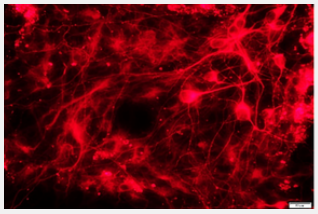
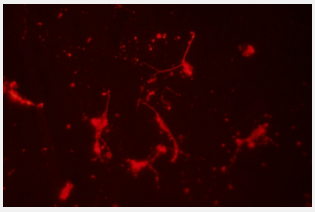
ENHANCING SPINAL CORD INJURY MODELS WITH DIVERSITY: INCORPORATING AGE AND SEX IN PRECLINICAL RESEARCH

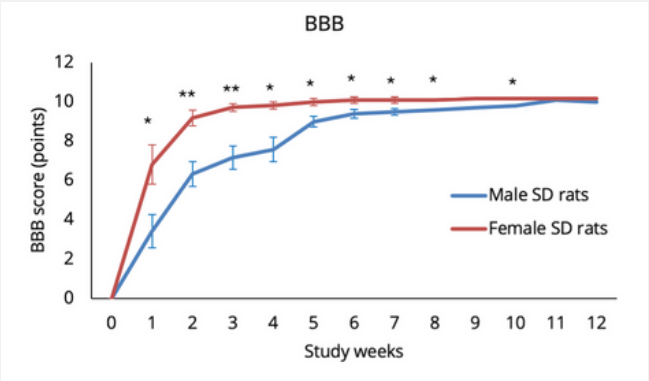
RESULTS



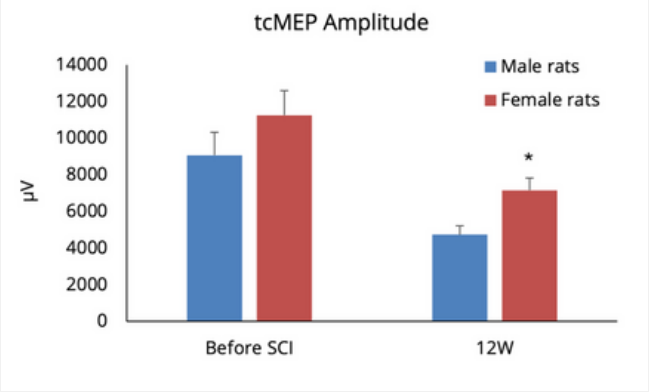
Spinal P0 tissue culture (DIV 3) stained with β-tubulin 3. The neurites extend across the entire coverslip.



Spinal P60 tissue culture (DIV 3) stained with β-tubulin 3. Slow neurite growth is observed, reflecting clinical conditions.



Basso, Beattie, Bresnahan (BBB) locomotor rating scale. Female rats exhibit faster motor function recovery than males.



In vivo transcranial electrophysiology monitoring of motor-evoked potentials (tcMEP). These findings support behavioral assays showing that females recover better from contusion-induced SCI.

OBJECTIVES

In vitro preclinical stroke models often use tissue cultures from <P9 donors; however, these tissues lack key components involved in neuronal growth inhibition. While newborn tissue cultures facilitate rapid neurite outgrowth, they have significant limitations. MD Biosciences has optimized this assay to better mimic the human condition of SCI by using adult tissue cultures.

Additionally, in vivo, we tested spinal cord injury recovery in both male and female rats to evaluate sex-based differences, as preclinical injury studies are often conducted in male rats.

PRECLINICAL MODEL

Spinal Cord In Vitro Assay: This assay utilizes primary neurons from adult rat spinal cord tissues, plated in media, and evaluated for their neurodegeneration index.

Spinal Cord Injury Rat Model: The spinal cord injury is created by contusion, cutting or extractions.

CONCLUSIONS

Incorporating age and sex diversity in spinal cord injury models enhances the clinical relevance of preclinical research. Using adult tissue cultures better mimics the inhibitory environment of the injured human spinal cord, improving the predictive value of in vitro studies. Additionally, recognizing sex differences in functional recovery can lead to more precise therapeutic strategies, ensuring treatments are effective across diverse patient populations.