Role of glycans in *Helicobacter pylori* infection and gastric carcinogenesis

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Chronic *Helicobacter pylori* infection is recognized as a cause of gastric diseases. *H. pylori* adhesion to gastric cells has been shown to be mediated by bacterial adhesins such as BabA and SabA. SabA binds the carbohydrate structure Sialyl-Lewis^x, which is expressed in the gastric epithelium during *H. pylori* infection. It has been suggested that *H. pylori* modulates host cell glycosylation patterns for enhanced adhesion. Here, we evaluated changes in the glycosylation-related gene expression profile of a human gastric carcinoma cell line following *H. pylori* infection. We observed that *H. pylori* significantly alters expression of 168 of the 1031 human genes tested by microarray, and the extent of these alterations is associated with markers of virulence of the *H. pylori* strain. A highly pathogenic *H. pylori* strain altered expression of several genes involved in glycan biosynthesis, including the β3GnT5, a GlcNAc-transferase essential for the biosynthesis of Lewis antigens. β3GnT5 induction was specific to infection with *H. pylori* strains carrying the *cag* pathogenicity island. Further, β3GnT5 overexpression in human gastric carcinoma cell lines led to increased Sialyl-Lewis^x expression and *H. pylori* adhesion. This study has identified a novel mechanism by which *H. pylori* modulates the biosynthesis of the SabA adhesin ligand in gastric cells, contributing to achieve a successful adhesion.

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