

# Abstract

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## **An increase in selenium intake improves immune function and poliovirus handling in adults with marginal selenium status.**

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**BACKGROUND:** Dietary selenium intakes in many countries, including the United Kingdom, are lower than international recommendations. No functional consequences of these lower intakes have been recognized, although experimental studies suggest that they might contribute to reduced immune function, increased cancer incidence, and increased susceptibility to viral disease.

**OBJECTIVE:** The objective was to assess whether administration of small selenium supplements to otherwise healthy UK subjects leads to functional changes in immune status and the rates of clearance and mutation of a picornavirus: live attenuated polio vaccine.

**DESIGN:** Twenty-two adult UK subjects with relatively low plasma selenium concentrations (<1.2 micromol/L, approximately 60% of those screened) received 50 or 100 microg Se (as sodium selenite) or placebo daily for 15 wk in a double-blind study. All subjects received an oral live attenuated poliomyelitis vaccine after 6 wk and enriched stable (<sup>74</sup>Se) intravenously 3 wk later.

**RESULTS:** Selenium supplementation increased plasma selenium concentrations, the body exchangeable selenium pool (measured by using (<sup>74</sup>Se), and lymphocyte phospholipid and cytosolic glutathione peroxidase activities. Selenium supplements augmented the cellular immune response through an increased production of interferon gamma and other cytokines, an earlier peak T cell proliferation, and an increase in T helper cells. Humoral immune responses were unaffected. Selenium-supplemented subjects also showed more rapid clearance of the poliovirus, and the poliovirus reverse transcriptase-polymerase chain reaction products recovered from the feces of the supplemented subjects contained a lower number of mutations.

**CONCLUSIONS:** The data indicate that these subjects had a functional selenium deficit with suboptimal immune status and a deficit in viral handling. They also suggest that the additional 100 microg Se/d may be insufficient to support optimal function.

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