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研究課題名(和文)サブミリ秒単位の時間分解能を有する超高速MRI測定方法の開発

研究課題名(英文)Development of ultra high-speed MRI measurement method with sub-millisecond temporal resolution

研究代表者

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研究成果の概要(和文)：脳機能を理解するためには、ダイナミックな特性を得る必要があり、神経電流、シナプスなどの神経活動に伴う速い信号の計測が可能な超高速MRI測定方法の開発が求められていた。本研究では、サブミリ秒(0.8ミリ秒)のデータサンプリングが可能な超高速MRI測定法を実現した。また、この測定法を改良し、通常のEEGで見られる脳活動信号の計測を試みた。そのために、サンプリング周期を伸ばす代わりに測定感度を向上した測定方法を開発した。この測定方法を用いて、EEGで見るとような速い脳活動信号をMRIで検出することに成功した。

研究成果の概要(英文)：It is necessary to obtain dynamic characteristics for understanding the mechanism of the brain function. To measure the dynamic characteristics, the development of ultra high-speed MRI measurement method which can measure fast signals accompanied by the nerve activity such as nerve current and synapse was required. In this study, we have realized an ultra high-speed MRI measurement that can sample data in a sub-millisecond (0.8 ms). In addition, in order to measure the brain activity signal seen in normal EEG, we also developed a measurement method to improve the measurement sensitivity by sacrificing the measurement speed. By this MRI measurement method, we could detect fast brain signals seen in EEG.

研究分野：Brain imaging

キーワード：Fast MRI Image reconstruction Brain function

であるサブミリ秒の超高速 MRI 測定法を開発することが出来た。また、神経電流（活動電位）の計測までには至らないものの、EEG で見るような数十ミリ秒周期の速い脳活動信号の計測ができた。

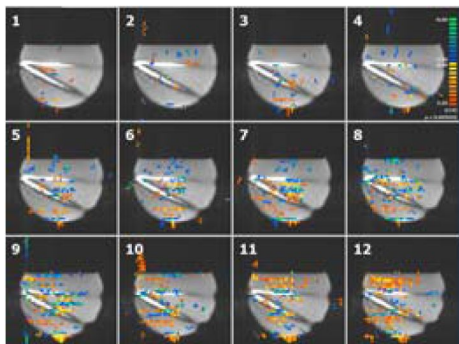


図1 高速サンプリング（1 ミリ秒）で撮像して再構成を行った画像の上に電流を与えたときの信号変化

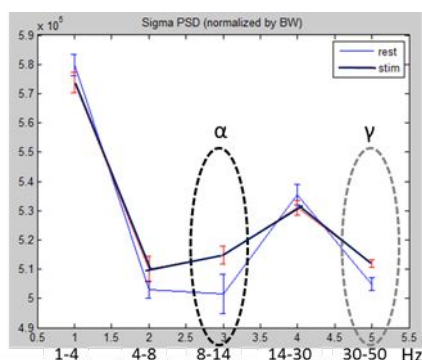


図2 高速MRIによる速い脳活動の検出

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5. 主な発表論文等

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〔図書〕(計 0 件)

〔産業財産権〕

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〔その他〕
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