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Titel des Beitrags: Postprandial activation of metabolic and inflammatory signalling pathways in human peripheral mononuclear cells.

Abstract: High-fat, high-carbohydrate (HFHC) meals induce an inflammatory response in mononuclear cells (MNC). Here, we studied the interaction between metabolic and inflammatory signalling pathways by the measurement of postprandial effects of three different test meals on intracellular Akt, S6 kinase (S6K)/mammalian target of rapamycin and NF-κB signalling in human MNC. We recruited six healthy, lean individuals. Each individual ingested three different meals in the morning separated by at least 3 d: a HFHC meal; an oral lipid-tolerance test meal; a healthy breakfast. Blood samples were obtained before and 1, 2, 4, 6 and 8 h after ingestion. Plasma insulin and IL-6 levels were measured. Intracellular metabolic and inflammatory signalling pathways were assessed by measuring the phosphorylation of Akt kinase and S6K, the degradation of inhibitory IκB-α protein and the DNA binding activity of NF-κB in MNC. mRNA expression levels of the Akt and NF-κB target genes Mn superoxide dismutase (MnSOD), CC-chemokine-receptor 5 (CCR5), intercellular adhesion molecule 1 (ICAM-1) and plasminogen activator inhibitor-1 (PAI-1) were measured by quantitative RT-PCR. We found a positive correlation of Akt phosphorylation with NF-κB activation (NF-κB binding activity: r 0.4500, P= 0.0003; IκB-α protein levels: r -0.5435,
P< 0.0001), a negative correlation of plasma insulin levels with NF-kB binding activity (r = -0.3993, P= 0.0016) and a positive correlation of plasma insulin levels with S6K activation (r = 0.4786, P< 0.0001).

The activation of Akt and pro-inflammatory NF-kB signalling was supported by the up-regulation of the respective target genes MnSOD and CCR5. In conclusion, the present data suggest a postprandial interaction between the metabolic and inflammatory signalling pathways Akt and NF-kB in MNC.