

評価対象論文リスト(要因:大豆製品、アウトカム:循環器病)

評価判定日:2024/10/28

①既存の系統的レビュー・メタ解析・統合解析

1	Naghshi S, Tutunchi H, Yousefi M, et al. Soy isoflavone intake and risk of cardiovascular disease in adults: A systematic review and dose-response meta-analysis of prospective cohort studies. <i>Crit Rev Food Sci Nutr.</i> 2024;64(18):6087-6101. doi:10.1080/10408398.2022.2163372
2	Yan Z, Zhang X, Li C, Jiao S, Dong W. Association between consumption of soy and risk of cardiovascular disease: A meta-analysis of observational studies. <i>Eur J Prev Cardiol.</i> 2017;24(7):735-747. doi:10.1177/2047487316686441

②日本人集団の個別疫学研究

3	Nozue M, Shimazu T, Charvat H, et al. Fermented soy products intake and risk of cardiovascular disease and total cancer incidence: The Japan Public Health Center-based Prospective study. <i>Eur J Clin Nutr.</i> 2021;75(6):954-968. doi:10.1038/s41430-020-00732-1
4	Kokubo Y, Iso H, Ishihara J, et al. Association of dietary intake of soy, beans, and isoflavones with risk of cerebral and myocardial infarctions in Japanese populations: the Japan Public Health Center-based (JPHC) study cohort I. <i>Circulation.</i> 2007;116(22):2553-2562. doi:10.1161/CIRCULATIONAHA.106.683755
5	Nguyen HN, Miyagawa N, Miura K, et al. Dietary tofu intake and long-term risk of death from stroke in a general population. <i>Clin Nutr.</i> 2018;37(1):182-188. doi:10.1016/j.clnu.2016.11.021
6	Katagiri R, Sawada N, Goto A, et al. Association of soy and fermented soy product intake with total and cause specific mortality: prospective cohort study. <i>BMJ.</i> 2020;368:m34. Published 2020 Jan 29. doi:10.1136/bmj.m34
7	Nagata C, Wada K, Tamura T, et al. Dietary soy and natto intake and cardiovascular disease mortality in Japanese adults: the Takayama study. <i>Am J Clin Nutr.</i> 2017;105(2):426-431. doi:10.3945/ajcn.116.137281

■メタ解析、系統的レビュー

Author	Title	Year	Include study				Design	Category	Relative risk (95% CI or p)	Weight	Magnitude of association
			Ref No.	First author	Year	Study period					
Naghshi S et al	Soy isoflavone intake and risk of cardiovascular disease in adults: A systematic review and dose-response meta-analysis of prospective cohort studies	2024	(Abstractより抜粋) ●In total, 13 publications were included in the systematic review and 12 in the meta-analysis. ●We found that a high intake of soy isoflavones was significantly associated with a lower risk of coronary heart disease (CHD) among whole populations (Pooled RR: 0.92, 95% CI: 0.85–0.99, I2 = 41.0%, Pheterogeneity = 0.10) and a lower risk of overall CVD (Pooled RR: 0.91, 95% CI: 0.84–0.98, I2 = 30.7%, Pheterogeneity = 0.19) and CHD (Pooled RR: 0.89, 95% CI: 0.83–0.96, I2 = 14.4%, Pheterogeneity = 0.32) among Western population. ●In the linear dose-response analysis, a 3 mg/day increase in soy isoflavone intake was associated with 16% and 14% lower risks of overall CVD and CHD, respectively, among Western population.								
Yan Z et al	Association between consumption of soy and risk of cardiovascular disease: A meta-analysis of observational studies	2017	9	Sasazuki (M)	2001	Japan	CHD	Case-control	consumption of soy foods according to the highest vs lowest	0.90 (0.60, 1.30)	3.26
			9	Sasazuki (W)	2001	Japan	CHD		0.50 (0.30, 0.90)	2.33	
			10	Fang	2006	USA	Stroke		0.72 (0.34, 1.04)	2.28	
			11	Ho (M)	2006	China	CHD		0.61 (0.42, 0.88)	3.37	
			11	Ho (M)	2006	China	Stroke		0.92 (0.63, 1.33)	3.35	
			11	Ho (W)	2006	China	CHD		0.60 (0.42, 0.87)	3.41	
			11	Ho (W)	2006	China	Stroke		0.60 (0.42, 0.87)	3.41	
			12	Okamoto	2006	Japan	Stroke		0.46 (0.18, 0.88)	1.44	
			15	Tavani	2006	Italy	CHD		0.90 (0.59, 1.38)	3.01	
			13	Liang	2009	China	Stroke		0.23 (0.14, 0.39)	2.51	
			14	Guo	2013	China	CHD		0.66 (0.51, 0.86)	4.15	
							Subtotal		0.63 (0.51, 0.77)	32.52	
			20	Nagata (M)	2002	Japan	Stroke		0.84 (0.55, 1.29)	3.00	
			20	Nagata (M)	2002	Japan	CHD		0.71 (0.39, 1.29)	2.10	
			20	Nagata (W)	2002	Japan	CHD	0.86 (0.42, 1.78)	1.65		
			20	Nagata (W)	2002	Japan	Stroke	0.85 (0.56, 1.30)	3.04		
			16	Zhang (W)	2003	China	CHD	0.25 (0.10, 0.63)	1.15		
			17	Van der Schouw (W)	2005	Netherland	CHD	0.94 (0.68, 1.30)	3.69		
			17	Van der Schouw (W)	2005	Netherland	Stroke	1.05 (0.64, 1.70)	2.64		
			18	Kokubo (M)	2007	Japan	CHD	1.23 (0.72, 2.07)	2.43		
			18	Kokubo (M)	2007	Japan	Stroke	0.95 (0.72, 1.26)	4.01		
			18	Kokubo (W)	2007	Japan	CHD	0.55 (0.26, 1.09)	1.66		
			18	Kokubo (W)	2007	Japan	Stroke	0.64 (0.43, 0.95)	3.20		
			23	Mink	2007	Norway	CHD	1.00 (0.83, 1.19)	4.71		
			23	Mink	2007	Norway	Stroke	1.23 (0.89, 1.69)	3.72		
			21	McCullough	2012	USA	CHD	0.88 (0.73, 1.07)	4.64		
			21	McCullough	2012	USA	Stroke	1.00 (0.78, 1.28)	4.25		
			19	Talaei	2014	Singapore	CHD	1.04 (0.92, 1.18)	5.04		
			19	Talaei	2014	Singapore	Stroke	1.00 (0.83, 1.20)	4.69		
			8	Yu (M)	2014	China	CHD	1.43 (0.98, 2.10)	3.30		
			24	Yamasaki (W)	2015	Japan	CVD	0.62 (0.27, 1.42)	1.35		
			24	Yamasaki (M)	2015	Japan	CVD	1.39 (0.78, 2.41)	2.26		
			8	Yu (W)	2015	China	Stroke	1.24 (1.08, 1.42)	4.97		
							Subtotal	0.98 (0.89, 1.08)	67.48		
							Subtotal	0.83 (0.75, 0.93)	100.00 ↓		

■コホート研究（コホートのプール解析含む）

Author	Title	Year	Study subjects					Category	Number among cases	Relative risk (95%CI or p)	P for trend	Confounding variables considered	Magnitude of association
			Study period	Number of subjects	Source of subjects	Event followed	Number of incident cases or deaths						
M Nozue et al	Fermented soy products intake and risk of cardiovascular disease and total cancer incidence: The Japan Public Health Center-based Prospective study	2021	1995-2012	79648	Japan Public Health Center-based Prospective study (JPHC Study)	Cardiovascular disease incidence	1,971	Japanese	Quartile of fermented soy productsa intake				
									Total soy products				
									Lowest	418	1.00 (Reference)		
									Second	432	0.91 (0.78, 1.06)	0.273	
									Third	425	0.87 (0.75, 1.02)		
									Highest	516	0.92 (0.78, 1.07)		-
									Nonfermented soy products				
									Lowest	434	1.00 (Reference)		
									Second	410	0.87 (0.75, 1.02)	0.458	
									Third	443	0.87 (0.75, 1.02)		
									Highest	504	0.94 (0.80, 1.09)		-
									Fermented soy products				
									Lowest	450	1.00 (Reference)		
									Second	439	0.91 (0.78, 1.06)	0.01	age, public health center area, smoking status, alcohol intake, body mass index, metabolic
									Third	441	0.86 (0.73, 1.01)		equivalent task hours, total energy intake, vegetable intake, fruit intake, fish intake, green tea intake, coffee intake, menopausal status
									Highest	461	0.80 (0.68, 0.95)		↓
									Miso				
									Lowest	441	1.00 (Reference)		
									Second	415	0.92 (0.79, 1.07)	0.05	
									Third	429	0.83 (0.71, 0.97)		
									Highest	506	0.87 (0.74, 1.02)		-
									Natto				
									Lowest	531	1.00 (Reference)		
									Second	423	0.95 (0.82, 1.12)	0.034	
									Third	407	0.87 (0.74, 1.03)		
									Highest	430	0.84 (0.71, 1.00)		-
									Total soy products isoflavones				
									Lowest	452	1.00 (Reference)		
									Second	398	0.84 (0.71, 0.98)	0.59	
									Third	442	0.91 (0.78, 1.06)		
									Highest	499	0.92 (0.78, 1.07)		-
									Nonfermented soy products isoflavones				
									Lowest	436	1.00 (Reference)		
									Second	426	0.93 (0.80, 1.08)	0.546	
									Third	423	0.83 (0.71, 0.97)		
									Highest	506	0.98 (0.84, 1.14)		-
									Fermented soy products isoflavones				
									Lowest	459	1.00 (Reference)		
									Second	447	0.95 (0.81, 1.10)	0.044	
									Third	430	0.87 (0.74, 1.03)		
									Highest	455	0.85 (0.71, 1.01)		-

Author	Title	Year	Period	Sex	Study	Outcome	N	Population	Frequency of Soy Intake, Days per Week				
									Men	Women	Men	Women	
Kokubo Y et al	Association of Dietary Intake of Soy, Beans, and Isoflavones With Risk of Cerebral and Myocardial Infarctions in Japanese Populations	2007	1990-2002	Men; 19,466 Women; 20,984	Japan Public Health Center-based Prospective study (JPHC Study)	Cerebral infarction (CI), Myocardial infarction (MI)	1230	Japanese	Frequency of Soy Intake, Days per Week				
									Men				
									Cerebral infarction (CI)				
									0-2	104	1.00 (Reference)	0.411	-
									3-4	130	0.85 (0.65-1.11) □		
									≥5	153	0.95 (0.72-1.26)		
						Myocardial infarction (MI)							
						0-2	55	1.00 (Reference)	0.243	-			
						3-4	100	1.26 (0.76-2.07) □					
						≥5	87	1.23 (0.72-2.07)					
						Women							
						Cerebral infarction (CI)							
				0-2	45	1.00 (Reference)	0.037	↓ ↓					
				3-4	65	0.81 (0.55-1.19) □							
				≥5	90	0.64 (0.43-0.95)							
				Myocardial infarction (MI)									
				0-2	18	1.00 (Reference)	0.098	↓					
				3-4	26	0.63 (0.31-1.25)							
				≥5	22	0.55 (0.26-1.09)							
				Miso soup, times per day									
				Men									
				Cerebral infarction (CI)									
				0-1	126	1.00 (Reference)	0.87	-					
				2	105	0.83 (0.63-1.11)							
≥3	152	0.79 (0.57-1.09)											
Myocardial infarction (MI)													
0-1	96	1.00 (Reference)	0.237	-									
2	59	0.99 (0.65-1.51)											
≥3	82	1.32 (0.82-2.12)											
Women													
Cerebral infarction (CI)													
0-1	80	1.00 (Reference)	0.088	↓ ↓									
2	55	0.60 (0.40-0.90)											
≥3	56	0.58 (0.35-0.96)											
Myocardial infarction (MI)													
0-1	28	1.00 (Reference)	0.166	↓ ↓									
2	22	1.22 (0.55-2.73)											
≥3	12	0.44 (0.14-1.32)											
Beans, days per week													
Men													
Cerebral infarction (CI)													
0-1	226	1.00 (Reference)	0.856	-									
2	114	0.89 (0.71-1.12)											
≥3	47	1.25 (0.91-1.71)											
Myocardial infarction (MI)													
0-1	146	1.00 (Reference)	0.765	-									
2	70	0.92 (0.67-1.26)											
≥3	26	0.98 (0.60-1.62)											
Women													
Cerebral infarction (CI)													
0-1	119	1.00 (Reference)	0.055										
2	60	0.78 (0.57-1.06)											

≥ 3	21	0.68 (0.42–1.09)	-
Myocardial infarction (MI)			
0-1	33	1.00 (Reference)	
2	27	1.10 (0.62–1.97)	0.676
≥ 3	6	0.69 (0.26–1.84)	-

HN Nguyen et al	Dietary tofu intake and long-term risk of death from stroke in a general population	2016	1980-2004	9244	National Nutrition Survey	Stroke death	417	Japanese	Quartiles of tofu intake				
									Men				
										[Stroke death]			age, smoking status, drinking status, residential area, body mass index, dietary intake of fruits, dietary intake of vegetables, dietary intake of fish, dietary intake of meat, dietary intake of milk, dietary intake of other dairy products, dietary intake of sodium
									Q1 (low)	50	1.00 (Reference)		-
									Q2	49	1.18 (0.79, 1.75)	0.344	-
									Q3	43	0.88 (0.58, 1.33)		-
									Q4 (high)	75	1.23 (0.86, 1.77)		-
										[Cerebral hemorrhage death]			
									Q1 (low)	14	1.00 (Reference)		-
									Q2	7	0.56 (0.23, 1.40)	0.962	-
									Q3	12	0.84 (0.39, 1.84)		-
									Q4 (high)	16	0.86 (0.42, 1.78)		-
										[Cerebral infraction death]			
									Q1 (low)	26	1.00 (Reference)		-
									Q2	36	1.86 (1.12, 3.11)	0.324	-
									Q3	24	0.97 (0.55, 1.70)		-
									Q4 (high)	47	1.51 (0.93, 2.45)		↑
									Women				
										[Stroke death]			
									Q1 (low)	57	1.00 (Reference)		-
									Q2	34	0.78 (0.51, 1.19)	0.323	-
									Q3	55	0.96 (0.66, 1.40)		-
									Q4 (high)	54	0.79 (0.54, 1.15)		-
										[Cerebral hemorrhage death]			
									Q1 (low)	16	1.00 (Reference)		-
									Q2	6	0.44 (0.17, 1.12)	0.03	-
									Q3	10	0.57 (0.26, 1.27)		-
									Q4 (high)	7	0.35 (0.14, 0.85)		↓↓↓
										[Cerebral infraction death]			
									Q1 (low)	25	1.00 (Reference)		-
									Q2	20	1.04 (0.58, 1.89)	0.618	-
									Q3	32	1.27 (0.75, 2.17)		-
									Q4 (high)	35	1.13 (0.67, 1.91)		-

Katagiri R et al	Association of soy and fermented soy product intake with total and cause specific mortality: prospective cohort study	2020	1995-2012	92915	Japan Public Health Center-based Prospective study (JPHC Study)	Cardiovascular disease death	all cause death; 13,303	Japanese	Men	[Total cardiovascular disease]	
									Total soy products		
									First (lowest intake)	345	1.00 (Reference)
									Second	397	1.03 (0.89 to 1.20)
									Third	398	0.97 (0.84 to 1.13)
									Fourth	397	0.89 (0.77 to 1.04)
									Fifth (highest intake)	463	0.95 (0.82 to 1.11)
									Fermented soy products		
									First (lowest intake)	363	1.00 (Reference)
									Second	369	0.98 (0.84 to 1.14)
									Third	424	1.04 (0.90 to 1.21)
									Fourth	436	1 (0.85 to 1.17)
									Fifth (highest intake)	408	0.82 (0.70 to 0.97)
									Non-fermented soy		
									First (lowest intake)	419	1.00 (Reference)
									Second	348	0.85 (0.74 to 0.98)
									Third	386	0.91 (0.79 to 1.04)
									Fourth	396	0.87 (0.75 to 1.00)
									Fifth (highest intake)	451	0.95 (0.82 to 1.09)
									Natto		
									First (lowest intake)	691	1.00 (Reference)
									Second	306	0.86 (0.74 to 1.00)
									Third	317	0.86 (0.73 to 1.00)
									Fourth	342	0.85 (0.73 to 0.99)
									Fifth (highest intake)	344	0.76 (0.65 to 0.90)
									Miso		
									First (lowest intake)	345	1.00 (Reference)
									Second	365	0.96 (0.84 to 1.13)
									Third	380	0.95 (0.81 to 1.10)
									Fourth	437	1.04 (0.90 to 1.21)
									Fifth (highest intake)	473	0.95 (0.82 to 1.10)
									Tofu		
									First (lowest intake)	425	1.00 (Reference)
									Second	348	0.83 (0.72 to 0.96)
									Third	381	0.89 (0.77 to 1.02)
									Fourth	406	0.87 (0.75 to 1.00)
									Fifth (highest intake)	440	0.9 (0.78 to 1.04)
									Women		
									Total soy products		
									First (lowest intake)	241	1.00 (Reference)
									Second	253	1.04 (0.87 to 1.24)
									Third	220	0.86 (0.71 to 1.04)
									Fourth	288	1.06 (0.89 to 1.27)
									Fifth (highest intake)	324	1.03 (0.86 to 1.23)
									Fermented soy products		
									First (lowest intake)	268	1.00 (Reference)
									Second	251	0.95 (0.80 to 1.13)
									Third	232	0.84 (0.70 to 1.01)
									Fourth	273	0.92 (0.76 to 1.11)
									Fifth (highest intake)	302	0.89 (0.73 to 1.07)
									Non-fermented soy		
									First (lowest intake)	280	1.00 (Reference)

age, area, smoking, frequency of alcohol intake, body mass index, sports or physical exercise, history of diabetes or taking drugs for diabetes, taking antihypertensives, health check-up, total energy intake, intake of green tea, coffee, fish, meat, fruit, and vegetables

									Second	251	1 (0.84 to 1.19)		
									Third	204	0.77 (0.64 to 0.93)	0.34	
									Fourth	265	1.01 (0.85 to 1.21)		
									Fifth (highest intake)	326	1.09 (0.92 to 1.29)		-
									Natto				
									First (lowest intake)	446	1.00 (Reference)		
									Second	189	0.76 (0.64 to 0.92)		
									Third	224	0.87 (0.72 to 1.04)	0.01	
									Fourth	209	0.72 (0.60 to 0.88)		
									Fifth (highest intake)	258	0.79 (0.65 to 0.95)		↓
									Miso				
									First (lowest intake)	258	1.00 (Reference)		
									Second	228	0.84 (0.70 to 1.01)		
									Third	242	0.8 (0.67 to 0.96)	0.86	
									Fourth	261	0.89 (0.74 to 1.07)		
									Fifth (highest intake)	337	0.94 (0.79 to 1.13)		-
									Tofu				
									First (lowest intake)	記載なし	1.00 (Reference)		
									Second	記載なし	0.94 (0.80 to 1.12)		
									Third	49	0.8 (0.67 to 0.95)	0.64	
									Fourth	70	0.89 (0.75 to 1.06)		
									Fifth (highest intake)	58	0.98 (0.82 to 1.16)		-
Nagata C et al	Dietary soy and natto intake and cardiovascular disease mortality in Japanese adults: the Takayama study	2017	1992-2008	men; 13355 female; 15724	the Takayama study	Cardiovascular disease death	CVD death; 1678 Stroke death; 677 Ischemic heart dis 308	Japanese	quartile of intake, g/d				
									Total soy prtein				
									Q1 (low)	292	1.00 (Reference)		
									Q2	393	0.96 (0.81, 1.11)	0.13	
									Q3	500	0.99 (0.84, 1.16)		
									Q4 (high)	493	0.87 (0.73, 1.04)		-
									Total soy isoflavones				
									Q1 (low)	255	1.00 (Reference)		
									Q2	417	1.02 (0.87, 1.21)	0.15	
									Q3	486	0.96 (0.81, 1.14)		
									Q4 (high)	520	0.91 (0.75, 1.09)		-
									Natto				
									Q1 (low)	362	1.00 (Reference)		
									Q2	470	0.90 (0.77, 1.05)	0.0004	
									Q3	549	0.97 (0.82, 1.14)		
									Q4 (high)	297	0.75 (0.64, 0.88)		↓
									Soy protein from soy foods other than natto				
									Q1 (low)	288	1.00 (Reference)		
									Q2	392	0.93 (0.79, 1.08)	0.13	
									Q3	499	1.00 (0.85, 1.17)		
									Q4 (high)	499	0.86 (0.72, 1.03)		-
									Soy isoflavones from soy foods other than natto				
									Q1 (low)	254	1.00 (Reference)		
									Q2	409	1.03 (0.87, 1.21)	0.35	
									Q3	478	0.96 (0.81, 1.13)		
									Q4 (high)	539	0.94 (0.78, 1.13)		-