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Bacterial bile salt hydrolase in the regulation of host lipid metabolism and circadian rhythm: A role in probiotic function?

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Bile acids act as key signaling molecules that have the capacity to alter systemic endocrine functions in the host. Individual bile acids are capable of interacting with host cell receptors (including FXR and TGR5 receptors) to induce cellular responses in the intestine and other tissues (including the liver and adipose tissue). As gut microorganisms have the capacity to significantly alter the signaling properties of bile acids we, and others, have investigated the impact of altered microbial bile acid signatures upon host physiological processes. In particular we have focused upon microbial bile salt hydrolase (BSH) activity as a gut microbial activity that has the capacity to profoundly alter both local (gastrointestinal) and systemic (hepatic) host functions. Using a functional metagenomics approach we demonstrated that BSH activity is widely distributed amongst gut bacteria and may contribute to microbial colonization in the gut. Using both germ free and conventionally-raised mouse models we showed that gastrointestinal expression of BSH results in local bile acid de-conjugation with concomitant alterations in lipid and cholesterol metabolism, signaling functions and weight gain. Key mediators of cholesterol homeostasis (*Abcg5/8*), gut homeostasis (*RegIIIγ*) and circadian rhythm (Dbp) were influenced by elevated BSH in our study. The implications of this work for the rational development of probiotics with the potential to modulate host weight gain will be discussed.

Biography

Cormac G M Gahan has graduated in 1996 with a PhD in Microbiology and Immunology from University College Cork, Ireland. He has published over 110 papers and his H-index is currently 40. He Co-Leads the Bile Research Group with Dr. Susan Joyce within the Alimentary Pharmabiotic Centre in University College Cork with a focus upon the impact of bacteria-derived bile acid signatures in host physiology.

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