

Supplementary Data 1 (1/4) - Distribution of complex N-glycans

No.	exact mass		Structures	Organs						
	theoretical <i>m/z</i>	Scheme		skin <i>[sk]</i>	gill <i>[gi]</i>	brain <i>[br]</i>	heart <i>[he]</i>	liver <i>[li]</i>	intestine <i>[in]</i>	testis <i>[te]</i>
NG1	1661,6					✓		✓	✓	
NG2	1824,9		✓							
NG3			✓							
NG4	1835,9							✓	✓	
NG5	1865,9							✓		
NG6	2029,0		✓	✓						
NG7			✓	✓						
NG8	2040,0			✓	✓				✓	
NG9	2070,0		✓					✓	✓	
NG10								✓		
NG11			✓						✓	
NG12	2081,1		✓	✓	✓	✓	✓	✓	✓	
NG13	2244,1		✓	✓	✓			✓	✓	
NG14			✓	✓				✓	✓	
NG15	2257,1									✓
NG16	2285,2		✓	✓		✓	✓	✓	✓	
NG17			✓						✓	
NG18					✓			✓		
NG19										✓
NG20	2431,2			✓						
NG21	2448,2			✓						
NG22				✓						
NG23	2459,2			✓	✓					
NG24	2461,2									✓
NG25	2489,3			✓		✓	✓	✓		
NG26			✓	✓		✓		✓		

Supplementary Data 1 (2/4)

No.	theoretical <i>m/z</i>	Scheme	<i>skin</i> [sk]	<i>gill</i> [gi]	<i>brain</i> [br]	<i>heart</i> [he]	<i>liver</i> [li]	<i>intestine</i> [in]	<i>testis</i> [te]	<i>ovary</i> [ov]
NG27	2489,3			✓		✓		✓		
NG28			✓			✓				
NG29			✓							
NG30	2605,3		✓	✓	✓	✓		✓		
NG31					✓					
NG32				✓	✓	✓		✓		
NG33			✓	✓		✓				
NG34								✓		
NG35	2622,3			✓						
NG36				✓						
NG37	2635,3			✓						
NG38				✓						
NG39				✓						
NG40				✓						
NG41				✓						
NG42	2663,3		✓	✓		✓	✓	✓	✓	✓
NG43			✓							
NG44	2693,4					✓				
NG45						✓				
NG46	2809,4		✓	✓		✓		✓		
NG47			✓	✓	✓	✓		✓		
NG48					✓					
NG49					✓			✓		
NG50			✓					✓		
NG51								✓		

Supplementary Data 1 (3/4)

No.	theoretical <i>m/z</i>	Scheme	skin [sk]	gill [gi]	brain [br]	heart [he]	liver [li]	intestine [in]	testis [te]	ovary [ov]
NG52	2826,4								✓	
NG53	2850,4		✓	✓						
NG54				✓						
NG55			✓	✓						
NG56			✓							
NG57	2867,4		✓	✓		✓		✓	✓	
NG58	2904,4									✓
NG59	2934,5									✓
NG60	2966,5				✓					
NG61	2983,5							✓		
NG62				✓				✓		
NG63				✓						
NG64								✓		
NG65	2996,5				✓					
NG66	3000,5								✓	
NG67	3013,5							✓		
NG68								✓		
NG69	3054,3			✓					✓	
NG70				✓					✓	
NG71	3071,5							✓	✓	
NG72						✓		✓	✓	
NG73								✓		
NG74	3129,5						✓			
NG75	3170,6			✓						
NG76					✓					
NG77	3187,6		✓	✓		✓	✓	✓	✓	✓
NG78	3187,6							✓		

Supplementary Data 1 (4/4)

No.	theoretical <i>m/z</i>	Scheme	skin [sk]	gill [gi]	brain [br]	heart [he]	liver [li]	intestine [in]	testis [te]	ovary [ov]
NG79	3200,6				✓					
NG80	3200,6				✓					
NG81	3217,6			✓						✓
NG82	3228,6			✓		✓		✓	✓	
NG83				✓				✓		
NG84								✓		
NG85	3245,6		✓	✓		✓	✓	✓	✓	✓
NG86	3361,7					✓				
NG87	3374,7				✓					
NG88						✓				
NG89	3548,8		✓	✓	✓	✓	✓	✓	✓	✓
NG90	3578,8		✓	✓	✓	✓	✓	✓	✓	✓
NG91	3608,8		✓	✓	✓	✓	✓	✓	✓	✓
NG92	3722,8		✓							
NG93	4359,2			✓						
NG94	4737,3			✓						
NG95	4739,3							✓		

Supplementary Data 1 - The inclusion criteria of individual molecules in an organ were (1) observation of corresponding MS signal in three independent experiments and (2) confirmation of individual compounds by MS/MS analysis of permethylated glycans. The structural analysis of N-glycans was mostly based on the CID MS/MS fragmentation patterns of permethylated N-glycans in positive mode, in accordance with knowledge of embryonic N-glycans¹⁻⁵. Graphical representation is based on accepted conventions for N-glycans and monosaccharide nomenclature as follows: yellow circle, Gal; yellow square, GalNAc; blue circle, Glc; blue square, GlcNAc; green circle, Man; red triangle, Fuc; purple diamond, Neu5Ac; light blue diamond, Neu5Gc; green diamond, Kdn.^{6,7} Core Fucose is *de facto* positioned on reducing GlcNAc residue

on C6 carbon as for all vertebrate *N*-glycans. The interglycosidic bonds between monosaccharides of antennae are represented using the conventional positions as in |, C2 position; /, C3 position; —, C4 position; \, C6 position. The respective positions of C3 and C6 branches on internal Man residue of *N*-glycan core are just indicative.

Supplementary References

1. Guérardel, Y., Chang, L.-Y., Maes, E., Huang, C.-J. & Khoo, K.-H. Glycomic survey mapping of zebrafish identifies unique sialylation pattern. *Glycobiology* **16**, 244–257 (2006).
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4. Hanzawa, K., Suzuki, N. & Natsuka, S. Structures and developmental alterations of *N*-glycans of zebrafish embryos. *Glycobiology* **27**, 228–245 (2017).
5. Takemoto, T., Natsuka, S., Nakakita, S.-I. & Hase, S. Expression of complex-type *N*-glycans in developmental periods of zebrafish embryo. *Glycoconj. J.* **22**, 21–26 (2005).
6. *Essentials of Glycobiology*. (Cold Spring Harbor Laboratory Press, 2015).
7. Varki, A. *et al.* Symbol Nomenclature for Graphical Representations of Glycans. *Glycobiology* **25**, 1323–1324 (2015).