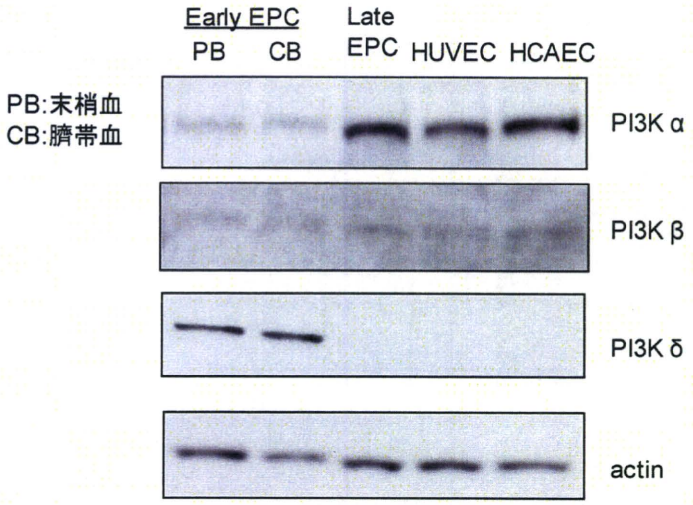


図 107. 種々の細胞における PI3K アイソフォームの発現

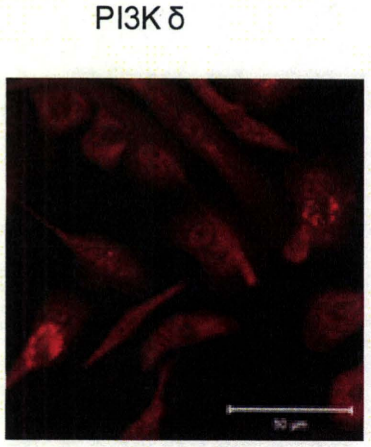


図 108. AC133 由来 Early EPC における p110 PI3K δ の発現

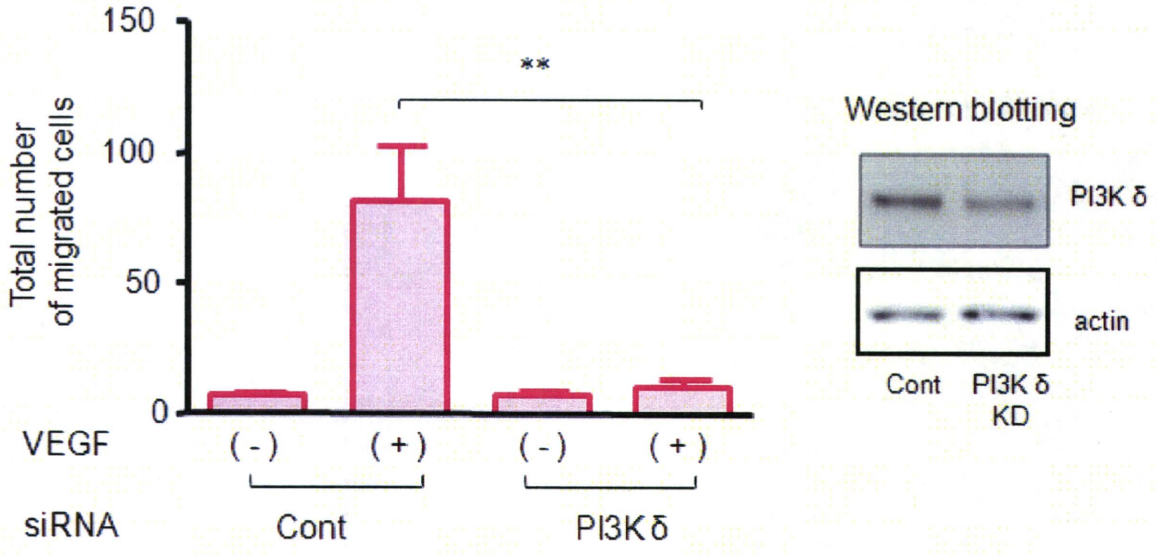


図 109. VEGF に誘導される Early EPC の遊走に対する p110 PI3K δ siRNA の効果

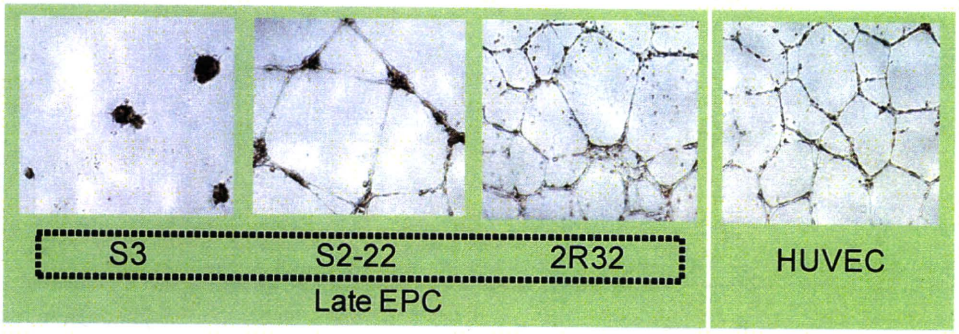


図 110. 種々の late EPC の *in vitro* 管腔形成能

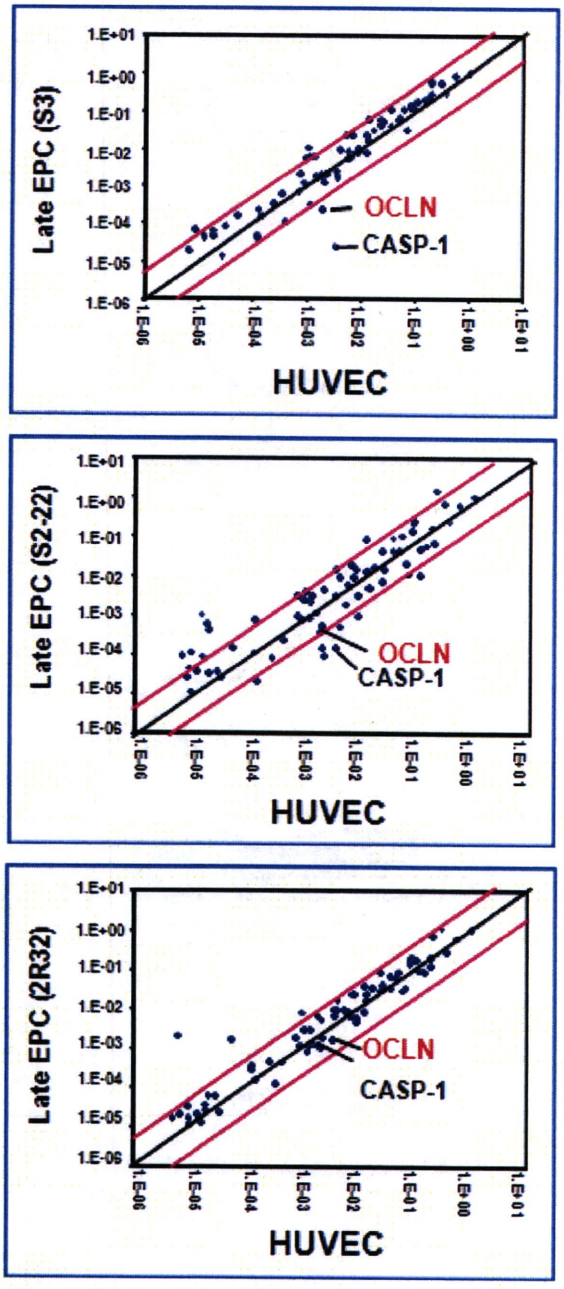


図 112. LateEPC と HUVEC における
遺伝子発現プロファイル比較

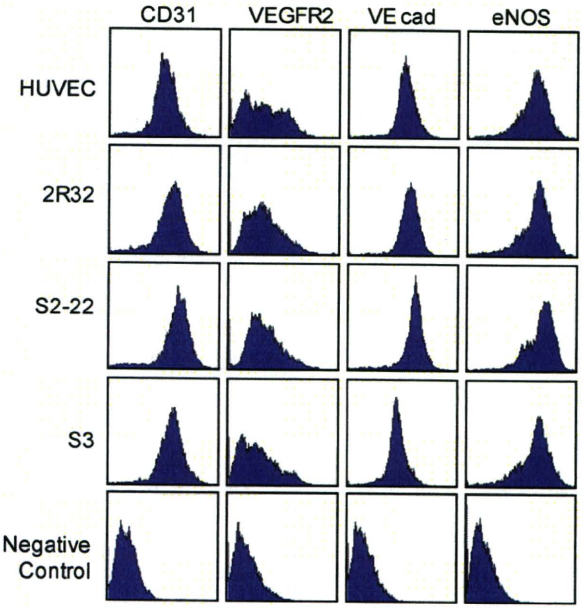


図 111. 種々の late EPC における血管内皮細胞
マーカー分子の発現

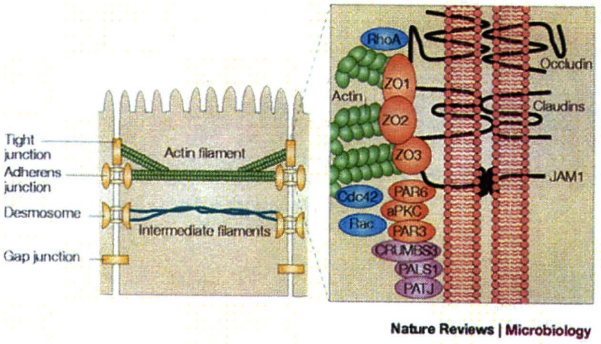


図 113. Tight Junction タンパクとして
働くオクルディン

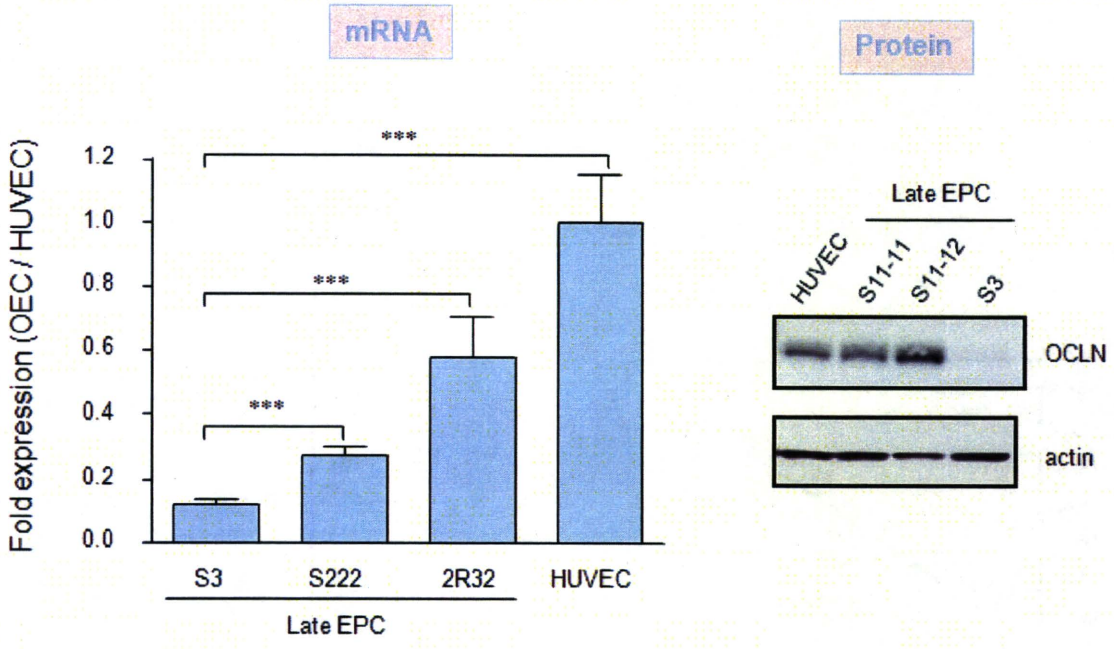


図 114. Late EPC におけるオクルディンの mRNA 及びタンパク質発現

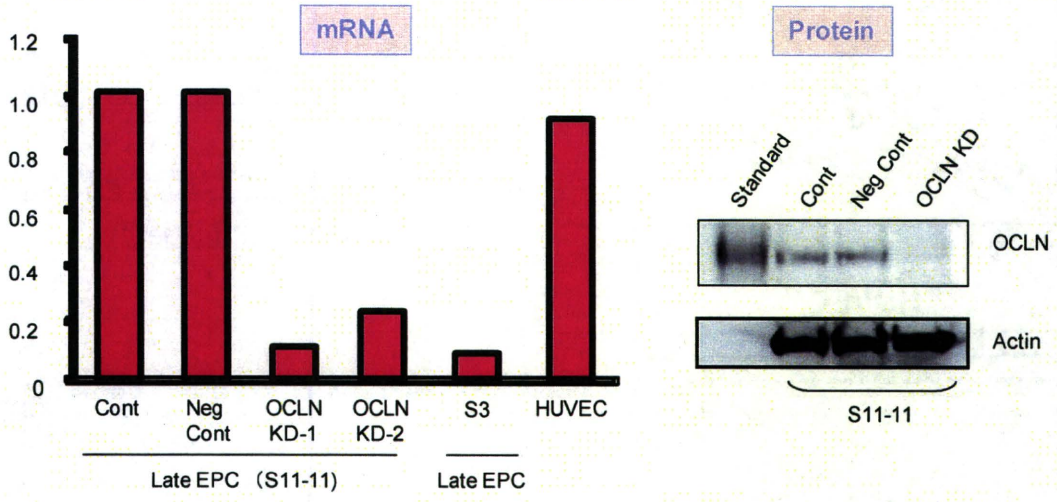


図 115. siRNA によるオクルディンの mRNA 及びタンパク質量の変化

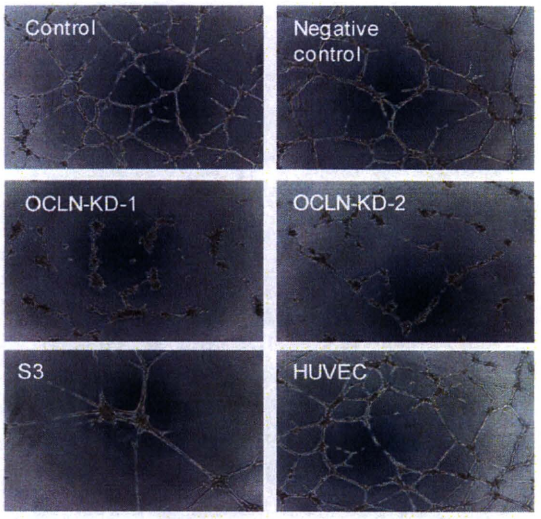


図 116. オクルディン siRNA による管腔形成の抑制

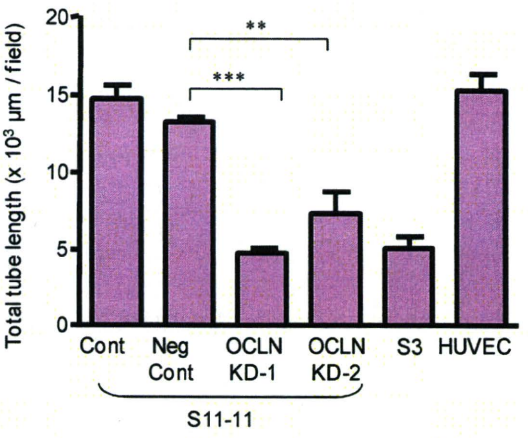


図 117. オクルディン siRNA による管腔形成抑制の定量評価

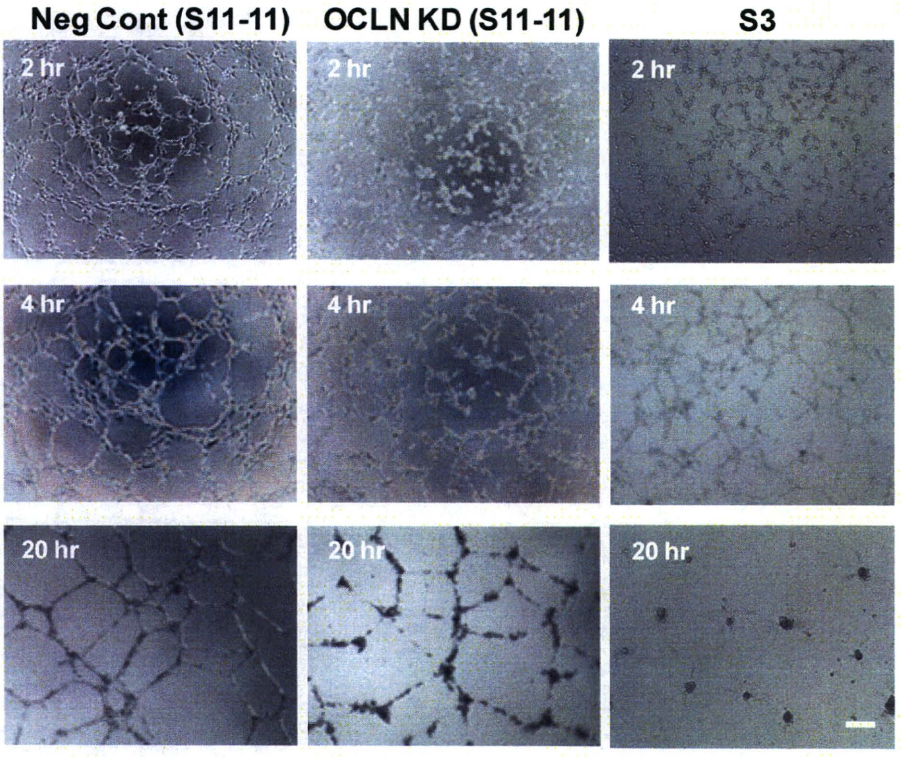


図 118. オクルディン siRNA の管腔形成への影響の経時的観察

Table 31. O-Glycans found in leukemia cell lines

Structure and monosaccharide compositions	Molecular ions	Peak ID	Relative abundance (%) K562	U937	Jurkat	HL-60
Asialo glycan						
Galβ1-3(Galβ1-4GlcNAcβ1-6)GalNAc-2AA#A2	869(+)	H-1				4.44
Monosialo glycans						
NeuAcα2-3Galβ1-3GalNAc-2AA#MS1 (Sialyl T antigen)	795(+)	K-1, U1, J-1, H-4	32.3	36.6	20.5	15.2
NeuAcα2-6GalNAc-2AA (Sialyl Tn antigen)	633(+)	H-7, J-2			28.9	1.16
NeuAcα2-3Galβ1-3(GlcNAcβ1-6)GalNAc-2AA#MS2	997(+)	H-3				4.24
Galβ1-3(Galβ1-4GlcNAcβ1-6)GalNAc-2AA + $NeuAc_1$#MS3	1159(-)	H-6				4.26
NeuAcα2-3Galβ1-3(GlcNAcβ1-6)GalNAc-2AA+ Fuc	1143(-)	H-2				2.08
Galβ1-3(Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA + $NeuAc_1$ #MS4	1305(-)	H-5				2.26
Disialo glycans						
NeuAcα2-3Galβ1-3(NeuAcα2-6)GalNAc-2AA#DS1 (Disialyl T antigen)	1085(-)	K-3, U-3, J-5, H-14	30.7	30.1	12.9	2.97
NeuAcα2-3Galβ1-3(NeuAcα2-3Galβ1-4GlcNAcβ1-6)GalNAc-2AA#DS2	1450(-)	J-4, H-13			10.7	25.9
NeuAcα2-3Galβ1-3(NeuAcα2-3Galβ1-4(Fucα1-3)GlcNAcβ1-6)GalNAc-2AA	1596(-)	H-12				0.14
NeuAcα2-3Galβ1-3(NeuAcα2-3Galβ1-4GlcNAcβ1-3Galβ1-4GlcNAcβ1-6)GalNAc-2AA#DS3	1815(-)	H-10				1.49
NeuAcα2-3Galβ1-3(NeuAcα2-3Galβ1-4GlcNAcβ1-3Galβ1-4(Fucα1-3)GlcNAcβ1-6)GalNAc-2AA#DS4	1961(-)	H-10				1.49
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_2$-Galβ1-4GlcNAcβ1-6)GalNAc -2AA #DS6	2180(-)	H-9				1.11
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_3$-Gal β1-4GlcNAcβ1-6)GalNAc -2AA #DS9	2545(-)	H-8				2.13
Degradation product						
NeuAcα2-3Gal-2AA	592(+)	K-2, U-2, J-3, H-11	17.3	21.2	20.6	23.7

We showed ms/ms data for the glycan with # markes in supporting information. The information is available free of charge via the Internet at http://pubs.acs.org. The structures in blue are confirmed according to the analogous consideration on the structures of higher / lower series of *O*-glycans. The structures in red are not assigned in the present study, because we could not observe good MS^n data.

Table 32. O-Glycans found in pancreatic cancer cell lines

O-glycans observed in PANC1	Molecular ions	O-glycans observed in BxPC3	Molecular ions
Asialo fraction(peak P-1): 0%		Asialo fraction (Peak B-1):6.0%	
		Galβ1-3GalNAc-2AA	504 (+)
		Galβ1-3(GlcNAcβ1-6)GalNAc-2AA#A1	707 (+)
		Galβ1-3(Galβ1-4GlcNAcβ1-6)GalNAc-2AA#A2	869 (+)
		Galβ1-3(GlcNAcβ1-3Galβ1-4GlcNAcβ1-6)GalNAc-2AA#A4	1093(+)
		Galβ1-3(Gal-GlcNAc-Galβ1-4GlcNAcβ1-6)GalNAc-2AA#A5	1255(+)
Monosialo fraction (Peak P2, P3): 63%		Monosialo fraction (Peak B-2): 70%	
NeuAcα2-3Galβ1-3GalNAc-2AA#MS1 (Sialyl T antigen)	795(+)	NeuAcα2-3Galβ1-3GalNAc-2AA#MS1 (Sialyl T antigen)	795(+)
		Galβ1-3(Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc1#MS3	1159(-)
		Galβ1-3(Gal-GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc1#MS5	1524(-)
		Galβ1-3 (Gal-GlcNAc-Gal-(Fuc-) GlcNAcβ1-6) -GalNAc-2AA + NeuAc1#MS6	1670(-)
		Galβ1-3((Gal-GlcNAc)2-Gal-GlcNAcβ1-6)GalNAc -2AA + NeuAc1#MS8	1889(-)
		Galβ1-3((Gal-GlcNAc)2-Gal-(Fuc-)GlcNAcβ1-6) -GalNA -2AA + NeuAc1#MS9	2035(-)
		Galβ1-3((Gal-GlcNAc)3-Gal-GlcNAcβ1-6)GalNAc -2AA + NeuAc1#MS10	2254(-)
		Galβ1-3((Gal-GlcNAc)3-Gal-(Fuc-)GlcNAcβ1-6) GalNAc -2AA + NeuAc1#MS11	2400(-)
		Galβ1-3((Gal-GlcNAc)4-Gal-GlcNAcβ1-6)GalNAc -2AA + NeuAc1#MS12	2619(-)
		Galβ1-3((Gal-GlcNAc)4-Gal-(Fuc-)GlcNAcβ1-6)GalNAc -2AA + NeuAc1#MS13	2765(-)
Disialo fraction (Peak P4): 37%		Disialo fraction (Peak B3, B4, B5): 24%	
NeuAcα2-3Galβ1-3(NeuAcα2-6)GalNAc-2AA#DS1 (Disialyl T antigen)	1085(-)	NeuAcα2-3Galβ1-3(NeuAcα2-6)GalNAc-2AA#DS1 (Disialyl T antigen)	1085(-)
		NeuAc2Hex1HexNAc1dHex1-2AA	1231(-)
		NeuAc-Galβ1-3(NeuAc-Gal-GlcNAcβ1-6)GalNAc-2AA#DS2	1450(-)

		NeuAc-Galβ1-3(NeuAc-Gal-GlcNAc-Gal-GlcNAcβ1-6)GalNAc -2AA#DS3	1815(-)
		NeuAc-Galβ1-3(NeuAc-Gal-GlcNAc-Gal-(Fuc-)GlcNAcβ1-6) GalNAc-2AA#DS4	1961(-)
		NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_2$-Gal-GlcNAcβ1-6) GalNAc-2AA#DS6	2180(-)
		NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_2$-Gal-(Fuc-)GlcNAcβ1-6) GalNAc-2AA#DS7	2326(-)
		NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_3$-Gal-GlcNAcβ1-6) GalNAc -2AA#DS9	2545(-)
		NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_3$-Gal-(Fuc-)GlcNAcβ1-6) GalNAc -2AA	2691(-)
		NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_4$-Gal-GlcNAcβ1-6)GalNAc -2AA#DS10	2910(-)
		NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_4$-Gal-(Fuc-)GlcNAcβ1-6) GalNAc -2AA	3056(-)
Degradation product		Degradation product	
NeuAcα2-3Gal-2AA	592(+)	NeuAcα2-3Gal-2AA	592(+)

We showed ms/ms data for the glycan with # markes in supporting information. The information is available free of charge via the Internet at http://pubs.acs.org. The structures in blue are confirmed according to the analogous consideration on the structures of higher / lower series of *O*-glycans. The structures in red are not assigned in the present study, because we could not observe good MS^n data.

Table 33. O-Glycans found in colon cancer cell lines

O-glycans observed in LS174T	Molecular ions	O-glycans observed in HCT-15	Molecular ions
Asialo fraction(peak L-1): 25.6%		Asialo fraction (Peak H-1):13.8%	
Galβ1-3GalNAc-2AA	504 (+)	GlcNAc-GalNAc-2AA	545 (+)
GlcNAc-GalNAc-2AA	545 (+)	Fuc-Galβ1-3GalNAc-2AA	649(+)
Galβ1-3(GlcNAcβ1-6)GalNAc-2AA$^{\#A1}$	707 (+)	Galβ1-3(GlcNAcβ1-6)GalNAc-2AA$^{\#A1}$	707 (+)
Galβ1-3(Gal-GlcNAcβ1-6)GalNAc-2AA$^{\#A2}$	869 (+)	Galβ1-3(Gal-GlcNAcβ1-6)GalNAc-2AA$^{\#A2}$	869 (+)
Galβ1-3(Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA$^{\#A3}$	1014(-)		
Galβ1-3(GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA$^{\#A4}$	1071(-)		
Galβ1-3(Gal-GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA$^{\#A5}$	1233(-)		
Galβ1-3(Gal-GlcNAc-Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA$^{\#A6}$	1379(-)		
Galβ1-3(GlcNAc-Gal-GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA$^{\#A7}$	1436(-)		
Galβ1-3((Gal-GlcNAc)$_2$-Gal-GlcNAcβ1-6)GalNAc-2AA$^{\#A8}$	1598(-)		
Galβ1-3((Gal-GlcNAc)$_2$-Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA$^{\#A9}$	1744(-)		
Monosialo fraction (Peak L-2): 37.1%		Monosialo fraction (Peak H-2): 23.8%	
Galβ1-3(Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$$^{\#MS3}$	1159(-)	NeuAcα2-3Galβ1-3GalNAc-2AA$^{\#MS1}$ (Sialyl T antigen)	795(+)
Galβ1-3(Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$ $^{\#MS4}$	1305(-)	Galβ1-3(GlcNAcβ1-6)GalNAc-2AA+ NeuAc$_1$$^{\#MS2}$	997(-)
Galβ1-3(Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$ + SO_3	1385(-)	Galβ1-3(Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$$^{\#MS3}$	1159(-)
Galβ1-3(Gal-GlcNAc-Gal-(Fuc-)(SO_3-)GlcNAcβ1-6)GalNAc-2AA$^{\#SU2}$	1459(-)	Galβ1-3(Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$$^{\#MS4}$	1305(-)
Galβ1-3(Gal-GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$$^{\#MS5}$	1524(-)		
Galβ1-3(Gal-(Fuc-)GlcNAc-Gal-(Fuc-)(SO_3-)GlcNAcβ1-6) GalNAc-2AA$^{\#SU3}$	1604(-)		
Galβ1-3(Gal-GlcNAc-Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$$^{\#MS6}$	1670(-)		
Galβ1-3(Gal-(Fuc-)GlcNAc-Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$$^{\#MS7}$	1816(-)		
Galβ1-3(Gal-(Fuc-)GlcNAc-Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$ + SO_3	1896(-)		
Galβ1-3((Gal-GlcNAc)$_2$-Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc$_1$ + SO_3	1969(-)		

Galβ1-3((Gal-GlcNAc)$_2$-Gal-(Fuc-)GlcNAcβ1-6)-GalNA-2AA + NeuAc$_1$[#MS9]	2035(-)
Galβ1-3(Gal-GlcNAc-Gal-(Fuc-)GlcNAc-Gal-(Fuc-)GlcNAcβ1-6) GalNAc-2AA + NeuAc$_1$	2181(-)
<u>Disialo fraction (Peak L-3. L-4, L-5): 37.1%</u>	
NeuAcα2-3Galβ1-3(NeuAcα2-6)GalNAc-2AA[#DS1] (Disialyl T antigen)	1085(-)
NeuAc-Galβ1-3(NeuAc-Gal-GlcNAcβ1-6)GalNAc-2AA[#DS2]	1450(-)
NeuAc-Galβ1-3(NeuAc-Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA	1596(-)
NeuAc-Galβ1-3(NeuAc-Gal-GlcNAc-Gal-GlcNAcβ1-6) GalNAc -2AA[#DS3]	1815(-)
NeuAc-Galβ1-3(NeuAc-Gal-GlcNAc-Gal-(SO_3-)GlcNAcβ1-6) GalNAc -2AA [#SU4]	1895(-)
NeuAc-Galβ1-3(NeuAc-Gal-GlcNAc-Gal-(Fuc-)GlcNAcβ1-6) GalNAc -2AA[#DS4]	1961(-)
NeuAc-Galβ1-3(NeuAc-Gal-(Fuc-)GlcNAc-Gal-(Fuc-)GlcNAcβ1-6)GalNAc -2AA[#DS5]	2107(-)
Galβ1-3((Gal-GlcNAc)$_2$-Gal-(Fuc-)(SO_3-)GlcNAcβ1-6) GalNA -2AA+ NeuAc$_1$[#SU5]	2115(-)
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_2$-Gal-GlcNAcβ1-6)GalNAc -2AA[#DS6]	2180(-)
Galβ1-3(Gal-GlcNAc-Gal-(Fuc-)(SO_3-)GlcNAc-Gal-(Fuc-) GlcNAcβ1-6)GalNAc -2AA + NeuAc$_1$[#SU6]	2260(-)
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_2$-Gal-(Fuc-)GlcNAcβ1-6) GalNAc -2AA[#DS7]	2326(-)
NeuAc-Galβ1-3(NeuAc-Gal-GlcNAc-Gal-(Fuc-)GlcNAc-Gal-(Fuc-)GlcNAcβ1-6)GalNAc -2AA[#DS8]	2472(-)
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_3$-Gal-(Fuc-)GlcNAcβ1-6) GalNAc -2AA	2691(-)
<u>Degradation product</u>	
(Gal-GlcNAc)$_2$-Gal-2AA[#DP2]	1029(-)

<u>Disialo fraction (Peak H-3. H-4): 62.4%</u>	
NeuAcα2-3Galβ1-3(NeuAcα2-6)GalNAc-2AA[#DS1] (Disialyl T antigen)	1085(-)
Galβ1-3(Gal-GlcNAcβ1-6)GalNAc-2AA + SO_3 + NeuAc$_1$ [#SU1]	1238(-)
NeuAc-Galβ1-3(NeuAc-Gal-GlcNAcβ1-6)GalNAc-2AA[#DS2]	1450(-)
Galβ1-3(Gal-GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA + SO_3 + NeuAc$_1$	1604
NeuAc-Galβ1-3(NeuAc-Gal-GlcNAc-Gal-GlcNAcβ1-6) GalNAc -2AA[#DS3]	1815(-)
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_2$-Gal-GlcNAcβ1-6) GalNAc -2AA[#DS6]	2180(-)
<u>Degradation product</u>	
NeuAc-Gal-GlcNAc-Gal-2AA[#DP1]	956(+)

Gal-GlcNAc-Gal-(Fuc-)GlcNAc-Gal-2AA$^{\#DP3}$	1176(-)
$(Gal\text{-}GlcNAc)_3$-Gal-2AA +Fuc	1541(-)
NeuAc-Gal-(Fuc-)GlcNAc-Gal-(Fuc-)$(SO_3\text{-})$GlcNAc-Gal-2AA$^{\#DP6}$	1691(-)
NeuAc-$(Gal\text{-}GlcNAc)_2$-Gal-2AA +Fuc_3	1758(-)

We showed ms/ms data for the glycan with # markes in supporting information. The information is available free of charge via the Internet at http://pubs.acs.org. The structures in blue are confirmed according to the analogous consideration on the structures of higher / lower series of *O*-glycans. The structures in red are not assigned in the present study, because we could not observe good MS^n data.

Table 34. O-Glycans found in gastric cancer cell lines

O-glycans observed in MKN45	Molecular ions	O-glycans observed in MKN7	Molecular ions
Asialo fraction(Peak M-1): 5.0%		Asialo fraction (Peak M7-1):0%	
Galβ1-3GalNAc-2AA	504 (+)		
GlcNAc-GalNAc-2AA	545 (+)		
Galβ1-3(GlcNAcβ1-6)GalNAc-2AA#A1	707 (+)		
Monosialo fraction (Peak M-2, M-3): 21.3%		Monosialo fraction (Peak M7-3, M7-4): 74.6%	
NeuAcα2-6GalNAc-2AA +Na (Sialyl Tn antigen)	654(+)	NeuAcα2-6GalNAc-2AA + Na (Sialyl Tn antigen)	654(+)
NeuAcα2-3Galβ1-3GalNAc-2AA#MS1 (Sialyl T antigen)	795(+)	NeuAcα2-3Galβ1-3GalNAc-2AA#MS1 (Sialyl T antigen)	795(+)
Galβ1-3(GlcNAcβ1-6)GalNAc-2AA + NeuAc1#MS2	998(+)	Galβ1-3(Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc1#MS3	1159(-)
Galβ1-3(Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc1#MS3	1159(-)	Galβ1-3(Gal-(Fuc-)GlcNAcβ1-6)GalNAc-2AA#MS4	1305
Galβ1-3(Gal-GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc1#MS5	1524(-)		
Galβ1-3((Gal-GlcNAc)2-Gal-GlcNAcβ1-6)GalNAc -2AA + NeuAc1#MS8	1889(-)		
Galβ1-3((Gal-GlcNAc)3-Gal-GlcNAcβ1-6)GalNAc -2AA + NeuAc1#MS10	2254(-)		
Galβ1-3((Gal-GlcNAc)4-Gal-GlcNAcβ1-6)GalNAc -2AA + NeuAc1#MS12	2619(-)		
Galβ1-3((Gal-GlcNAc)5-Gal-GlcNAcβ1-6)GalNAc -2AA + NeuAc1#MS14	2984(-)		
Disialo fractions (Peak M-4, M-6): 61.4%		Disialo fractions (Peak M7-5): 25.4%	
NeuAcα2-3Galβ1-3(NeuAcα2-6)GalNAc-2AA#DS1 (Disialyl T antigen)	1085(-)	NeuAcα2-3Galβ1-3(NeuAcα2-6)GalNAc-2AA#DS1 (Disialyl T antigen)	1085(-)
NeuAc-Galβ1-3(NeuAc-Gal-GlcNAcβ1-6)GalNAc-2AA#DS2	1450(-)		
NeuAc-Galβ1-3(NeuAc-Gal-GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA #DS3	1815(-)		
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)2-Gal-GlcNAcβ1-6)GalNAc- 2AA #DS6	2180(-)		
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)3-Gal-GlcNAcβ1-6)GalNAc- 2AA #DS9	2545(-)		
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)4-Gal-GlcNAcβ1-6)GalN	2910(-)		

Ac- 2AA #DS10			
NeuAc-Galβ1-3(NeuAc-(Gal-GlcNAc)$_5$-Gal-GlcNAcβ1-6)GalN Ac- 2AA #DS11	3275(-)		
Trisialo fraction (Peak M-5): 12.3%			
NeuAc-Gal-GlcNAc- (NeuAc-Gal-GlcNAc)Galb1-3(NeuAcα2-6)GalNAc-2AA#TS1	2106(-)		
NeuAc-Gal-GlcNAc- (NeuAc-Gal-GlcNAc)Galb1-3(NeuAcα2-6)GalNAc-2AA +Gal-GlcNAc#TS2	2471(-)		
NeuAc-Gal-GlcNAc- (NeuAc-Gal-GlcNAc)Galb1-3(NeuAcα2-6)GalNAc-2AA +(Gal-GlcNAc)$_2$#TS3	2836(-)		
NeuAc-Gal-GlcNAc- (NeuAc-Gal-GlcNAc)Galb1-3(NeuAcα2-6)GalNAc-2AA +(Gal-GlcNAc)$_3$#TS4	3201(-)		
NeuAc-Gal-GlcNAc- (NeuAc-Gal-GlcNAc)Galb1-3(NeuAcα2-6)GalNAc-2AA +(Gal-GlcNAc)$_4$#TS5	3566(-)		
NeuAc-Gal-GlcNAc- (NeuAc-Gal-GlcNAc)Galb1-3(NeuAcα2-6)GalNAc-2AA +(Gal-GlcNAc)$_5$#TS6	3931(-)		
Degradation product		Degradation product	
NeuAcα2-3Gal-2AA	592(+)	NeuAcα2-3Gal-2AA	592(+)
NeuAc-Gal-GlcNAc-Gal-2AA#DP1	957(+)	NeuAc-Gal-GlcNAc-Gal-2AA#DP1	956(+)
NeuAc-(Gal-GlcNAc)$_2$-Gal-2AA#DP4	1321(-)		
NeuAc-(Gal-GlcNAc)$_3$-Gal-2AA#DP5	1686(-)		
NeuAc-(Gal-GlcNAc)$_4$-Gal-2AA#DP7	2051(-)		
NeuAc-(Gal-GlcNAc)$_5$-Gal-2AA	2416(-)		
NeuAc-(Gal-GlcNAc)$_6$-Gal-2AA#DP8	2781(-)		

We showed ms/ms data for the glycan with # markes in supporting information. The information is available free of charge via the Internet at http://pubs.acs.org. The structures in blue are confirmed according to the analogous consideration on the structures of higher / lower series of *O*-glycans. The structures in red are not assigned in the present study, because we could not observe good MS^n data.

Table 35 Mucin-type O-glycans observed in HCT116 cell.

	M1
504	Gal-GalNAc-2AA
546	GlcNAc-GalNAc-2AA
625	GlcNAc-GalNAc-2AA + SO_3
706	Galβ1-3(GlcNAcβ1-6)GalNAc-2AA
786	Galβ1-3(GlcNAcβ1-6)GalNAc-2AA + SO_3
868	Galβ1-3 (Gal-GlcNAcβ1-6)GalNAc-2AA
949	Galβ1-3 (Gal-GlcNAcβ1-6)GalNAc-2AA + SO_3
1234	Galβ1-3 {(Gal-GlcNAc)$_2$β1-6} GalNAc-2AA

	M2
1158	Galβ1-3 (Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc
1361	Galβ1-3 (GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc
1523	Galβ1-3 {(Gal-GlcNAc)$_2$β1-6} GalNAc-2AA + NeuAc
1888	Galβ1-3 {(Gal-GlcNAc)$_3$β1-6} GalNAc-2AA + NeuAc
2253	Galβ1-3 {(Gal-GlcNAc)$_4$β1-6} GalNAc-2AA + NeuAc
2618	Galβ1-3 {(Gal-GlcNAc)$_5$β1-6} GalNAc-2AA + NeuAc

	M3
633	NeuAcα2-6GalNAc-2AA
795	NeuAcα2-3Galβ1-3GalNAc-2AA
998	NeuAcα2-3Galβ1-3(GlcNAcβ1-6)GalNAc-2AA
1160	Galb1-3 (Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc

	M4
1815	NeuAcα2-3Galβ1-3 {NeuAcα2-6(Gal-GlcNAc)$_2$β1-6}GalNAc-2AA
1969	Galβ1-3 {(Gal-GlcNAc)$_3$β1-6}GalNAc-2AA + NeuAc + SO_3
2180	NeuAcα2-3Galβ1-3 {NeuAcα2-6(Gal-GlcNAc)$_3$β1-6}GalNAc-2AA
2335	Galβ1-3 {(Gal-GlcNAc)$_4$β1-6}GalNAc-2AA + NeuAc + SO_3
2546	NeuAcα2-3Galβ1-3 {NeuAcα2-6(Gal-GlcNAc)$_4$β1-6}GalNAc-2AA

	M5
1450	NeuAcα2-3Galβ1-3 (NeuAcα2-6Gal-GlcNAcβ1-6)GalNAc-2AA
1815	NeuAcα2-3Galβ1-3 {NeuAcα2-6(Gal-GlcNAc)$_2$β1-6}GalNAc-2AA

	M6
1085	NeuAcα2-3Galβ1-3(NeuAcα2-6)GalNAc-2AA
1238	Galβ1-3 (Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc + SO_3
1440	Galβ1-3 (GlcNAc-Gal-GlcNAcβ1-6)GalNAc-2AA + NeuAc + SO_3
1450	NeuAcα2-3Galβ1-3 (NeuAcα2-6Gal-GlcNAcβ1-6)GalNAc-2AA
1604	Galβ1-3 {(Gal-GlcNAc)$_2$β1-6} GalNAc-2AA + NeuAc + SO_3
1684	Galβ1-3 {(Gal-GlcNAc)$_2$β1-6} GalNAc-2AA + NeuAc + $2SO_3$
1764	Galβ1-3 {(Gal-GlcNAc)$_2$β1-6} GalNAc-2AA + NeuAc + $3SO_3$
2260	NeuAcα2-3Galβ1-3 {NeuAcα2-6(Gal-GlcNAc)$_3$β1-6}GalNAc-2AA + SO_3
2626	NeuAcα2-3Galβ1-3 {NeuAcα2-6(Gal-GlcNAc)$_4$β1-6}GalNAc-2AA + SO_3
2106	NeuAcα2-3Galβ1-3 {NeuAcα2-6(Gal-GlcNAc)$_2$β1-6}GalNAc-2AA + NeuAc
2471	NeuAcα2-3Galβ1-3 {NeuAcα2-6(Gal-GlcNAc)$_3$β1-6}GalNAc-2AA + NeuAc

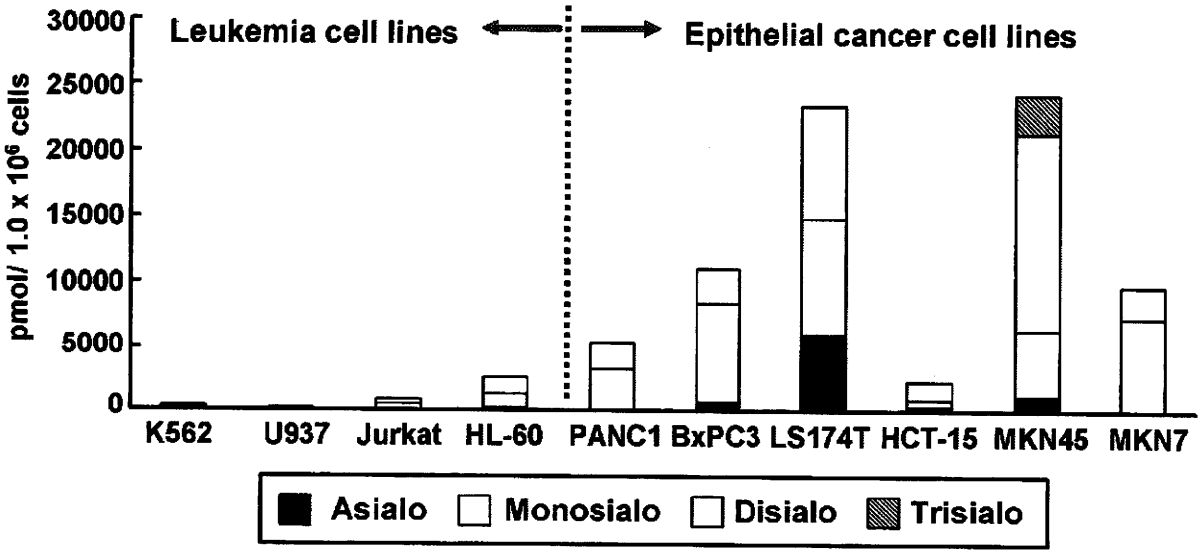


Fig.119 Comparison of the amounts of O-glycans expressed on cancer cells

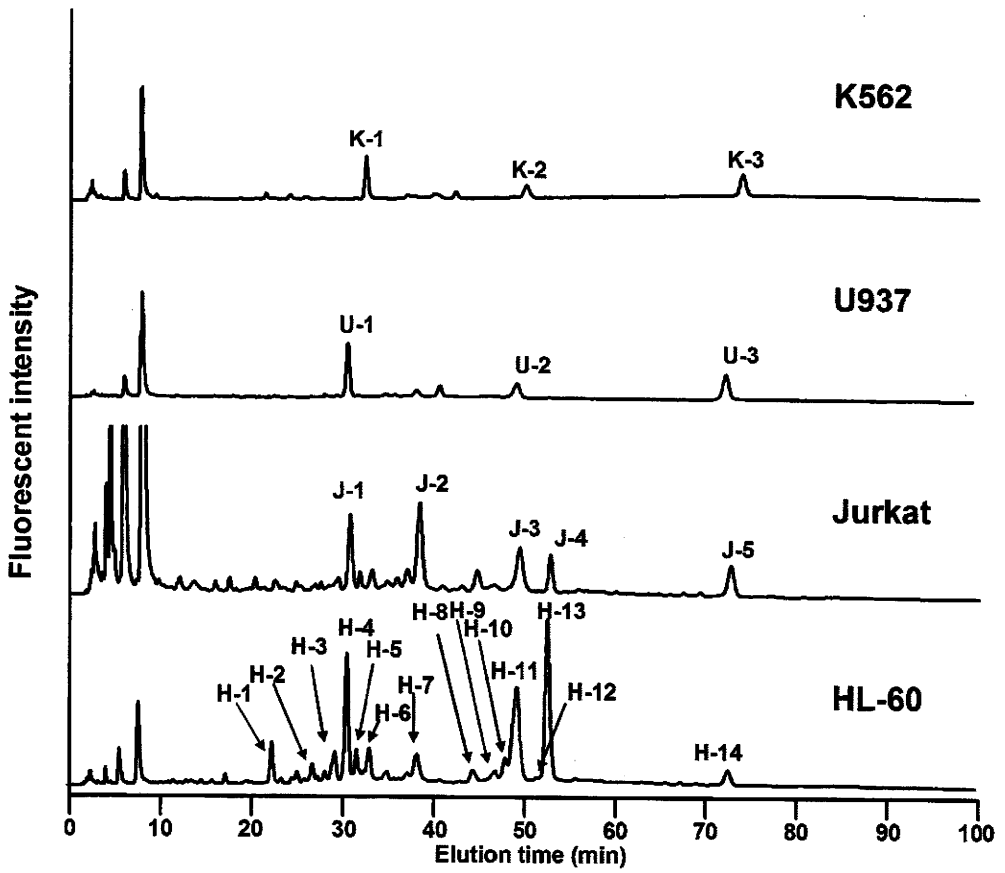


Fig.120 NP-HPLC analysis of O-glycans derived from leukemia cells

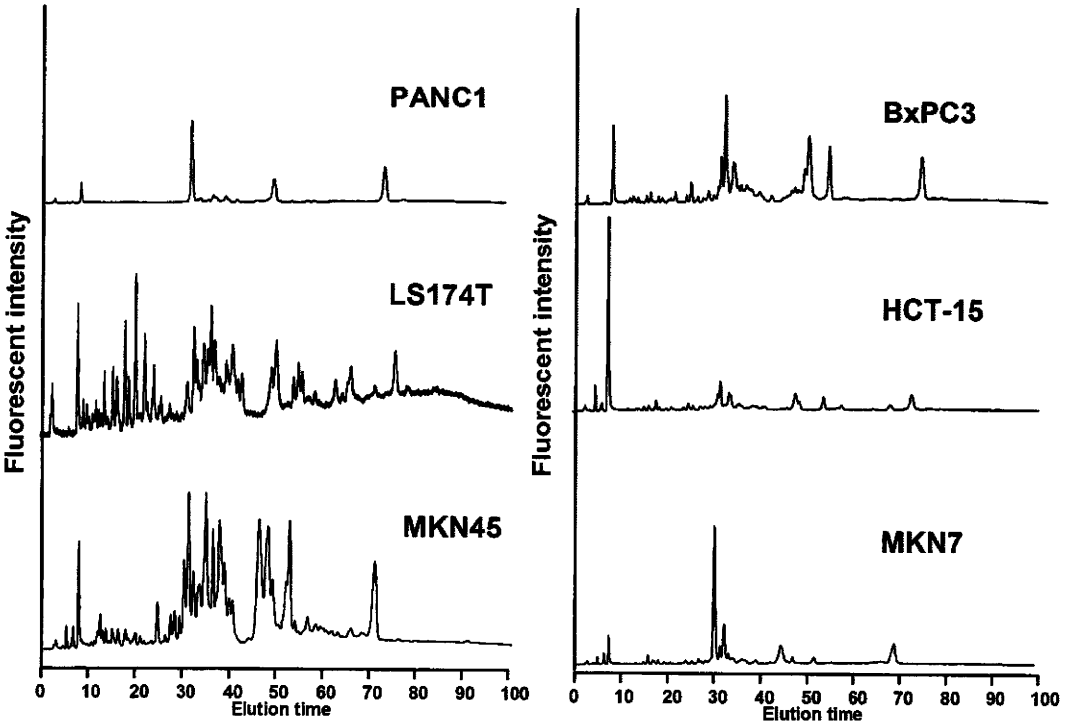


Fig.121 NP-HPLC analysis of O-glycans derived from epithelial cancer cells

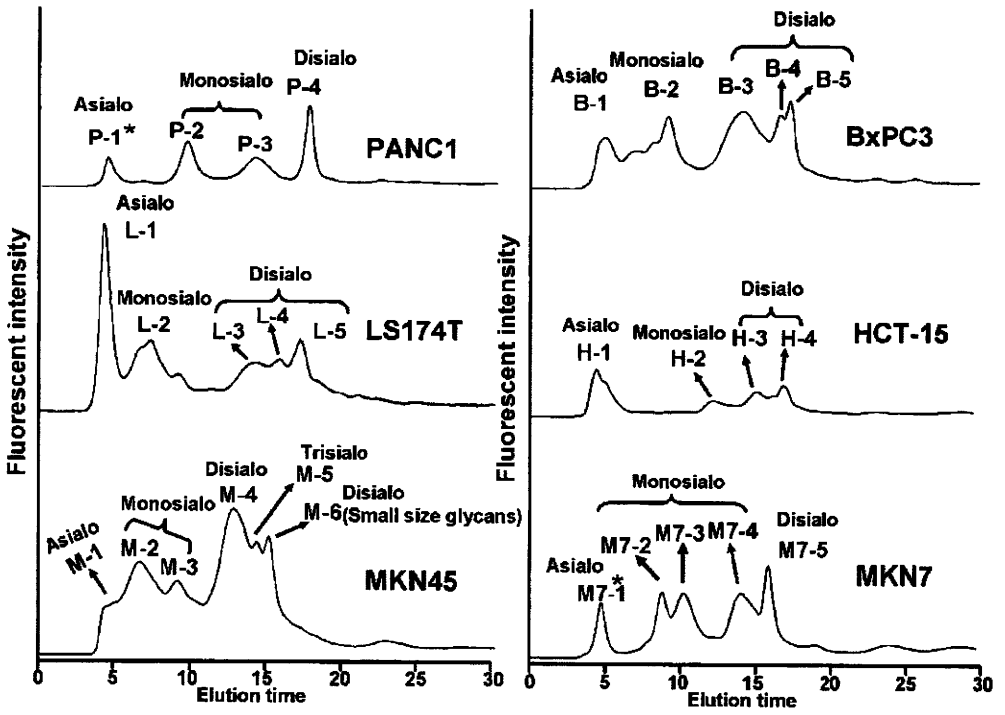


Fig.122 Separation of O-glycan pool derived from epithelial cancer cells by serotonin affinity chromatography

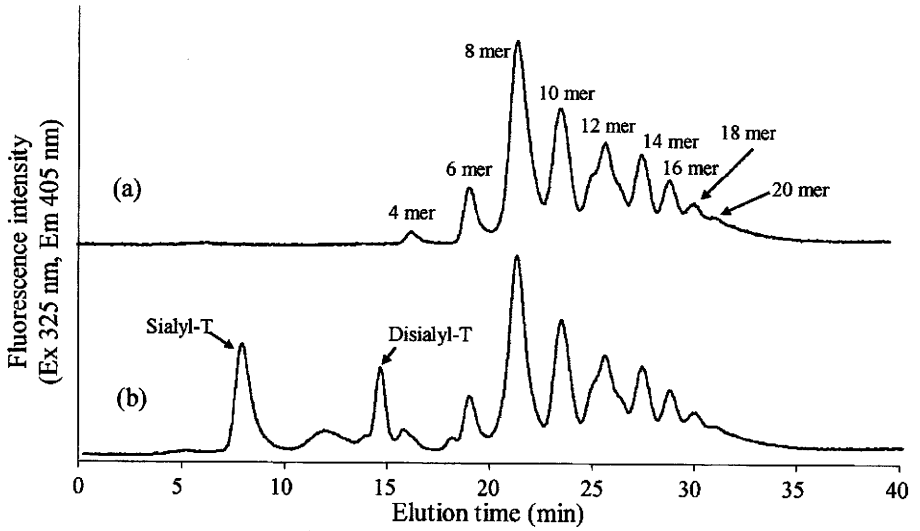


Fig.123 Serotonin affinity chromatography of HA oligosaccharides and mucin-type O-glycans. (a) 2AA-labeled HA oligosaccharides (4-20 mer) and (b) a mixture of mucin-type O-glycans from bovine fetuin and HA oligosaccharides. Analytical conditions; column, LA-serotonin (4.6 x 150 mm). flow rate, 0.5 mL/min. eluent; solvent A, water. solvent B, 50 mM Ammonium acetate in water. gradient conditions, a linear gradient (5-75 % solvent B) from 2 to 45 min and 75% solvent B from 37 to 45 min.

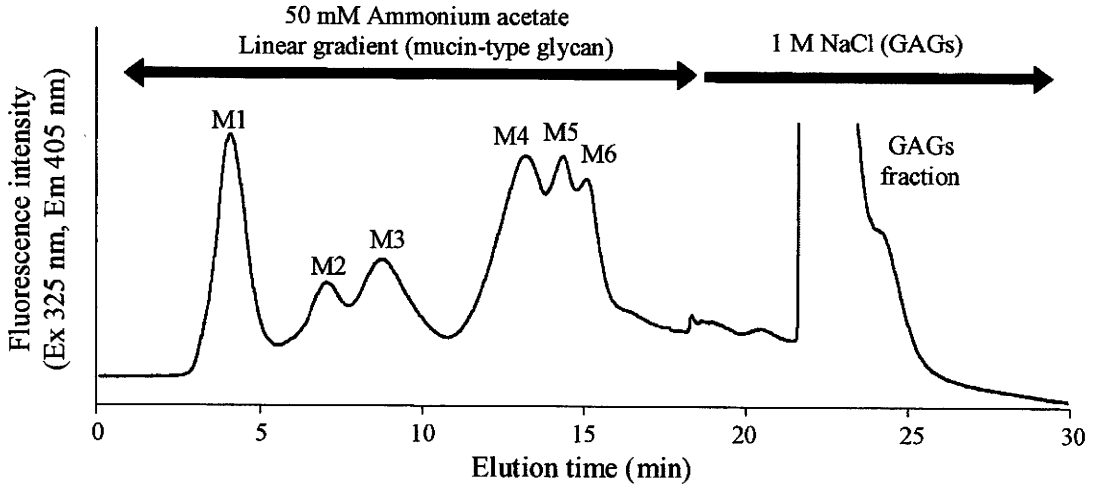


Fig.124 Serotonin affinity chromatography of O-linked glycans derived from HCT116 cell. Analytical conditions; column, LA-serotonin (4.6 x 150 mm). flow rate, 0.5 mL/min. eluent; solvent A, water. solvent B, 50 mM Ammonium acetate in water. gradient conditions, a linear gradient (5-40 % solvent B) from 2 to 20 min and 1 M NaCl from 20 to 45 min.

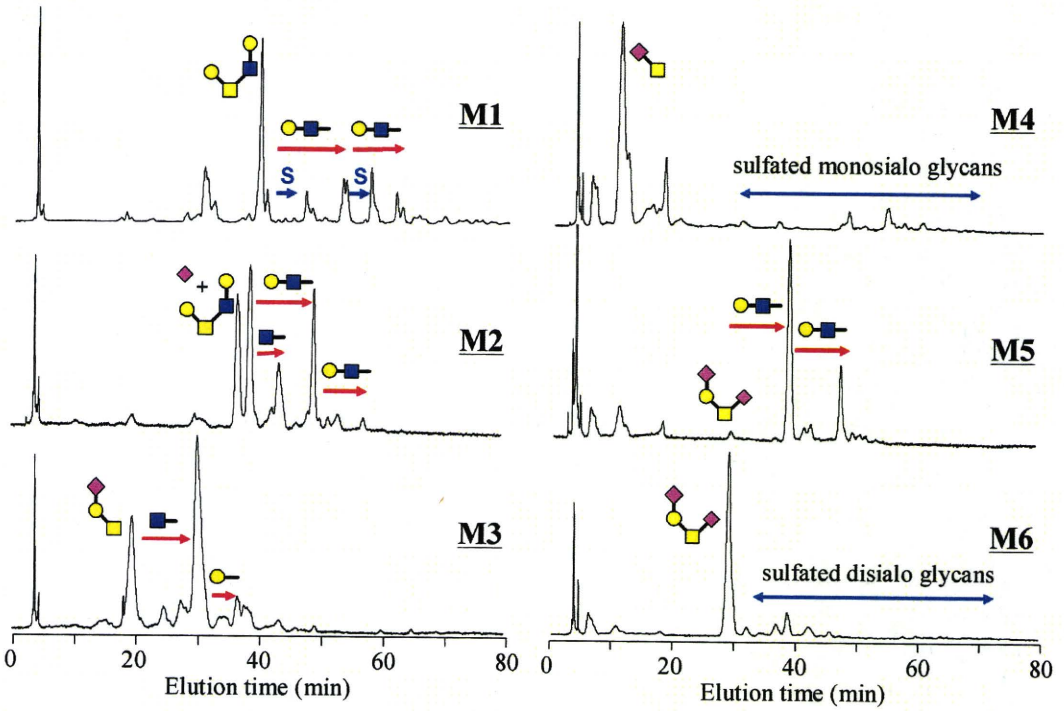


Fig.125 NP-HPLC analysis of mucin-type O-glycans from HCT116 cell. Analytical conditions: column, TSK-GEL Amide-80 (4.6 x 250 mm). flow rate, 0.8 mL/min. eluent, solvent A, 0.1% CH_3COOH in MeCN. solvent B, 0.2% CH_3COOH/0.2% triethylamine in water. gradient conditions: a linear gradient (15-50 % solvent B) from 5 to 85 min.

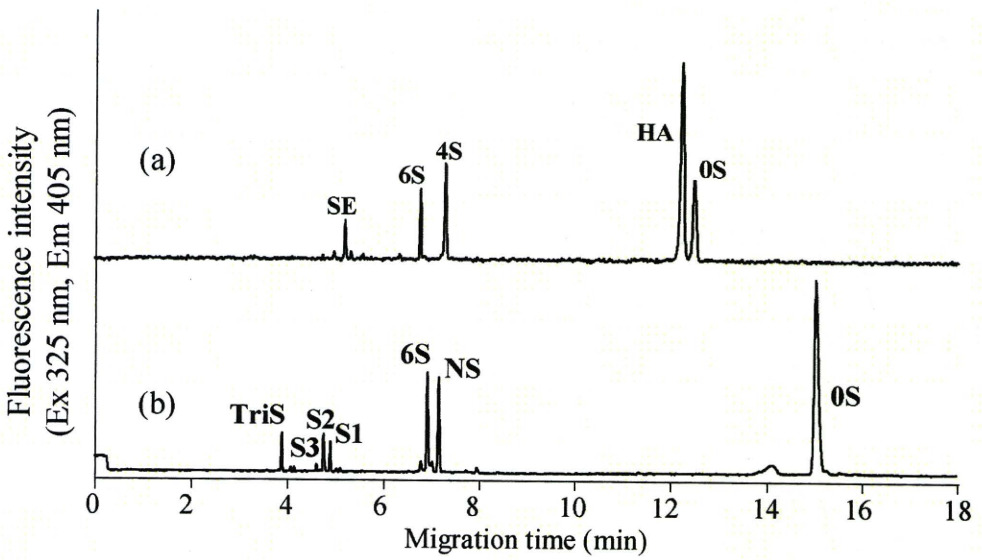
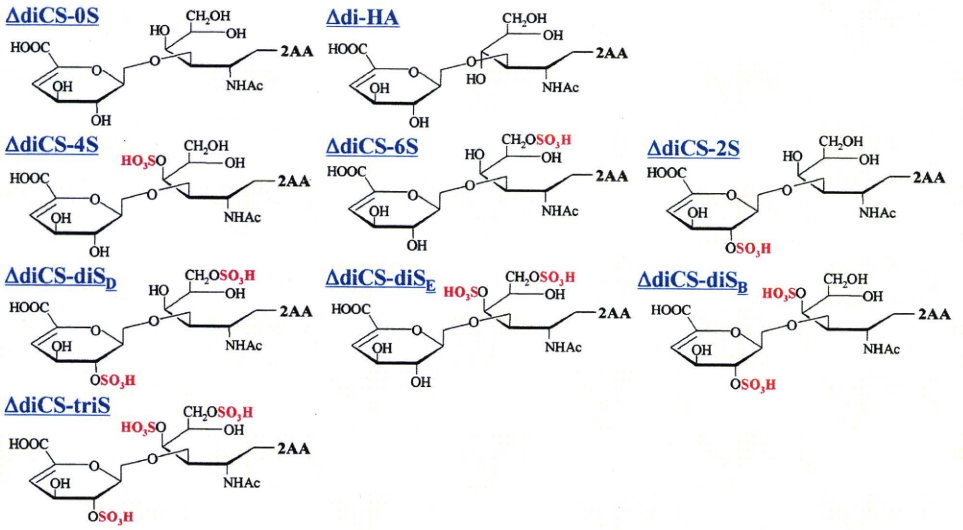


Fig.126 CE analysis of unsaturated disaccharides from HCT116 cell. Analytical conditions; Capillary, fused silica (40 cm x 50 μm.i.d). Buffer, 100 mM Tris-phosphate buffer (pH 3.0). Applied voltage, 25 kV. Injection, pressure method (1.0 psi, 10 sec). Temperature, 25 °C. Detection, He-Cd laser induced fluorescent detection (Ex: 325 nm, Em: 405 nm).

CS and HA unsaturated disaccharides



HS unsaturated disaccharides

Fig.127 Structures of unsaturated disaccharides from CS and HS.

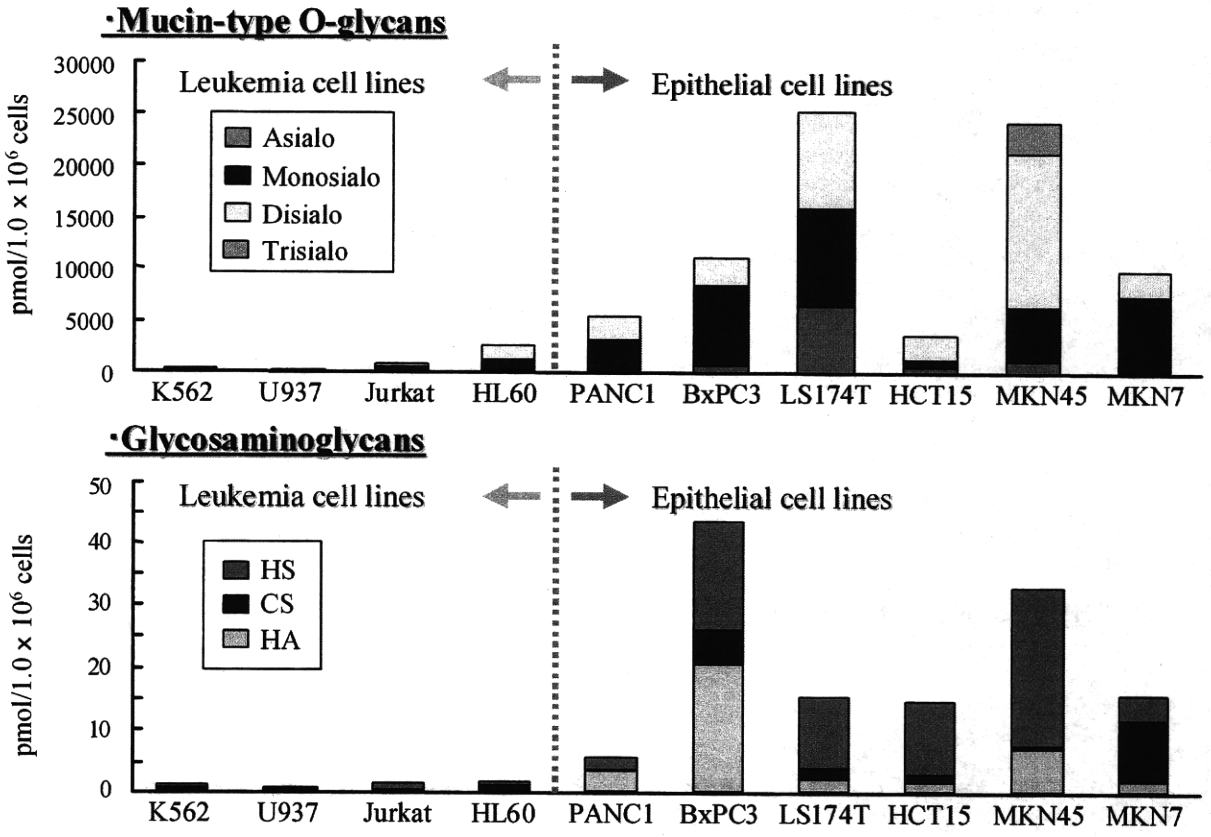


Fig.128 Comparison of the amounts of O-glycans expressed on cancer cells.

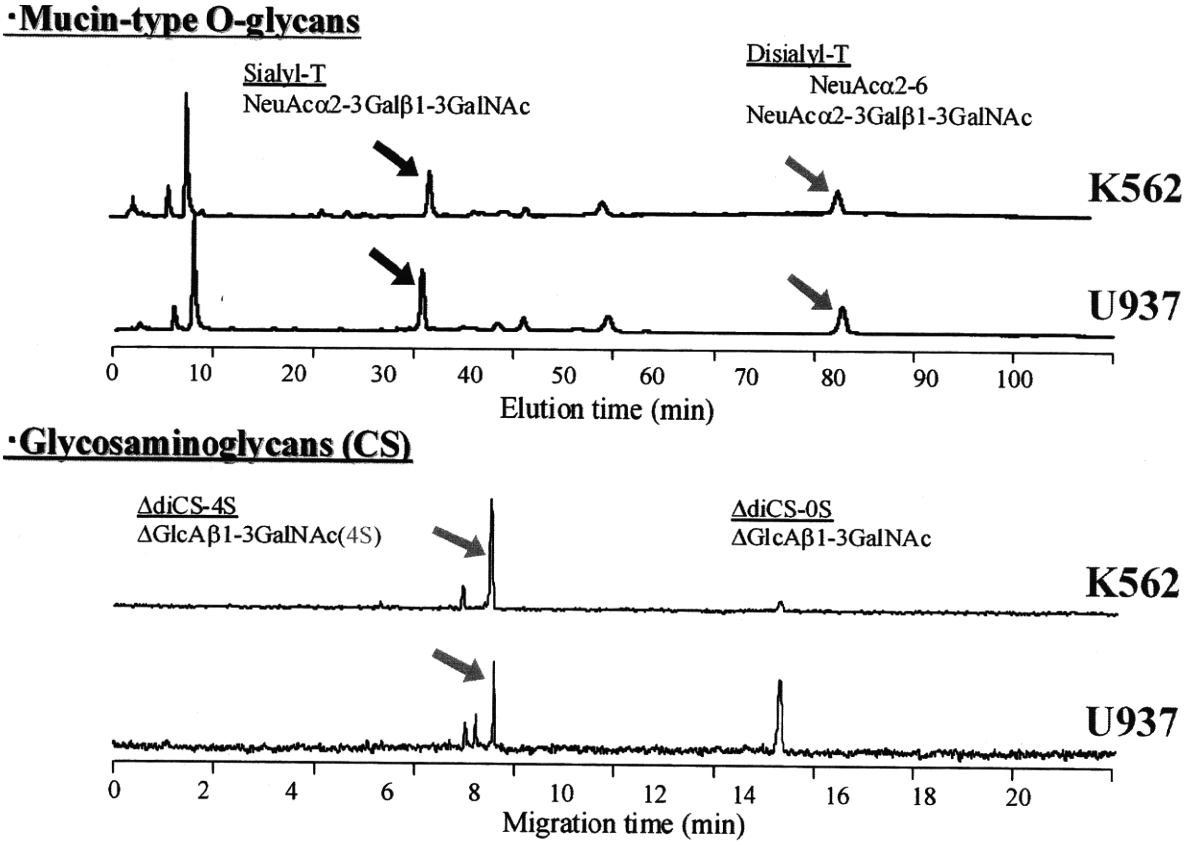


Fig.129 CE analysis of unsaturated disaccharides from K562 and U937 cell. Analytical conditions; Capillary, fused silica (40 cm x 50 μm.i.d). Buffer, 100 mM Tris-phosphate buffer (pH 3.0). Applied voltage, 25 kV. Injection, pressure method (1.0 psi, 10 sec). Temperature, 25 °C. Detection, He-Cd laser induced fluorescent detection (Ex: 325 nm, Em: 405 nm).