Effect of Antibiotics on Gut Microbiota, Gut Hormones and Glucose Metabolism

The gut microbiota has been designated as an active regulator of glucose metabolism and metabolic phenotype in a number of animal and human observational studies. We evaluated the effect of removing as many bacteria as possible by antibiotics on postprandial physiology in healthy humans. Meal tests with measurements of postprandial glucose tolerance and postprandial release of insulin and gut hormones were performed before, immediately after and 6 weeks after a 4-day, broad-spectrum, per oral antibiotic cocktail (vancomycin 500 mg, gentamycin 40 mg and meropenem 500 mg once-daily) in a group of 12 lean and glucose tolerant males. Faecal samples were collected for culture-based assessment of changes in gut microbiota composition. Acute and dramatic reductions in the abundance of a representative set of gut bacteria was seen immediately following the antibiotic course, but no changes in postprandial glucose tolerance, insulin secretion or plasma lipid concentrations were found. Apart from an acute and reversible increase in peptide YY secretion, no changes were observed in postprandial gut hormone release. As evaluated by selective cultivation of gut bacteria, a broad-spectrum 4-day antibiotics course with vancomycin, gentamycin and meropenem induced shifts in gut microbiota composition that had no clinically relevant short or long-term effects on metabolic variables in healthy glucose-tolerant males. clinicaltrials.gov NCT01633762.