

THE EFFECT OF SHORT-TERM CHROMIUM SUPPLEMENTATION ON  
INSULIN RESPONSE TO A GLUCOSE LOAD IN HEALTHY SUBJECTS

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The insulin response to a standard glucose load has been shown to vary markedly both within a defined population (Welborn and Wearm 1979) and between separate populations (Logan et al. 1978). It appears that an excessive insulin response may be necessary to maintain normal glucose tolerance in certain groups (Logan et al. 1978). The recent proposal that hyperinsulinaemia is an independent risk factor for ischaemic heart disease (IHD) (Logan et al. 1978; Pyorala 1979; Welborn and Wearm 1979) means that lowering excessive insulin responses may be worthwhile. Chromium as glucose tolerance factor (GTF) may be an agent capable of achieving this (Offenbacher and Pi-Sunyer 1980).

This study examined the effects of short-term chromium supplementation on glucose tolerance and insulin response in healthy adults. Baseline measurements of these parameters were established for all subjects from an oral glucose tolerance test (OGTT) with a 75 g glucose load. These measurements were then repeated after 3 d supplementation of the normal diet with either a brewers yeast (*Saccharomyces cerevisiae*)-based cookie (high chromium) or a torula yeast-based cookie (low chromium). The baseline data revealed a group of subjects who, although exhibiting a normal OGTT, had insulin responses significantly greater than the remaining subjects and in the range associated with high risk for IHD (Logan et al. 1978; Pyorala 1979; Welborn and Wearm 1979). The response to supplementation of this 'high insulin' subgroup was therefore compared to the response of the remaining 'low insulin' subgroup.

Mean areas under glucose and insulin curve ( $\pm$  SEM)

Glucose ( $\text{mmol l}^{-1} \text{h}$ )				
Time Interval	Classification of Subgroup	Baseline	High-chromium Cookie	Low-chromium Cookie
0- 60 min	low†	5.65 $\pm$ 0.50	5.96 $\pm$ 0.45	5.88 $\pm$ 0.38
	high††	5.21 $\pm$ 0.30	5.77 $\pm$ 0.50	5.37 $\pm$ 0.45
60-180 min	low	8.76 $\pm$ 0.55	9.23 $\pm$ 0.69	8.39 $\pm$ 0.38
	high	8.79 $\pm$ 0.27	9.39 $\pm$ 0.69	9.42 $\pm$ 0.85

  

Insulin ( $\text{pmol l}^{-1} \text{h}$ )				
Time Interval	Classification of Subgroup	Baseline	High-chromium Cookie	Low-chromium Cookie
0- 60 min	low	240 $\pm$ 21	304 $\pm$ 37	298 $\pm$ 36
	high	570 $\pm$ 57	341 $\pm$ 29*	401 $\pm$ 103
60-180 min	low	312 $\pm$ 34	330 $\pm$ 19	301 $\pm$ 21
	high	489 $\pm$ 105	508 $\pm$ 91	452 $\pm$ 91

\*  $p < 0.05$  (significance is from baseline measurement); †  $n=10$ ; ††  $n=5$

Supplementation with the high-chromium cookie for 3 d was sufficient to cause a significant lowering of insulin response in the 'high insulin' subgroup. Glucose tolerance remained unchanged. No change was seen in the OGTT or insulin response of the 'low insulin' subgroup.

These results are in agreement with other evidence which suggests that chromium is capable of decreasing the relative amount of insulin required to deal with a given glucose load.

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