NEGLECT IN RATS FOLLOWING UNILATERAL LESIONS OF CAUDAL PCm. Von R. King and James V. Corwin. University of New Orleans, New Orleans, LA.

Hemispatial neglect in the rat is seen following unilateral ablation of medial precentral cortex (PCm). Anatomical and physiological studies indicate rostral and caudal PCm (cPCm) may be discrete areas. This division is supported by the findings of the current study which showed that cPCm lesions resulted in greater polymodal neglect than did lesions of rostral PCm or the "entire" PCm. In addition, as with PCm operates, the dopamine agonist apomorphine attenuates neglect in cPCm operates in a dose-dependent fashion. The above study indicates that cPCm may be the focal point for the production of neglect in the rat.

INFORMAL DISCUSSION—HOSPITALITY SUITE

Drug Development and Behavioral Pharmacology

SUNDAY A.M.

SYMPOSIUM

Contingent Versus Noncontingent Drug Delivery: Behavioral and Neurobiological Consequences

Chair: *Steven I. Dworkin,* Wake Forest University, Bowman Gray School of Medicine, Winston-Salem, NC

Discussant: *Nancy Ator,* Johns Hopkins University School of Medicine, Baltimore, MD

INTRODUCTION. Steven I. Dworkin. Wake Forest University, Bowman Gray School of Medicine, Winston-Salem, NC.

Numerous studies indicate that the behavioral effects of most environmental stimuli can be altered by the arrangement of contingent relationships between behavior and the delivery of the stimulus. The concepts of "the law of effect" and schedules of reinforcement are a direct confirmation of the essential of contingent relationships for reinforcement. Although this principle is well accepted for most environmental events (i.e., food and water), there is a tendency to view psychoactive drugs as reinforcing in the absence of any contingent relationship. This symposium will present data from diverse paradigms that clearly demonstrate contingent drug delivery results in different behavioral and neurobiological effects than noncontingent drug administration. The implications of these findings for drug abuse research in both research and clinical settings will also be discussed. Dr. Linda Porrino will present a review of her work related to the neurobiological consequences of contingent and noncontingent stimulation of discrete brain sites. Dr. Porrino has detected major differences in both glucose utilization and neurotransmitter turnover rates related to the contingent versus noncontingent brain stimulation. The implications of these findings for drug abuse research will be discussed. Dr. Conan Kornetsky will review his work using the electrical brain stimulation procedure to provide a model of drug-induced euphoria and his recent work with ethanol which demonstrate the importance of contingent drug administration for the manifestation of the reinforcing effects of the drug. Dr. Steven Dworkin will present his findings related to the contingent versus noncontingent delivery of cocaine using the self-administration procedure. His data indicate that the noncontingent delivery of cocaine produces greater behavioral disruption and toxicity compared to contingent infusions. Dr. James Smith will review his research which provided the initial impetus for investigations of the differences between contingent and noncontingent drug delivery. His work has provided a model for which to investigate the neurobiological mechanisms of drug reinforcement. He will also review findings related to opiate self-administration in a clinical setting (patient controlled analgesia) and will provide an evaluation of the behavioral and neurobiological mechanisms related to enhanced therapeutic effect of this procedure.

EFFECTS OF EXPERIMENTER VERSUS SUBJECT ADMINISTERED ETHANOL ON REWARDING BRAIN STIMULATION. Conan Kornetsky. Boston University Medical Center School of Medicine, Boston, MA.

Many abused substances, including ethanol, have been reported to increase the sensitivity of animals to rewarding self administered electrical stimulation to the brain, a model of drug-induced euphoria. The effects of ethanol, however, are often variable or not present while those of drugs like cocaine or heroin, at proper doses, are compelling and relatively invariable. Since ethanol is usually administered by intraperitoneal injection or gavage, it is possible that the aversiveness of the method of administration precludes reinforcing effects and/or that contingent administration of ethanol is needed for it to cause a reinforcing effect. Since we have not been able to demonstrate an effect of ethanol on brain-stimulation reward using intraperitoneal administration, we determined the effects of oral self-administered ethanol. On experimental days animals trained to drink ethanol were allowed 30 minutes of free drinking of an ethanol/sucrose solution immediately prior to brain-stimulation reward testing. In two separate experiments, doses of ethanol between 0.8 and 1.6 g/kg caused an increase in rate of responding of increased sensitivity (lowers the threshold), respectively, for rewarding intracranial electrical stimulation. Yoked animals who were prepared with an indwelling gastric cannula and receive ethanol at the same dose and same rate as a paired ethanol-drinking animal, showed no increased sensitivity to the rewarding stimulation. Since the yoked animals were not subjected to the stress of IP or gavage ethanol administration the observed results demonstrate the importance of contingent drug administration for the manifestation of the reinforcing effects of ethanol. [Supported in part by NIAAA grant AA055950 and Research Scientist Award (C.K.) DA00099.]

DIFFERENTIAL NEUROCHEMICAL EFFECTS OF CONTINGENT AND NONCONTINGENT ELECTRICAL BRAIN STIMULATION. Linda J. Porrino. Clinical Neuroscience Branch, National Institute on Neurological Diseases and Stroke, Bethesda, MD.

Animals will work in order to receive brief trains of electrical stimulation directly to discrete brain sites (self-stimulation). The essence of this behavior is the contingent association between the response (in this case lever-pressing) and its consequences (brain stimulation). In contrast, animals will work to turn *off* electrical stimulation for which they had previously worked if it is presented in a noncontingent or response-independent manner (Steiner *et al.*, 1968). Using the 2-[^{14}C]deoxyglucose method (Sokoloff *et al.*, 1977) to map changes in functional activity that accompany brain stimulation, comparisons were made between animals self-stimulating to the ventral tegmental area and animals receiving experimenter-administered electrical stimulation to the same site at rates and parameters for which they had previously worked. Self-stimulating rats showed a pattern of changes in local metabolic activity distinctly different from and more extensive than the pattern of changes seen in rats stimulated noncontingently. Glucose utilization in the prefrontal cortex, nucleus accumbens, lateral septum, and mediodorsal thalamic nucleus was increased bilaterally in self-stimulating animals, but not in animals receiving