

**Supplementary Table 1. Long-TE (BOLD) signal change and Z-statistics.**

Measure	Tag Scenario	Region of interest		
		Affected	Unaffected	VBA
Normalized signal change	Full	0.034	0.050	0.042
	VBA 1	0.033	0.048	0.039
	VBA 2	0.033	0.048	0.040
	R ICA	0.033	0.047	0.041
	All Conditions	0.033	0.048	0.048
	<b>Control</b>	.034	.049	.041
Z-Statistic	Full	2.67	4.78	4.69
	VBA 1	3.59*	5.84*	5.45*
	VBA 2	3.39*	5.46*	5.32*
	R ICA	3.96*	6.19*	5.81*
	All Conditions	6.52*	11.11*	10.72*
	<b>Control</b>	2.76	4.99	5.02

Paired t-tests were performed between signal change and Z-statistic values for each tagging condition relative to the control scan. Presented are the average signal change and Z-statistic values for each scenario. \* $P \leq 0.003$ , Bonferroni corrected, relative to the control scan. Notice that percent signal changes do not differ between any of the labeling scenarios, likely owing to the small effect of the labeling on the long-TE BOLD-weighted contrast and each labeling condition being only approximately efficient for the denoted vessel (i.e., multiple labeling and clustering is required for flow territory quantification).