Abstract

Title: Selenium and diabetes – can selenium protect against the development of diabetes mellitus type 2?

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Background: Today 220 million people suffer from diabetes and 90% of these are diagnosed with type 2 diabetes. The disease is always preceded by insulin resistance and because it has a link to oxidative stress, there is a theory that selenium can play an important role. It is known that selenium has antioxidative effects in the body and previous studies have shown that selenium may mimic the effect of insulin and increase insulin sensitivity.

Objective: To determine if selenium can protect against the development of type 2 diabetes mellitus. The issues were to determine whether selenium supplementation, dietary selenium intake or plasma selenium concentration could affect the incidence of type 2 diabetes in healthy subjects.

Search strategy: The collection of data was performed in the National Library of Medicine, PubMed. The keywords that were used at start were “selenium AND diabetes mellitus type2”. Other keywords that were combined were diabetes, blood glucose, hyperglycemia, serum selenium and selenium supplementation.

Selection criteria: The inclusion criteria were RCT or longitudinal epidemiological studies, studies with the onset of type 2 diabetes as an endpoint, subjects who did not have type 2 diabetes at baseline and studies that examined dietary selenium intake, selenium supplementation or plasma selenium concentrations. The exclusion criteria were reviews, cross sectional studies, case control studies, other types of diabetes than type 2, studies that have examined selenium together with other antioxidants and factors, studies that only examined the relationship between selenium and blood glucose levels, studies that had inadequate follow-up or were written in other languages than English and Swedish.

Data collection and analysis: Three studies were selected for the final analysis, one RCT and two cohort studies. These three were examined under review templates taken from SBU and the Department of Clinical Nutrition, Gothenburg University. This resulted in a probative value for each study. The strength of evidence for the chosen endpoint was determined according to GRADE evidence summary form.

Main results: The study which examined the effect of selenium supplementation compared with placebo showed an increased incidence of type 2 diabetes in the intervention group. The study which examined dietary selenium intake showed that subjects with the highest selenium intake at baseline had an increased incidence of type 2 diabetes after 16 years of follow-up. The third study which examined plasma selenium concentrations found that low plasma selenium concentration was a risk factor of developing type 2 diabetes. The strength of evidence for the chosen endpoint, for all the three studies, was set to very low (+).

Conclusions: In the current situation there is insufficient evidence to say that selenium protects against the development of diabetes mellitus type 2.