

**Figure S8.** Maximum-likelihood tree for the Gns (N-acetyl-D-glucosamine specific mucin-desulfating sulfatase) proteins. Predicted sulfatase from *Bacteroides ovatus* SD CC 2a used as outgroup is shown by gray. Genes chromosomally clustered with the *nagKP* operon are shown by green, genes chromosomally clustered with the gene(s) for beta-hexosaminidase are shown by blue. The SEED identifiers for proteins are shown; for their sequences, see the file Sequences S1 in the Supplementary materials. Genome names are shown in brackets.

