Table 4. Mutations in genes which occurred during chronic airways infection in patient 1

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
m1	PA3565		probable transcriptional regulator		synonymous	247	C	T	L	L	-	
m2	PA3159	*wbpA*	probable UDP-glucose/GDP-mannose dehydrogenase	virulence, O-antigen	1.6kb IS insertion	811	-	-	-	-	-	
m3	PA1713	*exsA*	transcriptional regulator	virulence	nonsynonymous	53	A	G	N	S	Tolerated	
m4	PA4848	*accC*	biotin carboxylase	fatty-acid metabolism	nonsynonymous	542	C	T	S	L	Tolerated	
m5	PA4525	*pilA*	type 4 fimbrial precursor	virulence, motility	1.6kb IS insertion	262	-	-	-	-	-	
m6	PA2435		probable cation-transporting P-type ATPase	small-molecule transport	nonsynonymous	1835	T	C	L	P	Tolerated	
m8	PA0707	*toxR (regA)*	transcriptional regulator	virulence regulator	nonsynonymous	590	A	T	N	I	None	

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
m10	PA0425	*mexA*	Resistance-nodulation-cell division (RND) multidrug efflux membrane fusion protein precursor	small-molecule transport, virulence	nonsynonymous	497	G	C	G	A	Not tolerated	
m11	PA0366		probable aldehyde dehydrogenase		1bp deletion	1383	CCCCCCC	CCCCCC	-	-	-	
m12	PA4420	*(mraW yabC ylxA)*	conserved hypothetical protein		synonymous	798	G	T	L	L	-	
m13	PA0997	*pqsB*	Homologous to β-keto-acyl-acyl-carrier protein synthase	quorum sensing	nonsynonymous	269	C	T	A	V	None	
m14	in 45-kb genomic island	*(P1-001)*	hypothetical protein		1bp deletion	2845	GGGGGGGG	GGGGGGG	-	-	-	
m15	in PAGI-3(SG) and PAGI-2(C) genomic	*(C/SG114)*	hypothetical protein		1bp deletion	398	AA	A	-	-	-	

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
	island											
m17	PA4796		hypothetical protein		nonsynonymous	416	G	A	R	H	Tolerated	
m18	PA3817		probable methyltransferase		nonsynonymous	145	C	T	R	W	Not tolerated	
m19	PA2492	*mexT*	transcriptional regulator	regulation of small-molecule transport	nonsynonymous	708	A	G	H	R	Not tolerated	
m20	PA2491	*mexS*	probable oxidoreductase	small-molecule transport	nonsynonymous	260	C	T	A	V	Tolerated	
m21	PA2161		hypothetical protein		nonsynonymous	235	G	A	A	T	None	
m22	PA2020	*mexZ (amrR)*	probable transcriptional regulator	regulation of small-molecule transport	11bp deletion	193	GTCGCAC ATCG	-	-	-	-	
m23	PA1532	*dnaX*	DNA polymerase subunits gamma and tau	DNA replication	6bp insertion	1375	-	CCGAGC	-	-	-	Inserts 1 copy into 12 existing copies of

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
												repeat CCGAGC
m24	PA1430	*lasR*	transcriptional regulator of quorum sensing	virulence, quorum sensing	1bp deletion	147	C	-	-	-	-	
m25	PA1333		hypothetical protein		synonymous	99	C	T	A	A	-	
m26	PA0313	*(yecS)*	probable permease of ABC transporter	small-molecule transport	nonsynonymous	424	A	C	T	P	Not tolerated	
m27	in pKLC102 genomic island	*chvB*	cyclic beta-1,2-glucan biosynthesis protein	virulence, osmotic balance, motility, attachment	1bp deletion	2428	CCCCCCCC	CCCCCCC	-	-	-	
m28	in PAGI-2(C) genomic island	*(C71)*	putative RNA/DNA helicase	transcription	synonymous	1281	C	T	A	A	-	
m29	PA5238		probable O-antigen	virulence,	nonsynonymous	1585	C	T	Q	STOP	-	

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
			acetylase	O-antigen	(nonsense)							
m30	PA5005		probable carbamoyl transferase		nonsynonymous	1123	C	T	P	S	Not tolerated	
m31	PA4707	*(phuU)*	probable permease of ABC transporter	iron transport	nonsynonymous	460	G	A	A	T	Not tolerated	
m32	PA4580		conserved hypothetical protein		synonymous	426	C	T	S	S	-	
m33	PA4477	*cafA*	cytoplasmic axial filament protein	cell division	1bp deletion	273	GGGG	GGG	-	-	-	
m36	PA4217	*phzS*	flavin-containing monooxygenase	virulence	nonsynonymous	1106	A	G	E	G	Tolerated	
m37	PA3620	*mutS (fdv)*	DNA mismatch repair protein	mutator	nonsynonymous	1469	G	T	R	L	Not tolerated	
m38	PA3574		probable transcriptional regulator		1bp deletion	77	AAAA	AAA	-	-	-	
m39	PA3270		hypothetical protein		synonymous	336	C	T	N	N	-	
m40	PA3254		probable ATP-	small-	nonsynonymous	761	C	T	A	V	Tolerated	

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
			binding component of ABC transporter	molecule transport								
m41	PA3170		conserved hypothetical protein		1bp insertion	1306	GGGGGG	GGGGGG	-	-	-	
m42	PA2958		hypothetical protein		nonsynonymous	458	T	C	V	A	Not tolerated	
m43	PA2744	*thrS*	threonyl-tRNA synthetase		synonymous	1857	C	T	P	P	-	
m44	PA2426	*pvdS*	sigma factor	iron regulation, virulence	nonsynonymous	196	T	C	Y	H	Not tolerated	
m45	PA2092		probable major facilitator superfamily (MFS) transporter	small-molecule transport	nonsynonymous	1058	C	G	A	G	Tolerated	
m46	PA1910	*(ufrA)*	probable tonB-dependent receptor protein	iron transport	nonsynonymous	1466	T	C	M	T	Tolerated	
m48	PA1112	*(ylil)*	conserved hypothetical protein		nonsynonymous	688	G	C	A	P	Not tolerated	

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
m49	PA1032	*(pac)*	probable penicillin amidase	antibiotic resistance	1bp deletion	541	C	-	-	-	-	
m52	PA0081		hypothetical protein		54bp deletion	837	-	-	-	-	-	Deletes 9 of 17 copies of repeat GGCTGT
m53	in PAGI-3(SG) and PAGI-2(C) genomic islands	*(C/SG117)*	hypothetical protein		synonymous	468	C	T	G	G	-	
m54	PA4999		hypothetical protein		nonsynonymous	851	G	T	G	V	Not tolerated	
m55	PA4270	*rpoB*	DNA-directed RNA polymerase beta chain	transcriptio n	nonsynonymous	1562	A	G	D	G	Not tolerated	
m56	PA4251	*rplE*	50S ribosomal protein L5	translation	nonsynonymous	89	G	A	R	H	Not tolerated	
m57	PA3974		probable two-component sensor		nonsynonymous (nonsense)	1105	C	T	Q	STOP	-	

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
m58	PA3974		probable two-component sensor		nonsynonymous	2306	C	A	A	D	Not tolerated	
m59	PA3875	*narG*	respiratory nitrate reductase alpha chain	anaerobic growth	nonsynonymous	1420	G	T	A	S	Tolerated	
m60	PA3522		probable RND efflux transporter	small-molecule transport	3bp deletion	1062	GTGGTGGTGGTGGT G	GTGGTGGTGGTG	-	-	-	
m61	Deletion spans PA2272 to PA2410		-	iron transport, small-molecule transport, others	188kb deletion	1649	-	-	-	-	-	Deletes pyoverdine region
m62	PA2191	*exoY*	adenylate cyclase	virulence	1bp deletion	727	CCCCCC	CCCCC	-	-	-	
m63	PA2018	*(mexH;mexY;amrB)*	RND multidrug efflux transporter	small-molecule transport	nonsynonymous	860	G	C	G	A	Tolerated	
m64	PA1737	*(fadB)*	probable 3-hydroxyacyl-CoA	fatty-acid metabolism	3bp deletion	444	CGG	-	-	-	-	

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
			dehydrogenase									
m65	PA1713	*exsA*	transcriptional regulator	virulence	nonsynonymous	638	C	T	P	L	Tolerated	
m66	PA0426	*mexB*	RND multidrug efflux transporter	small-molecule transport, virulence	nonsynonymous (nonsense)	1762	C	T	Q	STOP	-	
m67	PA0004	*gyrB*	DNA gyrase subunit B	DNA replication	nonsynonymous	1404	G	T	E	D	Not tolerated	
m68	PA4642		hypothetical protein		2bp insertion	91	CCCCCCCC	CCCCCCCCCC	-	-	-	
s1	PA0081		hypothetical protein		24bp deletion	837	-	-	-	-	-	Deletes 4 of 17 copies of repeat GGCTGT
s2	PA0081		hypothetical protein		6bp insertion	837	-	-	-	-	-	Inserts 1 copy into 17 copies of repeat GGCTGT

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
s3	PA1430	*lasR*	transcriptional regulator	virulence, quorum sensing	nonsynonymous	199	G	C	A	P	Tolerated	
s4	PA0763	*mucA*	anti-sigma factor	mucoidy	1bp deletion	430	G	-	-	-	-	
s5	PA0081		hypothetical protein		12bp deletion	837	-	-	-	-	-	Deletes 2 of 17 copies of repeat GGCTGT
s6	PA0081		hypothetical protein		6bp deletion	837	-	-	-	-	-	Deletes 1 of 17 copies of repeat GGCTGT
s7	PA1532	*dnaX*	DNA polymerase subunits gamma and tau	DNA replication	6bp deletion	1375	CCGAGC	-	-	-	-	Deletes 1 of 12 copies of repeat TCGGGC
s8	PA0763	*mucA*	anti-sigma factor	mucoidy	1bp deletion	357	G	-	-	-	-	
s9	PA0081		hypothetical protein		12bp deletion	837	-	-	-	-	-	Deletes 2 of 17 copies of repeat GGCTGT

Mutation no. in Fig. 1*	PAO1 annotation no.	Gene name (alternate gene name)	Gene function	Functional category	Type of mutation	Nucleotide position mutated in gene	Nucleotide prior to mutation	Nucleotide after mutation	Amino acid prior to mutation	Amino acid after mutation	Computa-tional prediction of effect on protein function†	Notes
s10	PA2491	*mexS*	probable oxidoreductase	small-molecule transport	nonsynonymous	479	C	T	P	L	Tolerated	
s11	PA0081		hypothetical protein		12bp deletion	837	-	-	-	-	-	Deletes 2 of 17 copies of repeat GGCTGT
s13	PA3244	*minD*	cell division inhibitor	cell division	nonsynonymous	166	G	A	V	M	Not tolerated	
s14	PA0081		hypothetical protein		30bp deletion	837	-	-	-	-	-	Deletes 5 of 17 copies of repeat GGCTGT
s15	PA2312		probable transcriptional regulator		1bp insertion	396	CCCCC	CCCCCC	-	-	-	
s16	PA0763	*mucA*	anti-sigma factor	mucoidy	1bp deletion	420	AA	A	-	-	-	
s17	PA4642		hypothetical protein		1bp insertion	91	CCCCCCCC	CCCCCCCCC	-	-	-	

IS, insertion element.

*****Mutations present in the 96-month isolate, 35, are numbered m1–m68, and mutations present only in intermediate isolates are numbered s1–s17.

[†]Nonsynonymous mutations that are predicted to cause partial or complete loss of function are labeled “Not tolerated.” No prediction was made when fewer than four homologs were available.