

Supplementary Table 1: Full list of *P. aeruginosa* PA14 transposon insertion mutants displaying deficiencies in swarming motility.

PA14 locus	PAO1 homolog	Polar effect possible ^a	Gene Name	Gene Description	Mutant swarm zone relative to PA14 WT
PA14_00120	PA0011	N ^b		putative 2-OH-lauroyltransferase	less swarm
PA14_00460	PA0037	N ^b	<i>trpI</i>	trpBA operon transcriptional activator	no swarm
PA14_00700	PA0058	N ^b		putative protein-disulfide isomerase	no swarm
PA14_00750	PA0063	N ^b		putative aminopeptidase	no swarm
PA14_00780	PA0066	N ^b		putative carbonic anhydrases	no swarm
PA14_01340	PA0110	N ^b		conserved hypothetical protein	no swarm
PA14_02230	PA0177	N ^b	<i>cheW</i>	putative purine-binding chemotaxis protein	no swarm
PA14_02410	PA0192	N ^b		putative TonB-dependent receptor	no swarm
PA14_04410	PA0337	N ^b	<i>ptsP</i>	phosphoenolpyruvate-protein phosphotransferase	no swarm
PA14_05330	PA0409	Y	<i>pilH</i>	type IV pilus response regulator PilH	less swarm
PA14_05340	PA0410	Y	<i>pilI</i>	type IV pili signal transduction protein PilI	no swarm
PA14_05360	PA0411	N ^b	<i>pilJ</i>	type IV pili methyl-accepting chemotaxis transducer PilJ	less swarm
PA14_05380	PA0412	N ^b	<i>pilK</i>	methyltransferase PilK	no swarm
PA14_05450	PA0419	N ^b		conserved hypothetical protein	no swarm
PA14_05560	PA0428	N ^b		putative ATP-dependent RNA helicase, DEAD box family	no swarm
PA14_06210	PA0475	N ^b		putative transcriptional regulator	no swarm
PA14_06260	PA0479	N ^b		putative transcriptional regulator, LysR family	no swarm
PA14_06830	PA0524	N ^b	<i>norB</i>	nitric-oxide reductase subunit B	no swarm
PA14_07170	PA0551	N ^b	<i>epd</i>	D-erythrose 4-phosphate dehydrogenase	less swarm
PA14_07370	PA0567	N ^b		conserved hypothetical protein	no swarm
PA14_07530	PA0577	N ^b	<i>dnaG</i>	putative DNA primase	no swarm
PA14_07700	PA0590	N ^b	<i>apaH</i>	bis(5'-nucleosyl)-tetrphosphatase	no swarm
PA14_07710	PA0591	Y		putative apaG protein	no swarm
PA14_08210	PA0633	N ^b		putative major tail protein V	no swarm
PA14_08500	PA0664	N ^b		putative integral membrane protein	no swarm
PA14_54540	PA0754	N ^b		conserved hypothetical protein	no swarm
PA14_54520	PA0755	Y		probable porin	less swarm
PA14_53520	PA0831	N ^b	<i>oruR</i>	transcriptional regulator OruR	no swarm
PA14_53430	PA0837	N ^b	<i>slyD</i>	peptidyl-prolyl cis-trans isomerase SlyD	less swarm
PA14_53300	PA0848	N ^b		probable alkyl hydroperoxide reductase	less swarm
PA14_52730	PA0894	N ^b		hypothetical protein	no swarm
PA14_52570	PA0905	N ^b	<i>rsmA</i>	RsmA, regulator of secondary metabolites	no swarm
PA14_52280	PA0926	N ^b		hypothetical protein	no swarm

PA14_52260	PA0928	Y	<i>gacS</i>	sensor/response regulator hybrid	no swarm
PA14_52210	PA0932	N ^b	<i>cysM</i>	cysteine synthase B	no swarm
PA14_51390	PA0999	N ^b	<i>pqsD</i>	3-oxoacyl-[acyl-carrier-protein] synthase III	no swarm
PA14_51360	PA1001	N ^b	<i>phnA</i>	anthranilate synthase component I	no swarm
PA14_50560	PA1070	N ^b	<i>braG</i>	branched-chain amino acid transport protein BraG	less swarm
PA14_50470	PA1078	N ^b	<i>flgC</i>	flagellar basal-body rod protein FlgC	no swarm
PA14_50290	PA1092	N ^b	<i>fliC</i>	flagellin type B	no swarm
PA14_50280	PA1093	N ^b		hypothetical protein	no swarm
PA14_50270	PA1094	N ^b	<i>fliD</i>	flagellar capping protein FliD	no swarm
PA14_50130	PA1102	Y	<i>fliG</i>	flagellar motor switch protein FliG	no swarm
PA14_50110	PA1103	N ^b		probable flagellar assembly protein	no swarm
PA14_49800	PA1127	N ^b		probable oxidoreductase	less swarm
PA14_49320	PA1167	N ^b		Hypothetical	no swarm
PA14_49280	PA1171	N ^b		probable transglycolase	no swarm
PA14_49170	PA1180	N ^b	<i>phoQ</i>	two-component sensor PhoQ	no swarm
PA14_48830	PA1196	N ^b		putative transcriptional regulator	no swarm
PA14_48280	PA1237	N ^b		putative multidrug resistance efflux pump	no swarm
PA14_46850	PA1347	N ^b		putative transcriptional regulator	no swarm
PA14_46440	PA1377	N ^b		putative acetyltransferase	no swarm
PA14_46060	PA1422	N ^b	<i>gbuR</i>	transcriptional regulator	no swarm
PA14_45950	PA1431	N ^b	<i>rsaL</i>	regulatory protein RsaL	less swarm
PA14_45810	PA1442	Y		putative flagellar protein FliL	no swarm
PA14_45770	PA1446	Y	<i>fliP</i>	flagellar biosynthetic protein FliP	no swarm
PA14_45760	PA1447	Y	<i>fliQ</i>	flagellar biosynthetic protein FliQ	no swarm
PA14_45720	PA1449	N ^b	<i>flhB</i>	flagellar biosynthetic protein FlhB	no swarm
PA14_45680	PA1452	Y	<i>flhA</i>	flagellar biosynthesis protein FlhA	no swarm
PA14_45660	PA1453	Y	<i>flhF</i>	flagellar biosynthesis protein FlhF	no swarm
PA14_45590	PA1458	N ^b		putative two-component sensor	no swarm
PA14_45500	PA1464	N ^b		putative purine-binding chemotaxis protein CheW	no swarm
PA14_45120	PA1492	N ^b		hypothetical protein	no swarm
PA14_44490	PA1544	N ^b	<i>anr</i>	transcriptional regulator Anr	less swarm
PA14_44370	PA1554	N ^b	<i>ccoN</i>	cytochrome oxidase subunit (cbb3-type)	less swarm
PA14_43420	PA1631	N ^b		putative acyl-CoA dehydrogenase	no swarm
PA14_41710	PA1767	N ^b		putative membrane protein	less swarm
PA14_41220	PA1803	N ^b	<i>lon</i>	Lon protease	no swarm
PA14_40900	PA1827	N ^b		putative short-chain dehydrogenase	no swarm
PA14_40670	PA1843	N ^b	<i>metH</i>	methionine synthase	no swarm
PA14_40620	PA1848	N ^b		putative MFS transporter	no swarm
PA14_39070	PA1969	N ^b		conserved hypothetical protein	no swarm
PA14_38970	PA1976	N ^b		putative sensor histidine kinase protein	less swarm
PA14_38350	PA2023	N ^b	<i>galU</i>	UTP-glucose-1-phosphate uridylyltransferase	less swarm
PA14_37690	PA2072	N ^b		putative sensory box protein	no swarm
PA14_37370	PA2098	N ^b		putative esterase	no swarm
PA14_36310	PA2195	N ^b	<i>hcnC</i>	hydrogen cyanide synthase HcnC	no swarm

PA14_35550	PA2245	N ^b		hypothetical protein	less swarm
PA14_34450	PA2332	N ^b		putative transcriptional regulator, AraC family	less swarm
PA14_33890	PA2379	N ^b		putative oxidoreductase	no swarm
PA14_33650	PA2399	N ^b	<i>pvdD</i>	pyoverdine synthetase D	no swarm
PA14_33500	PA2413	N ^b	<i>pvdH</i>	2-ketoglutarate 4-aminotransferase	no swarm
PA14_33290	PA2423	N ^b		Hypothetical	less swarm
PA14_33010	PA2444	N ^b	<i>glyA2</i>	serine hydroxymethyltransferase	no swarm
PA14_32860	PA2455	N ^b		hypothetical protein	no swarm
PA14_32520	PA2483	N ^b		putative flavin-dependent oxidoreductase	no swarm
PA14_30840	PA2571	N ^b		putative signal transduction histidine kinase	no swarm
PA14_30660	PA2585	N ^b	<i>uvrC</i>	excinuclease ABC subunit C	less swarm
PA14_30650	PA2586	Y	<i>gacA</i>	response regulator GacA	hyperswarm
PA14_30630	PA2587	N ^b	<i>pqsH</i>	probable FAD-dependent monooxygenase	hyperswarm
PA14_30290	PA2615	N ^b	<i>ftsK</i>	cell division/stress response protein	no swarm
PA14_30200	PA2622	N ^b	<i>cspD</i>	cold-shock protein CspD	hyperswarm
PA14_30100	PA2630	N ^b		conserved hypothetical protein	less swarm
PA14_29830	PA2650	N ^b		putative methyltransferase	no swarm
PA14_29390	PA2685	N ^b		conserved hypothetical protein	no swarm
PA14_28950	PA2722	N ^b		conserved hypothetical protein	no swarm
PA14_27580	PA2821	N ^b		putative glutathione S-transferase	hyperswarm
PA14_27090	PA2863	N ^b	<i>lipH</i>	lipase modulator protein	no swarm
PA14_26670	PA2891	N ^b	<i>atuF</i>	putative biotin carboxylase/biotin carboxyl carrier protein	no swarm
PA14_26640	PA2893	N ^b	<i>atuH</i>	putative very-long-chain acyl-CoA synthetase	no swarm
PA14_26460	PA2909	N ^b	<i>cobK</i>	ppfam02571, CbiJ, Precorrin-6x reductase	no swarm
PA14_25800	PA2957	N ^b		putative transcriptional regulator, TetR family	no swarm
PA14_25420	PA2989	N ^b		conserved hypothetical protein	no swarm
PA14_25110	PA3011	N ^b	<i>topA</i>	DNA topoisomerase I	no swarm
PA14_24180	PA3091	N ^b		conserved hypothetical protein	no swarm
PA14_23830	PA3115	N ^b	<i>fimV</i>	pilus assembly protein	no swarm
PA14_23470	PA3141	N ^b	<i>wbpM</i>	nucleotide sugar epimerase/dehydratase WbpM	no swarm
PA14_23170	PA3175	N ^b		putative arginase family protein	less swarm
PA14_22020	PA3244	N ^b	<i>minD</i>	cell division inhibitor MinD	no swarm
PA14_21340	PA3300	N ^b	<i>fadD2</i>	long-chain-fatty-acid--CoA ligase	no swarm
PA14_21320	PA3301	N ^b		putative lysophospholipase	less swarm
PA14_21110	PA3319	N ^b	<i>plcN</i>	non-hemolytic phospholipase C precursor	less swarm
PA14_20870	PA3339	N ^b		putative membrane protein	less swarm
PA14_20630	PA3359	N ^b		conserved hypothetical protein	no swarm
PA14_20290	PA3385	Y		DNA binding-protein	no swarm
PA14_20280	PA3386	N ^b		conserved hypothetical protein	less swarm
PA14_20230	PA3391	N ^b	<i>nosR</i>	NosR Regulatory protein for N2O	less swarm

				reductase	
PA14_20110	PA3400	N ^b		putative ABC-type multidrug transport permease	no swarm
PA14_19630	PA3438	N ^b	<i>folE1</i>	GTP cyclohydrolase I precursor	no swarm
PA14_19130	PA3476	N ^b	<i>rhlI</i>	autoinducer synthesis protein RhlI	no swarm
PA14_19120	PA3477	N ^b	<i>rhlR</i>	acylhomoserine lactone dependent transcriptional regulator	no swarm
PA14_18960	PA3488	N ^b		hypothetical protein	no swarm
PA14_17900	PA3587	N ^b	<i>metR</i>	transcriptional regulator MetR	less swarm
PA14_17450	PA3625	N ^b	<i>surE</i>	putative stationary-phase survival protein SurE	no swarm
PA14_17410	PA3628	N ^b		putative esterase	no swarm
PA14_17370	PA3631	N ^b		putative transport permease protein	no swarm
PA14_16890	PA3670	N ^b		putative auxiliary component of ABC transporter	no swarm
PA14_16040	PA3738	N ^b	<i>xerD</i>	integrase/recombinase XerD	no swarm
PA14_15920	PA3749	N ^b		putative major facilitator family transporter	no swarm
PA14_15180	PA3781	N ^b		putative ABC transport system, membrane protein	no swarm
PA14_14850	PA3805	N ^b	<i>pilF</i>	type 4 fimbrial biogenesis protein PilF	no swarm
PA14_14500	PA3828	N ^b		putative permease	no swarm
PA14_14210	PA3850	N ^b		hypothetical protein	no swarm
PA14_13510	PA3895	N ^b		putative transcriptional regulator, LysR family	no swarm
PA14_12030	PA4005	N ^b		conserved hypothetical protein	no swarm
PA14_11970	PA4010	N ^b		methylpurine-DNA glycosylase family protein	no swarm
PA14_11940	PA4012	N ^b		hypothetical protein	no swarm
PA14_10440	PA4137	N ^b		putative porin	no swarm
PA14_10330	PA4144	N ^b		putative outer membrane protein precursor	no swarm
PA14_09970	PA4168	N ^b		putative TonB-dependent receptor	less swarm
PA14_09750	PA4186	N ^b		putative oxidoreductase	no swarm
PA14_09300	PA4223	N ^b		putative ATP-binding component of ABC transporter	less swarm
PA14_55770	PA4292	N ^b		putative probable phosphate transporter	less swarm
PA14_55920	PA4304	N ^b	<i>rcpA</i>	putative type II secretion system protein	no swarm
PA14_56070	PA4315	N ^b	<i>mvaT</i>	transcriptional regulator MvaT, P16 subunit	less swarm
PA14_56640	PA4355	N ^b		putative MFS transporter	no swarm
PA14_56730	PA4362	N ^b		conserved hypothetical protein	no swarm
PA14_57070	PA4391	N ^b		conserved hypothetical protein	no swarm
PA14_57100	PA4393	N ^b		putative permease	no swarm
PA14_57170	PA4398	Y		putative two-component response regulator	no swarm
PA14_57180	PA4399	N ^b		putative cob(I)alamin adenosyltransferase	less swarm
PA14_57480	PA4423	N ^b		putative lipoprotein	less swarm

PA14_58050	PA4472	N ^b	<i>pmbA</i>	PmbA protein	no swarm
PA14_58070	PA4474	N ^b		putative tldD protein	no swarm
PA14_58470	PA4505	N ^b	<i>dppD</i>	putative dipeptide ABC transporter	no swarm
PA14_58560	PA4513	N ^b		Sulfite reductase	no swarm
PA14_60210	PA4544	N ^b	<i>rluD</i>	ribosomal large subunit pseudouridine synthase D	less swarm
PA14_60960	PA4607	N ^b		conserved hypothetical protein	no swarm
PA14_61080	PA4616	N ^b		putative C4-dicarboxylate-binding protein	no swarm
PA14_61320	PA4634	N ^b		conserved hypothetical protein	less swarm
PA14_61720	PA4667	N ^b		conserved hypothetical protein	no swarm
PA14_62130	PA4694	N ^b	<i>ilvC</i>	ketol-acid reductoisomerase	no swarm
PA14_62530	PA4725	N ^b	<i>cbrA</i>	two-component sensor CbrA	no swarm
PA14_62710	PA4740	N ^b	<i>pnp</i>	polyribonucleotide nucleotidyltransferase	less swarm
PA14_62870	PA4752	N ^b	<i>ftsJ</i>	cell division protein FtsJ	no swarm
PA14_62900	PA4755	N ^b	<i>greA</i>	transcription elongation factor GreA	no swarm
PA14_63170	PA4778	N ^b		putative transcriptional regulator	no swarm
PA14_63370	PA4796	N ^b		putative glycine cleavage system H protein	less swarm
PA14_63680	PA4817	N ^b		conserved hypothetical protein	no swarm
PA14_63710	PA4819	N ^b		putative glycosyl transferase	no swarm
PA14_63860	PA4830	N ^b		conserved hypothetical protein	no swarm
PA14_64030	PA4842	N ^b		conserved hypothetical protein	no swarm
PA14_64170	PA4851	Y		conserved hypothetical protein	no swarm
PA14_64180	PA4852	Y		putative tRNA-dihydrouridine synthase	no swarm
PA14_64190	PA4853	N ^b	<i>fis</i>	DNA-binding protein Fis	no swarm
PA14_64590	PA4887	N ^b		putative MFS transporter	no swarm
PA14_64930	PA4916	N ^b		putative ADP-ribose pyrophosphatase	no swarm
PA14_65170	PA4934	N ^b	<i>rpsR</i>	30S ribosomal protein S18	less swarm
PA14_65320	PA4945	N ^b	<i>miaA</i>	delta 2-isopentenylpyrophosphate transferase	no swarm
PA14_65420	PA4952	N ^b		putative GTPase	no swarm
PA14_65520	PA4958	N ^b		conserved hypothetical protein	less swarm
PA14_65990	PA4990	N ^b	<i>qacH</i>	putative SMR multidrug efflux transporter	no swarm
PA14_66120	PA5001	N ^b		conserved hypothetical protein	less swarm
PA14_66140	PA5002	Y		conserved hypothetical protein	no swarm
PA14_66640	PA5042	N ^b	<i>pilO</i>	type 4 fimbrial biogenesis protein PilO	no swarm
PA14_66660	PA5044	Y	<i>pilM</i>	type 4 fimbrial biogenesis protein PilM	no swarm
PA14_67090	PA5078	N ^b		periplasmic glucan biosynthesis protein, MdoG	no swarm
PA14_67240	PA5091	N ^b	<i>hutG</i>	N-formylglutamate amidohydrolase	no swarm
PA14_67420	PA5105	Y	<i>hutC</i>	histidine utilization genes repressor protein	no swarm
PA14_67670	PA5124	Y	<i>ntrB</i>	two-component sensor NtrB	no swarm
PA14_67680	PA5125	N ^b	<i>ntrC</i>	two-component response regulator NtrC	no swarm
PA14_67810	PA5134	N ^b		putative carboxyl-terminal protease	less swarm
PA14_69090	PA5232	N ^b		putative membrane fusion protein	less swarm
PA14_69190	PA5239	N ^b	<i>rho</i>	transcription termination factor Rho	no swarm

PA14_69220	PA5241	N ^b	<i>ppx</i>	exopolyphosphatase	less swarm
PA14_69470	PA5261	N ^b	<i>algR</i>	alginate biosynthesis regulatory protein AlgR	less swarm
PA14_69560	PA5267	N ^b	<i>hcpA</i>	secreted protein Hcp	no swarm
PA14_70180	PA5315	N ^b	<i>rpmG</i>	50S ribosomal protein L33	less swarm
PA14_70570	PA5345	N ^b	<i>recG</i>	ATP-dependent DNA helicase RecG	no swarm
PA14_70850	PA5368	N ^b	<i>pstC</i>	phosphate ABC transporter, permease protein	no swarm
PA14_71000	PA5376	N ^b		putative lysine betaine/L-proline ABC transporter, ATP-binding subunit	no swarm
PA14_71030	PA5378	N ^b		putative glycine betaine/L-proline ABC transporter, periplasmic component	no swarm
PA14_72000	PA5454	N ^b	<i>rmd</i>	oxidoreductase Rmd	no swarm
PA14_72490	PA5493	N ^b	<i>polA</i>	DNA polymerase I	less swarm
PA14_72620	PA5503	N ^b		putative ATP-binding component of ABC transporter	less swarm
PA14_73020	PA5536	Y		putative C4-type zinc finger protein, DksA/TraR family	less swarm
PA14_73120	PA5545	N ^b		putative periplasmic transport protein	no swarm
PA14_07480		N/A		putative reverse transcriptase	no swarm
PA14_14350		N/A		hypothetical protein	no swarm
PA14_15450		N/A	<i>merD</i>	Mercuric resistance transcriptional repressor protein MerD	less swarm
PA14_17160		N/A		hypothetical protein	no swarm
PA14_17750		N/A		hypothetical protein	no swarm
PA14_23430		N/A	<i>ORF_11</i>	putative heparinase	less swarm
PA14_23460		N/A	<i>wbpL</i>	putative glycosyltransferase L	no swarm
PA14_24360		N/A		putative serine protease	no swarm
PA14_30120		N/A		hypothetical protein	no swarm
PA14_30210		N/A		putative cytoplasmic protease	no swarm
PA14_32960		N/A		hypothetical protein	no swarm
PA14_48120		N/A		hypothetical protein	no swarm
PA14_54970		N/A		probable ABC transporter protein	no swarm
PA14_56280		N/A		conserved hypothetical protein	no swarm
PA14_56610		N/A		hypothetical protein	no swarm
PA14_58760		N/A	<i>pilC</i>	type 4 fimbrial biogenesis protein pilC	less swarm
PA14_59060		N/A		putative DNA binding protein	no swarm
PA14_59560		N/A		transposase	less swarm
PA14_60060		N/A		hypothetical protein	no swarm
PA14_60290		N/A	<i>pilW</i>	type 4 fimbrial biogenesis protein PilW	no swarm
PA14_60310		N/A	<i>pilY1</i>	type 4 fimbrial biogenesis protein PilY1	no swarm
PA14_61380		N/A		conserved hypothetical protein	no swarm
PA14_62030		N/A		putative paraquat-inducible protein A	no swarm
PA14_63610		N/A		hypothetical protein	no swarm
PA14_67070		N/A		hypothetical protein	no swarm
PA14_69920		N/A		hypothetical protein	no swarm

Transposon mutants are organized in ascending order of PAO1 ortholog. The list represents all of the swarming deficient mutants verified on BM2 swarm agar plates. No swarm, surface coverage of mutant relative to PA14 WT is < 25 %; Less swarm, surface coverage of mutants relative to PA14 WT is < 50 %; Hyper-swarm, surface coverage of mutant relative to PA14 WT is > 25 %. ^a Possibility of transposon insertion affecting expression on downstream genes. Y, yes; N, no; N/A, not applicable. ^b No evidence for polar effect identified from our screens.