

Behavioral effects of stress and antidepressant treatment in neonatally-handled and maternally-separated adult rats

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Much evidence implicates early life events and stress as risk factors for depression. In rats, neonatal handling (H) or maternal separation (MS) results in altered behavioral and neurochemical responses to stress that persist into adulthood. Our recent findings suggest that chronic antidepressant (AD) treatment may rectify behavioral responses to stress by enhancing habituation processes. This study examined behavioral processes mediating the effects of stress and chronic antidepressant treatments on adult H and MS rats. Long-Evans rat pups underwent daily H (20-min), daily MS (3-hour), or were left non-handled (NH) from postnatal day 2-14. From postnatal day 90, H, NH and MS rats were chronically administered fluoxetine (FLU), desipramine (DES) or vehicle in their drinking water. From postnatal 120, male offspring were tested in a high- and low-luminance open field, elevated plus maze and acoustic startle paradigm immediately following either 0 or 60 min. restraint stress. In the high-luminance open field, H rats showed slightly lower initial locomotor reactivity compared to NH and MS rats. Restraint stress had no apparent effect on locomotion. FLU reduced habituation in MS rats while DES decreased initial reactivity across all groups. In the elevated plus maze, MS rats showed decreased open-arm activity compared to H and NH rats. Restraint stress decreased open-arm activity and was somewhat attenuated by FLU and DES treatments. Restraint stress increased initial startle reactivity in NH and MS, but not H, rats. FLU tended to increase startle amplitude in NH and MS rats while DES decreased startle across all groups. These results suggest task-specific behavioral responses to stress and AD treatment in H, NH and MS rats. MS rats appeared most affected by serotonergic alterations (FLU) while noradrenergic changes (DES) tended to reduce behavioral reactivity across all groups.

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