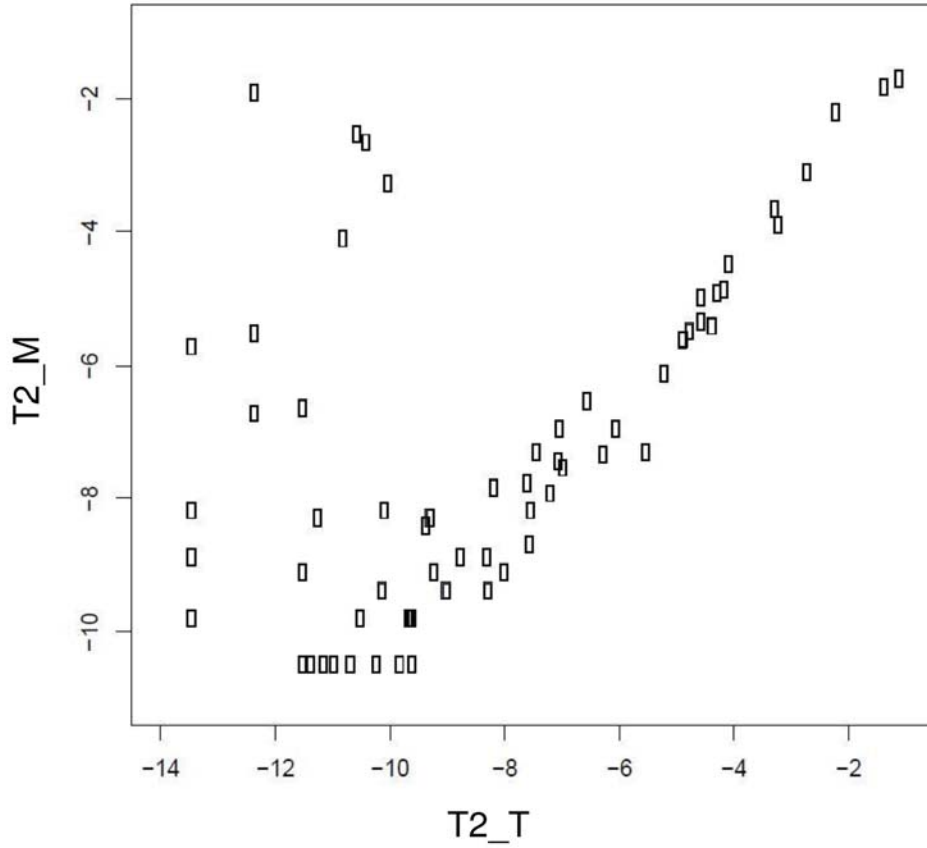


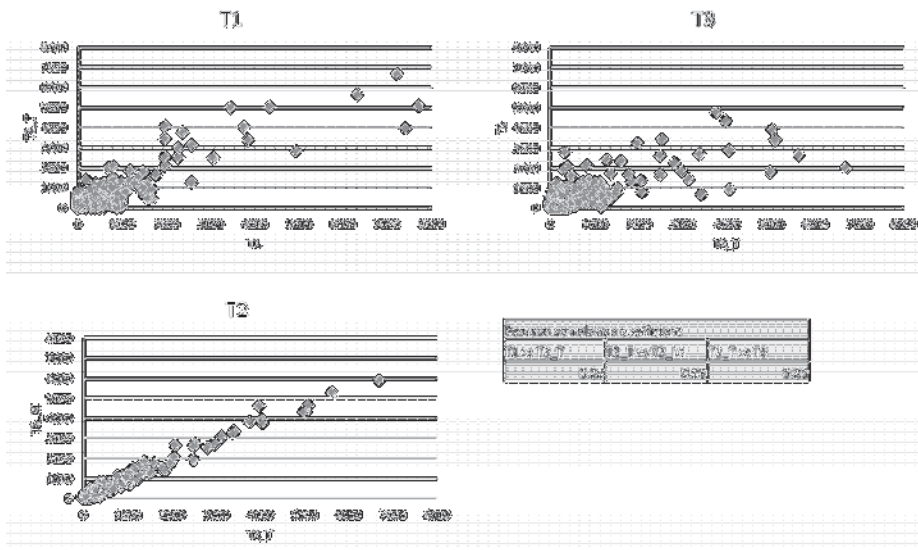
401 **Table and Figure Legends**

402 **Supplementary Figure 1.** Log relative abundances of common genera between 2D_1 and 2D_2.

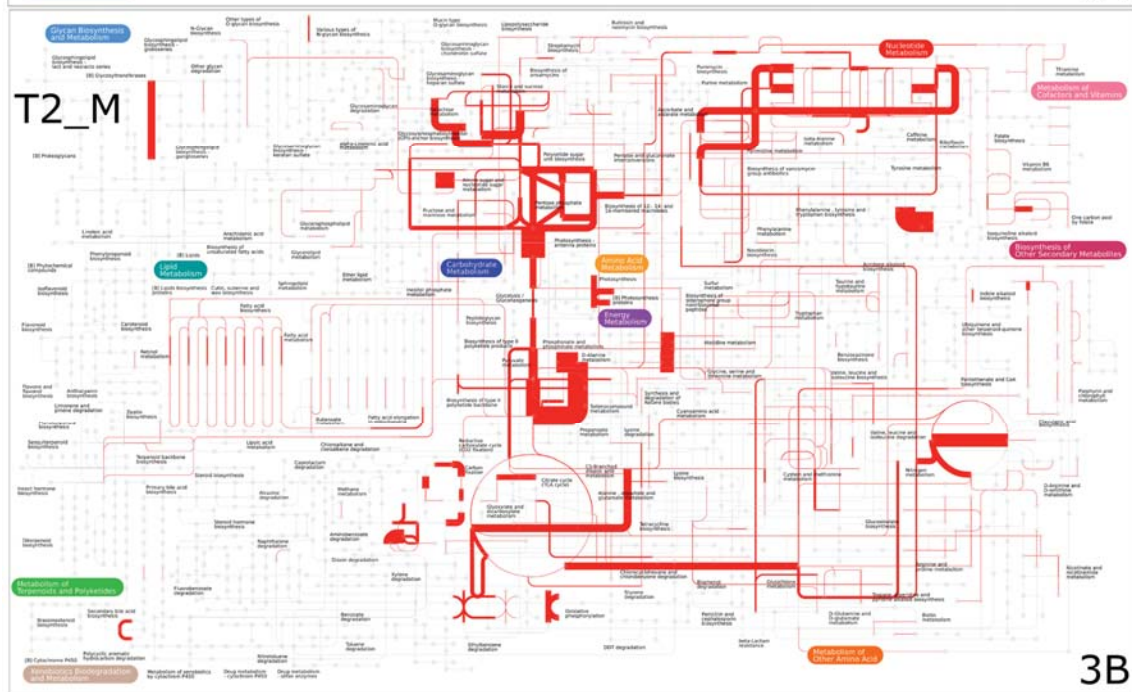
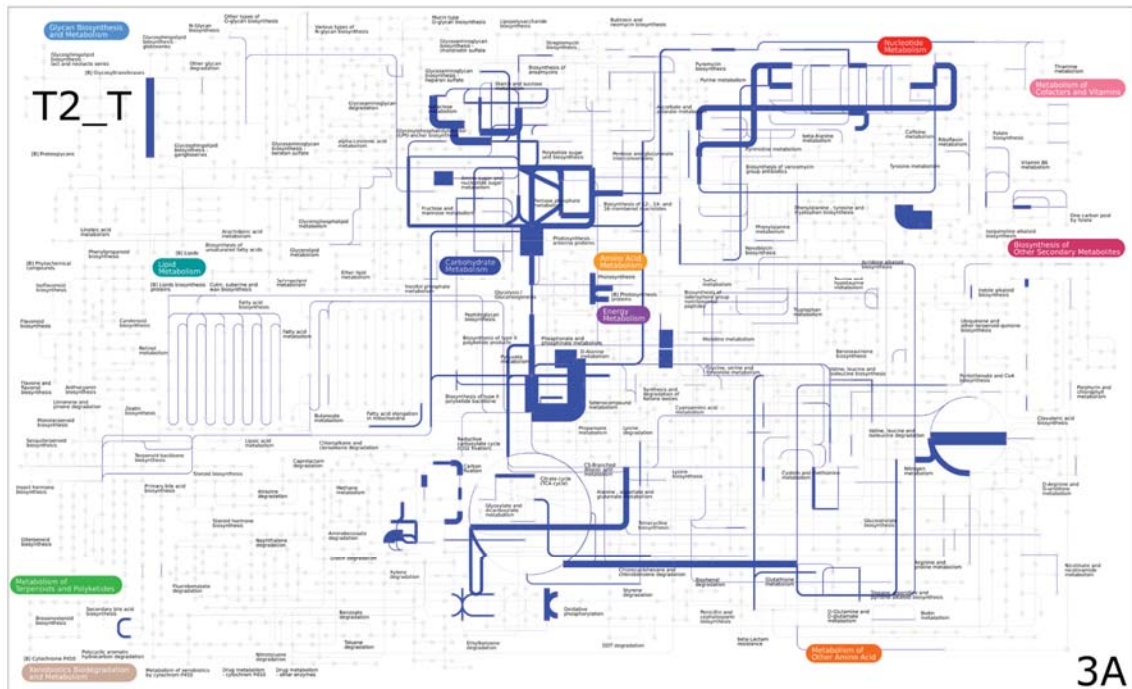


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404 **Supplementary Figure 2.** Correlations of the expression pattern between the samples.



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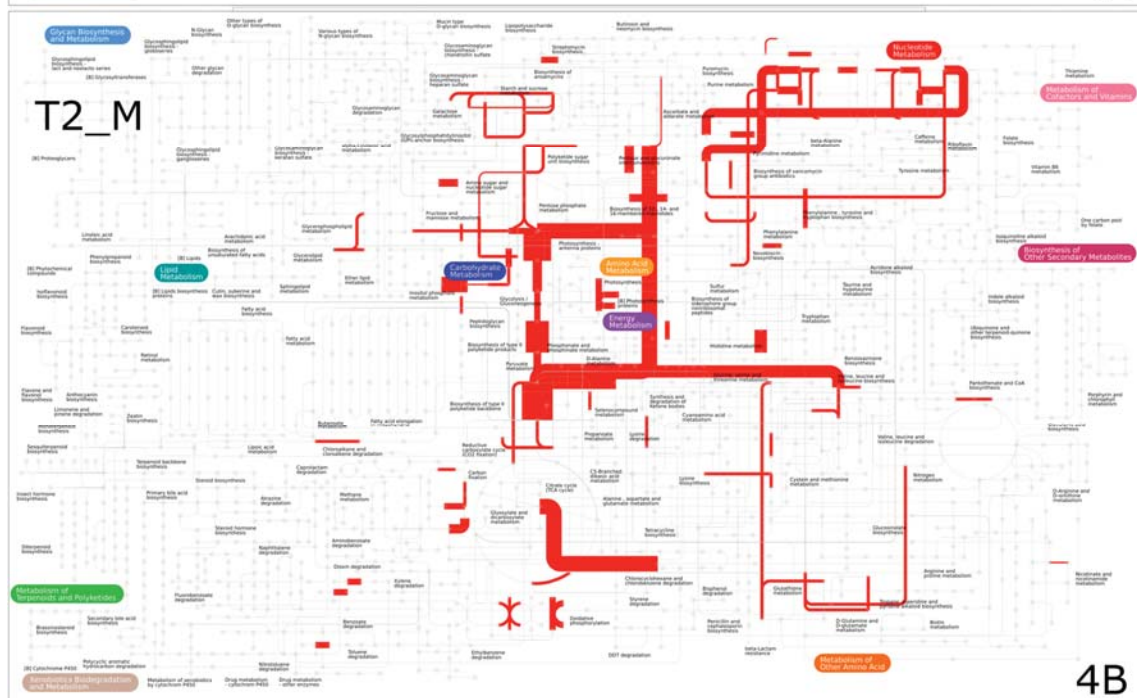
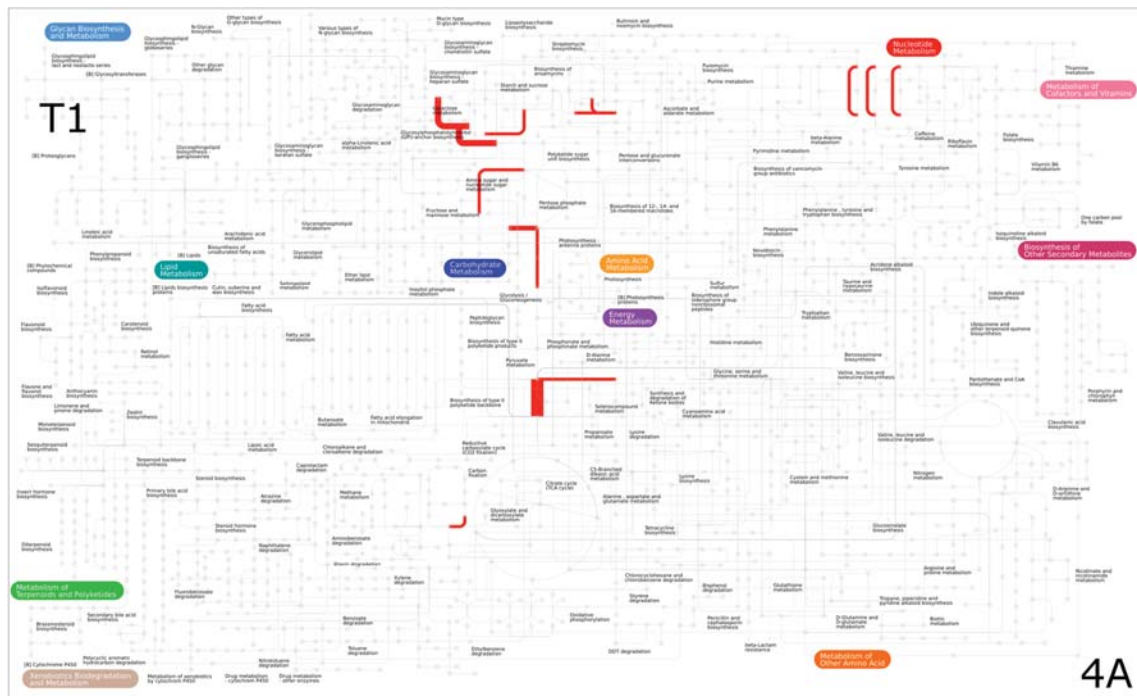


410 **Supplementary Table 1.** List of identified glycosylases in sample T2_M

K01176	amyA, malS; alpha-amylase;
K01182	oligo-1,6-glucosidase;
K01186	NEU1; sialidase-1;
K01187	malZ; alpha-glucosidase;
K01190	lacZ; beta-galactosidase;
K01191	alpha-mannosidase;
K01192	MANBA, manB; beta-mannosidase;
K01193	sacA; beta-fructofuranosidase;
K01197	hya; hyaluronoglucosaminidase;
K01198	xynB; xylan 1,4-beta-xylosidase;
K01200	pullulanase;
K01205	NAGLU; alpha-N-acetylglucosaminidase;
K01206	FUCA; alpha-L-fucosidase;
K01207	nagZ; beta-N-acetylhexosaminidase;
K01209	abfA; alpha-N-arabinofuranosidase;
K01210	glucan 1,3-beta-glucosidase;
K01215	dexB; glucan 1,6-alpha-glucosidase;
K01220	lacG; 6-phospho-beta-galactosidase;
K01223	bglA; 6-phospho-beta-glucosidase;
K01227	mannosyl-glycoprotein endo-beta-N-acetylglucosaminidase;
K01232	glvA; maltose-6'-phosphate glucosidase;
K01234	npIT; neopullulanase;
K01239	iunH; purine nucleosidase;
K01240	URH1; uridine nucleosidase;
K01243	mtnN, mtn, pfs; adenosylhomocysteine nucleosidase;
K01246	tag; DNA-3-methyladenine glycosylase I;
K01250	rihA; pyrimidine-specific ribonucleoside hydrolase;
K01811	yclI; alpha-D-xyloside xylohydrolase;
K02438	treX, glgX; glycogen operon protein;
K03332	fruA; fructan beta-fructosidase;
K03575	mutY; A/G-specific adenine glycosylase;
K03648	UNG, UDG; uracil-DNA glycosylase;
K03660	OGG1; N-glycosylase/DNA lyase;
K05349	bglX; beta-glucosidase;
K05520	pfpl; protease I;
K05546	GANAB; alpha 1,3-glucosidase;
K06113	abnA_B; arabinan endo-1,5-alpha-L-arabinosidase;
K07407	galA, rafA; alpha-galactosidase;
K08309	slt; soluble lytic murein transglycosylase;
K12111	ebgA; evolved beta-galactosidase subunit alpha;
K12308	bgaB, lacA; beta-galactosidase;
K12309	GLB1, ELNR1; beta-galactosidase;
K12373	HEXA_B; hexosaminidase;
K15532	yteR, yesR; unsaturated rhamnogalacturonyl hydrolase;

NCOAT, MGEA5; protein O-GlcNAcase / histone
 K15719 acetyltransferase
 K15921 xynD; arabinoxylan arabinofuranohydrolase;
 K15923 AXY8, FUC95A, afcA; alpha-L-fucosidase 2

411 **Supplementary Figure 4.** Overall expression of mRNA functions from LGG on the visualization tool
 412 iPATH2.0.



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