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Effects of social defeat on iκ-bα inflammatory signaling in male c57BL/6J

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INTRODUCTION

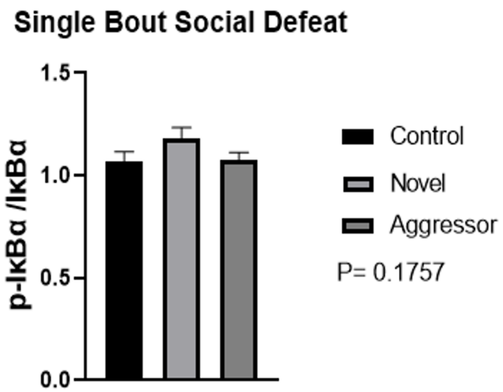
An estimated 30 million people in the United States have been diagnosed with mood and anxiety disorders. Unfortunately, many of these patients do not adequately respond to current pharmacotherapies, so developing new drugs and strategies to treat such disorders is critically important.. It's critical that we identify anti-inflammatory agents that effectively reduce neuroinflammatory responses, hereby expanding or augmenting available options for treating neurological disorders. In order to do this we must complete studies that would replicate the stress in a person by using social defeat as the stress inducer. By using single bout and repeated bouts of social defeat in mice we can see whether the stress increases or decreases specific stress proteins by looking at the whole brain lysates. By using both single bout and repeated bouts of social defeat we can analyze and compare the results looking at the immediate ramifications of the single bout and the elongated results of the repeated bouts.

METHODS

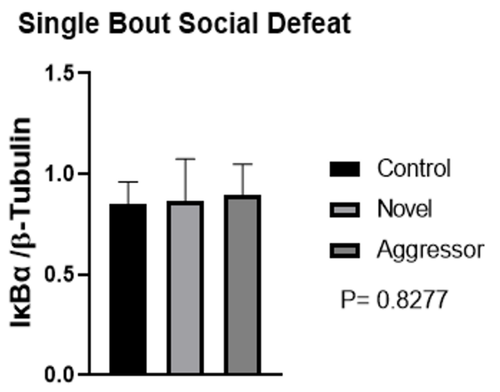
A single bout of social defeat was established by placing 3 C-57 (Black Mice) and a single CD-1 (Retired Breeder) in the same cage for 1 hours. After this, tissue was harvested from the 3 C-57 (Black Mice). Harvested tissues included: liver, brain, and spleen tissues while blood and plasma were also harvested. In the repeated social defeat bout the C-57 mice were placed in the same cage for one hour for 5 days. After the 5 days of experiment harvesting of tissues, blood, and plasma commenced. Western Blot Analysis was used to analyze the results of IkB from whole brain lysates. Samples were ran through SDS-PAGE gel electrophoresis and then protein transfer occurred onto a membrane with transfer buffer. Membranes went under antibody staining and buffer cleaner and imaging occurred after staining with each antibody. After obtaining imaging, NIH Image J was used for densitometry. Graphpad Prism for was used to created stats and figures.

RESULTS

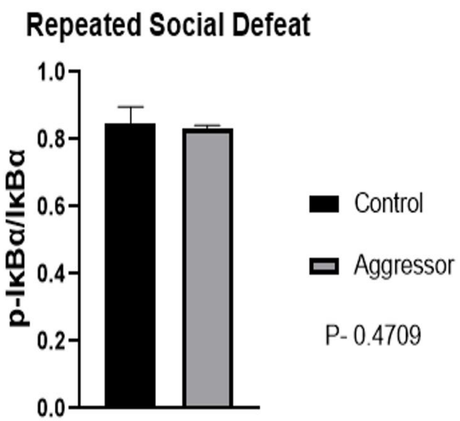
Effects of single bout social defeat on IkB activation



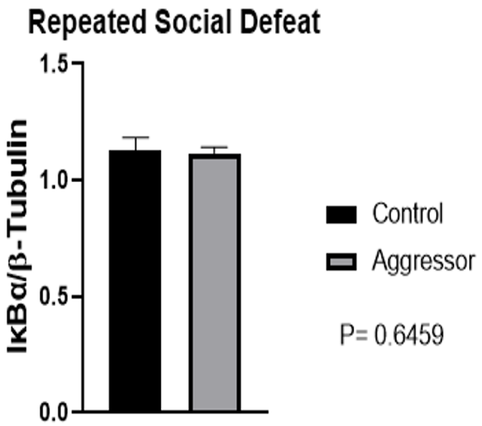
Effects of single bout social defeat on IkB β-Tubulin



Effects of repeated bout social defeat on IkB activation



Effects of repeated bout social defeat on IkB β-Tubulin



CONCLUSION

The results of the study show that there was no significant effect of social defeat on IκBα activation. One of the reasons as to why this could be is that the stress model might not affect this specific pathway. Also, we may find that inflammatory factors may be affected to a greater extent at earlier time points after RSD.

FUTURE DIRECTIONS

The overall objective of the study is to advance the translational implications of β-FNA as a neuroprotective agent, particularly in the context of repeated social stress and broadly in terms of numerous neuropathologies involving neuroinflammation We will also determine the effects of social defeat on inflammatory signaling in peripheral tissues. We will also assess β-FNA treatment on factors affected by social defeat. These testing conditions also need to be repeated in female mice to collect more accurate study results.

REFERENCES

Davis, R. L., Stevens, C. W., & Curtis, J. T. (2017). The opioid antagonist, β-funaltrexamine, inhibits lipopolysaccharide-induced neuroinflammation and reduces sickness behavior in mice. Physiology & Behavior, 173, 52–60. doi: 10.1016/j.physbeh.2017.01.037

Acknowledgements

Thank you to Dr. Randall Davis, Daniel Buck, Kelly McCracken, the OSU Center of Health Sciences for hosting, The OCAST HR18033 grant which helps fund this research, and to TABERC who gave me this opportunity to learn and grow this summer to further my future in the science field.