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【Abstract】 Background: Selenium (Se), an essential trace element, is known to be a cofactor of antioxidative selenoenzymes such as glutathione peroxidase and thioredoxin reductase. Methods: We assessed the pathophysiological significance of selenium (Se) by comparing the concentrations of serum Se and C-reactive protein (CRP) in healthy subjects (141; M=71, F=70) vs. patients with various pathological conditions. Results: In normal males in their 40s, peak serum Se concentrations were observed (2.03±0.30 μg/g of serum protein, 128%, P<0.001) vs. males in their 20s (1.59±0.20), whereas a peak was observed in females in their 30s (1.87±0.31, 119%, P<0.025) vs. those in their 20s (1.57±0.22). The serum Se concentrations in the high CRP value group (n=40, 1.07±0.29 μg/g, 64.1%), the rheumatoid arthritis (RA) test positive group (n=24, 1.37±0.29, 82.0%), the lung cancer group (n=16, 1.38±0.30, 82.6%), and the adult T-cell leukemia (ATL) group (n=22, 1.26±0.35, 75.4%) were significantly lower (P<0.001) than those in the healthy subjects (1.67±0.29 μg/g). This finding was confirmed by inducing acute phase response (APR) in rats by injection of lipopolysaccharide (LPS), which produced a significant decrease of Se in plasma and liver (69.5% and 81.6% vs. untreated rats, P<0.05). In contrast, the Se content in muscle, kidney, lung, spleen, heart, and thymus showed increases of <10%. Se mobilized from liver after LPS-challenge appeared to be translocated to muscle, and Se concentrations recovered by 80 h after APR to the control concentrations in parallel with the subsidence of APR. Conclusions: The reduction of Se in the liver and plasma during APR may be associated with the increased CRP synthesises in the liver.

Keywords: Serum selenium; C-reactive protein; Acute phase response; Selenium redistribution; Liver selenium; Muscle selenium