

Table S1. Database search formulas

Data base	Search terms for query
Pubmed	
#1	(elder adults) OR order adults
#2	((sarcopenia) OR frailty) OR dynapenia)
#3	((untrained) OR sedentary) OR hospitalized) OR Institutionalized
#4	#1 OR #2 OR #3
#5	((progressive resistance training) OR resistance exercise) OR strength training) OR strengthening exercise
#6	((protein supplement) OR protein supplementation) OR dietary protein) OR high-protein diet
#7	(Randomized controlled trial) OR Randomization
#8	((#4) AND #5) AND #6) AND #7
Physiotherapy Evidence Database (PEDro)	
	Method: clinical trial
	Abstract & Title:
#1	order adults
#2	sarcopenia
#3	frailty
#4	resistance training
#5	strengthening exercise
#6	Strength training
#7	protein supplementation
#8	high-protein diet
#9	dietary protein
China knowledge resource integrated database	
#1	order adults
#2	resistance exercise training
#3	protein supplementation
#4	randomized controlled trial
#5	#1 AND #2 AND #3 AND #4

(continued)

Table S1. (continued)

Data base	Search terms for query
Excerpta Medica dataBASE (EMBASE)	
#1	order adults
#2	sarcopenia
#3	frailty
#4	dynapenia
#5	sedentary/untrained
#6	strengthening exercise
#7	resistance training
#8	strength training
#9	protein supplementation
#10	dietary protein
#11	#1 OR #2 OR #3 OR #4 OR #5
#12	#6 OR #7 OR #8
#13	#9 OR #10
#14	#14 AND #15 AND #16 AND ([systematic review]/lim OR [meta analysis]/lim OR [randomized controlled trial]/lim) AND [humans]/lim
Cochrane Library Database	
#1	order adults
#2	sarcopenia
#3	frailty
#4	sedentary/untrained
#5	resistance training
#6	strength exercise training
#7	strengthening exercise
#8	protein supplementation
#9	dietary protein
#10	randomized controlled trial
#11	#1 OR #2 OR #3 OR #4
#12	#5 OR #6 OR #7
#13	#8 AND #9
#14	#11 AND #12 AND #13
Google Scholar	
#1	allintitle: elderly OR older adults
#2	allintitle: untrained OR sarcopenia OR frailty
#3	allintitle: resistance training OR strengthening exercise
#4	allintitle: "protein supplementation" OR "dietary protein"
#5	allintitle: randomized controlled trial

Table S2. Summary of included study characteristics.

Study (year) (reference number) ^a	Country (area)	Population	Study arm	Mean age (years)	Mean BMI (kg/m ²)	N	Sex		PS intervention			RT intervention				Outcome measures								Measured time point (week)	
							Female	Male	Frequency (intake day/week)	Intake amount (g/d)	Compliance (%)	% 1-RM	Frequency (session/ week)	Duration (week)	Compliance (%)	Muscle mass/volume			Strength		Mobility				
																Wole body lean mass	Appendicular lean mass	CSA/ Muscle thickness	Handgrip strength	Leg strength	Walking speed	Chair rise	TUG		SPPB
Aas 2019 [1]	Norway (Europe)	Mobility-limited older adults	MP+RT RC	86.6 82.6	26.1 26.3	11 11	7 8	4 3	7	34	NR	80–90	3	10	95.8		V	V		V	V		V	0, 10	
Amasene 2019 [2]; 2021 [3]	Span (Europe)	Post-hospitalized sarcopenic older adults	WP+RT	82.9	27.4	21	12	9	2	20	NR	70	2	12	NR	V	V	V	V		V	V		V	0, 12
			PLA+RT	81.2	31.1	20	10	10																	
Arciero 2014 [4]	USA (America)	Inactive middle- aged adults	WP+RT	47	29	22	17	5	4	60	75	RPE 7-9/10 (10-12 RM)	4	16	85	V								0, 16	
			WP	50	28	18	11	7																	
Arnarson 2013 [5]	Iceland (Europe)	Community- dwelling elderly	WP+RT	73.3	28.1	83	94 ^b	67 ^b	3	20	NR	75-80	3	12	NR	V	V		V	V		V		0, 12	
			PLA+RT	74.6	29.4	78																			
Bagheri 2022 [6]	Iran (Asia)	Untrained older adults	WP+RT	67.3	21.2	14	0	14	7	18	>90	60–80	3	8	>90	V				V				0, 8	
			PLA+RT	68.4	21.9	14	0	14																	
Bijeh 2022 [7]	Iran (Asia)	Untrained older adults	SP+RT	65.6 ^c	NR	15	0	15	7	6.75	100	60	3	12	100	V			V	V				0, 12	
			RT			15	0	15							100										
			SP			15	0	15																	
			RC			15	0	15																	
Candow 2006 [8]	Canada (America)	Untrained older adults	WP+RT	64.9	28.3	19	0	19	3	25	NR	70	3	12	NR	V		V		V			0, 12		
			PLA+RT	64.6	29.1	10	0	10		(0.3 g/kg/d)															
Candow 2008 [9]	Canada (America)	Untrained older adults	WP+Cre+RT	67.3	26.3	10	0	10	3	25	94	70	3	10	NR	V				V			0, 10		
			Cre+RT	65.5	28.1	13	0	13		(0.3 g/kg/d)	93														
			PLA+RT	64.1	26.1	12	0	12			95														
Chale 2013 [10]	USA (America)	Mobility-limited older adults	WP+RT	78	27	42	25	17	7	40	72.1	80	3	24	79.9	V		V		V	V	V	0, 24		
			PLA+RT	77.3	26.9	38	22	16			82.3				80.2										
Chang 2019 [11]	China (Asia)	Sarcopenic elderly people	Casein+RT	73.5	19.8	28	6	22	7	20	NR	70	3	24	NR				V				V	0, 24	
			RC	76.5	19.1	28	6	22																	
Chen 2017 [12]	China (Asia)	Sarcopenic elderly people	WP+RT	73.5	19.8	20	4	16	7	25	NR	70	3	24	NR				V				V	0, 24	
			RC	76.5	19.1	20	4	16																	
Colonetti 2023 [13]	Brazil (America)	Institutionalized older adults	WP+RT	73	30.4	8	1	7	3	30	NR	70	3	24	NR	V	V							0, 6, 24	
			PLA+RT	75.4	29.9	10	3	7																	
			RC	74.1	26.8	8	5	3																	
Daly 2014 [14]	Australia (Oceania)	Institutionalized older adults	Meat+RT	72.1	27.7	53	53	0	7	45	81	RPE 14-16/20	2	16	75	V		V		V	V		0, 16		
			CHO+RT	73.6	27.6	47	47	0		(1.3 g/kg/d)	100				72										

To be continued.

Table S2. Continued.																									
Study (year) (reference number) ^a	Country (area)	Population	Study arm	Mean age (years)	Mean BMI (kg/m ²)	N	Sex		PS intervention			RT intervention				Outcome measures								Measured time point (week)	
							Female	Male	Frequency (intake day/week)	Intake amount (g/d)	Compliance (%)	% 1-RM	Frequency (session/ week)	Duration (week)	Compliance (%)	Muscle mass/volume			Strength		Mobility				
																Wole body lean mass	Appendicular lean mass	CSA/ Muscle thickness	Handgrip strength	Leg strength	Walking speed	Chair rise	TUG		SPPB
de Azevedo Bach 2022 [15]	Brazil (America)	Sedentary older adults	WP+RT PLA+RT	66.9 65.8	26.3 25.4	16 15	NR NR	NR NR	7	30	97.2 97.1	75-85 (6-8 RM)	2	12	100 99	V	V		V		V	V		0, 12	
de Carvalho Bastone 2020 [16]	Brazil (America)	Dynapenic older adults	WP+RT RT WP RC	76.9 77.6 76.5 72.5	25.7 26 25.9 26.2	20 20 20 20	16 12 14 15	4 8 6 5	7	21	NR	80	3	12	98.5 97.2	V			V		V	V		0, 12	
Deer 2019 [17]	USA (America)	Hospitalized older adults	WP+RT PLA+RT WP PLA	80 77.6 80 75.7	26.1 27.4 28.9 29	20 21 20 20	14 14 14 14	6 7 6 6	7	40	75	NR (moderate intensity)	3	4	77	V	V				V	V		V	0, 4
Deibert 2011 [18]	Germany (Europe)	Untrained middle- aged adults	SP+RT RT RC	55.9 55.5 55.8	28.4 27.7 27.2	13 13 9	0 0 0	13 13 9	7	26.7	NR NR	NR (10 RM)	2	12	90 90	V				V					0, 12
Duff 2014 [19]	Canada (America)	Untrained older adults	MP+RT WP+RT	61.8 57.5	26.9 25.9	19 21	12 13	7 8	7	38	97 88	NR (8-12 RM)	3	8	86 84	V		V		V					0, 8
Dulac 2021 [20]	Canada (America)	Sedentary older adults	WP+RT Casein+RT PLA+RT	68.3 69 70.7	26.7 26 25.4	21 20 19	0 0 0	21 20 19	7	30	NR	80 (RPE 8-10/10)	3	12	NR	V	V	V	V	V	V	V	V		0, 12
Eliot 2008 [21]; Bemben 2010 [22]	USA (America)	Untrained middle- aged and older adults	WP+Cre+RT WP+RT Cre+RT PLA+RT	57.2 58.2 56.1 56.1	28.7 28.6 29.1 31.3	11 11 10 10	0 0 0 0	11 11 10 10	3	35	100	80	3	14	100	V	V		V						0, 14
Fiatarone 1994 [23]	USA (America)	Institutionalized elderly	SP+RT PLA+RT SP PLA	87.2 86.2 85.7 89.2	24.5 24.9 25.4 25.8	25 25 24 26	16 16 17 14	9 9 7 12	7	40	99	80	3	10	97	V		V		V	V				0, 10
Formica 2020 [24]	Australia (Oceania)	Community-dwelling elderly	Meat+RT RT	71.2 70.3	27.8 27.9	77 77	48 48	29 29	3	45 (1.3 g/kg/d)	NR	RPE 5-8/10	3	24	77.9 78.6	V	V	V		V	V	V	V		0, 24
Francis 2017 [25]	UK (Europe)	Untrained free- living older adults	MP+RT MP	60.4 61.8	24.7 26.1	29 28	29 28	0 0	7	24 (0.33 g/kg/d)	86 82	NR (8-15 RM)	3	12	NR	V	V		V	V	V				0, 12

To be continued.

Table S2. Continued.

Study (year) (reference number) ^a	Country (area)	Population	Study arm	Mean age (years)	Mean BMI (kg/m ²)	N	Sex		PS intervention			RT intervention				Outcome measures								Measured time point (week)	
							Female	Male	Frequency (intake day/week)	Intake amount (g/d)	Compliance (%)	% 1-RM	Frequency (session/ week)	Duration (week)	Compliance (%)	Muscle mass/volume			Strength		Mobility				
																Wole body lean mass	Appendicular lean mass	CSA/ Muscle thickness	Handgrip strength	Leg strength	Walking speed	Chair rise	TUG		SPPB
Gade 2019 [26]	Denmark (Europe)	Hospitalized older adults	MP+RT	85.3	25.1	73	51	22	7	27.5	62-87	NR (8-12 RM)	7	12	51	V	V		V	V			0, 1, 12		
			PLA+RT	84.2	25.8	75	49	26			55-88														
Granic 2020 [27]	UK (Europe)	Sarcopenic older adults	Whole-MP+RT	72	24.9	10	4	6	2	17	97.1	>70	2	6	97.2	V	V		V	V	V		0, 6		
			Skimmed-MP+RT	72.2	25.5	10	4	6			98.3														
			PLA+RT	70.8	27	10	4	6			95														
Griffen 2022 [28]	UK (Europe)	Community- dwelling older adults	WP+RT	68	26.6	9	0	9	7	50	96.1	80	2	12	98.2	V	V			V	V		0, 12		
			PLA+RT	67	25.1	9	0	9			96.1														
			WP	66	25	9	0	9			96.8														
			PLA	67	25.1	9	0	9			94.1														
Gronstedt 2020 [29]	Sweden (Europe)	Institutionalized elderly	MP+RT	85.8	25.3	52	34	18	7	36	64	NR	7	12	44	V				V	V		0, 12		
			RT	85.9	25.3	50	29	21							44										
Hamarsland 2019 [30]	Norway (Europe)	Untrained older adults	MP+RT	74.3	NR	15	6	9	7	40	99	NR (6-12 RM)	3	11	98.5	V	V	V		V			0, 11		
			WP+RT	72.9	NR	15	6	9			99				100										
Haß 2022 [31]	Germany (Europe)	Community- dwelling older adults	WP+Omega-3+RT	70.4	27.8	21	11	10	7	27	96	NR	3	8	NR	V			V	V	V	V		0, 8	
			WP+RT	71.5	28.2	20	11	9			98														
			RT	69.9	26.9	20	10	10																	
Haub 2002 [32]; Haub 2005 [33]	USA (America)	Community-dwelling older adults	Meat+RT	63	28.1	10	0	10	7	50	NR	80	2	12	94-100	V		V		V			0, 12		
			SP+RT	67	28.3	11	0	11		(0.33 g/kg/d)															
He 2022 [34]	China (Asia)	Sarcopenic older adults	WP+RT	82.4	19.4	75	0	75	7	25	NR	NR	7	4	NR				V				0, 4		
			RC	82.4	19.4	75	0	75																	
Holm 2008 [35]	Denmark (Europe)	Postmenopausal women	WP+RT	55	24	13	13	0	2-3	10	NR	NR (8 RM)	2-3	24	81-91.7	V		V		V			0, 12, 24		
			PLA+RT	55	27	16	16	0							81-91.7										
Holwerda 2018 [36]	Netherlands (Europe)	Community-dwelling older adults	WP+RT	69	25.5	21	0	21	7	21	99.6	80	3	12	95	V	V			V	V	V		0, 12	
			PLA+RT	71	25.1	20	0	20																	
Kang 2020 [37]	Korea (Asia)	Untrained older adults	MP+RT	61.2	23.7	60	41	19	7	40	>80	light	7	12	NR	V	V	V	V	V		V		0, 12	
			PLA+RT	58.4	23.6	60	46	14			>80														
Karelis 2015 [38]	Canada (America)	Sedentary non-frail elderly	WP+RT	69.9	24.9	34	26	8	7	20	97	80	3	19	90	V	V			V			0, 19		
			Casein+RT	71	25.4	33	26	7			96				91										
Kemmler 2020a [39]; 2020b [40]	Germany (Europe)	Elderly with osteosarcopenia	WP+RT	77.8	25	21	0	21	7	80	NR (high)	80	2-3	52	95	V			V	V	V		0, 52		
			WP	79.2	24.5	22	0	22		(0.33 g/kg/d)															

To be continued.

Table S2. Continued.

Study (year) (reference number) ^a	Country (area)	Population	Study arm	Mean age (years)	Mean BMI (kg/m ²)	N	Sex		PS intervention			RT intervention				Outcome measures								Measured time point (week)	
							Female	Male	Frequency (intake day/week)	Intake amount (g/d)	Compliance (%)	% 1-RM	Frequency (session/ week)	Duration (week)	Compliance (%)	Muscle mass/volume			Strength		Mobility				
																Wole body lean mass	Appendicular lean mass	CSA/ Muscle thickness	Handgrip strength	Leg strength	Walking speed	Chair rise	TUG		SPPB
Krause 2019 [41]	Ireland (Europe)	Sedentary, medically-stable older adults	WP+RT PLA+RT WP PLA	63.9 63.9 62.3 63.8	25.4 25 27.2 26.3	11 10 7 10	7 5 3 5	4 5 4 5	7	24 (0.33 g/kg/d)	NR	NR (8-15 RM)	3	12	NR	V			V		V	V		0, 12	
Kukuljan 2009a [42]; 2009b [43]	Australia (Oceania)	Untrained middle- aged and older adults	MP+RT RT MP RC	61.7 60.7 61.7 59.9	27.4 28.1 27.7 26.7	45 46 45 44	0 0 0 0	45 46 45 44	7	13	92	80-85	3	52	69 65	V		V		V				0, 52	
Kwon 2015 [44]	Janan (Asia)	Pre-frail older adults	Meat+RT RT RC	76.5 77.0 76.9	NR NR NR	26 25 28	0 0 0	26 25 28	7	20-22	NR	NR	1	12	NR				V		V			0, 12	
Lamb 2020 [45]	USA (America)	Untrained older adults	Peanut+RT RT	60.0 58.0	27.8 29.7	20 19	8 9	12 10	7	35	NR	RPE 7-9/10 (10-12 RM)	2	10	NR	V		V		V				0, 6	
Leenders 2013 [46]	Netherlands (Europe)	Untrained elderly	MP+RT PLA+RT	71.5 69.5	25.8 25.9	27 26	12 12	15 14	7	15	NR	75-80	3	24	90	V	V	V	V	V		V		0, 12, 24	
Liao 2021 [47]	Taiwan (Asia)	Older adults with knee osteoarthritis	WP+RT RT	68.6 69.8	28.1 27.4	36 36	36 36	0 0	2	14	100	RPE 13-15/20	2	12	84.3 82.6	V			V		V			0, 12	
Maesta 2007 [48]	Brazil (America)	Postmenopausal women	SP+RT PLA+RT SP PLA	57.6 60.7 61.3 57.9	27.8 27.7 27.2 26.6	14 11 10 11	14 11 10 11	0 0 0 0	NR	25 12.2	NR	60-80	3	16	NR	V								0, 16	
Maltais 2016 [49]	Canada (America)	Sarcopenic elderly men	MP+RT SP+RT PLA+RT	68 64 64	25.8 27 25.9	10 10 10	0 0 0	10 10 10	3	13.5 12	>90 >90 >90	80	3	16	>90 >90 >90	V	V			V	V	V	V	0, 16	
McKenna 2021 [50]	USA (America)	Untrained middle- aged and older adults	Meat+RT RT	49 50	27.6 27.5	28 22	14 13	14 9	7	60	97 92	75	3	10	89 87	V	V		V	V	V			0, 10	
Mertz 2021 [51]	Denmark (Europe)	Community- dwelling older adults	WP+RT WP PLA	70.4 70.3 69.6	25.8 25.2 26	72 50 36	36 22 18	36 28 18	7	40	88 88 95	NR (6 RM)	3	52	72-89	V		V		V	V			0, 52	
Miller 2021 [52]	Australia (Oceania)	Overweight or obese older adults with DM	WP+RT RT	61.1 62	29.6 31.1	98 100	36 36	62 64	7	40	78.6	RPE 12-15/20	3	24	67.5 57.9	V	V	V				V	V	0, 24	

To be continued.

Table S2. Continued.

Study (year) (reference number) ^a	Country (area)	Population	Study arm	Mean age (years)	Mean BMI (kg/m ²)	N	Sex		PS intervention			RT intervention				Outcome measures								Measured time point (week)
							Female	Male	Frequency (intake day/week)	Intake amount (g/d)	Compliance (%)	% 1-RM	Frequency (session/ week)	Duration (week)	Compliance (%)	Muscle mass/volume			Strength		Mobility			
																Wole body lean mass	Appendicular lean mass	CSA/ Muscle thickness	Handgrip strength	Leg strength	Walking speed	Chair rise	TUG		SPPB
Mitchell 2018 [53]	New Zealand (Oceania)	Middle-aged and older adults	MP+RT PLA+RT	51.5 48.5	27.5 28.3	15 15	0 0	15	3	20	NR	80	3	2	NR			V		V				0, 2
Molnar 2016 [54]	Hungary (Europe)	Institutionalized elderly	WP+RT RT	66.6 66.4	22.6 28.1	17 17	10 12	7	7	40	NR	NR	2	12	NR	V			V				V	0, 12
Mori 2018 [55]	Janan (Asia)	Untrained community- dwelling elderly	WP+RT RT WP	70.6 70.6 70.6	22.1 22.9 22.3	25 25 25	25 25 25	0	2	11	90.1	50-70	2	24	90.1 86.6	V	V		V	V	V			0, 24
Mori 2022 [56]	Janan (Asia)	Older adults with sarcopenia	WP+RT RT WP	77.7 77.6 77.8	20.3 20.3 20.1	23 23 24	20 19 20	3	2	11	73.2	50-70	2	24	73.2 72.4				V	V	V			0, 24, 36, 48
Nabuco 2018 [57]; 2019a [58]	Brazil (America)	Pre-conditioned older adults	WP+RT PLA+RT	66.9 66.5	25.9 23.8	47 23	47 23	0	3	27	NR	NR (8-12 RM)	3	12	NR	V	V		V	V	V	V		0, 12
Nabuco 2019b [59]	Brazil (America)	Older adults with sarcopenic obesity	WP+RT PLA+RT	68 70.1	26.4 27.4	13 13	13 13	0	3	35	NR	NR (12 RM)	3	12	NR	V	V							0, 12
Nabuco 2019c [60]	Brazil (America)	Community-dwelling older adults	WP+RT PLA+RT	69.2 68.4	27.4 26.6	15 15	15 15	0	3	35	NR	60-70 (12 RM)	3	12	NR	V			V					0, 12
Nilsson 2020 [61]	Canada (America)	Sedentary elderly	MP+RT PLA+RT	77.4 74.4	29.3 27.4	16 16	0 0	16	7	24	89.3 95.4	NR (10-15 RM)	3	12	84.1 89.1	V	V		V	V	V	V	V	0, 12
Oesen 2015 [62]	Australia (Oceania)	Institutionalized elder	WP+RT RT RC	81.8 83 83.4	29.8 28.9 28.9	36 41 40	31 37 35	5	7	40	NR	RPE <7/10	2	24	71 71				V	V	V	V		0, 12, 24
Orsatti 2018 [63]	Brazil (America)	Postmenopausal women	SP+RT PLA+RT	56.8 58.8	27.5 27.3	16 16	16 16	0	7	25	NR	60-80 (8-12 RM)	3	16	100 100	V				V				0, 16
Roschel 2021 [64]	Brazil (America)	Frail elderly	WP+RT SP+RT PLA+RT	72 72 73	26.7 28.6 28.8	22 22 22	22 22 22	0	7	30	NR	70	2	16	NR	V	V	V	V	V		V	V	0, 16
Seino 2018 [65]	Janan (Asia)	Sedentary older adults	MP+RT RT	73.4 73.7	22.9 22.9	40 40	34 33	6	7	10.5	>90	RPE 5-7/10 (20 RM)	2	12	95.3 94.6	V	V		V	V	V	V	V	0, 12
Shahar 2013 [66]	Malaysia (Asia)	Elderly with sarcopenia	SP+RT RT SP RC	65.2 69.7 65.9 67.3	26.5 23.7 24.3 26.4	15 19 15 16	18 ^b 	47 ^b 	7	20 (men); 40 (women)	86.7	NR	2	12	86.7	V	V							0, 6, 12

To be continued.

Table S2. Continued.

Study (year) (reference number) ^a	Country (area)	Population	Study arm	Mean age (years)	Mean BMI (kg/m ²)	N	Sex		PS intervention			RT intervention				Outcome measures								Measured time point (week)													
							Female	Male	Frequency (intake day/week)	Intake amount (g/d)	Compliance (%)	% 1-RM	Frequency (session/ week)	Duration (week)	Compliance (%)	Muscle mass/volume			Strength		Mobility																
																Wole body lean mass	Appendicular lean mass	CSA/ Muscle thickness	Handgrip strength	Leg strength	Walking speed	Chair rise	TUG		SPPB												
Shenoy 2013 [67]	India (Asia)	Postmenopausal women	SP+RT	54.1	28.9	20	20	0	7	40	NR	80	4	12	NR					V				0, 12													
			SP	54.6	31	20	20	0																													
			RC	54.1	30	20	20	0																													
Soares 2023 [68]	Brazil (America)	Older adults with type 2 DM	WP+RT	68.1	29.3	14	0	14	2	20	NR	70 (RPE 7-8/10)	2	12	NR	V			V	V			0, 12														
			PLA+RT	68.9	26.8	14	0	14																													
Sugihara Junior 2018 [69]	Brazil (America)	Pre-conditioned older adults	WP+RT	67.4	25.6	15	15	0	3	35	NR	NR (8-12 RM)	3	12	>85	V	V			V			0, 12														
			PLA+RT	67.8	25.4	16	16	0																													
Tang 2020 [70]	China (Asia)	Older adults with sarcopenia	WP+RT	76.6	19.3	100	0	100	7	25	NR	NR (20-30 RM)	6	24	NR				V			V	0, 24														
			RC	77	19.5	100	0	100																													
Thomson 2016 [71]	Australia (Oceania)	Overweight older adults	MP+RT	61.3	27.7	54	29	25	7	27	97	NR (8-12 RM)	3	12	91.4	V			V	V	V		0, 12														
			SP+RT	61.7	27.5	64	35	29			98.1																										
			PLA+RT	61.5	27.6	61	34	27			98.4																										
Tieland 2012 [72]; Dirks 2017 [73]	Netherlands (Europe)	Frail elderly people	MP+RT	78	28.7	31	20	11	7	30	≥98%	70	2	24	≥98%	V	V	V	V	V	V	V	V	0, 12, 24													
			PLA+RT	79	28.2	31	21	10																													
Trevisan 2010 [74]	Brazil (America)	Postmenopausal women, untrained (low muscle mass, overweight)	SP+RT	58	28	15	15	0	7	25	NR	60-80	3	12	NR	V							0, 12														
			PLA+RT	57	28	15	15	0																													
			SP	60	29	15	15	0																													
			PLA	60	27	15	15	0																													
Unterberger 2022 [75]	Australia (Oceania)	Untrained older adults	SP+RT	73.2	26.2	48	28	20	2	32	NR	RPE 6-7/10 (8-12 RM)	2	10	NR	V	V		V	V	V	V	V	0, 10													
			PLA+RT	72.4	26.3	41	21	20																													
			RC	73	26	47	24	23																													
Verdijk 2009 [76]	Netherlands (Europe)	Free-living elderly people	Casein+RT	72	26.5	13	0	13	3	20	NR	75-80	3	12	NR	V		V					0, 12														
			PLA+RT	72	27.4	13	0	13																													
Verreijen 2015 [77]	Netherlands (Europe)	Obese older adults	WP+RT	63.7	32.7	30	16	14	7	40	91	NR (12 RM)	3	13	72	V	V		V		V	V	0, 13														
			PLA+RT	63	33.3	30	16	14			97																										
Vijayakumaran 2023 [78]	Malaysia (Asia)	Sarcopenic older adults	WP+RT	66.6	26.4	8	8	0	7	15	90	75-80	3	12	90		V	V	V		V		V	0, 12													
			RT	65.5	24.5	8	8	0																													
Vikberg 2019 [79]	Sweden (Europe)	Old individuals with pre-sarcopenia	MP+RT	70.9	22.7	36	20	16	7	20-30	84	RPE 6-7/10 (8-10 RM)	7	10	91	V	V		V		V	V	V	V	0, 10												
			RC	70	23.3	34	18	16																													
Villanueva 2014 [80]	USA (America)	Untrained older adults	WP+RT	68.7	25.3	7	0	7	7	35	100	70	3	12	94	V				V	V			0, 6, 12													
			RT	68.7	27.1	7	0	7																													
			RC	67.1	26.8	8	0	8																													

To be continued.

Table S2. Continued.

Study (year) (reference number) ^a	Country (area)	Population	Study arm	Mean age (years)	Mean BMI (kg/m ²)	N	Sex		PS intervention			RT intervention				Outcome measures								Measured time point (week)
							Female	Male	Frequency (intake day/week)	Intake amount (g/d)	Compliance (%)	% 1-RM	Frequency (session/ week)	Duration (week)	Compliance (%)	Muscle mass/volume			Strength		Mobility			
																Wole body lean mass	Appendicular lean mass	CSA/ Muscle thickness	Handgrip strength	Leg strength	Walking speed	Chair rise	TUG		SPPB
Weisgarber 2015 [81]	Canada (America)	Postmenopausal women	WP+RT PLA+RT	57 ^c	28.3 ^c	12 12	12 12	0 0	4	40	100	30	4	10	NR		V	V		V				0, 10
Yamada 2019 [82]	Janan (Asia)	Older adults with sarcopenia or dynapenia	WP+RT	84.9	21.3	28	20	8	7	10	97.6	NR (20 RM)	2	12	88		V		V	V	V	V		0, 12
			RT	84.7	22.6	28	18	10					81											
			WP	83.2	22.6	28	20	8			100													
			RC	83.9	21.2	28	15	13																
Zdzieblik 2021 [83]	Austria (Europe)	Untrained overweight middle-aged adults	WP+RT	49.6	30.2	36	0	36	7	15	NR	85	3	12	NR	V	V			V			0, 12	
			PLA+RT	47.4	29.9	31	0	31																
Zhao 2022 [84]	China (Asia)	Sarcopenic older adults	WP+RT	61.9	19.9	20	12	8	7	24	NR	NR (8 RM)	7	12	NR	V			V		V		0, 4, 8, 12	
			WP	64.9	18.6	20	12	8																
			RC	62.9	19.8	20	12	8																
Zhu 2019 [85]	China (Asia)	Sarcopenic older adults	SP+RT	74.8	18.8	36	29	7	3	17.2	86.3	40	3	12	92.8		V		V	V	V	V	0, 12, 24	
			RT	74.5	18.8	40	29	11						95.3										
			RC	72.2	18.9	37	29	8																

^aThe number denotes the citation of the indicated reference at the end of table.

^bData is represented as total number of study sample.

^cData is represented as mean value of study sample.

1-RM, one-repetition maximum; BMI, body mass index; Cre, creatine; CSA, cross-section area; DM, diabetes mellitus; MP, milk protein; NR, not report; PLA, placebo; RPE, rate of perceived exertion; PS, protein supplementation; RC, regular care; RT, resistance training; SP, soy protein; SPPB, Short Physical Performance Battery; TUG, timed up and go; UK, United Kingdom; USA, United States of America; WP, whey protein.

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Supplementary table S3. League table for pairwise and network meta-analysis of mean change in muscle mass from baseline

Direct evidence of pairwise meta-analyses (row compared with column)												
	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11	V12
V1	Meat+RT					0.51 (-0.96, 1.97)					0.40 (-0.48, 1.28)	
V2	-0.02 (-0.84, 0.81)	MP+RT	0.36 (-0.61, 1.32)			-0.20 (-1.16, 0.76)		0.62 (-0.14, 1.39)		0.75 (-0.72, 2.22)	0.55 (0.17, 0.93)	1.31 (0.41, 2.22)
V3	-0.06 (-0.85, 0.73)	-0.05 (-0.42, 0.32)	WP+RT	0.60 (-0.68, 1.88)		0.12 (-1.20, 1.45)			0.95 (0.52, 1.37)		0.56 (0.33, 0.79)	1.36 (0.90, 1.83)
V4	0.36 (-0.87, 1.58)	0.37 (-0.63, 1.38)	0.42 (-0.54, 1.37)	Casein+RT							0.39 (-1.03, 1.80)	
V5	0.27 (-1.02, 1.57)	0.29 (-0.81, 1.39)	0.33 (-0.74, 1.41)	-0.08 (-1.51, 1.34)	Peanut+RT						0.25 (-0.81, 1.30)	
V6	0.17 (-0.64, 0.98)	0.19 (-0.28, 0.65)	0.23 (-0.19, 0.66)	-0.19 (-1.22, 0.84)	-0.10 (-1.22, 1.02)	SP+RT		0.56 (-0.87, 1.99)		1.21 (0.58, 1.85)	0.40 (-0.05, 0.85)	1.06 (0.49, 1.63)
V7	1.61 (-0.12, 3.34)	1.62 (0.04, 3.21)	1.67 (0.10, 3.24)	1.25 (-0.58, 3.08)	1.34 (-0.55, 3.22)	1.44 (-0.14, 3.01)	Meat			-0.45 (-1.92, 1.02)		
V8	0.77 (-0.21, 1.76)	0.79 (0.16, 1.42)	0.84 (0.18, 1.49)	0.42 (-0.73, 1.56)	0.50 (-0.73, 1.73)	0.60 (-0.09, 1.30)	-0.83 (-2.49, 0.82)	MP		0.19 (-1.28, 1.65)	-0.36 (-1.61, 0.90)	0.31 (-0.62, 1.24)
V9	0.87 (0.02, 1.72)	0.89 (0.39, 1.38)	0.93 (0.55, 1.32)	0.51 (-0.51, 1.53)	0.60 (-0.52, 1.72)	0.70 (0.17, 1.23)	-0.74 (-2.34, 0.87)	0.10 (-0.62, 0.82)	WP		-0.09 (-0.63, 0.45)	0.31 (-0.18, 0.81)
V10	1.16 (0.24, 2.07)	1.17 (0.57, 1.77)	1.22 (0.65, 1.79)	0.80 (-0.30, 1.90)	0.88 (-0.30, 2.07)	0.99 (0.42, 1.56)	-0.45 (-1.92, 1.02)	0.38 (-0.39, 1.15)	0.29 (-0.36, 0.93)	SP	-0.77 (-1.45,-0.08)	0.19 (-0.49, 0.87)
V11	0.52 (-0.24, 1.28)	0.53 (0.21, 0.86)	0.58 (0.36, 0.80)	0.16 (-0.80, 1.12)	0.25 (-0.81, 1.30)	0.35 (-0.04, 0.74)	-1.09 (-2.65, 0.47)	-0.26 (-0.89, 0.38)	-0.35 (-0.74, 0.04)	-0.64 (-1.18,-0.10)	RT	0.79 (0.42, 1.15)
V12	1.23 (0.41, 2.04)	1.24 (0.83, 1.65)	1.29 (0.96, 1.62)	0.87 (-0.13, 1.87)	0.95 (-0.14, 2.05)	1.06 (0.63, 1.49)	-0.38 (-1.95, 1.19)	0.45 (-0.19, 1.09)	0.36 (-0.07, 0.78)	0.07 (-0.48, 0.62)	0.71 (0.40, 1.02)	RC
Relative effects of NMA (column compared with row)												

Pairwise (upper right portion) and network (lower left portion) meta-analysis results are presented for mean change (from baseline) in global function. Effect estimation is presented in standardized mean difference with 95% confidence interval. Significant results (p <0.05) are marked in red.

MP, milk protein; RC, regular care; RT, resistance training; SP, soy protein; WP, whey protein.

Supplementary table S4. League table for pairwise and network meta-analysis of mean change in handgrip strength from baseline

Direct evidence of pairwise meta-analyses (row compared with column)									
	V1	V2	V3	V4	V5	V6	V7	V8	V9
V1	WP+RT	0.43 (-1.50, 2.36)	.	1.93 (-0.04, 3.90)	.	0.86 (0.11, 1.61)	.	0.31 (-0.16, 0.79)	1.53 (0.88, 2.19)
V2	0.06 (-0.85, 0.98)	SP+RT	0.18 (-1.73, 2.09)	.	.	.	2.46 (0.44, 4.48)	0.45 (-0.52, 1.42)	1.51 (0.11, 2.90)
V3	0.19 (-0.55, 0.92)	0.12 (-0.88, 1.12)	MP+RT	.	.	.	.	0.39 (-0.26, 1.04)	0.22 (-1.68, 2.13)
V4	0.22 (-1.11, 1.55)	0.16 (-1.39, 1.71)	0.03 (-1.41, 1.48)	Casein+RT	.	.	.	-0.58 (-2.52, 1.37)	2.98 (0.99, 4.97)
V5	2.32 (0.59, 4.06)	2.26 (0.37, 4.15)	2.14 (0.33, 3.94)	2.10 (-0.02, 4.23)	Meat+RT	.	.	-1.83 (-3.79, 0.12)	-0.88 (-2.82, 1.05)
V6	0.99 (0.31, 1.67)	0.93 (-0.14, 2.00)	0.80 (-0.11, 1.72)	0.77 (-0.67, 2.21)	-1.33 (-3.15, 0.48)	WP	.	-0.38 (-1.27, 0.51)	0.12 (-0.77, 1.01)
V7	1.16 (-0.52, 2.85)	1.10 (-0.61, 2.82)	0.98 (-0.77, 2.72)	0.94 (-1.14, 3.03)	-1.16 (-3.51, 1.19)	0.17 (-1.59, 1.94)	SP	-0.03 (-2.00, 1.94)	0.90 (-1.08, 2.88)
V8	0.47 (0.03, 0.92)	0.41 (-0.45, 1.27)	0.29 (-0.32, 0.89)	0.25 (-1.07, 1.58)	-1.85 (-3.56, -0.14)	-0.52 (-1.22, 0.18)	-0.69 (-2.34, 0.96)	RT	0.56 (-0.13, 1.26)
V9	1.46 (0.92, 2.00)	1.40 (0.47, 2.33)	1.27 (0.50, 2.04)	1.24 (-0.08, 2.56)	-0.87 (-2.57, 0.84)	0.47 (-0.26, 1.20)	0.29 (-1.37, 1.96)	0.99 (0.44, 1.53)	RC
Relative effects of NMA (column compared with row)									

Pairwise (upper right portion) and network (lower left portion) meta-analysis results are presented for mean change (from baseline) in global function. Effect estimation is presented in standardized mean difference with 95% confidence interval. Significant results (p <0.05) are marked in red.

MP, milk protein; RC, regular care; RT, resistance training; SP, soy protein; WP, whey protein.

Supplementary table S5. League table for pairwise and network meta-analysis of mean change in leg strength from baseline

Direct evidence of pairwise meta-analyses (row compared with column)											
	V1	V2	V3	V4	V5	V6	V7	V8	V9	V10	V11
V1	WP+RT	-0.12 (-1.02; 0.79)	0.74 (-0.50; 1.98)	.	0.33 (-0.85; 1.52)	1.30 (0.76; 1.84)	.	.	.	0.45 (0.20; 0.69)	1.30 (0.73; 1.87)
V2	0.08 (-0.32; 0.49)	MP+RT	0.32 (-0.87; 1.52)	.	.	.	.	0.70 (-0.13; 1.54)	.	0.34 (-0.08; 0.76)	0.69 (-0.47; 1.85)
V3	0.09 (-0.34; 0.51)	0.00 (-0.50; 0.50)	SP+RT	-0.42 (-1.81; 0.96)	.	.	1.92 (1.16; 2.68)	.	.	0.14 (-0.29; 0.57)	1.73 (1.14; 2.32)
V4	0.14 (-0.60; 0.88)	0.06 (-0.73; 0.85)	0.05 (-0.70; 0.81)	Meat+RT	.	.	.	.	.	0.13 (-0.68; 0.94)	.
V5	0.33 (-0.85; 1.52)	0.25 (-1.01; 1.50)	0.24 (-1.02; 1.50)	0.19 (-1.21; 1.59)	Casein+RT	.	.	.	.	.	.
V6	1.26 (0.78; 1.74)	1.17 (0.58; 1.77)	1.17 (0.58; 1.77)	1.12 (0.27; 1.97)	0.93 (-0.35; 2.21)	WP	.	.	.	-0.64 (-1.32; 0.03)	0.20 (-0.46; 0.85)
V7	1.38 (0.70; 2.05)	1.29 (0.57; 2.02)	1.29 (0.63; 1.95)	1.24 (0.29; 2.18)	1.04 (-0.32; 2.41)	0.12 (-0.66; 0.90)	SP	.	0.39 (-1.00; 1.77)	-0.58 (-1.47; 0.31)	0.41 (-0.32; 1.14)
V8	1.10 (0.39; 1.81)	1.02 (0.33; 1.70)	1.02 (0.26; 1.77)	0.96 (-0.02; 1.94)	0.77 (-0.61; 2.15)	-0.16 (-0.97; 0.66)	-0.27 (-1.18; 0.64)	MP	.	-0.47 (-1.63; 0.69)	-0.05 (-0.91; 0.82)
V9	1.76 (0.22; 3.30)	1.68 (0.11; 3.24)	1.67 (0.14; 3.21)	1.62 (-0.05; 3.30)	1.43 (-0.51; 3.37)	0.50 (-1.09; 2.09)	0.39 (-1.00; 1.77)	0.66 (-1.00; 2.32)	Meat	.	.
V10	0.43 (0.20; 0.66)	0.35 (-0.02; 0.71)	0.35 (-0.03; 0.72)	0.29 (-0.41; 1.00)	0.10 (-1.11; 1.31)	-0.83 (-1.31; -0.34)	-0.94 (-1.59; -0.30)	-0.67 (-1.36; 0.02)	-1.33 (-2.86; 0.20)	RT	0.94 (0.53; 1.36)
V11	1.41 (1.03; 1.79)	1.33 (0.86; 1.80)	1.32 (0.88; 1.77)	1.27 (0.49; 2.05)	1.08 (-0.17; 2.32)	0.15 (-0.37; 0.67)	0.03 (-0.61; 0.68)	0.31 (-0.38; 1.00)	-0.35 (-1.88; 1.18)	0.98 (0.63; 1.33)	RC
Relative effects of NMA (column compared with row)											

Pairwise (upper right portion) and network (lower left portion) meta-analysis results are presented for mean change (from baseline) in global function. Effect estimation is presented in standardized mean difference with 95% confidence interval. Significant results (p <0.05) are marked in red.
MP, milk protein; RC, regular care; RT, resistance training; SP, soy protein; WP, whey protein.

Supplementary table S6. League table for pairwise and network meta-analysis of mean change in walking speed from baseline

Direct evidence of pairwise meta-analyses (row compared with column)									
	V1	V2	V3	V4	V5	V6	V7	V8	V9
V1	WP+RT	.	.	-0.29 (-1.51; 0.93)	0.31 (-0.09; 0.70)	.	.	0.20 (-0.09; 0.49)	0.84 (0.43; 1.25)
V2	0.14 (-0.50; 0.78)	SP+RT	.	-0.27 (-1.44; 0.89)	.	0.37 (-0.82; 1.56)	.	0.22 (-0.46; 0.90)	0.55 (-0.28; 1.37)
V3	0.17 (-0.62; 0.97)	0.03 (-0.92; 0.99)	Meat+RT	.	.	.	.	0.20 (-0.60; 1.01)	0.04 (-1.15; 1.22)
V4	0.20 (-0.24; 0.64)	0.06 (-0.61; 0.73)	0.03 (-0.81; 0.87)	MP+RT	.	.	0.72 (-0.11; 1.54)	-0.04 (-0.46; 0.37)	0.19 (-0.94; 1.32)
V5	0.20 (-0.17; 0.57)	0.06 (-0.63; 0.74)	0.02 (-0.81; 0.86)	-0.00 (-0.52; 0.52)	WP	.	.	0.18 (-0.31; 0.67)	0.76 (0.30; 1.22)
V6	0.37 (-0.65; 1.40)	0.23 (-0.82; 1.28)	0.20 (-1.05; 1.44)	0.17 (-0.89; 1.23)	0.17 (-0.88; 1.23)	SP	.	-0.13 (-1.32; 1.06)	0.47 (-0.72; 1.66)
V7	0.95 (0.15; 1.75)	0.81 (-0.14; 1.76)	0.78 (-0.29; 1.85)	0.75 (0.00; 1.50)	0.76 (-0.09; 1.60)	0.58 (-0.67; 1.83)	MP	-0.53 (-1.66; 0.60)	-0.28 (-1.41; 0.85)
V8	0.22 (-0.05; 0.49)	0.07 (-0.53; 0.67)	0.04 (-0.71; 0.80)	0.02 (-0.36; 0.39)	0.02 (-0.36; 0.40)	-0.16 (-1.16; 0.85)	-0.74 (-1.51; 0.03)	RT	0.59 (0.22; 0.95)
V9	0.73 (0.39; 1.07)	0.59 (-0.03; 1.21)	0.56 (-0.23; 1.35)	0.53 (0.07; 1.00)	0.53 (0.13; 0.94)	0.36 (-0.65; 1.37)	-0.22 (-1.02; 0.57)	0.52 (0.19; 0.84)	RC
Relative effects of NMA (column compared with row)									

Pairwise (upper right portion) and network (lower left portion) meta-analysis results are presented for mean change (from baseline) in global function. Effect estimation is presented in standardized mean difference with 95% confidence interval. Significant results (p <0.05) are marked in red.
MP, milk protein; RC, regular care; RT, resistance training; SP, soy protein; WP, whey protein.

Supplementary table S7. League table for pairwise and network meta-analysis of mean change in chair rise from baseline

Direct evidence of pairwise meta-analyses (row compared with column)								
	V1	V2	V3	V4	V5	V6	V7	V8
V1	WP+RT	-0.00 (-0.71; 0.71)	0.25 (-0.57; 1.07)	.	.	0.85 (0.46; 1.25)	0.12 (-0.05; 0.29)	0.98 (0.64; 1.32)
V2	-0.04 (-0.46; 0.38)	SP+RT	.	.	.	.	0.17 (-0.29; 0.63)	0.92 (0.31; 1.54)
V3	0.22 (-0.04; 0.48)	0.26 (-0.20; 0.72)	MP+RT	.	0.31 (-0.37; 0.99)	.	-0.04 (-0.28; 0.20)	0.40 (-0.23; 1.03)
V4	0.49 (-0.11; 1.10)	0.53 (-0.18; 1.24)	0.27 (-0.35; 0.89)	Meat+RT	.	.	-0.35 (-0.93; 0.23)	.
V5	0.53 (-0.20; 1.26)	0.57 (-0.25; 1.39)	0.31 (-0.37; 0.99)	0.04 (-0.88; 0.95)	MP	.	.	.
V6	0.70 (0.36; 1.04)	0.74 (0.22; 1.25)	0.48 (0.08; 0.87)	0.20 (-0.47; 0.88)	0.17 (-0.62; 0.95)	WP	-0.55 (-0.95; -0.16)	0.02 (-0.36; 0.41)
V7	0.14 (-0.02; 0.31)	0.18 (-0.23; 0.59)	-0.08 (-0.30; 0.15)	-0.35 (-0.93; 0.23)	-0.38 (-1.10; 0.33)	-0.55 (-0.89; -0.21)	RT	0.82 (0.53; 1.11)
V8	0.84 (0.57; 1.10)	0.87 (0.44; 1.31)	0.62 (0.31; 0.92)	0.34 (-0.29; 0.97)	0.31 (-0.44; 1.05)	0.14 (-0.21; 0.49)	0.69 (0.44; 0.94)	RC

Relative effects of NMA (column compared with row)

Pairwise (upper right portion) and network (lower left portion) meta-analysis results are presented for mean change (from baseline) in global function. Effect estimation is presented in standardized mean difference with 95% confidence interval. Significant results (p <0.05) are marked in red.
MP, milk protein; RC, regular care; RT, resistance training; SP, soy protein; WP, whey protein.

Supplementary table S8. League table for pairwise and network meta-analysis of mean change in global physical mobility (SPPB) from baseline

Direct evidence of pairwise meta-analyses (row compared with column)						
	V1	V2	V3	V4	V5	V6
V1	WP+RT	.	.	0.01 (-1.23; 1.25)	0.03 (-0.52; 0.58)	1.79 (1.09; 2.48)
V2	0.49 (-0.21; 1.18)	MP+RT	.	.	-0.03 (-0.62; 0.56)	0.33 (-0.80; 1.46)
V3	0.55 (-0.76; 1.86)	0.07 (-1.31; 1.44)	Casein+RT	.	.	0.90 (-0.26; 2.06)
V4	0.25 (-0.81; 1.31)	-0.24 (-1.40; 0.93)	-0.30 (-1.90; 1.29)	WP	0.32 (-0.91; 1.56)	0.63 (-0.64; 1.89)
V5	0.29 (-0.23; 0.80)	-0.20 (-0.74; 0.34)	-0.27 (-1.61; 1.07)	0.04 (-1.03; 1.11)	RT	0.30 (-0.95; 1.55)
V6	1.45 (0.84; 2.07)	0.97 (0.22; 1.71)	0.90 (-0.26; 2.06)	1.21 (0.11; 2.30)	1.17 (0.49; 1.84)	RC
Relative effects of NMA (column compared with row)						

Pairwise (upper right portion) and network (lower left portion) meta-analysis results are presented for mean change (from baseline) in global function. Effect estimation is presented in standardized mean difference with 95% confidence interval. Significant results ($p < 0.05$) are marked in red. MP, milk protein; RC, regular care; RT, resistance training; SPPB, Short Physical Performance Battery; WP, whey protein.

Supplementary table S9. League table for pairwise and network meta-analysis of mean change in timed up-and-go task from baseline

	Direct evidence of pairwise meta-analyses (row compared with column)					
	V1	V2	V3	V4	V5	V6
V1	MP+RT	.	.	.	0.21 (-0.49; 0.90)	0.33 (-0.16; 0.82)
V2	0.17 (-0.54; 0.89)	WP+RT	.	0.48 (-0.12; 1.08)	0.03 (-0.15; 0.22)	.
V3	0.18 (-0.56; 0.92)	0.01 (-0.31; 0.32)	Meat+RT	.	0.03 (-0.23; 0.28)	.
V4	0.62 (-0.25; 1.49)	0.45 (-0.08; 0.97)	0.44 (-0.14; 1.03)	SP+RT	-0.38 (-0.98; 0.21)	.
V5	0.21 (-0.49; 0.90)	0.03 (-0.15; 0.22)	0.03 (-0.23; 0.28)	-0.42 (-0.94; 0.11)	RT	.
V6	0.33 (-0.16; 0.82)	0.15 (-0.72; 1.02)	0.15 (-0.74; 1.03)	-0.30 (-1.30; 0.70)	0.12 (-0.73; 0.97)	RC
Relative effects of NMA (column compared with row)						

Pairwise (upper right portion) and network (lower left portion) meta-analysis results are presented for mean change (from baseline) in global function. Effect estimation is presented in standardized mean difference with 95% confidence interval.

MP, milk protein; RC, regular care; RT, resistance training; SP, soy protein; WP, whey protein.

Table S10. Associations of moderators with treatment efficiency for main outcomes.

Moderator	Muscle mass						Muscle strength											
							Handgrip strength						Leg muscle strength					
	N	B	SE	Median	95% CrI		N	B	SE	Median	95% CrI		N	B	SE	Median	95% CrI	
Participant factor																		
Age	65	−0.268	0.0021	−0.27	−0.836,	0.319	32	0.152	0.0032	0.159	−0.760,	1.027	58	−0.623	0.0021	−0.622	−1.226,	−0.035
BMI	63	0.331	0.0018	0.331	−0.162,	0.839	30	−0.868	0.0039	−0.870	−1.944,	0.251	45	0.506	0.0024	0.503	−0.157,	1.185
Sex distribution ^b	64	−0.484	0.0026	−0.468	−1.204,	0.227	32	−1.719	0.0035	−1.720	−2.682,	−0.768	46	−0.151	0.0030	−0.143	−1.018,	0.671
Area of population ^c	65	−0.472	0.0026	−0.468	−1.177,	0.242	31	−1.036	0.0035	−1.036	−1.999,	−0.072	57	−0.860	0.0029	−0.855	−1.698,	−0.050
Health status ^d	65	0.743	0.0018	0.744	0.224,	1.247	32	0.16	0.0042	0.156	−1.012,	1.33	58	−0.709	0.0026	−0.709	−1.416,	0.001
Study design factor																		
ROB ^e	65	0.209	0.0025	0.209	−0.492,	0.899	32	0.209	0.0053	0.227	−1.280,	1.666	58	0.689	0.0027	0.684	−0.062,	1.432
Follow-up duration	65	−0.07	0.0014	−0.072	−0.454,	0.315	32	0.386	0.0057	0.386	−1.233,	2.009	58	−0.430	0.0016	−0.432	−0.873,	0.041
Intervention factor																		
PS dose	65	0.239	0.0025	0.242	−0.475,	0.929	32	0.239	0.0025	0.242	−0.475,	0.929	58	0.755	0.0025	0.752	0.060,	1.474
% 1-RM	61	0.141	0.0019	0.141	−0.417,	0.696	29	0.048	0.0034	0.044	−0.873,	0.998	47	0.425	0.0023	0.419	−0.211,	1.079
Treatment duration	65	−0.025	0.0014	−0.023	−0.419,	0.338	32	0.801	0.0053	0.819	−0.757,	2.204	58	−0.378	0.0015	−0.379	−0.807,	0.052

To be continued.

Table S10. Continued.

Moderator	Physical mobility																							
	Walking speed						Chair rise						Timed up and go						SPPB					
	N	B	SE	Median	95% CrI		N	B	SE	Median	95% CrI		N	B	SE	Median	95% CrI		N	B	SE	Median	95% CrI	
Participant factor																								
Age	34	−0.093	0.002	−0.089	−0.655,	0.447	27	−0.555	0.0045	−0.554	−1.816	0.702	11	0.042	0.0215	0.003	−6.272,	6.998	13	−0.363	0.0085	−0.332	−2.92	2.021
BMI	33	0.113	0.0019	0.114	−0.403,	0.638	26	0.222	0.0037	0.219	−0.806,	1.247	11	0.064	0.0129	−0.044	−3.230,	4.488	13	−1.846	0.0037	−1.843	−2.885,	−0.813
Sex distribution ^b	34	0.254	0.0019	−0.260	−0.254,	0.772	26	−0.079	0.0133	−0.081	−3.873,	3.721	10	0.208	0.0366	0.003	−5.546,	7.263	13	−1.614	0.003	−1.609	−2.471,	−0.785
Area of population ^c	34	−0.154	0.0017	−0.154	−0.635,	0.335	27	0.172	0.0042	0.172	−1.004,	1.35	11	0.383	0.0242	0.027	−5.686,	10.551	13	0.147	0.0053	0.134	−1.302,	1.638
Health status ^d	34	−0.279	0.002	−0.278	−0.832,	0.268	27	−1.214	0.0061	−1.218	−2.863,	0.482	11	−0.123	0.0017	−0.022	−5.595,	4.467	13	0.149	0.038	0.201	−12.667,	11.774
Study design factor																								
ROB ^e	34	0.471	0.0024	0.469	−0.173,	1.136	27	0.173	0.0064	0.155	−0.587,	2.007	11	−0.242	0.0266	−0.021	−10.733,	5.884	13	0.54	0.0465	0.153	−12.252,	16.765
Follow-up duration	34	−0.346	0.0015	−0.346	−0.781,	0.088	27	−0.054	0.0045	−0.079	−1.242,	1.243	11	−0.653	0.0273	−0.045	−10.950,	5.832	13	1.405	0.0023	1.404	0.772,	2.031
Intervention factor																								
PS dose	34	−0.169	0.0022	−0.168	−0.768,	0.424	27	0.081	0.0038	0.082	−0.973,	1.161	11	0.09	0.0273	0.001	−8.695,	9.259	13	−1.2	0.0056	−1.196	−2.816,	0.372
% 1-RM	31	0.099	0.0015	0.01	−0.319,	0.521	25	0.249	0.0039	0.261	−0.372,	1.242	11	−0.021	0.0213	−0.01	−6.394,	6.862	13	−0.841	0.0041	−0.879	−1.940,	0.455
Treatment duration	34	−0.294	0.0015	−0.297	−0.713,	0.143	27	0.085	0.008	0.07	−2.114,	2.364	11	−0.421	0.0299	0.001	−14.443,	7.278	13	1.411	0.0023	1.409	0.778,	2.051

^aData represents the change in effects associated with the moderator indicated. B, beta coefficient; SE, standard error; 95% CrI, 95% credibility interval. Significant results (p <0.05) are marked in bold.

^bThe proportion of female participants in sample.

^cCode for regression model: America = 1; Asian = 2; Europe = 3; Oceania = 4.

^dCode for regression model: Health = 1; Subhealthy = 2.

^eCode for regression model: Low risk of bias = 0; High risk of bias = 1.

% 1-RM, percentage of one repetition maximum; 95% CrI, credible interval; BMI, body mass index; PS, protein supplementation; ROB, risk of bias; SPPB, Short Physical Performance Battery.

Table S11. Summary of compliance & adverse events.

Study (year) (reference number) ^a	Study arm	Group sample (n)	Withdraw, attrition rate, or drop out (number of patients)				Side effects and complications (number of patients)				Serious adverse event ^b (number of patients)		
			Related to PS	Related to RT	Unrelated to treatment	Total sum	Related to PS	Related to RT	Unrelated to treatment	Total sum	Related to treatment	Unrelated to treatment	Total sum
Aas 2019 [1]	Gr 1: MP+RT	11	0	0	0	0	0	0	0	0	0	0	0
	Gr 2: RC	11			0	0			0	0	0	0	0
Amasene 2019 [2]; 2021 [3]	Gr 1: WP+RT	21	2	3	1	6	1	0	0	1	0	1	1
	Gr 2: PLA+RT	20	0	3	4	7	0	0	0	0	0	2	2
Arciero 2014 [4]	Gr 1: WP+RT	27	1	4	0	5	NR	NR	NR		NR	NR	
	Gr 2: WP	24	6		0	6	NR		NR		NR	NR	
Arnarson 2013 [5]	Gr 1: WP+RT	83	0	0	8	8	NR	NR	NR		NR	NR	
	Gr 2: PLA+RT	78	0	0	12	12	NR	NR	NR		NR	NR	
Bagheri 2022 [6]	Gr 1: WP+RT	14	0	0	0	0	0	0	0	0	0	0	0
	Gr 2: PLA+RT	14	0	0	0	0	0	0	0	0	0	0	0
Bijeh 2022 [7]	Gr 1: SP+RT	15	0	0	0	0	0	0	0	0	0	0	0
	Gr 2: RT	15		0	0	0		0	0	0	0	0	0
	Gr 3: SP	15	0		0	0	0		0	0	0	0	0
	Gr 4: RC	15			0	0			0	0	0	0	0
Candow 2006 [8]	Gr 1: WP+RT	25	0	0	6	6	NR	NR	NR		NR	NR	
	Gr 2: PLA+RT	13	0	0	3	3	NR	NR	NR		NR	NR	
Candow 2008 [9]	Gr 1: WP+Cre+RT	12	0	0	2	2	1	0	0	1	NR	NR	
	Gr 2: Cre+RT	14	0	0	1	1	1	1	0	2	NR	NR	
	Gr 3: PLA+RT	14	0	0	2	2	2	2	0	4	0	0	0
Chale 2013 [10]	Gr 1: WP+RT	42	0	0	3	3	4	1	9	14	0	6	6
	Gr 2: PLA+RT	38	0	0	2	2	2	3	15	20	0	3	3
Chang 2019 [11]	Gr 1: Casein+RT	28	0	0	0	0	NR	NR	NR		NR	NR	
	Gr 2: RC	28			0	0			NR		NR	NR	
Chen 2017 [12]	Gr 1: WP+RT	20	0	0	0	0	NR	NR	NR		NR	NR	
	Gr 2: RC	20			0	0			NR		NR	NR	
Colonetti 2023 [13]	Gr 1: WP+RT	10	0	2	0	2	0	0	0	0	0	0	0
	Gr 2: PLA+RT	10	0	0	0	0	0	0	0	0	0	0	0
	Gr 3: RC	10			2	2			0	0	0	0	0
Daly 2014 [14]	Gr 1: Meat+RT	53	0	0	5	5	0	2	0	2	0	0	0
	Gr 2: CHO+RT	47	0	0	4	4	0	2	0	2	0	0	0
de Azevedo Bach 2022 [15]	Gr 1: WP+RT	18	0	3	0	3	0	0	0	0	0	0	0
	Gr 2: PLA+RT	18	1	1	0	2	0	0	0	0	0	0	0
de Carvalho Bastone 2020 [16]	Gr 1: WP+RT	20	0	0	4	4	NR	NR	NR		NR	NR	
	Gr 2: RT	20		0	3	3		NR	NR		NR	NR	
	Gr 3: WP	20	0		2	2	NR		NR		NR	NR	
	Gr 4: RC	20			2	2			NR		NR	NR	
Deer 2019 [17]	Gr 1: WP+RT	20	0	0	4	4	NR	NR	NR		NR	NR	
	Gr 2: PLA+RT	21	0	0	4	4	NR	NR	NR		NR	NR	
	Gr 3: WP	20	0		5	5	NR		NR		NR	NR	
	Gr 4: PLA	20	0		7	7	NR		NR		NR	NR	

Deibert 2011 [18]	Gr 1: SP+RT	14	0	0	1	1	NR	NR	NR		NR	NR	
	Gr 2: RT	14		0	1	1		NR	NR		NR	NR	
	Gr 3: RC	12			3	3			NR		NR	NR	
Duff 2014 [19]	Gr 1: MP+RT	19	0	0	0	0	2	0	0	2	0	0	0
	Gr 2: WP+RT	21	0	0	1	1	3	0	0	3	0	0	0
Dulac 2021 [20]	Gr 1: WP+RT	25	0	0	4	4	0	0	0	0	0	0	0
	Gr 2: Casein+RT	25	0	0	5	5	0	0	0	0	0	0	0
	Gr 3: PLA+RT	25	0	0	6	6	0	0	0	0	0	0	0
Eliot 2008 [21]; Bemben 2010 [22]	Gr 1: WP+Cre+RT	11	0	0	0	0	0	0	0	0	0	0	0
	Gr 2: WP+RT	11	0	0	0	0	0	0	0	0	0	0	0
	Gr 3: Cre+RT	10	0	0	0	0	0	0	0	0	0	0	0
	Gr 4: PLA+RT	10	0	0	0	0	0	0	0	0	0	0	0
Fiatarone 1994 [23]	Gr 1: SP+RT	25	0	0	1	1	1	1	0	2	0	0	0
	Gr 2: PLA+RT	25	0	1	1	2	0	2	1	3	0	0	0
	Gr 3: SP	24	0		2	2	1		0	1	0	0	0
	Gr 4: PLA	26	0		1	1	0		0	0	0	0	0
Formica 2020 [24]	Gr 1: Meat+RT	77	0	0	4	4	0	6	0	6	0	0	0
	Gr 2: RT	77		0	5	5		7	0	7	0	0	0
Francis 2017 [25]	Gr 1: MP+RT	29	7	0	13	20	NR	NR	NR		NR	NR	
	Gr 2: MP	28	9		13	22	NR		NR		NR	NR	
Gade 2019 [26]	Gr 1: MP+RT	83	0	2	3	5	0	0	0	0	0	0	0
	Gr 2: PLA+RT	82	0	1	4	5	0	0	0	0	0	0	0
Granic 2020 [27]	Gr 1: Whole-MP+RT	10	0	0	1	1	0	0	0	0	0	0	0
	Gr 2: Skimmed-MP+I	10	0	0	0	0	0	0	0	0	0	0	0
	Gr 3: CHO+RT	10	0	0	0	0	0	0	0	0	0	0	0
Griffen 2022 [28]	Gr 1: WP+RT	9	0	0	0	0	0	0	0	0	0	0	0
	Gr 2: PLA+RT	10	0	0	1	1	0	1	0	1	0	0	0
	Gr 3: WP	10	0		1	1	0		0	0	0	0	0
	Gr 4: PLA	10	0		1	1	0		0	0	0	0	0
Gronstedt 2020 [29]	Gr 1: MP+RT	60	0	0	8	8	3	0	0	3	0	11	11
	Gr 2: RT	60		0	10	10		1	0	1	0	13	13
Hamarsland 2019 [30]	Gr 1: MP+RT	19	0	0	4	4	NR	NR	NR		NR	NR	
	Gr 2: WP+RT	19	0	0	4	4	NR	NR	NR		NR	NR	
Haß 2022 [31]	Gr 1: WP+Omega-3+	28	2	0	5	7	NR	NR	NR		NR	NR	
	Gr 2: WP+RT	27	2	0	5	7	NR	NR	NR		NR	NR	
	Gr 3: RT	22		0	2	2		NR	NR		NR	NR	
Haub 2002 [32]; 2005 [33]	Gr 1: Meat+RT	13	0	1	2	3	0	1	0	1	NR	NR	
	Gr 2: SP+RT	13	0	0	2	2	0	0	1	1	NR	NR	
He 2022 [34]	Gr 1: WP+RT	75	0	0	0	0	NR	NR	NR		NR	NR	
	Gr 2: RC	75			0	0			NR		NR	NR	
Holm 2008 [35]	Gr 1: WP+RT	13	0	0	5	5	NR	NR	NR		NR	NR	
	Gr 2: PLA+RT	16	0	0	4	4	NR	NR	NR		NR	NR	
Holwerda 2018 [36]	Gr 1: WP+RT	22	0	1	0	1	0	1	0	1	0	0	0
	Gr 2: PLA+RT	22	0	2	0	2	0	1	0	1	0	0	0
Kang 2020 [37]	Gr 1: MP+RT	60	0	0	6	6	1	0	2	3	0	0	0

Karelis 2015 [38]	Gr 2: PLA+RT	60	0	2	3	5	0	0	0	0	0	0	0
	Gr 1: WP+RT	49	1	3	4	8	1	2	0	3	0	0	0
	Gr 2: Casein+RT	50	1	2	4	7	1	1	0	2	0	0	0
Kemmler 2020a [39]; 2020b [40]	Gr 1: WP+RT	21	0	0	2	2	NR	NR	NR		NR	NR	
	Gr 2: WP	22	0		2	2	NR		NR		NR	NR	
Krause 2019 [41]	Gr 1: WP+RT	11	0	0	0	0	NR	NR	NR		NR	NR	
	Gr 2: PLA+RT	10	0	0	0	0	NR	NR	NR		NR	NR	
	Gr 3: WP	7	0		0	0	NR		NR		NR	NR	
	Gr 4: PLA	10	0		0	0	NR		NR		NR	NR	
Kukuljan 2009a [42]; 2009b [43]	Gr 1: MP+RT	45	0	0	1	1	0	5	0	5	0	0	0
	Gr 2: RT	46		0	1	1		5	0	5	0	0	0
	Gr 3: MP	45	0		1	1	0		0	0	0	0	0
	Gr 4: RC	44			2	2			0	0	0	0	0
Kwon 2015 [44]	Gr 1: Meat+RT	30	0	0	4	4	NR	NR	NR		NR	NR	
	Gr 2: RT	28		0	3	3		NR	NR		NR	NR	
	Gr 3: RC	31			3	3			NR		NR	NR	
Lamb 2020 [45]	Gr 1: Peanut+RT	22	0	1	1	2	NR	NR	NR		NR	NR	
	Gr 2: RT	19		0	0	0		NR	NR		NR	NR	
Leenders 2013 [46]	Gr 1: MP+RT	30	0	0	3	3	NR	NR	NR		NR	NR	
	Gr 2: PLA+RT	30	0	0	4	4	NR	NR	NR		NR	NR	
Liao 2021 [47]	Gr 1: WP+RT	36	0	0	1	1	0	0	0	0	0	0	0
	Gr 2: RT	36		0	2	2		0	0	0	0	0	0
Maesta 2007 [48]	Gr 1: SP+RT	15	1	0	0	1	1	0	0	1	0	0	0
	Gr 2: PLA+RT	15	2	0	2	4	2	0	0	2	0	0	0
	Gr 3: SP	15	3		2	5	3		0	3	0	0	0
	Gr 4: PLA	15	3		1	4	3		0	3	0	0	0
McKenna 2021 [49]	Gr 1: Meat+RT	28	0	0	7	7	NR	NR	NR		NR	NR	
	Gr 2: RT	22		1	3	4		NR	NR		NR	NR	
Mertz 2021 [50]	Gr 1: WP+RT	72	0	0	10	10	NR	NR	NR		NR	NR	
	Gr 2: WP	50	0		6	6	NR		NR		NR	NR	
	Gr 3: PLA	36	0		2	2	NR		NR		NR	NR	
Miller 2021 [51]	Gr 1: WP+RT	98	0	1	10	11	35	11	0	46	0	0	0
	Gr 2: RT	100		3	17	20		12	0	12	0	0	0
Mitchell 2018 [52]	Gr 1: MP+RT	15	0	0	0	0	NR	NR	NR		NR	NR	
	Gr 2: PLA+RT	15	0	0	0	0	NR	NR	NR		NR	NR	
Molnar 2016 [53]	Gr 1: WP+RT	17	0	0	0	0	NR	NR	NR		NR	NR	
	Gr 2: RT	17		0	0	0		NR	NR		NR	NR	
Mori 2018 [54]	Gr 1: WP+RT	27	1	0	3	4	NR	NR	NR		NR	NR	
	Gr 2: RT	27		0	4	4		NR	NR		NR	NR	
	Gr 3: WP	27	1		2	3	NR		NR		NR	NR	
Mori 2022 [55]	Gr 1: WP+RT	27	0	0	2	2	NR	NR	NR		NR	NR	
	Gr 2: RT	27		0	2	2		NR	NR		NR	NR	
	Gr 3: WP	27	0		2	2	NR		NR		NR	NR	
Nabuco 2018 [56];	Gr 1: WP+RT	47	0	0	4	4	NR	NR	NR		NR	NR	
	Gr 2: PLA+RT	23	0	0	0	0	NR	NR	NR		NR	NR	

2019a [57]													
Nabuco 2019b [58]	Gr 1: WP+RT	13	0	0	0	0	NR	NR	NR			NR	NR
	Gr 2: PLA+RT	13	0	0	0	0	NR	NR	NR			NR	NR
Nabuco 2019c [59]	Gr 1: WP+RT	15	0	0	0	0	NR	NR	NR			NR	NR
	Gr 2: PLA+RT	15	0	0	0	0	NR	NR	NR			NR	NR
Nilsson 2020 [60]	Gr 1: MP+RT	22	0	0	6	6	NR	NR	NR			NR	NR
	Gr 2: PLA+RT	23	0	0	7	7	NR	NR	NR			NR	NR
Oesen 2015 [61]	Gr 1: WP+RT	36	0	0	11	11	0	0	0	0	0	0	0
	Gr 2: RT	41		0	10	10		0	0	0	0	0	0
	Gr 3: RC	40			14	14			0	0	0	0	0
Orsatti 2018 [62]	Gr 1: SP+RT	21	0	2	3	5	0	0	0	0	0	0	0
	Gr 2: PLA+RT	20	0	2	2	4	0	0	0	0	0	0	0
Roschel 2021 [63]	Gr 1: WP+RT	22	0	0	3	3	NR	NR	NR			NR	NR
	Gr 2: SP+RT	22	0	0	2	2	NR	NR	NR			NR	NR
	Gr 3: PLA+RT	22	0	0	1	1	NR	NR	NR			NR	NR
Seino 2018 [64]	Gr 1: MP+RT	41	3	0	0	3	2	0	0	2	0	0	0
	Gr 2: RT	41		0	1	1		0	0	0	0	0	0
Shahar 2013 [65]	Gr 1: SP+RT	17	0	0	2	2	NR	NR	NR			NR	NR
	Gr 2: RT	21		0	2	2		NR	NR			NR	NR
	Gr 3: SP	18	0		3	3	NR		NR			NR	NR
	Gr 4: RC	19			3	3			NR			NR	NR
Shenoy 2013 [66]	Gr 1: SP+RT	20	0	0	0	0	NR	NR	NR			NR	NR
	Gr 2: SP	20	0		0	0	NR		NR			NR	NR
	Gr 3: RC	20			0	0			NR			NR	NR
Soares 2023 [67]	Gr 1: WP+RT	14	0	0	1	1	NR	NR	NR			NR	NR
	Gr 2: PLA+RT	14	0	0	1	1	NR	NR	NR			NR	NR
Sugihara Junior 2018 [68]	Gr 1: WP+RT	15	0	0	0	0	NR	NR	NR			NR	NR
	Gr 2: PLA+RT	16	0	0	0	0	NR	NR	NR			NR	NR
Tang 2020 [69]	Gr 1: WP+RT	100	0	0	0	0	NR	NR	NR			NR	NR
	Gr 2: RC	100			0	0			NR			NR	NR
Thomson 2016 [70]	Gr 1: MP+RT	61	5	10	12	27	3	13	0	16	0	0	0
	Gr 2: SP+RT	64	6	20	12	38	1	13	0	14	0	0	0
	Gr 3: CHO+RT	62	15	13	11	39	4	12	0	16	0	0	0
Tieland 2012 [71];	Gr 1: MP+RT	31	0	0	5	5	NR	NR	NR			NR	NR
Dirks 2017 [72]	Gr 2: PLA+RT	31	0	0	6	6	NR	NR	NR			NR	NR
Trevisan 2010 [73]	Gr 1: SP+RT	15	0	0	0	0	NR	NR	NR			NR	NR
	Gr 2: PLA+RT	15	0	0	0	0	NR	NR	NR			NR	NR
	Gr 3: SP	15	0		0	0	NR		NR			NR	NR
	Gr 4: PLA	15	0		0	0	NR		NR			NR	NR
Unterberger 2022 [74]	Gr 1: SP+RT	48	0	0	9	9	0	0	0	0	0	0	0
	Gr 2: PLA+RT	41	0	0	5	5	0	0	0	0	0	0	0
	Gr 3: RC	47			6	6			0	0	0	0	0
Verdijk 2009 [75]	Gr 1: Casein+RT	14	0	0	1	1	NR	NR	NR			NR	NR
	Gr 2: PLA+RT	14	0	0	1	1	NR	NR	NR			NR	NR
Verreijen 2015 [76]	Gr 1: WP+RT	40	0	3	5	8	0	3	0	3	0	0	0
	Gr 2: PLA+RT	40	0	3	4	7	0	3	0	3	0	0	0

Vijayakumaran 2023 [77]	Gr 1: WP+RT	8	0	0	0	0	0	0	0	0	0	0	0
	Gr 2: RT	8		0	0	0		0	0	0	0	0	0
Vikberg 2019 [78]	Gr 1: MP+RT	36	0	0	5	5	0	4	1	5	0	0	0
	Gr 2: RC	34			1	1			0	0	0	0	0
Villanueva 2014 [79]	Gr 1: WP+RT	8	0	0	1	1	0	0	0	0	0	0	0
	Gr 2: RT	8		0	1	1		0	0	0	0	0	0
	Gr 3: RC	9			1	1			0	0	0	0	0
Weisgarber 2015 [80]	Gr 1: WP+RT	17	0	0	2	2	0	0	0	0	0	0	0
	Gr 2: PLA+RT	17	0	0	3	3	0	0	0	0	0	0	0
Yamada 2019 [81]	Gr 1: WP+RT	28	2	2	2	6	0	0	0	0	0	0	0
	Gr 2: RT	28		2	2	4		0	0	0	0	0	0
	Gr 3: WP	28	4		2	6	0		0	0	0	0	0
	Gr 4: RC	28			2	2			0	0	0	0	0
Zdzieblik 2021 [82]	Gr 1: WP+RT	36	0	4	0	4	0	0	0	0	0	0	0
	Gr 2: PLA+RT	31	0	9	0	9	0	0	0	0	0	0	0
Zhao 2022 [83]	Gr 1: WP+RT	20	0	0	0	0	NR	NR	NR		NR	NR	
	Gr 2: WP	20	0			0	NR		NR		NR	NR	
	Gr 3: RC	20			0	0			NR		NR	NR	
Zhu 2019 [84]	Gr 1: SP+RT	36	0	0	8	8				4 ^c			12 ^c
	Gr 2: RT	40		0	16	16							
	Gr 3: RC	37			13	13							
Maltais 2016 [85]	Gr 1: MP+RT	10	0	0	2	2	NR	NR	NR		NR	NR	
	Gr 2: SP+RT	10	0	0	2	2	NR	NR	NR		NR	NR	
	Gr 3: PLA+RT	10	0	0	0	0	NR	NR	NR		NR	NR	

^aThe number denotes the citation of the indicated reference at the end of table.

^bThe reported events include cardiovascular onsets, fall injury, death, and other illness requiring inpatient hospitalization.

^cTotal number of participants in study.

CHO, carbohydrates; Cre, creatine; MP, milk protein; NR, not report; PLA, placebo; PS, protein supplementation; RT, resistance training; SP, soy protein; WP, whey protein RC, regular care.

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Table S12: Judgments in each domain of GRADE ranking system for muscle mass outcome

Treatment (Common comparator: RC)	Involved studies (n)	Participants (n)	Study limitation				Inconsistency (incoherence)				Indirection (transitivity)					Imprecision		Publication bias		Certainty of evidence ^a
			Contribution of risks of bias of direct estimates to network estimates			Judgment	Treatment effect, SMD (95%CI)			Judgment	P	I	C	O	Judgment	Network estimate	Judgment	Begg– Mazumdar rank correlation test	Judgment	
			High	Mod	Low		Direct estimate	Indirect estimate	Network estimate											
Casein+RT	2	46	46.17%	53.40%	0.44%	Serious limitations		0.87 (-0.13, 1.87)	0.87 (-0.13, 1.87)	No serious	Older people	PS+RT	RC, PLA, active comparator	LBM	No serious	0.87 (-0.13, 1.87)	Serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
Meat+RT	3	131	46.45%	53.29%	0.27%	Serious limitations		1.23 (0.41, 2.04)	1.23 (0.41, 2.04)	No serious	Older people	PS+RT	RC, PLA, active comparator	LBM	No serious	1.23 (0.41, 2.04)	No serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
MP+RT	16	490	27.61%	72.33%	0.05%	Serious limitations	1.31 (0.41, 2.22)	1.22 (0.77, 1.68)	1.24 (0.83, 1.65)	No serious	Older people	PS+RT	RC, PLA, active comparator	LBM	No serious	1.24 (0.83, 1.65)	No serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
Peanut+RT	1	20	45.08%	54.78%	0.14%	Serious limitations		0.95 (-0.14, 2.05)	0.95 (-0.14, 2.05)	No serious	Older people	PS+RT	RC, PLA, active comparator	LBM	No serious	0.95 (-0.14, 2.05)	Serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
SP+RT	11	207	9.26%	88.56%	2.20%	Serious limitations	1.06 (0.49, 1.63)	1.05 (0.40, 1.70)	1.06 (0.63, 1.49)	No serious	Older people	PS+RT	RC, PLA, active comparator	LBM	No serious	1.06 (0.63, 1.49)	No serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
WP+RT	40	991	7.15%	91.88%	0.97%	Serious limitations	1.36 (0.90, 1.83)	1.21 (0.74, 1.68)	1.29 (0.96, 1.62)	No serious	Older people	PS+RT	RC, PLA, active comparator	LBM	No serious	1.29 (0.96, 1.62)	No serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
Meat	1	10	43.18%	56.49%	0.32%	Serious limitations		-0.38 (-1.95, 1.19)	-0.38 (-1.95, 1.19)	No serious	Older people	PS	RC, PLA, active comparator	LBM	No serious	-0.38 (-1.95, 1.19)	Serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
MP	4	99	32.00%	67.88%	0.12%	Serious limitations	0.31 (-0.62, 1.24)	0.58 (-0.30, 1.74)	0.45 (-0.19, 1.09)	No serious	Older people	PS	RC, PLA, active comparator	LBM	No serious	0.45 (-0.19, 1.09)	Serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
SP	6	90	9.69%	89.89%	0.42%	Serious limitations	0.19 (-0.49, 0.87)	-0.17 (-1.11, 0.78)	0.07 (-0.48, 0.62)	No serious	Older people	PS	RC, PLA, active comparator	LBM	No serious	0.07 (-0.48, 0.62)	Serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
WP	10	203	12.29%	87.39%	0.35%	Serious limitations	0.31 (-0.18, 0.81)	0.46 (-0.33, 1.26)	0.36 (-0.07, 0.78)	No serious	Older people	PS	RC, PLA, active comparator	LBM	No serious	0.36 (-0.07, 0.78)	Serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕
RT	56	1399	9.64%	90.20%	0.18%	Serious limitations	0.79 (0.42, 1.15)	0.51 (-0.06, 1.09)	0.71 (0.40, 1.02)	No serious	Older people	RT	RC, PLA, active comparator	LBM	No serious	0.71 (0.40, 1.02)	No serious	<i>p</i> < 0.01	Serious	⊕⊕⊕⊕

^aCertainty of evidence is graded as follows: High: ⊕╕╕╕; Moderate: ⊕╕╕╕; Low: ⊕╕╕╕; Very low: ⊕╕╕╕.
CI, confidence interval; GRADE, Grading of Recommendations, Assessment, Development and Evaluations; LBM, lean body mass; MP, milk protein; PLA, placebo supplementation; PS, protein supplementation; RT, resistance training; SMD, standardized mean difference; SP, soy protein; WP, whey protein RC, regular care

Table S13: Judgments in each domain of GRADE framework for handgrip strength outcome

Treatment (Common comparator: RC)	Involved studies (n)	Participants (n)	Study limitation				Inconsistency (incoherence)				Indirection (transitivity)					Imprecision		Publication bias		Certainty of evidence ^a	
			Contribution of risks of bias of direct estimates to network estimates				Rate	Treatment effect, SMD (95%CI)			Rate	P	I	C	O	Rate	Network estimate	Rate	Begg– Mazumdar rank correlation test		Rate
			High	Mod	Low	Direct estimate	Indirect estimate	Network estimate													
Casein+RT	2	48	86.51%	10.82%	2.66%	Serious limitations	2.98 (0.99, 4.97)	-0.13 (-1.90, 1.64)	1.24 (-0.08, 2.56)	Serious	Older people	PS+RT	RC, PLA, active comparator	HG	No serious	1.24 (-0.08, 2.56)	Serious	<i>p</i> = 0.14	Undetected	⊕⊖⊖⊖	
Meat+RT	1	21	11.00%	86.44%	2.58%	Serious limitations	-0.88 (-2.82, 1.05)	-0.80 (-4.45, 2.85)	-0.87 (-2.57, 0.84)	No serious	Older people	PS+RT	RC, PLA, active comparator	HG	No serious	-0.87 (-2.57, 0.84)	Serious	<i>p</i> = 0.14	Undetected	⊕⊕⊖⊖	
MP+RT	9	368	34.14%	60.42%	5.43%	Serious limitations	0.22 (-1.68, 2.13)	1.48 (0.64, 2.32)	1.27 (0.50, 2.04)	No serious	Older people	PS+RT	RC, PLA, active comparator	HG	No serious	1.27 (0.50, 2.04)	No serious	<i>p</i> = 0.14	Undetected	⊕⊕⊕⊖	
SP+RT	4	99	20.46%	24.56%	54.99%	No serious limitations	1.51 (0.11, 2.90)	1.31 (0.60, 2.56)	1.40 (0.47, 2.33)	No serious	Older people	PS+RT	RC, PLA, active comparator	HG	No serious	1.40 (0.47, 2.33)	No serious	<i>p</i> = 0.14	Undetected	⊕⊕⊕⊕	
WP+RT	19	596	65.33%	29.84%	4.82%	Serious limitations	1.53 (0.88, 2.19)	1.30 (0.34, 2.26)	1.46 (0.92, 2.00)	No serious	Older people	PS+RT	RC, PLA, active comparator	HG	No serious	1.46 (0.92, 2.00)	No serious	<i>p</i> = 0.14	Undetected	⊕⊕⊕⊖	
SP	1	15	12.52%	16.60%	70.87%	No serious limitations	0.90 (-1.08, 2.88)	-1.17 (-4.24, 1.91)	0.29 (-1.37, 1.96)	No serious	Older people	PS	RC, PLA, active comparator	HG	No serious	0.29 (-1.37, 1.96)	Serious	<i>p</i> = 0.14	Undetected	⊕⊕⊕⊖	
WP	6	121	83.35%	13.55%	3.11%	Serious limitations	0.12 (-0.77, 1.01)	1.19 (-0.09, 2.48)	0.47 (-0.26, 1.20)	No serious	Older people	PS	RC, PLA, active comparator	HG	No serious	0.47 (-0.26, 1.20)	Serious	<i>p</i> = 0.14	Undetected	⊕⊕⊖⊖	
RT	25	737	33.37%	58.84%	7.77%	Serious limitations	0.56 (-0.13, 1.26)	1.65 (0.78, 2.52)	0.99 (0.44, 1.53)	No serious	Older people	RT	RC, PLA, active comparator	HG	No serious	0.99 (0.44, 1.53)	No serious	<i>p</i> = 0.14	Undetected	⊕⊕⊕⊖	

^aCertainty of evidence is graded as follows: High: ⊕⊕⊕⊕; Moderate: ⊕⊕⊕⊖; Low: ⊕⊕⊖⊖; Very low: ⊕⊖⊖⊖.
CI, confidence interval; GRADE, Grading of Recommendations, Assessment, Development and Evaluations; HG, handgrip strength; MP, milk protein; PLA, placebo supplementation; PS, protein supplementation; RT, resistance training; SMD, standardized mean difference; SP, soy protein; WP, whey protein RC, regular care

Table S14: Judgments in each domain of GRADE ranking system for leg strength outcome

Treatment (Common comparator: RC)	Involved studies (n)	Participants (n)	Study limitation				Inconsistency (incoherence)				Indirection (transitivity)					Imprecision		Publication bias		Certainty of evidence ^a
			Contribution of risks of bias of direct estimates to network estimates			Judgment	Treatment effect SMD (95%CI)			Judgment	P	I	C	O	Judgment	Network estimate	Judgment	Begg–Mazumdar rank correlation test	Judgment	
			High	Mod	Low		Direct estimate	Indirect estimate	Network estimate											
Casein+RT	1	33	39.88%	59.28%	0.86%	Serious limitations		1.08 (-0.17; 2.32)	1.08 (-0.17; 2.32)	No serious	Older people	PS+RT	RC, PLA, active comparator	Leg strength	No serious	1.08 (-0.17; 2.32)	Serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖
Meat+RT	3	130	45.89%	53.83%	0.26%	Serious limitations		1.27 (0.49; 2.05)	1.27 (0.49; 2.05)	No serious	Older people	PS+RT	RC, PLA, active comparator	Leg strength	No serious	1.27 (0.49; 2.05)	No serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖
MP+RT	11	309	21.89%	77.91%	0.20%	Serious limitations	0.69 (-0.47; 1.85)	1.45 (0.94, 1.97)	1.33 (0.86; 1.80)	No serious	Older people	PS+RT	RC, PLA, active comparator	Leg strength	No serious	1.33 (0.86; 1.80)	No serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖
SP+RT	10	204	6.60%	91.12%	2.27%	Serious limitations	1.73 (1.14; 2.32)	0.80 (0.13, 1.47)	1.32 (0.88; 1.77)	Serious	Older people	PS+RT	RC, PLA, active comparator	Leg strength	No serious	1.32 (0.88; 1.77)	No serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖
WP+RT	29	754	6.39%	92.35%	1.27%	Serious limitations	1.30 (0.73; 1.87)	1.50 (0.99, 2.01)	1.41 (1.03; 1.79)	No serious	Older people	PS+RT	RC, PLA, active comparator	Leg strength	No serious	1.41 (1.03; 1.79)	No serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖
Meat	1	10	40.29%	59.35%	0.38%	Serious limitations		-0.35 (-1.88; 1.18)	-0.35 (-1.88; 1.18)	No serious	Older people	PS	RC, PLA, active comparator	Leg strength	No serious	-0.35 (-1.88; 1.18)	Serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖
MP	3	88	23.23%	76.68%	0.09%	Serious limitations	-0.05 (-0.91; 0.82)	0.94 (-0.22, 2.09)	0.31 (-0.38; 1.00)	No serious	Older people	PS	RC, PLA, active comparator	Leg strength	No serious	0.31 (-0.38; 1.00)	Serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖
SP	4	70	2.72%	96.81%	0.50%	Serious limitations	0.41 (-0.32; 1.14)	-1.31 (-2.68, 0.07)	0.03 (-0.61; 0.68)	Serious	Older people	PS	RC, PLA, active comparator	Leg strength	No serious	0.03 (-0.61; 0.68)	Serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖
WP	5	127	12.93%	86.61%	0.46%	Serious limitations	0.20 (-0.46; 0.85)	0.07 (-0.80, 0.94)	0.15 (-0.37; 0.67)	No serious	Older people	PS	RC, PLA, active comparator	Leg strength	No serious	0.15 (-0.37; 0.67)	Serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖
RT	40	1040	7.66%	92.06%	0.25%	Serious limitations	0.94 (0.53; 1.36)	1.06 (0.41, 1.70)	0.98 (0.63; 1.33)	No serious	Older people	RT	RC, PLA, active comparator	Leg strength	No serious	0.98 (0.63; 1.33)	No serious	<i>p</i> < 0.01	Strongly suspected	⊕⊕⊕⊖

^aCertainty of evidence is graded as follows: High: ⊕⊕⊕⊕; Moderate: ⊕⊕⊕⊖; Low: ⊕⊕⊖⊖; Very low: ⊕⊖⊖⊖.

CI, confidence interval; GRADE, Grading of Recommendations, Assessment, Development and Evaluations; LBM, lean body mass; MP, milk protein; PLA, placebo supplementation; PS, protein supplementation; RT, resistance training; SMD, standardized mean difference; SP, soy protein; WP, whey protein RC, regular care

Table S15: Judgments in each domain of GRADE ranking system for walking speed outcome

Treatment (Common comparator: RC)	Involved studies (n)	Participants (n)	Study limitation				Inconsistency (incoherence)				Indirection (transitivity)					Imprecision		Publication bias		Certainty of evidence ^a
			Contribution of risks of bias of direct estimates to network estimates			Judgment	Treatment effect SMD (95%CI)			Judgment	P	I	C	O	Judgment	Network estimate	Judgment	Begg–Mazumdar rank correlation test	Judgment	
			High	Mod	Low		Direct estimate	Indirect estimate	Network estimate											
Meat+RT	2	101	41.24%	58.76%	0.00%	Serious limitations	0.04 (-1.15, 1.22)	0.97 (-0.08, 2.02)	0.56 (-0.23, 1.35)	No serious	Older people	PS+RT	RC, PLA, active comparator	Walking speed	No serious	0.56 (-0.23, 1.35)	Serious	<i>p</i> = 0.14	Undetected	⊕⊕⊖⊖
MP+RT	10	350	31.47%	68.53%	0.00%	Serious limitations	0.19 (-0.94, 1.32)	0.60 (0.09, 1.11)	0.53 (0.07, 1.00)	No serious	Older people	PS+RT	RC, PLA, active comparator	Walking speed	No serious	0.53 (0.07, 1.00)	No serious	<i>p</i> = 0.14	Undetected	⊕⊕⊕⊖
SP+RT	3	87	18.87%	81.13%	0.00%	Serious limitations	0.55 (-0.28, 1.37)	0.65 (-0.30, 1.60)	0.59 (-0.03, 1.21)	No serious	Older people	PS+RT	RC, PLA, active comparator	Walking speed	No serious	0.59 (-0.03, 1.21)	Serious	<i>p</i> = 0.14	Undetected	⊕⊕⊖⊖
WP+RT	21	601	25.39%	74.60%	0.00%	Serious limitations	0.84 (0.43, 1.25)	0.50 (-0.11, 1.10)	0.73 (0.39, 1.07)	No serious	Older people	PS+RT	RC, PLA, active comparator	Walking speed	No serious	0.73 (0.39, 1.07)	No serious	<i>p</i> = 0.14	Undetected	⊕⊕⊕⊖
MP	2	70	64.36%	35.66%	0.00%	Serious limitations	-0.28 (-1.41, 0.85)	-0.16 (-1.28, 0.96)	-0.22 (-1.02, 0.57)	No serious	Older people	PS	RC, PLA, active comparator	Walking speed	No serious	-0.22 (-1.02, 0.57)	Serious	<i>p</i> = 0.14	Undetected	⊕⊕⊖⊖
SP	3	24	70.25%	29.77%	0.00%	Serious limitations	0.47 (-0.72, 1.66)	0.08 (-1.82, 1.97)	0.36 (-0.65, 1.37)	No serious	Older people	PS	RC, PLA, active comparator	Walking speed	No serious	0.36 (-0.65, 1.37)	Serious	<i>p</i> = 0.14	Undetected	⊕⊕⊖⊖
WP	9	189	17.46%	82.55%	0.00%	Serious limitations	0.76 (0.30, 1.22)	-0.21 (-1.05, 0.62)	0.53 (0.13, 0.94)	Serious	Older people	PS	RC, PLA, active comparator	Walking speed	No serious	0.53 (0.13, 0.94)	No serious	<i>p</i> = 0.14	Undetected	⊕⊕⊖⊖
RT	29	872	26.45%	73.56%	0.00%	Serious limitations	0.59 (0.22, 0.95)	0.28 (-0.39, 0.95)	0.52 (0.19, 0.84)	No serious	Older people	RT	RC, PLA, active comparator	Walking speed	No serious	0.52 (0.19, 0.84)	No serious	<i>p</i> = 0.14	Undetected	⊕⊕⊕⊖

^aCertainty of evidence is graded as follows: High: ⊕⊕⊕⊕; Moderate: ⊕⊕⊕⊖; Low: ⊕⊕⊖⊖; Very low: ⊕⊖⊖⊖.
CI, confidence interval; GRADE, Grading of Recommendations, Assessment, Development and Evaluations; LBM, lean body mass; MP, milk protein; PLA, placebo supplementation; PS, protein supplementation; RT, resistance training; SMD, standardized mean difference; SP, soy protein; WP, whey protein RC, regular care

Table S16: Judgments in each domain of GRADE ranking system for chair rise outcome

Treatment (Common comparator: RC)	Involved studies (n)	Participants (n)	Study limitation				Inconsistency (incoherence)				Indirection (transitivity)					Imprecision		Publication bias		Certainty of evidence ^a
			Contribution of risks of bias of direct estimates to network estimates			Judgment	Treatment effect SMD (95%CI)			Judgment	P	I	C	O	Judgment	Network estimate	Judgment	Begg–Mazumdar rank correlation test	Judgment	
			High	Mod	Low		Direct estimate	Indirect estimate	Network estimate											
Meat+RT	1	43	20.68%	74.68%	4.66%	Serious limitations		0.34 (-0.29, 0.97)	0.34 (-0.29, 0.97)	No serious	Older people	PS+RT	RC, PLA, active comparator	Chair rise	No serious	0.34 (-0.29, 0.97)	Serious	<i>p</i> = 0.72	Undetected	⊕⊕⊖⊖
MP+RT	10	307	39.35%	56.54%	4.12%	Serious limitations	0.40 (-0.23, 1.03)	0.68 (0.33, 1.04)	0.62 (0.31, 0.92)	No serious	Older people	PS+RT	RC, PLA, active comparator	Chair rise	No serious	0.62 (0.31, 0.92)	No serious	<i>p</i> = 0.72	Undetected	⊕⊕⊕⊖
SP+RT	2	58	18.69%	19.10%	62.21%	No serious limitations	0.92 (0.31, 1.54)	0.82 (0.20, 1.45)	0.87 (0.44, 1.31)	No serious	Older people	PS+RT	RC, PLA, active comparator	Chair rise	No serious	0.87 (0.44, 1.31)	No serious	<i>p</i> = 0.72	Undetected	⊕⊕⊕⊕
WP+RT	16	488	49.42%	44.70%	5.88%	Serious limitations	0.98 (0.64, 1.32)	0.61 (0.20, 1.03)	0.84 (0.57, 1.10)	No serious	Older people	PS+RT	RC, PLA, active comparator	Chair rise	No serious	0.84 (0.57, 1.10)	No serious	<i>p</i> = 0.72	Undetected	⊕⊕⊕⊖
MP	2	25	57.59%	39.29%	3.10%	Serious limitations		0.31 (-0.44, 1.05)	0.31 (-0.44, 1.05)	No serious	Older people	PS	RC, PLA, active comparator	Chair rise	No serious	0.31 (-0.44, 1.05)	Serious	<i>p</i> = 0.72	Undetected	⊕⊕⊖⊖
WP	4	70	81.51%	15.63%	2.86%	Serious limitations	0.02 (-0.36, 0.41)	0.75 (-0.13, 1.63)	0.14 (-0.21, 0.49)	No serious	Older people	PS	RC, PLA, active comparator	Chair rise	No serious	0.14 (-0.21, 0.49)	Serious	<i>p</i> = 0.72	Undetected	⊕⊕⊖⊖
RT	24	737	30.55%	62.56%	6.89%	Serious limitations	0.82 (0.53, 1.11)	0.35 (-0.12, 0.83)	0.69 (0.44, 0.94)	No serious	Older people	RT	RC, PLA, active comparator	Chair rise	No serious	0.69 (0.44, 0.94)	No serious	<i>p</i> = 0.72	Undetected	⊕⊕⊕⊖

^aCertainty of evidence is graded as follows: High: ⊕⊕⊕⊕; Moderate: ⊕⊕⊕⊖; Low: ⊕⊕⊖⊖; Very low: ⊕⊖⊖⊖.
CI, confidence interval; GRADE, Grading of Recommendations, Assessment, Development and Evaluations; LBM, lean body mass; MP, milk protein; PLA, placebo supplementation; PS, protein supplementation; RT, resistance training; SMD, standardized mean difference; SP, soy protein; WP, whey protein RC, regular care

Table S17: Judgments in each domain of GRADE ranking system for timed up-and-go outcome

Treatment (Common comparator: RC)	Involved studies (n)	Participants (n)	Study limitation				Inconsistency (incoherence)				Indirection (transitivity)					Imprecision		Publication bias		Certainty of evidence ^a
			Contribution of risks of bias of direct estimates to network estimates			Judgment	Treatment effect SMD (95%CI)			Judgment	P	I	C	O	Judgment	Network estimate	Judgment	Begg–Mazumdar rank correlation test	Judgment	
			High	Mod	Low		Direct estimate	Indirect estimate	Network estimate											
Meat+RT	2	120	66.66%	33.33%	0.00%	Serious limitations		0.15 (-0.74, 1.03)	0.15 (-0.74, 1.03)	No serious	Older people	PS+RT	RC, PLA, active comparator	TUG	No serious	0.15 (-0.74, 1.03)	Serious	<i>p</i> = 0.17	Undetected	⊕⊕⊖⊖
MP+RT	2	47	100.00%	0.00%	0.00%	Serious limitations	0.33 (-0.16, 0.82)		0.33 (-0.16, 0.82)	No serious	Older people	PS+RT	RC, PLA, active comparator	TUG	No serious	0.33 (-0.16, 0.82)	Serious	<i>p</i> = 0.17	Undetected	⊕⊕⊖⊖
SP+RT	1	22	29.32%	41.35%	29.32%	Serious limitations		-0.30 (-1.30, 0.70)	-0.30 (-1.30, 0.70)	No serious	Older people	PS+RT	RC, PLA, active comparator	TUG	No serious	-0.30 (-1.30, 0.70)	Serious	<i>p</i> = 0.17	Undetected	⊕⊕⊖⊖
WP+RT	4	244	33.08%	65.39%	1.52%	Serious limitations		0.15 (-0.72, 1.02)	0.15 (-0.72, 1.02)	No serious	Older people	PS+RT	RC, PLA, active comparator	TUG	No serious	0.15 (-0.72, 1.02)	Serious	<i>p</i> = 0.17	Undetected	⊕⊕⊖⊖
RT	7	360	50.00%	50.00%	0.00%	Serious limitations		0.12 (-0.73, 0.97)	0.12 (-0.73, 0.97)	No serious	Older people	RT	RC, PLA, active comparator	TUG	No serious	0.12 (-0.73, 0.97)	Serious	<i>p</i> = 0.17	Undetected	⊕⊕⊖⊖

^aCertainty of evidence is graded as follows: High: ⊕╕╕╕; Moderate: ⊕╕╕⊖; Low: ⊕╕⊖⊖; Very low: ⊕⊖⊖⊖.
CI, confidence interval; GRADE, Grading of Recommendations, Assessment, Development and Evaluations; LBM, lean body mass; MP, milk protein; PLA, placebo supplementation; PS, protein supplementation; RT, resistance training; SMD, standardized mean difference; SP, soy protein; TUG, timed up and go; WP, whey protein RC, regular care

Table S18: Judgments in each domain of GRADE ranking system for global mobility (SPPB) outcome

Treatment (Common comparator: RC)	Involved studies (n)	Participants (n)	Study limitation				Inconsistency (incoherence)				Indirection (transitivity)					Imprecision		Publication bias		Certainty of evidence ^a		
			Contribution of risks of bias of direct estimates to network estimates			Judgment	Treatment effect SMD (95%CI)			Judgment	P	I	C	O	Judgment	Network estimate	Judgment	Begg–Mazumdar rank correlation test	Judgment			
			High	Mod	Low		Direct estimate	Indirect estimate	Network estimate													
Casein+RT	1	28	100.00%	0.00%	0.00%	Serious limitations	0.90 (-0.26, 2.06)			0.90 (-0.26, 2.06)	No serious	Older people	PS+RT	RC, PLA, active comparator	SPPB	No serious	0.90 (-0.26, 2.06)	Serious	<i>p</i> = 0.38	Undetected	⊕⊕⊖⊖	
MP+RT	5	151	69.51%	30.49%	0.00%	Serious limitations	0.33 (-0.80, 1.46)			1.46 (0.47, 2.45)	0.97 (0.22, 1.71)	No serious	Older people	PS+RT	RC, PLA, active comparator	SPPB	No serious	0.97 (0.22, 1.71)	No serious	<i>p</i> = 0.38	Undetected	⊕⊕⊕⊖
WP+RT	7	222	83.29%	16.70%	0.00%	Serious limitations	1.79 (1.09, 2.48)			022 (-1.12, 1.56)	1.45 (0.84, 2.07)	Serious	Older people	PS+RT	RC, PLA, active comparator	SPPB	No serious	1.45 (0.84, 2.07)	No serious	<i>p</i> = 0.38	Undetected	⊕⊕⊖⊖
WP	3	15	26.44%	73.57%	0.00%	Serious limitations	0.63 (-0.64, 1.89)			2.94 (0.75, 5.14)	1.21 (0.11, 2.30)	No serious	Older people	PS	RC, PLA, active comparator	SPPB	No serious	1.21 (0.11, 2.30)	No serious	<i>p</i> = 0.38	Undetected	⊕⊕⊕⊖
RT	9	209	64.04%	35.95%	0.00%	Serious limitations	0.30 (-0.95, 1.55)			1.53 (0.72, 2.33)	1.17 (0.49, 1.84)	No serious	Older people	RT	RC, PLA, active comparator	SPPB	No serious	1.17 (0.49, 1.84)	No serious	<i>p</i> = 0.38	Undetected	⊕⊕⊕⊖

^aCertainty of evidence is graded as follows: High: ⊕⊕⊕⊕; Moderate: ⊕⊕⊕⊖; Low: ⊕⊕⊖⊖; Very low: ⊕⊖⊖⊖.
CI, confidence interval; GRADE, Grading of Recommendations, Assessment, Development and Evaluations; LBM, lean body mass; MP, milk protein; PLA, placebo supplementation; PS, protein supplementation; RT, resistance training; SMD, standardized mean difference; SP, soy protein; SPPB, Short Physical Performance Battery; WP, whey protein RC, regular care