

Table S5. Genes expressed at significantly higher levels in the flea by wild-type *Y. pseudotuberculosis* (IP strain) than by wild-type *Y. pestis* CO92

Gene ID ^a	Gene name	Predicted gene function	Relative expression
1 day after infection:			
YPTB0024	YPO0024	<i>glnA</i> glutamine synthetase	2.8
YPTB0092	YPO0100	-- hypothetical protein	3.6
YPTB0189	YPO3846	-- hypothetical protein	2.2
YPTB0338	YPO0281	<i>hmuT</i> ABC transporter, periplasmic hemin-binding protein	3.7
YPTB0339	YPO0282	<i>hmuS</i> hemin degradation/transport protein	5.0
YPTB0373	YPO0318	<i>pspG</i> phage shock protein G	3.0
YPTB0576	YPO0431	<i>osmY</i> periplasmic protein	12.4
YPTB0577	YPO0432	-- DUF1328 domain-containing protein	5.6
YPTB0578	YPO0433	<i>yjjU</i> patatin family protein	2.0
YPTB0612	YPO0469	<i>dnaJ</i> chaperone protein	2.4
YPTB0795	YPO3336	-- hypothetical protein	2.0
YPTB0841	YPO3286	<i>aroF</i> phospho-2-dehydro-3-deoxyheptonate aldolase	3.1
YPTB0848	YPO3275	<i>clpB</i> protein disaggregation chaperone	2.6
YPTB0910	YPO3216	-- methyltransferase	6.5
YPTB0973	YPO3143	<i>glnK</i> nitrogen regulatory protein P-II 2	2.9
YPTB0978	YPO3138	<i>ymoA</i> hemolysin expression-modulating protein	2.5
YPTB0979	YPO3137	-- hypothetical protein	2.6
YPTB0998	YPO3116	<i>ddhD</i> CDP-6-deoxy-delta-3,4-glucoseen reductase	2.4
YPTB1001	YPO3113	<i>ddhC</i> CDP-4-keto-6-deoxy-D-glucose-3-dehydratase	2.8
YPTB1002	YPO3112	<i>prt</i> paratose synthase	3.0
YPTB1003	YPO3111	<i>wbyH</i> hypothetical protein	2.9
YPTB1008	YPO3104	<i>wbyK</i> mannosyltransferase	4.5
YPTB1011	YPO3099	<i>manC</i> mannose-1-phosphate guanylyltransferase	3.2
YPTB1012	YPO3098	<i>wbyL</i> glycosyltransferase	3.9
YPTB1013	YPO3097	<i>manB</i> phosphomannomutase	9.3
YPTB1014	YPO3096	<i>wzz</i> ferric enterobactin transport protein FepE	2.8
YPTB1125	YPO2635	<i>fldA</i> flavodoxin FldA	2.0
YPTB1167	YPO1134	<i>psiF</i> starvation-inducible protein	2.7
YPTB1197	YPO1167	<i>betI</i> transcriptional regulator	19.3
YPTB1222	YPO1181	-- membrane protein	3.3
YPTB1240	YPO1200	<i>adiC</i> arginine:agmatin antiporter	4.6
YPTB1241	YPO1201	<i>adiA</i> arginine decarboxylase	3.9
YPTB1258	YPO1218	<i>rscB</i> transcriptional regulator	2.3
YPTB1261	YPO1222	<i>ompC</i> outer membrane porin protein C	4.6
YPTB1292	YPO3653	-- colicin immunity protein	2.4
YPTB1332	YPO1301	<i>psaE</i> regulatory protein	2.3
YPTB1333	YPO1302	<i>psaF</i> hypothetical protein	9.2

YPTB1337	YPO1306	<i>nfo</i>	endonuclease IV	2.5
YPTB1338	YPO1307	--	membrane protein	2.2
YPTB1345	YPO1314	--	glutathione S-transferase-family protein	2.6
YPTB1384	YPO1358	<i>poxB</i>	pyruvate dehydrogenase	2.1
YPTB1392	YPO1366	<i>cspD</i>	cold shock-like protein	2.5
YPTB1448	YPO1423a	<i>rmf</i>	ribosome modulation factor	2.5
YPTB1515	YPO1499	--	ABC transporter permease	2.3
YPTB1578	YPO1569	<i>lldD</i>	L-lactate dehydrogenase	2.0
YPTB1617	YPO1739	--	membrane protein	4.0
YPTB1654	YPO1778	--	ASCH domain-containing protein	2.0
YPTB1658	YPO1782	<i>holE</i>	DNA polymerase III subunit theta	2.3
YPTB1955	YPO1957	<i>phoH</i>	phosphate starvation protein	2.0
YPTB1983	YPO1991	--	hypothetical protein	2.4
YPTB1987	YPO1995	--	hypothetical protein	2.3
YPTB1988	YPO1996	--	hypothetical protein	2.3
YPTB2079	YPO2152	--	hypothetical protein	2.3
YPTB2080	YPO2153	--	serine protein kinase PrkA	2.1
YPTB2124	YPO2202	--	lipoprotein	2.4
YPTB2151	YPO2229	<i>osmB</i>	lipoprotein	2.3
YPTB2192	YPO2270	<i>clcB</i>	voltage-gated ClC-type chloride channel ClcB	3.6
YPTB2223	YPO2301	--	universal stress protein UspE	2.0
YPTB2239	YPO2320	--	XRE family transcriptional regulator	4.0
YPTB2263	YPO2345	--	TIGR02293 family toxin-antitoxin system antitoxin component	2.1
YPTB2269	YPO2350	<i>pspB</i>	phage shock protein B	3.3
YPTB2270	YPO2351	<i>pspA</i>	phage shock protein	4.8
YPTB2285	YPO2371	--	lipoprotein	2.1
YPTB2288	YPO2374	<i>rovA</i>	transcriptional regulator SlyA	2.1
YPTB2299	YPO2386	<i>sodB</i>	superoxide dismutase	2.8
YPTB2306	YPO2393	<i>pykF</i>	pyruvate kinase	2.4
YPTB2375	YPO1706	<i>htpX</i>	heat shock protein	3.0
YPTB2444	YPO1624	<i>ycfJ</i>	hypothetical protein	4.5
YPTB2532	YPO2496	--	tartrate dehydrogenase	2.8
YPTB2542	YPO2506	<i>ompX</i>	outer membrane protein X	2.8
YPTB2546	YPO2510	<i>dps</i>	DNA starvation/stationary phase protection protein	2.9
YPTB2563	YPO2531	<i>elaB</i>	membrane protein	2.3
YPTB2603	YPO2781	--	NUDIX hydrolase	2.0
YPTB2704	YPO2981	--	hypothetical protein	5.0
YPTB2745	YPO3027	<i>ygiW</i>	TIGR00156 family protein	2.0
YPTB2813	YPO2847	<i>yegM</i>	multidrug efflux system subunit MdtA	3.4
YPTB2916	YPO2692	<i>kdpA</i>	potassium-transporting ATPase subunit A	3.2
YPTB2935	YPO2674	<i>hdeB</i>	acid-resistance protein	49.9
YPTB2940	YPO2669	<i>ureF</i>	urease accessory protein	2.5

YPTB2941	YPO2668	<i>ureE</i>	urease accessory protein	5.1
YPTB2942	YPO2667	<i>ureC</i>	urease subunit alpha	4.6
YPTB2943	YPO2666	<i>ureB</i>	urease subunit beta	2.5
YPTB2944	YPO2665	<i>ureA</i>	urease subunit gamma	4.2
YPTB2952	YPO2654	<i>yicN</i>	membrane protein	8.0
YPTB3045	YPO0796	<i>lysA</i>	diaminopimelate decarboxylase	2.3
YPTB3123	YPO0881	--	Mgs family antitoxin component of toxin/antitoxin system	2.1
YPTB3125	YPO0883	--	transcriptional regulator	2.0
YPTB3126	YPO0884	--	bacteriophage protein	3.4
YPTB3468	YPO0590	<i>hdeD</i>	acid-resistance membrane protein	2.3
YPTB3475	YPO0582	--	membrane protein	2.3
YPTB3585	YPO3643	<i>cspa1</i>	major cold shock protein	2.1
YPTB3724	YPO0180	--	hydrolase	2.6
YPTB3770	YPO0130	--	hypothetical protein	2.9
YPTB3850	YPO4015	<i>hutT</i>	APC family histidine permease	3.1
YPTB3851	YPO4016	<i>hutH</i>	histidine ammonia-lyase	6.4
YPTB3852	YPO4017	<i>hutU</i>	urocanate hydratase	9.9
YPTB3905	YPO4084	<i>ibpB</i>	heat shock chaperone	3.6
YPTB3922	YPO4064	--	hypothetical protein	2.3
YPTB3928	YPO4057	<i>fdoH</i>	formate dehydrogenase-O, iron-sulfur subunit	7.6
YPTB3929	YPO4056	<i>fdol</i>	formate dehydrogenase-O subunit gamma	6.1
YPTB3931	YPO4054	<i>selA</i>	selenocysteine synthase	2.3
14 days after infection:				
YPTB0003	YPO0003	<i>asnA</i>	asparagine synthetase	2.2
YPTB0031	YPO0034	--	NCS2 family xanthine/uracil:H ⁺ symporter	2.6
YPTB0093	YPO0101	--	membrane protein	5.3
YPTB0110	YPO3927	<i>argC</i>	N-acetyl-gamma-glutamyl-phosphate reductase	3.6
YPTB0111	YPO3925	<i>argB</i>	acetylglutamate kinase	3.0
YPTB0112	YPO3924	<i>argH</i>	argininosuccinate lyase	2.1
YPTB0128	YPO3907	--	sugar ABC transporter ATPase	2.0
YPTB0139	YPO3893	--	membrane protein	2.5
YPTB0141	YPO3894	--	membrane protein	2.7
YPTB0160	YPO3877	--	fimbrial protein	4.7
YPTB0336	YPO0279	<i>hmuV</i>	hemin importer ATP-binding subunit	3.1
YPTB0337	YPO0280	<i>hmuU</i>	ABC hemin transporter, permease subunit	3.6
YPTB0338	YPO0281	<i>hmuT</i>	ABC transporter, periplasmic hemin-binding protein	6.1
YPTB0339	YPO0282	<i>hmuS</i>	hemin degradation/transport protein	7.9
YPTB0358	YPO0301	--	hypothetical protein	2.1
YPTB0373	YPO0318	<i>pspG</i>	phage shock protein G	2.5
YPTB0437	YPO3540	--	hypothetical protein	2.8
YPTB0526	YPO3446	<i>argI</i>	ornithine carbamoyltransferase subunit I	2.8
YPTB0576	YPO0431	<i>osmY</i>	periplasmic chaperone protein	11.3

YPTB0577	YPO0432	--	DUF1328 domain-containing protein	5.9
YPTB0578	YPO0433	<i>yjjU</i>	patatin family protein	2.4
YPTB0678	YPO0544	<i>ygaW</i>	L-alanine exporter AlaE	2.2
YPTB0800	YPO3331	--	ABC sugar transporter, permease subunit	2.1
YPTB0910	YPO3216	--	methyltransferase	3.6
YPTB0998	YPO3116	<i>ddhD</i>	CDP-6-deoxy-delta-3,4-glucoseen reductase	2.3
YPTB1002	YPO3112	<i>prt</i>	paratose synthase	2.8
YPTB1003	YPO3111	<i>wbyH</i>	hypothetical protein	3.8
YPTB1004	YPO3110	<i>wzx</i>	O-unit flippase	3.8
YPTB1006	YPO3107	<i>wbyJ</i>	mannosyltransferase	3.6
YPTB1008	YPO3104	<i>wbyK</i>	mannosyltransferase	6.1
YPTB1011	YPO3099	<i>manC</i>	mannose-1-phosphate guanylyltransferase	4.7
YPTB1012	YPO3098	<i>wbyL</i>	glycosyltransferase	7.1
YPTB1039	YPO2822	--	hypothetical protein	2.6
YPTB1061	YPO2796	--	pertactin family virulence factor/autotransporter	2.2
YPTB1083	YPO2589	--	antibiotic biosynthesis monooxygenase	2.3
YPTB1125	YPO2635	<i>fldA</i>	flavodoxin	2.6
YPTB1197	YPO1167	<i>betI</i>	transcriptional regulator	13.0
YPTB1226	YPO1185	<i>phnE2</i>	ABC transport permease subunit	3.2
YPTB1239	YPO1199	--	ABC type choline/glycine/betaine transporter, permease subunit	2.0
YPTB1240	YPO1200	<i>adiC</i>	arginine:agmatin antiporter	5.7
YPTB1241	YPO1201	<i>adiA</i>	arginine decarboxylase	4.6
YPTB1243	YPO1203	--	drug/metabolite exporter YedA	2.3
YPTB1248	YPO1209	<i>tyrP</i>	HAAAP family tyrosine/H(+) symporter	2.0
YPTB1261	YPO1222	--	outer membrane porin protein C	3.7
YPTB1320	YPO1288	--	dihydrofolate reductase	2.1
YPTB1333	YPO1302	<i>psaF</i>	pH 6 antigen protein	3.9
YPTB1334	YPO1303	<i>psaA</i>	pH 6 antigen precursor (antigen 4) (adhesin)	103.2
YPTB1335	YPO1304	<i>psaB</i>	pH 6 antigen chaperone protein precursor	6.9
YPTB1345	YPO1314	--	glutathione S-transferase-family protein	2.0
YPTB1423	YPO1398	<i>cspB</i>	cold shock-like protein	3.0
YPTB1515	YPO1499	--	ABC transporter permease	3.7
YPTB1546	YPO1534	<i>ysuC</i>	ABC iron-siderophore transporter, permease subunit	2.1
YPTB1579	YPO1570	<i>argG</i>	argininosuccinate synthase	2.9
YPTB1617	YPO1739	--	membrane protein	4.9
YPTB1622	YPO1744	<i>pagP</i>	phospholipid:lipid A palmitoyltransferase	2.3
YPTB1630	YPO1754	<i>yebN</i>	membrane protein	2.5
YPTB1664	YPO1789	--	hypothetical protein	2.2
YPTB1691	YPO1819	<i>fliR</i>	flagellar biosynthesis protein	2.1
YPTB1914	YPO1894	--	sugar ABC transporter permease	2.3
YPTB1983	YPO1991	--	hypothetical protein	2.1
YPTB1985	YPO1993	--	dehydrogenase	3.7

YPTB1986	YPO1994	--	hypothetical protein	3.2
YPTB1987	YPO1995	--	hypothetical protein	3.2
YPTB1988	YPO1996	--	hypothetical protein	2.6
YPTB2062	YPO2080	--	hypothetical protein	2.1
YPTB2152	YPO2230	<i>araD</i>	L-ribulose-5-phosphate 4-epimerase	2.7
YPTB2159	YPO2238	--	hypothetical protein	2.9
YPTB2174	YPO2255	<i>araF</i>	arabinose ABC transporter substrate-binding protein	2.0
YPTB2192	YPO2270	<i>clcB</i>	voltage-gated ClC-type chloride channel ClcB	6.4
YPTB2237	YPO2318	--	acid shock protein	2.8
YPTB2239	YPO2320	--	transcriptional regulator	3.8
YPTB2285	YPO2371	--	lipoprotein	2.1
YPTB2301	YPO2388	--	LysR-family transcriptional regulator	2.2
YPTB2302	YPO2389	--	Bcr/CflA family drug resistance efflux transporter	2.4
YPTB2306	YPO2393	<i>pykF</i>	pyruvate kinase	2.2
YPTB2336	YPO2428	<i>pheT</i>	phenylalanyl-tRNA synthetase subunit beta	3.0
YPTB2337	YPO2429	<i>pheS</i>	phenylalanyl-tRNA synthetase subunit alpha	2.1
YPTB2375	YPO1706	<i>htpX</i>	heat shock protein	2.2
YPTB2444	YPO1624	<i>ycfJ</i>	hypothetical protein	11.5
YPTB2542	YPO2506	<i>ompX</i>	outer membrane protein X	2.3
YPTB2546	YPO2510	<i>dps</i>	DNA starvation/stationary phase protection protein	2.2
YPTB2573	YPO2541	--	hypothetical protein	2.2
YPTB2602	YPO2782	<i>ulaA</i>	PTS system ascorbate-specific transporter subunit IIC	2.2
YPTB2624	YPO2759	<i>smfA</i>	fimbrial protein	3.0
YPTB2662	YPO2934	--	Type VI secretion system locus 3 (T6SS-3) protein	3.1
YPTB2664	YPO2937	--	T6SS-3 Hcp1 family effector protein	2.6
YPTB2687	YPO2963	--	hypothetical protein	2.0
YPTB2704	YPO2981	--	hypothetical protein	6.7
YPTB2772	YPO3050	--	ABC transporter, periplasmic iron binding protein	2.6
YPTB2813	YPO2847	<i>yegM</i>	multidrug efflux system subunit MdtA	2.1
YPTB2814	YPO2848	<i>yegN</i>	multidrug efflux system subunit MdtB	2.2
YPTB2907	YPO2701	--	membrane protein	2.1
YPTB2915	YPO2693	<i>ybfA</i>	hypothetical protein	2.6
YPTB2919	YPO2689	<i>kdpD</i>	sensor protein KdpD	3.1
YPTB2935	YPO2674	<i>hdeB</i>	acid-resistance protein	18.8
YPTB2936	YPO2673	--	nickel transport (NiCoT family) protein	2.7
YPTB2939	YPO2670	<i>ureG</i>	urease accessory protein	2.6
YPTB2940	YPO2669	<i>ureF</i>	urease accessory protein	3.3
YPTB2941	YPO2668	<i>ureE</i>	urease accessory protein	2.9
YPTB2942	YPO2667	<i>ureC</i>	urease subunit alpha	2.1
YPTB2952	YPO2654	<i>yicN</i>	membrane protein	8.9
YPTB2954	YPO2652	<i>asr</i>	acid shock protein precursor	8.3
YPTB3045	YPO0796	<i>lysA</i>	diaminopimelate decarboxylase	2.7
YPTB3125	YPO0883	--	transcriptional regulator	2.2

YPTB3126	YPO0884	--	bacteriophage protein	2.7
YPTB3257	YPO0983	--	CPBP family intramembrane metalloprotease	2.1
YPTB3328	YPO0735	--	hypothetical protein	2.0
YPTB3512	YPO3568	<i>degS</i>	serine endoprotease	2.9
YPTB3670	YPO0237	--	alternative ribosome-rescue factor A	2.2
YPTB3772	YPO0128	--	gluconate periplasmic binding protein	2.3
YPTB3826	YPO3986	<i>cdh</i>	CDP-diacylglycerol pyrophosphatase	2.1
YPTB3828	YPO3988	--	c-di-GMP phosphodiesterase (untranslated in <i>Y. pestis</i>)	2.2
YPTB3839	YPO4000	<i>dppD</i>	dipeptide transporter ATP-binding subunit	2.3
YPTB3840	YPO4001	<i>dppC</i>	dipeptide transporter	2.2
YPTB3851	YPO4016	<i>hutH</i>	histidine ammonia-lyase	2.4
YPTB3852	YPO4017	<i>hutU</i>	urocanate hydratase	3.3
YPTB3856	YPO4021	--	biotin carboxylase superfamily protein	3.1
YPTB3928	YPO4057	<i>fdoH</i>	formate dehydrogenase-O, iron-sulfur subunit	5.7
YPTB3929	YPO4056	<i>fdol</i>	formate dehydrogenase-O subunit gamma	6.3
YPTB3930	YPO4055	<i>fdhE</i>	formate dehydrogenase accessory protein	2.2
YPTB3931	YPO4054	<i>selA</i>	selenocysteine synthase	2.7

^a Annotation numbers of the *Y. pseudotuberculosis* IP32953 (YPTB) and *Y. pestis* CO92 (YPO) homologs
Criteria: ≥ 2 -fold difference; p -value ≤ 0.01 ; $\geq 98\%$ nucleotide sequence identity between the homologs