

## Selenium status in very old adults: Insights from the Newcastle 85+ Study

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It is well-known that selenium intakes are suboptimal in older adults in the UK, however, less is known about selenium status and the relationships between biomarkers of selenium status in very old adults ( $\geq 85$  years). We aimed to assess biomarkers of selenium status among 85-year-old participants, and to quantify the relationship between serum selenium and selenoproteins, glutathione peroxidase (GPx3) and selenoprotein P (SePP).

Biomarkers of selenium status (serum selenium, GPx3 activity and SePP) were measured using standard laboratory techniques (benchtop total reflection x-ray fluorescence (TXRF), coupled-enzyme reaction measuring nicotinamide adenine dinucleotide phosphate hydrogen (NADPH) consumption and immunoluminometric, commercial enzyme-linked immunosorbent assay (ELISA), respectively) in 757 participants from The Newcastle 85+ Study. Biomarkers of selenium status concentrations were assessed and compared to cut-offs based on selenium DRVs. The cut-offs used were 70  $\mu\text{g/l}$  for serum selenium, 115 U/L for GPx3 and 4.5 mg/l for SePP based on the respective previous literature<sup>(1,2,3)</sup>. Linear equations were plotted between serum selenium and the two selenoproteins (GPx3 and SePP) to assess the relationship.

The median concentrations (IQR) were serum selenium 53.6 (23.6)  $\mu\text{g/l}$ , GPx3 activity 142.1 (50.7) U/L, and SePP 2.9 (1.9) mg/l. There was a strong, positive linear, the relationship between serum selenium and GPx3 activity ( $y = 90.79 + 0.97 * x$ ;  $R^2 = 0.132$   $P < 0.001$ ) and SePP ( $y = 0.99 + 0.04 * x$ ;  $R^2 = 0.247$   $P < 0.001$ ). Based on the literature and derived cut-offs for selenium adequacy, the selenium status of this very old population is inadequate, especially regarding serum selenium (82% below 70  $\mu\text{g/l}$ ) and SePP (83% below 4.5 mg/l). In contrast, GPx3 activity appears to be sufficient when compared to other British cohorts.

In this population of very old adults, selenium status was suboptimal, especially the biomarkers, serum selenium and SePP. There were linear associations between serum selenium and the selenoproteins, suggesting expression was not optimised. The implications of this low selenium status are currently being explored in this cohort.

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