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THE INFLUENCE OF PARENTAL SOCIAL EXPERIENCE ON OFFSPRING NOVELTY-EXPLORING AND DEPRESSION-LIKE BEHAVIOR

POSTER SESSION 07 - SECTION: NEUROBIOLOGY OF STRESS, ANXIETY, AND DEPRESSION

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Aims: The influence of parental social experience on the offspring neurodevelopment and its own susceptibility to the sculpting effect of social experience are not well understood. Using rat model we aimed to examine whether and how social experience of adolescent parents impacts psychophysical characteristics of their offspring, during pre-weaning period and later during adolescent growing in defined social conditions. **Methods:** Peripubertal Wistar rats (both sexes) were randomly selected for group housing (GH; n=3 per cage) or single housing (SH; n=1 per cage) at postnatal day (P) 29 and left undisturbed until P55. Thereafter, they were grouped for mating (SH males with SH females, GH males with GH females). Body weight (BW) of pups was monitored at P7, P14, and P21. At P17 motor activity of the offspring was monitored; at P29 the animals were subjected to GH or SH; after 1 week (P36) and 2 weeks (P43) their motor activity was monitored; at P45 they were subjected to sucrose preference test (SPT). **Results:** The male offspring of SH parents had decreased locomotor activity in a novel open arena, at P17. At P36 and P43, adolescent SH offspring showed hypolocomotion in a novel arena and hypohedonic behavior in SPT compared to GH counterparts, regardless of parental experience. BW did not differ between groups. **Conclusions:** Parental social experience influences novelty-exploring behavior of offspring, producing response below expected at P17. With further offspring development, their individual social experience has stronger impact on the appearance of depression-like phenotypes than parental social experience.

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Altered hedonic, novelty-, stress- and D-amphetamine-induced response due to social isolation in peripuberty.
Reduction in direct social contact with peers during early adolescence is thought to be a risk factor for an increase in depressive symptoms, but there is still no clear evidence to suggest early behavioral manifestations and their association with the later outcome of social distancing during this period. To address this question, we used social isolation paradigm in peripubertal rats as the rodent model of adolescence. The litter was an experimental unit. On postnatal day 29, each litter gave group-housed and single-housed males, which were reared and tested one week and two weeks thereafter. Psychomotor/emotional response to novelty in exploration-based tasks, behavioral and neuronal responses to the drug reward (D-amphetamine), motivation/hedonic behavior, physiological and response to physiological stress were examined. Social isolation in peripubertal rats manifested through: hyper-reactivity/agitation and the state anxiety/risk-taking at an early stage; reduced behavioral response to D-amphetamine and altered neural processing of this stimulus, at a later stage; consummatory hypohedonia that deepened over time without changing the motivation to eat; unchanged body weight gain and resting blood corticosterone, cortisol and glucose levels over time; altered blood biochemistry (silenced corticosterone and increased glucose) due to overnight fasting only at an early stage. Our results highlight that the outcome of reduced direct social contact with peers during peripuberty is dynamic, with the cluster of atypical early symptoms that evolve into the syndrome that is delicate for assessment through routinely measurable behavior and biomarkers of stress, but with progressive consummatory hypohedonia and unaffected motivation to eat as stable marks.
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Motivation, risk-taking and sensation seeking behavior in propofol anesthesia exposed peripubertal rats.
Adolescent neurodevelopment confer vulnerability to the actions of treatments that produce adaptations in neurocircuitry underlying motivation, impulsivity and reward. Considering wide usage of a sedative-hypnotic agent propofol in clinical practice, we examined whether propofol is a challenging treatment for peripubertal brain. Motivation/hedonic behavior (sucrose preference test), approach/avoidance behavior (elevated plus maze test) and response to dissociative drug phencyclidine (PCP) were studied in peripubertal rats (the rodent model of periadolescence) after propofol anesthesia

exposure (PAE). Neurodegeneration (Fluoro-Jade staining) and the expression of proteins (Western blot) involved in excitatory synaptic transmission and activity-dependent synaptic stabilization in the medial prefrontal cortex (mPFC) and striatum (components of motivation/reward circuitry; process both appetitive and aversive events) were examined as well. In peripubertal rats PAE produced 1) transient brain-region specific changes in the expression of N-methyl-d-aspartate (NMDA) receptor subunits NR2A and NR2B, PSD-95 and N-cadherin, without neurotoxicity, 2) hyperlocomotor response to PCP, 3) no changes in preference for palatable 1% sucrose solution and a decrease in food eaten, 4) preference for 20% sucrose solution without changes in food eaten, 5) stretch-attended postures and open arms entries in the elevated plus maze test. Overall, these novel findings show that PAE leaves transient synaptic trace recognized as early form of synaptic plasticity related to passive drug exposure in the brain systems implicated in motivation/reward, increases drug-responsiveness, favors risk-taking and preference of novel/intense stimuli repairing otherwise present motivational deficiency. These findings accentuate multifaceted response to propofol in peripuberty and the importance of environmental stability for the most favorable neurobehavioral recovery.
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