

Supporting Information

Mapping Long-Term Functional Changes in Cerebral Blood Flow by Arterial Spin Labeling

Tracy Ssali^{1,2*}, Udunna C Anazodo^{1,2}, Yves Bureau¹, Bradley J MacIntosh³, Matthias Günther^{4,5}, Keith St Lawrence^{1,2}

¹Lawson Health Research Institute, London, ON, Canada.

²Department of Medical Biophysics, Western University, London, ON, Canada.

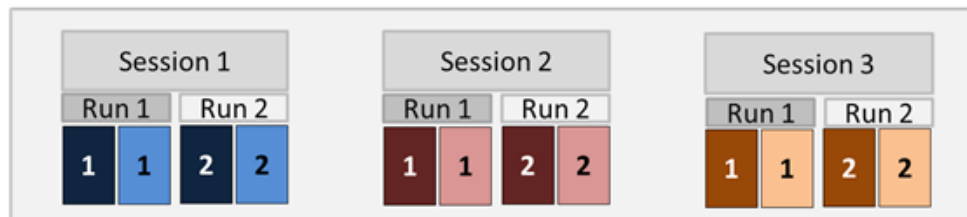
³Sunnybrook Health Sciences Centre, Toronto, ON, Canada.

⁴Fraunhofer Institute for Medical Image Computing MEVIS, Bremen, Germany

⁵Mediri GmbH, Heidelberg, Germany

* **Corresponding author:** Tracy Ssali, Electronic mail: tssali@uwo.ca.

A. Data Acquisition



B. Data Analysis



Fig A. Pictorial representation of: (A) data acquisition and (B) data analysis. Data were acquired in 3 sessions, where blue red and orange represent sessions 1 through 3 respectively. Each session consisted of two runs, where each run was comprised of a ~5 minute resting period (indicated by darker shade) and a ~5 minute sequential finger tapping task period (indicated by the lighter shaded colour).

Contrasts were generated by concatenating task data with rest:

- (I.) Within-session
 - a. ex. Session 1 Run 1 Rest vs. Session 1 Run 1 Task
- (II.) within-session different run (within-session_{DR})
 - a. ex. Session 1 **Run 2** Rest vs. Session 1 **Run 1** Task
- (III.) between-sessions
 - a. ex. 1 week: **Session 2** Run 1 Rest vs. **Session 1** Run 1 Task
 - b. ex. 1 month: **Session 3** Run 1 rest vs. **Session 1** Run 1 Task)

For precision and dice analysis, activation data generated using the same task data were compared to each other (i.e down each column). That is to say, the task data remained the same while the rest data was within-session, within-session_{DR} or between-session. The precision and dice coefficients were then averaged together based on the separation between rest and task. A similar analysis was performed for run 2 data.

Table A. Background suppression timing used for ASL and ATT mapping sequences.

	Post Labeling Delay	Inversion Pulse 1 (ms)	Inversion Pulse 2 (ms)
<u>ASL</u>			
	1200	372	956
<u>ATT</u>			
	700	198	543
	1300	410	1041
	1900	666	1563
	2500	965	2102
	3100	1310	2657

Table B. Precision measured using the activated region defined by the family wise error rate (FWE), false discovery rate (FDR), or an anatomically defined motor region (AAL) as the true positive region. Between-session precision is expressed relative to within-session_{DR} precision.

	aCBF			rCBF		
	FWE	FDR	AAL	FWE	FDR	AAL
Week	74 ± 13%	69 ± 13%	78 ± 14%	84 ± 11%	76 ± 11%	87 ± 9%
3 Weeks	84 ± 19%	84 ± 27%	87 ± 12%	88 ± 20%	84 ± 19%	91 ± 19%
Month	75 ± 17%	73 ± 27%	80 ± 11%	84 ± 17%	82 ± 12%	85 ± 12%

Table C. Between-session Dice coefficients relative to within-session_{DR} measured with FWE and FDR statistical thresholds.

	aCBF		rCBF	
	FWE	FDR	FWE	FDR
Week	74 ± 33%	71 ± 48%	88 ± 12%	83 ± 13%
3 Weeks	79 ± 32%	82 ± 54%	90 ± 18%	87 ± 15%
Month	69 ± 30%	69 ± 50%	87 ± 16%	87 ± 15%