

Supplementary Materials

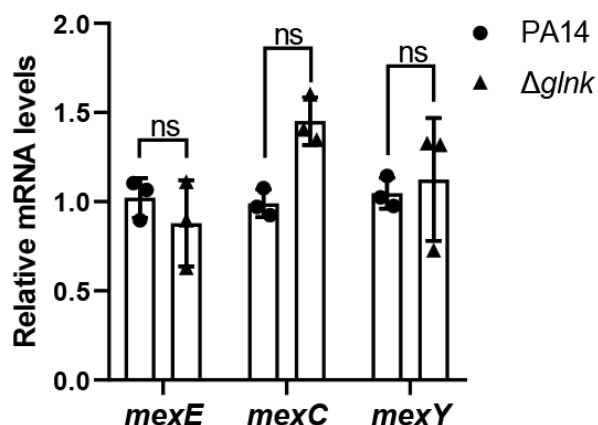


Figure S1. mRNA levels of *mexE*, *mexC* and *mexY* in the wild-type PA14 and $\Delta glnK$. Gene expression levels were normalized to *rpsL* mRNA levels. Data are shown as mean $\pm$ SD from triplicate biological replicates. ns, not significant by one-way ANOVA.

Table S1. Differential gene expression of selected gene categories in $\Delta glnK$ vs. wild-type PA14.

Gene ID	Gene Name	Description	log ₂ FC ^a
A.Metabolic genes involved in nitrogen metabolism			
PA14_60710	<i>gdhA</i>	glutamate dehydrogenase	-2.71
PA14_67600	<i>glnA</i>	glutamine synthetase	1.82
PA14_49250	<i>napA</i>	nitrate reductase catalytic subunit	-1.51
PA14_49210	<i>napE</i>	periplasmic nitrate reductase NapE	-0.23
PA14_49230	<i>napD</i>	NapD protein of periplasmic nitrate reductase	-1.48
PA14_49250	<i>napA</i>	nitrate reductase catalytic subunit	-1.51
PA14_68350	<i>arcC</i>	carbamate kinase	-0.40
PA14_49270	<i>napC</i>	cytochrome c-type protein NapC	-1.72
PA14_49220	<i>napF</i>	ferredoxin protein NapF	-0.18
PA14_03860	-	glutamine synthetase family protein	1.57
PA14_38140	-	glutamine synthetase family protein	1.91
PA14_64350	<i>ureA</i>	urease subunit gamma	2.79
PA14_64390	<i>ureC</i>	urease subunit alpha	3.08
PA14_64335	<i>ureD</i>	urease accessory protein	3.15
PA14_64370	<i>ureB</i>	urease subunit beta	3.41
PA14_64660	<i>ureF</i>	urease accessory protein UreF	4.94
PA14_64670	<i>ureG</i>	urease accessory protein	4.66
PA14_64650	<i>ureE</i>	urease accessory protein	4.29
PA14_69795	<i>amtB</i>	ammonium transporter	3.29
PA14_44240	-	glutamine synthetase family protein	1.73
PA14_72850	-	glutamine synthetase family protein	1.51

PA14_41540	<i>nirD</i>	nitrite reductase small subunit NirD	7.31
B. RND efflux pump and outer membrane porin genes involved in multidrug transport			
PA14_05530	<i>mexA</i>	multidrug efflux RND transporter periplasmic adaptor subunit MexA	0.27
PA14_05540	<i>mexB</i>	multidrug efflux RND transporter permease subunit MexB	0.49
PA14_05550	<i>oprM</i>	multidrug efflux RND transporter outer membrane channel subunit OprM	0.39
PA14_60850	<i>mexC</i>	multidrug efflux RND transporter periplasmic adaptor subunit MexC	0.18
PA14_60830	<i>mexD</i>	multidrug efflux RND transporter permease subunit MexD	0.4
PA14_60820	<i>oprJ</i>	multidrug efflux transporter outer membrane subunit OprJ	0.27
PA14_32400	<i>mexE</i>	multidrug efflux RND transporter periplasmic adaptor subunit MexE	0.26
PA14_32390	<i>mexF</i>	multidrug efflux RND transporter permease subunit MexF	0.82
PA14_32380	<i>oprN</i>	multidrug efflux RND transporter outer membrane subunit OprN	0.65
PA14_38395	<i>mexX</i>	multidrug efflux RND transporter periplasmic adaptor subunit MexX	0.39
PA14_38410	<i>mexY</i>	multidrug efflux RND transporter permease subunit MexY	1.12
PA14_51880	<i>oprD</i>	outer membrane porin OprD	1.40

^a, FC, fold change.

Table S2. The role of OprD in the carbapenem resistance of the *ntrB* and *glnK* mutants.

Antibiotics	MIC (µg/mL)					
	PA14	$\Delta glnK$	$\Delta ntrB$	$\Delta ntrC$	$\Delta oprD$	$\Delta glnK\Delta ntrB\Delta oprD$
MEM	0.25	0.0625	0.25	0.25	16	16
IMP	1	0.5	2	1	8	16
DRPM	0.125	0.0625	0.125	0.125	4	4