S18.4

Developmental Regulation, Cell-Type Specificity, and Tumor-Associated Expression of Sialoglycoconjugates

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Sialic acids comprise a large family of closely related derivatives of *N*-acetyl- and *N*-glycolylneuraminic acid. They can be found in a variety of chemical linkages as a single moiety or as homo- and heteropolymers at the terminus of oligosaccharide side chains. Sialic acids which are found from insects to higher vertebrates have been implicated in a variety of biological events. The recent availability of specific probes for the detection by light and electron microscopy and blotting techniques of sialic acids in different chemical linkages to penultimate sugars and of α 2,8 linked homopolymers of sialic acid (polysialic acid) has provided opportunities to study various aspects of their expression. This talk will discuss aspects of the developmentally-regulated expression of various sialic acids during embryonic formation of kidney and in the regenerating epithelial lining of adult large intestine. The cell-type specific expression of specific sialic acids in adult kidney and colon as well their tumor-associated reexpression and *de novo* synthesis, respectively, will be presented.

S18.5

Extended Helical Epitope of α(2-8)-Polysialic Acid

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α(2-8)-polysialic acid is poorly immunogenic and this property arises from the recognition of extended helical structures which are also integral components of ([E]NCAM) and shorter helices which are conformationally similar to shorter α(2-8) oligomers found on other human tissues. Nevertheless antibodies to α(2-8)-polysialic acid can be produced in special circumstances and all of them are exclusively specific for an extended helical epitope. The presence of an extended helical epitope (n>9) was first hypothesized on the basis of extensive immunological studies and subsequent NMR studies in conjunction with potential energy calculations demonstrated that helices of this type were energetically favourable. Similar experiments carried out on carboxyl-reduced α(2-8)-polysialic acid also indicated that the carboxylate groups are critical for the formation of these extended helices. Recent studies in which helices of different pitches were docked in the binding site of a model of an α(2-8)-polysialic acid-specific mAb (735) confirms that the binding site has a unique specificity and that it accommodates nine contiguous sialic acid residues with a restricted range of helical pitch.

S18.6

Identification and Structural Determination of the KDN-Containing *N*-Linked Complex-Type Glycan Chains in a Rainbow Trout Vitelline Envelope Glycoprotein. The First Demonstration of the Presence of *N*-Linked KDN-Glycan Units

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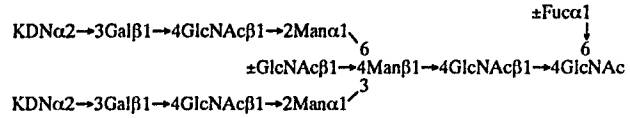
KDN-Rich glycoprotein (KDN-gp) is a highly acidic glycoprotein isolated from the vitelline envelope of rainbow trout. A characteristic feature of the KDN-gp is the presence of multiple *O*-linked α-2→8-oligo/poly (KDN)-containing glycan chains (1). We first found the KDN residues in the cortical alveolar-derived polysialoglycoprotein from the unfertilized eggs of rainbow trout (2). Subsequently, the occurrence of KDN residues has been reported for several glycoproteins, glycosphingolipids, and bacterial capsular polysaccharide. Concerning the KDN-glycan units in glycoproteins, all thus far analyzed are of *O*-linked glycan structures. The previous finding of Man and GlcNAc as the minor integral components in addition to Gal, GalNAc, and KDN (3) prompted us to investigate whether they represent the presence of *N*-linked glycan chain(s) in KDN-gp.

We isolated at least three fractions which consisted of KDN, Man, Gal, and GlcNAc, and were devoid of GalNAc, upon hydrazinolysis of KDN-gp followed by fractionation. Structural analysis by 400-MHz ^{1}H NMR spectroscopy and methylation analysis established a major component to be:



Evidence was also obtained to support the presence of triantennary KDN-containing complex-type glycan chain as the second most abundant *N*-linked glycan units in the KDN-gp. These results suggested that KDN-containing *N*-linked glycan chains represent the normal end results of the biosynthetic pathway for *N*-glycosylation in animals and are complementary to previously identified *O*-linked KDN-glycan chains in KDN-glycoproteins.

(1) A. Kanamori *et al.* (1990) *J. Biol. Chem.*, **265**, 21811 – 21819. (2) D. Nadano *et al.* (1986) *J. Biol. Chem.*, **261**, 11550 – 11557. (3) S. Inoue *et al.* (1988) *Biochem. Biophys. Res. Commun.*, **153**, 172 – 176.

S18.7

Interactions of Anti-Polysialosyl Antibodies with Human Embryonal Brain Glycopeptides and Sialic Acid Oligosaccharides

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Antibodies to polysialic acid have been shown to require an unusually long conformationally determined epitope for recognition[1]. We have studied the binding properties of several antibodies made against polysialic acid in neural cell adhesion molecule (*N*-CAM), Neisseria meningitidis group B (Men B) capsular polysaccharide, its *N*-propionylated derivative (NPr) and *Escherichia coli* K1 polysaccharide, using labelled human embryonal brain glycopeptides and polysaccharides.