Introduction

Serotonin has important impacts on behavior, including pain sensation, mood modification, sleep pattern, and aggression.

Materials and Methods

Subjects:
- Twelve SERT knockout mice, broken into two treatment groups of six receiving LPS and six receiving saline.
- Twelve wild type mice, broken into two treatment groups of six receiving LPS and six receiving saline.

Treatments:
- Injections were performed with dosages of 0.005 cc/1g body weight performed partially.
- LPS concentration of 1 μg/ml - Saline concentration of 1x

Experimental Procedure:
- SERT genotyped mice were weighed and injected with their appropriate treatment solution.
- Mice were then placed in separate enclosures exposed to other mice in view of a camera with an infrared filter.

Post-Experiment Analysis:
- Mice were then euthanized, with blood serum taken and internal structures fixed with formalin during necropsy for future investigative study.

Conclusions

In concordance with previous publications, we showed that the SERT KO mouse does show a greater level of depressive-like behaviors compared to WT mice by displaying significantly less distance travelled, more time spent immobile, and fewer mobility episodes when treated with saline alone.

However...

A significant difference arose between WT and SERT KO mice regarding distance travelled after treatment, with SERT KO animals moving a further total distance over 24 hours than did WT mice indicating SERT KO mice display a blunted depression-like behavioral state when treated with LPS.

A significant difference arose between WT and SERT KO mice of the total time spent immobile after LPS injections over the 24-hour period with SERT KO mice spending less time immobile, demonstrating further the blunted depression-state that the SERT KO mouse experiences compared to the WT mouse.

Overall, though the SERT KO mouse under physiologic conditions exhibits behaviors consistent with a stress-vulnerable model, when induced into a stressed state the SERT KO mouse has the predicted depression-like state blunted compared to WT mice. These findings indicate that the serotonin transporter plays an important role to behavior beyond the CNS pathway, and illuminates the need for further research of its role in the peripheral immune system.

Figures and Results

Figure 1

This linear graphical representation of the believed step-wise progression of the process of LPS inducing a depression-like state through the innate immune system.

Figure 2

This series shows the total values related to locomotion calculated compared with treatment and genotype groups. A – The total distance travelled (m) of the study mice showed a significant difference between SERT KO and WT mice regarding saline treatment and within the respective genotypes receiving LPS/saline treatment.

B – The total time immobile (s) showed significant difference only between the WT mice. C – The mobility episodes showed significant differences between SERT KO and WT mice regarding saline treatment and within the respective genotypes receiving LPS/saline treatment.

Figure 3

This picture displays the enclosures post 24 hour treatment of different genotypes and treatments.


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References


