repeated doses (in total 0.75 – 1.5 g) of oligosaccharides prepared free of peptide and derived from bovine plasma glycoproteins. This cured the test animals while those in the control goup died. The bacteria that adhered to the small intestinal mucosa were reduced by two orders of magnitude, but were not eliminated. This proves the antiadhesion concept, and this result is of great promise for future design of optimized sugar analogues in those cases where no good treatment exists today. Technical approaches are now available for the rational investigation of carbohydrate receptors for microbes, based on new assay techniques and high-technology analysis methods.

1. K.-A. Karlsson, *Trends Pharmacol. Sci.*, **12** (1991) 265.
2. K.-A. Karlsson, *Annu. Rev. Biochem.*, **58** (1989) 309.
3. N. K. Sauter *et al.*, *Biochemistry*, **31** (1992) 9609.
4. M. Mouricout *et al.*, *Infect. Immunol.*, **58** (1990) 98.

S15.5
Glycosylation in CF Airway Epithelial Cells

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Cell surface glycoproteins are differentially glycosylated in cystic fibrosis (CF) cells when compared to non CF cells. This was demonstrated by increased fucosylation of CF fibroblast glycoproteins (*Pediatr. Res.*, **19**, 368, 1985; *Clin. Chim. Acta*, 188, 193, 1990). Glycosylation in CF cells has received recent attention since altered glycosylation has been linked to the basic defect in CF cells by the finding that defective acidification of intracellular organelles in CF occurs as a result of decreased Cl-conductance (*Nature*, **352**, 70, 1991); and abnormal processing and glycosylation of CFTR, the protein product of the CF gene, has been proposed as the mechanism causing CF (*Cell*, **63**, 827, 1990). Since the lung is the site of major pathology in CF, it is important to determine if CF airway epithelial cells have altered glycosylation. Therefore glycoproteins and glycopeptides from immortalized airway cells were examined. Non CF and CF cells were grown for 3 days and then labeled for 48 hr with D-[^{3}H]glucosamine or L-[^{3}H]fucose. The peripheral glycoproteins were removed by controlled trypsinization and the cells which remained intact were further processed to remove the surface membranes (*Chest*, **101**, 58, 1992) or were extracted with 1% NP-40. CF ^{3}H-glycoproteins showed more (>2-fold) binding to WGA-Sepharose than those from non CF cells. Most interesting was the 5-fold increase in binding of ^{3}H-CFTR from CF cells as compared to ^{3}H-CFTR from the non CF cells. CFTR, M_r170,000, was detected by western blot analysis using antibody CF-15 and by cutting the radioactive blot. A study of oligosaccharides of CF and non CF glycoproteins from airway cells will provide further information regarding the effect of CF mutations on the glycosylation of airway epithelial cells and may identify targets useful for gene therapy of CF. Supported by NIH DK 16859 and the CF Foundation.

S15.6
GBS Toxin: An Inflammatory Agent with Anti-Tumor Activity

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We have demonstrated that Group B Streptococcus (GBS), isolated from human neonates with respiratory distress, produce a polysaccharide exotoxin (GBS Toxin). In a sheep model, we have demonstrated that GBS Toxin produces the pathophysiology seen in developing lung in neonates until four days post-partum. GBS Toxin infused intravenously in sheep accumulates in the lung. Immunohistochemical analysis shows that GBS Toxin also binds to developing endothelium associated with human neoplasia. Using human tumor xenografts implanted in nude mice, we demonstrated that GBS Toxin infused intravenously in picomole quantities induces inflammatory reaction towards the tumor in the mice. Immunocompetent BALB/c mice bearing Madison Lung Tumors responded with similar inflammatory reactions at the tumor site when treated with GBS Toxin i.v. Marked changes in tumor morphology were seen, including vasodilation, necrosis, and infiltration by inflammatory cells. We hypothesize that GBS Toxin binds to susceptible endothelial cells and activates inflammatory responses through soluble mediators, including C3. Preliminary studies indicate an increase of serum TNFα and IL-1α in tumor-bearing mice treated with GBS Toxin. Using an optimal dose of GBS Toxin for treating tumor-bearing mice, long-term tumor-free survivors have been noted. (Supported by CarboMed, Inc.)

S15.7
Acidic Oligosaccharides Isolated from Respiratory Mucins of a Patient Suffering from Cystic Fibrosis (CF)

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Previous studies [1-3] have shown that respiratory mucins secreted by CF patients, as well as glycoconjugates synthetized by cultured CF nasal epithelium [4], were oversulfated. Barasch *et al.* have suggested that CFTR, the protein encoded by the CF gene, could be responsible for defective acidification of trans-Golgi and trans-Golgi network and for abnormal glycosylation and/or sulfation of glycoconjugates [5].

We have extended a preliminary study of the sulfation of respiratory mucins from a CF patient [6] by analyzing a pool of acidic alditol-oligosaccharides (IIIc), using High-Performance Anion Exchange Chromatography (HPAEC) with pellicular resins and pulsed amperometric detection (Dionex). Disialylated, sialylated/sulfated, as well as sulfated oligosaccharides were isolated and their structures were determined using 400 MHz ^{1}H-NMR and FAB mass spectrometry. In all the sulfated oligosaccharides isolated so far, sulfate was 3-linked to a terminal galactose.

In order to find out whether or not CF mucins are oversulfated, a similar experiment is currently under way on a similar fraction from respiratory mucins secreted by a patient suffering from chronic bronchitis.