

Abstract

Diarrhoea as a disease is still the leading cause of malnutrition and a major cause of deaths in children under 5 years of age in the low-income countries. Additionally, it is the most common health problem associated with travelling to the developing countries. In all the mentioned cases, enterotoxigenic *E. coli* (ETEC) is one of the most frequent causes.

ETEC is defined as a pathogenic strain of *E. coli* producing enterotoxins. So far, two types of enterotoxins have been identified: heat-stable (ST) and heat-labile (LT). LTs are further divided into two categories based on their relatedness with cholera toxin to type I (LT-I) and type II (LT-II). All of these enterotoxins have been found to bind to carbohydrate structures on glycosphingolipids by their respective B subunits, however, their binding patterns differ. While LT-I, LT-IIa and LT-IIb have been previously studied in terms of binding specificities, the newest LT-IIc was tested only on few commercially available ganglio-series gangliosides.

In this thesis, the binding capabilities of this novel enterotoxin were re-examined by series of binding assays using more ganglio-series and some neolacto-series gangliosides as well as other glycolipids and glycoproteins, to establish the basics of the recognition pattern and to characterize the optimal binding sequence. At the end, inhibition studies using pure carbohydrates were carried out.

As previously described, ganglio-series gangliosides with Sia α 3Gal β 3GalNAc carbohydrate chain sequence were bound by the B subunits of LT-IIc (LT-IIc-B) and the strongest binding was noted for Neu5AcGD1a. Similarly strong binding was noted for neolacto-core gangliosides Neu5Ac α 3nLc₄Cer and Neu5Gc α 3nLc₆Cer with the similar terminal sequence Sia α 3Gal β 4GlcNAc. No binding to gangliosides carrying a disialo motif (Sia α 8Sia α 3-) or an α 6-linked Neu5Ac occurred. Furthermore, no binding was noted for asialo glycolipids or glycoproteins, underlining the importance of the sialic acid in LT-IIc-B carbohydrate interactions.