

## Estimation of brain response during sleep from serum metabolome by NMR spectroscopy

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Brain activity during sleep and wakefulness is key to the understanding of sleep related disorders such as insomnia, parasomnias, sleep apnea, and narcolepsy. Increasing evidence also points to the bidirectional interaction of sleep and metabolism. However, there is no simple and quantitative test to estimate brain function as it relates to sleep and metabolic function. We profiled the blood serum metabolome of healthy individuals every 2 hours over a period of 48 hours that included regular sleep and wakefulness periods using NMR spectroscopy. Brain activity of the participants was monitored via overnight polysomnography. Multivariate regression modelling was used to correlate these two different data sets. We observed encouraging results that suggests the possibility of estimation of brain activity during sleep. These results have the potential to uncover the connection of altered brain function and metabolic biochemistry in dysregulated sleep.