THE INFLUENCE OF SERNYLAN ON THE EEG AND AVERAGE EVOKED POTENTIAL OF THE SQUIRREL MONKEY

Roger K. Thomas, Jr.

University of Georgia

Phencyclidine hydrochloride, sold under the trade name Sernylan (Parke-Davis & Co., Detroit, Michigan), is recommended by the manufacturer "as an immobilizing agent for primates only." The Sernylan brochure describes the anesthetic effects of the drug as being "unlike those produced by classical anesthetics in that even though the animal is incapacitated or completely anesthetized: (1) simple reflexes such as the patellar, palpebral, corneal and pupillary are not completely eliminated; (2) the eyes may remain open; (3) muscle tone is increased in most cases, but where a decrease occurs it is not marked, and (4) respiration and blood pressure are not usually depressed except in deliberate overdosage."

In view of these pharmacological properties of Sernylan, it would appear to be advantageous, where possible, to have electrophysiological data as an aid to estimating the depth of anesthesia induced by this drug. Perhaps the most comprehensive work on the influences of Sernylan on a variety of mammalian species is that of Domino (1964), and this paper should be consulted by the potential user of Sernylan. Domino's work included data on the effect of Sernylan on the electroencephalogram (EEG) and the evoked potentials of several species including rhesus *(Macaca mulatta)* and cynomolgus *(M. fascicularus)* monkeys. The present work examined the influence of Sernylan on the EEG and the averaged evoked potential of the squirrel monkey.

Methods and Results

Data were collected (under similar conditions) from five adult male squirrel monkeys *(Saimiri sciureus*, Gothic type*)*.

The monkeys were prepared for chronic recording by implanting stainless steel screws in the skull. The screws were implanted in pairs at bilateral frontal, parietal, and occipital locations. The screws were joined to a central connector (Amphenol Corp., Chicago, Ill.) by means of stainless steel wire which was insulated with polyethylene tubing. The screws, insulated wire and central connector were embedded in dental acrylic.

The monkeys were restrained in a primate chair (Lehigh Valley Electronics Co., Fogelsville, Pennsylvania) for recording. Recordings of the spontaneous EEG and the averaged evoked potential were done before and after the administration of Sernylan (2 mg/kg intramuscularly; this was the upper limit of the recommended dosage for squirrel monkeys to achieve "reduced response, catalepsis, and analgesia"). A Grass Model VI Electroencephalograph was used for the recordings of the spontaneous EEG.

The stimulus for the averaged evoked response was a light flash of approximately 10 microsec. duration from a Grass Model PS3 Photostimulator at an intensity setting described by the manufacturer as being approximately 750,000 candlepower. The stimulus lamp was situated approximately 15 in. directly in front of the monkey's eyes. The evoked potentials reported here resulted from 75 light flashes at irregular intervals of approximately one flash per sec. The averaged response was recorded with a system that consisted of the Grass electroencephalograph, a computer of average transients (the CAT 1000, Technical Measurement Corporation, North Haven, Conn.), and an X-Y plotter (Moseley Division, Hewlett-Packard, Palo Alto, Calif.)

Figure 1 shows the spontaneous EEG and the averaged visually evoked

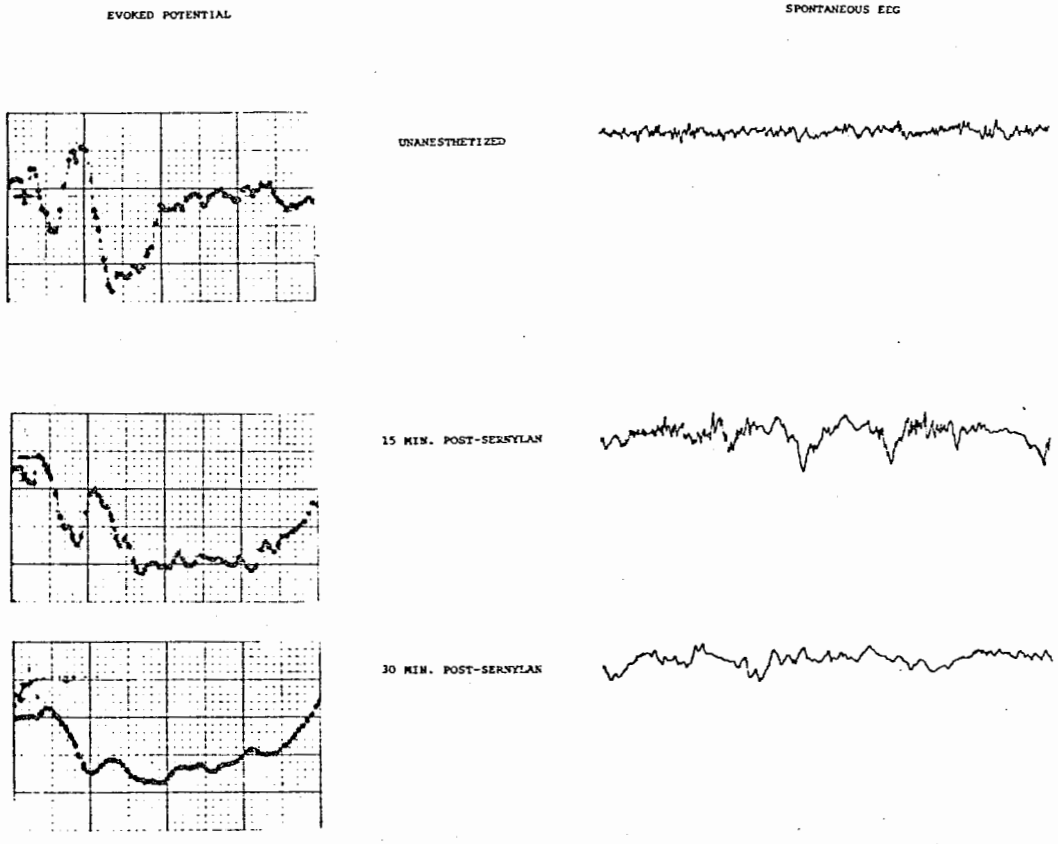

Figure 1. Evoked potentials and spontaneous EEG of a squirrel monkey before and after Sernylan. Evoked potential records are approximately 0.3 sec. duration with the unanesthetized trace representing an amplitude of approximately 150 microvolts. The spontaneous EEG is 5.0 sec. duration, and the unanesthetized trace represents an amplitude of approximately 25-50 microvolts.

response of a squirrel monkey (left occipital location) prior to the administration of Sernylan, 15 min. after administration, and 30 min. after administration of the drug. As may be seen in the figure, there is increased slow wave activity as well as a general increase in amplitude in the EEG 15 min. after the administration of the drug, and 30 min. post-Sernylan, the EEG is not unlike that of the sleeping human (Gergen, 1967, has reported cortical synchronization in the squirrel monkey during drowsiness).

It is apparent from Figure 1 that the evoked potential seen in the unanesthetized monkey is well defined, but the evoked potential is sharply reduced in amplitude 15 min. post-Sernylan, and the amplitude of the evoked potential is further reduced in the 30 min. post-Sernylan record. Similar results were obtained with the five monkeys that were tested.

The squirrel monkey shows many of the pharmacological symptoms described in the opening paragraph (patellar and palpebral reflexes and respiration and blood pressure were not examined); consequently, the electrophysiological data is a valuable aid in estimating the level of anesthesia following the administration of Sernylan.

REFERENCES

Domino, E. F. Neurobiology of phencyclidine (Sernyl), a drug with an unusual spectrum of pharmacological activity. In C. C. Pfeiffer & J. R. Smythies (Eds.) *International Review of Neurobiology*. Vol. 6. New York: Academic Press, 1964.

Gergen, J. A. Functional properties of the hippocampus in the sub-human primate. In W. R. Adey & T. Tokizane (Eds.) *Progress in Brain Research*. Vol. 27. Amsterdam: Elsevier Publ. Co., 1967.

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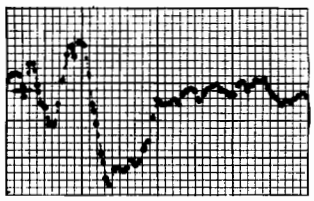
LABORATORY-BRED RHESUS FOR SALE

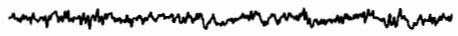
Sixteen laboratory-bred and -reared *M. mulatta* are available for sale. These animals were suckled and raised by their mothers and, after weaning, have been housed in small compatible groups. The fathers and mothers are long-term residents of our breeding colony. No experimental procedures of any kind have been performed on these youngsters. The sex and date of birth of each animal is as follows: Male: 10-20-67, Female: 11-3-67, Female: 12-27-67, Male: 1-17-68, Female: 1-19-68, Male: 1-24-68, Male: 2-12-68, Female: 4-17-68, Female: 7-15-68, Female: 8-24-68, Male: 8-25-68, Male: 9-14-68, Female: 11-16-68, Male: 11-24-68, Male: 11-25-68, Female: 11-28-68.--Sigmund T. Rich, D.V.M., Animal Facility, School of Medicine, University of California, Los Angeles, California 90024. Telephone: Area Code 213 825-5691.

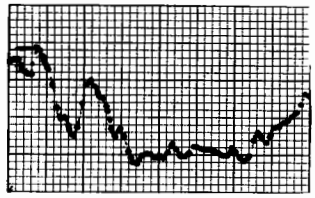
EVOKED POTENTIAL

SPONTANEOUS EEG

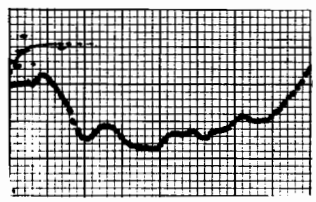


UNANESTHETIZED





15 MIN. POST-SERNYLAN



30 MIN. POST-SERNYLAN