Sex-dependent expression of microRNA -19b predicts chronic widespread pain and posttraumatic stress disorder development following trauma exposure

INTRODUCTION

In humans, chronic widespread pain (CWP) and posttraumatic stress disorder (PTSD) are frequent sequelae of trauma that occur more commonly in women. One known trigger of CWP and PTSD is motor vehicle collision (MVC). Childhood sexual abuse is strongly associated with CWP/PTSD vulnerability. Although associations have been described in human, animal, and molecular studies, we still lack the ability to identify microRNA (miRNA), small regulatory RNA, that may contribute to CWP/PTSD vulnerability.

HYPOTHESES

Based on the above data, we hypothesized that (1) circulating levels of miR-19b would predict CWP and PTSD following MVC trauma, (2) miR-19b expression is sex dependent and predicts CWP/PTSD outcomes in a sex-dependent manner, (3) miR-19b regulates gene transcripts known to play pathogenic roles in pain/PTSD.

METHODS

HUMAN: We first used an unbiased approach to identify miRNA that target gene transcripts that play an important role in pain and PTSD processing. Pain and PTSD were identified using previously published databases (n = 129 genes). Candidate miRNAs were determined using prediction algorithms that are directly targeted by miR-19b (predicted via TargetScan). Circulating miR-19b levels were assessed by assayed 3'UTR luciferase activity using the luciferase activity using the luciferase reporter assay system (Promega, Madison, WI). The 3'UTR sequence of the target gene was inserted into a luciferase reporter vector. The luciferase activity represents the level of microRNA that would predict CWP and PTSD in a sex-dependent manner.

RESULTS

miR-19b expression influences the development of chronic widespread pain and PTSD after motor vehicle collision. Sex-dependent differences in miR-19b suggest that this miRNA may mediate sex differences in CWP/PTSD vulnerability after common traumatic events.

CONCLUSIONS

miR-19b expression influences the development of chronic widespread pain and PTSD after motor vehicle collision. Sex-dependent differences in miR-19b suggest that this miRNA may mediate sex differences in CWP/PTSD vulnerability after common traumatic events.

REFERENCES


