

## Rifampicin resistance mutations in other bacterial strains and species

The list below is not exhaustive; other rifampicin resistance mutations have been described in these strains, and mutations have been described in unlisted strains. The list is merely intended to show that the position and nature of resistance mutations are strongly conserved (due to the mechanism of affecting rifampicin binding sites<sup>1</sup>). Note that the nucleotide and amino acid residue numbering differs between strains, and that some papers use *E. coli* numbering instead of the numbering from the focal species<sup>2</sup>. Also note that *E. coli* K-12 M1655 and *E. coli* B REL606 RpoB (amino acid) sequences are identical.

No.	Name <sup>a</sup>	Base Change <sup>b</sup>	Residue Change <sup>c</sup>	Rif Conc <sup>d</sup>	REL606 homology <sup>e</sup>	This study <sup>f</sup>
<i>Escherichia coli</i> K-12 MG1655 (laboratory isolates): non-pathogenic laboratory strain <sup>3</sup>						
1	1019	g436t	V146F	20-1000	V146F	Exact
2	3445	Δ1520-1531	Δ507-511(insV)	20-1000	Δ507-511(insV)	No
3	101	a1538t	Q513L	20-1000	Q513L	Exact
4	8	a1538c	Q513P	20-1000	Q513P	Exact
5	113	g1546a	D516N	20-1000	D516N	Exact
6	148	a1547t	D516V	20-1000	D516V	Exact
7	3051	1551insGACCAG	S17insDQ	20-1000	S17insDQ	No
8	3595	c1565t	S522F	20-1000	S522F	Exact
9	2	c1576t	H526Y	20-1000	H526Y	Exact
10	3401	c1585t	R529C	20-1000	R529C	Exact
11	3402	c1585a	R529S	20-1000	R529S	Residue
12	256	Δ1591-1599	Δ531-533	20-1000	Δ531-533	No
13	114	c1592t	S531F	20-1000	S531F	Exact
14	3449	Δ1594-1596	Δ532	20-1000	Δ532	No
15	3443	t1598c	L533P	20-1000	L533P	Residue
16	3370	a1687c	T563P	20-1000	T563P	Exact
17	111	c1691t	P564L	20-1000	P564L	Exact
18	7	a1714t	I572F	20-1000	I572F	Exact
19	3406	g2060a	R687H	20-1000	R687H	No
<i>Pseudomonas aeruginosa</i> PA01 (laboratory isolates): opportunistic human pathogen <sup>4</sup>						
1	Unnamed	a455g	Q152R	62.11	Q148R	Exact
2	Unnamed	a455t	Q152L	62.11	Q148L	Exact
3	Unnamed	c1550t	S517L	62.11	S512L	Residue
4	Unnamed	1552ins(cgc)	S17insP	62.11	S12insP	No
5	Unnamed	c1552a	Q518K	62.11	Q513K	Exact
6	Unnamed	a1553g	Q518R	62.11	Q513R	Exact
7	Unnamed	a1553t	Q518L	62.11	Q513L	Exact
8	Unnamed	a1562g	D521G	62.11	D516G	Exact
9	Unnamed	a1562t	D521V	62.11	D516V	Exact
10	Unnamed	c1563g	D521E	62.11	D516E	Residue
11	Unnamed	c1591t	H531Y	62.11	H526Y	Exact
12	Unnamed	a1592g	H531R	62.11	H526R	Residue
13	Unnamed	a1592t	H531L	62.11	H526L	Residue
14	Unnamed	c1607t	S536F	62.11	S531F	Exact
15	Unnamed	c1706t	P569L	62.11	P564L	Exact
<i>Mycobacterium tuberculosis</i> (clinical isolates): human pathogen currently treated with rifampicin <sup>2</sup>						
1	Unnamed	t1289c & a1304g	L430P & D435G	Unknown	L511P & D515G	No
2	Unnamed	a1295g	Q432R	Unknown	Q513R	Exact
3	Unnamed	Δ1301-1303	Δ434-435(insN)	Unknown	Δ515-516(insD)	Residue
4	Unnamed	a1304t	D435V	Unknown	D516V	Exact
5	Unnamed	Δ1303-1308	Δ435-436	Unknown	Δ516-517	Residue
6	Unnamed	c1333g	H445D	Unknown	H526D	Residue
7	Unnamed	c1333t	H445Y	Unknown	H526Y	Exact
8	Unnamed	c1333t & a1334g	H445C	Unknown	H526C	Residue
9	Unnamed	c1649t	S550L	Unknown	S531L	Residue
10	Unnamed	c1649g	S550W	Unknown	S531W	Residue
11	Unnamed	t1655c	L552P	Unknown	L533P	Residue

**Table 1: Mutations in *rpoB* that result in rifampicin resistance in species other than *E. coli* B REL606.** <sup>a</sup>Strain name as provided in the reference paper. <sup>b</sup>Change in DNA sequence labeled according to the species *rpoB* sequence. <sup>c</sup>Resulting amino acid change. <sup>d</sup>Rifampicin concentration at which the mutant was isolated (μg/ml). <sup>e</sup>The homologous amino acid change in the REL606 RpoB sequence. <sup>f</sup>Presence of mutation(s) among the isolates of this study (No=not present, Exact=precise change found, Residue=residue mutated, but to a different amino acid). *E. coli* B REL606: *rpoB* NC\_012967.1; *E. coli* K-12 M1655: *rpoB* NC\_000913.2; *P. aeruginosa* PA01: *rpoB* NC\_002516.2; *M. tuberculosis* H37Rv: *rpoB* NC\_000962.2.

<sup>1</sup> Campbell, E. A., N. Korzheva, A. Mustaev, K. Murakami, S. Nair, A. Goldfarb, and S. A. Darst. 2001. Structural mechanism for rifampicin inhibition of bacterial RNA polymerase. *Cell* 104:901-912. <sup>2</sup> Garcia, L., M. Alonso-Sanz, M. J. Rebollo, C. Tercero, and F. Chaves. 2001. Rifampicin-resistant *Mycobacterium tuberculosis* isolates in Spain and their rapid detection by PCR-enzyme linked immunosorbent assay. *J Clin Microbiol* 39:1813-1818. <sup>3</sup> Jin, D. J., and C. A. Gross. 1988. Mapping and sequencing of mutations in the *Escherichia coli rpoB* gene that lead to rifampicin resistance. *J Mol Biol* 202:45-58. <sup>4</sup> MacLean, R. C., and A. Buckling. 2009. The Distribution of Fitness Effects of Beneficial Mutations in *Pseudomonas aeruginosa*. *PLoS Genet* 5:e1000406.