Probiotics-2013

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference and Exhibition on
Probiotics & Functional Foods

October 23-25, 2013 Holiday Inn Orlando International Airport, USA

Potential of probiotics for reducing the impact of metabolic diseases

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Abstract

A metabolic disorder or disease ("MD") may develop when organs such as the liver, pancreas, or intestinal tract do not function normally. Underlying to this is the disruption of normal metabolic pathways due to a defect in genetically determined enzymes. Metabolic diseases are therefore typically hereditary, but symptoms may appear as a result of various conditions such as stress, fasting, liver or respiratory failure or unhealthy life style including dietary habits. "Metabolic syndrome" results when risk factors such as dyslipidemia, hypertension and hyperglycemia cluster together, and is commonly associated with insulin resistance and cardiovascular disease. Overweight and obesity seem to correlate with these conditions, with especially abdominal fat accumulation correlating with metabolic risk factors. Improved understanding of the role of gut microbiota in host energy metabolism stimulated new approaches for treatment and/or prevention of conditions such as obesity and associated metabolic disorders. Modulating gut microbiota by probiotics suggests an anti-obesity potential based on complex interactions with the autochthonous population, thereby affecting the host energy metabolism. Treatment of Caco-2 cells with putative probiotic LAB strains resulted in up-regulation of the LXRs and followed by a regulated sterol efflux and influx mediated by ABCG5/ABCG8 and NPC1L1 gene expression. Dose dependent probiotic feeding *in vivo* caused dose dependent modulation of *Firmicutes, Bacteroidetes, Clostridium* clusters I and XIVab in the small intestine but not in the faeces. This affected gene expression of various ileal immune biomarkers, and also resulted in a significant reduction of epididymal fat and down-regulation of obesity-related biomarkers.

Biography

Prof. Dr. Wilhelm H Holzapfel obtained his Ph.D. (*Dr.rer.nat.*) at 27 years at the Technical University of München, Germany. Presently he is Chair Professor at "AGEE" and associated with School of Life Sciences at Handong Global University, South Korea; President of the ICFMH of IUMS since 1996; Formerly Head of the Institute of Hygiene and Toxicology, BfEL, Karlsruhe, Germany; and hon. Professor for Industrial Microbiology at the Technical University Karlsruhe (KIT); and (until 1987) full Professor of Microbiology, University of Pretoria. He published more than 300 papers in reputed scientific journals, 5 books and more than 60 book chapters. He served as editorial board member of several journals.