
PANEL DISCUSSION

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INTRODUCTION

Atropine and JB-329 have been observed to produce a depression of thresholds for production of caudate spindles and the elevation of thresholds for inhibition of these spindles by reticular stimulation. The spontaneous activity of the hippocampus was also altered by the two drugs [1]. Since these observations indicated that there might be some relationship between the reticular "depression" and hippocampal activity, it seemed desirable to attempt to determine whether any such relationship existed. This could be readily done by use of a preparation with mesencephalic reticular lesions. Concomitantly, these animals were also used to investigate the effect of the two drugs on the nonspecific projection system and the visual evoked response.

METHODS

Twenty-seven adult male and female cats were prepared for acute experiments as described in our previous paper [1].

Concentric bipolar stimulating electrodes of 21-gauge tubing with tip separation of 0.7 mm were stereotaxically placed within the optic tract and nucleus ventralis anterior. All coordinates were taken from the atlas of Jasper and Ajmone-Marsan [2]. In some experiments, a monopolar electrode of 0.010 mm stainless steel wire insulated with an epoxy resin was inserted in the hippocampus. Cortical activity was recorded monopolarly from silver ball electrodes on the dura to an indifferent electrode placed at the nasion. Evoked potentials were displayed on a Tektronix 502 dual-beam oscilloscope and photographed. Spontaneous activity from the occipital cortex, hippocampus, and electrocardiogram were monitored on a Grass Model III electroencephalograph.

In fourteen cats, mesencephalic reticular lesions were made bilaterally with a radiofrequency lesion maker. Electrographic criteria for acceptable lesions were the persistent presence of slow waves and spontaneous spindles bilaterally over the occipital cortices.

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Stimulation to the various areas was accomplished with two Grass S-4 stimulators with isolation units. Parameters for optic tract stimulation were 0.1 msec duration, 0.3/sec frequency, at minimal voltage to give fully developed, consistent optic evoked responses [3]. In our experiments, these voltages ranged from 10 to 60 v.

The ventralis anterior nucleus was stimulated at 0.25 msec duration, 0.3/sec frequency, 2 to 15 v to produce evoked responses [4]. It was found that cats without lesions gave such inconsistent and low-amplitude responses to these single shock stimuli that no useful recording could be obtained with the sampling procedure used.

JB-329* or atropine sulfate was administered in doses of 0.3 to 1.0 mg/kg through the intravenous catheter. Recordings of evoked potentials were made at 5, 15, and 30 min after drug administration; physostigmine sulfate in amounts equal to the JB-329 or atropine was then given intravenously, and a record of the evoked responses was again obtained at intervals as described above. At the end of the experiment, the cat was killed and the brain removed and fixed in formalin. After fixation, the position of the lesions and the electrodes was verified by gross inspection. In some animals, histological verification was necessary.

The photographic records of the evoked potentials obtained were analyzed visually to determine the amplitude in microvolts and the latency in milliseconds. Three sequences each containing at least five overtraced evoked potentials were averaged to determine the mean values for each sample. These changes after drug administration were subjected to statistical analysis to determine their validity.

*JB-329 (Ditran) was furnished by Lakeside Laboratories.

Fig. 1. Spontaneous cortical activity after administration of atropine in a cat with a reticular formation lesion.