

RECIPROCAL EFFECTS OF RESPONSE CONTINGENT AND NON-CONTINGENT INTRAVENOUS HEROIN ON IN VIVO NUCLEUS ACCUMBENS SHELL VERSUS CORE DOPAMINE: A REPEATED SAMPLING MICRODIALYSIS STUDY

Cacciapaglia¹Fabio, Lecca Daniele^{1,2}, Valentini Valentina^{1,2} and Di Chiara Gaetano^{1,2,3}

¹Department of Toxicology, ²Centre of Excellence for Studies on Addictions and ³Institute of Neuroscience, Consiglio Nazionale delle Ricerche (CNR), University of Cagliari, Italy

In naive rats, passive administration of drugs of abuse preferentially increases extracellular dopamine (DA) levels in the nucleus accumbens (NAc) shell as compared to the core. Repeated exposure to the same drugs results in the induction of behavioral and biochemical sensitization characterized by stereotyped activity and by reduction of the DA shell/core response ratio. To date, no information is available on the within subject evolution of the response of DA transmission across the daily sessions of heroin drug SA. This study investigated by repeated microdialysis sampling the inter- and intrasession changes in the responsiveness of NAc shell and core DA to and the behavioral effects of active and passive heroin exposure in the i.v. self-administration/yoked paradigm. Rats were implanted with jugular catheters and bilateral chronic guide cannulae aimed at the NAc shell and core. After recovery, rats were trained to self-administer heroin in single daily 1h-session for four weeks (5 days/weeks). Nose poking in the active hole by master rats resulted in heroin administration (0.05 mg/kg) to the same subjects and to their yoked mates. Dialysate DA was monitored for 90-min after each session from the NAc shell and core starting on the first exposure to the drug. Behavior associated with heroin exposure, distinguished into non-stereotyped and stereotyped items, was also recorded. No differences were found in basal extracellular DA in the NAc shell and core. DA levels elicited by heroin in the NAc of master rats were greater in the shell compared to the core, whereas, in yoked rats the DA shell and core responsiveness was similar during the first week and became higher in the core compared to the shell from the second week until the end of heroin paired-administered. Moreover, yoked rats showed a progressive and faster increase of stereotyped behaviors than master rats. Non-stereotyped behavior followed the reverse trend. Response-non-contingent heroin administration is particularly prone, compared to response-contingent administration, to induce behavioral and neurochemical sensitization.