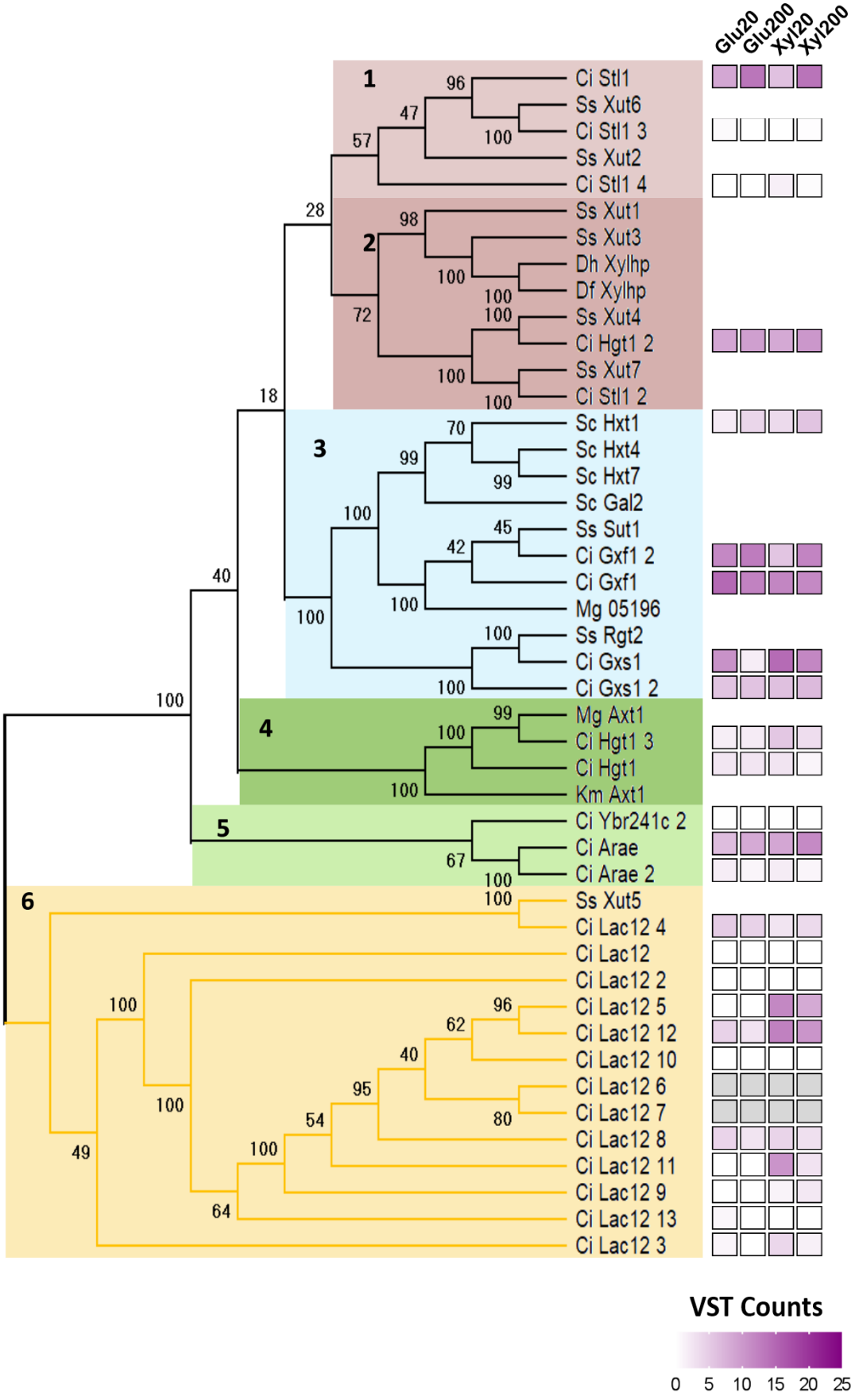
Additional file 3.



Additional file 3. Phylogenetic tree of putative sugar transporters from *C. intermedia* and other pentose-assimilating yeasts. Putative sugar transporters in the *C. intermedia* CBS 141442 genome were tracked using protein sequences from characterized yeast transporters (*S. cerevisiae* Hxt1 and Stl1; *S. stipitis* Sut1 and Xut1; *C. intermedia* Gxs1 and Gxf1) as probes. Additionally, transporters reported as capable of xylose uptake from other yeast species were added to the dataset. A total of 45 sequences were aligned, and then used to construct a ML phylogenetic tree using the maximum-likelihood method with bootstrap numbers indicated at each branching point. The accession numbers are listed in the table below. Our analysis revealed a tree with 6 distinct branches of transporters. Branches 1 and 2 contain five transporters from *C. intermedia*, some of them closely related to several of the Xut transporters from *S. stipitis* that are known to transport xylose [1-4]. The previously identified Gxf1 and Gxs1 and novel homologs Gxf1_2 and Gxs1_2 from *C. intermedia* fall into branch 3, together with Hxt1, 4 and 7 and Gal2 from *S. cerevisiae* and Sut1 from *S. stipitis*, all of which are previously shown to transport xylose but having a much higher affinity for glucose over xylose [3, 5]. Branch 5 contains five *C. intermedia* genes for transporters that show similarities to either the arabinose/xylose transporters in *M. guilliermondii* and *K. marxianus* [6] or the putative arabinose-proton symporter in *S. stipitis* [2], and branch 6 contains 13 *C. intermedia* genes where the corresponding proteins show homology to permeases selective for disaccharides such as lactose and cellobiose as well as the monosaccharide galactose [7]. Normalized expression of *C. intermedia* protein-encoding genes is represented in all growth conditions using variance-stabilized counts (VST). Proteins are preceded by a prefix identifying the yeast species. Sc – *Saccharomyces cerevisiae*; Ss - *Scheffersomyces stipitis*; Sp - *Spathaspora passalidarum*; Ci – *Candida intermedia*; Km – *Kluyveromyces marxianus;* Mg - *Meyerozyma guilliermondii*; Dh – *Debaryomyces hansenii*; Df - *Debaryomyces fabryi.*

Accession numbers for *C. intermedia* CBS 141442 putative MFS sugar transporters and known xylose-transporters from other yeast species. References for reported xylose uptake activity are included.

Gene	Accession Number	Reference
Sc Stl1	NP_010825.3	
Sc Hxt1	NP_011962.1	Hamacher et al. 2002
Sc Hxt4	NP_011960.2	Hamacher et al. 2002
Sc Hxt7	NP_010629.3	Hamacher et al. 2002; Young et al. 2011
Sc Gal2	NP_013182.1	Hamacher et al. 2002; Young et al. 2011
Ss Xut1	XP_001385583.1	Young et al. 2011
Ss Xut2	XP_001387242.2	Du et al. 2010
Ss Xut3	XP_001387138.1	Young et al. 2011
Ss Xut4 (Hgt3)	XP_001386715.1	Ma et al. 2012; Moon et al. 2013
Ss Xut5	XP_001385962.2	Moon at al. 2013
Ss Xut6 (Stl12)	XP_001386589.1	Ma et al. 2012; Moon et al. 2013
Ss Xut7 (Stl13)	XP_001387067.1	Moon et al. 2013
Ss Sut1	XP_001387898.1	Katahira et al. 2008
Ss Rgt2	XP_001386588.1	Young et al. 2014
Dh Xylhp	XP_458169.1	Young et al. 2011; Ferreira et al. 2013
Df Xylhp	AAR06925.2	Ferreira et al. 2013
Mg 05196	XP_001482176.1	Wang et al. 2015
Mg Axt1	XP_001482096.1	Knoshaug et al. 2015
Km Axt1	XP_022674058.1	Knoshaug et al. 2015
Ci Hgt1	SGZ50992.1	
Ci Hgt1_2	SGZ51695.1	
Ci Hgt1_3	SGZ49593.1	
Ci GXF1	SGZ57542.1	Leandro et a. 2006; Young et al. 2011
Ci GXF1_2	SGZ47691.1	
Ci GXS1	SGZ53008.1	Leandro et a. 2006; Young et al. 2011
Ci GXS1_2	SGZ50173.1	
Ci Stl1	SGZ58446.1	
Ci Stl1_2	SGZ47012.1	
Ci Stl1_3	SGZ46314.1	
Ci Stl1_4	SGZ57759.1	
Ci Lac12	SGZ47224.1	
Ci Lac12_2	SGZ49661.1	
Ci Lac12_3	SGZ48118.1	

Ci Lac12_4	SGZ57765.1
Ci Lac12_5	SGZ55027.1
Ci Lac12_6	SGZ54820.1
Ci Lac12_7	SGZ51011.1
Ci Lac12_8	SGZ47318.1
Ci Lac12_9	SGZ57769.1
Ci Lac12_10	SGZ54727.1
Ci Lac12_11	SGZ55091.1
Ci Lac12_12	SGZ51023.1
Ci Lac12_13	SGZ47317.1
Ci Ybr241c_2	SGZ47420.1
Ci Arae	SGZ57929.1
Ci Arae_2	SGZ47799.1

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