



Effects of Maternal Separation and Adolescent Stress on Microglial Levels in the Adult Brain

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Effects of Maternal Separation and Adolescent Stress on Microglial Levels in the Adult Brain

Abstract

Early life stress, such as maternal separation, has been associated with depressive-like symptoms in adult rats. Previous studies have linked depression with reduced activation of microglia in different parts of the brain. Microglia are important for neuronal transmission and plasticity, both of which are affected by stress. However, whether developmental stress alters microglial function to cause depression in adulthood is not fully understood. We hypothesized that exposing rats to early life stress would lead to depressive-like symptoms in adults that would be associated with reduced microglial levels in the brain. To test this hypothesis, male and female rats were maternally separated for 3 hours a day starting at post-natal day 1 for 14 days. After the rats reached adolescence (P28), they were exposed to repeated restraint stress for 2 hours a day for 14 days. Rats were then housed in their home cages until adulthood. Then, the rats were tested in the zero maze to measure their anxiety and the forced swim test to measure their depressive-like behaviors. Compared to the control group that did not receive maternal separation or restraint stress, the stressed female rats showed more depressive-like behaviors. We are currently quantifying microglial activity via western blots of the microglial marker Iba-1 to determine whether the increased depressive-like behavior correlates with changes in microglia in specific brain regions.

Keywords

Microglia; Depression; Early life stress; Female rats

Cover Page Footnote

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ABSTRACT

Early life stress, such as maternal separation, has been associated with depressive-like symptoms in adult rats. Previous studies have linked depression with reduced activation of microglia in different parts of the brain. Microglia are important for neuronal transmission and plasticity, both of which are affected by stress. However, whether developmental stress alters microglial function to cause depression in adulthood is not fully understood. We hypothesized that exposing rats to early life stress would lead to depressive-like symptoms in adults that would be associated with reduced microglial levels in the brain. To test this hypothesis, male and female rats were maternally separated for 3 hours a day starting at post-natal day 1 for 14 days. After the rats reached adolescence (P28), they were exposed to repeated restraint stress for 2 hours a day for 14 days. Rats were then housed in their home cages until adulthood. Then, the rats were tested in the zero maze to measure their anxiety and the forced swim test to measure their depressive-like behaviors. Compared to the control group that did not receive maternal separation or restraint stress, the stressed female rats showed more depressive-like behaviors. We are currently quantifying microglial activity via western blots of the microglial marker Iba-1 to determine whether the increased depressive-like behavior correlates with changes in microglia in specific brain regions.

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