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The role of gut microbiota produced short chain fatty acids (SCFAs) in adiposity and inflammation in obesity and type 2 diabetes

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Background: Diabetes and obesity are leading health problems around the world including India. The gut microbiota has been identified as a potential contributor to the development of metabolic diseases. Gut microbiota alteration using spectrum specific antibiotics can prevent progression of high sucrose diet (HSD) mediated obesity and diabetes through microbial metabolites and inflammatory mediators like adipokines.

Aim: To study the effect of modulating the gut microflora by oral administration of spectrum specific antibiotics delivery in HSD induced obesity and insulin resistance.

Methods: Rats were fed HSD with or without antibiotics for 60 days. The physiological and biochemical parameters, fecal microbiota composition, Short chain fatty acids (SCFAs), Liver biochemistry, histopathology and gene expression of various G-protein coupled receptors (GPCRs) and various adipokines were investigated.

Results: Simultaneous administration of HSD and antibiotics has shown significant improvements in glucose tolerance and obesity associated parameters like hypercholesterolemia and hypertriglyceremia as compared to HSD. The qPCR study of fecal samples showed increased in gram positive bacteria and reduction in gram negative bacteria which shows that restoration of commensal microflora in direction to improvement in obesity and insulin sensitivity. Treatment had reduced the effect of lipopolysaccharide content which further reduced immune receptors, GPCRs expression along with reduced the expression of proinflammatory cytokines. Gut microbiota manipulation towards decreased inflammation and insulin resistance needs to be further explored for its therapeutic applications in order to treat the metabolic complications.

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Development of RAPD-sequenced characterized amplified region marker for the identification of *Viola serpens* Wall. Ex Ging

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Viola serpens Wall. Ex Ging is a glabrous perennial herb belongs to the family *Violaceae*. It is commonly known as Banfshah and is an antipyretic, antiseptic, demulcent, diuretic, emetic, expectorant and purgative in action. It is also useful in the treatment of asthma, bleeding piles, cancer of throat and skin diseases. RAPD-based SCAR marker was developed to identify *Viola serpens*. A putative 1130 bp marker specific to *Viola serpens* was identified using RAPD technique. This RAPD-amplicon was then sequenced and cloned. A 1130 bp polymorphic band obtained with OPAA-8 primer which was specific to *Viola serpens* accessions. A pair of SCAR primers (VioS F & VioS R) based on the sequences of unique RAPD amplicon was designed. The SCAR primers produced a specific 280 bp amplicon in authentic *V. serpens* and not in the allied species. Amplification of genomic DNA of *Viola serpens* with the SCAR primers produce a clear, bright and distinct band in *Viola serpens* only. This marker can be useful in the authentication of genuine plant from the market samples.

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