

Supplementary Material 4: Excluded studies with reasons for exclusion

This table lists 51 full-text records excluded after full-text assessment and the corresponding reason for exclusion.

No.	Authors	Year	Title	Journal	Reason for exclusion	Study design
1	C. D. Martin-Ruiz, H. O.; Keys, B.; Rowan, E.; Kenny, R. A.; von Zglinicki, T.	2006	Telomere length predicts poststroke mortality, dementia, and cognitive decline	Annals of Neurology	Outcome was not specific to ischemic stroke.	Case-control
2	R. Y. C. Zee, A. J.; Barton, N. S.; Ridker, P. M.; Zee, Robert Y. L.; Castonguay, Amy J.; Barton, Nathaniel S.; Ridker, Paul M.	2010	Relative leukocyte telomere length and risk of incident ischemic stroke in men: a prospective, nested case-control approach	Rejuvenation Research	Telomere length was not reported in measurable units.	Cohort
3	A. L. K. Fitzpatrick, R. A.; Kimura, M.; Gardner, J. P.; Psaty, B. M.; Jenny, N. S.; Tracy, R. P.; Hardikar, S.; Aviv, A.; Fitzpatrick, Annette L.; Kronmal, Richard A.; Kimura, Masayuki; Gardner, Jeffrey P.; Psaty, Bruce M.; Jenny, Nancy S.; Tracy, Russell P.; Hardikar, Sheetal; Aviv, Abraham	2011	Leukocyte telomere length and mortality in the Cardiovascular Health Study	Journals of Gerontology Series A: Biological Sciences & Medical Sciences	Outcome was not specific to ischemic stroke.	Cohort
4	T. O. Maeda, Jun-ichi; Sasaki, Makoto; Nishiyama, Yasuhiro; Kudo, Yoshihiro; Yamori, Tomoko; Nakazono, Takashi; Arima, Takahiro; Makino, Naoki	2011	The physical ability of elderly female Japanese patients with cerebrovascular disease correlates with telomere length in their peripheral blood leukocytes	Aging Clinical & Experimental Research	Outcome was not specific to ischemic stroke.	Cross-sectional
5	R. Y. L. R. Zee, P. M.; Chasman, D. I.	2011	Genetic variants in eleven telomere-associated genes and the risk of incident cardio/cerebrovascular disease: The Women's Genome Health Study	Clinica Chimica Acta	No telomere length data were reported.	Cohort
6	D. A. Biotti, S.; Béjot, Y.; Giroud, M.; Caillier, M.; Ragot, S.; Osseby, G. V.; Moreau, T.; Teyssier, J. R.	2012	Leukocyte telomere length: a focus on cerebrovascular events	Rejuvenation Res	The study focused on recurrent ischemic stroke.	Cross-sectional

No.	Authors	Year	Title	Journal	Reason for exclusion	Study design
7	H. C. Ding, C.; Shaffer, J. R.; Liu, L.; Xu, Y.; Wang, X.; Hui, R.; Wang, D. W.; Ding, Hu; Chen, Chen; Shaffer, John R.; Liu, Lei; Xu, Yujun; Wang, Xiaojing; Hui, Rutai; Wang, Dao Wen	2012	Telomere length and risk of stroke in Chinese	Stroke (00392499)	Telomere length was measured after ischemic stroke onset.	Case-control
8	X. D. Jiang, M.; Cheng, J.; Huang, S.; He, Y.; Ma, K.; Tang, B.; Guo, Y.	2013	Decreased leukocyte telomere length (LTL) is associated with stroke but unlikely to be causative	PLoS One	Outcome was not specific to ischemic stroke.	Case-control
9	W. C. Zhang, Y.; Wang, Y.; Liu, P.; Zhang, M.; Zhang, C.; Medoro, F. B.; Hui, R.	2013	Short telomere length in blood leucocytes contributes to the presence of atherothrombotic stroke and haemorrhagic stroke and risk of post-stroke death	Clinical Science	The study focused on recurrent ischemic stroke.	Case-control
10	A. M. Sen, Gunther; Freudenberger, Paul; Schallert, Michael; Toeglhofer, Anna M.; Nagl, Christoph; Schmidt, Reinhold; Launer, Lenore J.; Schmidt, Helena	2014	Association between higher plasma lutein, zeaxanthin, and vitamin c concentrations and longer telomere length: results of the Austrian Stroke Prevention Study	Journal of the American Geriatrics Society	Outcome was not specific to ischemic stroke.	Cross-sectional
11	J. F. Bressler, N.; Demerath, E. W.; Mosley, T. H.; Folsom, A. R.; Boerwinkle, E.	2015	Sequence variation in telomerase reverse transcriptase (TERT) as a determinant of risk of cardiovascular disease: the Atherosclerosis Risk in Communities (ARIC) study	BMC Med Genet	Telomere length was not measured in leukocytes.	Case-control
12	M. M. Allende, Eva; González-Porras, José Ramón; Toledo, Estefanía; Lecumberri, Ramón; Hermida, José	2016	Short leukocyte telomere length is associated with cardioembolic stroke risk in patients with atrial fibrillation	Stroke (00392499)	Telomere length was measured after ischemic stroke onset.	Cohort
13	Y. Z. Liang, R.; Zhang, S.; Ji, G.; Shi, P.; Yang, T.; Liu, F.; Feng, J.; Li, C.; Guo, D.; Chen, M.	2017	Association of ACYP2 and TSPYL6 genetic polymorphisms with risk of ischemic stroke in Han Chinese population	Mol Neurobiol	No telomere length data were reported.	Case-control
14	D. H. Luo, Q.; Yu, J.; Yu, D.	2017	Telomere length associated with the risks of high-risk and ischemic stroke in southern Chinese Han population	Oncotarget	Telomere length was measured after ischemic stroke onset.	Case-control

No.	Authors	Year	Title	Journal	Reason for exclusion	Study design
15	S. W. Thériault, R.; Raman, K.; Vincent, J.; Yusuf, S.; Paré, G.	2017	Gene expression profiles for the identification of prevalent atrial fibrillation	Journal of the American Heart Association	Outcome was not specific to ischemic stroke.	Cohort
16	J. L. Yu, D.; Zhou, F.; Jin, T.; Liang, X.; Yu, D.	2017	Polymorphism of TNIP1 was associated with atherosclerotic ischemic stroke in southern Han Chinese but unrelated with telomere	International Journal of Clinical and Experimental Pathology	No telomere length data were reported.	Case-control
17	N. T. Zhang, G.; Liang, X.; Li, G.; Liu, T.	2017	Telomere length: A newly marker for predicting atrial fibrillation?	International Journal of Cardiology	Outcome was not specific to ischemic stroke.	
18	S. J. Zhang, G.; Liang, Y.; Zhang, R.; Shi, P.; Guo, D.; Li, C.; Feng, J.; Liu, F.; Peng, R.; Chen, M.	2017	Polymorphisms in telomere length associated TERC and TERT predispose for ischemic stroke in a Chinese Han population	Sci Rep	No telomere length data were reported.	Case-control
19	J. F. Li, C.; Li, L.; Yang, S.; Chen, Y.; Hui, R.; Zhang, M.; Zhang, W.	2018	The association of telomere attrition with first-onset stroke in Southern Chinese: a case-control study and meta-analysis	Sci Rep	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Meta-analysis
20	J. Y. Xiao, Qian; Zhang, Simiao; Li, Xiaodong; Bai, Hongying; Wang, Yunliang; Duan, Shiwei; Thachangattuthodi, Anish	2019	The telomere length of peripheral blood cells is associated with the risk of ischemic stroke in Han population of northern China	Medicine	Telomere length was measured after ischemic stroke onset.	Case-control
21	M. K. Cherska, D.; Tronko, N.; Kondratiuk, V.; Gurianov, V.; Kukharsky, V.	2020	Telomere length, telomerase activity, heart rate variability, or oxidative stress: which one is most associated with the atherothrombotic stroke in the elderly?	Georgian Medical News	Full text was not accessible.	
22	G. R. Machado-Oliveira, C.; Marques, A. R. A.; Vieira, O. V.	2020	Cell senescence, multiple organelle dysfunction and atherosclerosis	Cells	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Review
23	L. H. Malan, M.; von Känel, R.; van Wyk, R. D.; Sumner, A. E.; Nilsson, P. M.; Lambert, G. W.; Steyn, H. S.; Badenhorst, C. J.; Malan, N. T.	2021	A stress syndrome prototype reflects type 3 diabetes and ischemic stroke risk: the SABPA study	Biology (Basel)	No telomere length data were reported.	Cohort

No.	Authors	Year	Title	Journal	Reason for exclusion	Study design
24	X. Y. Yang, X.; Chen, M.; Gao, Y.	2021	The association between telomere length in peripheral blood and new-onset atrial arrhythmia after acute myocardial infarction	Chinese Circulation Journal	Full text was not accessible.	
25	E. T. Yetim, M. A.; Yürür-Kutlay, N.; Tükün, A.; Oguz, K. K.; Arsava, E. M.	2021	The association between telomere length and ischemic stroke risk and phenotype	Scientific Reports	Telomere length was measured after ischemic stroke onset.	Case-control
26	N. W. Chen, X.; Zhang, Y. K.	2022	Effect and mechanism of mesenchymal stem cells on aging-related ischemic stroke	Chinese Journal of Tissue Engineering Research	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Review
27	I. M. B. Idris, E. A.; Hyacinth, H. I.	2022	Sickle cell disease as an accelerated aging syndrome	Experimental Biology and Medicine	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Review
28	S. L. Luo, Y.; Wong, T. H. T.; Schooling, C. M.; Au Yeung, S. L.	2022	Identifying factors contributing to increased susceptibility to COVID-19 risk: A systematic review of Mendelian randomization studies	International Journal of Epidemiology	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Systematic review
29	S. C. C. Ren, X.; Gong, H.; Wang, H.; Wu, C.; Li, P. H.; Chen, X. F.; Qu, J. H.; Tang, X.	2022	SIRT6 in vascular diseases, from bench to bedside	Aging and Disease	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Review
30	F. T.-M. Rodríguez-Esparragón, L. B.; López-Fernández, J. C.; Cappiello, L.; González-Martín, J. M.; Clavo, B.; Serna-Gómez, J. A.; Estupiñán-Quintana, L.; Torres-Ascensión, C.; Villar, J.	2022	Clinical relevance of circulating angiogenic cells in patients with ischemic stroke	BMC Cardiovasc Disord	Outcome was not specific to ischemic stroke.	Cohort
31	L. F. G. Saccaro, S.; Rutigliano, G.	2022	Applications of Mendelian randomization in psychiatry: A comprehensive systematic review	Psychiatric Genetics	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Systematic review

No.	Authors	Year	Title	Journal	Reason for exclusion	Study design
32	B. S. Tessema, U.; König, B.; Serebrovskaya, Z.; Egorov, E.	2022	Effects of intermittent hypoxia in training regimes and in obstructive sleep apnea on aging biomarkers and age-related diseases: a systematic review	Frontiers in Aging Neuroscience	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Review
33	F. L. v. D. Meulmeester, K.; Mooijaart, S. P.; van Heemst, D.; Noordam, R.	2023	The association of measures of body shape and adiposity with incidence of cardiometabolic disease from an ageing perspective	GeroScience	Outcome was not specific to ischemic stroke.	Cohort
34	H. L. Zhang, X.; Fang, Q.; Ma, L.; Liu, M.; Yang, H.; Guo, W.; He, M.; Yang, L.; Zhang, X.	2023	Independent and joint association of leukocyte telomere length and lifestyle score with incident stroke	Stroke	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Research letter
35	X. C. Zhang, S.; Li, Z.; Gu, H.; Jiang, Y.; Li, H.; Meng, X.; Wang, Y.	2023	Telomere length and stroke recurrence after ischemic stroke and TIA	Int J Stroke	The study focused on recurrent ischemic stroke.	Cohort
36	E. M. Argis, A.	2024	Investigation of telomere length in young age ischemic stroke patients	Neurology Asia	Telomere length was measured after ischemic stroke onset.	Case-control
37	L. S. da Cunha Agostini, G. N.	2024	Telomere length as a biomarker for cerebrovascular diseases: current evidence	Molecular Biology Reports	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Review
38	M. L. Hu, B.; Yang, T.; Yang, Y.; Yin, C.	2024	Effect of household income on cardiovascular diseases, cardiovascular biomarkers, and socioeconomic factors	Clinical Therapeutics	No telomere length data were reported.	Mendelian randomization
39	M. Y. Hu, T.; Yang, Y.	2024	Causal associations of education level with cardiovascular diseases, cardiovascular biomarkers, and socioeconomic factors	Am J Cardiol	No telomere length data were reported.	Mendelian randomization
40	S. H. K. Lee, T. K.; Yoo, J. H.; Park, H. J.; Kim, J. H.; Lee, J. H.	2024	Analysis of the association between telomere length and neurological disability in stroke types	Medicina (Kaunas)	Outcome was not specific to ischemic stroke.	Cohort

No.	Authors	Year	Title	Journal	Reason for exclusion	Study design
41	K. P. Mróz, E.; Baran, M.; Z?bczyk, M.; Butenas, S.; Undas, A.	2024	Elevated carbonylated proteins are associated with major cardiovascular events in patients with chronic coronary syndrome: A cohort study	Kardiologia Polska	Outcome was not specific to ischemic stroke.	Cohort
42	E. C.-M. Muiño, J.; Lluçia-Carol, L.; Gallego-Fabrega, C.; Cullell, N.; Lledós, M.; Martín-Campos, J. M.; Villatoro-González, P.; Sierra-Marcos, A.; Ros-Castelló, V.; Aguilera-Simon, A.; Martí-Fàbregas, J.; Fernández-Cádenas, I.	2024	Identification of genetic loci associated with intracerebral hemorrhage using a multitrait analysis approach	Neurology	Outcome was not specific to ischemic stroke.	
43	M. J. P. Smith, M.; Major, B.; Graco, M.; Porter, S.; Kramer, S.; Sewell, K.; Salberg, S.; Chen, Z.; Mychasiuk, R.; Lannin, N. A.	2024	Improving physical movement during stroke rehabilitation: investigating associations between sleep measured by wearable actigraphy technology, fatigue, and key biomarkers	Journal of NeuroEngineering and Rehabilitation	No telomere length data were reported.	Cross-sectional
44	R. H. Vostatek, P.; Schmaldienst, S.; Lorenz, M.; Klauser-Braun, R.; Pabinger, I.; Säemann, M.; Ay, C.; Königsbrügge, O.	2024	Telomere length is associated with increased risk of cardiovascular events in patients with end-stage kidney disease on hemodialysis	Cardiorenal Med	The study focused on recurrent ischemic stroke.	Cohort
45	J. Z. Wei, X.; Wang, J.; Yang, K.; Chen, J.; Li, J.; Zuo, S.; Liu, N.	2024	Mendelian randomization studies in ankylosing spondylitis: A systematic review	International Journal of Rheumatic Diseases	Outcome was not specific to ischemic stroke.	Systematic review
46	J. Y. Y. B. Wong, B.; Liu, Z.; Shi, J.; Roger, V. L.	2024	Genetic susceptibility to chronic diseases leads to heart failure among Europeans: the influence of leukocyte telomere length	Human Molecular Genetics	Outcome was not specific to ischemic stroke.	Cohort
47	Y. Y. F. Yao, F. Y.; Li, S. K.; Shi, A. M.; Yang, J. H.; Zhang, Y. K.	2024	Effects of Qixiong Zuogui Compound Prescription on blood-brain barrier permeability of rats with ischemic stroke by interfering in exosomes of bone marrow stem cells and its anti-aging effects	Zhongguo Zhong Yao Za Zhi	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Animal study

No.	Authors	Year	Title	Journal	Reason for exclusion	Study design
48	W. S. Jiang, T.; Otsuka, I.; Okazaki, S.; Tanifuji, T.; Horai, T.; Minami, H.; Miyachi, M.; Okada, S.; Hishimoto, A.	2025	Epigenetic clock analysis for national institutes of health stroke scale in patients with ischemic stroke	Neuropsychopharmacology 1 Rep	Study design did not meet eligibility criteria (non-observational/non-Mendelian randomization study).	Meta-analysis
49	T. N. P. Kimball, S.; Tack, R. W. P.; Tan, B.; Senff, J. R.; Kourkoulis, C.; Singh, S.; Rosand, J.; Anderson, C. D.	2025	Association of leucocyte telomere length with stroke, dementia, and late-life depression: the role of modifiable risk factors	Neurology	Full text was not accessible.	Mendelian randomization
50	Z. G. Li, Y.; Zhu, S.; Thomas, A. M.; Li, S.	2025	Inflammatory cytokines are associated with stroke and risk factors of cerebrovascular diseases: a Mendelian randomization study	Mammalian Genome	No telomere length data were reported.	Mendelian randomization
51	Y. Y. Zeng, X.; Zi, J.; Hu, Y.; Wang, X.; Cheng, G.; Xiong, J.	2025	Telomere length mediates the causal effects of excess adiposity on cardiovascular risk: a two-step Mendelian randomization study	Nutr Metab Cardiovasc Dis	No telomere length data were reported.	Mendelian randomization