ABSTRACT

Acute mouse brain slice-based assays offer distinct advantages over other sensitivity MEA with low impedance and a high signal-to-noise ratio capable of measuring subtle yet robust activity from acute electrophysiological activity in multiple acute slices simultaneously. The MED64 Quad-II high throughput MEA is a high mouse hippocampal slices to predict neurotoxic adverse events of drug compounds by assessing multiple measures of neurotoxicity. Here, we demonstrate the power of a high-sensitivity MEA engineered for acute brain slices for improving the in vitro activity (convulsants). We demonstrate the capabilities of the highly sensitive MED4-Quad system, a novel medium-throughput network burst activity and decomposed frequency analysis of field potential oscillations (analogous to EEG) in response to acute brain slice preparations. The results of this study indicate that the MED4-Quad system, in conjunction with acute hippocampal slices from mouse, are a useful assay for screening epileptiform activity, which is a useful assay for screening safety risk of investigational compounds.

RESULTS

We demonstrated the power of the MED64 Quad-II high-throughput high-sensitivity MEA as an assay for neurotoxicology screening of acute mouse hippocampal slices. The results indicate that our acute slice assay is able to detect changes in spike activity and slow-wave network activity in response to convulsants. These results can be applied to neurotoxicity safety pharmacology screening assays for investigational drug compounds where less sensitive methods may not be able to detect safety issues. Acute hippocampal slices from mice are an ideal in vivo model for the wide variety of mouse models of disease. However, a high sensitivity assay is needed to detect subtle activity that may be missed by other assays.

CONCLUSION

The high-throughput capabilities of the MED64 Quad-II combined with the ability of mouse models make it the ideal combination for rapid assays in drug discovery and safety pharmacology. The capability of multiple levels of measurement is a defining feature of this assay making it a powerful tool for probing the mechanisms of the brain, behavior, and disease.

MATERIALS AND METHODS

To evaluate the electrophysiological responses to convulsants, we used the MED4-Quad II MEA platform that was used to assess electrophysiological activity in multiple acute slices simultaneously. The MED4-Quad II high throughput MEA platform was used to assess electrophysiological activity in multiple acute slices simultaneously. The MED4-Quad II high throughput MEA platform was used to assess electrophysiological activity in multiple acute slices simultaneously.

INTRODUCTION

Acute mouse brain slice-based assays offer distinct advantages over other in vitro models. Studies using acute mouse brain slices have been used extensively to probe the genetic components of the mechanisms of the brain, behavior, and disease. Additionally, the synaptology of anatomical networks remains largely intact with acute brain slices making them ideal for predictive assays in drug discovery and safety pharmacology. This study sought to gain insight into the capacity of acute mouse hippocampal slices to predict neurotoxic adverse events of drug compounds by assessing multiple measures of neuronal scaling and electrophysiological activity. A high sensitivity high-throughput MED4-Quad platform was used to assess electrophysiological activity in acute slices simultaneously. The MED4-Quad II high throughput MEA is a high sensitivity MEA with low impedance and a high signal-to-noise ratio capable of measuring subtle yet robust activity from acute brain slice preparations. The results of this study indicate that acute slice assays using the MED4-Quad II are capable of predicting neurotoxic risk due to the Quad-II’s ability to measure multiple parameters of neuronal network activity on a variety of scales.

RESULTS

We demonstrated the power of the MED4-Quad II high-throughput high-sensitivity MEA as an assay for neurotoxicology screening of acute mouse hippocampal slices. The results indicate that our acute slice assay is able to detect changes in spike activity and slow-wave network activity in response to convulsants. These results can be applied to neurotoxicity safety pharmacology screening assays for investigational drug compounds where less sensitive methods may not be able to detect safety issues. Acute hippocampal slices from mice are an ideal in vivo model for the wide variety of mouse models of disease. However, a high sensitivity assay is needed to detect subtle activity that may be missed by other assays.

CONCLUSION

We demonstrated the power of the MED4-Quad II high-throughput high-sensitivity MEA as an assay for neurotoxicology screening of acute mouse hippocampal slices. The results indicate that our acute slice assay is able to detect changes in spike activity and slow-wave network activity in response to convulsants. These results can be applied to neurotoxicity safety pharmacology screening assays for investigational drug compounds where less sensitive methods may not be able to detect safety issues. Acute hippocampal slices from mice are an ideal in vivo model for the wide variety of mouse models of disease. However, a high sensitivity assay is needed to detect subtle activity that may be missed by other assays.

The high-throughput capabilities of the MED4-Quad II combined with the ability of mouse models make it the ideal combination for rapid assays in drug discovery and safety pharmacology. The capability of multiple levels of measurement is a defining feature of this assay making it a powerful tool for probing the mechanisms of the brain, behavior, and disease.

DISCUSSION

To evaluate the electrophysiological responses to convulsants, we used the MED4-Quad II MEA platform that was used to assess electrophysiological activity in multiple acute slices simultaneously. The MED4-Quad II high throughput MEA platform was used to assess electrophysiological activity in multiple acute slices simultaneously. The MED4-Quad II high throughput MEA platform was used to assess electrophysiological activity in multiple acute slices simultaneously.

REFERENCES

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