

Table 10. Evidence for the effect of nutrients on the excretion of MeHg.

Nutrient	MeHg exposure	Nutrient dose	Animal model	Duration of experiment	Effects	Ref.
Protective effects						
Chemically defined liquid diet	0.46 mg MeHgCl/kg bw, single dose p.o. on d 0	116 EC GIBCO diet <i>ad libitum</i> vs pellet rodent diet	Mouse	14 d	Increased elimination of whole-body Hg compared to rodent pellet diet; increased excretion of inorganic Hg	(85)
Cysteine	4 mmol MeHgCl/kg bw, single i.v. injection	8 mmol Cys/kg bw, single i.v. injection premixed with Hg	Rat	4 hr	Promoted biliary excretion of MeHg	(74)
Cysteine	4 mmol MeHgCl/kg bw, single i.v. injection	3 mmol cysteine/kg bw in 2 mL of water	Rat	300 min	Cys temporarily decreased biliary excretion of MeHg but then increased it as biliary excretion of Cys decreased	(301)
Cystine and selenite	15–25 ppm MeHgCl	0.4% L-cystine, 0.6 ppm selenite, in diet, <i>ad libitum</i>	Rat	6–10 wk	Reduced Hg toxicity; decreased excretion of Hg slightly and increased retention	(70)
Fish protein	15–25 ppm MeHgCl in diet, <i>ad libitum</i> vs casein diet	10–20% fish protein	Rat	6–10 wk	Increased urinary and fecal excretion compared to diets supplemented with selenite or cystine or the casein diet; slightly increased Hg in muscle	(70)
Glutathione	4 mmol MeHgCl/kg bw, single i.v. injection	8 mmol cysteine/kg bw, single i.v. injection premixed with Hg	Rat	4 hr	Promoted biliary excretion of MeHg	(74)
Lipoic acid	NA	NA	NA	NA	Protected Hg toxicity	(140)
Methionine	20 mmol Hg as MeHg/kg bw	1–7.5% or 24.8% protein diet	Rat		Hg excretion in urine was increased but not fecal excretion	(257)
Selenium	6.5–13 ppm MeHgCl in diet	0.5–4 ppm selenite in diet	Chick	12 d	Increased Hg concentration in ileum; increased Hg excretion	(302)
Sulfur amino acids in low protein diet	20 mmol MeHg/kg, orally (24 hr before death)	7.5% protein diet vs 24.8% protein diet plus 0.03% cysteine and 1.1% methionine, 5 d	Mouse	5 d	Increased urinary Hg over normal protein diet	(69)
Synthetic liquid diet (high protein, low fat)	0.6 mg MeHgCl/kg bw (single p.o. dose)	Synthetic diet (high protein, low fat) <i>ad libitum</i>	Mouse	2 wk	Increased whole-body elimination of Hg compared to rodent pellet diet; antibiotic treatment reduced fecal Hg to zero and suppressed urinary Hg excretion	(88)
Wheatbran	5.0 mg Hg as MeHgCl/kg bw, single p.o. dose)	5, 15, 30% wheatbran in diet compared to fiber-free diet	Mouse	104 d	Increased rate of Hg elimination by 43%	(78)
Enhanced toxicity						
Lipoic acid	10 mmol/kg bw, i.v. injection	37.5–300 μmol lipoic acid/kg, i.v. injection	Rat	3 hr	Decreased biliary excretion of MeHg but increased GSH and inorganic Hg excretion	(139)
Low-protein diet	20 mmol Hg as MeHg/kg bw, orally, on d 0	7.5% vs 24.8% protein diet	Mouse	7 d	Decreased urine Hg 3.7 times; did not affect fecal level	(87)
Low-protein diet	20 mmol Hg as MeHg/kg bw orally, 24 hr before death	7.5 vs 24.8% protein diet, 5 d	Mouse	5 d	Decreased Hg in urine	(69)
Methyl iodide	MeHg, dose NA	0.5 mmol methyl iodide/kg bw, single i.v. injection	Rat	300 min	Decreased biliary excretion of MeHg	(301)
Selenium	50 mmol Hg as MeHgCl/kg bw, p.o.	50 mmol selenite/kg bw, p.o.	Guinea pigs	13 d	Decreased fecal excretion; fecal excretion was predominant excretion path	(199)
Other effects						
Cellulose	5.0 mg MeHgCl/kg bw, single p.o. dose	5% cellulose in diet vs fiber-free diet	Mouse	104 d	Did not affect Hg elimination	(78)
Cystine	15–25 ppm MeHgCl, in diet <i>ad libitum</i>	0.4% L-cystine, in diet, <i>ad libitum</i>	Rat	6–10 wk	Does not exert protective effect by increasing excretion	(70)
Ethanol	2.5 mg MeHgCl/kg bw, in water	5.0 mL/kg bw of 25% ethanol	Rat	7 wk	No effect on feces and urine levels of Hg	(79)
Milk	0.46 mg MeHgCl/kg (single dose p.o. on d 0)	Evaporated whole milk diet <i>ad libitum</i> vs pellet rodent diet	Mouse	14 d	Decreased elimination of whole-body Hg compared to rodent pellet diet; fecal excretion was less than pellet diet	(85)
Pectin	5.0 mg Hg as MeHgCl/kg bw, single p.o. dose	5% pectin in diet compared to fiber free diet	Mouse	104 d	No effect on Hg elimination	(78)
Selenium	15–25 ppm MeHgCl in diet	0.6 ppm selenite, in diet, <i>ad libitum</i>	Rat	6–10 wk	Reduced MeHg toxicity but did not accelerate elimination of Hg in urine or feces	(70)
Selenium-L-methionine	1 nmol Hg as MeHgCl/mL, 5 wk, during and after pregnancy, in drinking water (essentially nontoxic level)	3 mg Se–Met/mL in drinking water (diet already contains 0.9 ppm Se)	Mouse	9–10 wk	Rate of Hg excretion after birth was not affected by Se–Met	(97, 276)