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Supplemental Material

Exposure to per- and Polyfluoroalkyl Substances and Markers of Liver Injury: A Systematic Review and Meta-Analysis

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References

Additional File- Excel Document

Description of domains in Office of Health Assessment and Translation (OHAT) Risk of Bias tool

	Definitely low (++)	Probably Low (+)	Probably High (NR, -)	Definitely High (--)
Was administered dose or exposure level adequately randomized? (EA)	Authors explicitly describe the randomization procedures and there is a concurrent control group.	Authors state that randomization occurred, but do not describe the randomization procedure. Inequalities in treatment group sizes are not explained.	There is no description of the procedures used to allocated animals to treatment groups (NR), or there is indirect evidence that the procedures were not random.	Animals were allocated to treatment groups using a non-random method, or there was no appropriate control group.
Was allocation to study groups adequately concealed? (EA)	Authors state that allocation to study groups was concealed from study personnel at the time of randomization or treatment assignment, and that blinding was unlikely to be broken.	Though not stated explicitly it is implied that allocation to study groups was concealed from study personnel, or lack of concealment was unlikely to introduce bias.	There is no description of concealment procedures (NR), or lack of concealment may introduce bias.	Allocation to study groups was not concealed from study personnel, and this is likely to introduce bias.
Did selection of study participants result in appropriate comparison groups? (Co, CrSe)	Exposed and non-exposed participants were similar (recruited from the same base population, similar demographics, similar response/missing rates, etc).	Exposed and non-exposed participants are likely to be similar, but no direct evidence is provided.	Exposed and non-exposed participants are not likely to be similar, or there is insufficient information (NR).	Exposed and non-exposed participants were not similar (did not arise from the same base population, different response rates, different health status and risks, etc).
Did the study design or analysis account for important confounding and modifying variables? (Co, CrSe)	Authors provided comprehensive evidence-based justification for all confounding and modifying variables, and accounted for all risk factors (obesity, alcohol and smoking, type 2 diabetes, etc)	The analyses adjusted for, at minimum, BMI and alcohol use, or provided evidence-based justification for lack of adjustment.	The analyses failed to adjust for either BMI or alcohol use, without scientific justification (ie. 'variable was not available in the dataset').	The analysis did not control for any confounding or modifying variables.

Were experimental conditions identical across study groups? (EA)	Experimental conditions for treatment and control groups are described, and are identical.	Animal care conditions are not described in detail, but are stated to be identical across groups.	Animal care conditions are not described (NR) and are likely to differ between study groups.	Animal care conditions were not identical across study groups (ie., different vehicles).
Were the research personnel blinded to the study group during the study? (EA)	Authors state that study personnel were blinded to the study group for the entire study, and that blinding was unlikely to be broken.	Though not stated explicitly, it is implied that study personnel were blinded to study groups, or lack of blinding was unlikely to introduce bias.	There is no description of blinding (NR), or it is implied that study personnel were not blinded.	Study personnel were not blinded, and this is likely to introduce bias.
Were outcome data complete without attrition or exclusion from analysis? (Co, CrSe, EA)	There was no or insignificant loss of subjects and outcome data were complete. Any loss of animals was not related to the study conditions, or was treated as an outcome related to PFAS exposure.	There was attrition, but it was unlikely to introduce bias. Authors may state that there was no attrition/mortality without providing the initial sample size.	Sample sizes for outcomes vary without justification or explanation. No sample sizes/survival data are provided (NR).	There was significant loss of subjects from loss to follow up (humans) or death (animals), or large numbers of subjects were excluded from analysis.
Can we be confident in the exposure characterization? (Co, CrSe, EA)	EA: Purity of the experimental compound is described and is at or above 95%, confirmed by independent testing. The experimental compound was consistently administered throughout the study. Co, CrSe: Exposure was evaluated using the same method for all subjects. Exposure assessment method is the 'gold-standard' or directly measures exposure (in body fluids, environment).	EA: Purity is at or above 95%, with no independent testing, or is below 95% with independent testing. The experimental compound was consistently administered throughout the study. Co, CrSe: Exposure was assessed using well-established methods with high validity.	EA: Purity is not described (NR), or is below 95%. Co, CrSe: Exposure assessment method is not described (NR), or exposure was assessed using indirect measures (ie. questionnaires) that are not validated or well-established.	EA: the experimental compound was highly contaminated and/or administered inconsistently. Co, CrSe: Exposure was assessed using methods known to have poor validity.
Can we be confident in the outcome assessment? (Co, CrSe, EA)	Outcomes were assessed using the 'gold-standard' method, at the same time for all study groups, and	Outcomes were assessed using an acceptable but not 'gold-standard' method. Outcomes were	Outcome assessment and/or blinding not adequately described (NR).	Outcomes were assessed using an insensitive instrument, after different lengths of time, and were not

	outcome assessors were blinded to study group.	assessed at the same time for all study groups and assessors were blinded, or deviations from these criteria were not expected to introduce bias.	Methods used in outcome assessment were insensitive, or outcomes were not assessed at the same time for all study groups.	blinded, and these were expected to introduce significant bias.
Were all measured outcomes reported? (Co, CrSe, EA)	All outcomes described in the methods are completely reported in the results.	All outcomes described in the methods are reported in the results. EA: Histopathological results are lacking some detail, but this is unlikely to be due to selective reporting.	Not enough information is provided to evaluate the potential for selective reporting (NR). Outcomes described in the methods are not presented in the results. EA: Specific outcomes (ie., histopathological findings) not described in methods but are reported in the results. Outcomes were reported for some study groups but not others.	Outcomes were selectively reported for different study groups.
Were there other potential threats to internal validity?	Note concerns about the choice of statistical methods, adherence to study protocol, study design, or undue influence of study sponsors.			

NR: not reported; EA: experimental animal study; Co: cohort study; CrSe: cross sectional study

Review articles screened for additional eligible articles

Deierlein AL, Rock S, Park S. 2017. Persistent endocrine-disrupting chemicals and fatty liver disease. Current environmental health reports 4:439-449.

Fenton SE, Ducatman A, Boobis A, DeWitt JC, Lau C, Ng C, et al. 2021. Per- and polyfluoroalkyl substance toxicity and human health review: Current state of knowledge and strategies for informing future research. Environ Toxicol Chem 40:606-630.

Klaunig JE, Li X, Wang Z. 2018. Role of xenobiotics in the induction and progression of fatty liver disease. Toxicology Research 7:664-680.

Steenland K, Fletcher T, Savitz DA. 2010. Epidemiologic evidence on the health effects of perfluorooctanoic acid (pfoa). Environ Health Perspect 118:1100-1108.

Steenland K, Fletcher T, Stein CR, Bartell SM, Darrow L, Lopez-Espinosa MJ, et al. 2020. Review: Evolution of evidence on pfoa and health following the assessments of the c8 science panel. Environment International 145.

Treviño LS, Katz TA. 2018. Endocrine disruptors and developmental origins of nonalcoholic fatty liver disease. Endocrinology 159:20-31.

VoPham T. 2019. Environmental risk factors for liver cancer and nonalcoholic fatty liver disease. Curr Epidemiol Rep 6:50-66.

Table S1. Assessment of study quality by the OHAT approach[1] (human studies).

Author, Year	Selection of study participants resulted in appropriate comparison groups	Study design/analysis accounted for important confounding and modifying variables	Outcome data complete without attrition or exclusion from analysis	Confidence in the exposure characterization	Confidence in the outcome assessment	All measured outcomes reported	Other potential threats to internal validity
Attanasio (2019)[2] & Attanasio (2019b)[3]	++	+	++	++	++	++	None
Bassler et al. (2019)[4]	++	+	++	++	++	++	None
Darrow et al. (2016)[5]	++	+	++	+	++	++	None
Emmett et al. (2006)[6]	++	--	++	++	++	++	None
Gallo et al. (2012)[7]	+	+	+	++	++	++	None
Gilliland and Mandel (1996)[8]	+	+	++	+	++	++	None
Gleason et al. (2015)[9]	++	+	++	++	++	++	None
Jain and Ducatman (2019)[10]	++	+	+	++	++	++	None
Jain (2019)[11]	++	+	+	++	++	++	None
Jin et al. (2020)[12]	++	+	++	++	++	++	None
Khalil et al. (2019)[13]	++	+	++	++	++	++	None
Lin et al. (2010)[14]	++	+	++	++	++	++	None
Mora et al. (2018)[15]	++	+	+	++	++	++	None
Mundt et al. (2007)[16]	++	-	+	-	+	++	Few references provided. No standard errors reported.
Nian et al. (2019)[17]	++	+	++	++	+	++	None
Olsen et al. (1999)[18]	++	+	++	++	++	+	None
Olsen et al. (2003)[19]	++	+	++	+	++	+	None
Olsen and Zobel (2007)[20]	++	+	++	+	++	++	None
Rantakokko et al. (2015)[21]	++	+	++	++	++	++	None
Sakr et al. (2007)[22]	++	-	+	++	++	++	None
Sakr et al. (2007b)[23]	++	+	+	++	++	++	None
Salihovic et al. (2018)[24]	++	+	+	++	++	++	None
Sen et al. (2021)[25]	++	+	++	++	++	++	None
Stratakis et al. (2020)[26]	++	+	+	++	++	++	None
Yamaguchi et al. (2013)[27]	++	+	++	++	++	++	None

Legend: definitely low risk of bias (++); probably low risk of bias (+); probably high risk of bias (-); definitely high risk of bias (--); not reported (NR)
Four elements did not apply to cross-sectional and cohort studies and were excluded from the table.

Table S2. Assessment of study quality by the OHAT approach[1] (animal studies).

Author/Year	Administered dose/exposure level adequately randomized	Allocation to study groups adequately concealed	Experimental conditions identical across study groups	Research personnel blinded to the study group during the study	Outcome data complete without attrition or exclusion from analysis	Confidence in the exposure characterization	Confidence in the outcome assessment	All measured outcomes reported	Other potential threats to internal validity
Bagley et al. (2017)[28]	++	- (NR)	++	- (NR)	++	-	+	+	None
Bijland, et al. (2011)[29]	+	- (NR)	++	- (NR)	-	+	+	++	None
Blake et al. (2020)[30]	++	++	++	++	++	- (NR)	+	++	None
Botelho et al. (2015)[31]	- (NR)	- (NR)	++	- (NR)	++	+	+	++	None
Butenhoff et al. (2009)[32]	+	- (NR)	++	- (NR)	++	++	+	++	None
Butenhoff et al. (2012)[33]	+	- (NR)	++	- (NR)	++	++	+	++	None
Butenhoff et al. (2012b)[34]	++	- (NR)	++	- (NR)	+	+	-	-	Histopathology data was collected at different time points (weeks 14, 53, 104, and unscheduled termination) but is summarized all together.
Butenhoff et al. (2012c)[35]	++	- (NR)	++	- (NR)	++	++	+	++	None
Butenhoff et al. (2017)[36]	+	- (NR)	++	- (NR)	++	+	+	-	None
Chang et al. (2018)[37]	++	-	++	-	++	+	+	++	None
Chappel et al. (2020)[38]	- (NR)	- (NR)	++	- (NR)	- (NR)	-	+	++	None
Chengelis et al. (2009)[39]	+	- (NR)	++	- (NR)	++	++	+	++	None
Crebelli et al. (2019)[40]	+	- (NR)	++	- (NR)	++	- (NR)	+	++	None
Cui et al. (2019)[41]	+	- (NR)	++	- (NR)	++	++	+	++	None
Curran et al. (2008)[42]	- (NR)	- (NR)	++	- (NR)	++	+	+	++	None
Das et al. (2017)[43]	- (NR)	- (NR)	++	- (NR)	++	+	+	++	None
Deng et al. (2020)[44]	+	- (NR)	++	- (NR)	++	+	+	++	None
Ding et al. (2009)[45]	+	- (NR)	++	- (NR)	- (NR)	- (NR)	+	++	None
Elcombe et al. (2012a)[46]	+	- (NR)	++	- (NR)	++	-	+	++	None
Elcombe et al. (2012b)[47]	+	- (NR)	++	- (NR)	++	-	+	++	None
Fang et al. (2012)[48]	- (NR)	- (NR)	++	- (NR)	-	+	+	++	None
Fang et al. (2015)[49]	+	- (NR)	+	- (NR)	++	+	+	++	None
Foreman et al. (2009)[50]	+	- (NR)	++	- (NR)	- (NR)	- (NR)	+	++	None
Guo et al. (2019)[51]	+	- (NR)	++	- (NR)	-	+	+	++	None
Guo et al. (2021a)[52] & Guo et al. (2021b)[53]	+	- (NR)	++	- (NR)	+	+	+	++	None
Hamilton et al. (2021)[54]	- (NR)	- (NR)	++	- (NR)	++	- (NR)	+	+	None
Han et al. (2018a)[55]	+	- (NR)	++	- (NR)	++	+	+	++	None
Han et al. (2018b)[56]	+	- (NR)	++	- (NR)	++	+	+	++	None
Huang et al. (2020)[57]	+	- (NR)	++	- (NR)	++	+	+	++	None
Huck et al. (2018)[58]	- (NR)	- (NR)	++	- (NR)	- (NR)	- (NR)	+	++	None
Hui et al. (2017)[59]	+	- (NR)	++	- (NR)	- (NR)	+	+	++	None

Kato et al. (2015)[60]	++	- (NR)	++	- (NR)	++	++	+	++	None
Kim et al. (1998)[61]	- (NR)	- (NR)	- (NR)	- (NR)	- (NR)	- (NR)	+	++	None
Kim et al. (2011)[62]	+	- (NR)	++	- (NR)	++	+	+	++	None
Lai et al. (2017)[63]	- (NR)	- (NR)	++	- (NR)	- (NR)	- (NR)	+	++	None
Li D et al. (2019)[64]	+	- (NR)	++	- (NR)	+	+	+	++	None
Li X et al. (2019)[65]	+	- (NR)	++	- (NR)	++	+	+	++	None
Liang et al. (2019)[66]	+	- (NR)	++	- (NR)	- (NR)	- (NR)	+	++	None
Lieder et al. (2009)[67]	- (NR)	- (NR)	++	- (NR)	++	+	+	++	None
Liu et al. (2016)[68]	- (NR)	- (NR)	++	- (NR)	+	+	+	++	None
Luo et al. (2017)[69]	- (NR)	- (NR)	++	- (NR)	+	+	+	++	None
Lv et al. (2013)[70]	+	- (NR)	++	- (NR)	++	+	+	++	None
Lv et al. (2018)[71]	+	- (NR)	++	- (NR)	++	+	+	++	None
Marques et al. (2020)[72]	- (NR)	- (NR)	++	- (NR)	-	- (NR)	+	++	None
Marques et al. (2021)[73]	+	- (NR)	++	- (NR)	++	+	+	++	None
Martin et al. (2007)[74]	++	++	++	++	-	+	++	++	None
Minata et al. (2010)[75]	+	- (NR)	++	- (NR)	++	+	+	++	None
Nakagawa et al. (2012)[76]	- (NR)	- (NR)	++	- (NR)	++	- (NR)	+	++	None
Owumi et al. (2021)[77]	+	- (NR)	++	- (NR)	++	+	+	++	None
Pfohl et al. (2021)[78]	- (NR)	- (NR)	++	- (NR)	+	- (NR)	+	++	None
Pouwer et al. (2019)[79]	+	- (NR)	++	- (NR)	++	+	+	++	None
Qazi et al. (2010)[80]	- (NR)	- (NR)	++	- (NR)	++	+	+	++	None
Qazi et al. (2013a)[81]	+	- (NR)	++	- (NR)	+	+	+	+	None
Qazi et al. (2013b)[82]	+	- (NR)	++	- (NR)	+	+	+	++	None
Quist et al. (2015)[83]	- (NR)	- (NR)	++	- (NR)	++	+	+	++	None
Rigden et al. (2015)[84]	+	- (NR)	++	- (NR)	++	- (NR)	+	++	None
Roth et al. (2021)[85]	+	- (NR)	++	- (NR)	- (NR)	- (NR)	+	++	None
Schlezinger et al. (2020)[86]	- (NR)	- (NR)	+	- (NR)	+	++	+	++	None
Seacat et al. (2003)[87]	++	- (NR)	++	- (NR)	++	+	+	-	None
Shao et al. (2021)[88]	+	- (NR)	++	- (NR)	- (NR)	+	+	++	None
Shi et al. (2021)[89]	+	- (NR)	++	- (NR)	- (NR)	+	+	++	None
Son et al. (2008)[90]	+	- (NR)	++	- (NR)	++	+	+	++	None
Su et al. (2019)[91]	+	- (NR)	++	- (NR)	++	+	+	+	None
Takahashi et al. (2014)[92]	++	- (NR)	++	- (NR)	++	++	+	++	None
Tan et al. (2013)[93]	- (NR)	- (NR)	+	- (NR)	- (NR)	- (NR)	+	++	None
Van Esterik et al. (2016)[94]	- (NR)	- (NR)	++	- (NR)	++	+	+	++	None
Wan et al. (2012)[95]	+	- (NR)	++	- (NR)	+	+	+	++	None
Wan et al. (2016)[96]	+	- (NR)	++	- (NR)	++	+	+	++	None
Wang et al. (2015)[97]	+	- (NR)	++	- (NR)	-	+	+	++	None
Wang et al. (2017)[98]	+	- (NR)	++	- (NR)	-	+	+	++	None

Wang et al. (2021)[99]	+	- (NR)	++	- (NR)	+	- (NR)	+	++	None
Wang G et al. (2020)[100]	+	- (NR)	++	- (NR)	++	+	+	++	None
Wang D et al. (2020)[101]	+	- (NR)	++	- (NR)	++	+	+	++	None
Weatherly et al. (2021)[102]	+	-	++	-	++	+	+	++	None
Wu et al. (2017)[103]	+	- (NR)	++	- (NR)	- (NR)	+	+	++	None
Wu et al. (2018)	+	- (NR)	++	- (NR)	- (NR)	+	+	++	None
Xing et al. (2016)[104]	+	- (NR)	++	- (NR)	++	+	+	+	None
Yahia et al. (2010)[105]	- (NR)	- (NR)	++	- (NR)	-	-	+	++	None
Yan et al. (2014)[106]	+	- (NR)	++	- (NR)	++	+	+	++	None
Yan et al. (2015)[107]	+	- (NR)	+	- (NR)	-	+	+	++	None
Yang et al. (2014)[108]	- (NR)	- (NR)	++	- (NR)	- (NR)	+	+	++	None
Zhang et al. (2016)[109]	+	- (NR)	++	- (NR)	+	+	+	+	None
Zhang et al. (2018)[110]	- (NR)	- (NR)	+	- (NR)	+	+	+	++	None
Zou et al. (2015)[111]	+	- (NR)	++	- (NR)	-	+	+	++	None

Legend: definitely low risk of bias (++); probably low risk of bias (+); probably high risk of bias (-); definitely high risk of bias (--); not reported (NR)
Two elements did not apply to animal studies and were excluded from the table.

Table S3. Weighted Z-scores for the cross-sectional associations of PFAS with ALT and GGT in humans with selected exclusions.

	No. of Studies	Z-Score	P-Value
PFOA + ALT			
≥ 12 Years Old	8	6.20	1.30E-09
Men	4	2.80	0.0051
Women	3	3.33	0.00090
Removing Largest Study (Gallo et al. 2012)	7	2.07	0.038
NHANES Only	4	2.03	0.042
Adults + Children	11	5.68	2.53E-08
PFOA + GGT			
Removing Largest Study (Gallo et al. 2012)	7	2.50	0.012
NHANES Only	4	2.09	0.037
PFOS + ALT			
≥ 12 Years Old	6	3.55	0.00042
Removing Largest Study (Gallo et al. 2012)	5	1.11	0.27
NHANES Only	4	0.90	0.37
Adults + Children	8	3.27	0.0011
PFOS + GGT			
Removing Largest Study (Gallo et al. 2012)	5	0.47	0.65
NHANES Only	4	0.28	0.79

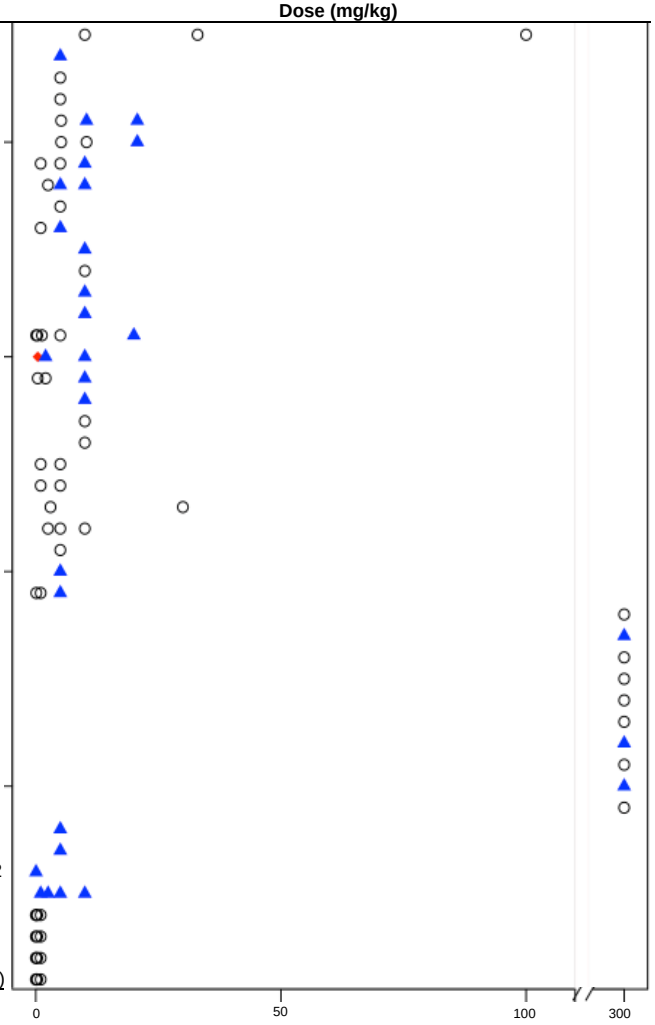
Note: perfluoroalkyl substance (PFAS); alanine aminotransferase (ALT); gamma-glutamyl transferase (GGT); perfluorooctanoic acid (PFOA); perfluorooctane sulfonic acid (PFOS); National Health and Nutrition Examination Survey (NHANES)

Table S4. Weighted Z-scores for the cross-sectional associations of PFAS with GGT and AST in humans ≥ 12 years old.

	No. of Studies	Z-Score	P-Value
GGT			
PFOA	8	4.13	4.32E-5
PFOS	6	1.13	0.26
PFNA	5	1.45	0.15
PFHxS	5	0.66	0.52
AST			
PFOA	6	1.95	0.050
PFOS	4	0.37	0.72
PFNA	4	0.95	0.35
PFHxS	4	1.50	0.13

Note: perfluoroalkyl substance (PFAS); gamma-glutamyl transferase (GGT); aspartate aminotransferase (AST); perfluorooctanoic acid (PFOA); perfluorooctane sulfonic acid (PFOS); perfluorononanoic acid (PFNA); perfluorohexane sulfonate (PFHxS)

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection	Dose (mg/kg)
Rigden et al. (2015)[84]	Rats	SD (M)	Gavage	PFOA	3D	EOT	
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA	28D	EOT	
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 25	28D	EOT	
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 50	28D	EOT	
Minata et al. (2010)[75]	Mice	129S4/SvlmJ (M)	Gavage	PFOA	4W	EOT	
Minata et al. (2010)[75]	Mice	PPARα-null (M)	Gavage	PFOA	4W	EOT	
Yahia et al. (2010)[105]	Mice	ICR (Dams)	Gavage	PFOA	GD0-GD17	EOT	
Yang et al. (2014)[108]	Mice	Kunming (M)	Gavage	PFOA	14D	EOT	
Wu et al. (2017)[103]	Mice	Kunming (M)	Gavage	PFOA	1D	EOT	
Wu et al. (2018)[112]	Mice	Kunming (M)	Gavage	PFOA	21D	EOT	
Zou et al. (2015)[111]	Mice	Kunming (M)	Gavage	PFOA	15D	EOT	
Zou et al. (2015)[111]	Mice	Kunming (M)	Gavage	PFOA + Que	15D	EOT	
Liu et al. (2016)[68]	Mice	Kunming (M)	Gavage	PFOA	14D	EOT	
Liu et al. (2016)[68]	Mice	Kunming (M)	Gavage	PFOA + GSPE	14D	EOT	
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	
Guo et al. (2019)[51]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	
Guo et al. (2021)[52]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 125	28D	EOT	
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 250	28D	EOT	
Blake et al. (2020)[30]	Mice	CD-1 (F)	Gavage	PFOA	E1.5-E11.5	E17.5	
Blake et al. (2020)[30]	Mice	CD-1 (F)	Gavage	PFOA	E1.5-E11.5	E11.5	
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	15D	EOT	
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	30D	EOT	
Tan et al. (2013)[93]	Mice	C57Bl/6N (M)	Diet	PFOA	3W	EOT	
Tan et al. (2013)[93]	Mice	C57Bl/6N (M)	Diet	PFOA + HFD	3W	EOT	
Crebelli et al. (2019)[40]	Mice	C57Bl/6 (M)	Water	PFOA	5W	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA	1D	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + Que	1D	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad1	1D	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad2	1D	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad1	1D	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad2	1D	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad1	1D	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad2	1D	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao1	1D	EOT	
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao2	1D	EOT	
Cui et al. (2019)[41]	Mice	C57BL/6J (M)	Gavage	PFOA	28D	EOT	
Cui et al. (2019)[41]	Mice	miR-34a(-/-) C57BL/6J (M)	Gavage	PFOA	28D	EOT	
Shao et al. (2021)[88]	Mice	ICR (M)	Prenatal	PFOA	GD13-17	PN Week 12	
Li D et al. (2019)[64]	Mice	Kunming (F)	Prenatal	PFOA	GD1-17	PD21	
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-17	PND91	
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA + LFD	GD1-17	PND91	
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA + HFD	GD1-17	PND91 (F)	
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA + HFD	GD1-17	PND91 (NF)	



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Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 3
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 6
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 12
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 18
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	EOT
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 3
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 6
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 12
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 18
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	EOT
Qazi et al. (2010)[80]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA + Con A	10D	EOT
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA	28D	EOT
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA + Con A	28D	EOT
Son et al. (2008)[90]	Mice	ICR (M)	Water	PFOA	21D	EOT

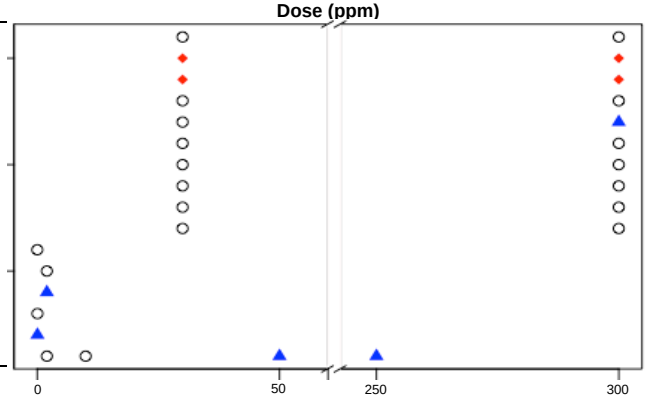
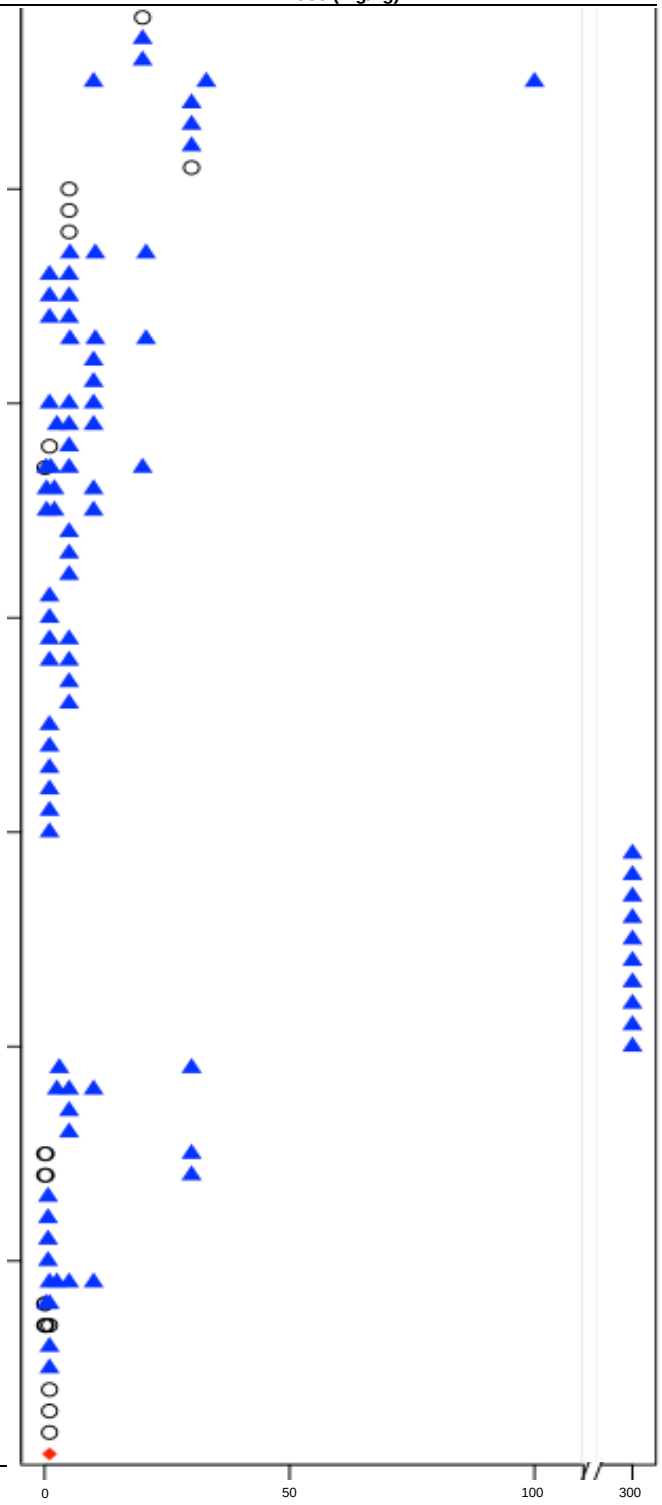


Figure S1. Strip plots for PFOA and AST in animal studies. Blue triangles indicate a significant increase in AST and red diamonds indicate a significant decrease in AST relative to control. Circles indicate no significant change in AST relative to control. *Abbreviations:* End of treatment (EOT); low fat diet (LFD); high fat diet (HFD); postnatal day (PND); gestational day (GD); embryonic day (E); Sprague Dawley (SD); 4-phenylbutyric acid (4-PBA); fasted (F); non-fasted (NF); concanavalin A (Con A); quecertin (Que); *N*-acetylcysteine (NAC); grape seed proanthocyanidin extract (GSPE). Additional exposures in Shi et al (2021) refer to lactic acid bacterial strains. An accessible version of this figure is available in Table S7.

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOA	1D	EOT
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOA	2D	EOT
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOA	5D	EOT
Rigden et al. (2015)[84]	Rats	SD (M)	Gavage	PFOA	3D	4D Post
Butenhoff et al. (2012a)[35]	Rats	SD (M)	Gavage	PFOA	28D	EOT
Butenhoff et al. (2012a)[35]	Rats	SD (F)	Gavage	PFOA	28D	EOT
Butenhoff et al. (2012a)[35]	Rats	SD (M)	Gavage	PFOA	28D	3W Post
Butenhoff et al. (2012a)[35]	Rats	SD (F)	Gavage	PFOA	28D	3W Post
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA	28D	EOT
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 25	28D	EOT
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 50	28D	EOT
Minata et al. (2010)[75]	Mice	129S4/Svlmj (M)	Gavage	PFOA	4W	EOT
Nakagawa et al. (2012)[76]	Mice	mPPARα (M)	Gavage	PFOA	6W	EOT
Nakagawa et al. (2012)[76]	Mice	hPPARα (M)	Gavage	PFOA	6W	EOT
Nakagawa et al. (2012)[76]	Mice	PPARα-null (M)	Gavage	PFOA	6W	EOT
Minata et al. (2010)[75]	Mice	PPARα-null (M)	Gavage	PFOA	4W	EOT
Das et a. (2017)[43]	Mice	PPARα-null (M)	Gavage	PFOA	7D	EOT
Das et a. (2017)[43]	Mice	SV129 (M)	Gavage	PFOA	7D	EOT
Yahia et al. (2010)[105]	Mice	ICR (Dams)	Gavage	PFOA	GD0-GD17	EOT
Yang et al. (2014)[108]	Mice	Kunming (M)	Gavage	PFOA	14D	EOT
Wu et al. (2018)[112]	Mice	Kunming (M)	Gavage	PFOA	21D	EOT
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT
Guo et al. (2019)[51]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT
Guo et al. (2021)[52]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 125	28D	EOT
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 250	28D	EOT
Marques et al. (2021)[73]	Mice	CD-1 (Dams)	Gavage	PFOA	GD1-PND21	EOT
Marques et al. (2021)[73]	Mice	CD-1 (Dams)	Gavage	PFOA + HFD	GD1-PND21	EOT
Blake et al. (2020)[30]	Mice	CD-1 (Dams)	Gavage	PFOA	E1.5-11.5	E17.5
Blake et al. (2020)[30]	Mice	CD-1 (Dams)	Gavage	PFOA	E1.5-11.5	EOT
Tan et al. (2013)[93]	Mice	C57BL/6N (M)	Diet	PFOA	3W	EOT
Tan et al. (2013)[93]	Mice	C57BL/6N (M)	Diet	PFOA+HFD	3W	EOT
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+LFD	16W	EOT
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+LFD	8W	EOT
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+LFD	2W	EOT
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+HFD	16W	EOT
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+HFD	8W	EOT
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+HFD	2W	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA	1D	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + Que	1D	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad1	1D	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad2	1D	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad1	1D	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad2	1D	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad1	1D	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad2	1D	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao1	1D	EOT
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao2	1D	EOT
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	15D	EOT
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	30D	EOT
Cui et al. (2019)[41]	Mice	C57BL/6J (M)	Gavage	PFOA	28D	EOT
Cui et al. (2019)[41]	Mice	miR-34a-/- C57BL/6J (M)	Gavage	PFOA	28D	EOT
Pouwer et al. (2019)[79]	Mice	APOE*3-Leiden CETP (M)	Diet	PFOA	6W	EOT
Pouwer et al. (2019)[79]	Mice	APOE*3-Leiden CETP (M)	Diet	PFOA	4W	EOT
Schlezinger et al. (2020)[86]	Mice	hPPARa (M)	Water	PFOA	6W	EOT
Schlezinger et al. (2020)[86]	Mice	PPARa-null (M)	Water	PFOA	6W	EOT
Schlezinger et al. (2020)[86]	Mice	hPPARa (F)	Water	PFOA	6W	EOT
Schlezinger et al. (2020)[86]	Mice	PPARa-null (F)	Water	PFOA	6W	EOT
Li D et al. (2019)[64]	Mice	Kunming (F)	Prenatal	PFOA	GD1-17	PND21
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-17	PND21
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-17	PND91
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOA	GD1-PND21	EOT
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOA + HFD	GD1-PND21	EOT
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-PND21	PND90
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOA + HFD	GD1-PND21	PND90
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOA	GD1-PND21	PND90
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOA + HFD	GD1-PND21	PND90



(Figure S2 continued on next page)

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection	Dose (ppm)
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	EOT	
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	EOT	
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	1Y	EOT	
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	1Y	EOT	
Botelho et al. (2015)[31]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT	
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT	
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA + Con A	10D	EOT	
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA	28D	EOT	
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA + Con A	28D	EOT	
Son et al. (2008)[90]	Mice	ICR (M)	Water	PFOA	21D	EOT	

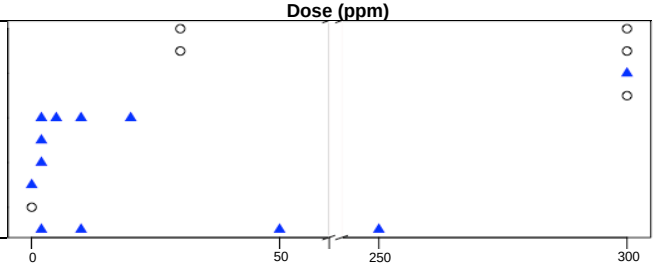
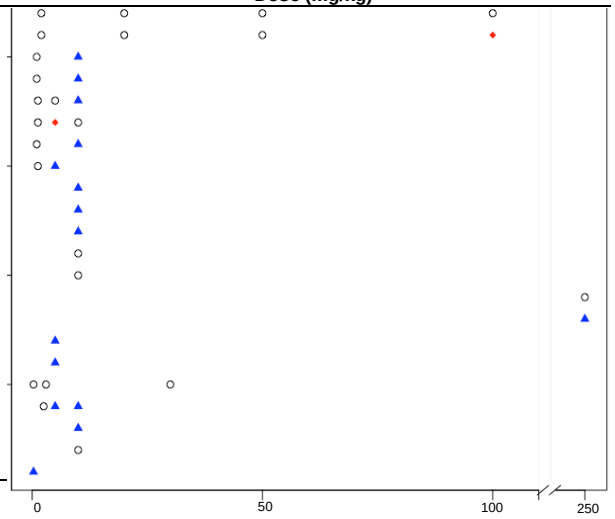


Figure S2. Strip plots for PFOA and relative liver weight in animal studies. Blue triangles indicate a significant increase in relative liver weight relative to control. Circles indicate no significant change in relative liver weight relative to control. Plots are ordered by species and strain. *Abbreviations:* End of treatment (EOT); low fat diet (LFD); high fat diet (HFD); postnatal day (PND); gestational day (GD); embryonic day (E); Sprague Dawley (SD); *N*-acetylcysteine (NAC); 4-phenylbutyric acid (4-PBA). Additional exposures in Shi et al (2021) refer to lactic acid bacterial strains. An accessible version of this figure is available in Table S8.

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection
Curran et al. (2008)[42]	Rats	SD (M)	Diet	PFOS	28D	EOT
Curran et al. (2008)[42]	Rats	SD (F)	Diet	PFOS	28D	EOT
Han et al. (2018a)[55]	Rats	SD (M)	Gavage	PFOS	28D	EOT
Han et al. (2018b)[56]	Rats	SD (M)	Gavage	PFOS	28D	EOT
Kim et al. (2011)[62]	Rats	SD (M)	Gavage	PFOS	28D	EOT
Kim et al. (2011)[62]	Rats	SD (F)	Gavage	PFOS	28D	EOT
Wan et al. (2016)[96]	Rats	SD (M)	Gavage	PFOS	28D	EOT
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOS	28D	EOT
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS	21D	EOT
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS + Nar	21D	EOT
Su et al. (2019)[91]	Mice	ICR (M)	Gavage	PFOS	21D	EOT
Su et al. (2019)[91]	Mice	ICR (M)	Gavage	PFOS + VC100	21D	EOT
Su et al. (2019)[91]	Mice	ICR (M)	Gavage	PFOS + VC200	21D	EOT
Deng et al. (2020)[44]	Mice	C57BL/6 (M)	Gavage	PFOS	1D	2D Post
Deng et al. (2020)[44]	Mice	C57BL/6 (M)	Gavage	PFOS + PCB126	1D	2D Post
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS	4W	EOT
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS + HFD	4W	EOT
Wang G et al. (2020)[100]	Mice	C57BL/7 (M)	Gavage	PFOS	16D	EOT
Xing et al. (2016)[104]	Mice	C57BL/7 (M)	Gavage	PFOS	30D	EOT
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS	21D	EOT
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS + GSPE	21D	EOT
Lai et al. (2017)[63]	Mice	C57BL/7 (MF)	Prenatal	PFOS + DEN	E0-E18.5	EOT
Seacat et al. (2003)[87]	Rats	SD (F)	Diet	PFOS	4W	EOT
Seacat et al. (2003)[87]	Rats	SD (M)	Diet	PFOS	4W	EOT
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	1D Post
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	28D Post
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	56D Post
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	84D Post
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	1D	EOT
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	7D	EOT
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	28D	EOT
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	W4
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	W14
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	W27
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	EOT
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	W4
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	W14
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	W27
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	2D	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	2D	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	9D	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	9D	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	16D	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	16D	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	23D	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	23D	EOT
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	2D	EOT
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	2D	EOT
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	9D	EOT
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	9D	EOT
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	16D	EOT
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	16D	EOT
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	23D	EOT
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	23D	EOT
Qazi et al. (2010)[80]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS + Con A	10D	EOT
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	28D	EOT
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS + Con A	28D	EOT



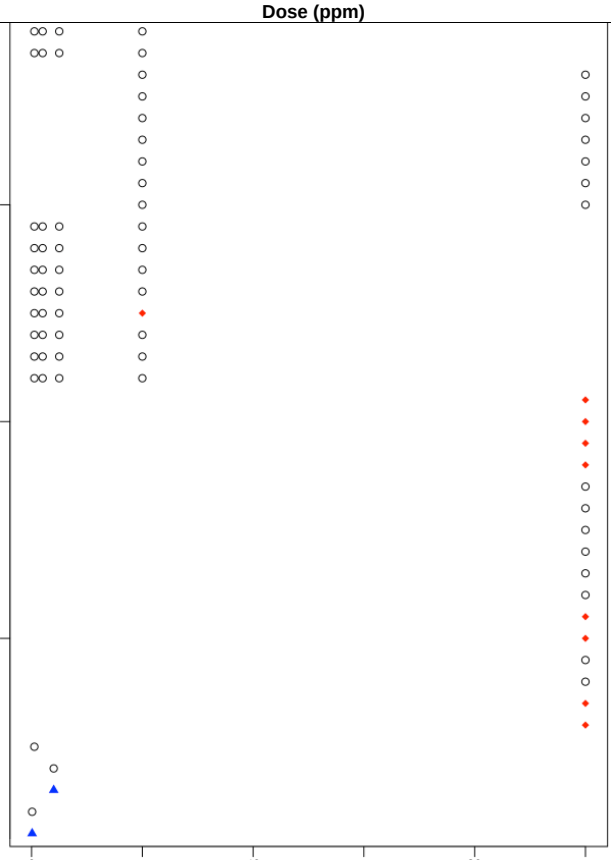
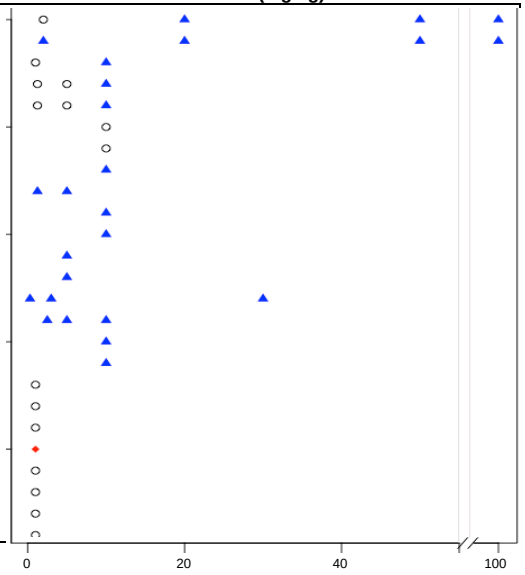


Figure S3. Strip plots for PFOS and AST in animal studies. Blue triangles indicate a significant increase in AST and red diamonds indicate a significant decrease in AST relative to control. Circles indicate no significant change in AST relative to control. Plots are ordered by species and strain. *Abbreviations:* End of treatment (EOT); embryonic day (E); Vitamin C (VC); polychlorinated biphenyl (PCB); diethylnitrosamine (DEN); choline supplementation (CS); concanavalin A (Con A); naringin (Nar); Sprague Dawley (SD); grape seed proanthocyanidin extract (GSPE). An accessible version of this figure is available in Table S9.

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection	Dose (mg/kg)
Curran et al. (2008)[42]	Rats	SD (M)	Diet	PFOS	28D	EOT	
Curran et al. (2008)[42]	Rats	SD (F)	Diet	PFOS	28D	EOT	
Han et al. (2018b)[56]	Rats	SD (M)	Gavage	PFOS	28D	EOT	
Kim et al. (2011)[62]	Rats	SD (M)	Gavage	PFOS	28D	EOT	
Kim et al. (2011)[62]	Rats	SD (F)	Gavage	PFOS	28D	EOT	
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOS	1D	EOT	
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOS	2D	EOT	
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOS	5D	EOT	
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOS	28D	EOT	
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS	21D	EOT	
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS + Nar	21D	EOT	
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS	4W	EOT	
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS + HFD	4W	EOT	
Wang et al. (2020)[100]	Mice	C57BL/6J (M)	Gavage	PFOS	16D	EOT	
Xing et al. (2016)[104]	Mice	C57BL/6J (M)	Gavage	PFOS	30D	EOT	
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS	21D	EOT	
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS + GSPE	21D	EOT	
Marques et al. (2021)[73]	Mice	CD-1 (dams)	Gavage	PFOS	GD1-PND21	EOT	
Marques et al. (2021)[73]	Mice	CD-1 (dams)	Gavage	PFOS + HFD	GD1-PND21	EOT	
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOS	GD1-PND90	EOT	
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOS + HFD	GD1-PND90	EOT	
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOS	GD1-PND90	EOT	
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOS + HFD	GD1-PND90	EOT	
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOS	GD1-PND90	EOT	
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOS + HFD	GD1-PND90	EOT	



(Figure S4 continued on next page)

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection
Seacat et al. (2003)[87]	Rats	SD (F)	Diet	PFOS	4W	EOT
Seacat et al. (2003)[87]	Rats	SD (F)	Diet	PFOS	14W	EOT
Seacat et al. (2003)[87]	Rats	SD (M)	Diet	PFOS	4W	EOT
Seacat et al. (2003)[87]	Rats	SD (M)	Diet	PFOS	14W	EOT
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	1D Post
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	28D Post
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	56D Post
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	84D Post
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	1D	EOT
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	7D	EOT
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	28D	EOT
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	1W Post
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	1W Post
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	22D	EOT
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	22D	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	22D	EOT
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	22D	EOT
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation	PFOS	1W*	EOT
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation	PFOS	1W*	EOT
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation	PFOS	4W*	EOT
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation	PFOS	4W*	EOT
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation	PFOS	13W*	EOT
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation	PFOS	13W*	EOT
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation	PFOS	13W*	4W Post
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation	PFOS	13W*	4W Post
Qazi et al. (2010)[80]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	28D	EOT
Pfohl et al. (2021)[78]	Mice	C57BL/6 (M)	Diet	PFOS + LFD	12W	EOT
Pfohl et al. (2021)[78]	Mice	C57BL/6 (M)	Diet	PFOS + HFD	12W	EOT
Zhang et al. (2016)[109]	Mice	C57BL/6J (M)	Diet	PFOS	24D	EOT
Zhang et al. (2016)[109]	Mice	C57BL/6J (M)	Diet	PFOS + mMCD	24D	EOT
Zhang et al. (2016)[109]	Mice	C57BL/6J (M)	Diet	PFOS	6W	EOT
Zhang et al. (2016)[109]	Mice	C57BL/6J (M)	Diet	PFOS + CS	6W	EOT
Huck et al. (2018)[58]	Mice	C57BL/6J (M)	Diet	PFOS	6W	EOT
Huck et al. (2018)[58]	Mice	C57BL/6J (M)	Diet	PFOS + HFD	6W	EOT
Marques et al. (2020)[72]	Mice	C57BL/6N (M)	Diet	PFOS	6W	EOT
Marques et al. (2020)[72]	Mice	C57BL/6N (M)	Diet	PFOS + HFD/STD	6W	EOT
Marques et al. (2020)[72]	Mice	C57BL/6N (M)	Diet	PFOS + HFD	6W	EOT

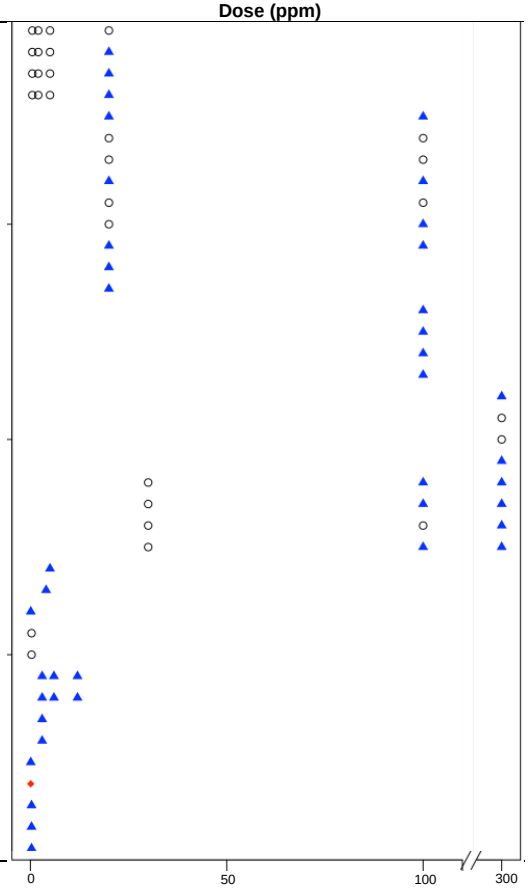


Figure S4. Strip plots for PFOS and relative liver weight in animal studies. Blue triangles indicate a significant increase in relative liver weight relative to control. Black dots indicate no significant change in relative liver weight relative to control. Plots are ordered by species and strain. *Abbreviations:* End of treatment (EOT); marginal methionine/choline-deficient diet (mMCD); choline supplementation (CS); naringin (Nar); Sprague Dawley (SD); grape seed proanthocyanidin extract (GSPE); high fat diet (HFD); low fat diet (LFD); initial high fat diet followed by standard diet (HFD/STD). *Atmospheric exposure occurred for 5 hours/day, 5 days/week. An accessible version of this figure is available in Table S10.

Table S5. Results for PFOA and ALT in animal studies.

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection	Findings
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOA	1D	EOT	ALT was not significantly different in rats treated with 20 mg/kg PFOA compared to controls.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOA	2D	EOT	ALT was not significantly different in rats treated with 20 mg/kg PFOA compared to controls.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOA	5D	EOT	ALT was not significantly different in rats treated with 20 mg/kg PFOA compared to controls.
Rigden et al. (2015)[84]	Rats	SD (M)	Gavage	PFOA	3D	EOT	ALT was significantly higher in rats treated with 33 mg/kg PFOA compared to controls, but not in rats treated with 10 or 100 mg/kg PFOA.
Butenhoff et al. (2012a)[33]	Rats	SD (M)	Gavage	PFOA	28D	EOT	ALT was significantly higher in rats treated with 30 mg/kg PFOA compared to controls.
Butenhoff et al. (2012a)[33]	Rats	SD (F)	Gavage	PFOA	28D	EOT	ALT was significantly higher in rats treated with 30 mg/kg PFOA compared to controls.
Butenhoff et al. (2012a)[33]	Rats	SD (M)	Gavage	PFOA	28D	3W Post	ALT was not significantly different in rats treated with 30 mg/kg PFOA compared to controls.
Butenhoff et al. (2012a)[33]	Rats	SD (F)	Gavage	PFOA	28D	3W Post	ALT was significantly higher in rats treated with 30 mg/kg PFOA compared to controls.
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA	28D	EOT	ALT was significantly higher in rats treated with 5 mg/kg PFOA compared to controls.
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 25	28D	EOT	ALT was not significantly different in rats treated with 5 mg/kg PFOA and 25 mg NAC compared to controls.
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 50	28D	EOT	ALT was not significantly different in rats treated with 5 mg/kg PFOA and 25 mg NAC compared to controls.
Minata et al. (2010)[75]	Mice	129S4/SvlmJ (M)	Gavage	PFOA	4W	EOT	ALT was significantly higher in mice treated with 12.5, 25, and 50 mg/kg PFOA compared to controls.
Nakagawa et al. (2012)[76]	Mice	mPPARα (M)	Gavage	PFOA	6W	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOA compared to controls, but not in mice treated with 1 mg/kg PFOA.
Nakagawa et al. (2012)[76]	Mice	hPPARα (M)	Gavage	PFOA	6W	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOA compared to controls, but not in mice treated with 1 mg/kg PFOA.
Nakagawa et al. (2012)[76]	Mice	PPARα-null (M)	Gavage	PFOA	6W	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOA compared to controls, but not in mice treated with 1 mg/kg PFOA.
Minata et al. (2010)[75]	Mice	PPARα-null (M)	Gavage	PFOA	4W	EOT	ALT was significantly higher in mice treated with 12.5, 25, and 50 mg/kg PFOA compared to controls.
Yahia et al. (2010)[105]	Mice	ICR (Dams)	Gavage	PFOA	GD0-GD17	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOA compared to controls, but not in mice treated with 1 or 5 mg/kg PFOA.
Yang et al. (2014)[108]	Mice	Kunming (M)	Gavage	PFOA	14D	EOT	ALT was significantly higher in mice treated with 2.5, 5, and 10 mg/kg PFOA compared to controls.
Wu et al. (2017)[103]	Mice	Kunming (M)	Gavage	PFOA	1D	EOT	ALT was not significantly different in mice treated with 5 mg/kg PFOA compared to controls.
Wu et al. (2018)[112]	Mice	Kunming (M)	Gavage	PFOA	21D	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOA compared to controls, but not in mice treated with 1 mg/kg PFOA.
Zou et al. (2015)[111]	Mice	Kunming (M)	Gavage	PFOA	15D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOA compared to controls.
Zou et al. (2015)[111]	Mice	Kunming (M)	Gavage	PFOA + Que	15D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOA and Que compared to controls.
Liu et al. (2016)[68]	Mice	Kunming (M)	Gavage	PFOA	14D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOA compared to controls.
Liu et al. (2016)[68]	Mice	Kunming (M)	Gavage	PFOA + GSPE	14D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOA and GSPE compared to controls.
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	ALT was significantly higher in mice treated with 20 mg/kg PFOA compared to controls, but not in mice treated with 0.08, 0.31, 1.25, or 5 mg/kg PFOA.
Guo et al. (2019)[51]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	ALT was significantly higher in mice treated with 2 and 10 mg/kg PFOA compared to controls, but not in mice treated with 0.4 mg/kg PFOA.
Guo et al. (2021)[52]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	ALT was significantly higher in mice treated with 2 and 10 mg/kg PFOA compared to controls, but not in mice treated with 0.4 mg/kg PFOA.
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOA compared to controls.
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 125	28D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOA and 125 mg 4-PBA compared to controls.
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 250	28D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOA and 250 4-PBA compared to controls.
Hui et al. (2017)[59]	Mice	BALB/c (M)	Gavage	PFOA	7D	EOT	ALT was significantly higher in mice treated with 1 and 5 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (Dams)	Gavage	PFOA	GD1-PND21	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (Dams)	Gavage	PFOA + HFD	GD1-PND21	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Blake et al. (2020)[30]	Mice	CD-1 (Dams)	Gavage	PFOA	E1.5-E11.5	E17.5	ALT was not significantly different in mice treated with 1 or 5 mg/kg PFOA compared to controls.
Blake et al. (2020)[30]	Mice	CD-1 (Dams)	Gavage	PFOA	E1.5-E11.5	E11.5	ALT was not significantly different in mice treated with 1 or 5 mg/kg PFOA compared to controls.
Tan et al. (2013)[93]	Mice	C57Bl/6N (M)	Diet	PFOA	3W	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOA compared to controls.
Tan et al. (2013)[93]	Mice	C57Bl/6N (M)	Diet	PFOA+HFD	3W	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOA and HFD compared to controls.
Li X et al. (2019)[65]	Mice	C57Bl/6 (M)	Gavage	PFOA+LFD	16W	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOA and LFD compared to controls.
Li X et al. (2019)[65]	Mice	C57Bl/6 (M)	Gavage	PFOA+LFD	8W	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOA and LFD compared to controls.
Li X et al. (2019)[65]	Mice	C57Bl/6 (M)	Gavage	PFOA+LFD	2W	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOA and LFD compared to controls.

Li X et al. (2019)[65]	Mice	C57Bl/6 (M)	Gavage	PFOA+HFD	16W	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Li X et al. (2019)[65]	Mice	C57Bl/6 (M)	Gavage	PFOA+HFD	8W	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Li X et al. (2019)[65]	Mice	C57Bl/6 (M)	Gavage	PFOA+HFD	2W	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Crebelli et al. (2019)[40]	Mice	C57Bl/6 (M)	Water	PFOA	5W	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOA compared to controls, but not in mice treated with 0.1 and 1 mg/kg PFOA.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA	1D	EOT	ALT was significantly higher in mice treated with 300 mg/kg PFOA compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + Que	1D	EOT	ALT was significantly higher in mice treated with 300 mg/kg PFOA and Que compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad1	1D	EOT	ALT was significantly higher in mice treated with 300 mg/kg PFOA and HaoHad1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad2	1D	EOT	ALT was significantly higher in mice treated with 300 mg/kg PFOA and HaoHad2 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad1	1D	EOT	ALT was significantly higher in mice treated with 300 mg/kg PFOA and HaoLad1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad2	1D	EOT	ALT was significantly higher in mice treated with 300 mg/kg PFOA and HaoLad2 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad1	1D	EOT	ALT was significantly higher in mice treated with 300 mg/kg PFOA and LaoHad1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad2	1D	EOT	ALT was not significantly different in mice treated with 300 mg/kg PFOA and LaoHad2compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao1	1D	EOT	ALT was significantly higher in mice treated with 300 mg/kg PFOA and LaoLao1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao2	1D	EOT	ALT was significantly higher in mice treated with 300 mg/kg PFOA and LaoLao2 compared to controls.
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	15D	EOT	ALT was significantly higher in mice treated with 3 and 30 mg/kg PFOA compared to controls.
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	30D	EOT	ALT was significantly higher in mice treated with 2.5, 5, and 10 mg/kg PFOA compared to controls.
Cui et al. (2019)[41]	Mice	C57BL/6J (M)	Gavage	PFOA	28D	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOA compared to controls.
Cui et al. (2019)[41]	Mice	miR-34a(-/-) C57BL/6J (M)	Gavage	PFOA	28D	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOA compared to controls.
Pouwer et al. (2019)[79]	Mice	APOE*3-Leiden CETP (M)	Diet	PFOA	6W	Week 4	ALT was significantly higher in mice treated with 30000 ng/g PFOA compared to controls, but not in mice treated with 10 or 300 ng/g PFOA
Pouwer et al. (2019)[79]	Mice	APOE*3-Leiden CETP (M)	Diet	PFOA	6W	EOT	ALT was significantly higher in mice treated with 30000 ng/g PFOA compared to controls, but not in mice treated with 10 or 300 ng/g PFOA
Pouwer et al. (2019)[79]	Mice	APOE*3-Leiden CETP (M)	Diet	PFOA	4W	EOT	ALT was significantly higher in mice treated with 30000 ng/g PFOA compared to controls, but not in mice treated with 10 or 300 ng/g PFOA
Shao et al. (2021)[88]	Mice	ICR (M)	Prenatal	PFOA	GD13-17	PN Week 12	ALT was not significantly different in mice treated with 0.05 mg/kg PFOA compared to controls.
Li D et al. (2019)[64]	Mice	Kunming (F)	Prenatal	PFOA	GD1-17	PD21	ALT was significantly higher in mice treated with 1, 2.5, 5, and 10 mg/kg PFOA compared to controls.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-17	PND91	ALT was not significantly different in mice treated with 0.01, 0.1, 0.3, or 1 mg/kg PFOA compared to controls.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA + LFD	GD1-17	PND91	ALT was not significantly different in mice treated with 0.01, 0.1, 0.3, or 1 mg/kg PFOA and LFD compared to controls.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA + HFD	GD1-17	PND91 (F)	ALT was not significantly different in mice treated with 0.01, 0.1, 0.3, or 1 mg/kg PFOA and HFD compared to controls.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA + HFD	GD1-17	PND91 (NF)	ALT was not significantly different in mice treated with 0.01, 0.1, 0.3, or 1 mg/kg PFOA and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOA	GD1-PND21	EOT	ALT was significantly higher in mice treated with 1 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOA + HFD	GD1-PND21	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-PND21	PND90	ALT was not significantly different in mice treated with 1 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOA + HFD	GD1-PND21	PND90	ALT was not significantly different in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOA	GD1-PND21	PND90	ALT was not significantly different in mice treated with 1 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOA + HFD	GD1-PND21	PND90	ALT was not significantly different in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 3	ALT was significantly higher in rats treated with 30 and 300ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 6	ALT was significantly higher in rats treated with 30 and 300ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 12	ALT was significantly higher in rats treated with 30 and 300ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 18	ALT was significantly higher in rats treated with 300ppm PFOA compared to controls, but not in rats treated with 30 ppm PFOA.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	EOT	ALT was not significantly different in rats treated with 30 or 300ppm PFOA compared to controls.

Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 3	ALT was not significantly different in rats treated with 30 or 300ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 6	ALT was not significantly different in rats treated with 30 or 300ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 12	ALT was not significantly different in rats treated with 30 or 300ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 18	ALT was not significantly different in rats treated with 30 or 300ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	EOT	ALT was not significantly different in rats treated with 30 or 300ppm PFOA compared to controls.
Qazi et al. (2010)[80]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT	ALT was not significantly different in mice treated with 0.002% w/w PFOA compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	diet	PFOA	10D	EOT	ALT was not significantly different in mice treated with 0.002% w/w PFOA compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	diet	PFOA + Con A	10D	EOT	ALT was significantly higher in mice treated with 0.002% w/w PFOA and Con A compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	diet	PFOA	28D	EOT	ALT was not significantly different in mice treated with 0.00005% w/w PFOA compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	diet	PFOA + Con A	28D	EOT	ALT was significantly higher in mice treated with 0.00005% w/w PFOA and Con A compared to controls.
Botelho et al. (2015)[31]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT	ALT was significantly higher in mice treated with 0.02% w/w PFOA compared to controls, but not in mice treated with 0.002%, 0.005%, or 0.01% w/w PFOA.
Son et al. (2008)[90]	Mice	ICR (M)	Water	PFOA	21D	EOT	ALT was significantly higher in mice treated with 10, 50, and 250 ppm PFOA compared to controls, but not in mice treated with 2 ppm PFOA.

Notes:
Abbreviations: End of treatment (EOT); low fat diet (LFD); high fat diet (HFD); postnatal day (PND); gestational day (GD); embryonic day (E); Sprague Dawley (SD); N-acetylcysteine (NAC); 4-phenylbutyric acid (4-PBA); quecertin (Que); fasted (F); non-fasted (NF); grape seed proanthocyanidin extract (GSPE). Additional exposure abbreviations in Shi et al (2021) refer to lactic acid bacterial strains.

Table S6. Results for PFOS and ALT in rodent studies.

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection	Findings
Curran et al. (2008)[42]	Rats	SD (M)	Diet	PFOS	28D	EOT	ALT was significantly higher in rats treated with 100 mg/kg PFOS compared to controls, but not in rats treated with 2, 20, or 50 mg/kg PFOS.
Curran et al. (2008)[42]	Rats	SD (F)	Diet	PFOS	28D	EOT	ALT was not significantly different in rats treated with 2, 20, 50, or 100 mg/kg PFOS compared to controls.
Han et al. (2018a)[55]	Rats	SD (M)	Gavage	PFOS	28D	EOT	ALT was significantly higher in rats treated with 1 and 10 mg/kg PFOS compared to controls.
Han et al. (2018b)[56]	Rats	SD (M)	Gavage	PFOS	28D	EOT	ALT was significantly higher in rats treated with 1 and 10 mg/kg PFOS compared to controls.
Kim et al. (2011)[62]	Rats	SD (M)	Gavage	PFOS	28D	EOT	ALT was not significantly different in rats treated with 1.25, 5, or 10 mg/kg PFOS compared to controls.
Kim et al. (2011)[62]	Rats	SD (F)	Gavage	PFOS	28D	EOT	ALT was not significantly different in rats treated with 1.25, 5, or 10 mg/kg PFOS compared to controls.
Wan et al. (2016)[96]	Rats	SD (M)	Gavage	PFOS	28D	EOT	ALT was significantly higher in rats treated with 1 and 10 mg/kg PFOS compared to controls.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOS	1D	EOT	ALT was not significantly different in rats treated with 10 mg/kg PFOS compared to controls.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOS	2D	EOT	ALT was not significantly different in rats treated with 10 mg/kg PFOS compared to controls.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOS	5D	EOT	ALT was not significantly different in rats treated with 10 mg/kg PFOS compared to controls.
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOS	28D	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOS compared to controls, but not in rats treated with 1.25 mg/kg PFOS.
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS	21D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS compared to controls.
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS + Nar	21D	EOT	ALT was not significantly different in mice treated with 10 mg/kg PFOS and NAR compared to controls.
Su et al. (2019)[91]	Mice	ICR (M)	Gavage	PFOS	21D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS compared to controls.
Su et al. (2019)[91]	Mice	ICR (M)	Gavage	PFOS + VC100	21D	EOT	ALT was not significantly different in mice treated with 10 mg/kg PFOS and 100 mg VC compared to controls.
Su et al. (2019)[91]	Mice	ICR (M)	Gavage	PFOS + VC200	21D	EOT	ALT was not significantly different in mice treated with 10 mg/kg PFOS and 200 mg VC compared to controls.
Deng et al. (2020)[44]	Mice	C57BL/6 (M)	Gavage	PFOS	1D	2D Post	ALT was not significantly different in mice treated with 250 mg/kg PFOS compared to controls.
Deng et al. (2020)[44]	Mice	C57BL/6 (M)	Gavage	PFOS + PCB126	1D	2D Post	ALT was significantly higher in mice treated with 250 mg/kg PFOS and PCB126 compared to controls.
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS	4W	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOS compared to controls.
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS + HFD	4W	EOT	ALT was significantly higher in mice treated with 5 mg/kg PFOS and HFD compared to controls.
Wang G et al. (2020)[100]	Mice	C57BL/7 (M)	Gavage	PFOS	16D	EOT	ALT was significantly higher in mice treated with 0.3, 3, and 30 mg/kg PFOS compared to controls.
Xing et al. (2016)[104]	Mice	C57BL/7 (M)	Gavage	PFOS	30D	EOT	ALT was significantly higher in mice treated with 5 and 10 mg/kg PFOS compared to controls, but not in mice treated with 2.5 mg/kg PFOS.
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS	21D	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS compared to controls.
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS + GSPE	21D	EOT	ALT was not significantly different in mice treated with 10 mg/kg PFOS and GSPE compared to controls.
Hamilton et al. (2021)[54]	Mice	hCYP2B6-Tg (M)	Gavage	PFOS	3W	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS compared to controls, but not in mice treated with 1 mg/kg PFOS.
Hamilton et al. (2021)[54]	Mice	Cyp2b-null (M)	Gavage	PFOS	3W	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS compared to controls, but not in mice treated with 1 mg/kg PFOS.
Hamilton et al. (2021)[54]	Mice	hCYP2B6-Tg (F)	Gavage	PFOS	3W	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS compared to controls, but not in mice treated with 1 mg/kg PFOS.
Hamilton et al. (2021)[54]	Mice	Cyp2b-null (F)	Gavage	PFOS	3W	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS compared to controls, but not in mice treated with 1 mg/kg PFOS.
Hamilton et al. (2021)[54]	Mice	hCYP2B6-Tg (M)	Gavage	PFOS + HFD	3W	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS and HFD compared to controls.
Hamilton et al. (2021)[54]	Mice	hCYP2B6-Tg (F)	Gavage	PFOS + HFD	3W	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS and HFD compared to controls, but not in mice treated with 1 mg/kg PFOS and HFD.
Hamilton et al. (2021)[54]	Mice	Cyp2b-null (F)	Gavage	PFOS + HFD	3W	EOT	ALT was significantly higher in mice treated with 10 mg/kg PFOS and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (dams)	Gavage	PFOS	GD1-PND21	EOT	ALT was significantly higher in mice treated with 1 mg/kg PFOS compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (dams)	Gavage	PFOS + HFD	GD1-PND21	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOS and HFD compared to controls.
Lai et al. (2017)[63]	Mice	C57BL/7 (MF)	Prenatal	PFOS + DEN	E0-E18.5	EOT	ALT was significantly higher in mice treated with 0.3 mg/kg PFOS and DEN compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOS	GD1-PND21	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOS compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOS + HFD	GD1-PND21	EOT	ALT was not significantly different in mice treated with 1 mg/kg PFOS and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOS	GD1-PND21	PND90	ALT was not significantly different in mice treated with 1 mg/kg PFOS compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOS + HFD	GD1-PND21	PND90	ALT was not significantly different in mice treated with 1 mg/kg PFOS and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOS	GD1-PND21	PND90	ALT was not significantly different in mice treated with 1 mg/kg PFOS compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOS + HFD	GD1-PND21	PND90	ALT was not significantly different in mice treated with 1 mg/kg PFOS and HFD compared to controls.
Seacat et al. (2003)[87]	Rats	SD (F)	Diet	PFOS	14W	EOT	ALT was not significantly different in rats treated with 0.003%, 0.006%, or 0.012% w/w PFOS compared to controls.
Seacat et al. (2003)[87]	Rats	SD (M)	Diet	PFOS	14W	EOT	ALT was significantly higher in rats treated with 0.012% w/w PFOS compared to controls, but not 0.006% or 0.012% w/w PFOS.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	1D Post	ALT was significantly higher in rats treated with 20 and 100ppm PFOS compared to controls.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	28D Post	ALT was not significantly different in rats treated with 20 and 100ppm PFOS compared to controls.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	56D Post	ALT was not significantly different in rats treated with 20 and 100ppm PFOS compared to controls.

Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	84D Post	ALT was not significantly different in rats treated with 20 and 100ppm PFOS compared to controls.
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	1D	EOT	ALT was not significantly different in rats treated with 20 and 100ppm PFOS compared to controls.
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	7D	EOT	ALT was not significantly different in rats treated with 20 and 100ppm PFOS compared to controls.
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	28D	EOT	ALT was not significantly different in rats treated with 20 and 100ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	W4	ALT was not significantly different in rats treated with 0.5, 2, 5, or 20ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	W14	ALT was not significantly different in rats treated with 0.5, 2, 5, or 20ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	W27	ALT was not significantly different in rats treated with 0.5, 2, 5, or 20ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	EOT	ALT was not significantly different in rats treated with 0.5, 2, 5, or 20ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	W4	ALT was not significantly different in rats treated with 0.5, 2, 5, or 20ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	W14	ALT was significantly higher in rats treated with 20 ppm PFOS compared to controls, but not in rats treated with 0.5, 2, or 5 ppm PFOS.
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	W27	ALT was not significantly different in rats treated with 0.5, 2, 5, or 20ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	EOT	ALT was significantly higher in rats treated with 20 ppm PFOS compared to controls, but not in rats treated with 0.5, 2, or 5 ppm PFOS.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	2D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	2D	EOT	ALT was significantly lower in rats treated with 100ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	9D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	9D	EOT	ALT was significantly lower in rats treated with 100ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	16D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	16D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	23D	EOT	ALT was significantly higher in rats treated with 100ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	23D	EOT	ALT was significantly higher in rats treated with 100ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	2D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	2D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	9D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	9D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	16D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	16D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	23D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	23D	EOT	ALT was not significantly different in rats treated with 100ppm PFOS and CS compared to controls.
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation*	PFOS	13W*	EOT	ALT was significantly higher in rats treated with 30, 100, and 300 ppm v/v PFOS compared to controls.
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation*	PFOS	13W*	4W Post	ALT was not significantly different in rats treated with 30, 100, and 300 ppm v/v PFOS compared to controls.
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation*	PFOS	13W*	EOT	ALT was not significantly different in rats treated with 30, 100, and 300 ppm v/v PFOS compared to controls.
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation*	PFOS	13W*	4W Post	ALT was not significantly different in rats treated with 30, 100, and 300 ppm v/v PFOS compared to controls.
Qazi et al. (2010)[80]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT	ALT was not significantly different in mice treated with 0.0005% w/w PFOS compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT	ALT was not significantly different in mice treated with 0.004% w/w PFOS compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS + Con A	10D	EOT	ALT was significantly higher in mice treated with 0.004% w/w PFOS and Con A compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	28D	EOT	ALT was not significantly different in mice treated with 0.0001% w/w PFOS compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS + Con A	28D	EOT	ALT was significantly higher in mice treated with 0.0001% w/w PFOS and Con A compared to controls.
Zhang et al. (2016)[109]	Mice	C57BL/6 (M)	Diet	PFOS	2W	EOT	ALT was significantly higher in mice treated with 0.003% and 0.012% w/w PFOS compared to controls, but not in mice treated with 0.006% w/w PFOS.
Zhang et al. (2016)[109]	Mice	C57BL/6 (M)	Diet	PFOS + mMCD	2W	EOT	ALT was significantly higher in mice treated with 0.003%, 0.006%, and 0.012% w/w PFOS and mMCD compared to controls.
Zhang et al. (2016)[109]	Mice	C57BL/6 (M)	Diet	PFOS	6W	EOT	ALT was significantly higher in mice treated with 0.003% w/w PFOS compared to controls.
Zhang et al. (2016)[109]	Mice	C57BL/6 (M)	Diet	PFOS + CS	6W	EOT	ALT was not significantly different in mice treated with 0.003% w/w PFOS and CS compared to controls.

Notes:

Abbreviations: End of treatment (EOT); embryonic day (E); Vitamin C (VC); diethylnitrosamine (DEN); marginal methionine/choline-deficient diet (mMCD); choline supplementation (CS); concanavalin A (Con A); naringin (Nar); Sprague Dawley (SD); grape seed proanthocyanidin extract (GSPE). *Atmospheric exposure occurred for 5 hours/day, 5 days/week.

Table S7. Results for PFOA and AST in animal studies.

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection	Findings
Rigden et al. (2015)[84]	Rats	SD (M)	Gavage	PFOA	3D	EOT	AST was significantly higher in rats treated with 33 mg/kg PFOA compared to controls, but not in rats treated with 10 or 100 mg/kg PFOA.
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA	28D	EOT	AST was significantly higher in rats treated with 5 mg/kg PFOA compared to controls.
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 25	28D	EOT	AST was not significantly different in rats treated with 5 mg/kg PFOA and 25 mg NAC compared to controls.
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 50	28D	EOT	AST was not significantly different in rats treated with 5 mg/kg PFOA and 50 mg NAC compared to controls.
Minata et al. (2010)[75]	Mice	129S4/SvlmJ (M)	Gavage	PFOA	4W	EOT	AST was significantly higher in mice treated with 25 and 50 umol/kg PFOA compared to controls but not in mice treated with 12.5 umol/kg PFOA.
Minata et al. (2010)[75]	Mice	PPARα-null (M)	Gavage	PFOA	4W	EOT	AST was significantly higher in mice treated with 50 umol/kg PFOA compared to controls but not in mice treated with 12.5 and 25 umol/kg PFOA.
Yahia et al. (2010)[105]	Mice	ICR (Dams)	Gavage	PFOA	GD0-GD17	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOA compared to controls but not in mice treated with 1 or 5 mg/kg PFOA.
Yang et al. (2014)[108]	Mice	Kunming (M)	Gavage	PFOA	14D	EOT	AST was significantly higher in mice treated with 5 and 10 mg/kg PFOA compared to controls but not in mice treated with 2.5 mg/kg PFOA.
Wu et al. (2017)[103]	Mice	Kunming (M)	Gavage	PFOA	1D	EOT	AST was not significantly different in mice treated with 5 mg/kg PFOA compared to controls.
Wu et al. (2018)[112]	Mice	Kunming (M)	Gavage	PFOA	21D	EOT	AST was significantly higher in mice treated with 5 mg/kg PFOA compared to controls but not in mice treated with 1 mg/kg PFOA.
Zou et al. (2015)[111]	Mice	Kunming (M)	Gavage	PFOA	15D	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOA compared to controls.
Zou et al. (2015)[111]	Mice	Kunming (M)	Gavage	PFOA + Que	15D	EOT	AST was not significantly different in mice treated with 10 mg/kg PFOA and Que compared to controls.
Liu et al. (2016)[68]	Mice	Kunming (M)	Gavage	PFOA	14D	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOA compared to controls.
Liu et al. (2016)[68]	Mice	Kunming (M)	Gavage	PFOA + GSPE	14D	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOA and GSPE compared to controls.
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	AST was significantly higher in mice treated with 20 mg/kg PFOA compared to controls, but not in mice treated with 0.08, 0.31, 1.25, or 5 mg/kg PFOA.
Guo et al. (2019)[51]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	AST was significantly lower in mice treated with 0.4 mg/kg PFOA compared to controls, and significantly higher in mice treated with 2 and 10 mg/kg PFOA.
Guo et al. (2021)[52]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOA compared to controls, but not in mice treated with 0.4 or 2 mg/kg PFOA.
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOA compared to controls.
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 125	28D	EOT	AST was not significantly different in mice treated with 10 mg/kg PFOA and 125 mg 4-PBA compared to controls.
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 250	28D	EOT	AST was not significantly different in mice treated with 10 mg/kg PFOA and 250 mg 4-PBA compared to controls.
Blake et al. (2020)[30]	Mice	CD-1 (F)	Gavage	PFOA	E1.5-E11.5	E17.5	AST was not significantly different in mice treated with 1 or 5 mg/kg PFOA compared to controls.
Blake et al. (2020)[30]	Mice	CD-1 (F)	Gavage	PFOA	E1.5-E11.5	E11.5	AST was not significantly different in mice treated with 1 or 5 mg/kg PFOA compared to controls.
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	15D	EOT	AST was not significantly different in mice treated with 3 or 30 mg/kg PFOA compared to controls.
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	30D	EOT	AST was not significantly different in mice treated with 2.5, 5 , or 10 mg/kg PFOA compared to controls.
Tan et al. (2013)[93]	Mice	C57Bl/6N (M)	Diet	PFOA	3W	EOT	AST was not significantly different in mice treated with 5 mg/kg PFOA compared to controls.
Tan et al. (2013)[93]	Mice	C57Bl/6N (M)	Diet	PFOA + HFD	3W	EOT	AST was significantly higher in mice treated with 5 mg/kg PFOA and HFD compared to controls.
Crebelli et al. (2019)[40]	Mice	C57Bl/6 (M)	Water	PFOA	5W	EOT	AST was significantly higher in mice treated with 5 mg/kg PFOA compared to controls, but not in mice treated with 0.1 or 1 mg/kg PFOA.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA	1D	EOT	AST was not significantly different in mice treated with 300 mg/kg PFOA compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + Que	1D	EOT	AST was significantly higher in mice treated with 300 mg/kg PFOA and Que compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad1	1D	EOT	AST was not significantly different in mice treated with 300 mg/kg PFOA and HaoHad1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad2	1D	EOT	AST was not significantly different in mice treated with 300 mg/kg PFOA and HaoHad2 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad1	1D	EOT	AST was not significantly different in mice treated with 300 mg/kg PFOA and HaoLad1 compared to controls.

Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad2	1D	EOT	AST was not significantly different in mice treated with 300 mg/kg PFOA and HaoLad2 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad1	1D	EOT	AST was significantly higher in mice treated with 300 mg/kg PFOA and LaoHad1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad2	1D	EOT	AST was not significantly different in mice treated with 300 mg/kg PFOA and LaoHad2 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao1	1D	EOT	AST was significantly higher in mice treated with 300 mg/kg PFOA and LaoLao1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao2	1D	EOT	AST was not significantly different in mice treated with 300 mg/kg PFOA and LaoLao2 compared to controls.
Cui et al. (2019)[41]	Mice	C57BL/6J (M)	Gavage	PFOA	28D	EOT	AST was significantly higher in mice treated with 5 mg/kg PFOA compared to controls.
Cui et al. (2019)[41]	Mice	miR-34a(-/-) C57BL/6J (M)	Gavage	PFOA	28D	EOT	AST was significantly higher in mice treated with 5 mg/kg PFOA compared to controls.
Shao et al. (2021)[88]	Mice	ICR (M)	Prenatal	PFOA	GD13-17	PN Week 12	AST was significantly higher in mice treated with 0.05 mg/kg PFOA compared to controls.
Li D et al. (2019)[64]	Mice	Kunming (F)	Prenatal	PFOA	GD1-17	PD21	AST was significantly higher in mice treated with 1, 2.5, 5, and 10 mg/kg PFOA compared to controls.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-17	PND91	AST was not significantly different in mice treated with 0.01, 0.1, 0.3, or 1 mg/kg PFOA compared to controls.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA + LFD	GD1-17	PND91	AST was not significantly different in mice treated with 0.01, 0.1, 0.3, or 1 mg/kg PFOA compared to controls.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA + HFD	GD1-17	PND91 (F)	AST was not significantly different in mice treated with 0.01, 0.1, 0.3, or 1 mg/kg PFOA compared to controls.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA + HFD	GD1-17	PND91 (NF)	AST was not significantly different in mice treated with 0.01, 0.1, 0.3, or 1 mg/kg PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 3	AST was not significantly different in rats treated with 30 or 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 6	AST was significantly lower in rats treated with 30 and 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 12	AST was significantly lower in rats treated with 30 and 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	Month 18	AST was not significantly different in rats treated with 30 or 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	EOT	AST was significantly higher in rats treated with 300 ppm PFOA compared to controls, but not in rats treated with 30 ppm PFOA.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 3	AST was not significantly different in rats treated with 30 or 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 6	AST was not significantly different in rats treated with 30 or 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 12	AST was not significantly different in rats treated with 30 or 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	Month 18	AST was not significantly different in rats treated with 30 or 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	EOT	AST was not significantly different in rats treated with 30 or 300 ppm PFOA compared to controls.
Qazi et al. (2010)[80]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT	AST was not significantly different in mice treated with 0.002% w/w PFOA compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT	AST was not significantly different in mice treated with 0.002% w/w PFOA compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA + Con A	10D	EOT	AST was significantly higher in mice treated with 0.002% w/w PFOA and Con A compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA	28D	EOT	AST was not significantly different in mice treated with 0.00005% w/w PFOA compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA + Con A	28D	EOT	AST was significantly higher in mice treated with 0.00005% w/w PFOA and Con A compared to controls.
Son et al. (2008)[90]	Mice	ICR (M)	Water	PFOA	21D	EOT	AST was significantly higher in mice treated with 50 and 250 ppm PFOA compared to controls, but not in mice treated with 2 or 10 ppm PFOA.

Notes:

Abbreviations: End of treatment (EOT); low fat diet (LFD); high fat diet (HFD); postnatal day (PND); gestational day (GD); embryonic day (E); Sprague Dawley (SD); N-acetylcysteine (NAC); 4-phenylbutyric acid (4-PBA); quecertin (Que); fasted (F); non-fasted (NF); grape seed proanthocyanidin extract (GSPE). Additional exposure abbreviations in Shi et al (2021) refer to lactic acid bacterial strains.

Table S8. Results for PFOA and relative liver weight in animal studies.

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection	Findings
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOA	1D	EOT	Liver weight was not significantly different in rats treated with 20 mg/kg PFOA compared to controls.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOA	2D	EOT	Liver weight was significantly higher in rats treated with 20 mg/kg PFOA compared to controls.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOA	5D	EOT	Liver weight was significantly higher in rats treated with 20 mg/kg PFOA compared to controls.
Rigden et al. (2015)[84]	Rats	SD (M)	Gavage	PFOA	3D	4D Post	Liver weight was significantly higher in rats treated with 10, 33, and 100 mg/kg PFOA compared to controls.
Butenhoff et al. (2012a)[35]	Rats	SD (M)	Gavage	PFOA	28D	EOT	Liver weight was significantly higher in rats treated with 30 mg/kg PFOA compared to controls.
Butenhoff et al. (2012a)[35]	Rats	SD (F)	Gavage	PFOA	28D	EOT	Liver weight was significantly higher in rats treated with 30 mg/kg PFOA compared to controls.
Butenhoff et al. (2012a)[35]	Rats	SD (M)	Gavage	PFOA	28D	3W Post	Liver weight was significantly higher in rats treated with 30 mg/kg PFOA compared to controls.
Butenhoff et al. (2012a)[35]	Rats	SD (F)	Gavage	PFOA	28D	3W Post	Liver weight was not significantly different in rats treated with 30 mg/kg PFOA compared to controls.
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA	28D	EOT	Liver weight was not significantly different in rats treated with 5 mg/kg PFOA compared to controls.
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 25	28D	EOT	Liver weight was not significantly different in rats treated with 5 mg/kg PFOA and 25 mg NAC compared to controls.
Owumi et al. (2021)[77]	Rats	Wistar (M)	Gavage	PFOA + NAC 50	28D	EOT	Liver weight was not significantly different in rats treated with 5 mg/kg PFOA and 50 mg NAC compared to controls.
Minata et al. (2010)[75]	Mice	129S4/Svlmj (M)	Gavage	PFOA	4W	EOT	Liver weight was significantly higher in mice treated with 12.5, 25, and 50 umol/kg PFOA compared to controls.
Nakagawa et al. (2012)[76]	Mice	mPPARα (M)	Gavage	PFOA	6W	EOT	Liver weight was significantly higher in mice treated with 1 and 5 mg/kg PFOA compared to controls.
Nakagawa et al. (2012)[76]	Mice	hPPARα (M)	Gavage	PFOA	6W	EOT	Liver weight was significantly higher in mice treated with 1 and 5 mg/kg PFOA compared to controls.
Nakagawa et al. (2012)[76]	Mice	PPARα-null (M)	Gavage	PFOA	6W	EOT	Liver weight was significantly higher in mice treated with 1 and 5 mg/kg PFOA compared to controls.
Minata et al. (2010)[75]	Mice	PPARα-null (M)	Gavage	PFOA	4W	EOT	Liver weight was significantly higher in mice treated with 12.5, 25, and 50 umol/kg PFOA compared to controls.
Das et a. (2017)[43]	Mice	PPARα-null (M)	Gavage	PFOA	7D	EOT	Liver weight was significantly higher in mice treated with 10 mg/kg PFOA compared to controls.
Das et a. (2017)[43]	Mice	SV129 (M)	Gavage	PFOA	7D	EOT	Liver weight was significantly higher in mice treated with 10 mg/kg PFOA compared to controls.
Yahia et al. (2010)[105]	Mice	ICR (Dams)	Gavage	PFOA	GD0-GD17	EOT	Liver weight was significantly higher in mice treated with 1, 5, and 10 mg/kg PFOA compared to controls.
Yang et al. (2014)[108]	Mice	Kunming (M)	Gavage	PFOA	14D	EOT	Liver weight was significantly higher in mice treated with 2.5, 5, and 10 mg/kg PFOA compared to controls.
Wu et al. (2018)[112]	Mice	Kunming (M)	Gavage	PFOA	21D	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOA compared to controls, but not in mice treated with 1 mg/kg PFOA.
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	Liver weight was significantly higher in mice treated with 0.31, 1.25, 5, and 20 mg/kg PFOA compared to controls, but not in mice treated with 0.08 mg/kg PFOA.
Guo et al. (2019)[51]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	Liver weight was significantly higher in mice treated with 0.4, 2, and 10 mg/kg PFOA compared to controls.
Guo et al. (2021)[52]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	Liver weight was significantly higher in mice treated with 0.4, 2, and 10 mg/kg PFOA compared to controls.
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA	28D	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOA compared to controls.
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 125	28D	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOA and 125 mg 4-PBA compared to controls.
Yan et al. (2015)[107]	Mice	BALB/c (M)	Gavage	PFOA+4-PBA 250	28D	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOA and 250 mg 4-PBA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (Dams)	Gavage	PFOA	GD1-PND21	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (Dams)	Gavage	PFOA + HFD	GD1-PND21	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Blake et al. (2020)[30]	Mice	CD-1 (Dams)	Gavage	PFOA	E1.5-11.5	E17.5	Liver weight was significantly higher in mice treated with 1 and 5 mg/kg PFOA compared to controls.
Blake et al. (2020)[30]	Mice	CD-1 (Dams)	Gavage	PFOA	E1.5-11.5	EOT	Liver weight was significantly higher in mice treated with 1 and 5 mg/kg PFOA compared to controls.
Tan et al. (2013)[93]	Mice	C57BL/6N (M)	Diet	PFOA	3W	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOA compared to controls.
Tan et al. (2013)[93]	Mice	C57BL/6N (M)	Diet	PFOA+HFD	3W	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOA and HFD compared to controls.
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+LFD	16W	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA compared to controls.

Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+LFD	8W	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA compared to controls.
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+LFD	2W	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA compared to controls.
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+HFD	16W	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+HFD	8W	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Li X et al. (2019)[65]	Mice	C57BL/6 (M)	Gavage	PFOA+HFD	2W	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + Que	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA and Que compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad1	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA and HaoHad1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoHad2	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA and HaoHad2 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad1	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA and HaoLad1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + HaoLad2	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA and HaoLad2 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad1	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA and LaoHad1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoHad2	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA and LaoHad2 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao1	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA and LaoLao1 compared to controls.
Shi et al. (2021)[89]	Mice	C57BL/6J (M)	Gavage	PFOA + LaoLao2	1D	EOT	Liver weight was significantly higher in mice treated with 300 mg/kg PFOA and LaoLao2 compared to controls.
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	15D	EOT	Liver weight was significantly higher in mice treated with 3 and 30 mg/kg PFOA compared to controls.
Wang et al. (2021)[99]	Mice	C57BL/6J (M)	Gavage	PFOA	30D	EOT	Liver weight was significantly higher in mice treated with 2.5, 5, and 10 mg/kg PFOA compared to controls.
Cui et al. (2019)[41]	Mice	C57BL/6J (M)	Gavage	PFOA	28D	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOA compared to controls.
Cui et al. (2019)[41]	Mice	miR-34a-/- C57BL/6J (M)	Gavage	PFOA	28D	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOA compared to controls.
Pouwer et al. (2019)[79]	Mice	APOE*3-Leiden CETP (M)	Diet	PFOA	6W	EOT	Liver weight was significantly higher in mice treated with 30000 ng/g PFOA compared to controls, but not in mice treated with 300 or 10 ng/g PFOA.
Pouwer et al. (2019)[79]	Mice	APOE*3-Leiden CETP (M)	Diet	PFOA	4W	EOT	Liver weight was significantly higher in mice treated with 30000 ng/g PFOA compared to controls, but not in mice treated with 300 or 10 ng/g PFOA.
Schlezinger et al. (2020)[86]	Mice	hPPARa (M)	Water	PFOA	6W	EOT	Liver weight was significantly higher in mice treated with 0.7 mg/kg PFOA compared to controls.
Schlezinger et al. (2020)[86]	Mice	PPARa-null (M)	Water	PFOA	6W	EOT	Liver weight was significantly higher in mice treated with 0.7 mg/kg PFOA compared to controls.
Schlezinger et al. (2020)[86]	Mice	hPPARa (F)	Water	PFOA	6W	EOT	Liver weight was significantly higher in mice treated with 0.7 mg/kg PFOA compared to controls.
Schlezinger et al. (2020)[86]	Mice	PPARa-null (F)	Water	PFOA	6W	EOT	Liver weight was significantly higher in mice treated with 0.7 mg/kg PFOA compared to controls.
Li D et al. (2019)[64]	Mice	Kunming (F)	Prenatal	PFOA	GD1-17	PND21	Liver weight was significantly higher in mice treated with 1, 2.5, 5, and 10 mg/kg PFOA compared to controls.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-17	PND21	Liver weight was significantly higher in mice treated with 0.3 and 1 mg/kg PFOA compared to controls, but not in mice treated with 0.01 or 0.1 mg/kg PFOA.
Quist et al. (2015)[83]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-17	PND91	Liver weight was not significantly different in mice treated with 0.01, 0.1, 0.3, or 1 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOA	GD1-PND21	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOA + HFD	GD1-PND21	EOT	Liver weight was significantly higher in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOA	GD1-PND21	PND90	Liver weight was not significantly different in mice treated with 1 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOA + HFD	GD1-PND21	PND90	Liver weight was not significantly different in mice treated with 1 mg/kg PFOA and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOA	GD1-PND21	PND90	Liver weight was not significantly different in mice treated with 1 mg/kg PFOA compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOA + HFD	GD1-PND21	PND90	Liver weight was significantly lower in mice treated with 1 mg/kg PFOA and HFD compared to controls.

Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	2Y	EOT	Liver weight was significantly higher in rats treated with 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	2Y	EOT	Liver weight was not significantly different in rats treated with 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (M)	Diet	PFOA	1Y	EOT	Liver weight was not significantly different in rats treated with 30 or 300 ppm PFOA compared to controls.
Butenhoff et al. (2012c)[35]	Rats	SD (F)	Diet	PFOA	1Y	EOT	Liver weight was not significantly different in rats treated with 30 or 300 ppm PFOA compared to controls.
Botelho et al. (2015)[31]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT	Liver weight was significantly higher in mice treated with 0.002%, 0.005%, 0.01%, 0.02% w/w PFOA compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA	10D	EOT	Liver weight was significantly higher in mice treated with 0.002% w/w PFOA compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA + Con A	10D	EOT	Liver weight was significantly higher in mice treated with 0.002% w/w PFOA and Con A compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA	28D	EOT	Liver weight was significantly higher in mice treated with 0.00005% w/w PFOA compared to controls.
Qazi et al. (2013b)[82]	Mice	C57BL/6 (M)	Diet	PFOA + Con A	28D	EOT	Liver weight was not significantly different in mice treated with 0.00005% w/w PFOA and Con A compared to controls.
Son et al. (2008)[90]	Mice	ICR (M)	Water	PFOA	21D	EOT	Liver weight was significantly higher in mice treated with 2, 10, 50, and 250 ppm PFOA compared to controls.

Notes:

Abbreviations: End of treatment (EOT); low fat diet (LFD); high fat diet (HFD); postnatal day (PND); gestational day (GD); embryonic day (E); Sprague Dawley (SD); N-acetylcysteine (NAC); 4-phenylbutyric acid (4-PBA); quecertin (Que); grape seed proanthocyanidin extract (GSPE).

Additional exposures in Shi et al (2021) refer to lactic acid bacterial strains.

Table S9. Results for PFOS and AST in animal studies.

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection	Findings
Curran et al. (2008)[42]	Rats	SD (M)	Diet	PFOS	28D	EOT	AST was not significantly different in rats treated with 2, 30, 50, or 100 mg/kg PFOS compared to controls.
Curran et al. (2008)[42]	Rats	SD (F)	Diet	PFOS	28D	EOT	AST was significantly lower in rats treated with 100 mg/kg PFOS compared to controls, but not in rats treated with 2, 30, or 50 mg/kg PFOS.
Han et al. (2018a)[55]	Rats	SD (M)	Gavage	PFOS	28D	EOT	AST was significantly higher in rats treated with 10 mg/kg PFOS compared to controls, but not in rats treated with 1 mg/kg PFOS.
Han et al. (2018b)[56]	Rats	SD (M)	Gavage	PFOS	28D	EOT	AST was significantly higher in rats treated with 10 mg/kg PFOS compared to controls, but not in rats treated with 1 mg/kg PFOS.
Kim et al. (2011)[62]	Rats	SD (M)	Gavage	PFOS	28D	EOT	AST was significantly higher in rats treated with 10 mg/kg PFOS compared to controls, but not in rats treated with 1.25 and 5 mg/kg PFOS.
Kim et al. (2011)[62]	Rats	SD (F)	Gavage	PFOS	28D	EOT	AST was significantly lower in rats treated with 5 mg/kg PFOS compared to controls, but not in rats treated with 1.25 and 10 mg/kg PFOS.
Wan et al. (2016)[96]	Rats	SD (M)	Gavage	PFOS	28D	EOT	AST was significantly higher in rats treated with 10 mg/kg PFOS compared to controls, but not in rats treated with 1 mg/kg PFOS.
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOS	28D	EOT	AST was significantly higher in mice treated with 5 mg/kg PFOS compared to controls, but not in mice treated with 1.25 mg/kg PFOS.
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS	21D	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOS compared to controls.
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS + Nar	21D	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOS and Nar compared to controls.
Su et al. (2019)[91]	Mice	ICR (M)	Gavage	PFOS	21D	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOS compared to controls.
Su et al. (2019)[91]	Mice	ICR (M)	Gavage	PFOS + VC100	21D	EOT	AST was not significantly different in mice treated with 10 mg/kg PFOS and 100 mg VC compared to controls.
Su et al. (2019)[91]	Mice	ICR (M)	Gavage	PFOS + VC200	21D	EOT	AST was not significantly different in mice treated with 10 mg/kg PFOS and 200 mg VC compared to controls.
Deng et al. (2020)[44]	Mice	C57BL/6 (M)	Gavage	PFOS	1D	2D Post	AST was not significantly different in mice treated with 250 mg/kg PFOS compared to controls.
Deng et al. (2020)[44]	Mice	C57BL/6 (M)	Gavage	PFOS + PCB126	1D	2D Post	AST was significantly higher in mice treated with 250 mg/kg PFOS and PCB126 compared to controls.
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS	4W	EOT	AST was significantly higher in mice treated with 5 mg/kg PFOS compared to controls.
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS + HFD	4W	EOT	AST was significantly higher in mice treated with 5 mg/kg PFOS and HFD compared to controls.
Wang G et al. (2020)[100]	Mice	C57BL/7 (M)	Gavage	PFOS	16D	EOT	AST was not significantly different in mice treated with 0.3, 3, or 30 mg/kg PFOS compared to controls.
Xing et al. (2016)[104]	Mice	C57BL/7 (M)	Gavage	PFOS	30D	EOT	AST was not significantly different in mice treated with 0.3, 3, or 30 mg/kg PFOS compared to controls.
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS	21D	EOT	AST was significantly higher in mice treated with 10 mg/kg PFOS compared to controls.
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS + GSPE	21D	EOT	AST was not significantly different in rats treated with 10 mg/kg PFOS and GSPE compared to controls.
Lai et al. (2017)[63]	Mice	C57BL/7 (MF)	Prenatal	PFOS + DEN	E0-E18.5	EOT	AST was significantly higher in mice treated with 0.3 mg/kg PFOS and DEN compared to controls.
Seacat et al. (2003)[87]	Rats	SD (F)	Diet	PFOS	4W	EOT	AST was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Seacat et al. (2003)[87]	Rats	SD (M)	Diet	PFOS	4W	EOT	AST was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	1D Post	AST was not significantly different in rats treated with 20 or 100 ppm PFOS compared to controls.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	28D Post	AST was not significantly different in rats treated with 20 or 100 ppm PFOS compared to controls.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	56D Post	AST was not significantly different in rats treated with 20 or 100 ppm PFOS compared to controls.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	84D Post	AST was not significantly different in rats treated with 20 or 100 ppm PFOS compared to controls.
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	1D	EOT	AST was not significantly different in rats treated with 20 or 100 ppm PFOS compared to controls.
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	7D	EOT	AST was not significantly different in rats treated with 20 or 100 ppm PFOS compared to controls.
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	28D	EOT	AST was not significantly different in rats treated with 20 or 100 ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	W4	AST was significantly lower in rats treated with 20 ppm PFOS compared to control, but not in rats treated with 0.5, 2, or 5 ppm PFOS.

Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	W14	AST was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	W27	AST was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	EOT	AST was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	W4	AST was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	W14	AST was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	W27	AST was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	EOT	AST was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	2D	EOT	AST was significantly lower in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	2D	EOT	AST was significantly lower in rats treated with 100 ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	9D	EOT	AST was significantly lower in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	9D	EOT	AST was significantly lower in rats treated with 100 ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	16D	EOT	AST was not significantly different in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	16D	EOT	AST was not significantly different in rats treated with 100 ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	23D	EOT	AST was not significantly different in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	23D	EOT	AST was not significantly different in rats treated with 100 ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	2D	EOT	AST was not significantly different in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	2D	EOT	AST was not significantly different in rats treated with 100 ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	9D	EOT	AST was significantly lower in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	9D	EOT	AST was significantly lower in rats treated with 100 ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	16D	EOT	AST was not significantly different in rats treated with 100 ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	16D	EOT	AST was significantly lower in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	23D	EOT	AST was significantly lower in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	23D	EOT	AST was significantly lower in rats treated with 100 ppm PFOS and CS compared to controls.
Qazi et al. (2010)[80]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT	AST was not significantly different in mice treated with 0.0005% w/w PFOS compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT	AST was not significantly different in mice treated with 0.004% w/w PFOS compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS + Con A	10D	EOT	AST was significantly higher in mice treated with 0.004% w/w PFOS and Con A compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	28D	EOT	AST was not significantly different in mice treated with 0.0001% w/w PFOS compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS + Con A	28D	EOT	AST was significantly higher in mice treated with 0.0001% w/w PFOS and Con A compared to controls.

Notes:

Abbreviations: End of treatment (EOT); embryonic day (E); Vitamin C (VC); diethylnitrosamine (DEN); marginal methionine/choline-deficient diet (mMCD); choline supplementation (CS); concanavalin A (Con A); naringin (Nar); Sprague Dawley (SD); grape seed proanthocyanidin extract (GSPE). *Atmospheric exposure occurred for 5 hours/day, 5 days/week.

Table S10. Results for PFOS and relative liver weight in animal studies.

Reference	Species	Strain (Sex)	Exposure Route	Exposure	Duration	Sample Collection	Dose (mg/kg)
Curran et al. (2008)[42]	Rats	SD (M)	Diet	PFOS	28D	EOT	Liver weight was significantly higher in rats treated with 20, 50, 100 mg/kg PFOS compared to controls, but not in rats treated with 2 mg/kg PFOS.
Curran et al. (2008)[42]	Rats	SD (F)	Diet	PFOS	28D	EOT	Liver weight was significantly higher in rats treated with 2, 20, 50, 100 mg/kg PFOS compared to controls.
Han et al. (2018b)[56]	Rats	SD (M)	Gavage	PFOS	28D	EOT	Liver weight was significantly higher in rats treated with 10 mg/kg PFOS compared to controls, but not in rats treated with 1 mg/kg PFOS.
Kim et al. (2011)[62]	Rats	SD (M)	Gavage	PFOS	28D	EOT	Liver weight was significantly higher in rats treated with 10 mg/kg PFOS compared to controls, but not in rats treated with 1.25 or 5 mg/kg PFOS.
Kim et al. (2011)[62]	Rats	SD (F)	Gavage	PFOS	28D	EOT	Liver weight was significantly higher in rats treated with 10 mg/kg PFOS compared to controls, but not in rats treated with 1.25 or 5 mg/kg PFOS.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOS	1D	EOT	Liver weight was not significantly different in rats treated with 10 mg/kg PFOS compared to controls.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOS	2D	EOT	Liver weight was not significantly different in rats treated with 10 mg/kg PFOS compared to controls.
Martin et al. (2007)[74]	Rats	SD (M)	Gavage	PFOS	5D	EOT	Liver weight was significantly higher in rats treated with 10 mg/kg PFOS compared to controls.
Yan et al. (2014)[106]	Mice	BALB/c (M)	Gavage	PFOS	28D	EOT	Liver weight was significantly higher in mice treated with 1.25 and 5 mg/kg PFOS compared to controls.
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS	21D	EOT	Liver weight was significantly higher in mice treated with 10 mg/kg PFOS compared to controls.
Lv et al. (2018)[71]	Mice	- (M)	Gavage	PFOS + Nar	21D	EOT	Liver weight was significantly higher in mice treated with 10 mg/kg PFOS and Nar compared to controls.
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS	4W	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOS compared to controls.
Qin et al. (2021)[113]	Mice	C57BL/6J (M)	Gavage	PFOS + HFD	4W	EOT	Liver weight was significantly higher in mice treated with 5 mg/kg PFOS and HFD compared to controls.
Wang et al. (2020)[100]	Mice	C57BL/6J (M)	Gavage	PFOS	16D	EOT	Liver weight was significantly higher in mice treated with 0.3, 3, and 30 mg/kg PFOS compared to controls.
Xing et al. (2016)[104]	Mice	C57BL/6J (M)	Gavage	PFOS	30D	EOT	Liver weight was significantly higher in mice treated with 2.5, 5, and 10 mg/kg PFOS compared to controls.
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS	21D	EOT	Liver weight was significantly higher in mice treated with 10 mg/kg PFOS compared to controls.
Huang et al. (2020)[57]	Mice	Kunming (M)	Gavage	PFOS + GSPE	21D	EOT	Liver weight was significantly higher in mice treated with 10 mg/kg PFOS and GSPE compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (dams)	Gavage	PFOS	GD1-PND21	EOT	Liver weight was not significantly different in mice treated with 1 mg/kg PFOS compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (dams)	Gavage	PFOS + HFD	GD1-PND21	EOT	Liver weight was not significantly different in mice treated with 1 mg/kg PFOS and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOS	GD1-PND90	EOT	Liver weight was not significantly different in mice treated with 1 mg/kg PFOS compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (MF)	Prenatal	PFOS + HFD	GD1-PND90	EOT	Liver weight was significantly lower in mice treated with 1 mg/kg PFOS and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOS	GD1-PND90	EOT	Liver weight was not significantly different in mice treated with 1 mg/kg PFOS compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (M)	Prenatal	PFOS + HFD	GD1-PND90	EOT	Liver weight was not significantly different in mice treated with 1 mg/kg PFOS and HFD compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOS	GD1-PND90	EOT	Liver weight was not significantly different in mice treated with 1 mg/kg PFOS compared to controls.
Marques et al. (2021)[73]	Mice	CD-1 (F)	Prenatal	PFOS + HFD	GD1-PND90	EOT	Liver weight was not significantly different in mice treated with 1 mg/kg PFOS and HFD compared to controls.
Seacat et al. (2003)[87]	Rats	SD (F)	Diet	PFOS	4W	EOT	Liver weight was not significantly different in rats treated with 0.5, 2, 5, or 20 ppm PFOS compared to controls.
Seacat et al. (2003)[87]	Rats	SD (F)	Diet	PFOS	14W	EOT	Liver weight was significantly higher in rats treated with 20 ppm PFOS compared to controls, but not in rats treated with 0.5, 2, or 5 ppm PFOS.
Seacat et al. (2003)[87]	Rats	SD (M)	Diet	PFOS	4W	EOT	Liver weight was significantly higher in rats treated with 20 ppm PFOS compared to controls, but not in rats treated with 0.5, 2, or 5 ppm PFOS.
Seacat et al. (2003)[87]	Rats	SD (M)	Diet	PFOS	14W	EOT	Liver weight was significantly higher in rats treated with 20 ppm PFOS compared to controls, but not in rats treated with 0.5, 2, or 5 ppm PFOS.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	1D Post	Liver weight was significantly higher in rats treated with 20 and 100 ppm PFOS compared to controls.

Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	28D Post	Liver weight was not significantly different in rats treated with 20 and 100 ppm PFOS compared to controls.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	56D Post	Liver weight was not significantly different in rats treated with 20 and 100 ppm PFOS compared to controls.
Elcombe et al. (2012b)[47]	Rats	SD (M)	Diet	PFOS	7D	84D Post	Liver weight was significantly higher in rats treated with 20 and 100 ppm PFOS compared to controls.
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	1D	EOT	Liver weight was not significantly different in rats treated with 20 and 100 ppm PFOS compared to controls.
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	7D	EOT	Liver weight was significantly higher in rats treated with 100 ppm PFOS compared to controls, but not in rats treated with 20 ppm PFOS.
Elcombe et al. (2012a)[46]	Rats	SD (M)	Diet	PFOS	28D	EOT	Liver weight was significantly higher in rats treated with 20 and 100 ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (F)	Diet	PFOS	52W	1W Post	Liver weight was significantly higher in rats treated with 20 ppm PFOS compared to controls.
Butenhoff et al. (2012b)[34]	Rats	SD (M)	Diet	PFOS	52W	1W Post	Liver weight was significantly higher in rats treated with 20 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS	22D	EOT	Liver weight was significantly higher in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (F)	Diet	PFOS + CS	22D	EOT	Liver weight was significantly higher in rats treated with 100 ppm PFOS and CS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS	22D	EOT	Liver weight was significantly higher in rats treated with 100 ppm PFOS compared to controls.
Bagley et al. (2017)[28]	Rats	SD (M)	Diet	PFOS + CS	22D	EOT	Liver weight was significantly higher in rats treated with 100 ppm PFOS and CS compared to controls.
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation	PFOS	1W*	EOT	Liver weight was not significantly different in rats treated with 300 ppm PFOS compared to controls.
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation	PFOS	1W*	EOT	Liver weight was significantly higher in rats treated with 300 ppm PFOS compared to controls.
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation	PFOS	4W*	EOT	Liver weight was significantly higher in rats treated with 300 ppm PFOS compared to controls.
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation	PFOS	4W*	EOT	Liver weight was significantly higher in rats treated with 300 ppm PFOS compared to controls.
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation	PFOS	13W*	EOT	Liver weight was significantly higher in rats treated with 100 and 300 ppm PFOS compared to controls, but not in rats treated with 30 ppm PFOS.
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation	PFOS	13W*	EOT	Liver weight was significantly higher in rats treated with 100 and 300 ppm PFOS compared to controls, but not in rats treated with 30 ppm PFOS.
Butenhoff et al. (2017)[36]	Rats	SD (F)	Inhalation	PFOS	13W*	4W Post	Liver weight was significantly higher in rats treated with 300 ppm PFOS compared to controls, but not in rats treated with 30 and 100 ppm PFOS.
Butenhoff et al. (2017)[36]	Rats	SD (M)	Inhalation	PFOS	13W*	4W Post	Liver weight was significantly higher in rats treated with 100 and 300 ppm PFOS compared to controls, but not in rats treated with 30 ppm PFOS.
Qazi et al. (2010)[80]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT	Liver weight was significantly higher in mice treated with 0.005% w/w PFOS compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	10D	EOT	Liver weight was significantly higher in mice treated with 0.004% w/w PFOS compared to controls.
Qazi et al. (2013a)[81]	Mice	C57BL/6 (M)	Diet	PFOS	28D	EOT	Liver weight was significantly higher in mice treated with 0.00001% w/w PFOS compared to controls.
Pfohl et al. (2021)[78]	Mice	C57BL/6 (M)	Diet	PFOS + LFD	12W	EOT	Liver weight was not significantly different in rats treated with 0.0003% w/w PFOS and LFD compared to controls.
Pfohl et al. (2021)[78]	Mice	C57BL/6 (M)	Diet	PFOS + HFD	12W	EOT	Liver weight was not significantly different in rats treated with 0.0003% w/w PFOS and HFD compared to controls.
Zhang et al. (2016)[109]	Mice	C57BL/6J (M)	Diet	PFOS	24D	EOT	Liver weight was significantly higher in mice treated with 0.003, 0.006, and 0.012% w/w PFOS compared to controls.
Zhang et al. (2016)[109]	Mice	C57BL/6J (M)	Diet	PFOS + mMCD	24D	EOT	Liver weight was significantly higher in mice treated with 0.003, 0.006, and 0.012% w/w PFOS and mMCD compared to controls.
Zhang et al. (2016)[109]	Mice	C57BL/6J (M)	Diet	PFOS	6W	EOT	Liver weight was significantly higher in mice treated with 0.003% w/w PFOS compared to controls.
Zhang et al. (2016)[109]	Mice	C57BL/6J (M)	Diet	PFOS + CS	6W	EOT	Liver weight was significantly higher in mice treated with 0.003% w/w PFOS and CS compared to controls.
Huck et al. (2018)[58]	Mice	C57BL/6J (M)	Diet	PFOS	6W	EOT	Liver weight was significantly higher in mice treated with 0.0001% w/w PFOS compared to controls.
Huck et al. (2018)[58]	Mice	C57BL/6J (M)	Diet	PFOS + HFD	6W	EOT	Liver weight was significantly lower in mice treated with 0.0001% w/w PFOS and HFD compared to controls.
Marques et al. (2020)[72]	Mice	C57BL/6N (M)	Diet	PFOS	6W	EOT	Liver weight was significantly higher in mice treated with 0.0003% w/w PFOS compared to controls.
Marques et al. (2020)[72]	Mice	C57BL/6N (M)	Diet	PFOS + HFD/STD	6W	EOT	Liver weight was significantly higher in mice treated with 0.0003% w/w PFOS and HFD/ST compared to controls.

Marques et al. (2020)[72]	Mice	C57BL/6N (M)	Diet	PFOS + HFD	6W	EOT	Liver weight was significantly higher in mice treated with 0.0003% w/w PFOS and HFD compared to controls.

Notes:
Abbreviations: End of treatment (EOT); embryonic day (E); Vitamin C (VC); diethylnitrosamine (DEN); marginal methionine/choline-deficient diet (mMCD); choline supplementation (CS); concanavalin A (Con A); naringin (Nar); Sprague Dawley (SD); grape seed proanthocyanidin extract (GSPE). *Atmospheric exposure occurred for 5 hours/day, 5 days/week.

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