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Supplemental Material

Effects of Ambient Coarse, Fine, and Ultrafine Particles and Their Biological Constituents on Systemic Biomarkers: A Controlled Human Exposure Study

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Table S1. Baseline characteristics of subjects (N=55).

Characteristic	**Median (5th – 95th percentile, unless otherwise noted)**
Age, years (mean ± standard deviation)	28 ± 9
Sex (female/male)	29/26
Race (Asian/Caucasian/other)	24/23/8
Body mass index (kg/m^2)	23.0 (19.5, 27.8)
Blood biomarkers	
IL-6 (pg/ml)	0.8 (0.2, 3.3)
CRP (! g/ml)	0.43 (0.02, 5.38)
ET-1 (pg/ml)	1.2 (0.6, 2.4)
VEGF (pg/ml)	27.5 (11.2, 65.1)
MDA (! M)	0.8 (0.3, 2.9)
Urinary biomarkers	
VEGF (pg/mg Creatinine)	54.4 (1.2, 176.1)
8-OHdG (ng/mg Creatinine)	3.7 (1.6, 10.6)
MDA (nmol/mg Creatinine)	2.2 (1.1, 5.4)

Table S2. Mean changes in biomarker concentrations (95% confidence interval) in blood and urine for an increase in one unit [ln(pg/m^3)] of glucan in coarse or fine CAP.

Biomarker	Glucan in coarse CAP 1-hr post exposure	Glucan in coarse CAP 21-hr post exposure	Glucan in fine CAP 1-hr post exposure	Glucan in fine CAP 21-hr post exposure
Blood biomarkers				
IL-6 (pg/ml)	0.00 (-0.14, 0.15)	-0.04 (-0.10, 0.03)	-0.05 (-0.11, 0.00)*	Not available[a]
CRP (ng/ml)	-1.01 (-4.23, 2.20)	-1.66 (-5.67, 2.35)	-0.38 (-4.86, 4.09)	-4.38 (-14.87, 6.10)
ET-1 (pg/ml)	-0.01 (-0.03, 0.01)	0.00 (-0.02, 0.02)	0.03 (-0.02, 0.08)	0.01 (-0.02, 0.05)
VEGF (pg/ml)	0.72 (-0.47, 1.91)	-0.30 (-1.74, 1.14)	-0.89 (-2.64, 0.86)	-0.83 (-3.48, 1.81)
MDA (μM)	-0.01 (-0.06, 0.04)	0.82 (-0.43, 2.07)	-0.09 (-0.19, 0.02)	-1.19 (-2.74, 0.37)
Urinary biomarkers				
VEGF (pg/mg Creatinine)	4.05 (-2.36, 10.46)	0.77 (-4.23, 5.77)	2.79 (-5.10, 10.68)	4.64 (-3.86, 13.14)
8-OHdG (ng/mg Creatinine)	0.09 (-0.04, 0.21)	0.02 (-0.13, 0.17)	-0.06 (-0.34, 0.22)	0.00 (-0.24, 0.24)
MDA (nmol/mg Creatinine)	0.02 (-0.05, 0.09)	0.04 (-0.07, 0.15)	0.12 (-0.12, 0.35)	0.09 (-0.16, 0.33)

*$p<0.1$. [a]Result not available due to singularity problem of the matrix in the model.

Table S3. Mean changes in biomarker concentrations (95% confidence interval) in blood and urine for exposure to ultrafine CAP. Ultrafine CAP was in number count concentration (100,000/cm^3).

Biomarker	1-hr post exposure	21-hr post exposure
Blood biomarkers		
IL-6 (pg/ml)	0.10 (-0.29, 0.49)	0.08 (-0.12, 0.28)
CRP (ng/ml)	26.2 (-27.1, 79.4)	-10.0 (-88.4, 68.4)
ET-1 (pg/ml)	0.00 (-0.20, 0.20)	0.02 (-0.08, 0.12)
VEGF (pg/ml)	-1.00 (-4.92, 2.92)	-2.90 (-8.78, 2.98)
MDA (μM)	2.00 (-3.88, 7.88)	-0.02 (-0.18, 0.14)
Urinary biomarkers		
VEGF (pg/mg Creatinine)	7.00 (-8.68, 22.68)	0.22 (-13.90, 14.33)
8-OHdG (ng/mg Creatinine)	0.30 (-0.09, 0.69)*	0.20 (-0.19, 0.59)
MDA (nmol/mg Creatinine)	0.10 (-0.10, 0.30)	0.27 (-0.12, 0.66)*

*$p<0.1$.