HISTOCHEMICAL CHARACTERIZATION OF GLYCOCONJUGATES PRODUCED BY GOBLET CELLS AND BRUNNER GLANDS IN THE DUODENUM OF BUBALUS BUBALI

R. Verdiglione[1], C.L. Mammola[2], M. Gargano[3], U. Filotto[1]
1 Dep. of Animal Science, University of Padova; 2 Dep. STAFA, University Mediterranea of Reggio Calabria; 3 professional biologist

Mucin glycoproteins produced by goblet cells (GC) and Brunner glands (BG) constitute a slippery viscous-elastic gel that covers and protects the delicate underlying mucosa of duodenum. The aim of this study was to compare the glycoconjugates produced by GC and BG in the proximal duodenum of the buffalo. Samples of duodenal tissues were collected from 10 buffaloes 13 months old, fixed in two different fixing solutions (2% calcium acetate in 10% formalin - 0.1% glutaraldehyde and 6% $MgCl_2$ in 1% sodium acetate), and embedded in paraffin wax. Serial sections were investigated by means of both conventional histochemical methods (PAS, AB, HID) and with some biotinylated lectins (GS-I-B4, DBA, PNA, WGA, succWGA, UEA-I, ConA, GNA) (Sigma-Aldrich, Vector, EY). Conventional histochemical methods pointed out that both GC and BG contained neutral glycoconjugates. GC contained also acidic, partly carboxylated and partly sulphated glycoconjugates, whereas BG exhibited scarceness of acidic glycoconjugates tightly localised in a few of the tubular and/or alveolar endpieces located in the peripheral part of the lobules. Lectin histochemistry allowed us to characterize the oligocaccharidic side chains of glycoproteins. The duodenal wall generally showed a good affinity for the different lectins employed highlighting the presence of various saccharidic residues. GC reacted with WGA, UEA-I, and ConA while BG reacted with all of the lectins employed. These findings underlined that both GC and BG elaborate O-linked and N-linked glycoproteins, otherwise greater terminal carbohydrate residues diversity was noticed in BG, since GC appeared to be lacking in terminal galactosyl residues. The heterogeneity in the saccharidic residues observed in BG compared to GC in the buffalo is in agreement with data obtained in other mammalian species by Schumacher et al. (2004) and suggests that the mucus secreted by BG is more adaptable. The different carbohydrate profile of GC and BG may reflect a different physiological property of these mucins which are modified by variations on the oligosaccharidic side chains. Moreover the identification of numerous additional factors (as epidermal growth factor, IGF-I receptors, lisozima, IgA and IgM, pepsinogens, lipase, duodenase) in Brunner glands secretion (Krause, 2000), highlighted the complexity of their function that is not limited to a simply mechanical defensive role. Finally histochemical profile of the BG in the buffalo is partly similar to results reported in cattle, in which otherwise the production of acidic glycoproteins appeared to be more intense and extended as far as most of the terminal tracts of the glands (Takehana et al. 1991; Verdiglione et al. 2002) exhibiting a carbohydrate profile clearly different from the main part of the gland and more similar to GC carbohydrate profile (Verdiglione et al. 2000).