

## **ORCA - Online Research @ Cardiff**

This is an Open Access document downloaded from ORCA, Cardiff University's institutional repository:https://orca.cardiff.ac.uk/id/eprint/130906/

This is the author's version of a work that was submitted to / accepted for publication.

Citation for final published version:

Driver, Ian D., Traat, Maarika, Fasano, Fabrizio and Wise, Richard G. 2020. Most small cerebral cortical veins demonstrate significant flow pulsatility: a human phase contrast MRI study at 7T. Frontiers in Neuroscience 14, 415.

10.3389/fnins.2020.00415

Publishers page: http://dx.doi.org/10.3389/fnins.2020.00415

## Please note:

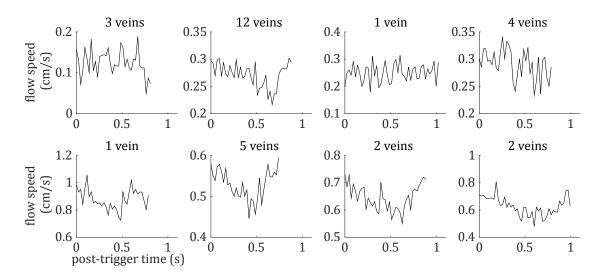
Changes made as a result of publishing processes such as copy-editing, formatting and page numbers may not be reflected in this version. For the definitive version of this publication, please refer to the published source. You are advised to consult the publisher's version if you wish to cite this paper.

This version is being made available in accordance with publisher policies. See http://orca.cf.ac.uk/policies.html for usage policies. Copyright and moral rights for publications made available in ORCA are retained by the copyright holders.

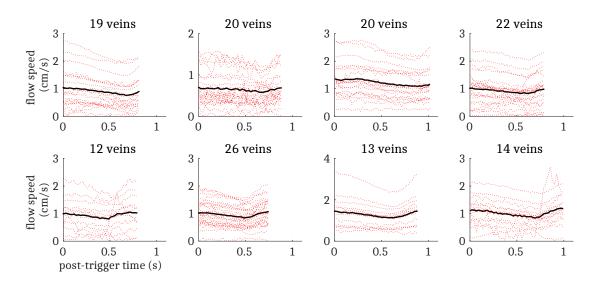


## Supplementary Material

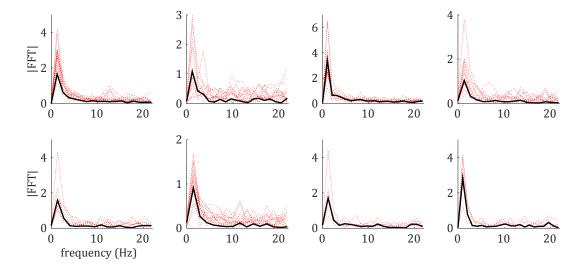
## 1 Supplementary Figures



**Supplementary Figure S1.** Cardiac cycle synchronized venous blood flow time-courses for each subject for veins that do not meet the PCNR>3.9 threshold (i.e. 'non-pulsatile veins'). The number of non-pulsatile veins for each subject is displayed above the respective plot.



**Supplementary Figure S2.** Cardiac cycle synchronized venous blood flow time-courses for each subject for every vein (red dotted lines) and for the mean across veins (black line). The total number of veins studied for each subject is displayed above the respective plot.



**Supplementary Figure S3.** Frequency spectra for each subject, for every small vein (red dotted lines) and for the mean across small veins (black line). This was calculated by fast Fourier transform of the time-course. Note that the main peak at  $\sim 1 \, \mathrm{Hz}$  corresponds to the principle frequency of the cardiac cycle.