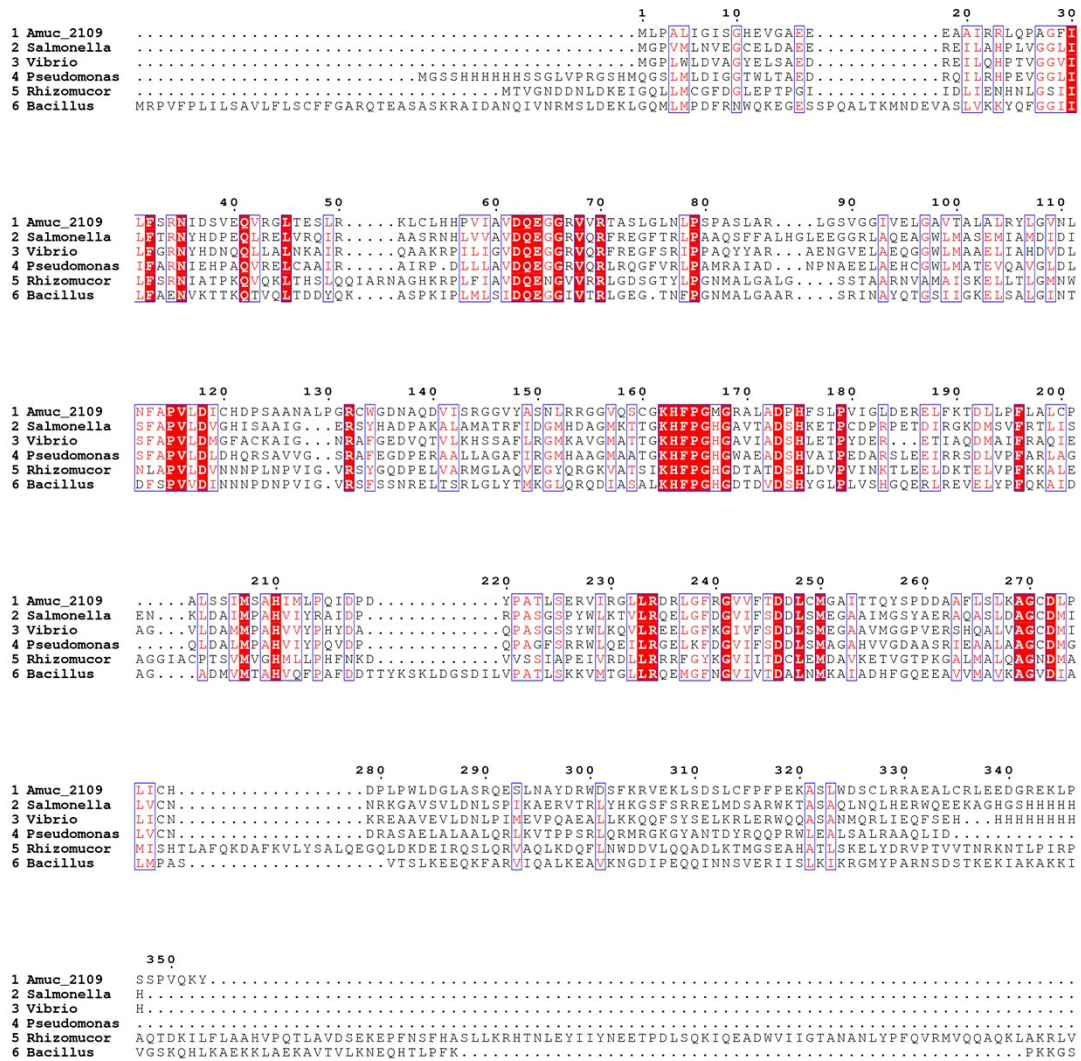


Supplement Figures

Fig. S1 Sequence alignment of a region surrounding the acid/base residue of selected family 3 hexosaminidases.

Fig. S1



Supplement Tables

Tab. S1 Specific activity of Amuc_2109 and mutant toward pNP- β -GlcNAc

Tab. S2 Pathological scores

Tab. S3 Disease activity index (DAI) scoring system

Tab. S4 Oligonucleotide primers used for qRT-PCR

Tab. S1

Enzyme	Substrate	Specific activity (U/mg)
Wild-type Amuc_2109	pNP- β -GlcNAc	14.9 \pm 0.3
D246A	pNP- β -GlcNAc	None Detected
D246N	pNP- β -GlcNAc	None Detected

Tab. S2

score	Inflammation	Mucosal damage	Crypt damage	Range of lesions (%)
0	None	None	None	0
1	Mild	Mucus layer	1/3	1-25
2	Moderate	Submucosa	2/3	26-50
3	Severe	Muscularis and serosa	100%	51-75
4	—	—	100%+epithelium loss	76-100

Tab. S3

DAI score	Weight loss (%)	Stool consistency	Occult/gross bleeding
0	None	Normal	Negative hemocult
1	1-5	Soft but still formed	
2	6-10	Soft	Positive hemocult
3	11-18	Very soft; wet	Blood trace in stool visible
4	>18	Watery diarrhea	Gross rectal bleeding

Tab. S4

Gene	5'-3' Primer sequence
ZO-1	F: TCTTCCATCATTTCGCTGTGT R: TCTGAAACCATCAAGTCCACA
Occludin	F: TCACTTTTCCTGCGGTGACT R: GGGAACGTGGCCGATATAATG
claudin-1	F: ATGCAAAGATGTTTTGCCACAG R: TACAAATCCCATTGCAGCCC
TNF- α	F: ATGAGAAGTTCCCAAATGGC R: CTCCACTTGGTGGTTTGCTA
IL-1 β	F: TGCCACCTTTTGACAGTGATG R: AAGGTCCACGGGAAAGACAC
IL-6	F: GGCCCTTGCTTCTCTTCG R: ATAATAAAGTTTTGATTATGT;
NLRP3	F: TGGAAGATTACCCGCCCGAGAA R: TCCAGCAAACCCATCCACTCTTC
Caspase-1	F: TGAAAGACAAGCCCAAGGTGATC R: CAATGAAAAGTGAGCCCCTGAC
ASC	F: CATCTTGTCTTGGCTGGTGGTCT R: CGGACACGGACAGGATTGACA
β -actin	F: TGTCCACCTTCCAGCAGATGT R: AGCTCAGTAACAGTCCGCCTAGA