

評価対象論文リスト(要因:肉・赤肉・加工肉、アウトカム:循環器病)

評価判定日:2025/1/27

①既存の系統的レビュー・メタ解析・統合解析

1	Lee JE, McLerran DF, Rolland B, et al. Meat intake and cause-specific mortality: a pooled analysis of Asian prospective cohort studies. <i>The American Journal of Clinical Nutrition</i> . 2013;98(4):1032-1041. doi:10.3945/ajcn.113.062638
2	Wang X, Lin X, Ouyang YY, et al. Red and processed meat consumption and mortality: dose-response meta-analysis of prospective cohort studies. <i>Public Health Nutr</i> . 2016;19(5):893-905. doi:10.1017/S1368980015002062
3	Papier K, Knuppel A, Syam N, Jebb SA, Key TJ. Meat consumption and risk of ischemic heart disease: A systematic review and meta-analysis. <i>Critical Reviews in Food Science and Nutrition</i> . 2023;63(3):426-437. doi:10.1080/10408398.2021.1949575
4	Bhandari B, Liu Z, Lin S, et al. Long-term consumption of 10 food groups and cardiovascular mortality: a systematic review and dose response meta-analysis of prospective cohort studies. <i>Advances in Nutrition</i> . 2023;14(1):55-63. doi:10.1016/j.advnut.2022.10.010
5	Abete I, Romaguera D, Vieira AR, Lopez De Munain A, Norat T. Association between total, processed, red and white meat consumption and all-cause, CVD and IHD mortality: a meta-analysis of cohort studies. <i>Br J Nutr</i> . 2014;112(5):762-775. doi:10.1017/S000711451400124X
6	Kim K, Hyeon J, Lee SA, et al. Role of total, red, processed, and white meat consumption in stroke incidence and mortality: a systematic review and meta-analysis of prospective cohort studies. <i>JAHA</i> . 2017;6(9):e005983. doi:10.1161/JAHA.117.005983
7	Yang C, Pan L, Sun C, Xi Y, Wang L, Li D. Red meat consumption and the risk of stroke: a dose-response meta-analysis of prospective cohort studies. <i>Journal of Stroke and Cerebrovascular Diseases</i> . 2016;25(5):1177-1186. doi:10.1016/j.jstrokecerebrovasdis.2016.01.040
8	Kaluza J, Wolk A, Larsson SC. Red meat consumption and risk of stroke: a meta-analysis of prospective studies. <i>Stroke</i> . 2012;43(10):2556-2560. doi:10.1161/STROKEAHA.112.663286
9	Shi W, Huang X, Schooling CM, Zhao JV. Red meat consumption, cardiovascular diseases, and diabetes: a systematic review and meta-analysis. <i>European Heart Journal</i> . 2023;44(28):2626-2635. doi:10.1093/eurheartj/ehad336
10	Chen GC, Lv DB, Pang Z, Liu QF. Red and processed meat consumption and risk of stroke: a meta-analysis of prospective cohort studies. <i>Eur J Clin Nutr</i> . 2013;67(1):91-95. doi:10.1038/ejcn.2012.180
11	Cui K, Liu Y, Zhu L, Mei X, Jin P, Luo Y. Association between intake of red and processed meat and the risk of heart failure: a meta-analysis. <i>BMC Public Health</i> . 2019;19(1):354. doi:10.1186/s12889-019-6653-0
12	De Medeiros GCBS, Mesquita GXB, Lima SCVC, et al. Associations of the consumption of unprocessed red meat and processed meat with the incidence of cardiovascular disease and mortality, and the dose-response relationship: A systematic review and meta-analysis of cohort studies. <i>Critical Reviews in Food Science and Nutrition</i> . 2023;63(27):8443-8456. doi:10.1080/10408398.2022.2058461
13	Micha R, Wallace SK, Mozaffarian D. Red and processed meat consumption and risk of incident coronary heart disease, stroke, and diabetes mellitus: a systematic review and meta-analysis. <i>Circulation</i> . 2010;121(21):2271-2283. doi:10.1161/CIRCULATIONAHA.109.924977
14	Bechthold A, Boeing H, Schwedhelm C, et al. Food groups and risk of coronary heart disease, stroke and heart failure: A systematic review and dose-response meta-analysis of prospective studies. <i>Critical Reviews in Food Science and Nutrition</i> . 2019;59(7):1071-1090. doi:10.1080/10408398.2017.1392288
15	Zeraatkar D, Han MA, Guyatt GH, et al. Red and processed meat consumption and risk for all-cause mortality and cardiometabolic outcomes: a systematic review and meta-analysis of cohort studies. <i>Ann Intern Med</i> . 2019;171(10):703-710. doi:10.7326/M19-0655

②日本人集団の個別研究

16	Sauvaget C, Nagano J, Allen N, Grant EJ, Beral V. Intake of animal products and stroke mortality in the hiroshima/nagasaki life span study. <i>International Journal of Epidemiology</i> . 2003;32(4):536-543. doi:10.1093/ije/dyg151
17	Japan Diabetes Complications Study Group, Horikawa C, Kamada C, et al. Meat intake and incidence of cardiovascular disease in Japanese patients with type 2 diabetes: analysis of the Japan Diabetes Complications Study (Jdcs). <i>Eur J Nutr</i> . 2019;58(1):281-290. doi:10.1007/s00394-017-1592-y
18	Segawa H, Kondo K, Kadota A, et al. Association of red meat intake with the risk of cardiovascular mortality in general japanese stratified by kidney function: nippon data80. <i>Nutrients</i> . 2020;12(12):3707. doi:10.3390/nu12123707
19	Saito E, Tang X, Abe SK, et al. Association between meat intake and mortality due to all-cause and major causes of death in a Japanese population. Cardoso MA, ed. <i>PLoS ONE</i> . 2020;15(12):e0244007. doi:10.1371/journal.pone.0244007
20	Nagao M, Iso H, Yamagishi K, Date C, Tamakoshi A, for the JACC Study Group. Meat consumption in relation to mortality from cardiovascular disease among Japanese men and women. <i>Eur J Clin Nutr</i> . 2012;66(6):687-693. doi:10.1038/ejcn.2012.6
21	Iso H. Fat and protein intakes and risk of intraparenchymal hemorrhage among middle-aged japanese. <i>American Journal of Epidemiology</i> . 2003;157(1):32-39. doi:10.1093/aje/kwf166
22	Ozawa M, Yoshida D, Hata J, et al. Dietary protein intake and stroke risk in a general japanese population: the hisayama study. <i>Stroke</i> . 2017;48(6):1478-1486. doi:10.1161/STROKEAHA.116.016059

脳血管疾患 (cerebrovascular disease)

■コホート研究

Reference			Study subjects						Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of	Participant's race						
Incidence														
Chika Horikawa et al.	Meat intake and incidence of cardiovascular disease in Japanese patients with type 2 diabetes: analysis of the Japan Diabetes Complications Study (JDACS)	2019	1995-2003	1353	Japan Diabetes Complications Study (aged 40-70 years with HbA1c >	Stroke incidence	63	Japanese patients with type 2 diabetes	Meat intake Q1 Q2 Q3 Q4 High meat intake ≥20g/day (ref: low intake)	15 15 14 19 48	1.00 (reference) 0.77 (0.36-1.64) 0.86 (0.38-1.92) 1.31 (0.55-3.15) 0.87 (0.45-1.67)	0.54 - -	age, sex, current smoker, physical activity, alcohol intake, body mass index, HbA1c, diabetes duration, diabetic retinopathy, treatment by insulin, oral hypoglycemic agents, antihypertensive agents, lipid-lowering agents, systolic blood	-

Mortality (Cerebrovascular disease)

Mortality (stroke、全脳卒中)														
Saito et al.	Association between meat intake and mortality due to all-cause and major causes of death in a Japanese population	2020	1995-2011	87507	JPHC study	deaths due to cerebrovascular disease (I60-I69)		Japanese	All meat intake in men Q1 Q2 Q3 Q4 Red meat intake in men Q1 Q2 Q3 Q4 Processed meat intake in men Q1 Q2 Q3 Q4 Chicken intake in men Q1 Q2 Q3 Q4 All meat intake in women Q1 Q2 Q3 Q4 Red meat intake in women Q1 Q2 Q3 Q4 Processed meat intake in women Q1 Q2 Q3 Q4 Chicken intake in women Q1 Q2 Q3 Q4	173 123 130 143 174 123 130 142 206 128 128 107 160 129 141 139 123 79 80 89 120 90 78 83 115 91 89 76 97 90 82 102	1.00 (reference) 0.89 (0.70-1.15) 1.03 (0.78-1.35) 1.39 (0.97-1.98) 1.00 (reference) 0.85 (0.66-1.10) 1.02 (0.78-1.35) 1.36 (0.95-1.95) 1.00 (reference) 0.80 (0.63-1.02) 0.86 (0.67-1.09) 0.85 (0.64-1.13) 1.00 (reference) 0.91 (0.71-1.16) 1.05 (0.82-1.34) 1.01 (0.77-1.31) 1.00 (reference) 0.70 (0.51-0.94) 0.68 (0.50-0.95) 0.66 (0.44-0.99) 1.00 (reference) 0.84 (0.63-1.13) 0.68 (0.49-0.96) 0.62 (0.41-0.95) 1.00 (reference) 1.13 (0.84-1.52) 1.18 (0.87-1.61) 1.01 (0.71-1.42) 1.00 (reference) 1.05 (0.77-1.42) 0.95 (0.69-1.31) 1.04 (0.75-1.44)	0.127 0.137 0.251 0.742 0.029 0.013 0.793 0.964	age (years, continuous); public health center area; smoking status (never, former, current), alcohol intake (none, >0-<150 g/w, 150-<300 g/w, 300+g/w), BMI (<25, 25 - <27, 27-<30, 30+), quartile of metabolic equivalent task-hours/d, history of hypertension, history of diabetes, total energy intake, intakes of fruits, vegetables, fish, dairy products, egg, sodium and total fat (continuous). For red meat, additionally adjusted for chicken. For chicken, additionally adjusted for red meat.	- - - - ↓↓ ↓↓ - -
Catherine Sauvaget et al.	Intake of animal products and stroke mortality in the Hiroshima/Nagasaki Life Span Study	2003	1980-1996	15350 men and 24999 women	Life Span Study (people exposed and non-exposed to atomic bomb radiation)	Stroke mortality	1462	Japanese	Beef and pork Never <Once/week 2-4 times/week Almost daily Chicken Never <Once/week 2-4 times/week Almost daily Pork products Never <Once/week 2-4 times/week Almost daily Total meat intake in men	93/1160 420/8574 630/21482 81/3237 102/2360 511/16061 479/12951 40/677 284/5287 425/14749 219/8536 30/1284	1.00 (reference) 0.83 (0.65-1.06) 0.80 (0.63-1.02) 1.01 (0.73-1.38) 1.00 (reference) 0.88 (0.70-1.10) 0.99 (0.79-1.25) 1.43 (0.98-2.10) 1.00 (reference) 0.96 (0.82-1.12) 1.03 (0.85-1.24) 0.90 (0.61-1.33)	0.857 0.011 0.812	HR stratified by sex and birth cohort, and adjusted for city, radiation dose, self-reported body mass index, smoking status, alcohol habits, education level, history of diabetes, or hypertension.	- - -

Nagao et al.	Meat consumption in relation to mortality from cardiovascular disease among Japanese men and women	2012	1988-2008	20466 men and 31217 women	JACC study	Total stroke mortality	1209	Japanese	Q1	130	1.00 (reference)	0.461	age, BMI, ethanol intake, perceived mental stress, walking time, sports participation time, education years, history of hypertension and diabetes, total energy, energy-adjusted food (rice, soy, vegetables and fruits) intakes						
									Q2	105	0.91 (0.70-1.19)								
									Q3	122	1.08 (0.83-1.39)								
									Q4	101	0.92 (0.70-1.20)								
									Q5	131	1.10 (0.84-1.20)								
									Total meat intake in women									0.357	
									Q1	185	1.00 (reference)								
									Q2	138	1.02 (0.82-1.28)								
									Q3	100	0.88 (0.68-1.13)								
									Q4	103	0.92 (0.72-1.19)								
				Q5	94	0.91 (0.70-1.19)													

■メタ解析、系統的レビュー

Reference		Include study				Design		Category	Relative risk (95% CI or p)	Weight	Magnitude of association					
Author	Title	Year	Ref No.	First author	Year	Study period	Study location					Event (*Definition)				
Kim et al.	Role of Total, Red, Processed, and White Meat Consumption in Stroke Incidence and Mortality: A Systematic Review and Meta-Analysis of Prospective Cohort Studies	2017		Nagao et al.	2012		Japan	stroke mortality	Stroke incidence	Meta-analysis of 7 cohort studies	Total meat highest vs lowest	1.18 (1.09-1.28)	100	↑		
										(Incidence: NOT including Japanese)	Red meat highest vs lowest	1.11 (1.03-1.20)	100	↑		
											Processed meat	1.17 (1.08-1.25)	100	↑		
											White meat	0.87 (0.78-0.96)	100	-		
											stroke mortality	Meta-analysis of 8 cohort studies	Total meat highest vs lowest	0.97 (0.85-1.11)	100	-
			(Mortality: including Japanese)	Red meat highest vs lowest	0.87 (0.64-1.18)	100	-									
				Sauvaget et al.	2003		Japan	stroke mortality	Prospective cohort study	Total meat 77.6g/d vs 10.4 g/d	M: 1.10 (0.84-1.43) F: 0.91 (0.70-1.19)	25.50 25.63	-			
				Sauvaget et al.	2003		Japan	stroke mortality	Prospective cohort study	Red meat: never vs almost daily	1.01 (0.73-1.38)	26.64	-			
Yang et al.	Red meat Consumption and the Risk of Stroke: A dose-response Meta-analysis of Prospective Cohort Studies	2016		Sauvaget et al.	2003		Japan	stroke mortality	Total stroke	Meta-analysis of 7 cohort studies	Total red meat	1.14 (1.05-1.24)	100	↑		
										(Stroke risk and stroke mortality)	Processed meat	1.17 (1.09-1.27)	100	↑		
											Fresh red meat	1.10 (1.02-1.19)	100	↑		
											stroke mortality	Prospective cohort study	Total red meat	0.95 (0.75-1.23)	10.58	-
									Processed meat	0.90 (0.61-1.33)	3.83	-				
									Fresh red meat	1.01 (0.73-1.38)	6.12	-				
Kaluza et al.	Red meat Consumption and the Risk of Stroke: A Meta-analysis of Prospective Studies	2012		Sauvaget et al.	2003		Japan	stroke mortality	Incident stroke and stroke mortality	Meta-analysis of 6 prospective studies (including Japanese)	Fresh red meat 1 sv/d increase (100-120g)	1.11 (1.03-1.20)	100	↑		
											Processed meat 1 sv/d increase (50g)	1.13 (1.03-1.24)	100	↑		
											Total red meat 1 sv/d increase (100-120g)	1.11 (1.06-1.16)	100	↑		
								stroke mortality	Prospective cohort study	Fresh red meat 1 sv/d increase (100-120g)	1.11 (0.89-1.39)	-	-			
										Processed meat 1 sv/d increase (50g)	1.06 (0.78-1.44)	-	-			
Shi et al.	Red meat consumption, cardiovascular diseases, and diabetes: a systematic review	2023		Sauvaget et al.	2003		Japan	stroke mortality	Stroke	Meta-analysis of 16 studies (including Japanese)	Processed red meat per 50g/day increment	1.16 (1.04-1.29)	100	↑		
											Unprocessed red meat per 100g/day increment	1.08 (0.99-1.18)	100	-		
											Unprocessed red meat per 100g/day increment	1.11 (0.89-1.38)	6.57	-		
Chen et al.	Red and processed meat consumption and risk of stroke: a meta-analysis of prospective cohort studies	2013		Sauvaget et al.	2003		Japan	stroke mortality	Total stroke risk	Meta-analysis of 5 prospective studies (including Japanese)	Total meat highest vs lowest	1.15 (1.05-1.25)	100	↑		
													Red meat highest vs lowest	1.09 (0.01-1.18)	100	↑
													Processed meat highest vs lowest	1.14 (1.05-1.25)	100	↑
													Total meat per 100g increment	1.10 (1.05-1.15)	100	↑
													Red meat per 100g increment	1.13 (1.03-1.23)	100	↑
													Processed meat per 50g increment	1.11 (1.02-1.20)	100	↑
															Red meat highest vs lowest	1.01 (0.73-1.39)
				Processed meat highest vs lowest	0.90 (0.61-1.33)	5.03	-									

Mortality (Hemorrhagic stroke (出血性脳卒中), Intracerebral Hemorrhage 脳出血)

Saito et al.	Association between meat intake and mortality due to all-cause and major causes of death in a Japanese population	2020	1995-2011	87507	JPHC study	deaths due to Intracerebral Hemorrhage (I61)	Japanese	All meat intake in men					0.742	age (years, continuous); public health center area; smoking status (never, former, current), alcohol intake (none, >0-<150 g/w, 150-<300 g/w, 300+g/w), BMI (<25, 25 - <27, 27-<30, 30+), quartile of metabolic equivalent task-hours/d, history of hypertension, history of diabetes, total energy intake, intakes of fruits, vegetables, fish, dairy products, egg, sodium and total fat (continuous). For red meat, additionally adjusted for chicken. For chicken, additionally		
								Q1	51	1.00 (reference)						
								Q2	39	0.96 (0.61-1.51)						
								Q3	37	0.98 (0.60-1.61)						
								Q4	54	1.43 (0.78-2.65)						
								Red meat intake in men							0.293	
								Q1	51	1.00 (reference)						
								Q2	36	0.85 (0.53-1.35)						
								Q3	42	1.09 (0.67-1.78)						
											men	Q4			52	1.38 (0.74-2.59)
								Processed meat intake in men							0.251	
								Q1	57	1.00 (reference)						
								Q2	46	0.80 (0.63-1.02)						
								Q3	43	0.86 (0.67-1.09)						
												Q4			35	0.85 (0.64-1.13)
								Chicken intake in men							0.742	
								Q1	47	1.00 (reference)						
								Q2	47	0.91 (0.71-1.16)						
								Q3	50	1.05 (0.82-1.34)						
												Q4			37	1.01 (0.77-1.31)
All meat intake in women					0.609											
Q1	41	1.00 (reference)														
Q2	19	0.53 (0.29-0.98)														
Q3	23	0.73 (0.40-1.35)														
				Q4	28	0.87 (0.40-1.86)										
Red meat intake in women																

women	Q1	37	1.00 (reference)	0.907	adjusted for red meat.	-		
	Q2	27	1.03 (0.59-1.79)					
	Q3	19	0.76 (0.39-1.49)					
	Q4	28	1.12 (0.50-2.48)					
	Processed meat intake in women							
	Q1	37	1.00 (reference)	0.408			-	
	Q2	23	1.07 (0.61-1.90)					
	Q3	26	1.30 (0.73-2.33)					
	Q4	25	1.24 (0.65-2.35)					
	Chicken intake in women							
	Q1	35	1.00 (reference)	0.307				-
	Q2	28	0.91 (0.53-1.57)					
Q3	21	0.74 (0.41-1.33)						
Q4	27	0.77 (0.42-1.41)						

■メタ解析、系統的レビュー

Reference			Include study					Design	Category	Relative risk (95% CI or p)	Weight	Magnitude of association	
Author	Title	Year	Ref No.	First author	Year	Study period	Study location	Event (*Definition)					
Yang et al.	Red meat Consumption and the Risk of Stroke: A dose-response Meta-analysis of	2016						Hemorrhagic stroke risk	Meta-analysis of 4 cohort studies (NOT including Japanese)	Total red meat	1.18 (0.93-1.50)	100	-
									Processed meat	1.17 (0.94-1.45)	100	-	
									Fresh red meat	0.88 (0.73-1.06)	100	-	
Kaluza et al.	Red meat Consumption and the Risk of Stroke: A Meta-analysis of Prospective	2012						Hemorrhagic stroke (I60 and I61) risk	Meta-analysis of 6 cohort studies (NOT including Japanese)	Fresh red meat 1 sv/d increase (100-120g)	1.08 (0.84-1.39)	100	-
									Processed meat 1 sv/d increase (50g)	1.16 (0.92-1.46)	100	-	
									Total red meat 1 sv/d increase (100-120g)	1.13 (0.94-1.35)	100	-	
Shi et al.	Red meat consumption, cardiovascular diseases, and	2023						Hemorrhagic stroke (I60 and I61) risk	Meta-analysis of 4 studies (NOT including Japanese)	Processed red meat per 50g/day increment	1.15 (0.75-1.77)	100	-
Chen et al.	Red and processed meat consumption and risk of stroke: a meta-analysis of	2013						hemorrhagic stroke	Meta-analysis of 4 prospective studies (Not including Japanese)	Total meat highest vs lowest	1.16 (0.81-1.66)	100	-
									Red meat highest vs lowest	0.99 (0.77-1.28)	100	-	
									Processed meat highest vs lowest	1.23 (0.96-1.58)	100	-	

Ischemic stroke (虚血性脳卒中)

■メタ解析、系統的レビュー

Reference			Include study					Design	Category	Relative risk (95% CI or p)	Weight	Magnitude of association	
Author	Title	Year	Ref No.	First author	Year	Study period	Study location	Event (*Definition)					
Yang et al.	Red meat Consumption and the Risk of Stroke: A dose-response Meta-analysis of	2016						Ischemic stroke	Meta-analysis of 4 cohort studies (NOT including Japanese)	Total red meat	1.22 (1.01-1.46)	100	↑
									Processed meat	1.15 (0.98-1.36)	100	-	
									Fresh red meat	1.15 (1.03-1.29)	100	↑	
Kaluza et al.	Red meat Consumption and the Risk of Stroke: A Meta-analysis of Prospective	2012						Ischemic stroke	Meta-analysis of 6 cohort studies (NOT including Japanese)	Fresh red meat 1 sv/d increase (100-120g)	1.13 (1.00-1.27)	100	↑
									Processed meat 1 sv/d increase (50g)	1.15 (1.06-1.24)	100	↑	
									Total red meat 1 sv/d increase (100-120g)	1.12 (1.05-1.19)	100	↑	
Shi et al.	Red meat consumption, cardiovascular diseases, and	2023						Ischemic stroke	Meta-analysis of 4 studies (NOT including Japanese)	Processed red meat per 50g/day increment	1.42 (1.09-1.85)	100	↑
Chen et al.	Red and processed meat consumption and risk of stroke: a meta-analysis of	2013						Ischemic stroke	Meta-analysis of 4 prospective studies (Not including Japanese)	Total meat highest vs lowest	1.15 (1.04-1.28)	100	↑
									Red meat highest vs lowest	1.13 (1.01-1.25)	100	↑	
									Processed meat highest vs lowest	1.19 (1.08-1.31)	100	↑	

心疾患 (Heart disease)

■コホート研究

Reference			Study subjects						Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of	Participant's race						
Chika Horikawa et al.	Meat intake and incidence of cardiovascular disease in Japanese patients with type 2 diabetes: analysis of the Japan Diabetes Complications Study (JDACS)	2019	1995-2003	1353	Japan Diabetes Complications Study (aged 40-70 years with HbA1c >	Coronary heart disease (CHD) incidence	96	Japanese patients with type 2 diabetes	Meat intake				age, sex, current smoker, physical activity, alcohol intake, body mass index, HbA1c, diabetes duration, diabetic retinopathy, treatment by insulin, oral hypoglycemic agents, antihypertensive agents, lipid-lowering agents, systolic blood	↑ ↑ ↑
									Q1	10	1.00 (reference)	0.02		
									Q2	29	2.98 (1.33-6.66)			
									Q3	27	3.31 (1.44-7.58)			
									Q4	30	3.33 (1.37-8.10)			
High meat intake ≥20g/day (ref: low intake)	86	3.13 (1.46-6.72)	-											

y (Heart disease)

men 751	All meat intake in men						↑
	Q1	218	1.00 (reference)	0.083			
	Q2	184	1.05 (0.85-1.30)				
	Q3	156	0.99 (0.78-1.26)				
	Q4	193	1.46 (1.08-1.99)				
	Red meat intake in men						
	Q1	221	1.00 (reference)	0.048	↑ ↑		
	Q2	180	1.03 (0.83-1.27)				
	Q3	153	1.00 (0.78-1.28)				
	Q4	197	1.51 (1.11-2.06)				
	Processed meat intake in men						

Eiko Saito et al.	Association between meat intake and mortality due to all-cause and major causes of death in a Japanese population	2020	1995-2011	87507	JPHC study	deaths due to heart disease (I20-I52)	Japanese	men 458	Q1	247	1.00 (reference)	0.935	age (years, continuous); public health center area; smoking status (never, former, current), alcohol intake (none, >0-<150 g/w, 150-<300 g/w, 300+g/w), BMI (<25, 25 - <27, 27-<30, 30+), quartile of metabolic equivalent task-hours/d, history of hypertension, history of diabetes, total energy intake, intakes of fruits, vegetables, fish, dairy products, egg, sodium and total fat (continuous). For red meat, additionally adjusted for chicken. For chicken, additionally adjusted for red meat.	-									
									Q2	183	1.02 (0.83-1.25)												
									Q3	157	0.93 (0.75-1.16)												
									Q4	164	1.05 (0.83-1.32)												
									Chicken intake in men														
									Q1	230	1.00 (reference)	0.245											
									Q2	183	0.96 (0.79-1.18)												
									Q3	157	0.82 (0.65-1.02)												
									Q4	181	0.92 (0.73-1.15)												
									All meat intake in women														
									Q1	128	1.00 (reference)	0.829											
									Q2	106	0.99 (0.75-1.30)												
									Q3	97	0.92 (0.69-1.24)												
									Q4	127	1.09 (0.77-1.56)												
									Red meat intake in women														
									Q1	130	1.00 (reference)	0.921											
									Q2	100	0.91 (0.69-1.21)												
									Q3	105	0.98 (0.73-1.33)												
									Q4	123	1.01 (0.70-1.45)												
									Processed meat intake in women														
Q1	149	1.00 (reference)	0.355																				
Q2	96	0.92 (0.70-1.21)																					
Q3	106	1.08 (0.82-1.42)																					
Q4	107	1.11 (0.83-1.48)																					
Chicken intake in women																							
Q1	132	1.00 (reference)	0.819																				
Q2	107	1.02 (0.78-1.33)																					
Q3	91	0.89 (0.67-1.18)																					
Q4	128	1.08 (0.81-1.42)																					

Mortality (Ischemic heart disease)

Eiko Saito et al.	Association between meat intake and mortality due to all-cause and major causes of death in a Japanese population	2020	1995-2011	87507	JPHC study	deaths due to ischemic heart disease (I20-I25)	Japanese	Men	All meat intake in men			0.897	age (years, continuous); public health center area; smoking status (never, former, current), alcohol intake (none, >0-<150 g/w, 150-<300 g/w, 300+g/w), BMI (<25, 25 - <27, 27-<30, 30+), quartile of metabolic equivalent task-hours/d, history of hypertension, history of diabetes, total energy intake, intakes of fruits, vegetables, fish, dairy products, egg, sodium and total fat (continuous). For red meat, additionally adjusted for chicken. For chicken, additionally adjusted for red meat.	-									
									Q1	109	1.00 (reference)												
									Q2	79	0.80 (0.59-1.10)												
									Q3	80	0.84 (0.60-1.18)												
									Q4	99	1.10 (0.72-1.69)												
									Red meat intake in men														
									Q1	114	1.00 (reference)	0.779											
									Q2	76	0.75 (0.55-1.03)												
									Q3	73	0.74 (0.52-1.04)												
									Q4	104	1.05 (0.68-1.60)												
									Processed meat intake in men														
									Q1	116	1.00 (reference)	0.219											
									Q2	92	1.07 (0.80-1.43)												
									Q3	80	0.88 (0.64-1.21)												
									Q4	79	0.84 (0.59-1.18)												
									Chicken intake in men														
									Q1	104	1.00 (reference)	0.643											
									Q2	81	0.97 (0.71-1.31)												
									Q3	83	0.97 (0.71-1.33)												
									Q4	99	1.09 (0.79-1.50)												
All meat intake in women																							
Q1	50	1.00 (reference)	0.709																				
Q2	43	0.94 (0.61-1.46)																					
Q3	39	0.84 (0.54-1.38)																					
Q4	50	0.94 (0.53-1.65)																					
Red meat intake in women																							
Q1	50	1.00 (reference)	0.632																				
Q2	41	0.89 (0.57-1.40)																					
Q3	46	1.02 (0.64-1.63)																					
Q4	45	0.80 (0.44-1.44)																					
Processed meat intake in women																							
Q1	61	1.00 (reference)	0.68																				
Q2	42	0.85 (0.55-1.30)																					
Q3	35	0.76 (0.48-1.21)																					
Q4	44	0.95 (0.61-1.49)																					
Chicken intake in women																							
Q1	54	1.00 (reference)	0.768																				
Q2	45	0.97 (0.63-1.48)																					
Q3	31	0.70 (0.44-1.12)																					
Q4	52	1.02 (0.66-1.58)																					
Total meat intake in men																							
Q1	74	1.00 (reference)	0.015																				
Q2	65	0.97 (0.69-1.36)																					
Q3	63	0.92 (0.65-1.30)																					

↓↓

Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of	Participant's race	Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association				
															Study subjects			
Papier et al.	Meat consumption and risk of ischemic heart disease: A systematic review and meta-analysis	2023						Japan	IHD (incidence and/or death)	Meta-analysis of 13 prospective studies (including Japanese)	Poultry (per 50g/day)	1.02 (0.97-1.07)	-					
									Nagao et al.	2012	IHD, fatal	Subgroup analyses of Asian region			Unprocessed red meat (per 50g/day)	1.09 (0.96-1.24)	-	
												Processed meat (per 50g/day)	0.33 (0.14-0.80)	↓↓↓				
												Poultry (per 50g/day)	1.09 (0.82-1.45)	-				
												Unprocessed red meat (per 50g/day) in men	0.67 (0.47-0.96)	↓				
												Unprocessed red meat (per 50g/day) in women	1.40 (0.87-2.25)	-				
												Processed meat (per 50g/day) in men	0.10 (0.02-0.49)	↓↓↓				
									Saito et al.	2021	IHD, fatal	Processed meat (per 50g/day) in women	0.62 (0.07-5.83)	0.06	↓			
												Poultry (per 50g/day) in men	0.79 (0.42-1.50)	0.64	-			
												Poultry (per 50g/day) in women	1.44 (0.81-2.57)	0.31	-			
Unprocessed red meat (per 50g/day) in men	0.90 (0.60-1.34)	0.47	-															
Shi et al.	Red meat consumption, cardiovascular diseases, and diabetes: a systematic review and meta-analysis	2023						Japan	CHD	Meta-analysis of 17 studies (including Japanese)	Processed red meat per 50g/day increment	1.14 (1.06-1.23)	100	↑				
									Saito et al.	2020		Unprocessed red meat per 100g/day increment	1.17 (1.09-1.27)	100	↑			
												Processed red meat per 50g/day increment men	0.21 (0.02-2.20)	0.10	-			
									Nagao et al.	2003	Japan	Processed red meat per 50g/day increment women	0.84 (0.09-7.98)	0.11	-			
												Unprocessed red meat per 100g/day increment men	1.10 (0.66-1.88)	1.93	-			
												Unprocessed red meat per 100g/day increment women	0.81 (0.38-1.69)	0.99	-			
												Processed red meat per 50g/day increment men	0.10 (0.02-0.50)	0.20	↓↓			
												Processed red meat per 50g/day increment women	0.62 (0.07-5.85)	0.11	-			
												Unprocessed red meat per 100g/day increment men	0.45 (0.22-0.92)	1.07	↓↓			
									Unprocessed red meat per 100g/day increment women	1.99 (0.77-5.06)	0.63	-						

全循環器疾患 (CVD total)

■コホート研究

Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of	Participant's race	Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association
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Incidence

Chika Horikawa et al.	Meat intake and incidence of cardiovascular disease in Japanese patients with type 2 diabetes: analysis of the Japan Diabetes Complications Study (JDACS)	2019	1995-2003	1353	Japan Diabetes Complications Study (aged 40-70 years with HbA1c >	CVD incidence (CHD+stroke)	129	Japanese patients with type 2 diabetes	Meat intake	Q1	19	1.00 (reference)	0.06	age, sex, current smoker, physical activity, alcohol intake, body mass index, HbA1c, diabetes duration, diabetic retinopathy, treatment by insulin, oral hypoglycemic agents, antihypertensive agents, lipid-lowering agents, systolic blood	↑ ↑ ↑
									Q2	39	1.73 (0.98-3.06)				
									Q3	33	1.73 (0.95-3.17)				
									Q4	38	2.05 (1.06-0.96)				
									High meat intake ≥20g/day (ref: low intake)	110	1.77 (1.05-3.00)				

Mortality

Hiroyochi Segawa et al.	Association of Red Meat Intake with the Risk of Cardiovascular Mortality in General Japanese Stratified by Kidney Function: NIPPON DATA80	2020	1980-2009	9112	NIPPON DATA80 (aged 30 years or older)	CVD mortality	1117	Japanese	Red meat intake in men	T1	213	1.00 (reference)	0.471	age, body mass index, smoking (current, never, or ex-smoker), drinking (every day, sometimes, never, or ex-drinker), diabetes mellitus, systolic blood pressure, proteinuria, vegetables, fruit, and salt intake.	-
									T2	148	0.90 (0.73-1.11)				
									T3	171	1.08 (0.88-1.33)				
									Red meat intake in women	T1	249	1.00 (reference)	0.915		
									T2	176	0.96 (0.79-1.17)				
									T3	160	1.01 (0.83-1.24)				
									Red meat intake in men with eGFR < 60	T1	52	1.00 (reference)	0.825		
									T2	42	1.00 (0.65-1.52)				
									T3	50	1.05 (0.69-1.60)				
									Red meat intake in women with eGFR < 60	T1	87	1.00 (reference)	0.039		
									T2	58	0.91 (0.64-1.29)				
									T3	44	0.67 (0.46-0.98)				

Nagao et al.	Meat consumption in relation to mortality from cardiovascular disease among Japanese men and women	2012	1988-2008	20466 men and 31217 women	JACC study	Total CVD mortality	2685	Japanese	Total meat intake in men	Q1	300	1.00 (reference)	0.988	age, BMI, ethanol intake, perceived mental stress, walking time, sports participation time, education years, history of hypertension and diabetes, total energy, energy-adjusted food (rice, soy, vegetables and fruits) intakes	-
									Q2	260	0.98 (0.83-1.16)				
									Q3	246	0.94 (0.79-1.12)				
									Q4	233	0.93 (0.78-1.11)				
									Q5	278	1.00 (0.84-1.20)				
									Total meat intake in women	Q1	407	1.00 (reference)	0.351		
									Q2	265	0.91 (0.77-1.06)				
									Q3	233	0.93 (0.79-1.10)				
									Q4	232	0.98 (0.83-1.16)				
									Q5	231	1.07 (0.90-1.28)				

									Total meat intake in men	Q1	1.00 (ref)	0.29	
									Q2	0.87 (0.75-1.00)			

Lee et al.	Meat intake and cause-specific mortality: a pooled analysis of Asian prospective cohort studies	2013	112,310 men and 184,411 women	ACC (including Japan)	CVD death	6373	Asian	Q3	0.91 (0.79-1.04)	0.14	age, BMI, education, smoking habit, rural/urban residence, alcohol intake, fruit and vegetable intake, and total energy intake	-	
								Q4	0.91 (0.78-1.05)				
								Red meat intake in men					
								Q1	1.00 (ref)				
								Q2	0.89 (0.79-0.99)				0.04
								Q3	0.87 (0.79-0.97)				
								Q4	0.87 (0.78-0.98)				
								Poultry in men					
								T1	1.00 (ref)				
								T2	0.82 (0.66-1.02)				
								T3	0.82 (0.64-1.06)				
								Total meat intake in women					
								Q1	1.00 (ref)				
								Q2	0.88 (0.78-0.99)				0.8
Q3	0.88 (0.74-1.04)												
Q4	1.02 (0.89-1.18)												
Red meat intake in women													
Q1	1.00 (ref)												
Q2	0.93 (0.82-1.06)												
Q3	0.86 (0.75-0.99)	0.99											
Q4	1.03 (0.85-1.25)												
Poultry in women													
T1	1.00 (ref)												
T2	0.97 (0.85-1.09)												
T3	1.05 (0.92-1.18)												

■メタ解析、系統的レビュー

Reference			Include study				Design	Category	Relative risk (95% CI or p)	Weight	Magnitude of association		
Author	Title	Year	Ref No.	First author	Year	Study period	Study location	Event (*Definition)					
Wang et al.	Red and processed meat consumption and mortality: dose-response meta-analysis of prospective cohort studies	2015		Nagao et al.	2012		Japan	Cardiovascular mortality	Meta-analysis of 9 prospective studies (including Japanese)	Processed meat intake (the highest v. the lowest)	1.15 (1.07-1.24)		↑
										Unprocessed meat intake (the highest v. the lowest)	1.06 (0.88-1.28)		-
										Total red meat intake (the highest v. the lowest)	1.19 (1.14-1.25)		↑
										each SV/day of processed meat in men	0.11 (0.02-0.49)	0.29	↓
										each SV/day of processed meat in women	0.62 (0.07-5.86)	0.1	↓
										each SV/day of unprocessed meat in men	0.70 (0.47-1.04)	9.24	-
										each SV/day of unprocessed meat in women	1.23 (0.82-1.85)	9.05	-
										each SV/day of total meat in men	1.00 (0.78-1.28)	3.05	-
		each SV/day of total meat in women	1.22 (0.89-1.67)	1.95	-								
Abete et al.	Association between total, processed, red and white meat consumption and all-cause, CVD and IHD mortality: a meta-analysis of cohort studies	2014		Lee et al.	2013		Asia	CVD mortality	Meta-analysis of 13 cohort studies (including Japanese)	Processed meat intake (the highest v. the lowest)	1.18 (1.05-1.32)		↑
										Processed meat intake (per 50g/d increase)	1.24 (1.09-1.40)		↑
										Red meat intake (the highest v. the lowest)	1.16 (1.03-1.32)		↑
										Red meat intake (per 100g/d increase)	1.15 (1.05-1.26)		↑
										Total meat intake (the highest v. the lowest)	1.08 (0.85-1.36)		-
										Total meat intake (per 100g/d increase)	1.12 (0.96-1.29)		-
										White meat intake (the highest v. the lowest)	1.01 (0.96-1.07)		-
										White meat intake (per 100g/d increase)	1.00 (0.87-1.15)		-
		Lee et al.	2013	Asia	CVD mortality	Red meat intake (the highest v. the lowest (>66.5g/d v.<11.5g/d))	0.93 (0.79-1.09)	16.07		-			
		Nagao et al.	2012	Japan	CVD mortality	Processed meat intake (the highest v. the lowest (>11.7v.<1.02g/d))	0.99 (0.86-1.14)	22.07		-			
						Red meat intake (the highest v. the lowest (>49.4 v.<4.9 g/d))	1.03 (0.91-1.17)	18		-			
Bhandari et al.	Long-Term Consumption of 10 Food Groups and Cardiovascular Mortality: A Systematic Review and Dose Response Meta-Analysis of Prospective Cohort Studies	2023					CVD mortality.	Meta-analysis of prospective studies (not including Japanese)	red/processed meat consumption (the highest vs. the lowest)	1.23 (1.09-1.39)		↑	
Shi et al.	Red meat consumption, cardiovascular diseases, and diabetes: a systematic review and meta-analysis	2023		Saito et al.	2020		Japan	CVD mortality	Meta-analysis (including Japanese)	Processed red meat per 50g/day increment	1.26 (1.18-1.35)	100	↑
										Unprocessed red meat per 100g/day increment	1.11 (1.05-1.16)	100	↑
										Processed red meat per 50g/day increment men	1.29 (0.27-6.17)	0.19	-
										Processed red meat per 50g/day increment women	2.12 (0.50-9.04)	0.22	-
										Unprocessed red meat per 100g/day increment men	1.69 (1.17-2.46)	1.64	↑
										Unprocessed red meat per 100g/day increment women	1.06 (0.67-1.66)	1.13	-
		Segawa et al.	2020	Japan	CVD mortality	Unprocessed red meat per 100g/day increment men	1.14 (0.85-1.51)	2.59		-			
						Unprocessed red meat per 100g/day increment women	1.02 (0.72-1.44)	1.86		-			

Stroke, 全脳卒中

■コホート研究

Reference			Study subjects						Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of incident cases or deaths	Participant's race						
Catherine Sauvaget et al.	Intake of animal products and stroke mortality in the Hiroshima/Nagasaki Life Span Study	2003	1980-1996	15350 men and 24999 women	Life Span Study (people exposed and non-exposed to atomic bomb radiation)	Stroke mortality	1462	Japanese	Beef and pork					
									Never	93/1160	1.00 (reference)	0.857	HR stratified by sex and birth cohort, and adjusted for city, radiation dose, self-reported body mass index, smoking status, alcohol habits, education level, history of diabetes, or hypertension.	
									<Once/week	420/8574	0.83 (0.65-1.06)			
									2-4 times/week	630/21482	0.80 (0.63-1.02)			
									Almost daily	81/3237	1.01 (0.73-1.38)			
									Chicken					
									Never	102/2360	1.00 (reference)	0.011		
									<Once/week	511/16061	0.88 (0.70-1.10)			
									2-4 times/week	479/12951	0.99 (0.79-1.25)			
									Almost daily	40/677	1.43 (0.98-2.10)			
Pork products														
Never	284/5287	1.00 (reference)	0.812											
<Once/week	425/14749	0.96 (0.82-1.12)												
2-4 times/week	219/8536	1.03 (0.85-1.24)												
Almost daily	30/1284	0.90 (0.61-1.33)												
Nagao et al.	Meat consumption in relation to mortality from cardiovascular disease among Japanese men and women	2012	1988-2008	20466 men and 31217 women	JACC study	Total stroke mortality	1209	Japanese	Total meat intake in men					
									Q1	130	1.00 (reference)	0.461	age, BMI, ethanol intake, perceived mental stress, walking time, sports participation time, education years, history of hypertension and diabetes, total energy, energy-adjusted food (rice, soy, vegetables and fruits) intakes	
									Q2	105	0.91 (0.70-1.19)			
									Q3	122	1.08 (0.83-1.39)			
									Q4	101	0.92 (0.70-1.20)			
									Q5	131	1.10 (0.84-1.20)			
									Total meat intake in women					
									Q1	185	1.00 (reference)	0.357		
									Q2	138	1.02 (0.82-1.28)			
									Q3	100	0.88 (0.68-1.13)			
Q4	103	0.92 (0.72-1.19)												
Q5	94	0.91 (0.70-1.19)												

■メタ解析、系統的レビュー

Reference			Include study				Design	Category	Relative risk (95% CI or p)	Weight	Magnitude of association				
Author	Title	Year	Ref.No.	First author	Year	Study period						Study location	Event (*Definition)		
Kim et al.	Role of Total, Red, Processed, and White Meat Consumption in Stroke Incidence and Mortality: A Systematic Review and Meta-Analysis of Prospective Cohort Studies	2017					Overall	Stroke incidence	Meta-analysis of 7 cohort studies (Incidence: NOT including Japanese)	Total meat highest vs lowest	1.18 (1.09-1.28)	100	↑		
										Red meat highest vs lowest	1.11 (1.03-1.20)	100	↑		
										Processed meat	1.17 (1.08-1.25)	100	↑		
										White meat	0.87 (0.78-0.96)	100	-		
										stroke mortality	Meta-analysis of 8 cohort studies (Mortality: including Japanese)	Total meat highest vs lowest	0.97 (0.85-1.11)	100	-
												Red meat highest vs lowest	0.87 (0.64-1.18)	100	-
Yang et al.	Red meat Consumption and the Risk of Stroke: A dose-response Meta-analysis of Prospective Cohort Studies	2016					Overall	Stroke incident and mortality	Meta-analysis of 7 cohort studies (including Japanese)	Total red meat	1.14 (1.05-1.24)	100	↑		
										Processed meat	1.17 (1.09-1.27)	100	↑		
										Fresh red meat	1.10 (1.02-1.19)	100	↑		
								Sauvaget et al.	2003	Japan	stroke mortality	Prospective cohort study	Total red meat	0.95 (0.75-1.23)	10.58
					Processed meat	0.90 (0.61-1.33)	3.83	-							
					Fresh red meat	1.01 (0.73-1.38)	6.12	-							
Kaluza et al.	Red meat Consumption and the Risk of Stroke: A Meta-analysis of Prospective Studies	2012					Overall	Stroke incident and mortality	Meta-analysis of 6 prospective studies (including Japanese)	Fresh red meat 1 sv/d increase (100-120g)	1.11 (1.03-1.20)	100	↑		
										Processed meat 1 sv/d increase (50g)	1.13 (1.03-1.24)	100	↑		
										Total red meat 1 sv/d increase (100-120g)	1.11 (1.06-1.16)	100	↑		
								Sauvaget et al.	2003	Japan	stroke mortality	Prospective cohort study	Fresh red meat 1 sv/d increase (100-120g)	1.11 (0.89-1.39)	-
					Processed meat 1 sv/d increase (50g)	1.06 (0.78-1.44)	-								
Shi et al.	Red meat consumption, cardiovascular diseases, and diabetes: a systematic review and meta-analysis	2023					Overall	Incident and mortality	Meta-analysis of 16 studies (including Japanese)	Processed red meat per 50g/day increment	1.16 (1.04-1.29)	100	↑		
										Unprocessed red meat per 100g/day increment	1.08 (0.99-1.18)	100	-		
								stroke mortality		Unprocessed red meat per 100g/day increment	1.11 (0.89-1.38)	6.57	-		
Chen et al.	Red and processed meat consumption and risk of stroke: a meta-analysis of prospective cohort studeis	2013					Overall	Stroke incident and mortality	Meta-analysis of 5 prospective studies (including Japanese)	Total meat highest vs lowest	1.15 (1.05-1.25)	100	↑		
										Red meat highest vs lowest	1.09 (0.01-1.18)	100	↑		
										Processed meat highest vs lowest	1.14 (1.05-1.25)	100	↑		
										Total meat per 100g increment	1.10 (1.05-1.15)	100	↑		
										Red meat per 100g increment	1.13 (1.03-1.23)	100	↑		
										Processed meat per 50g increment	1.11 (1.02-1.20)	100	↑		
				Sauvaget et al.	2003	Japan	stroke mortality			Red meat highest vs lowest	1.01 (0.73-1.39)	6.21	-		
										Processed meat highest vs lowest	0.90 (0.61-1.33)	5.03	-		

Gidyenne Christine Bandeira	Associations of the consumption of unprocessed red meat and processed meat with the incidence of cardiovascular disease and	2023		Overall	Stroke incidence	Meta-analysis of 3 cohort studies (not including Japanese)	Unprocessed red meat: highest vs lowest category Processed meat: highest vs lowest category	1.10 (1.01-1.19) 1.17 (1.08-1.26)	100 100	↑ ↑
renata Michalek et al	Red and Processed Meat Consumption and Risk of Incident Coronary Heart Disease, Stroke, and Diabetes Mellitus A Systematic Review and Meta-Analysis	2010	Sauvaget et al. 2003	Overall	Stroke incident and mortality	Meta-analysis of 9 cohort studies and case-control studies (including Japanese)	Consumption of red meat: per 100g per day Consumption of processed meat: per 50g per day Consumption of total meat: per 100g per day	1.17 (0.40-3.43) 1.14 (0.94-1.39) 1.24 (1.08-1.43)	100 100 100	- - ↑
Angela Bechthold et al	Food groups and risk of coronary heart disease, stroke and heart failure: A systematic review and dose-response meta-analysis of prospective studies	2019		Overall	Stroke incident and mortality	Meta-analysis of 7 prospective studies (not including Japanese)	Consumption of red meat: highest vs lowest Consumption of red meat: per 100g per day Consumption of processed meat: highest vs lowest Consumption of processed meat: per 50g per day	1.16 (1.08-1.25) 1.12 (1.06-1.17) 1.16 (1.07-1.25) 1.17 (1.02-1.34)	100 100 100 100	↑ ↑ ↑ ↑
Dena Zeraatkar et al	Red and Processed Meat Consumption and Risk for All-Cause Mortality and Cardiometabolic Outcomes A Systematic Review and Meta-analysis of Cohort Studies	2019		Overall	stroke incident and mortality (Stroke (fatal and nonfatal)) Stroke mortality (Fatal stroke)	meta-analysis of 6 cohort studies (including Japanese) meta-analysis of 8 cohort studies (including Japanese)	Unprocessed red meat intake (reduction of 3sv (1sv=120g) per week) Processed meat intake (reduction of 3sv per week) Unprocessed red meat intake (reduction of 3sv (1sv=50g) per week) Processed meat intake (reduction of 3sv per week)	0.94 (0.90-0.98) 0.94 (0.90-0.98) 0.94 (0.89-0.99) 0.95 (0.92-0.98)	100 100 100 100	↑ ↑ ↑ ↑

Hemorrhagic stroke (出血性脳卒中), Intracerebral Hemorrhage 脳出血

■コホート研究

Reference			Study subjects						Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association			
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of incident cases or deaths	Participant's race									
Saito et al.	Association between meat intake and mortality due to all-cause and major causes of death in a Japanese population	2020	1995-2011	87507	JPHC study	Intracerebral Hemorrhage (I61)	deaths due to Intracerebral Hemorrhage (I61)	Japanese	All meat intake in men			0.742	age (years, continuous); public health center area; smoking status (never, former, current), alcohol intake (none, >0-<150 g/w, 150-<300 g/w, 300+g/w), BMI (<25, 25 - <27, 27-<30, 30+), quartile of metabolic equivalent task-hours/d, history of hypertension, history of diabetes, total energy intake, intakes of fruits, vegetables, fish, dairy products, egg, sodium and total fat (continuous). For red meat, additionally adjusted for chicken. For chicken, additionally adjusted for red meat.	-			
									Q1	51	1.00 (reference)						
									Q2	39	0.96 (0.61-1.51)						
									Q3	37	0.98 (0.60-1.61)						
									Q4	54	1.43 (0.78-2.65)						
									Red meat intake in men						0.251		
									Q1	51	1.00 (reference)						
									Q2	36	0.85 (0.53-1.35)						
									Q3	42	1.09 (0.67-1.78)						
									Q4	52	1.38 (0.74-2.59)						
									Processed meat intake in men							0.609	
									Q1	57	1.00 (reference)						
									Q2	46	0.80 (0.63-1.02)						
									Q3	43	0.86 (0.67-1.09)						
									Q4	35	0.85 (0.64-1.13)						
									Chicken intake in men								0.907
									Q1	47	1.00 (reference)						
									Q2	47	0.91 (0.71-1.16)						
									Q3	50	1.05 (0.82-1.34)						
									Q4	37	1.01 (0.77-1.31)						
All meat intake in women			0.408														
Q1	41	1.00 (reference)															
Q2	19	0.53 (0.29-0.98)															
Q3	23	0.73 (0.40-1.35)															
Q4	28	0.87 (0.40-1.86)															
Red meat intake in women				-													
Q1	37	1.00 (reference)															
Q2	27	1.03 (0.59-1.79)															
Q3	19	0.76 (0.39-1.49)															
Q4	28	1.12 (0.50-2.48)															
Processed meat intake in women					-												
Q1	37	1.00 (reference)															
Q2	23	1.07 (0.61-1.90)															
Q3	26	1.30 (0.73-2.33)															
Q4	25	1.24 (0.65-2.35)															
Chicken intake in women						-											
Q1	35	1.00 (reference)															

Q2	28	0.91 (0.53-1.57)	0.307
Q3	21	0.74 (0.41-1.33)	
Q4	27	0.77 (0.42-1.41)	

■メタ解析、系統的レビュー

Reference			Include study				Design		Category	Relative risk (95% CI or p)	Weight	Magnitude of association	
Author	Title	Year	Ref No.	First author	Year	Study period	Study location	Event (*Definition)					
Yang et al.	Red meat Consumption and the Risk of Stroke: A dose-response Meta-analysis of Prospective Cohort Studies	2016	Overall					Hemorrhagic stroke incident and mortality	Meta-analysis of 4 cohort studies (NOT including Japanese)	Total red meat	1.18 (0.93-1.50)	100	-
										Processed meat	1.17 (0.94-1.45)	100	-
										Fresh red meat	0.88 (0.73-1.06)	100	-
Kaluza et al.	Red meat Consumption and the Risk of Stroke: A Meta-analysis of Prospective Studies	2012	Overall					Hemorrhagic stroke (I60 and I61) incident and mortality	Meta-analysis of 6 cohort studies (NOT including Japanese)	Fresh red meat 1 sv/d increase (100-120g)	1.08 (0.84-1.39)	100	-
										Processed meat 1 sv/d increase (50g)	1.16 (0.92-1.46)	100	-
										Total red meat 1 sv/d increase (100-120g)	1.13 (0.94-1.35)	100	-
Shi et al.	Red meat consumption, cardiovascular diseases, and diabetes: a systematic review and meta-analysis	2023	Overall					Hemorrhagic stroke (I60 and I61)	Meta-analysis of 4 studies (NOT including Japanese)	Processed red meat per 50g/day increment	1.15 (0.75-1.77)	100	-
Chen et al.	Red and processed meat consumption and risk of stroke: a meta-analysis of prospective cohort studies	2013	Overall					Hemorrhagic stroke incident	Meta-analysis of 4 prospective studies (Not including Japanese)	Unprocessed red meat per 100g/day increment	0.83 (0.61-1.14)	100	-
										Total meat highest vs lowest	1.16 (0.81-1.66)	100	-
										Red meat highest vs lowest	0.99 (0.77-1.28)	100	-
Gidyenne Christine Bandeira Silva de Medeiros et	Associations of the consumption of unprocessed red meat and processed meat with the incidence of cardiovascular disease and mortality, and the dose-response relationship: a systematic review and meta-analysis of cohort	2023	Overall				Japan	Hemorrhagic stroke mortality deaths due to Intracerebral Hemorrhage (I61)	Meta-analysis of 2 cohort studies (including Japanese)	Unprocessed red meat: highest vs lowest category	0.75 (0.57-0.99)	100	↓
											M: 1.07 (0.65-1.76)	25.7	-
										Saito et al (2020)	2020	Prospective cohort study	F: 0.82 (0.43-1.56)

Ischemic stroke (虚血性脳卒中)

■メタ解析、系統的レビュー

Reference			Include study				Design		Category	Relative risk (95% CI or p)	Weight	Magnitude of association	
Author	Title	Year	Ref No.	First author	Year	Study period	Study location	Event (*Definition)					
Yang et al.	Red meat Consumption and the Risk of Stroke: A dose-response Meta-analysis of Prospective Cohort Studies	2016	Overall					Ischemic stroke incident and mortality	Meta-analysis of 4 cohort studies (NOT including Japanese)	Total red meat	1.22 (1.01-1.46)	100	↑
										Processed meat	1.15 (0.98-1.36)	100	-
										Fresh red meat	1.15 (1.03-1.29)	100	↑
Kaluza et al.	Red meat Consumption and the Risk of Stroke: A Meta-analysis of Prospective Studies	2012	Overall					Ischemic stroke incident and mortality	Meta-analysis of 6 cohort studies (NOT including Japanese)	Fresh red meat 1 sv/d increase (100-120g)	1.13 (1.00-1.27)	100	↑
										Processed meat 1 sv/d increase (50g)	1.15 (1.06-1.24)	100	↑
										Total red meat 1 sv/d increase (100-120g)	1.12 (1.05-1.19)	100	↑
Shi et al.	Red meat consumption, cardiovascular diseases, and diabetes: a systematic review and meta-analysis	2023	Overall					Ischemic stroke incident and mortality	Meta-analysis of 4 studies (NOT including Japanese)	Processed red meat per 50g/day increment	1.42 (1.09-1.85)	100	↑
Chen et al.	Red and processed meat consumption and risk of stroke: a meta-analysis of prospective cohort studies	2013	Overall					Ischemic stroke incident	Meta-analysis of 4 prospective studies (Not including Japanese)	Total meat highest vs lowest	1.15 (1.04-1.28)	100	↑
										Red meat highest vs lowest	1.13 (1.01-1.25)	100	↑
										Processed meat highest vs lowest	1.19 (1.08-1.31)	100	↑
Gidyenne Christine Bandeira	Associations of the consumption of unprocessed red meat and processed meat with the incidence of cardiovascular disease and	2023	Overall					Ischemic stroke incidence	Meta-analysis of 3 cohort studies (not including Japanese)	Unprocessed red meat: highest vs lowest category	1.04 (0.94-1.17)	100	-
										Processed red meat: highest vs lowest category	1.05 (0.79-1.39)	100	-

Mortality (Ischemic heart disease 虚血性心疾患)

■コホート研究

Reference			Study subjects						Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association
Author	Title	Year	Study period	Number of subjects	Source of subjects	Event followed	Number of incident cases or deaths	Participant's race						
								Men	All meat intake in men					
									Q1	109	1.00 (reference)			
									Q2	79	0.80 (0.59-1.10)	0.897		-
									Q3	80	0.84 (0.60-1.18)			
									Q4	99	1.10 (0.72-1.69)			
									Red meat intake in men					
									Q1	114	1.00 (reference)			
									Q2	76	0.75 (0.55-1.03)	0.779		-
									Q3	73	0.74 (0.52-1.04)			
									Q4	104	1.05 (0.68-1.60)			
									Processed meat intake in men					
									Q1	116	1.00 (reference)			
									Q2	92	1.07 (0.80-1.43)	0.219		-
									Q3	80	0.88 (0.64-1.21)			
									Q4	79	0.84 (0.59-1.18)			
									Chicken intake in men					
									Q1	104	1.00 (reference)			-

age (years, continuous); public health center area; smoking status (never, former, current), alcohol intake (none, >0-<150 g/w, 150-<300 g/w, >300 g/w)

Author	Study Title	Year	Period	n	Study	Outcome	Gender	Ethnicity	Q1	Q2	Q3	Q4	Q5	HR	95% CI	Significance	Adjustment
Eiko Saito et al.	Association between meat intake and mortality due to all-cause and major causes of death in a Japanese population	2020	1995-2011	87507	JPHC study	deaths due to ischemic heart disease (I20-I25)	Women	Japanese	Q2	81	0.97 (0.71-1.31)	0.643			300+g/w), BMI (<25, 25 - <27, 27- <30, 30+), quartile of metabolic equivalent task-hours/d, history of hypertension, history of diabetes, total energy intake, intakes of fruits, vegetables, fish, dairy products, egg, sodium and total fat (continuous). For red meat, additionally adjusted for chicken. For chicken, additionally adjusted for red meat.		
									Q3	83	0.97 (0.71-1.33)						
									Q4	99	1.09 (0.79-1.50)						
									All meat intake in women								
									Q1	50	1.00 (reference)	0.709					
									Q2	43	0.94 (0.61-1.46)						
									Q3	39	0.84 (0.54-1.38)						
									Q4	50	0.94 (0.53-1.65)						
									Red meat intake in women								
									Q1	50	1.00 (reference)	0.632					
									Q2	41	0.89 (0.57-1.40)						
									Q3	46	1.02 (0.64-1.63)						
									Q4	45	0.80 (0.44-1.44)						
									Processed meat intake in women								
									Q1	61	1.00 (reference)	0.68					
									Q2	42	0.85 (0.55-1.30)						
									Q3	35	0.76 (0.48-1.21)						
									Q4	44	0.95 (0.61-1.49)						
									Chicken intake in women								
									Q1	54	1.00 (reference)	0.768					
Q2	45	0.97 (0.63-1.48)															
Q3	31	0.70 (0.44-1.12)															
Q4	52	1.02 (0.66-1.58)															
Masanori Nagao et al.	Meat consumption in relation to mortality from cardiovascular disease among Japanese men and women	2012	1988-2008	20466 men and 31217 women	JACC study	Death from Ischemic heart disease	Men	Japanese	Total meat intake in men						age, BMI, ethanol intake, perceived mental stress, walking time, sports participation time, education years, history of hypertension and diabetes, total energy, energy-adjusted food (rice, soy, vegetables and fruits) intakes		
									Q1	74	1.00 (reference)	0.015					
									Q2	65	0.97 (0.69-1.36)						
									Q3	63	0.92 (0.65-1.30)						
									Q4	49	0.73 (0.50-1.06)						
									Q5	50	0.66 (0.45-0.97)						
									Red meat intake in men								
									Q1	69	1.00 (reference)	0.038					
									Q2	74	1.19 (0.85-1.65)						
									Q3	53	0.88 (0.61-1.27)						
									Q4	59	1.00 (0.70-1.44)						
									Q5	46	0.7 (0.47-1.04)						
									Poultry intake in men								
									Q1	69	1.00 (reference)	0.405					
									Q2	74	0.85 (0.58-1.25)						
									Q3	53	0.93 (0.63-1.37)						
									Q4	59	0.63 (0.41-0.96)						
									Q5	46	0.86 (0.60-1.23)						
									Liver intake in men								
									Q1	69	1.00 (reference)	0.838					
Q2	74	0.95 (0.61-1.48)															
Q3	53	1.02 (0.69-1.51)															
Q4	59	0.72 (0.46-1.15)															
Q5	46	0.95 (0.63-1.42)															
Processed meat intake in men																	
Q1	69	1.00 (reference)	0.002														
Q2	74	1.01 (0.66-1.54)															
Q3	53	0.87 (0.55-1.37)															
Q4	59	0.80 (0.53-1.21)															
Q5	46	0.56 (0.36-0.88)															
Total meat intake in women																	
Q1	73	1.00 (reference)	0.397														
Q2	44	0.89 (0.60-1.30)															
Q3	39	0.93 (0.62-1.40)															
Q4	35	0.89 (0.58-1.35)															
Q5	45	1.22 (0.81-1.83)															
Red meat intake in women																	
Q1	77	1.00 (reference)	0.317														
Q2	47	0.96 (0.66-1.40)															
Q3	30	1.24 (0.46-1.10)															
Q4	38	1.12 (0.72-1.74)															
Q5	44	1.06 (0.69-1.62)															
Poultry intake in women																	
Q1	77	1.00 (reference)	0.888														
Q2	47	1.09 (0.72-1.66)															
Q3	30	1.24 (0.78-1.98)															
Q4	38	1.12 (0.72-1.74)															
Q5	44	1.06 (0.69-1.62)															
Processed meat intake in women																	

Q1	77	1.00 (reference)	
Q2	47	1.12 (0.68-1.84)	
Q3	30	1.04 (0.61-1.84)	0.631
Q4	38	0.92 (0.56-1.50)	
Q5	44	0.98 (0.59-1.62)	
Liver intake in women			
Q1	77	1.00 (reference)	
Q2	47	0.91 (0.50-1.67)	
Q3	30	0.66 (0.37-1.19)	0.166
Q4	38	0.88 (0.51-1.51)	
Q5	44	1.01 (0.60-1.68)	

■メタ解析、系統的レビュー

Reference			Include study						Design	Category	Relative risk (95% CI or p)	Weight	Magnitude of association	
Author	Title	Year	Ref No.	First author	Year	Study period	Study location	Event (*Definition)						
Abete et al.	Association between total, processed, red and white meat consumption and all-cause, CVD and IHD mortality: a meta-analysis of cohort studies	2014	Overall						IHD mortality	Meta-analysis of 13 cohort studies (including Japanese)	Total meat (the highest v. the lowest category)	1.52 (0.68-3.40)		-
			Total meat (per 100g/d increase)	1.38 (0.39-4.87)		-								
			Processed meat (the highest vs the lowest category)	1.52 (0.50-4.66)		-								
			Processed meat (per 50g/per day increase)	1.14 (0.22-6.02)		-								
			Red meat (the highest v. the lowest category)	1.02 (0.72-1.46)		-								
			Red meat (per 100g/d increase)	0.86 (0.46-1.62)		-								
			White meat (the highest v. the lowest)	1.00 (0.82-1.21)		-								
			White meat (per 100g/d increase)	1.10 (0.63-1.89)		-								
			Nagao et al.	2012	Japan	IHD mortality	Processed meat (the highest vs the lowest category(>=11.7 v. <1.02g/d))	0.72 (0.51-1.00)			40.22%	-		
			Red meat (the highest v. the lowest category (>49.9 v. <4.9g/d))	0.92 (0.69-1.23)	30.20%	-								
Papier et al.	Meat consumption and risk of ischemic heart disease: A systematic review and meta-analysis	2023	Overall						IHD (incidence and/or death)	Meta-analysis of 13 prospective studies (including Japanese)	Unprocessed red meat (per 50g/day)	1.09 (1.06-1.12)		↑
			Processed meat (per 50g/day)	1.18 (1.12-1.25)		↑								
			Poultry (per 50g/day)	1.02 (0.97-1.07)		-								
			Subgroup analyses of Asian region											
			Unprocessed red meat (per 50g/day)	1.09 (0.96-1.24)		-								
			Processed meat (per 50g/day)	0.33 (0.14-0.80)		↓↓↓								
			Poultry (per 50g/day)	1.09 (0.82-1.45)		-								
			Nagao et al.	2012	Japan	IHD, fatal	Unprocessed red meat (per 50g/day) in men	0.67 (0.47-0.96)			0.59	↓		
			Unprocessed red meat (per 50g/day) in women	1.40 (0.87-2.25)	0.34	-								
			Processed meat (per 50g/day) in men	0.10 (0.02-0.49)	0.13	↓↓↓								
Processed meat (per 50g/day) in women	0.62 (0.07-5.83)	0.06	↓											
Poultry (per 50g/day) in men	0.79 (0.42-1.50)	0.64	-											
Poultry (per 50g/day) in women	1.44 (0.81-2.57)	0.31	-											
Saito et al.	2021	Japan	IHD, fatal	Unprocessed red meat (per 50g/day) in men	0.90 (0.60-1.34)	0.47	-							
Unprocessed red meat (per 50g/day) in women	1.10 (0.46-2.62)	0.1	-											
Processed meat (per 50g/day) in men	0.28 (0.04-1.83)	0.09	↓↓											
Processed meat (per 50g/day) in women	0.97 (0.19-5.06)	0.12	-											
Poultry (per 50g/day) in men	1.39 (0.49-3.96)	0.24	-											
Poultry (per 50g/day) in women	1.00 (0.29-3.49)	0.17	-											
Shi et al.	Red meat consumption, cardiovascular diseases, and diabetes: a systematic review and meta-analysis	2023	Overall						CHD incident and mortality	Meta-analysis of 17 studies (including Japanese)	Processed red meat per 50g/day increment	1.14 (1.06-1.23)	100	↑
			Unprocessed red meat per 100g/day increment	1.17 (1.09-1.27)	100	↑								
			Processed red meat per 50g/day increment men	0.21 (0.02-2.20)	0.10	-								
			Processed red meat per 50g/day increment women	0.84 (0.09-7.98)	0.11	-								
			Unprocessed red meat per 100g/day increment men	1.10 (0.66-1.88)	1.93	-								
			Unprocessed red meat per 100g/day increment women	0.81 (0.38-1.69)	0.99	-								
			Processed red meat per 50g/day increment men	0.10 (0.02-0.50)	0.20	↓↓								
			Processed red meat per 50g/day increment women	0.62 (0.07-5.85)	0.11	-								
			Nagao et al.	2012	Japan	Unprocessed red meat per 100g/day increment men	0.45 (0.22-0.92)	1.07			↓↓			
			Unprocessed red meat per 100g/day increment women	1.99 (0.77-5.06)	0.63	-								
Gidyenne Christine Bandeira Silva de Medeiros et al.	Associations of the consumption of unprocessed red meat and processed meat with the incidence of cardiovascular disease and mortality, and the dose-response relationship: a systematic review and meta-analysis of cohort studies	2023	Overall						CHD mortality	Meta-analysis of 3 cohort studies (including Japanese)	Unprocessed red meat: highest vs lowest category	1.20 (0.94-1.52)	100	-
			Nagao et al.	2012	Japan	M: 0.70 (0.47-1.04)	17.9	-						
			F: 1.23 (0.82-1.85)	17.6	-									
			Overall								Meta-analysis of 3 cohort studies (including Japanese)	0.92 (0.67-1.26)	100	-
Nagao et al.	2012	Japan	Processed red meat: highest vs lowest category	M: 0.56 (0.36-0.87)	18.1	-								
F: 0.98 (0.59-1.63)	16.3	-												

			Nagao et al.	2012	Japan					M: 0.84 (0.59-1.20) F: 0.95 (0.61-1.48)	20.9 18.1	-
renata Michal	Red and Processed Meat Consumption and Risk of Incident Coronary Heart Disease, Stroke, and Diabetes Mellitus A Systematic Review and Meta-Analysis	2010			Overall	CHD incident and mortality	Meta-analysis of 9 cohort studies and case-control studies (including Japanese)	Consumption of red meat: per 100g per day Consumption of processed meat: per 50g per day	1.00 (0.81-1.23) 1.42 (1.07-1.89)	100 100	- ↑	
Angela Bechthold et al	Food groups and risk of coronary heart disease, stroke and heart failure: A systematic review and dose-response meta-analysis of prospective studies	2019			Overall	CHD incident and mortality	Meta-analysis of 3 prospective studies (not including Japanese)	Consumption of total meat: per 100g per day Consumption of red meat: highest vs lowest Consumption of red meat: per 100g per day Consumption of processed meat: highest vs lowest Consumption of processed meat: per 50g per day	1.27 (0.94-1.72) 1.16 (1.08-1.24) 1.15 (1.08-1.23) 1.15 (0.99-1.33) 1.27 (1.09-1.49)	100 100 100 100	- ↑ ↑ - ↑	

Mortality (Heart failure 心不全)

■メタ解析、系統的レビュー

Reference			Include study							Design	Category	Relative risk (95% CI or p)	Weight	Magnitude of association
Author	Title	Year	Ref No.	First author	Year	Study period	Study location	Event (*Definition)						
Shi et al.	Red meat consumption, cardiovascular diseases, and diabetes: a systematic review and	2023					Overall	Heart failure incident and	Meta-analysis of 5 studies (Not including Japanese)	Processed red meat per 50g/day increment Unprocessed red meat per 100g/day increment	1.16 (1.08-1.25) 1.09 (0.96-1.24)	100 100	↑ -	
Cui et al.	Association between intake of red and processed meat and the risk of heart failure: a	2019					Overall	Heart failure incident and	Meta-analysis of 6 studies (Not including Japanese)	processed meat (lowest vs highest) red meat (lowest vs highest)	1.23 (1.07-1.41) 1.04 (0.96-1.12)	100 100	↑ -	
Angela Bechthold et al	Food groups and risk of coronary heart disease, stroke and heart failure: A systematic review and dose-response meta-analysis of prospective studies	2019					Overall	Heart failure incident and mortality	Meta-analysis of 5 prospective studies (not including Japanese)	Consumption of red meat: highest vs lowest Consumption of red meat: per 100g per day Consumption of processed meat: highest vs lowest Consumption of processed meat: per 50g per day	1.12 (1.04-1.21) 1.08 (1.02-1.14) 1.27 (1.14-1.41) 1.12 (1.05-1.19)	100 100 100 100	↑ ↑ - ↑	