the mechanism of an enhancement of the chemotactic response, several mutants were used. The chemotactic response of the pre-exposed *tph-1* and *bas-1* mutants, whose main defect was serotonin secretion, was enhanced in comparison with that of the control mutants ($p<0.01$). However, the *cat-1* and *cat-2* mutants, which are defective in the secretions of both serotonin and dopamine and of only dopamine, respectively, showed no enhancement of the response to Na-Ace even when they were pre-exposed to the chemical. When the *cat-1* and *cat-2* mutants were pre-exposed to Na-Ace and bred in the presence of 40 mM dopamine, these mutants were enhanced their response to Na-Ace ($p<0.05$). These results suggest that the enhancement of chemotactic response to Na-Ace after pre-exposure to this chemical is modulated by dopaminergic neurotransmission.