TITLE: STUDY OF ROLE OF *Bacteroides fragilis* IN THE PRESENCE OF HYDROPHOBIC MOLECULES

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ABSTRACT:

The commensal microbiota of the gastrointestinal tract plays an essential role in harvesting nutrients and energy from food which regulates the metabolic pathways of the host and interfere with metabolism and reabsorption of hydrophobic molecules, such as bile salts. Furthermore, intestinal bacteria are thought to play a role in β-carotene metabolism, although the mechanisms are unclear. β-carotene is a nutrient precursor of vitamin A (VA), which is an important molecule in innate and adaptive immune system responses. Recently, studies have reported the relationship between VA and Bacteroidetes, where administration of VA modifies the composition of the microbiota by raising Bacteroidetes. *Bacteroides fragilis*, is part of the gastrointestinal tract microbiota and is positively correlated with the development of the mucosal immune response. Despite this, it is among the species most commonly found in isolates of strict anaerobic infections. In an earlier study from our group high concentrations of bile salts interfered in the expression of outer membrane proteins of *B. fragilis*, including a lipocalin homolog protein, which we hypothesized to play a role in both bile salts response and the transport of fat-soluble vitamins (such as vitamin A). Our objective was to understand how *B. fragilis* behaves in the presence of hydrophobic molecules, such as bile acids and β-carotene. We analyzed the presence of the lipocalin gene (BF638R_2715) in 29 strains of *B. fragilis* isolated from infection or normal microbiota and verified that all the isolates harbor the gene. The minimum inhibitory and bactericidal concentrations of bile salts (MIC and MBC) was determined and 18 isolates had a MIC ≥ 8% and 10 isolates had a MBC ≥ 14%, 14 isolates had MBC between 8% and 12% and the others

MBC between 4% and 12%. Bacterial growth in the presence of β-carotene (20, 10 and 5 μg/L), extracted from carrots, revealed that isolates had a significant growth improvement compared to controls without β-carotene. Our data suggests that the isolates are consuming this carotenoid or even binding to it based on the amount of β-carotene present in the supernatant of the control and the isolates. In view of these results it is suggested that this species may take advantage of β-carotene in the medium and that the susceptibility to bile acids is different between the isolates. More studies are needed to understand the function of this protein and its relationship with bile salts and β-carotene.

Keywords: *Bacteroides fragilis*, lipocalin, bile salts, MIC, MBC, β-carotene.

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