

Study on novel glycosylceramides mediating cell-cell adhesion of mammalian skin cells-their possible involvement in apoptosis

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In this study, we showed that antibodies against human blood group B trisaccharides block Ca^{2+} dependent cell-cell adhesion of frog (*Xenopus laevis*) embryonic cells. We isolated several different novel pentaglycosylceramides with blood group B activity. The structure is novel in that it lacks N-acetylhexosamine in its core carbohydrate structure. By using two dimensional electrophoresis followed by western blot analysis, we identified two series of acidic proteins in 30-60 kDa range. We showed that one series of protein spots represents proteins with glycosyl phosphatidylinositol anchor (GPI-anchor). The effect of phosphatidylinositol specific phospholipase C on Ca^{2+} dependent cell-cell adhesion was tested and the enzyme treatment inhibited Ca^{2+} dependent adhesion of embryonic cells completely. From these experiments, we concluded the presence of novel GPI-anchored cell-cell adhesion molecules with human blood group B antigens. Blood group B active glycosylceramides were also detected in the nematode *Caenorhabditis elegans*. In the nematode and in frog cells, the blood group B active glycoconjugates colocalized with cadherins. The colocalization is observed in nematode nervous cells and in frog embryonic cells and in skin cells. The cadherins and blood group B active glycoconjugates seem to be forming supramolecular complex on cell surface. On the basis of our findings, it now seems possible to isolate homologous glycoconjugates (especially GPI-anchored glycoproteins) from mammalian skin cells. Isolation of mammalian homologues of these novel GPI-anchored glycoproteins and glycosylceramides of frog cells will certainly shed light on the mechanism of skin cell adhesion, thus deepening our understanding of the dynamic nature of homeostasis of skin cells through differentiation and apoptosis. The possible interaction of signaling pathways through ceramide, cadherin and diacylglycerol is also discussed.