Table S1: The urinary phthalate metabolites of study population and the difference between groups with and without lung function impairment

	Total	Lung function impairment		P
		No	Yes	
Mono carboxyisononyl phthalate	5.51 ±0.95	5.51 ±0.96	5.49 ±0.90	0.488
Mono carboxyoctyl phthalate	7.01 ±1.28	7.02 ±1.27	6.94 ±1.29	0.113
Mono-2-ethyl-5-carboxypentyl phthalate	7.59 ±0.99	7.59 ±0.99	7.60 ±0.98	0.751
Mono-n-butyl phthalate	7.18 ±0.97	7.18 ±0.96	7.19 ±0.97	0.871
Mono-(3-carboxypropyl) phthalate	5.59 ±1.08	5.58 ±1.09	5.64 ±1.00	0.120
Mono-ethyl phthalate	8.95 ±1.43	8.94 ±1.43	8.99 ±1.38	0.333
Mono-(2-ethyl-5-hydroxyhexyl) phthalate	7.15 ±1.06	7.15 ±1.07	7.17 ±1.03	0.564

Mono-(2-ethyl)-hexyl phthalate	5.22 ±1.12	5.24 ±1.13	5.14 ±1.06	0.027
Mono-isobutyl phthalate	6.58 ±0.82	6.60 ±0.81	6.49 ±0.83	0.001
Mono-isononyl phthalate	4.68 ±1.15	4.69 ±1.15	4.66 ±1.12	0.531
Mono-(2-ethyl-5-oxohexyl) phthalate	6.64 ±1.01	6.64 ±1.01	6.66 ±0.99	0.599
Mono-benzyl phthalate	6.32 ±0.98	6.30 ±0.98	6.40 ±0.96	0.007
DEHP	8.38 ±0.97	8.38 ±0.98	8.39 ±0.95	0.733

Lung function impairment: decline in lung function: best test FEV1/FVC ratio below lower limit of normal and/or less than 70%. DEHP: di-2-ethylhexyl phthalate, DEHP=Mono-2-ethyl-5-carboxypentyl phthalate+Mono-(2-ethyl-5-hydroxyhexyl) phthalate, +Mono-(2-ethyl)-hexyl phthalate +Mono-(2-ethyl-5-oxohexyl) phthalate. UPMs: urinary phthalate metabolites. The ln transformed of [urinary phthalate metabolites (ng/L)/ urinary creatinine (g/dL)] were used in the analysis.

Table S2: The blood cells of study population and the difference between groups with and without lung function impairment

	Total	Lung function impairment		P
		No	Yes	
Blood cells				
Monocyte percent (%)	7.62 ±2.27	7.60 ±2.26	7.71 ±2.33	0.261
Neutrophils percent (%)	57.92 ±9.51	57.79 ±9.46	58.61 ±9.73	0.041
Eosinophils percent (%)	2.82 ±2.08	2.79 ±2.10	2.98 ±1.95	0.024
Basophils percent (%)	0.69 ±0.55	0.69 ±0.55	0.69 ±0.58	0.825
Monocyte number (cells/uL)	529.34 ±183.65	524.46 ±180.27	554.93 ±198.65	<0.001
Neutrophils number (cells/uL)	4259.81 ±2071.89	4227.04 ±2127.74	4431.69 ±1741.19	0.006
Eosinophils number (cells/uL)	200.14 ±200.36	197.53 ±208.85	213.8 ±147.40	0.012
Basophils number (cells/uL)	40.41 ±93.58	40.09 ±98.56	42.11 ±61.15	0.471

Lung function impairment: best test FEV1/FVC ratio below lower limit of normal

and/or less than 70%.

Table S3: The blood cells of study population according to the concentration of urinary MBP

Blood cells	Quartile of ln(MBP/Ucr), range (median)				P_{trend}
	2.15~5.69 (5.23)	5.69~6.31 (6.03)	6.31~6.93 (6.59)	6.93~10.20 (7.40)	
Monocyte percent (%)	7.64 ±2.15	7.6 ±2.29	7.70 ±2.35	7.53 ±2.30	0.463
Neutrophils percent (%)	57.46 ±8.98	57.8 ±9.90	57.96 ±9.66	58.47 ±9.45	0.012
Eosinophils percent (%)	2.76 ±1.88	2.88 ±2.19	2.82 ±1.98	2.83 ±2.23	0.633
Basophils percent (%)	0.72 ±0.57	0.69 ±0.58	0.66 ±0.47	0.69 ±0.59	0.116
Monocyte number	510.29 ±172.93	519.58 ±178.28	540.4 ±186.68	547.01 ±193.75	<0.001

(cells/uL)					
Neutrophils number (cells/uL)	4028.43 ±1513.40	4172.29 ±1756.88	4298.82 ±1759.86	4537.27 ±2918.24	<0.001
Eosinophils number (cells/uL)	189.62 ±145.24	196.66 ±161.12	200.09 ±149.04	214.03 ±300.76	0.004
Basophils number (cells/uL)	39.89 ±60.69	39.17 ±63.05	37.94 ±65.9	44.59 ±151.16	0.301

ln(MBP/Ucr): ln[mono-benzyl phthalate(ng/L)/urinary creatinine(g/dL)]; MBP: mono-benzyl phthalate.

Table S4: Association between FeNO, eosinophil and urinary MBP

Outcomes	Model	Quartiles of ln(MBP/UCr), range (median)				P_{trend}
		2.15~5.69 (5.23)	5.69~6.31 (6.03)	6.31~6.93 (6.59)	6.93~10.20 (7.40)	
FeNO	Model 1	1.00 (Reference)	0.93 (0.74, 1.16)	0.85 (0.68, 1.06)	0.84 (0.67, 1.05)	0.092
	Model 2	1.00 (Reference)	0.99 (0.79, 1.24)	0.98 (0.78, 1.23)	1.05 (0.83, 1.32)	0.737
	Model 3	1.00 (Reference)	1.08 (0.85, 1.36)	1.06 (0.83, 1.35)	1.17 (0.92, 1.50)	0.243
	Model 4	1.00 (Reference)	1.07 (0.85, 1.36)	1.06 (0.83, 1.34)	1.17 (0.92, 1.50)	0.251
High eosinophil	Model 1	1.00 (Reference)	1.08 (0.82, 1.41)	1.00 (0.76, 1.31)	1.18 (0.91, 1.54)	0.300

	Model 1				
Model 2	1.00 (Reference)	1.11 (0.85, 1.46)	1.07 (0.81, 1.4)	1.31 (1.00, 1.71)	0.078
Model 3	1.00 (Reference)	1.08 (0.82, 1.43)	1.00 (0.75, 1.33)	1.21 (0.91, 1.61)	0.275
Model 4	1.00 (Reference)	1.09 (0.83, 1.44)	1.02 (0.77, 1.36)	1.23 (0.93, 1.63)	0.222

ln(MBP/UCr): ln[mono-benzyl phthalate(ng/L)/urinary creatinine(g/dL)]; MBP: mono-benzyl phthalate; FeNO: fractional exhaled nitrous oxide; high eosinophil: the number of eosinophil >=500 cells/ul or the eosinophil percent >=5%;

Model1: Unadjusted model

Model2: Adjusted for gender (man or woman), age (years old), race(Mexican American, other Hispanic, Non-Hispanic White, Non-Hispanic Black, and Other Race), education (below high school, high school, above high school)

Model3: Adjusted for gender (man or woman), age (years old), race(Mexican American, other Hispanic, Non-Hispanic White, Non-Hispanic Black, and Other Race), education (below high school, high school, above high school), BMI (kg/m2), history of diabetes (yes or no), smoker status(never,former, current), and hypertension(yes or no).

Model4: Adjusted for gender (man or woman), age (years old), race(Mexican American, other Hispanic, Non-Hispanic White, Non-Hispanic Black, and Other Race), education (below high school, high school, above high school), history of diabetes (yes or no), and hypertension(yes or no).
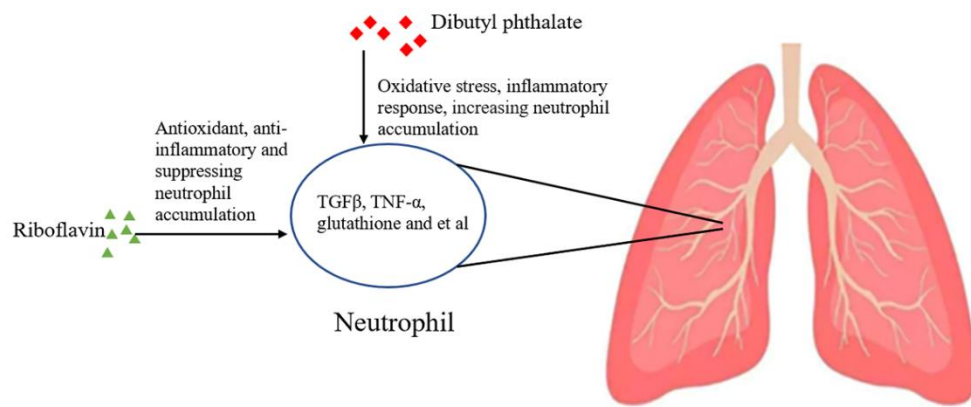
Figure S1: the potential biochemical and cell biological mechanisms of the riboflavin on lung function. Riboflavin exerted both the antioxidant and anti-inflammatory effects against acetic acid-induced colonic inflammation by suppressing neutrophil accumulation, inhibiting reactive oxidant generation. The decreasing level of TGFβ and TNF-α, and increasing levels of glutathione in neutrophil may be the potential antioxidant and anti-inflammatory effects of riboflavin.