

## Supplementary Material

**Table i.** PICOS (population, intervention, comparator, outcome, setting) criteria used to perform the systematic review

Criteria	Description
Population	C57BL/6 mice used to study osteoarthritis
Intervention	High-fat diet: percentage of calories derived from fat ranged from 32% to 60%, as described in each study
Comparator	Control diet: percentage of calories derived from fat ranged from 4.2% to 13.5%, as described in each study
Outcome	Primary: cartilage damage and alterations measured with Osteoarthritis Research Society International (OARSI) or Mankin Score; progression of osteoarthritis (OA) measured with OARSI or Mankin Score Secondary: change of levels of proinflammatory factors and biochemical parameters
Setting	Orthopaedics

**Table ii.** Search strategies

Database	Search terms
PubMed	((("osteoarthritis"[MeSH Terms] OR "osteoarthritis"[tiab]) OR ("arthritis"[MeSH Terms] OR "arthritis"[tiab]) OR "OA[tiab]" OR ("osteoarthritis"[MeSH Terms] OR "osteoarthritis"[tiab] OR "osteoarthrosis"[tiab]) OR ("joint diseases"[MeSH Terms] OR ("joint"[tiab] AND "diseases"[tiab]) OR "joint diseases"[tiab] OR "arthrosis"[tiab] OR "joint disease"[tiab] OR ("cartilage"[MeSH Terms] OR "cartilage"[tiab])) AND ("mice"[MeSH Terms] OR "mice"[tiab] OR "mouse"[tiab]) OR ("mice"[MeSH Terms] OR "mice"[tiab])) AND ("high fat diet"[tiab] OR "western diet"[tiab] OR "low fat diet"[tiab] OR ("fasting"[MeSH Terms] OR "fasting"[tiab]) OR ("diet"[MeSH Terms] OR "diet"[tiab]))
Embase	'osteoarthritis'/exp OR osteoarthritis OR 'arthritis'/exp OR arthritis OR 'oa' OR 'osteoarthrosis'/exp OR osteoarthrosis OR 'arthrosis'/exp OR arthrosis OR 'joint disease*' OR 'cartilage'/exp OR cartilage AND ('mouse'/exp OR mouse OR 'mice'/exp OR mice) AND ('high fat diet'/exp OR 'high fat diet' OR 'western diet'/exp OR 'western diet' OR 'low fat diet'/exp OR 'low fat diet' OR 'fasting'/exp OR fasting OR 'diet'/exp OR diet)
Scopus	TITLE-ABS-KEY (("osteoarthritis" OR "arthritis" OR "OA" OR osteoarthrosis OR arthrosis OR "joint disease" OR "joint diseases" OR cartilage) AND (mouse OR mice) AND ("high fat diet" OR "western diet" OR "low fat diet" OR fasting OR diet))
Web of Science	TS=("osteoarthritis" OR "arthritis" OR "OA" OR "osteoarthrosis" OR "arthrosis" OR "joint disease*" OR "cartilage") AND TS=("mouse OR mice") AND TS=("high fat diet" OR "western diet" OR "low fat diet" OR "fasting OR diet")

**Table iii.** Dietary information for high-fat diets and control diets

Study	Experimental model	kcal from fat, %		kcal from protein, %		kcal from carbohydrates, %		Source of fat		Fat composition		Type of carbohydrate		Protein	Sources of protein	Manufacturer; name of diets		
		HFD	CD	HFD	CD	HFD	CD	HFD	CD	HFD	CD	HFD	CD				HFD	CD
Alibula et al <sup>29</sup> (2016)	Diet	56.7	12.2	23.2	30.1	20.1	57.7	3:4 beef tallow; safflower oil	Cereal germ; soybean oil	SFA (22.3%); MFA (66.5%); PUFA (10.4%)	N/A	N/A	Corn starch, maltodextrin, lactose, sucrose	Wheat flour, corn, milo	N/A	Soybean; whitefish; yeast	CLEA Japan, Inc., Tokyo, Japan; HFD: high-fat diet 32 (HFD32) (high-fat diet for diabetes and obesity research); LFD: CLEA Rodent Diet CE-2 (for rearing and breeding)	
Asou et al <sup>5</sup> (2016)	Diet	56.7	12.2	23.2	30.1	20.1	57.7	3:4 beef tallow; safflower oil	Cereal germ; soybean oil	SFA (22.3%); MFA (66.5%); PUFA (10.4%)	N/A	N/A	Corn starch, maltodextrin, lactose, sucrose	Wheat flour, corn, milo	N/A	Soybean; whitefish; yeast	CLEA Japan, Inc.; HFD: high-fat diet 32 (HFD32) (high-fat diet for diabetes and obesity research); LFD: CLEA Rodent Diet CE-2 (for rearing and breeding)	
Barboza et al <sup>27</sup> (2017)	Diet	60	10	20	20	20	70	Lard; soybean oil	N/A	N/A	N/A	N/A	Sucrose; starch	Sucrose; starch	Casein; cystine	Milk (animal)	Research Diets, New Brunswick, New Jersey; HFD: D12492; control: D124508i	
Datta et al <sup>4</sup> (2017)	Diet + surgery	60.3	10.2	18.3	20	21.4	69.8	10:1 lard:soybean oil	1:1 lard:soybean oil	Approximate fatty acid profile (% of total fat): 37% saturated, 47% monounsaturated, 16% polyunsaturated	Approximate fatty acid profile (% of total fat): 29% saturated, 37% monounsaturated, 34% polyunsaturated	N/A	N/A	Maltodextrin, sucrose	Corn starch, maltodextrin, sucrose	Casein; L-cystine	Milk (animal)	Envigo - Harlan Teklad, Huntingdon, United Kingdom; TD 06414 (HFD); TD 06416 (LFD); LM-485 (normal chow)
Griffin et al <sup>34</sup> (2010)	Diet	45	10	20	20	20	70	7:1 lard:soybean oil	1:1:25 lard:soybean oil	N/A	N/A	N/A	Corn starch, maltodextrin, sucrose	Corn starch, maltodextrin, sucrose	Casein; L-cystine	N/A	Research Diets; D12451i (HFD); D124508i (LFD)	
Griffin et al <sup>35</sup> (2012)	Diet	60	13.5	20	28.5	20	58	N/A	N/A	N/A	N/A	N/A	Starch (31.9%), glucose (0.22 %), fructose (0.30 %), sucrose (3.70 %), lactose (2.01%)	Wheat flour, corn, milo	N/A	Soybean; whitefish; yeast	Research Diets (HFD); Purina (chow), Horley, United Kingdom; HFD: D12492; Purina Rodent chow: 5001	
Iwata et al <sup>31</sup> (2013)	Diet	56.7	12.2	23.2	30.1	20.1	57.7	3:4 beef tallow; safflower oil	Cereal germ; soybean oil	SFA (22.3%); MFA (66.5%); PUFA (10.4%)	N/A	N/A	Corn starch, maltodextrin, lactose, sucrose	Wheat flour, corn, milo	N/A	Soybean; whitefish; yeast	CLEA Japan, Inc.; HFD: high-fat diet 32 (HFD32) (high-fat diet for diabetes and obesity research); LFD: CLEA Rodent Diet CE-2 (for rearing and breeding)	
Kc et al <sup>30</sup> (2015)	Diet	35	18	36	24	29	58	Lard	N/A	N/A	N/A	N/A	Dextrose	Sucrose	Casein	Milk (animal)	Envigo - Harlan Teklad; Global 18% Protein Rodent Diet; LM-485 (normal chow)	
Kozijn et al <sup>28</sup> (2018)	Diet	45	10	20	20	35	70	7:1 lard:soybean oil	1:1:25 lard:soybean oil	N/A	N/A	N/A	Corn starch, maltodextrin, sucrose	Corn starch, maltodextrin, sucrose	Casein; L-cystine	N/A	Research Diets; D12451i (HFD); D124508i (LFD)	
Louet et al <sup>12</sup> (2012)	Diet	60	13.5	20	28.5	20	58	N/A	N/A	N/A	N/A	N/A	Starch (31.9%), glucose (0.22 %), fructose (0.30 %), sucrose (3.70 %), lactose (2.01%)	Wheat flour, corn, milo	N/A	Soybean; whitefish; yeast	Research Diets (HFD); Purina (chow); HFD: D12492; Purina Rodent chow: 5001	
	Diet + surgery	60	13.5	20	28.5	20	58	N/A	N/A	N/A	N/A	N/A	Starch (31.9%), glucose (0.22 %), fructose (0.30 %), sucrose (3.70 %), lactose (2.01%)	Wheat flour, corn, milo	N/A	N/A	N/A	

(Continued)

**Table iii.** (Continued)

Study	Experimental model	kcal from fat, %		kcal from protein, %		kcal from carbohydrates, %		Source of fat		Fat composition		Type of carbohydrate		Protein	Sources of protein	Manufacturer; name of diets
		HFD	CD	HFD	CD	HFD	CD	HFD	CD	HFD	CD	HFD	CD			
		60	10	20	20	20	20	70	70	Lard; soybean oil; N/A	N/A	N/A	N/A			
Mooney et al <sup>26</sup> (2011)	Diet + diet + surgery	60	10	20	20	20	70	Lard; soybean oil; N/A	N/A	N/A	N/A	Sucrose; starch	Casein; cysteine	Milk (animal)	Research Diets; HFD: D12492; control: D124508i	
O'Connor et al <sup>32</sup> (2013)	Diet	60	10	20	20	20	70	Lard; soybean oil	N/A	N/A	N/A	Sucrose; starch	Casein; cysteine	Milk (animal)	Research Diets; HFD: D12492; control: D124508i	
Triantaphyllidou et al <sup>17</sup> (2013)	Diet	42	10.6	15	29	43	60.4	Milk fat	SFA (62%), MFA (27%), PUFA (5%)	N/A	Corn starch, sucrose (1:2.3)	N/A	N/A	N/A	N/A	Mucedola SRL, Settimo Milanese, Italy
Wu et al <sup>6</sup> (2015)	Diet (nonoperative knee)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Diet (SFA) + surgery	60	10	20	70	20	20	20	Lard; soybean oil; coconut oil; menhaden oil	SFA (24.7%), MFA (16.7%), PUFA (15.6%), ω-6 FA: ω-3 FA = 10	SFA (1.9%), MFA (2.6%), PUFA (5.2%), ω-6 FA: ω-3 FA = 9.7	Sucrose	Casein; L-cysteine	Casein; L-cysteine	N/A	N/A	
Diet (ω-6 FA) + surgery	60	10	20	70	20	20	20	Lard; soybean oil; safflower oil; olive oil	SFA (14.6%), MFA (18.4%), PUFA (24.3%), ω-6 FA: ω-3 FA = 24.7	SFA (1.9%), MFA (2.6%), PUFA (5.2%), ω-6 FA: ω-3 FA = 9.8	Sucrose	Casein; L-cysteine	Casein; L-cysteine	N/A	N/A	
Diet (ω-3 FA) + surgery	60	10	20	70	20	20	20	Lard; soybean oil; safflower oil; olive oil; menhaden oil	SFA (15.4%), MFA (18.5%), PUFA (23.1%), ω-6 FA: ω-3 FA = 1.9	SFA (1.9%), MFA (2.6%), PUFA (5.2%), ω-6 FA: ω-3 FA = 9.9	Sucrose	Casein; L-cysteine	Casein; L-cysteine	N/A	N/A	

HFD, high-fat diet; CD, control diet; SFA, saturated fatty acids; MFA, monounsaturated fatty acids; PUFA, polyunsaturated fatty acids; N/A, not applicable; LFD, low-fat diet; ω-6 FA, omega-6 fatty acids; ω-3 FA, omega-3 fatty acids