

**Supporting Information Table 4. Levels of metabolites at  $T_{-0.5}$ ,  $T_0$  and  $T_2$  in *B. subtilis* 168 cells**

Metabolites of level (area/ml OD) above 10 for cations and 1 for anions are listed. The compounds which are presumed the same metabolites are lined up. A 10-fold increase (blue box) or decrease (red) in level of metabolite versus that at  $T_{0.5}$  is indicated.

From molecular weight,  $^{13}\text{C}$  contributions<sup>25</sup> and LIGAND database<sup>22</sup>, compound names are designated in parentheses and estimated formulas ranking first are listed.

Compound	$T_{-0.5}$ level (area/ $\mu\text{l}$ OD)	$T_0$ level (area/ $\mu\text{l}$ OD)	$T_2$ level (area/ $\mu\text{l}$ OD)	Compound name or estimated formula
UC76, 0.7037		22.4	19.5	10.8 Gly
UC84, 0.9082		119.0	78.6	59.3 (Piperidine)
UC90, 0.6160				22.0 $\beta$ -Ala
UC90, 0.7611	258.8	91.5	48.6	Ala
UC95, 0.3449	25.4	10.3	3.0	(N-Methylpyridinium)
UC102, 0.9067	195.8	131.4	87.8	C4 H7 N O2
UC103, 0.4236	11.5	12.3	8.6	Cadaverine
UC104, 0.5830	176.8	245.8	479.1	C4 H9 N O2
UC104, 0.6445			10.0	GABA
UC106, 0.8400	44.8	30.9	16.7	Ser
UC109, 0.3447	76.2	41.9	28.5	(Phenylethylamine)
UC114, 0.6194	1122.0	792.4	619.0	Creatinine
UC116, 0.9040		398.3	243.5	Pro
UC117, 0.9431	21.7	13.2	17.0	(5-Aminopentanamide)
UC118, 0.8427	170.3	116.4	16.3	Val
UC120, 0.8471	49.9	55.0		HomoSer
UC120, 0.8818	241.0	330.3		Thr
UC129, 0.7414	18.7		123.1	(L-Lysine 1,6-lactam)
UC130, 0.8602			111.4	C6 H11 N O2
UC130, 0.8998	58.9	13.8	48.1	(Oxoproline)
UC130, 0.9071	347.5	234.1	161.7	C6 H11 N O2
UC131, 0.4404	13.1	13.5	18.3	C5H14N4, C5H10N2O2, C6H10O3 or C6H14N2O
UC132, 0.7481	476.0	308.8	203.6	Creatine
UC132, 0.8583	140.0	58.4		Ile
UC132, 0.8665	383.1	230.6	14.9	Leu
UC132, 0.10053			21.9	OH-Pro
UC133, 0.5794	10.1			Orn
UC134, 0.9667	150.8	211.1	57.0	Asp
UC137, 0.9311	17.0	8.5	22.8	Hypoxanthine
UC138, 0.7010	40.8	21.7	17.6	Tyramine
UC139, 0.7012	32.0			Urocanate
UC140, 0.9401			22.8	(6-Hydroxynicotinate)
UC140, 0.9464	43.8	52.2	19.3	(N-Monomethyl-2-aminoethylphosphonate)
UC144, 0.6999	269.7	319.3	131.6	[4-Methyl-5-thiazolethanol)
UC146, 0.3850	17.5		13.5	Spermidine
UC146, 0.6854	98.7	146.3	862.2	(Amino-oxohexanoate)
UC147, 0.5848	34.1	38.0	329.5	Lys
UC147, 0.9001	505.5	101.9	387.1	Gln
UC148, 0.7704	144.7	266.2	108.8	C5 H9 N O4
UC148, 0.9074	6837.1	4237.5	3099.8	Glu
UC150, 0.8980	55.0	42.2	25.9	Met
UC150, 0.8944		33.7	535.5	(Dihydroxyindole)
UC153, 0.3442	37.5	17.8	14.3	Xanthine
UC156, 0.6191	17.7	14.4		His
UC158, 0.7708	177.1	49.9	18.2	(Homostachydrine)
UC160, 1.1189	39.6	42.9	10.1	(5-Acetamidopentanoate)
UC161, 0.7046		11.8	13.3	C7 H17 N2 O2 or C6H11NO4
UC162, 0.7201	3143.2	2741.8	7868.7	L-Carnitine
UC166, 0.9280	64.4	52.7	89.8	Phe
UC169, 0.9006	55.9	25.5	54.6	(N-Trimethyl-2-aminoethylphosphonate)
UC170, 0.9079	332.8	333.7	196.3	(L-Cysteate)
UC173, 0.7610	17.0	19.2	42.0	(Acetylglutamine)
UC175, 0.6043	182.3	147.9	61.9	Arg
UC175, 0.7996			37.2	N-Acetyl-L-ornithine
UC176, 0.9203	75.4	68.4	217.2	Cit
UC182, 0.9511	12.1		29.2	Tyr
UC189, 0.3461	14.8	10.0	8.0	C8 H18 N4 O
UC189, 0.6085	10.4	11.7	28.8	C9 H20 N2 O2 or C8H15N2O3
UC189, 0.8215	9.5	8.1	225.6	C9 H20 N2 O2 or C8H15N2O3
UC189, 0.9554	15.0	8.6	194.9	C9 H20 N2 O2
UC190, 0.9287			124.1	(L-Homocitrulline)
UC191, 0.7474	12.0		42.8	2,6-Diaminoheptanedioate
UC202, 0.7834	4396.9	1528.0	459.2	(Heteropyrithiamine)
UC205, 0.9023			10.7	Trp
UC208, 0.8105	30.7	32.5	39.2	C10 H9 N O4
UC214, 0.7698	165.8	132.5	99.3	Phenazopyridine
UC218, 0.8125	8.8		151.9	( $\beta$ -Alanyl-L-lysine)
UC219, 0.8054			16.0	C9 H18 N2 O4
UC219, 0.8578			27.0	C9 H18 N2 O4
UC224, 0.8467			17.9	C15 H13 N O
UC227, 0.5738	108.6	172.8	114.4	Car
UC227, 0.6185	314.8	269.5	215.3	(Porphobilinogen)
UC231, 0.9050	18.5	16.1	7.0	(Camoensine)
UC235, 0.9455	621.6	744.4	1143.4	(Benzoylglutamine)
UC241, 0.5813	22.8	35.1	165.1	Homocarnosine
UC244, 0.8065			20.8	Cytidine
UC246, 0.5679			48.6	( $\beta$ -Alanyl-L-arginine)
UC247, 0.5519		31.9		(N2-(2-Carboxyethyl)arginine)
UC249, 0.5324		25.7		(5-Hydroxyindoleacetyl)glycine)
UC263, 0.7473	17.8	38.5	26.2	(D-Ornialine)
UC268, 0.8221			140.3	Adenosine
UC276, 0.8657	1643.8	778.9	218.7	Eserine
UC296, 0.9608	55.4	88.1	45.7	(Mebendazole)
UC302, 0.8770	80.0	43.2	26.2	((Ac)2-L-Lys-D-Ala)

UC315, 0.8995	36.7		31.7 (Dihydropteroate)
UC316, 0.8754	826.8	463.6	72.2 (Hippeastrine)
UC317, 0.3438	114.6	58.1	32.9 (O-Methylptelefolonium)
UC319, 0.3415	41.0	64.2	25.3 (Eseramine)
UC339, 0.9074	23.8	34.2	20.9 (1-(5-Phosphoribosyl)imidazole-4-acetate)
UC352, 0.9456	10.1	24.3	68.9 (o-β-D-Xylosylzeatin)
UC376, 0.9047	28.9		(o-β-D-Xylosylzeatin)
UC392, 0.6186	12.0		(Heteratisine)
UC397, 0.3539	12.3		(Cephalothin)
UC411, 1.0164	11.3	9.7	43.8 (Ceftibuten)
UA73, 0.799	3.70	5.47	6.01 (Propanoate)
UA87, 0.946	34.27	10.47	2.65 Pyruvate
UA89, 1.038	340.10	152.38	26.28 Lactate
UA93, 0.581	2.82		(Chloroacetate)
UA99, 1.127	2.58		Tiglate
UA105, 1.068	3.92	2.34	Glycerate
UA115, 0.770	2.73	3.40	Fumarate
UA115, 1.080	11.28	10.23	21.15 3-Methyl-2-oxobutanate
UA117, 1.141	57.45	83.41	82.73 Succinate
UA117, 1.141	17.98	6.64	6.44 (Methylmalonate)
UA121, 1.104	9.55	8.07	3.44 Benzoate
UA122, 1.102	2.52	3.81	Nicotinate
UA129, 1.122	57.63	35.76	30.79 C5 H6 O4
UA129, 1.143	13.13	4.56	6.08 4-Methyl-2-oxovalerate
UA132, 1.134	187.85	183.67	38.10 (Aspartate)
UA133, 0.793	6.48	5.28	Malate
UA135, 1.141	125.76	48.03	58.36 C8 H8 O2
UA137, 0.959	4.93	4.67	(Urocanate )
UA137, 1.131	2.59		p-Hydroxybenzoate
UA145, 0.792	22.77	9.62	7.65 2-Oxoglutarate
UA150, 1.000	151.65	51.45	20.90 C8 H9 N O2
UA153, 1.126	2.28		Protocatechurate
UA163, 0.931	5.47	5.59	4.02 C9 H8 O3 or C10 H12 O2
UA163, 0.958	3.86	4.22	C9 H8 O3 or C10 H12 O2
UA167, 0.791	20.16		PEP
UA169, 0.952	15.08	2.12	DHAP
UA171, 0.972	64.26	15.86	11.00 Glycerophosphate
UA173, 0.948	3.11		5.76 Phenylphosphate
UA174, 0.894		6.47	C6 H7 O6 or C6 H9 N O5
UA175, 0.873	4.75	48.56	N-Carbamoyl-L-asparatate
UA179, 1.040	10.74	5.40	(2-Deoxy-D-gluconate)
UA181, 0.931	11.08	10.18	7.58 (4-Hydroxyphthalate)
UA185, 0.811	225.18	32.21	7.39 3PG
UA187, 1.071			3.00 Azelate
UA188, 0.937	8.10	11.36	N-Acetyl-L- glutamate
UA191, 0.825	6.66	71.84	0.73 iso-Citrate
UA191, 0.852	6.83		0.73 Citrate
UA196, 0.617	6.62		5.01 (Phosphoguanidinoacetate)
UA199, 0.987	5.41	2.51	0.74 E4P
UA207, 0.961	67.88	88.29	Benzylsuccinate
UA207, 1.051			3.77 (Dihydrolipoate)
UA218, 1.039	24.33		4-Nitrophenyl phosphate
UA229, 1.031	46.78	4.73	4.20 Ru5P
UA229, 1.055	13.53	1.62	R5P
UA232, 1.141	3.05		(2-Hydroxy-6-oxo-(2'-aminophenyl)-hexa-2,4-dienoate)
UA246, 0.821			12.14 (Pyridoxal phosphate)
UA247, 0.958	3.35	4.12	(Pyridoxamine phosphate)
UA253, 0.872	71.11	33.43	C7 H11 O8 P, C7 H14 N2 O6 S, C7 H14 N2 O4 S2 or C6 H15 N4 O5 P
UA253, 1.503	31.56	29.32	(Palmitoleate)
UA259, 1.047	31.34	8.29	G1P
UA259, 1.076	72.51	4.04	5.63 F6P
UA259, 1.107	72.70	13.48	2.24 G6P
UA260, 0.639		2.90	(N'-Phosphoguanidinoethyl methyl phosphate)
UA268, 0.973	2.25		(N-Acetyl-L- glutamate 5-phosphate)
UA275, 0.888	10.75	5.84	(2-Carboxy-D-arabinitol 1-phosphate)
UA275, 0.939	14.81		4.93 6PG
UA285, 0.806	8.28		(N-Glucosylnicotinate)
UA287, 0.927	27.04	2.99	C7 H13 O10 P
UA287, 1.143	5.24	11.19	8.53 C7 H13 O10 P
UA289, 1.123	166.42		(Sedoheptulose 7-phosphate)
UA299, 0.976	5.04	5.41	C18 H20 O4, C18 H36 O3 or C20 H28 O2
UA303, 1.000	15.53	5.88	2.18 Nopaline
UA306, 1.114	4.21	3.69	2.32 dCMP
UA307, 1.098	2.05		dUMP
UA309, 1.027	6.79		(N-Acetylneuraminate)
UA313, 1.123	10.44	15.46	16.84 (Geranyl diphosphate)
UA321, 1.142	5.90		TMP
UA323, 0.822	31.83	12.14	C9 H13 N2 O9 P or C10 H13 O10 P
UA323, 1.001	12.25	7.33	3.17 C9 H13 N2 O9 P or C10 H13 O10 P
UA323, 1.109	35.93	38.24	58.15 C9 H13 N2 O9 P or C10 H13 O10 P
UA323, 1.123			5.80 UMP
UA325, 0.957	4.49	4.59	(Glucosyl-2-hydroxycinnamate)
UA330, 1.138	4.60	6.57	5.61 dAMP
UA336, 1.105	93.67	86.95	5.05 (5-Hydroxymethyldeoxycytidylate)
UA339, 0.892	70.97	7.30	0.55 F1,6P
UA339, 1.089	8.79	6.49	C6 H14 O12 P2
UA347, 1.123	17.58	21.29	IMP
UA359, 1.077	2.81		C18 H16 O8
UA363, 0.949		2.62	(Xanthosine 5'-phosphate)
UA369, 0.908	28.81	7.12	(Sedoheptulose 1,7-bisphosphate)
UA377, 0.979	2.28	3.39	(7-Methylguanosine 5'-phosphate)
UA380, 0.940	13.03	15.83	(N-Acetyl-D-glucosamine 1,6-bisphosphate)
UA387, 1.032		2.61	9.42 (dUDP)

UA393, 0.876	3.74			(5'-Butyrylphosphouridine)
UA399, 0.918	20.56	6.92		(Bis(glycerophospho)-glycerol)
UA401, 1.014	5.90	6.41	2.95	TDP
UA404, 0.985	3.58		2.35	UDP
UA407, 1.095	12.22	6.66	13.54	(Palmitoylglycerone phosphate)
UA409, 1.140	25.17	11.15	63.80	(1-Palmitoylglycerol 3-phosphate)
UA410, 1.034	6.99	6.36		dADP
UA414, 1.141			2.62	(N6-(delta2-Isopentenyl)-adenosine 5'-monophosphate)
UA418, 1.095	9.24	7.36	13.31	(myo-Inositol trisphosphate)
UA421, 0.831	2.40			C12 H23 O14 P
UA427, 1.038	10.41	6.67	5.62	IDP
UA429, 1.026	5.38	3.31	3.36	(CMP-2-aminoethylphosphonate)
UA460, 1.154	16.78	11.85	2.96	(3-Phosphoglycerol-glutathione)
UA462, 0.916	2.33	3.14		Adenylosuccinate
UA476, 1.157	160.39	90.25	82.10	(Phosphatidylinositol phosphate)
UA481, 1.002		7.32	3.44	dTTP
UA483, 0.977	19.95	6.90		UTP
UA498, 1.159	4.95	5.39	4.54	C26 H45 N O6 S
UA507, 1.001		4.69		ITP
UA536, 0.980	6.54			(CDPribitol)
UA542, 0.849	3.39			(CMP-3-deoxy-D-manno-octulosonate)
UA559, 1.012	11.90	3.10	2.30	(ADPribose)
UA577, 1.011	2.11	3.13		C16 H24 N2 O17 P2
UA579, 1.029	9.06	4.98	8.47	(UDPglucuronate)
UA589, 1.151	2.19	2.16	3.57	(UDP-2-acetamido-4-amino-2,4,6-trideoxyglucose)
UA678, 1.083	4.67			(UDP-N-acetylmuramate)
UN322, 1.071	12.2	6.0	79.7	CMP
UN346, 1.107	83.5	70.0	487.5	AMP
UN362, 1.126	5.9	1.9	8.5	GMP
UN402, 0.948	4.0	1.6	8.8	CDP
UN426, 0.980	33.2	16.3	58.0	ADP
UN442, 0.994	2.1	1.4	12.4	GDP
UN482, 0.906	4.7		1.8	CTP
UN506, 0.924	31.1	7.4	8.6	ATP
UN522, 0.939	1.9	1.0		GTP
UN662, 1.552	139.2	193.9	256.3	NAD
UN664, 1.189				NADH
UN742, 1.066	6.8	7.4	29.3	NADP
UN744, 0.949	0.4	0.5	0.8	NADPH
UN766, 0.983		0.2	1.7	CoA
UN784, 1.234			6.8	FAD
UN808, 0.999	0.5	2.1	34.4	Acetyl CoA
UN866, 0.924			0.2	Succinyl CoA