

Insulin sensitivity and insoluble wheat and oat fiber

Summary:

Three randomized controlled trials presented evidence that insoluble oatfiber (Weickert MO et al. 2005, Weickert MO et al. 2006, Weickert MO et al. 2011) and one study that insoluble wheat fiber (Weickert MO et al. 2005) improve insulin sensitivity.

Characteristics:

The characteristics of the RCTs are described in the attachments Table1 and Table 2

Results:

The results of the RCTs are described in the attachment Table 3.

Background:

As supporting information on the background of the metabolic effects of the insoluble cereal fibers wheat fiber and oat fiber in the following an excerpt of the Review Article by M.O. Weickert (2012), “ insoluble cereal fiber intake, under isoenergetic conditions, increases whole-body insulin sensitivity in both short-term and more prolonged studies, as measured using euglycaemic-hyperinsulinaemic clamps [1,2,3]. These effects appear to be dose-dependent [1] but independent of colonic fermentation, changes in dominant groups of the gut microbiota, or circulating GLP-1 [1, 2, 4]. We have recently proposed a novel concept that could contribute to explaining improved insulin sensitivity with cereal fiber intake, showing that cereal fiber may hinder the digestion and/or absorption of dietary protein in the upper gut, thereby preventing amino-acid-induced activation of the mammalian target of rapamycin (mTOR)/translation initiation factor serine-kinase-6-1 (S6K1) signalling pathway that is known to drive insulin resistance [2, 5, 6]. Cereal diet-induced effects on whole-body insulin sensitivity were not matched by changes in markers of colonic fermentation and/or the composition of the gut microbiota, neither in the full model nor in additionally performed uncorrected subgroup analyses, and there was also no tendency to more pronounced effects after 18 versus 6 weeks of dietary intervention [4]. Insoluble cereal fibers generally show no major direct effects on the modulation of blood lipids, but may indirectly influence these parameters at the long term via improvement of whole body insulin sensitivity [1, 2, 7-9, 10, 11, 12,13, 14]. Further potential effects of cereal fiber intake may include the modulation of gut hormones, adipokines, bile acid binding, and metabolite profiles which deserve further investigation.”[Weickert MO 2012, p..8f]

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