

Supplementary Material

Table S1. Data for cephalic artery size, blood flow rate and wall shear stress taken from 19 published studies of adult humans.

Study	Artery	Method	Diameter	Radius	Flow rate	Flow rate	WSS	Sample size
			mm	cm	ml min ⁻¹	cm ³ s ⁻¹		
Scheel et al. 2000	CCA	CDDU	6.15	0.31	411	6.85	12.0	78
Samijo et al. 1998	CCA	MSDU	6.16	0.31	507	8.46	14.7	111
Samijo et al. 2002	CCA	MSDU	6.29	0.31	535	8.92	14.6	13
Dammers et al. 2003	CCA	MSDU	6.70	0.34	624	10.40	14.1	10
Zhao et al. 2015	CCA	PC-MRI	6.95	0.35	388	6.47	7.8	301
Oyre et al. 1998	CCA	PC-MRI	7.22	0.36	445	7.42	8.0	69
Schoning et al 1994	CCA	CDMU	6.30	0.32	470	7.83	12.8	48
Willie et al. 2012	ICA	TCD	5.40	0.27	231	3.85	10.0	26
Lewis et al. 2015	ICA	HRU	4.85	0.24	227	3.78	13.5	24
Liu et al.. 2013	ICA	CDDU	4.73	0.24	233	3.88	15.0	21
Chnafa et al. 2017	ICA	PC-MRI	3.52	0.18	195	3.25	30.4	31
Bouillot et al. 2018	ICA	PC-MRI	4.10	0.21	204	3.40	20.1	35
Sato and Sadamoto 2010	ICA	HRU	4.80	0.24	295	4.92	18.1	10
Scheel et al. 2000	ICA	CDDU	4.85	0.24	252	4.20	15.0	78
Zhao et al. 2015	ICA	PC-MRI	5.25	0.26	256	4.27	12.0	301
Enzmann et al. 1994	ICA	PC-MRI	5.29	0.26	320	5.33	14.6	10
de Eulate et al. 2016	ICA	PC-MRI	5.24	0.26	214	3.57	10.1	32
Peng et al. 2015	ICA	PC-MRI	5.08	0.25	260	4.33	13.4	12
Schoning et al. 1994	ICA	CDDU	4.80	0.24	265	4.42	16.3	48
van Ooij et al. 2013	ICA	PC-MRI	4.10	0.20	210	3.50	20.7	5
Lewis et al. 2015	VA	HRU	3.80	0.19	67	1.12	8.3	24
Willie et al. 2012	VA	TCD	3.70	0.19	58	0.97	7.8	26
Sato and Sadamoto 2010	VA	HRU	3.20	0.16	95	1.58	19.7	10
Scheel et al. 2000	VA	CDDU	3.40	0.17	80	1.33	13.8	78
Zhao et al. 2015	VA	PC-MRI	4.25	0.21	94	1.57	8.3	301
de Eulate et al. 2017	VA	PC-MRI	3.79	0.19	65	1.09	8.1	32
Peng et al. 2015	VA	PC-MRI	4.27	0.21	111	1.85	9.7	12
Schoning et al. 1994	VA	CDDU	3.40	0.17	85	1.42	14.7	48
Zhao et al. 2015	BA	PC-MRI	3.50	0.18	137	2.29	21.7	301
Enzmann et al. 1994	BA	PC-MRI	4.22	0.21	161	2.68	14.5	10
van Ooij et al. 2013	BA	PC-MRI	3.66	0.18	132	2.20	18.3	5
Bouillot et al. 2018	ACA	PC-MRI	1.90	0.10	66	1.10	65.3	35
Chnafa et al. 2017	ACA	PC-MRI	2.09	0.10	65	1.09	48.6	31
Zhao et al. 2015	ACA	PC-MRI	2.70	0.14	72	1.19	24.7	301
Enzmann et al. 1994	ACA	PC-MRI	3.48	0.17	82	1.36	13.2	10
van Ooij et al. 2013	ACA	PC-MRI	2.74	0.14	78	1.30	25.7	5
Wilson et al. 2011	MCA	PC-MRI	3.04	0.15	140	2.33	33.8	24
Coverdale et al.. 2014	MCA	PC-MRI	2.67	0.13	215	3.58	76.7	19
Bouillot et al. 2018	MCA	PC-MRI	2.60	0.13	117	1.95	45.2	35
Chnafa et al. 2017	MCA	PC-MRI	2.80	0.14	125	2.09	38.8	31
Zhao et al. 2015	MCA	PC-MRI	3.45	0.17	152	2.53	25.1	301
Enzmann et al. 1994	MCA	PC-MRI	4.22	0.21	118	1.96	10.6	10
van Ooij et al. 2013	MCA	PC-MRI	3.48	0.17	144	2.40	23.2	5
Zhao et al. 2015	PCA	PC-MRI	2.80	0.14	67	1.11	20.6	301
Enzmann et al. 1994	PCA	PC-MRI	3.39	0.17	52	0.87	9.1	10
van Ooij et al. 2013	PCA	PC-MRI	2.79	0.14	60	1.00	18.8	5

Abbreviations:

Arteries: CCA common carotid; ICA internal carotid; VA vertebral; BA basilar; ACA anterior cerebral; MCA middle cerebral; PCA posterior cerebral.

Techniques: PC-MRI phase-contrast magnetic resonance imaging; TCD transcranial Doppler ultrasound; HRU high resolution ultrasound; CDDU color duplex Doppler ultrasound; MSDU multi-gate spectral Doppler ultrasound.

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Table S2. Mean \pm 95% CI arterial lumen radii, blood flow rates, and calculated wall shear stress (WSS) of single arteries of the human cephalic circulation based on data from 10 exclusively PC-MRI studies. Compare to Table 2 in the main text

Artery	Number of studies	Radius (r_i , cm)		Flow rate (\dot{Q} , cm ³ s ⁻¹)		WSS (τ , dyne cm ⁻²)	
		mean	95% CI	mean	95% CI	mean	95% CI
SINGLE	N	mean	95% CI	mean	95% CI	mean	95% CI
common carotid (CCA)	2	0.354	0.013	6.94	0.94	7.9	0.2
internal carotid (ICA)	7	0.233	0.027	3.95	0.55	17.3	5.2
basilar (BA)	3	0.190	0.021	2.39	0.29	18.2	4.1
vertebral (VA)	3	0.205	0.015	1.50	0.43	8.7	1.0
middle cerebral (MCA)	7	0.159	0.021	2.41	0.42	36.2	15.7
posterior cerebral (PCA)	3	0.150	0.019	0.99	0.14	16.2	7.0
anterior cerebral (ACA)	5	0.129	0.027	1.21	0.10	35.5	18.5

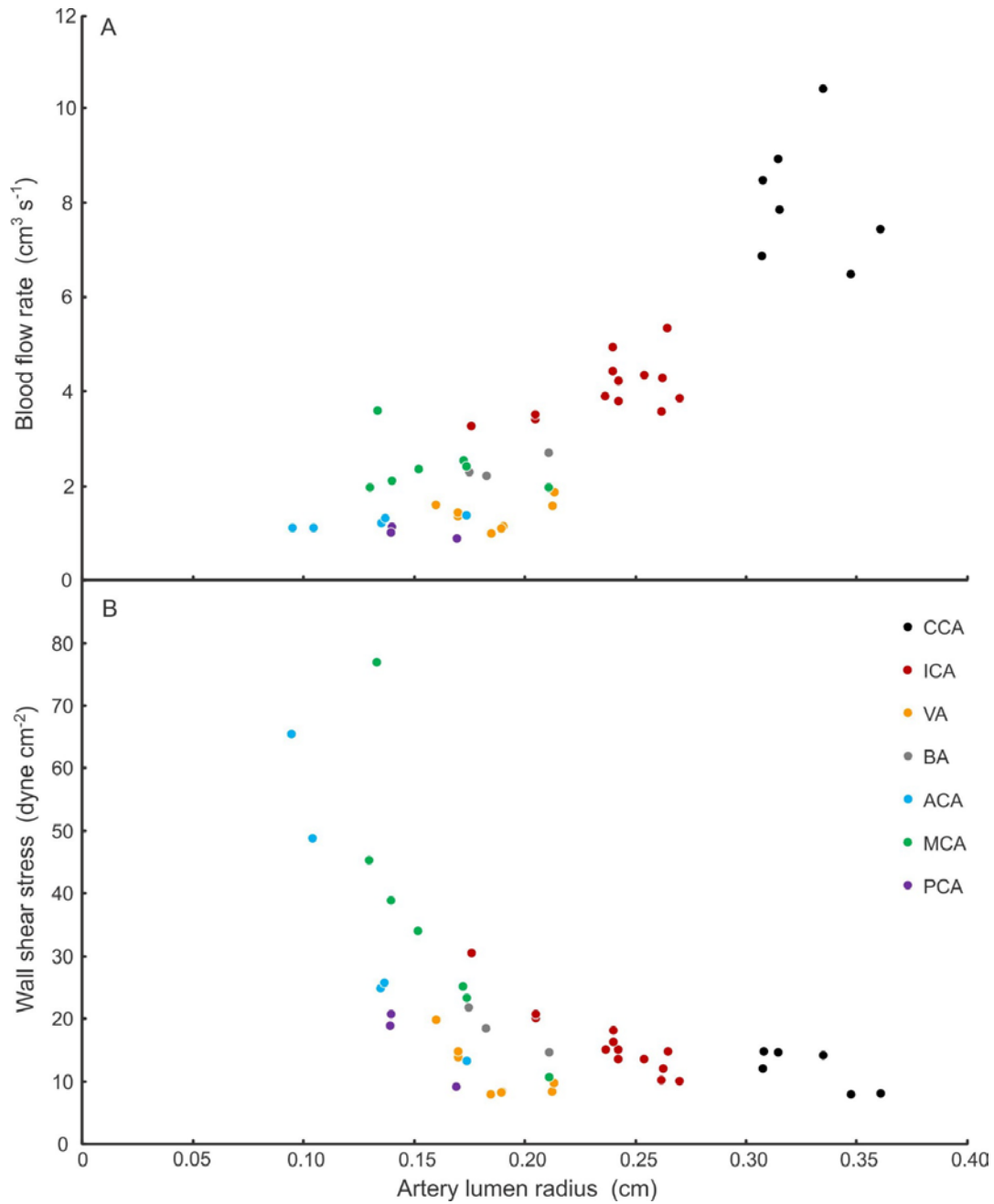


Figure S1. (A) Blood flow rate (\dot{Q} , $\text{cm}^3 \text{s}^{-1}$) and (B) calculated wall shear stress (τ , dyne cm^{-2}) in seven major cephalic arteries in relation to lumen radius (r_i , cm) in humans. The arteries are the common carotid (CCA), internal carotid (ICA), vertebral (VA), basilar (BA), anterior cerebral (ACA), middle cerebral (MCA) and posterior cerebral (PCA).