

# Gut microflora and diabetes: Study suggests role for pro-, pre-biotics

By Stephen Daniells, 12-Feb-2010

Related topics: Probiotics and prebiotics, Diabetes, Weight management

**Bacterial populations in the gut of diabetics differ from non-diabetics, says a new study from Denmark that may open up a potential role for modify gut microflora with probiotics and prebiotics and improve health.**

The study, published in the open-access peer-reviewed journal *PLoS ONE*, builds on earlier studies that have linked gut microflora and obesity. A breakthrough paper published in *Nature* in December 2006 reported that microbial populations in the gut are different between obese and lean people, and that when the obese people lost weight their microflora reverted back to that observed in a lean person, suggesting that obesity may have a microbial component.

Led by Nadja Larsen from the University of Copenhagen, the new research is reportedly the first to look at intestinal microbiota in humans with and without type-2 diabetes.

"Our data suggest that the levels of glucose tolerance or severity of diabetes should be considered while linking microbiota with obesity and other metabolic diseases in humans," wrote the Danish researchers.

"It is especially important for developing the strategies to modify the gut microbiota in order to control metabolic diseases, since obesity and diabetes might be associated with different bacterial populations," they added.

It is too soon to consider a role for probiotics and/or prebiotics in diabetes prevention or management, but the new research points to a potential use in the future.

Commenting independently on the study, Professor Glenn Gibson from the University of Reading told NutraIngredients that the link between human gut bacteriology and metabolic syndrome, and other related disorders is "intriguing and gathering much pace".

"There seems to be a consensus that differences do exist between microbiota competition and obesity, Type 2 diabetes etc. However, the precise nature of those differences is contentious. The current study adds to this debate and has used robust molecular based methodologies to do so. What is clear is that the metabolic function of gut flora is able to impact markedly upon the host and affect health status - including satiety, effects upon calory extraction rates," said Prof Gibson.

"The good news is that probiotic and prebiotic intervention may be used, in high risk populations, to change this for the better. In terms of metabolic syndrome the target outcome (i.e. desired flora change) is still under debate, but the tools are ready to fire at this target," he added.

## Study details

Thirty-six men with range of ages and body-mass indices (BMIs) were recruited to take part in the new study. Half the participants were diagnosed with type-2 diabetes.

Results showed significant differences in intestinal populations of various bacterial groups. In particular, a reduction in the "relative abundance" of *Firmicutes* was observed, as well as increases in the proportion of *Bacteroidetes* and *Proteobacteria* in diabetics, compared their non-diabetics.

A positive correlation was observed for the ratios of *Bacteroidetes* to *Firmicutes* and reduced glucose tolerance, added Larsen and her co-workers.

"Assuming that diabetes and impaired glucose tolerance are linked to obesity, our results are in agreement with the recent evidence obtained for overweight persons," they wrote.

"Furthermore, based on the assumption above, a positive correlation between ratios of Bacteroidetes to Firmicutes and BMI could be expected. However, the reverse tendency was observed, indicating that overweight and diabetes are associated with different groups of the intestinal microbiota," they noted.

### **Take home**

"The results of this study indicate that type-2 diabetes in humans is associated with compositional changes in intestinal microbiota," wrote the researchers.

"The level of glucose tolerance should be considered when linking microbiota with metabolic diseases such as obesity and developing strategies to control metabolic diseases by modifying the gut microbiota," they concluded.

An estimated 19 million people are affected by diabetes in the EU 25, equal to four per cent of the total population. This figure is projected to increase to 26 million by 2030.

In the US, there are almost 24 million people with diabetes, equal to 8 per cent of the population. The total costs are thought to be as much as \$174 billion, with \$116 billion being direct costs from medication, according to 2005-2007 American Diabetes Association figures.

Source: *PLoS ONE*

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"Gut Microbiota in Human Adults with Type 2 Diabetes Differs from Non-Diabetic Adults"

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