

Suppl. Table 9. Base substitution details

MA Lines	Position	Mutation	Genic region*	nino acid chan	Gene**	Protein	nonsyn/syn***
Hv1	_013964:13993	C>T	Coding	Ala225Ala	dppC13	ABC-type trans	syn
Hv1	_013967:16683	C>T	NonCoding				
Hv1	_013967:25676	C>A	NonCoding				
Hv1	_013968.1:815	G>A	Coding	Asp99Asp	HVO_RS19610	hypothetical	syn
Hv2	_013966:26315	G>A	NonCoding				
Hv2	_013967:10447	G>A	Coding	Ala112Val	pssA	CDP-diacylglyc	nonsyn
Hv2	_013967:13245	A>G	Coding	Glu277Gly	HVO_1452	Citrate-lyase (E	nonsyn
Hv2	_013967:13286	T>C	Coding	Arg163Arg	HVO_1456	HTR-like protei	syn
Hv5	_013967:93748	C>T	Coding	Val90Met	HVO_1028	Putative oxido	nonsyn
Hv8	_013967:6336	G>A	NonCoding				
Hv8	_013967:69639	C>T	NonCoding				
Hv16	_013964:33734	G>A	NonCoding				
Hv16	_013967:27926	G>A	Coding	Ala36Thr	HVO_2956	Uncharacterize	nonsyn
Hv17	_013967:71098	G>T	NonCoding				
Hv18	_013966:39471	G>A	Coding	Gly260Ser	dppC8	ABC-type trans	nonsyn
Hv18	_013967:12828	C>A	NonCoding				
Hv18	_013967:21185	A>T	Coding	Gly280Gly	HVO_2259	XerC/D-like int	syn
Hv18	_013967:28373	G>A	Coding	Arg58Cys	htr15b	Transducer pro	nonsyn
Hv19	_013967:24796	G>A	Coding	Arg36Arg	htlC	Htr-like protei	syn
Hv20	_013967:16751	T>A	Coding	Lys89Asn	tatCt	Sec-independe	nonsyn
Hv20	_013967:15562	G>T	Coding	Gly95Val	HVO_1697	FAD-dependen	nonsyn
Hv20	_013967:16482	A>G	Coding	Asp91Gly	HVO_1781	Uncharacterize	nonsyn
Hv21	_013967:59304	G>T	NonCoding				
Hv21	_013967:11825	G>A	Coding	Lys239Lys	HVO_1298	Adaptive-respo	syn
Hv21	_013967:18110	A>T	NonCoding				
Hv22	_013966:38015	T>A	NonCoding				
Hv23	_013967:28299	G>A	Coding	His321Tyr	metY1	O-acetylhomos	nonsyn
Hv25	_013966:49053	C>A	NonCoding				
Hv25	_013967:12017	G>A	Coding	Leu31Leu	HVO_1316	Uncharacterize	syn
Hv25	_013967:19333	G>A	Coding	Thr118Thr	HVO_2078	DUF304 domai	syn
Hv25	_013967:28445	G>T	NonCoding				
Hv26	_013968:8331	G>T	NonCoding				
Hv26	_013966:2109	G>C	Coding	Glu85Asp	HVO_A0019	OB-fold nucleic	nonsyn
Hv26	_013967:91290	A>G	NonCoding				
Hv29	_013966:43390	C>T	Coding	Ser69Asn	dppA9	ABC-type trans	nonsyn
Hv29	_013967:79341	G>T	Coding	Lys287Asn	epf1	mRNA 3-end p	nonsyn
Hv29	_013967:14833	G>A	Coding	Thr28Thr	HVO_1614	Uncharacterize	syn
Hv29	_013967:19973	C>G	Coding	Arg156Pro	fbp2	Fructose-1,6-b	nonsyn
Hv29	_013966.1:4339	C>T	Coding	Ser69Ser	HVO_RS03750	ABC-transport	syn
Hv30	_013966:25587	G>T	Coding	Ala331Ser	HVO_A0254	Conserved pro	nonsyn
Hv30	_013967.1:9207	G>A	NonCoding				
Hv30	_013967:10243	A>T	NonCoding				

Hv32	_013967:6747C	G>T	Coding	Asp302Tyr	HVO_0753	Uncharacterize	nonsyn
Hv32	_013967:15955	T>C	Coding	Ser272Pro	orc5	ORC1-type DN	nonsyn
Hv32	_013967:27384	A>T	NonCoding				
Hv33	_013966:32376	T>C	NonCoding				
Hv33	_013966:38537	C>A	Coding	Cys354Phe	HVO_A0376	Xaa-Pro amino	nonsyn
Hv33	_013967:92743	G>T	Coding	Arg511Leu	HVO_1018	RecJ domain p	nonsyn
Hv33	_013967:12120	C>T	Coding	Glu877Lys	lhr2	ATP-dependen	nonsyn
Hv33	_013967:13489	T>A	Coding	Ile191Asn	tfb5	Transcription i	nonsyn
Hv33	_013967:14049	C>T	NonCoding				
Hv33	_013967:18641	T>A	NonCoding				
Hv33	_013967:20300	C>T	Coding	Thr1618Met	HVO_2160	Uncharacterize	nonsyn
Hv33	_013966.1:1104	G>A	Coding	Tyr184Tyr	hvo_rs01910	hypothetical	
Hv34	_013964:13663	T>A	Coding	Ser9Thr	dppA13	ABC-type trans	nonsyn
Hv34	_013964:36835	C>A	NonCoding				
Hv34	_013966:50405	G>A	Coding	Ala201Val	boa7	Bacterio-opsin	nonsyn
Hv34	_013967:50283	T>A	NonCoding				
Hv35	_013966:6877	G>T	Coding	Ala648Ser	HVO_A0074	Uncharacterize	nonsyn
Hv35	_013967:23745	G>T	Coding	Val289Phe	carA	Carbamoyl-pho	nonsyn
Hv41	_013966:13714	C>G	Coding	Glu283Asp	ltrC3	LtrC-like protei	nonsyn
Hv42	_013967:6683	A>T	Coding	Arg929Ser	polD2	DNA polymera	nonsyn
Hv42	_013967:62433	C>T	Coding	Val166Ile	HVO_0693	Auxin permeas	nonsyn
Hv43	_013967:16242	C>T	NonCoding				
Hv43	_013967:19276	G>A	NonCoding				
Hv43	_013967:25587	G>A	Coding	Glu285Lys	rtcB	tRNA-splicing l	nonsyn
Hv43	_013967:28309	A>T	NonCoding				
Hv44	_013966:32363	T>C	NonCoding				
Hv44	_013967:41511	C>T	Coding	Val388Val	HVO_0465	DNA damage-i	syn
Hv45	_013964:1411	G>T	Coding	Glu197*	gcvT1	Sacrosine dehy	stop_gained
Hv45	_013964:23366	A>G	NonCoding				
Hv45	_013964:25526	G>A	Coding	Glu40Glu	HVO_B0216	Uncharacterize	syn
Hv45	_013967:14673	G>A	Coding	Arg294His	HVO_0160	CAAX amino te	nonsyn
Hv45	_013967:14376	C>T	Coding	Arg359His	top6A	Type 2 DNA to	nonsyn
Hv46	_013964:28842	C>A	Coding	Gly182Trp	HVO_B0241	IS1341-type tri	nonsyn
Hv46	_013967:12405	G>T	Coding	Leu82Ile	HVO_1361	UPF0721 trans	nonsyn
Hv46	_013967:21649	C>T	Coding	Asp109Asn	HVO_2295	Cationic aminc	nonsyn
Hv46	_013967.1:27015	A>T	Coding	His15Leu	HVO_RS18545	DUF211 domi	nonsyn
Hv47	_013966:14588	T>A	NonCoding				
Hv47	_013966:31348	A>G	Coding	Gly5Gly	HVO_A0301	Polysaccharide	syn
Hv47	_013967:37144	A>G	NonCoding				
Hv47	_013967:12918	A>G	Coding	Ile396Thr	HVO_1417	DUF318 family	nonsyn
Hv47	_013967.1:14075	T>A	Coding	Ala206Ala	glpB	glycerol-3-pho	syn
Hv47	_013967:16448	G>A	Coding	Ala704Thr	katG	Catalase-perox	nonsyn
Hv48	_013964:38435	A>G	NonCoding				
Hv48	_013967:13013	G>C	Coding	Ala96Ala	HVO_1428	Homolog to ph	syn
Hv49	_013964:5530	T>C	NonCoding				

Hv49	_013967:70165	C>T	Coding	Ala44Thr	HVO_0781	NAD operon pr	nonsyn
Hv49	_013967:12744	C>A	Coding	Pro513Pro	tsgD11	ABC-type trans	syn
Hv49	_013967:19629	T>C	NonCoding				
Hv49	_013967:24434	C>A	Coding	Glu68*	HVO_2592	DsbA family pr	stop_gained
Hv49	_013967:25772	A>G	Coding	Thr537Ala	etfA2	Electron transf	nonsyn
Hv50	_013964:18817	G>A	Coding	Ser204Ser	qcrB	Menaquinol-cy	syn
Hv50	_013964:25628	C>A	Coding	Ala380Glu	HVO_B0216	Uncharacterize	nonsyn
Hv50	_013966:60366	G>T	NonCoding				
Hv50	_013967:55166	G>T	Coding	Arg322Ser	pilB1	Type IV pilus b	nonsyn
Hv50	_013967:24275	G>A	Coding	Tyr184Tyr	HVO_2576	DnaJ domain p	syn
Hv50	_013967:27725	T>A	Coding	Lys64Asn	mc1B	Nonhistone ch	nonsyn
Hv51	_013966:51674	C>T	Coding	Val330Ile	aldY5	Aldehyde dehy	nonsyn
Hv51	_013966:54570	C>A	Coding	Val80Val	HVO_A0541	ABC-type trans	syn
Hv51	_013967:79671	T>A	Coding	Asp23Val	nthB	Endonuclease	nonsyn
Hv51	_013967:25028	G>T	Coding	Ala311Asp	HVO_2654	Cytochrome B6	nonsyn
Hv52	_013967:22728	G>T	Coding	Ser130*	gcvT	Probable amin	stop_gained
Hv53	_013966:32397	T>C	NonCoding				
Hv54	_013968:3983	G>A	Coding	Ala435Ala	HVO_C0042	Putative helica	syn
Hv54	_013964:29193	C>T	Coding	Ala346Val	aor1	Aldehyde ferre	nonsyn
Hv54	_013967:14019	C>T	Coding	Gly165Asp	HVO_1534	Methyltransfe	nonsyn
Hv54	_013967:18818	C>T	NonCoding				
Hv54	_013967:23297	G>A	Coding	Ala39Ala	gul	Inosine-5-mon	syn
Hv65	_013966:10685	G>A	Coding	Ala8Ala	HVO_A0101	Uncharacterize	syn
Hv65	_013966:52877	G>A	Coding	Val212Ile	hbd4	3-hydroxyacyl-	nonsyn
Hv65	_013967:24024	G>A	Coding	Gly254Gly	HVO_0271	Homolog to vir	syn
Hv65	_013967:98218	G>T	Coding	Ala137Ser	graD1	Sugar nucleoti	nonsyn
Hv65	_013967:15462	T>C	NonCoding				
Hv66	_013967:15401	T>A	Coding	Asp77Val	malQ	4-alpha-glucan	nonsyn
Hv67	_013968:8489	T>A	Coding	Glu48Val	HVO_C0089	Uncharacterize	nonsyn
Hv68	_013967:1:15974	T>A	Coding	Glu22Val	HVO_RS13010	TATA-box-bin	nonsyn
Hv69	_013968:4169	C>A	Coding	Leu1056Ile	HVO_C0042	Putative helica	nonsyn
Hv69	_013967:15410	T>C	Coding	Val139Ala	thrS	Threonine--tr	nonsyn
Hv69	_013967:21704	A>T	Coding	Val402Asp	HVO_2302	Putative ubiqu	nonsyn
Hv73	_013964:26492	G>A	NonCoding				
Hv74	_013966:42351	T>C	Coding	Asn4Asn	HVO_A0419	Nucleotidyltra	syn
Hv74	_013967:26371	C>A	Coding	Gly63Cys	HVO_2806	Uncharacterize	nonsyn
Hv74	_013967:1:11438	C>T	Coding	Val180Met	HVO_RS10740	DUF58 domain-containing protein	
Hv76	_013967:1:5021	C>A	Coding	Gly313Asp	HVO_RS04945	cation:proton antiporter	
Hv76	_013967:52562	C>T	NonCoding				
Hv76	_013967:86807	A>T	Coding	Thr50Thr	HVO_0959	Uncharacterize	syn
Hv76	_013967:15182	G>A	Coding	Thr148Thr	cysK2	Cysteine synth	syn
Hv76	_013967:23411	T>A	Coding	Leu389His	nac	Nascent polyp	nonsyn
Hv76	_013966:1:6314	C>T	NonCoding				
Hv76	_013964:1:3405	G>T	NonCoding				
Hv77	_013964:23945	C>T	Coding	Pro334Pro	lccA	Laccase (EC 1.1	syn

Hv77	_013964:4088C	G>A	Coding	Arg547Cys	HVO_B0354	Uncharacterize	nonsyn
Hv77	_013966:2020A	A>T	Coding	Leu208*	HVO_A0198	Uncharacterize	stop_gained
Hv77	_013966:3372C	C>T	Coding	Ala429Ala	bgaH	Beta-D-galacto	syn
Hv79	_013967:6550	G>A	Coding	Ser488Ser	polD2	DNA polymera	syn
Hv79	_013967:8981A	A>T	Coding	Gly506Gly	nuoM	NADH dehydrc	syn
Hv79	_013967:1197A	C>T	Coding	Ala186Thr	HVO_1311	Putative oxido	nonsyn
Hv80	_013966:3014A	T>G	NonCoding				
Hv80	_013966:3768T	T>G	Coding	Ile35Ser	HVO_A0365	Uncharacterize	nonsyn
Hv80	_013967:1284G	G>A	Coding	Gly192Ser	HVO_1410	Uncharacterize	nonsyn
Hv80	_013967:1744C	C>T	Coding	Ala42Thr	HVO_1893	Ham1 family p	nonsyn
Hv80	_013967:2794A	A>G	NonCoding				
Hv85	_013966:2296G	G>A	Coding	Met401Ile	HVO_A0222	Uncharacterize	nonsyn
Hv85	_013967:1143C	C>T	Coding	Val180Met	HVO_1256	Uncharacterize	nonsyn
Hv85	_013967:2067C	C>A	Coding	Ala80Asp	HVO_2199	Uncharacterize	nonsyn
Hv85	_013967:2072G	G>A	Coding	Ala151Val	ftsZ4	Tubulin-like pr	nonsyn
Hv86	_013967:8173G	G>A	Coding	Pro80Pro	livJ1	ABC-type trans	syn
Hv86	_013967:2554A	A>T	Coding	Ser20Thr	HVO_2707	GFO family oxi	nonsyn
Hv87	_013964:4173C	C>T	Coding	Arg114Gln	HVO_B0360	Uncharacterize	nonsyn
Hv87	_013966:989A	A>C	NonCoding				
Hv87	_013967:7711G	G>A	Coding	Arg251His	polB1	DNA polymera	nonsyn
Hv87	_013967:1510C	C>T	Coding	Gly89Gly	HVO_1647	Cytochrome C	syn
Hv87	_013967:2574A	A>G	NonCoding				
Hv88	_013966:1119G	G>A	Coding	Asp135Asp	HVO_A0010	Uncharacterize	syn
Hv88	_013966:1121T	T>C	Coding	Glu129Glu	HVO_A0010	Uncharacterize	syn
Hv88	_013967:5727C	C>T	Coding	Arg190*	HVO_0636	Uncharacterize	stop_gained
Hv88	_013967:1317A	A>G	NonCoding				
Hv90	_013967:6041C	C>T	Coding	Gly223Arg	dppB1	ABC-type trans	nonsyn
Hv90	_013967:6241G	G>A	Coding	Ser240Leu	dppA1	ABC-type trans	nonsyn
Hv90	_013967:4755A	G>A	Coding	Thr276Thr	HVO_0544	Galactose-prot	syn
Hv90	_013967:1339T	T>A	Coding	Glu504Val	menD		nonsyn
Hv98	_013967:7433G	G>A	Coding	Ala170Thr	HVO_0823	DUF420 family	nonsyn
Hv98	_013967:9567T	T>G	NonCoding				
Hv98	_013967:1127C	C>T	Coding	Arg260His	acs3	Acyl-CoA synth	nonsyn
Hv98	_013967:2265A	A>T	Coding	Tyr4Asn	HVO_2395	ATP:cob(I)alarr	nonsyn
Hv98	_013967:4734C	C>T	Coding	Pro40Pro	acnA	Aconitate hydr	syn

\*Noncoding - noncoding sequence, Coding - coding sequence. \*\* Gene is the gene name or type of gene where the base substitution occurs.\*\*\* syn - synonymous, nonsyn - nonsynonymous.