

Supplementary material “Retinal and Cerebral Microvasculopathy: Relations and their Genetic Contributions”

	Central retinal artery equivalent	Central retinal vein equivalent	Arteriole-venular ratio	Fractal dimension of arteries	Fractal dimension of veins	Curvature tortuosity of arteries	Curvature tortuosity of veins	Periventricular white matter hyperintensities volume	Deep white matter hyperintensities volume
	B, p-value (95% CI)	B, p-value (95% CI)	B, p-value (95% CI)	B, p-value (95% CI)	B, p-value (95% CI)	Ratio, p-value (95% CI of ratio)	Ratio, p-value (95% CI of ratio)	Ratio, p-value (95% CI of ratio)	Ratio, p-value (95% CI of ratio)
Diabetes mellitus II	-9.086, p<0.001 (-13.058 to -5.114)	-25.901, p=0.022 (-48.072 to -3.729)	0.027, p=0.195 (-0.014 to 0.067)	0.646*, p=0.833 (-5.370 to 6.661)	<b>1.831*</b> , p=0.046 (0.0315 to 3.631)	0.975†, p=0.967 (0.293 to 3.243)	0.698†, p=0.521 (0.233 to 2.092)	1.050, p=0.837 (0.661 to 1.671)	0.615, p=0.274 (0.257 to 1.469)
Hypertension	3.348, p=0.122 (-0.892 to 7.588)	<b>5.094</b> , p=0.044 (0.135 to 10.054)	0.164*, p=0.864 (-1.705 to 2.033)	0.011, p=0.158 (-0.004 to 0.027)	0.353*, p=0.579 (-0.894 to 1.600)	<b>1.107</b> , p=0.007 (1.028 to 1.194)	1.057, p=0.118 (0.986 to 1.132)	1.219, p=0.186 (0.910 to 1.633)	1.019, p=0.938 (0.646 to 1.607)
Smoking	-0.736, p=0.741 (-5.091 to 3.619)	-0.637, p=0.870 (-8.291 to 7.016)	0.293*, p=0.829 (-2.366 to 2.951)	-0.643*, p=0.668 (-3.579 to 2.293)	-0.127*, p=0.891 (-1.943 to 1.689)	0.944, p=0.350 (0.834 to 1.067)	1.076, p=0.227 (0.955 to 1.213)	<b>1.644</b> , p=0.021 (1.079 to 2.500)	1.327, p=0.211 (0.853 to 2.061)
Body mass index	0.425, p=0.170 (-0.181 to 1.031)	0.665, p=0.098 (-0.122 to 1.452)	0.012*, p=0.925 (-0.235 to 0.259)	-0.203*, p=0.112 (-0.460 to 0.055)	-0.195*, p=0.086 (-0.418 to 0.028)	0.673*, p=0.529 (0.196 to 2.312)	0.412*, p=0.051 (0.169 to 1.005)	0.513*, p=0.756 (0.008 to 34.674)	0.962, p=0.085 (0.920 to 1.005)
Mean arterial pressure	-0.114, p=0.124 (-0.259 to 0.031)	-0.007, p=0.954 (-0.243 to 0.229)	<b>-0.069*</b> , p=0.030 (-0.130 to -0.007)	-0.001*, p=0.985 (-0.056 to 0.055)	-0.018*, p=0.557 (-0.077 to 0.042)	1.156*, p=0.368 (0.841 to 1.589)	1.236*, p=0.156 (0.923 to 1.660)	4.345*, p=0.059 (0.944 to 20.045)	2.698*, p=0.181 (0.630 to 11.535)
Framingham risk score	<b>-0.166</b> , p=0.011 (-0.295 to -0.038)	-0.116, p=0.449 (-0.417 to 0.185)	-0.050*, p=0.224 (-0.131 to 0.031)	0.019*, p=0.544 (-0.042 to 0.080)	0.024*, p=0.376 (-0.030 to 0.078)	1.107*, p=0.587 (0.767 to 1.592)	<b>1.361*</b> , p=0.030 (1.030 to 1.803)	<b>4.977*</b> , p=0.042 (1.062 to 23.335)	2.317*, p=0.327 (0.432 to 12.445)

**Supplementary table 1:** Associations between retinal vascular parameters/white matter hyperintensities and cardiovascular risk factors. Note that some values are reported as ratios due to a log transformation applied to some of the dependent variables. **Bold** values are significant at p<0.05. GEE, corrected for age and gender. Eye/brain parameters were chosen as the dependent variables. \* = in steps of 100, † = in steps of 10

	Periventricular white matter hyperintensities volume Ratio, p-value (95% CI of ratio)	Deep white matter hyperintensities volume Ratio, p-value (95% CI of ratio)
Central retinal artery equivalent*	2.447, p=0.185 (0.652 to 9.204)	1.714, p=0.519 (0.333 to 8.790)
Central retinal vein equivalent*	<b>3.148, p=0.015</b> <b>(1.250 to 7.925)</b>	2.009, p=0.244 (0.621 to 6.486)
Arteriole-venular ratio	0.174, p=0.204 (0.012 to 2.576)	0.292, p=0.476 (0.010 to 8.650)
Fractal dimension of arteries	1.380, p=0.833 (0.069 to 27.73)	<b>306.902, p&lt;0.001</b> <b>(12.388 to 7603.263)</b>
Fractal dimension of veins	3.126, p=0.522 (0.095 to 102.329)	<b>30.761, p=0.042</b> <b>(1.125 to 841.395)</b>
Curvature tortuosity of arteries†	1.936, p=0.237 (0.648 to 5.792)	3.061, p=0.075 (0.891 to 10.510)
Curvature tortuosity of veins†	2.022, p=0.293 (0.544 to 7.508)	<b>7.303, p=0.004</b> <b>(1.853 to 28.787)</b>

**Supplementary table 2:** Associations between retinal vascular parameters and white matter hyperintensities, given in ratios due to a log transformation applied to the dependent variables. **Bold** values are significant at  $p<0.05$ . GEE, corrected for age, gender, total intracranial volume and Framingham Risk Score. Brain parameters were chosen as the dependent variables. \* reported in steps of 100, † reported in steps of  $10^{-4}$ .