

Table S1. Zebrafish primers used for real time PCR.

Gene	Forward	Reverse
Mgat1a	GGTTGTTGTTGTGGAGGACGA	TTGTCATTCCAGGCAGACACG
Mgat1b	ACAAGATCGCCAGGCACTAC	ACAGCGCACGGAAATACTCA
β -actin	AGTTGTCTAACAGGGGAGAGC	TTGTGAGGAGGGCAAAGTGG
elfa	CTTCTCAGGCTGACTGTGC	CCGCTAGCATTACCCTCC

Table S2. Relative abundancies of each of the N-glycans from the Wt AB strain using ESI-MS.

Observed m/z (Na ⁺)	Composition	Relative %
1579.7849	(Hex) ₂ + (Man) ₃ (GlcNAc) ₂	14.4
1783.8851	(Hex) ₃ + (Man) ₃ (GlcNAc) ₂	5.4
1987.9858	(Hex) ₄ + (Man) ₃ (GlcNAc) ₂	3.5
2040.0272	(Hex) ₁ (HexNAc) ₂ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	1.7
2070.0395	(Hex) ₂ (HexNAc) ₂ + (Man) ₃ (GlcNAc) ₂	1.3
2081.0537	(HexNAc) ₃ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	8.9
2173.0784	(Hex) ₂ (HexNAc) ₁ (Fuc) ₂ + (Man) ₃ (GlcNAc) ₂	0.0
2186.0854	(Hex) ₂ (HexNAc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.6
2192.0854	(Hex) ₅ + (Man) ₃ (GlcNAc) ₂	3.4
2244.1277	(Hex) ₂ (HexNAc) ₂ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	3.8
2285.1539	(Hex) ₁ (HexNAc) ₃ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	1.1
2360.1746	(Hex) ₂ (HexNAc) ₁ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	1.9
2390.1850	(Hex) ₃ (HexNAc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	2.8
2396.1844	(Hex) ₆ + (Man) ₃ (GlcNAc) ₂	5.1
2418.2135	(Hex) ₂ (HexNAc) ₂ (Fuc) ₂ + (Man) ₃ (GlcNAc) ₂	1.2
2459.2430	(Hex) ₁ (HexNAc) ₃ (Fuc) ₂ + (Man) ₃ (GlcNAc) ₂	6.8
2489.2510	(Hex) ₂ (HexNAc) ₃ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	0.6
2530.2780	(Hex) ₁ (HexNAc) ₄ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	0.2
2564.2746	(Hex) ₃ (HexNAc) ₁ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	2.4
2600.2838	(Hex) ₇ + (Man) ₃ (GlcNAc) ₂	0.2
2605.3014	(Hex) ₂ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.7
2622.3093	(Hex) ₃ (HexNAc) ₂ (Fuc) ₂ + (Man) ₃ (GlcNAc) ₂	0.3
2646.3256	(Hex) ₁ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	1.7
2704.3674	(Hex) ₁ (HexNAc) ₄ (Fuc) ₂ + (Man) ₃ (GlcNAc) ₂	0.5
2751.3607	(Hex) ₃ (HexNAc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.1
2809.4016	(Hex) ₃ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	1.0
2837.4297	(Hex) ₂ (HexNAc) ₃ (Fuc) ₃ + (Man) ₃ (GlcNAc) ₂	1.4
2850.4258	(Hex) ₂ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.6
2966.4758	(Hex) ₂ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	5.3
2983.4875	(Hex) ₃ (HexNAc) ₂ (Fuc) ₂ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.4
2996.4874	(Hex) ₃ (HexNAc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.6
3024.5083	(Hex) ₂ (HexNAc) ₃ (Fuc) ₂ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.9
3054.5327	(Hex) ₃ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.4
3082.5575	(Hex) ₂ (HexNAc) ₄ (Fuc) ₃ + (Man) ₃ (GlcNAc) ₂	1.2
3095.5615	(Hex) ₂ (HexNAc) ₄ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.1
3170.5761	(Hex) ₃ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	8.1
3183.5907	(Hex) ₃ (HexNAc) ₅ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	0.2
3200.5907	(Hex) ₄ (HexNAc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.8
3269.6416	(Hex) ₂ (HexNAc) ₄ (Fuc) ₂ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.4
3344.6614	(Hex) ₃ (HexNAc) ₂ (Fuc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.8
3374.6762	(Hex) ₄ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	3.9
3385.6846	(Hex) ₂ (HexNAc) ₃ (Fuc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.1
3387.6935	(Hex) ₄ (HexNAc) ₅ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	0.5
3456.7318	(Hex) ₂ (HexNAc) ₄ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.2
3514.7686	(Hex) ₂ (HexNAc) ₅ (Fuc) ₂ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.1
3533.7472	(Hex) ₅ (HexNAc) ₄ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	1.1
3548.7659	(Hex) ₄ (HexNAc) ₂ (Fuc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	2.0
3589.7845	(Hex) ₃ (HexNAc) ₃ (Fuc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.2
3619.8082	(Hex) ₄ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.2
3776.8773	(Hex) ₃ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₃ + (Man) ₃ (GlcNAc) ₂	0.6
4185.0789	(Hex) ₅ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₃ + (Man) ₃ (GlcNAc) ₂	0.5
4400.1875	(Hex) ₄ (HexNAc) ₄ (Fuc) ₂ (NeuAc) ₃ + (Man) ₃ (GlcNAc) ₂	0.4
4587.2797	(Hex) ₄ (HexNAc) ₄ (Fuc) ₁ (NeuAc) ₄ + (Man) ₃ (GlcNAc) ₂	0.5
4948.4513	(Hex) ₄ (HexNAc) ₄ (Fuc) ₁ (NeuAc) ₅ + (Man) ₃ (GlcNAc) ₂	0.4

Table S3. Relative abundancies of each of the N-glycans from the Mgat1b^{-/-} strain.

Observed m/z (Na ⁺)	Composition	Relative %
1579.7839	(Hex) ₂ + (Man) ₃ (GlcNAc) ₂	30.1
1783.8842	(Hex) ₃ + (Man) ₃ (GlcNAc) ₂	7.3
1835.9242	(HexNAc) ₂ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	0.6
1987.9845	(Hex) ₄ + (Man) ₃ (GlcNAc) ₂	3.8
2040.0259	(Hex) ₁ (HexNAc) ₂ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	1.4
2081.0530	(HexNAc) ₃ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	8.4
2186.0844	(Hex) ₂ (HexNAc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.4
2192.0840	(Hex) ₅ + (Man) ₃ (GlcNAc) ₂	3.1
2244.1257	(Hex) ₂ (HexNAc) ₂ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	2.6
2285.1524	(Hex) ₁ (HexNAc) ₃ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	0.6
2360.1725	(Hex) ₂ (HexNAc) ₁ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.9
2396.1837	(Hex) ₆ + (Man) ₃ (GlcNAc) ₂	3.6
2418.2080	(Hex) ₂ (HexNAc) ₂ (Fuc) ₂ + (Man) ₃ (GlcNAc) ₂	0.8
2459.2427	(Hex) ₁ (HexNAc) ₃ (Fuc) ₂ + (Man) ₃ (GlcNAc) ₂	5.3
2489.2513	(Hex) ₂ (HexNAc) ₃ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	0.4
2564.2743	(Hex) ₃ (HexNAc) ₁ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	1.8
2605.2994	(Hex) ₂ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	1.1
2646.3221	(Hex) ₁ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	1.0
2809.3995	(Hex) ₃ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	1.0
2837.4269	(Hex) ₂ (HexNAc) ₃ (Fuc) ₃ + (Man) ₃ (GlcNAc) ₂	0.9
2850.4221	(Hex) ₂ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.4
2966.4748	(Hex) ₂ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	4.2
2996.4853	(Hex) ₃ (HexNAc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.8
3024.5031	(Hex) ₂ (HexNAc) ₃ (Fuc) ₂ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.6
3054.5302	(Hex) ₃ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.4
3082.5574	(Hex) ₂ (HexNAc) ₄ (Fuc) ₃ + (Man) ₃ (GlcNAc) ₂	0.4
3095.5583	(Hex) ₂ (HexNAc) ₄ (Fuc) ₁ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	0.1
3140.5490	(Hex) ₂ (HexNAc) ₂ (Fuc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.6
3170.5752	(Hex) ₃ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	6.9
3200.5856	(Hex) ₄ (HexNAc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	1.1
3211.5953	(Hex) ₂ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.6
3344.6561	(Hex) ₃ (HexNAc) ₂ (Fuc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.8
3374.6761	(Hex) ₄ (HexNAc) ₂ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	2.8
3387.6880	(Hex) ₄ (HexNAc) ₅ (Fuc) ₁ + (Man) ₃ (GlcNAc) ₂	0.2
3415.6970	(Hex) ₃ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	0.6
3533.7391	(Hex) ₅ (HexNAc) ₄ (NeuAc) ₁ + (Man) ₃ (GlcNAc) ₂	1.7
3548.7633	(Hex) ₄ (HexNAc) ₂ (Fuc) ₂ (NeuAc) ₂ + (Man) ₃ (GlcNAc) ₂	2.4
3776.8770	(Hex) ₃ (HexNAc) ₃ (Fuc) ₁ (NeuAc) ₃ + (Man) ₃ (GlcNAc) ₂	0.4
4587.2754	(Hex) ₄ (HexNAc) ₄ (Fuc) ₁ (NeuAc) ₄ + (Man) ₃ (GlcNAc) ₂	0.2
4948.4490	(Hex) ₄ (HexNAc) ₄ (Fuc) ₁ (NeuAc) ₅ + (Man) ₃ (GlcNAc) ₂	0.2

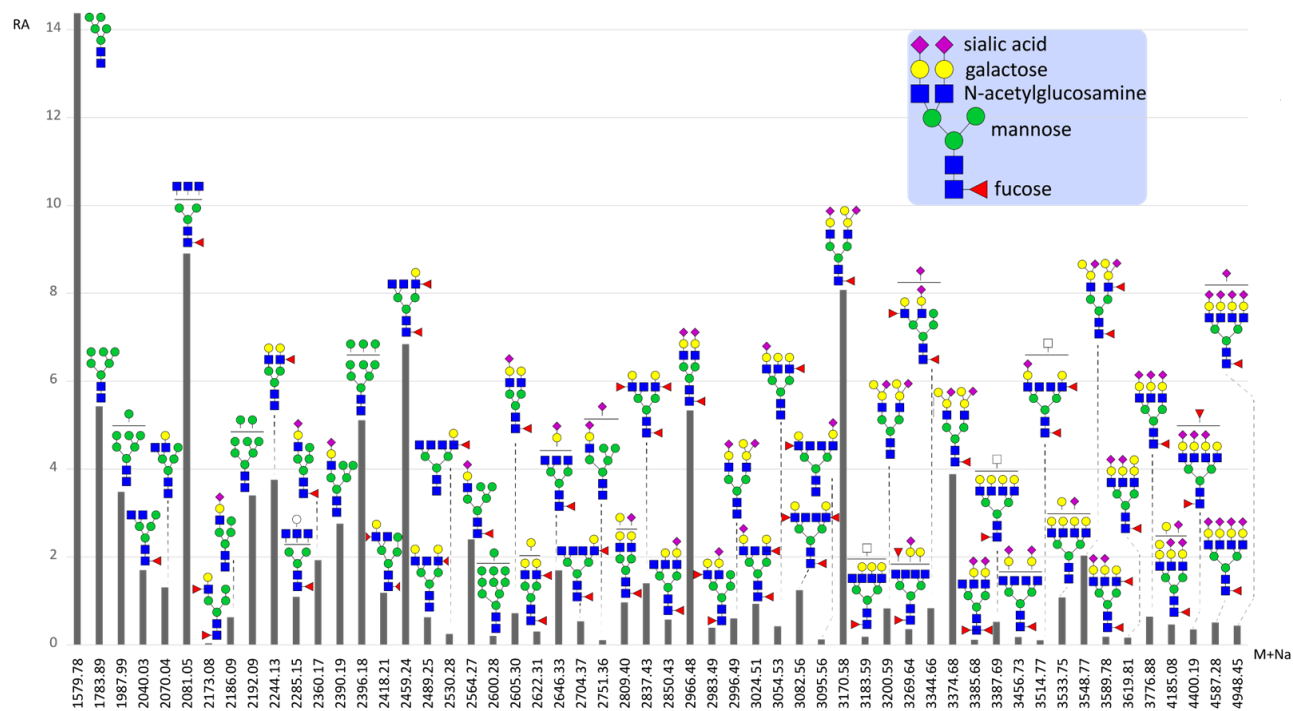


Figure S1. LC-ESI-MS intensities of the permethylated N-glycans derived from the Wt AB zebrafish strain.

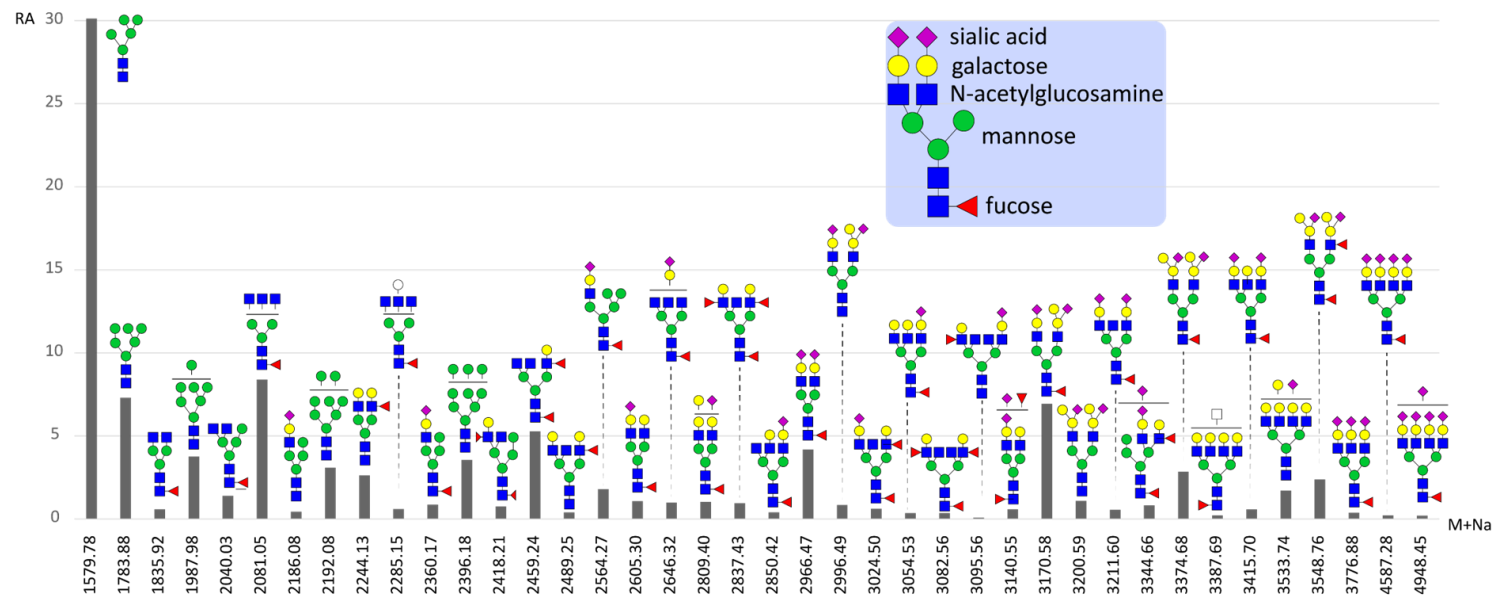


Figure S2. LC-ESI-MS intensities of the permethylated N-glycans derived from the *Mgat1b*^{-/-} zebrafish strain.

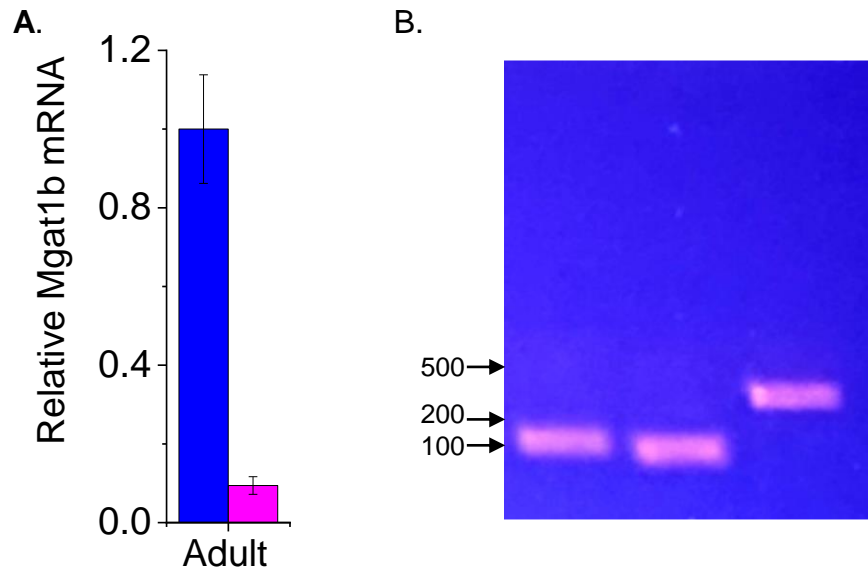


Figure S3. Comparing relative levels of Mgat1b transcripts from adult Wt AB and Mgat1b^{-/-}zebrafish strains. Transcript levels were normalized to elfa (A). RT-PCR products run on agarose gel (B). The sizes of the fragments were as follows: Mgat1b, 129 bp; β -actin, 95 bp; elfa, 358 bp.

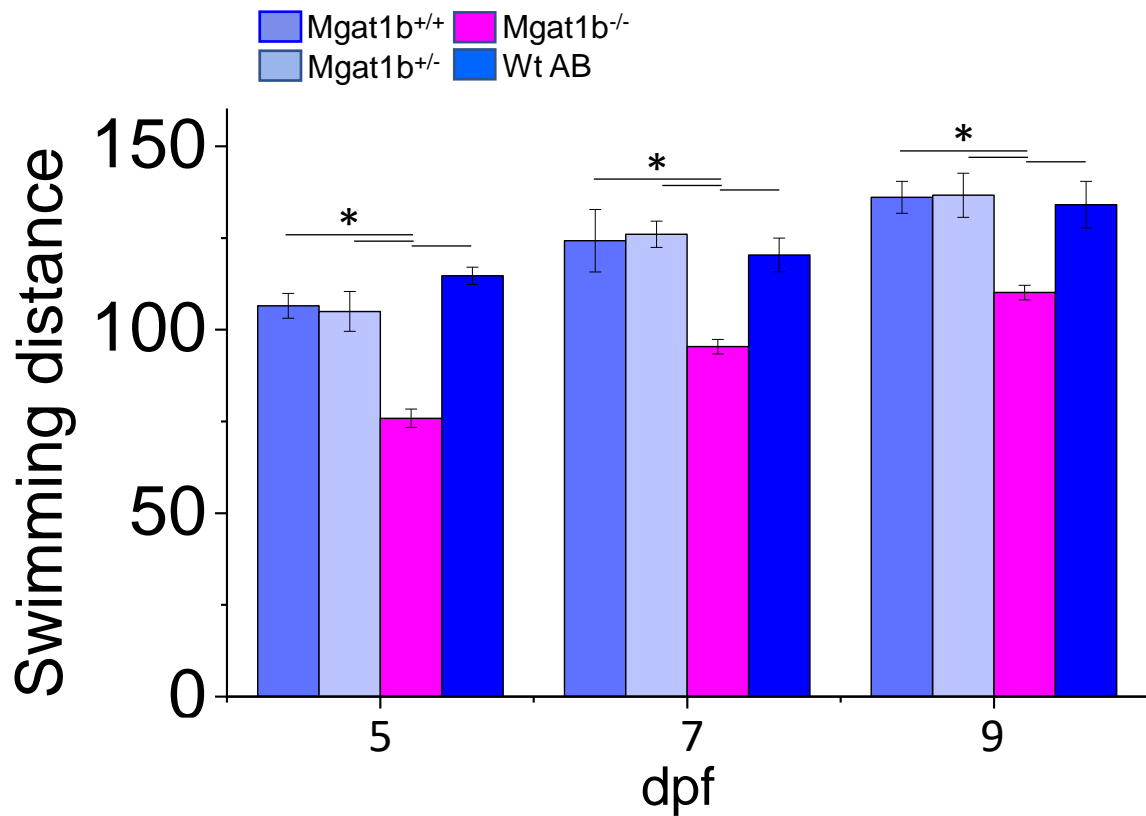


Figure S4. Swimming locomotor activity of Wt AB and the various Mgat1b zebrafish strains. Data are presented as mean \pm SEM, $n \geq 21$ and were compared by one-way ANOVA with Holmes-Bonferroni adjustments, $*p < 0.05$).