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Supplementary Information for

Functional Imaging Evidence for Task-induced Deactivation and Disconnection of a Major Default Mode Network Hub in the Mouse Brain

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Figures S1 to S4

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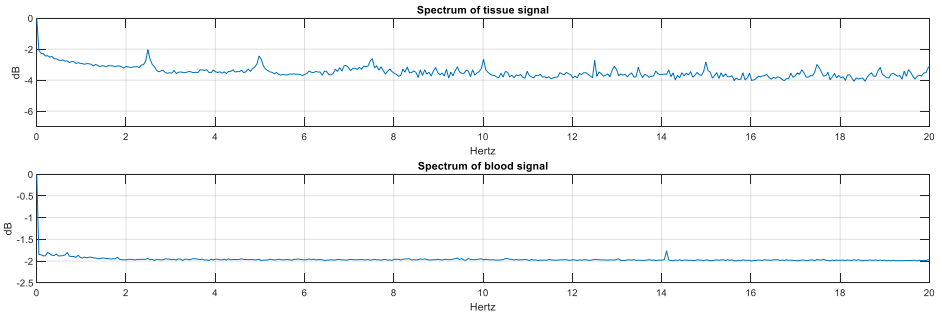
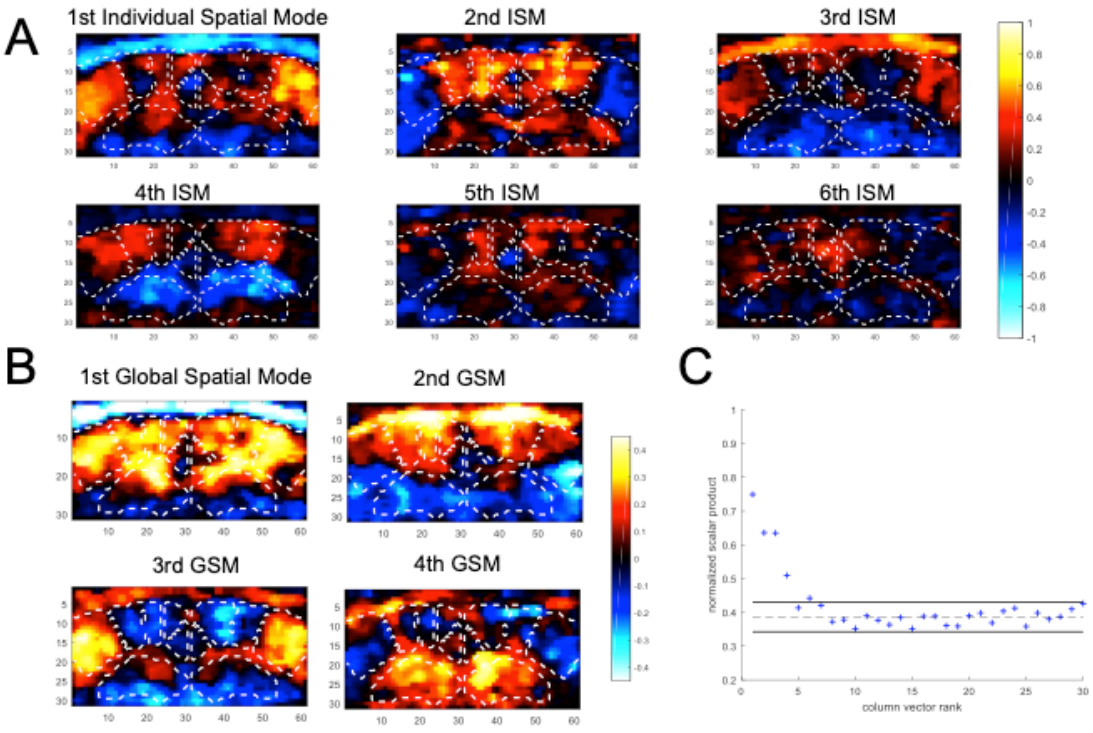


Fig. S1. Spectrum of the tissue and blood signals in an awake mouse. fUS allows to capture frequency up to 250Hz, breathing can be found around 2.5 Hz in the tissue signal and cardiac pulsatility around 14 Hz in the blood signal..



. **Fig. S2. Individual Global Spatial Modes (GSMs) of brain connectivity at the individual and the group level.** A) The 6 first individual Global Spatial Modes for one representative awake mouse in resting-state epochs. B) The 4 first Global Spatial Modes representing reproducible connectivity patterns (n=6 awake mice, resting-state epochs). C – Difference of GSMs (blue) from noise (plain black lines representing ± 2 x the standard deviation of mean noise, dotted line represents mean noise, computed over the last 15 GSMs).

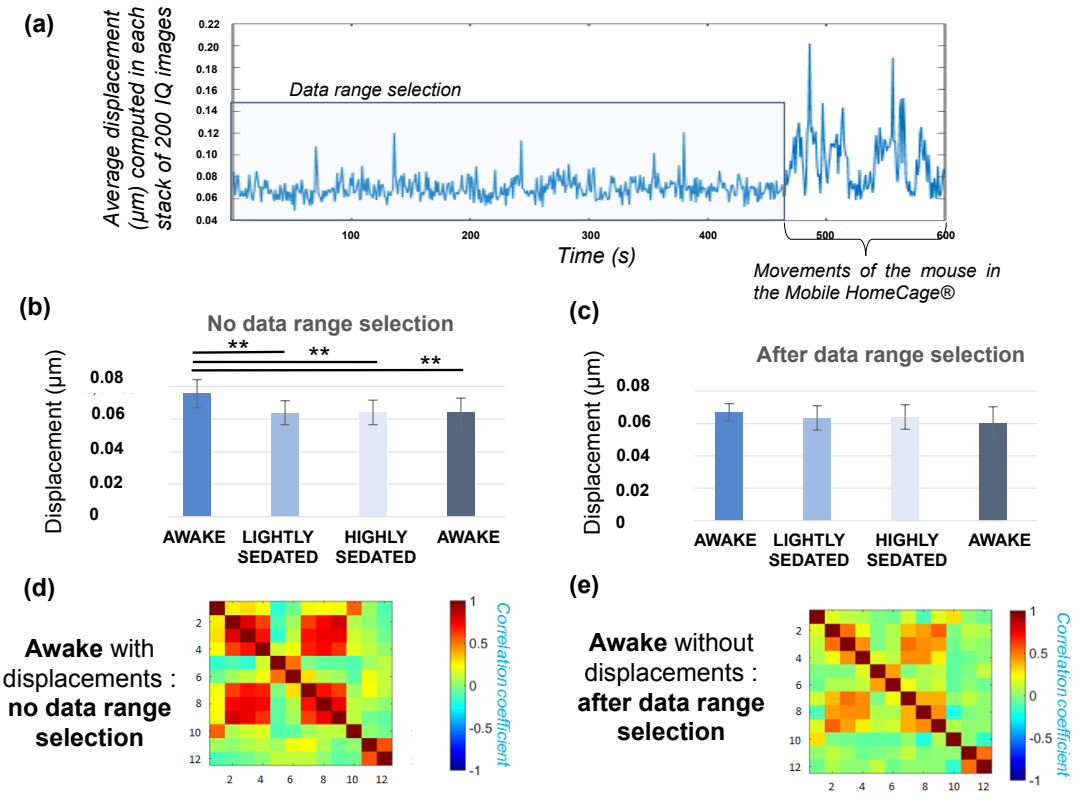


Fig. S3 : Selection of time epochs based on displacement measure with ultrafast ultrasound. The average displacement in each stack of IQ images has been computed using phase shift measurement. The phase shift has been computed in each pixel by correlation between an image and the following image of the IQ stack. Then, the displacement has been computed with:

$$d = -\frac{\varphi}{2\pi} * \frac{\lambda}{2}$$

where φ is the phase shift and λ the ultrasound wavelength. (a) Averaged displacement (averaged over all the pixels of the IQ stack) over time. An increase in averaged displacement can be observed in the last minutes of the acquisition, corresponding to a movement of the mouse in the floating cage. Thus, the movement of the mouse in the cage induced movement artifacts, visible and quantifiable in IQ data. (b-c) Displacement in Doppler images, before and after selection of the “calm and immobile” epochs, has been quantified. For each acquisition, a temporal average of the displacement has been computed. This computation has been made for each mouse and each consciousness state, before and after data selection, and then the values have been averaged over the N=6 mice. Before data selection (b), the amount of displacement artifacts in IQ images is significantly higher when mice are in awake state than in the other consciousness states (bilateral paired t-test, *: p<0.05, ** p<0.01). After data selection (c), the amount of displacement artifacts in IQ images is similar whatever the consciousness state: there is no more displacements in awake mice than in highly sedated mice, for instance. (d-e) Functional connectivity matrices obtained in an awake mouse before and after displacement-based time range selection, respectively.

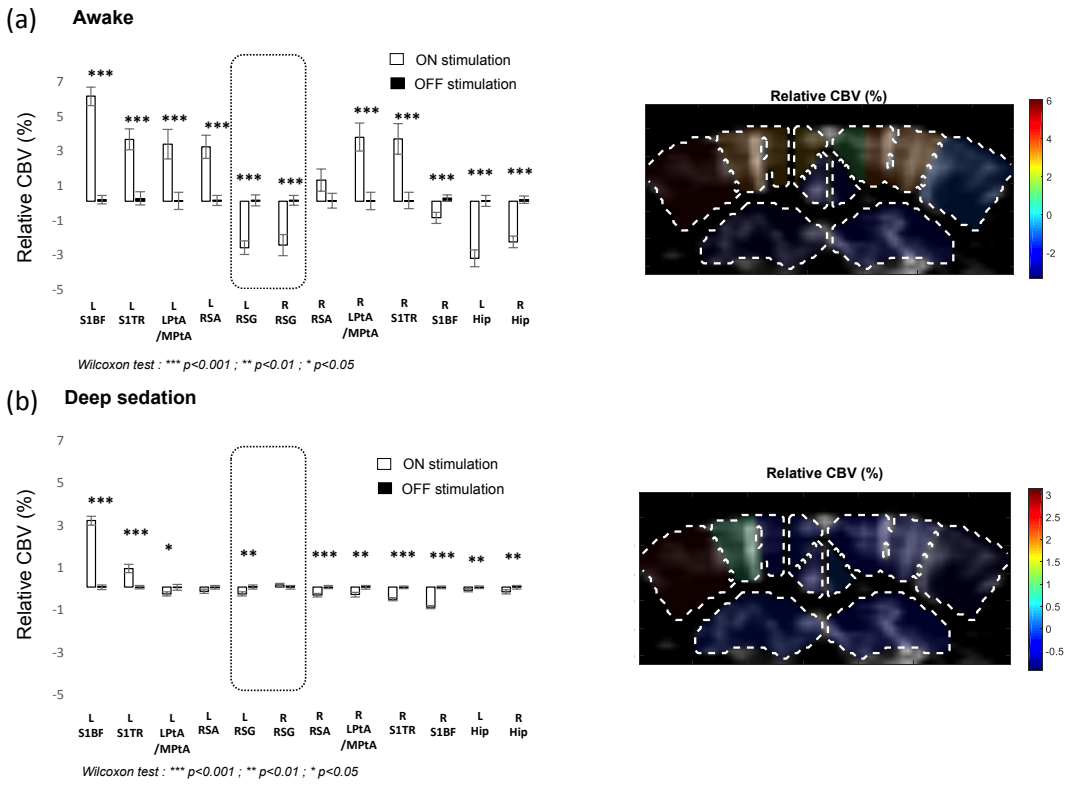


Fig. S4. Task-induced CBV variations during left whiskers stimulation compared to rest in awake mice (a) and after injection of a high medetomidine dose (b) in regions of interest. Data are presented as mean ± standard error (bilateral paired t-test, *: p<0.05, ** p<0.01, *** p<0.001).