
Emotional Behavior in Cats Induced Olfactorily by matatabi (*Actinidia polygama*)

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The odor of the plant known as matatabi in Japan (*Actinidia polygama*) attracts cats and causes a quick response, in which the animals reach an ecstatic state, sniffing, licking, salivating, rolling around, and rubbing the back against the floor. We designated these responding cats, R-cats. The signs of response seem to be similar to the normal sexual reflexes of cats. The specificity of responsiveness to the matatabi odorant varies widely. There is a minority of adult cats (we designated them, NR-cats) which exhibit little response. The biologically active substances, matatabi-lactone, actinidine, and beta-phenylethylalcohol, have been isolated from the plant [1].

In this study, we constructed a recording apparatus for matatabi response and we investigated the behavioral mechanism underlying the response by using the apparatus. We also investigated the effects of unilateral damage to the rhinencephalon upon matatabi response and sexual and emotional behavior in R- and NR-cats.

The matatabi response was clear in male and female adult R-cats and unclear in kittens. Kittens began responding from the age of about 8 months. The cats were presented with matatabi, and the specific movement of the R-cats was recorded with a static sensograph and an XY-recorder. The matatabi-induced movement ceased after olfactory deprivation.

In three NR- and four R-cats, we produced a unilateral lesion of the rhinencephalon, the amygdala, parts of the inferior temporal neocortex, the temporal pole, the hippocampus, and the pyriform cortex. NR-cats showed the matatabi response clearly 6–32 days after the operation, and responded to matatabi in all presentation trials over a 5-month period. The R-cats showed no change, their performance level being same as that shown preoperatively. When these animals received an aversive stimulus, i.e., electroshock (10–40 V, 50 Hz, AC) administered for 2.5 s through a grill floor during the

matatabi response, they ceased responding to it. At higher voltages, the duration of matatabi response blocking in amygdalectomized NR-cats was longer than in control cats.

Fifteen R-cats of both sexes were divided into three groups: amygdalectomized, neocortical control, and unoperated controls. In the neocortical control group, lesions were produced unilaterally or bilaterally in the cortex of the suprasylvian gyrus. The weekly score for the appearance of sexual behavior, i.e., mounting or lordosis, as a ratio of the score on test trials, was referred to as sexual activity. Successive estrus in the amygdalectomized females was observed for a long period following the onset of estrus. In the males, sexual activity scores rose gradually from 2 to 11 weeks after the amygdalectomy. They also mounted other males, homosexually, as well as mounting females. In the control cats, sexual activity scores did not reach a high level.

The specificity of the matatabi response in NR-cats is, conceivably, not due to the smell itself, but to neural mechanisms. The above notion for the exclusion of false effects is supported by the findings of lack of response to matatabi in NR-cats preoperatively stage, and less effective response to matatabi in R-cats following unilateral amygdalectomy. The physiological finding [2] that substances isolated from matatabi influenced the electrical activity of the amygdala and hippocampus in cats also supports the above view.

The results of this study revealed that the mechanism responsible for the release of the matatabi response may be closely related to the central nervous and the olfactory system, regulation of emotional and sexual behaviors. Matatabi response in cats may be a good index for the study of sexual and emotional behavior.

References

1. Sakan T (1967) Matatabi (*Actinidia polygama* Miq.): The isolations and the structures of its biologically active components (in Japanese). *Protein, Nucleic Acid and Enzyme* 12:2–9
2. Yoshii N, Hano K, Suzuki Y (1963) Effect of certain substances isolated from 'Matatabi' on the EEG of cat. *Folia Psychiatr Neurol jap* 17:335–350

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