ADDITIONAL MATERIALS AVAILABLE ON THE HEI WEB SITE

Research Report 184

Advanced Collaborative Emissions Study (ACES): Lifetime Cancer and Non-Cancer Assessment in Rats Exposed to New-Technology Diesel Exhaust

Part 4. Assessment of Plasma Markers and Cardiovascular Responses in Rats After Chronic Exposure to New-Technology Diesel Exhaust in the ACES Bioassay

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Additional Materials 1. Summary Data Tables of Plasma Markers Measured in Rats Exposed to Filtered Air or Diesel Exhaust Emissions at 1 and 3 Months of Exposure

Additional Materials available on the Web may appear in a different order from the original Investigators' Report, and some remnants of their original names may be apparent. HEI has not changed the content of these documents, only the original identifier (letter or number). Additional Materials 1 was originally Appendix A.

This document was reviewed by the HEI ACES Review Panel but did not undergo the HEI scientific editing and production process.

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APPENDIX A: Summary data (mean±S.E.) tables of plasma markers measured in air-or diesel exhaust (DE) emission-exposed male (♂) and female (♀) rats (R) at 1 month (1m) or 3 months (3m) of exposure.

Table 1: Plasma levels (mean±S.E.) of factors measured in air-or diesel engine (DE) emission-exposed male (♂) and female (♀) rats (R) at 1 month (1m) or 3 months (3m) of exposure. The sample size is 10 per cell unless indicated by the number in the parenthesis (n) after the value.

		CHOL[1] (n=160)	HDL[1] (n=160)	LDL[1] (n=160)	HDL/LDL (n=160)	TRIG[1] (n=160)	ALB[2] (n=160)	TP[2] (n=160)	NAP[2] (n=160)
R♂ 1m	Air	78.13±5.18	47.06±3.64	14.64±1.13	3.24±0.21	92.95±18.51	3.93±0.06	6.07±0.09	2.13±0.05
	Low	82.43±3.39	48.96±2.45	14.15±1.17	3.62±0.3	132.2±13.59	3.92±0.04	5.99±0.07	2.07±0.04
	Mid	94.05±4.47	56.98±2.93	17.73±1.94	3.43±0.25	116.9±19.47	4.13±0.09	6.37±0.17	2.25±0.09
	High	94.95±6.5	59.17±3.88	17.71±2.39	3.7±0.34	107.9±20.25	4.05±0.08	6.18±0.15	2.12±0.08
R♀ 1m	Air	78.32±3.62	48.29±2.08	14.99±0.74	3.24±0.16	56.79±13.67	4.67±0.08	6.82±0.16	2.15±0.08
	Low	86.74±4.68	54.82±2.63	15.93±1.16	3.52±0.18	55.87±10.82	4.78±0.09	7.11±0.18	2.34±0.09
	Mid	85.17±3.25	53.85±2.2	15.42±0.99	3.57±0.19	73.34±14.51	4.62±0.09	6.78±0.18	2.17±0.1
	High	73.62±3.00	46.75±2.51	12.36±1.15	4.08±0.44	58.64±15.04	4.56±0.09	6.7±0.17	2.14±0.09
R♂ 3m	Air	83.47±3.15	51.56±1.87	13.64±1.11	4.05±0.46	114.79±15	4.09±0.04	6.11±0.12	2.02±0.08
	Low	90.85±3.76	56.87±2.87	14.71±0.76	3.94±0.19	116.4±14.49	4.15±0.04	6.17±0.07	2.02±0.06
	Mid	83.04±3.64	49.8±2.06	15.4±2.04	3.72±0.44	70.22±11.52	4.12±0.04	6.2±0.15	2.08±0.12
	High	83.55±3.86	53.44±2.3	14.02±1.16	3.94±0.22	98.05±16.56	4.04±0.04	6.05±0.11	2.01±0.08
R♀ 3m	Air	92.11±5.54	61.14±3.71	14.57±1.21	4.35±0.34	57.38±16.57	4.79±0.11	6.89±0.19	2.09±0.09
	Low	81.15±2.88	53.69±2.32	13.05±0.89	4.34±0.44	53.04±9.49	4.69±0.07	6.75±0.12	2.07±0.07
	Mid	74.84±3.60	49.6±2.81	12.29±1.36	4.35±0.43	78.98±22.91	4.69±0.09	6.68±0.15	1.99±0.09
	High	87.78±3.78	58.46±2.81	13.48±0.95	4.52±0.35	67.09±21.92	4.62±0.11	6.67±0.2	2.05±0.10

Abbr.: CHOL, cholesterol; HDL, high density lipoprotein; LDL, low density lipoprotein; HDL/LDL ratio; TRIG, triglycerides; ALB, albumin; TP, total protein; NAP, non-albumin protein; ALT, alanine aminotransferase; AST, aspartate aminotransferase; CK, creatine kinase; CREA, creatinine; LDH, lactate dehydrogenase; IgE, immunoglobulin E; IgG, immunoglobulin gamma; IgM, immunoglobulin M; units: [1], mg/dl; [2], g/dl; [3], U/L; [4], ng/ml; [5], mg/ml; [6], µg/ml.

Table 1: (cont.)

		ALT[3] (n=159)	AST[3] (n=160)	CK[3] (n=158)	CREA[1] (n=159)	LDH[3] (n=159)	IgE[4] (n=158)	IgG[5] (n=160)	IgM[6] (n=160)
R♂ 1m	Air	35.99±2.24	67.3±6.95	283.4±40.23	0.40±0.01	204.1±25.1	6.33±3.88 (9)	2.15±0.26	98.39±11.01
	Low	37.09±1.89	62.75±4.39	384.2±178.3 (9)	0.39±0.01	232.1±30.1	2.13±0.3	1.55±0.24	75.13±12.51
	Mid	42.92±3.83	73.19±5.93	281.8±36.75	0.38±0.02	249.3±50.8	3.89±0.99	1.71±0.16	56.84±8.19
	High	35.23±2.17	69.44±5.64	245.9±16.66 (9)	0.42±0.04	235.3±38.0	3.06±1.11	1.48±0.18	79.88±11.13
R♀ 1m	Air	32.19±1.28 (9)	69.27±9.36	277.7±35.02	0.42±0.02	223.0±12.7(9)	3.92±1.32	2.75±0.36	70.47±6.48
	Low	41.41±4.4	74.17±7.07	244.8±23.08	0.39±0.01	253.5±24.5	10.38±3.9 (9)	2.30±0.43	70.99±12.59
	Mid	38.37±2.49	66.53±4.44	188.5±12.87	0.4±0.01	199±16.7	7.44±4.61	1.91±0.38	58.99±10.13
	High	38.54±3.44	83±9.46	438.3±115.4	0.42±0.02	241.4±24.6	2.39±0.44	2.93±0.57	82.36±8.26
R♂ 3m	Air	39.56±1.94	81.9±8.29	307.25±58.5	0.56±0.03	216.2±25.2	7.58±3.02	4.82±0.68	145.8±16.97
	Low	48.97±8.87	80.49±6.55	268.45±26.3	0.52±0.01	214.4±13.1	2.71±0.73	3.5±0.46	149.3±12.22
	Mid	41.53±4.71	91.96±13.32	429.8±117.2	0.52±0.02	379±173	6.94±2.87	4.26±0.85	151.8±15.43
	High	38.35±1.10	69.52±4.29	231.3±27.1	0.51±0.04	195.3±10.5	3.25±0.97	5.78±0.95	165.6±24.99
R♀ 3m	Air	65.77±11.4	117.5±17.34	255.5±30.35	0.46±0.02	242.6±22.6	10.21±4.93	5.41±0.33	130.26±7.69
	Low	66.85±9.25	105.3±14.59	220.9±24.1	0.48±0.02	232.6±18.1	7.86±2.55	5.22±0.61	111.3±13.27
	Mid	46.92±5.26	91.3±10.54	279.78±44.1	0.46±0.02 (9)	227.9±20.2	3.98±1.32	6.89±1.16	138.25±9.35
	High	46.82±5.25	103.1±15.84	390.1±148.0	0.47±0.02	265.3±35.0	3.81±1.54	7.29±0.88	149.7±17.23

Abbr.: CHOL, cholesterol; HDL, high density lipoprotein; LDL, low density lipoprotein; HDL/LDL ratio; TRIG, triglycerides; ALB, albumin; TP, total protein, g/dl; NAP, non-albumin protein; ALT, alanine aminotransferase; AST, aspartate aminotransferase; CK, creatine kinase; CREA, creatinine; LDH, lactate dehydrogenase; IgE, immunoglobulin E; IgG, immunoglobulin gamma; IgM, immunoglobulin M; units: [1], mg/dl; [2], g/dl; [3], U/L; [4], ng/ml; [5], mg/ml; [6], µg/ml.

Table 2: Plasma levels (mean±S.E.) of cytokines/chemokines measured in air-or diesel engine (DE) emission-exposed male (♂) and female (♀) rats (R) at 1 month (1m) or 3 months (3m) of exposure. The sample size is 10 per cell unless indicated by the number in the parenthesis (n) after the value.

		GM-CSF[1] (n=160)	MCP-1[1] (n=160)	IL-1ß[1] (n=160)	IL-6[1] (n=160)	IL-10[1] (n=160)	IFN-γ[1] (n=160)	KC[1] (n=160)
R♂ 1m	Air	112.7±19.6	110±26.6	24.8±5.88	3190±2370	113.5±32.5	310±222	182±14.1
	Low	122.27±33.2	95.7±10.4	37.26±8	1559±783	123.3±48.4	109±29	208±30.4
	Mid	111±28.65	91.0±8.75	24.6±7.07	769.8±385	206.9±59.3	102±24.3	190±35.8
	High	138.9±20.8	99.6±7.73	31.4±13.6	8958±5845	199.6±70.9	874±727	189±37.7
R♀ 1m	Air	102.2±27.4	51.4±7.1	37.5±15.8	305.4±76.0	141.2±59.1	61.8±9.6	237±46.3
	Low	190±131.8	58.4±8.3	17.2±3.74	6516±4139	125.4±21.2	405.8±239	249±38.4
	Mid	93.91±18.8	66.6±8.91	28.2±9.6	1845±836	116.4±24.9	143±51.6	186±26.1
	High	115.4±23.8	47.7±7.26	22.0±7.26	2733±1244	110.2±35.9	147±56.3	212±31.8
R♂ 3m	Air	123.96±29.	81.5±12.1	36.3±13.6	1186±548	123.5±32.1	114±36.2	247±34.5
	Low	84.22±17.6	73.73±6.17	50.1±16.1	3433±1899	194.8±34.3	148±41.4	318±65.2
	Mid	85.7±17.7	75.2±9.4	41.2±15.8	3142±1316	113±31.1	252±99.2	237±37.7
	High	191.1±41.4	76.4±9.95	31.8±9.4	2498±1369	169±34.7	163.6±57.9	287±55.7
R♀ 3m	Air	105.8±21.5	53.7±13.9	32.4±9.8	1087±387	104±28.7	104.9±21.8	349±78.6
	Low	121.2±22.6	44.54±6.1	26.97±7.6	5687±4590	101±24.6	352±264.5	272±45
	Mid	84.1±21.38	49.7±8.85	30.3±11.2	1247±604	105.9±33.4	128±52.2	259±49.8
	High	77.7±20.01	40.4±16.7	11.8±3.3	7410±5928	180±104.0	489±413.7	282±46.28

Abbr.: GM-CSF, granulocyte/macrophage colony-stimulating factor; MCP-1, monocyte chemotactic protein-1; IL-1β, interleukin-1β; IL-6, interleukin-6; IL-10, interleukin-10; IFN-γ, interferon-γ; KC, keratinocyte-derived chemoattractant (CXCL1); TNF-α, tumor necrosis factor-α; VEGF, vascular endothelial growth factor; sICAM-1, soluble intercellular adhesion molecule-1; CRP, C-reactive peptide; units: [1], pg/ml; [2], ng/ml.

Table 2: (cont.)

		TNF-α[1] (n=160)	VEGF[1] (n=159)	sICAM-1[1] (n=160)	Fibrinogen[1] (n=160)	Leptin[1] (n=159)	CRP[2] (n=160)
R♂ 1m	Air	15.79±8.8	13.9±2.55	7620±1081.4	537±16.8	546±110.6	221±14.0
	Low	6.58±0.71	15.4±3.85	7328±558.87	556±18.9	1004±267	224±13.9
	Mid	6.36±0.9	7.04±1.19	6031±480.4	556±18.1	530±92.5	230±22.9
	High	9.24±1.18	8.51±1.87	6371±409.1	562±16.5	564±64.4 (9)	235.±14.4
R♀ 1m	Air	6.66±0.81	8.48±1.55	3530±378	535±23.7	194±27.2	262±18.6
	Low	10.12±3.5	9.7±2.46 (9)	3677±236	588±19.5	313±61.8	285±19.3
	Mid	7.35±0.78	12.9±4.1	4012±284	537±25.46	249.6±53.3	255±19.59
	High	7.15±1.15	12.6±2.78	4228±351	545±23.58	277±42.4	290±12.87
R♂ 3m	Air	6.16±0.83	7.79±1.95	5174±472	556±19.2	915±169.5	232±11.76
	Low	4.99±0.38	7.19±2.16	5204±205	559.6±16.6	1087±186	252±16.03
	Mid	5.81±0.71	9.83±2.5	5710±439	549.5±20.7	557±78.34	252±13.06
	High	5.97±0.98	6.59±1.23	4848±258	552.2±21.3	939±101.9	232±10.52
R♀ 3m	Air	4.95±0.46	7.96±2.05	3082±219	517.4±11.1	321±48.7	267±15.3
	Low	5.11±0.45	10.6±4.01	3416±617	577.5±20.2	318±46.8	252±13.3
	Mid	5.36±0.5	10±2.66	2541±164	557±15.9	325±30.6	268±11.0
	High	8.15±2.98	8.15±3.35	3664±910	584.7±21.7	377±49.5	249±7.2

Abbr.: GM-CSF, granulocyte/macrophage colony-stimulating factor; MCP-1, monocyte chemotactic protein-1; IL-1β, interleukin-1β; IL-6, interleukin-6; IL-10, interleukin-10; IFN-γ, interferon-γ; KC, keratinocyte-derived chemoattractant (CXCL1); TNF-α, tumor necrosis factor-α; VEGF, vascular endothelial growth factor; sICAM-1, soluble intercellular adhesion molecule-1; CRP, C-reactive peptide; units: [1], pg/ml; [2], ng/ml.