Last lecture I talked about the formation of this complex oligiosaccharide. You have two N-actylglucosamine that is linked to the protein, 3-mannone, 3-galactose, 3-NaNa. So how do you form this? First place of trimming took place in the ER lumen. It is a sequence of enzymes that acts sepecifically in the ER. First is glucosidase 1, it will remove one glucose. Then folllowes two more removal of glucose by glucosidase II. Followed by Er mannosidase that will remove one mannose. You will have an intermediate (check slide) and it will go into the cis Golgi area and there the trimming continues. You will have another enzyme called Golgi Mannosidase I that will remove three mannose that will leave you with another intermediate. There is another enzyme called N-acetylglucosamine transerase 1 and it will add one N-actylglucosamine next to the mannose. The resulting intermediate proceeds to anther region of the Golgi where you have another trimming of two mannoses by Golgi mannosidase II. At this point you have sugar additions that are all added with UDP. You have 2 N-acytl glucosamine, 3 Galactose, 3 NaNa. So then you have this complete molecule. There is a point here, inside the Golgi there is a very powerful enzyme. The short name is endo H (endoglycosidase). Where does this act on? This enzyme will cut off the whole oligosccharde chain from the point in-between the addition of two mannose by Golgi mannosidase II. Once passing this point, the bonds becomes protected so the endo-H can no longer remove the oligiocomplex. So this glycosylated protein, is secreted by one of the epithelial cells that line the gut lumen. When secreted it will give protection to the lining of the Gut.

The endo-H will attack the High Mannose Oligiosaccharide following the entire oligosaccharide. So from the start where you have 9 Mannose in the oligiosaccharide to the point where you have 4 mannose in the olgiosccharide, these oligiosccharide intermediates are sensitive to being cleaved by endo-H. Beyond this point Endo H can no longer cleave the oligiosccharide. Overall I also mention that there is also an O-linked glycosylation. We will not study this but we will say that in the gut endothelial cells this is the basis of the material or the sticky stuff you call mucin.

EXPLAINATION OF LOCALIZATION OF ACTIVITY IN GOLGI

Final point to review is, make sure that you know the two models of the maturation of the Golgi. People are saying that, didn't I tell you that you have regional functions, here in the trans and the cis region where most of the mannose are removed. Then you have N-actylglucosamine added, then the middle region and later when Na-Na is added. What does this say about the function, are the enzymatic reactions regional in nature? If they are regional in nature you can shoot down the theory. Well the cis region has one group of enzymes, the trans region has another group of enzymes. But you have to think about it in another way. In all this glucose trimming process, one step follows the next step. Step one cannot go to step two unless, enzymatically it is completed. So if all your sacks have all the enzymes that can complete glucose trimming, it really doesn't matter when we talk about the regionalizatioin of the Golgi. All it is that most of the mannose are trimmed when the proteins are at that point, because the glycosylation has move on to the next step. The enzymes are still here, but there is no reason to trim the mannose. So the division of the regions of the golgi will be artificial, it really doesn't matter, but it just reflects the time where most of the functions are completed.

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