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Supplemental information

Multiplexed transcriptional repression identifies a network of bactericidal interactions between mycobacterial respiratory complexes

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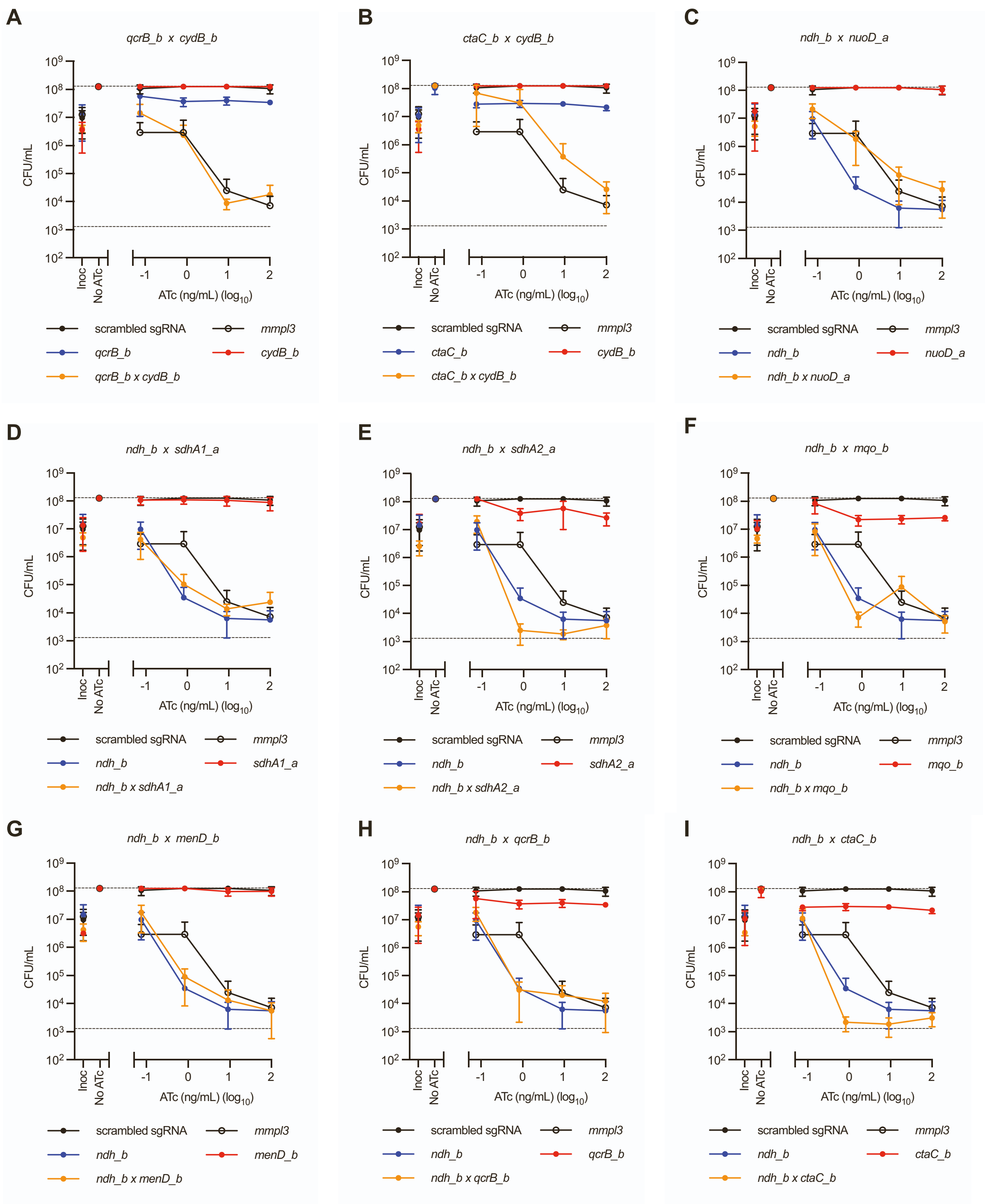

Figure S1| Killing phenotypes of multiplexed, related to figure 1: CFU/ml plots of *M. smegmatis* strains expressing stated single and multiplexed sgRNAs. A strain expressing a non-targeting (NT) sgRNA or sgRNA targeting *mmpL3* is used as a negative and positive control respectively. Results are the mean ± SD of four biological replicates

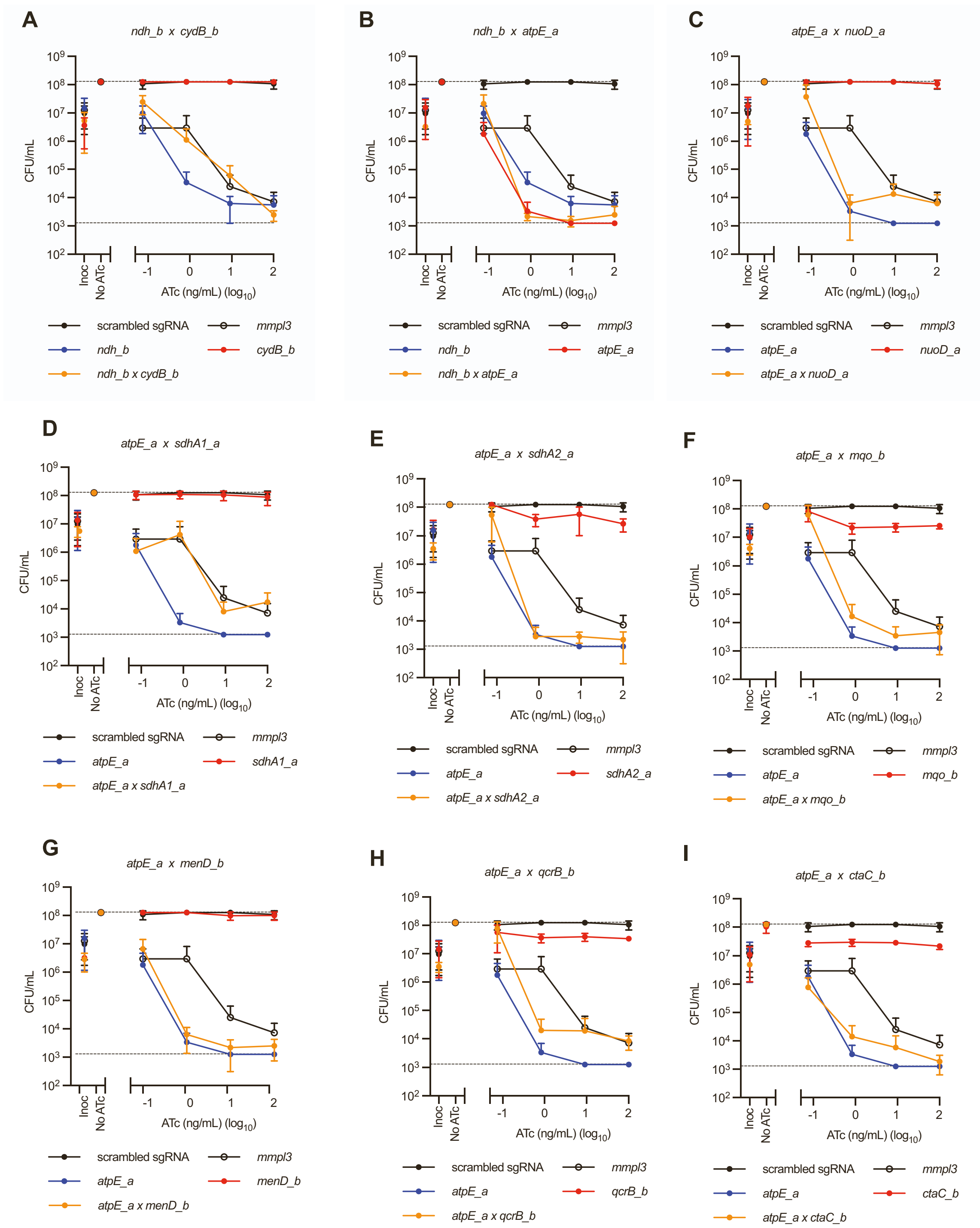

Figure S2| Killing phenotypes of multiplexed, related to figure 1: CFU/ml plots of *M. smegmatis* strains expressing stated single and multiplexed sgRNAs. A strain expressing a non-targeting (NT) sgRNA or sgRNA targeting *mmpL3* is used as a negative and positive control respectively. Results are the mean ± SD of four biological replicates

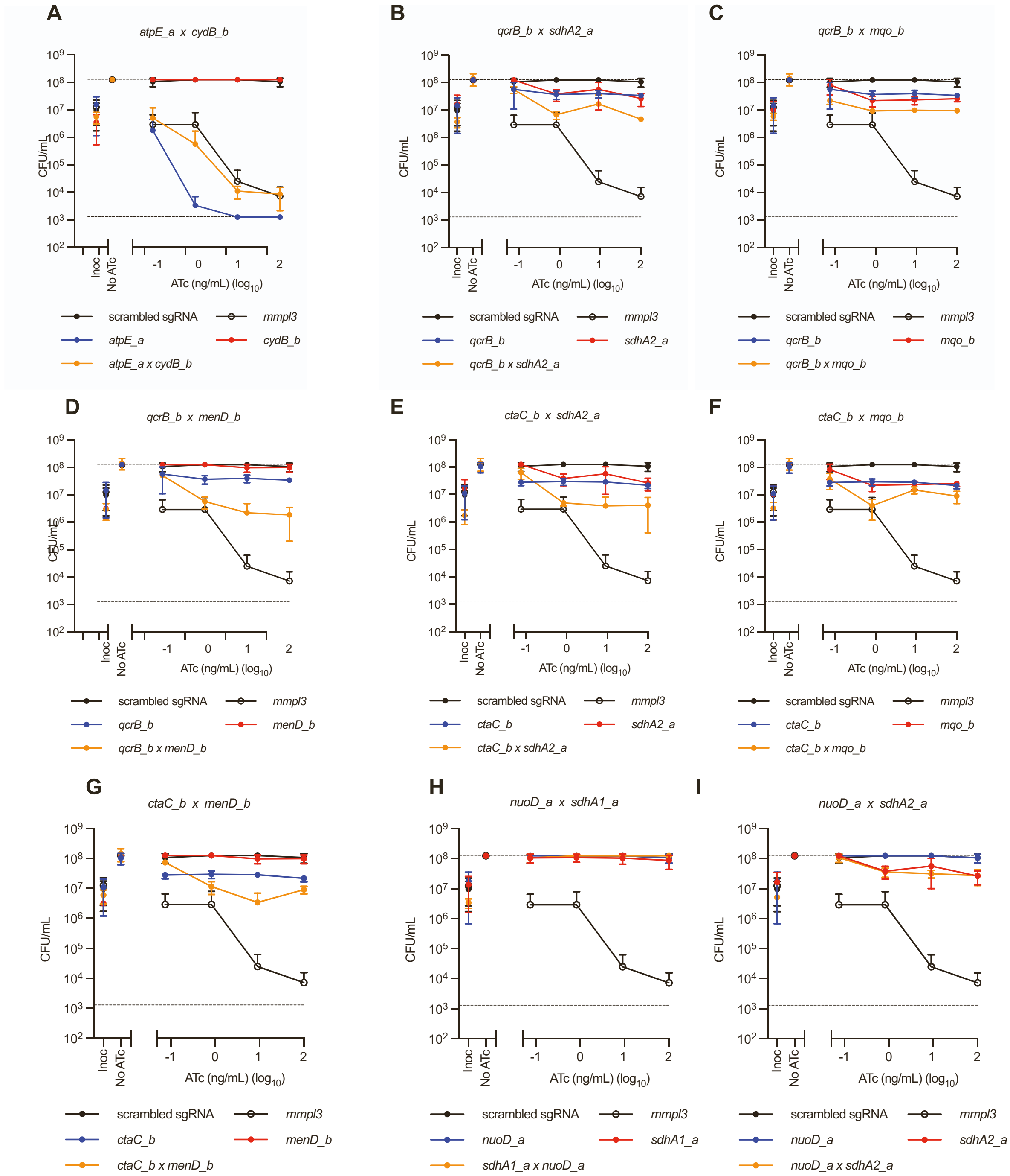

Figure S3| Killing phenotypes of multiplexed, related to figure 1: CFU/ml plots of *M. smegmatis* strains expressing stated single and multiplexed sgRNAs. A strain expressing a non-targeting (NT) sgRNA or sgRNA targeting *mmpL3* is used as a negative and positive control respectively. Results are the mean ± SD of four biological replicates

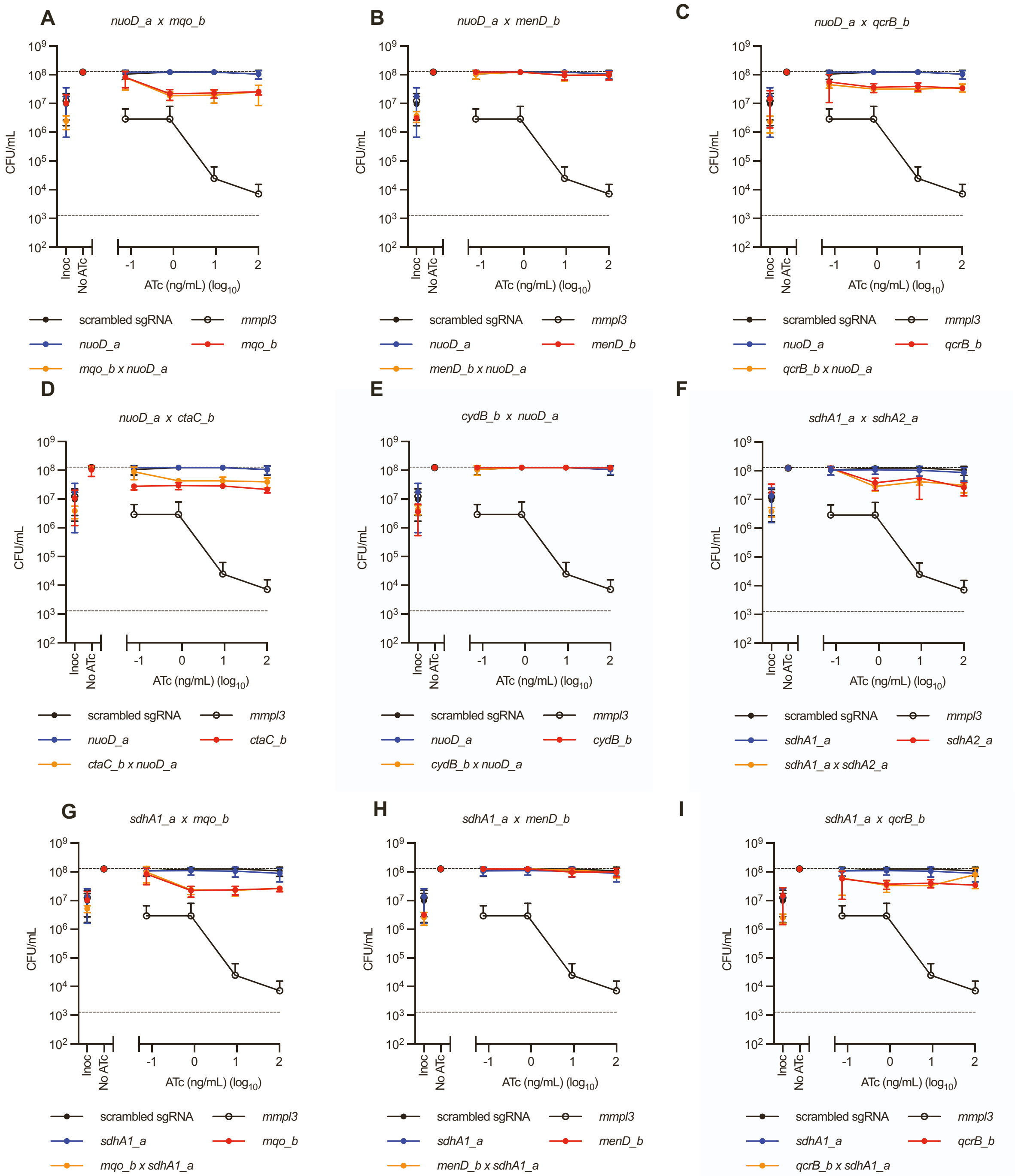

Figure S4| Killing phenotypes of multiplexed, related to figure 1: CFU/ml plots of *M. smegmatis* strains expressing stated single and multiplexed sgRNAs. A strain expressing a non-targeting (NT) sgRNA or sgRNA targeting *mmpL3* is used as a negative and positive control respectively. Results are the mean ± SD of four biological replicates

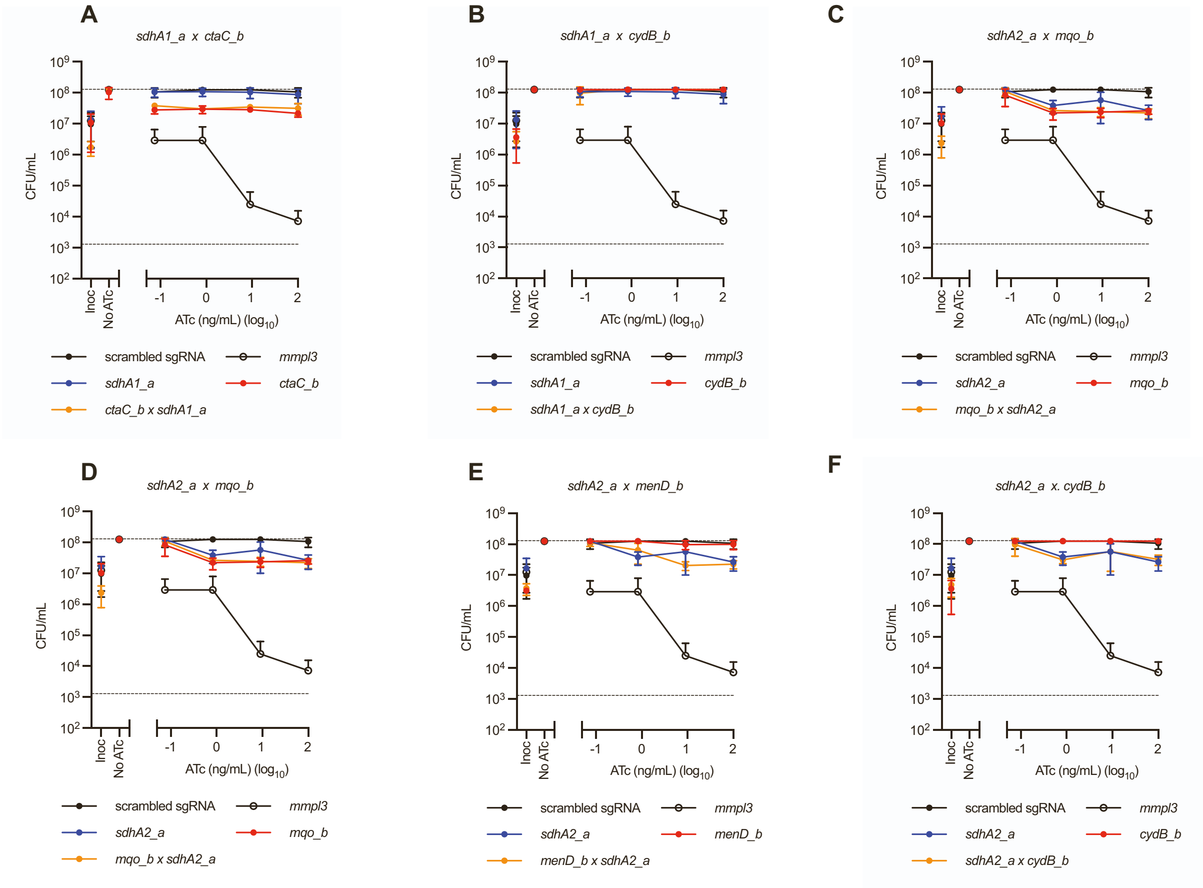

Figure S5| Killing phenotypes of multiplexed, related to figure 1: CFU/ml plots of *M. smegmatis* strains expressing stated single and multiplexed sgRNAs. A strain expressing a non-targeting (NT) sgRNA or sgRNA targeting *mmpL3* is used as a negative and positive control respectively. Results are the mean ± SD of four biological replicates

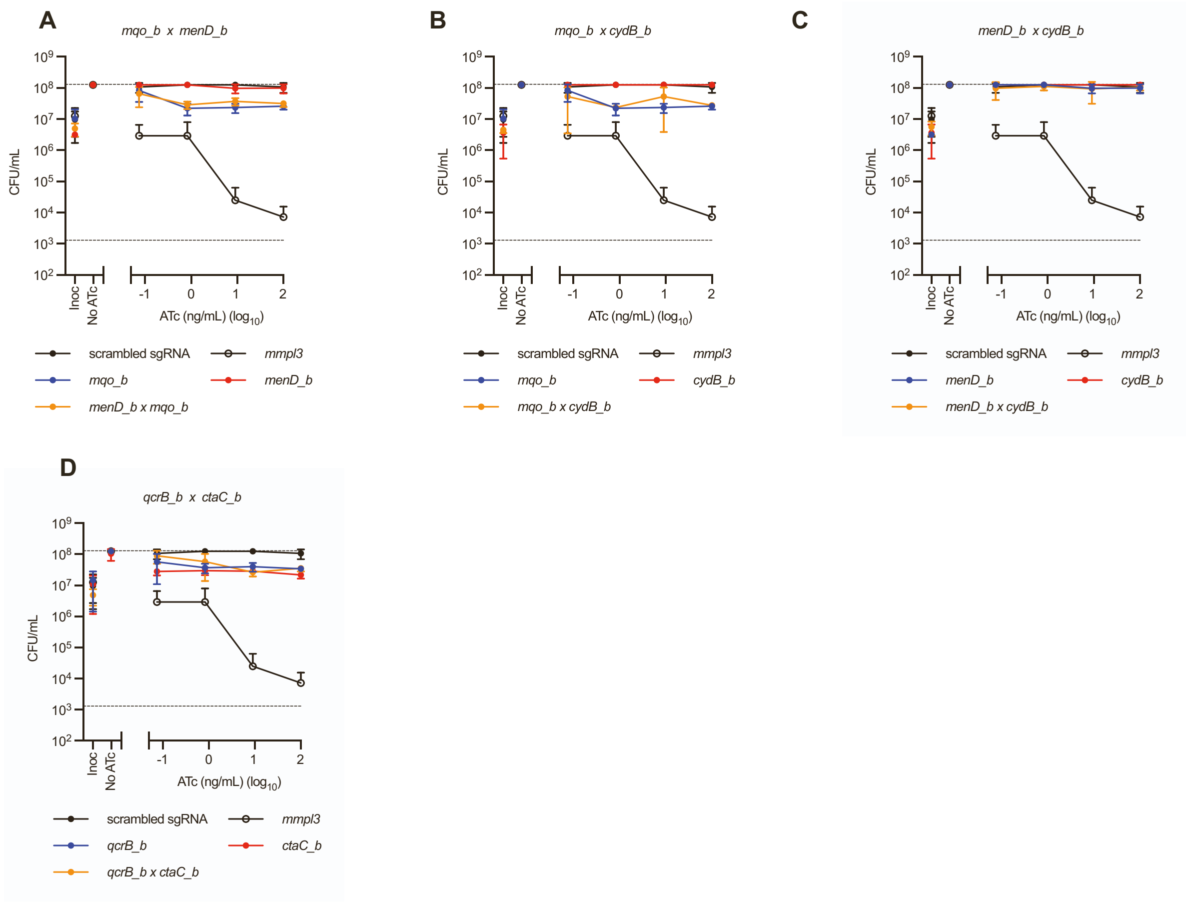

Figure S6| Killing phenotypes of multiplexed, related to figure 1: CFU/ml plots of *M. smegmatis* strains expressing stated single and multiplexed sgRNAs. A strain expressing a non-targeting (NT) sgRNA or sgRNA targeting *mmpL3* is used as a negative and positive control respectively. Results are the mean ± SD of four biological replicates

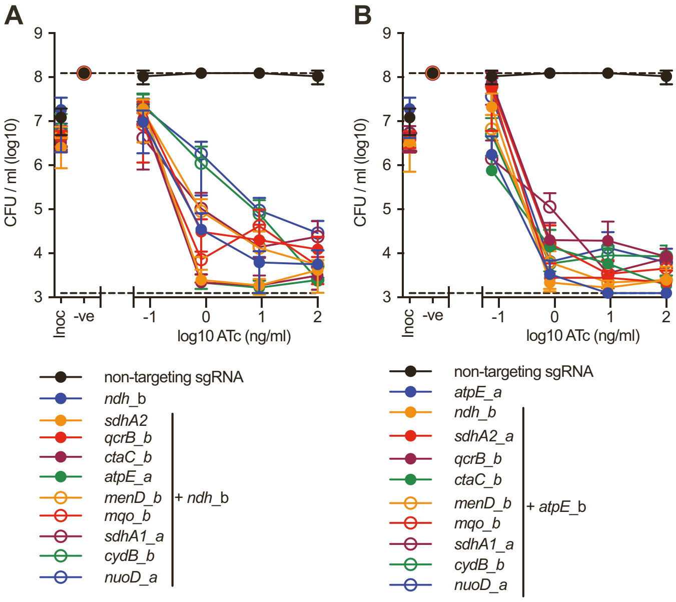

Figure S7| Killing phenotypes of sgRNAs targeting *ndh* and *atpE* in multiplexed combinations, related to figure 2: (A-B) CFU/ml plots of *M. smegmatis* strains expressing (A) *ndh_b* or (B) *atpE_a* in combination with sgRNAs targeting alternative respiratory components across increasing concentrations of ATc. A strain expressing a non-targeting (NT) sgRNA is used as a negative control. Results for A-D are the mean ± SD of four biological replicates.

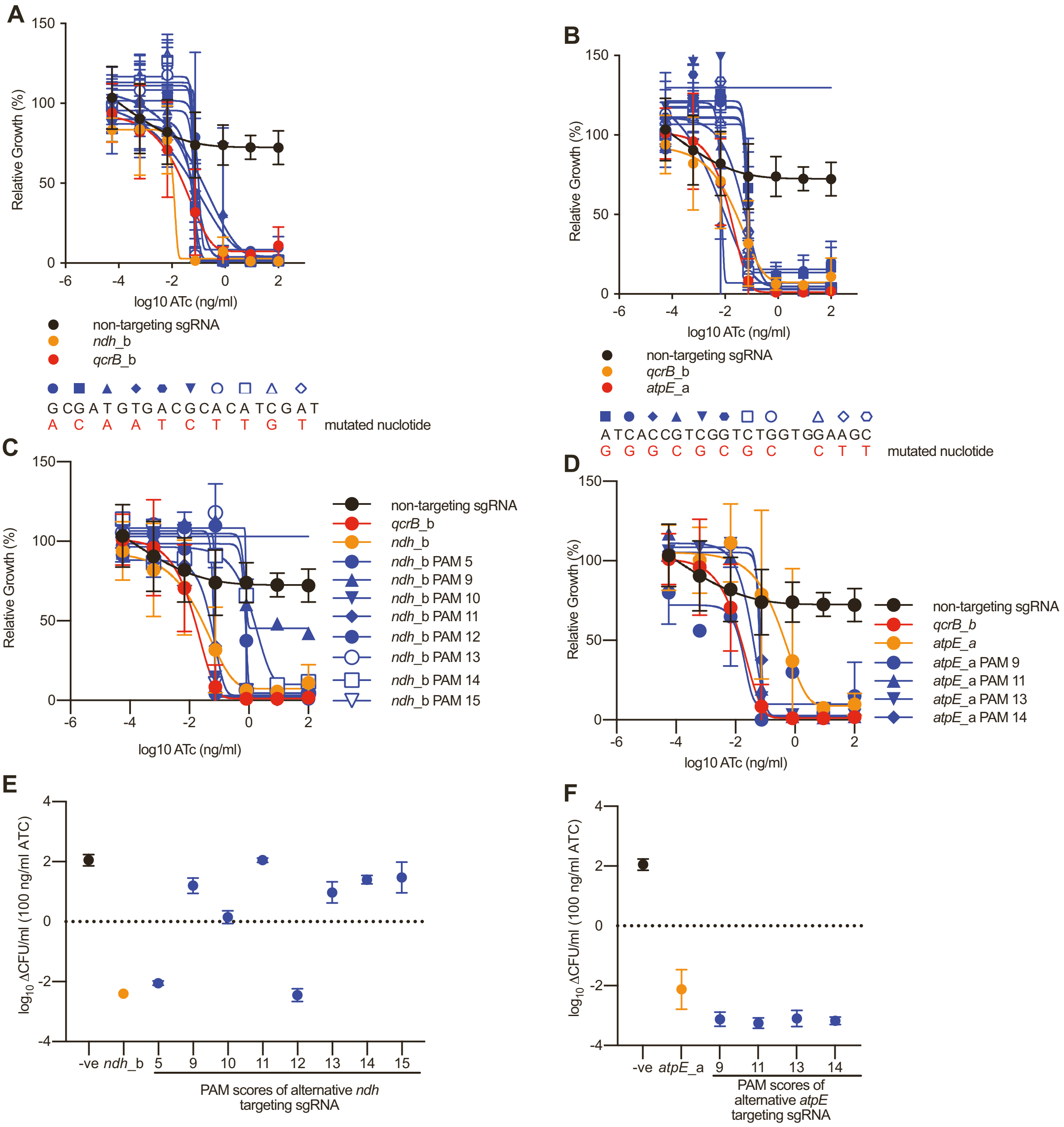

Figure S8| Phenotypes of alternative PAM variants of sgRNAs targeting *ndh* and *atpE*, related to figure 2: (A-D) Growth of *M. smegmatis* strains expressing either (A) *ndh*_b mis-matched sgRNAs, (B) *atpE*_a mis-matched sgRNAs, (C) sgRNAs targeting *ndh* with weaker PAM variants or (D) sgRNAs targeting *atpE* with weaker PAM variants in the presence of increasing concentrations of ATc. Growth is expressed relative to a no ATc control. PAM score is based on previous studies that identified 15 permissible non-canonical PAM variants that retained inhibitory phenotype. (E-F)

Reduction in CFU/ml (CFU/ml at 0 hrs -26hrs) in the presence of 100 ng/ml ATc. For *M. smegmatis* strains expressing sgRNAs targeting *ndh* or *atpE* with weaker PAM variants. Results for A-F are the mean ± SD of four biological replicates. For all experiments included a negative non-targeting and a parental bactericidal sgRNA (i.e. *ndh*_b or *atpE*_a)

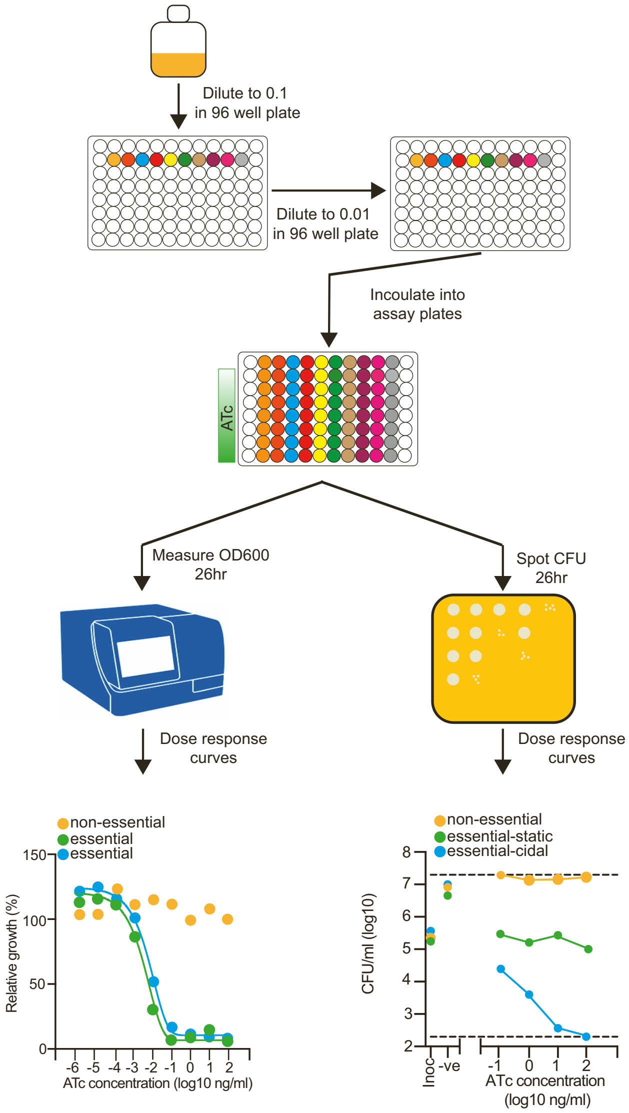

Figure S9| Workflow for bacterial phenotyping screens of single and multiplex sgRNAs, related to figure 1. Work flow for phenotypic assays, with specific details in materials and methods.

Table S1: CRISPRi plasmids used and constructed in this study

plasmid name	Target-Species	Target-Gene	sgRNA name	Target sequence (Coding (5'-3'))	PAM (non coding 5'-3', NN…...)	PAM Score (Rock et al)	sgRNA target length	Fwd Oligo (5-3') (GGGA_)	Oligo Rev Sequence (AAAC_)
pJLR962	M. smegmatis		non-targeting sgRNA	CGAGACGCATTAATCGTCTCC				GGGAGGAGACGATTAATGCGTCTCG	AAACCGAGACGCATTAATCGTCTCC
pCi2	M. smegmatis	MSMEG_0250	*mmpL3*	GACGAGGGCAGCCAGTCTGTCGC	GTAGAAA			GGGAGCGACAGACTGGCTGCCCTCGTC	AAACGACGAGGGCAGCCAGTCTGTCGC
pCi3	M. smegmatis	MSMEG_0418	*sdhA1*_a	GCGACGAGGTGGCCCGCGCC	GGGGAAG			GGGAGGCGCGGGCCACCTCGTCGC	AAACGCGACGAGGTGGCCCGCGCC
pCi4	M. smegmatis	MSMEG_1670	*sdhA2*_a	AGGCCAAGCTGCCCGACATC	CGAGAAC	5	20	GGGAGATGTCGGGCAGCTTGGCCT	AAACAGGCCAAGCTGCCCGACATC
pCi21	M. smegmatis	MSMEG_1670	*sdhA2*_c	AGACGCTGTACCAAAACTGC	GCAGGAT	9	20	GGGAGCAGTTTTGGTACAGCGTCT	AAACAGACGCTGTACCAAAACTGC
pCi46	M. smegmatis	MSMEG_2060	*nuoD*_a	AGATCGAGGGCGAGATCATC	CCAGGAT	9	20	GGGAGATGATCTCGCCCTCGATCT	AAACAGATCGAGGGCGAGATCATC
pCi47	M. smegmatis	MSMEG_2060	*nuoD*_b	GAACGCGAGGAGATCCTGCGGGT	ACGGAAG	4	23	GGGAACCCGCAGGATCTCCTCGCGTTC	AAACGAACGCGAGGAGATCCTGCGGGT
pCi48	M. smegmatis	MSMEG_3621	*ndh*_a	CCGCTGCTCTACCAGGTGGC	CTGGAAG	4	20	GGGAGCCACCTGGTAGAGCAGCGG	AAACCCGCTGCTCTACCAGGTGGC
pCi49	M. smegmatis	MSMEG_3621	*ndh*_b	GCGATGTGACGCACATCGAT	CGAGAAG	1	20	GGGAATCGATGTGCGTCACATCGC	AAACGCGATGTGACGCACATCGAT
pCi50	M. smegmatis	MSMEG_4263	*qcrB*_a	CTGGGTGAGATCGCGCTGTAC	CAGGAAG	4	21	GGGAGTACAGCGCGATCTCACCCAG	AAACCTGGGTGAGATCGCGCTGTAC
pCi51	M. smegmatis	MSMEG_4263	*qcrB*_b	GATCCGTCGATGGCACACGT	GAAGAAC	5	20	GGGAACGTGTGCCATCGACGGATC	AAACGATCCGTCGATGGCACACGT
pCi52	M. smegmatis	MSMEG_4268	*ctaC*_a	GATTGCGTCGTTCGCCGTGGGT	ACGGAAC	11	22	GGGAACCCACGGCGAACGACGCAATC	AAACGATTGCGTCGTTCGCCGTGGGT
pCi53	M. smegmatis	MSMEG_4268	*ctaC*_b	TTCACCGTCGTCGTGCAGGAAC	GTAGAAC	5	22	GGGAGTTCCTGCACGACGACGGTGAA	AAACTTCACCGTCGTCGTGCAGGAAC
pCi54	M. smegmatis	MSMEG_4941	*atpE*_a	ATCACCGTCGGTCTGGTGGAAGC	GAAGAAC	5	23	GGGAGCTTCCACCAGACCGACGGTGAT	AAACATCACCGTCGGTCTGGTGGAAGC
pCi55	M. smegmatis	MSMEG_4942	*atpB*_a	CCACTGCCGTCACCGCCGTGAT	CGAGAAT	2	22	GGGAATCACGGCGGTGACGGCAGTGG	AAACCCACTGCCGTCACCGCCGTGAT
pCi56	M. smegmatis	MSMEG_4942	*atpB*_b	CTGCGGGCCAAGGTCACCTC	GTAGAAG	1	20	GGGAGAGGTGACCTTGGCCCGCAG	AAACCTGCGGGCCAAGGTCACCTC
pCi59	M. smegmatis	MSMEG_2613	*mqo*_a	GCCCACGCCGTCGAGAACGGT	CCAGAAC	5	21	GGGAACCGTTCTCGACGGCGTGGGC	AAACGCCCACGCCGTCGAGAACGGT
pCi60	M. smegmatis	MSMEG_2613	*mqo*_b	AACCCTGTGCCGCATGTGAGT	GAGGAAG	4	21	GGGAACTCACATGCGGCACAGGGTT	AAACAACCCTGTGCCGCATGTGAGT
pCi65	M. smegmatis	MSMEG_3232	*cydB*_a	CTGCTGGAGGGCTTCGACTT	GAAGAAG	1	20	GGGAAAGTCGAAGCCCTCCAGCAG	AAACCTGCTGGAGGGCTTCGACTT

pCi66	M. smegmatis	MSMEG_3232	*cydB*_b	GGCCGTGCCGCCGAGAAACGC	GAAGAAC	5	21	GGGAGCGTTTCTCGGCGGCACGGCC	AAACGGCCGTGCCGCCGAGAAACGC
pCi67	M. smegmatis	MSMEG_1109	*menD*_a	TGATCGTGCTGAGCGCCAAC	GCGGAAC	11	20	GGGAGTTGGCGCTCAGCACGATCA	AAACTGATCGTGCTGAGCGCCAAC
pCi68	M. smegmatis	MSMEG_1109	*menD*_b	GCACGGGCGCCAACCAGACC	CGAGCAT	7	20	GGGAGGTCTGGTTGGCGCCCGTGC	AAACGCACGGGCGCCAACCAGACC
pCi266	M. smegmatis	MSMEG_3621	*ndh*_b_1MM	ACGATGTGACGCACATCGAT	CGAGAAG	1	20	GGGAATCGATGTGCGTCACATCGT	AAACACGATGTGACGCACATCGAT
pCi267	M. smegmatis	MSMEG_3621	*ndh*_b_3MM	GCCATGTGACGCACATCGAT	CGAGAAG	1	20	GGGAATCGATGTGCGTCACATGGC	AAACGCCATGTGACGCACATCGAT
pCi268	M. smegmatis	MSMEG_3621	*ndh*_b_5MM	GCGAAGTGACGCACATCGAT	CGAGAAG	1	20	GGGAATCGATGTGCGTCACTTCGC	AAACGCGAAGTGACGCACATCGAT
pCi269	M. smegmatis	MSMEG_3621	*ndh*_b_7MM	GCGATGAGACGCACATCGAT	CGAGAAG	1	20	GGGAATCGATGTGCGTCTCATCGC	AAACGCGATGAGACGCACATCGAT
pCi270	M. smegmatis	MSMEG_3621	*ndh*_b_9MM	GCGATGTGTCGCACATCGAT	CGAGAAG	1	20	GGGAATCGATGTGCGACACATCGC	AAACGCGATGTGTCGCACATCGAT
pCi271	M. smegmatis	MSMEG_3621	*ndh*_b_11MM	GCGATGTGACCCACATCGAT	CGAGAAG	1	20	GGGAATCGATGTGGGTCACATCGC	AAACGCGATGTGACCCACATCGAT
pCi272	M. smegmatis	MSMEG_3621	*ndh*_b_13MM	GCGATGTGACGCTCATCGAT	CGAGAAG	1	20	GGGAATCGATGAGCGTCACATCGC	AAACGCGATGTGACGCTCATCGAT
pCi273	M. smegmatis	MSMEG_3621	*ndh*_b_15MM	GCGATGTGACGCACTTCGAT	CGAGAAG	1	20	GGGAATCGAAGTGCGTCACATCGC	AAACGCGATGTGACGCACTTCGAT
pCi274	M. smegmatis	MSMEG_3621	*ndh*_b_17MM	GCGATGTGACGCACATGGAT	CGAGAAG	1	20	GGGAATCCATGTGCGTCACATCGC	AAACGCGATGTGACGCACATGGAT
pCi275	M. smegmatis	MSMEG_3621	*ndh*_b_19MM	GCGATGTGACGCACATCGTT	CGAGAAG	1	20	GGGAAACGATGTGCGTCACATCGC	AAACGCGATGTGACGCACATCGTT
pCi276	M. smegmatis	MSMEG_3621	*ndh*_m	CGGGACCATCCGTCGCATCGAGT	TCGGAAT	12	23	GGGAACTCGATGCGACGGATGGTCCCG	AAACCGGGACCATCCGTCGCATCGAGT
pCi277	M. smegmatis	MSMEG_3621	*ndh*_n	CGTTCACCGTCGTCGGCGCGGGC	TCAGCAA	10	23	GGGAGCCCGCGCCGACGACGGTGAACG	AAACCGTTCACCGTCGTCGGCGCGGGC
pCi278	M. smegmatis	MSMEG_3621	*ndh*_o	GCAAGCAGAAGAACGCCCAGGT	GGAGGAT	9	22	GGGAACCTGGGCGTTCTTCTGCTTGC	AAACGCAAGCAGAAGAACGCCCAGGT
pCi279	M. smegmatis	MSMEG_3621	*ndh*_p	TTCGGCAACGACCACTTCGC	GTAGGAC	15	20	GGGAGCGAAGTGGTCGTTGCCGAA	AAACTTCGGCAACGACCACTTCGC
pCi280	M. smegmatis	MSMEG_3621	*ndh*_q	GCGGTGGCCAAGGTGGGTCC	GGAGAAC	5	20	GGGAGGACCCACCTTGGCCACCGC	AAACGCGGTGGCCAAGGTGGGTCC
pCi281	M. smegmatis	MSMEG_3621	*ndh*_r	GTCACACCTACTCGACGCCC	CGAGCAG	13	20	GGGAGGGCGTCGAGTAGGTGTGAC	AAACGTCACACCTACTCGACGCCC
pCi282	M. smegmatis	MSMEG_3621	*ndh*_s	GCACCAAGCGTGGTCAGCTC	TCAGGAA	14	20	GGGAGAGCTGACCACGCTTGGTGC	AAACGCACCAAGCGTGGTCAGCTC
pCi283	M. smegmatis	MSMEG_3621	*ndh*_t	AGCACCAAGCGTGGTCAGCT	CAGGAAC	11	20	GGGAAGCTGACCACGCTTGGTGCT	AAACAGCACCAAGCGTGGTCAGCT
pCi284	M. smegmatis	MSMEG_4941	*atpE*_a_1MM	GTCACCGTCGGTCTGGTGGAAGC	GAAGAAC	5	23	GGGAGCTTCCACCAGACCGACGGTGAC	AAACGTCACCGTCGGTCTGGTGGAAGC
pCi285	M. smegmatis	MSMEG_4941	*atpE*_a_3MM	ATGACCGTCGGTCTGGTGGAAGC	GAAGAAC	5	23	GGGAGCTTCCACCAGACCGACGGTCAT	AAACATGACCGTCGGTCTGGTGGAAGC

pCi286	M. smegmatis	MSMEG_4941	*atpE*_a_5MM	ATCAGCGTCGGTCTG GTGGAAGC	GAAGAAC	5	23	GGGAGCTTCCACCA GACCGACGCTGAT	AAACATCAGCGTCG GTCTGGTGGAAGC
pCi287	M. smegmatis	MSMEG_4941	*atpE*_a_7MM	ATCACCCTCGGTCTG GTGGAAGC	GAAGAAC	5	23	GGGAGCTTCCACCA GACCGAGGGTGAT	AAACATCACCCTCG GTCTGGTGGAAGC
pCi288	M. smegmatis	MSMEG_4941	*atpE*_a_9MM	ATCACCGTGGGTCTG GTGGAAGC	GAAGAAC	5	23	GGGAGCTTCCACCA GACCCACGGTGAT	AAACATCACCGTGG GTCTGGTGGAAGC
pCi289	M. smegmatis	MSMEG_4941	*atpE*_a_11MM	ATCACCGTCGCTCTG GTGGAAGC	GAAGAAC	5	23	GGGAGCTTCCACCA GAGCGACGGTGAT	AAACATGAGCGTCG GTCTGGTGGAAGC
pCi290	M. smegmatis	MSMEG_4941	*atpE*_a_13MM	ATCACCGTCGGTGTG GTGGAAGC	GAAGAAC	5	23	GGGAGCTTCCACCA CACCGACGGTGAT	AAACATCACCGTCG GTGTGGTGGAAGC
pCi291	M. smegmatis	MSMEG_4941	*atpE*_a_15MM	ATCACCGTCGGTCTC GTGGAAGC	GAAGAAC	5	23	GGGAGCTTCCACGA GACCGACGGTGAT	AAACATCACCGTCG GTCTCGTGGAAGC
pCi292	M. smegmatis	MSMEG_4941	*atpE*_a_17MM	ATCACCGTCGGTCTG GAGGAAGC	GAAGAAC	5	23	GGGAGCTTCCTCCA GACCGACGGTGAT	AAACATCACCGTCG GTCTGGAGGAAGC
pCi293	M. smegmatis	MSMEG_4941	*atpE*_a_19MM	ATCACCGTCGGTCTG GTGCAAGC	GAAGAAC	5	23	GGGAGCTTGCACCA GACCGACGGTGAT	AAACATCACCGTCG GTCTGGTGCAAGC
pCi294	M. smegmatis	MSMEG_4941	*atpE*_a_21MM	ATCACCGTCGGTCTG GTGGATGC	GAAGAAC	5	23	GGGAGCATCCACCA GACCGACGGTGAT	AAACATCACCGTCG GTCTGGTGGATGC
pCi295	M. smegmatis	MSMEG_4941	*atpE*_a_23MM	ATCACCGTCGGTCTG GTGGAAGT	GAAGAAC	5	23	GGGAACTTCCACCA GACCGACGGTGAT	AAACATCACCGTCG GTCTGGTGGAAGT
pCi296	M. smegmatis	MSMEG_4942	*atpB*_n	CGCCGATCAACATCGT CGAAGAAC	CGAGGAA	14	24	GGGAGTTCTTCGAC GATGTTGATCGGCG	AAACCGCCGATCAA CATCGTCGAAGAAC
pCi297	M. smegmatis	MSMEG_4942	*atpB*_o	CACGCGGCAGGCATC TGGCGT	GTAGCAG	13	21	GGGAACGCCAGATG CCTGCCGCGTG	AAACCACGCGGCAG GCATCTGGCGT
pCi298	M. smegmatis	MSMEG_4942	*atpB*_p	TGGTACATCCAGTGGT TCCC	GGGGAAC	11	20	GGGAGGGAACCACT GGATGTACCA	AAACTGGTACATCC AGTGGTTCCC
pCi299	M. smegmatis	MSMEG_4942	*atpB*_q	TCTCCAACTGGCTCGC GGTGC	TCAGGAT	9	21	GGGAGCACCGCGA GCCAGTTGGAGA	AAACTCTCCAACTG GCTCGCGGTGC

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Table S2: Oligos Used in This Study		
Name-MMO	**Sequence**	**Description**
MMO117	TGCGGCGCTTTTTTTTTTGAATTC	Sequencing pJR962
MMO119	CTGCGTTATCCCCTGATTCTG	Sequencing pJR962
MMO120	AATATGCTCTTCAGGATCTGACCAGGGAAAATAGCC	Fwd primer-Cloning into SapI site pJR962/5
MMO121	TTTATGCTCTTCACTGAAAAAAAAAACACCCTGCCATAAAATGAC	Rev primer-Cloning into SapI site pJR962/5
MMO202	GCCTGGCCATCATGGGTATC	Msm_gDNA_check_F1
MMO203	GGAGGATCCGGAGACCAAGC	Msm_gDNA_check_R1
MMO206	CCTCCGTCTTTTCGGCAACA	qPCR-AtpB-MSMEG4942
MMO207	GTCGAAGGTCTTCCACACGG	qPCR-AtpB-MSMEG4942
MMO208	CTGATCTCGGGTATCGCCC	qPCR-AtpE-MSMEG4941
MMO209	GCCAGGTTGATGAAGTACGC	qPCR-AtpE-MSMEG4941
MMO212	GAGTTCGTCCTGAACTCGGC	qPCR-CtaC-MSMEG4268
MMO213	TGTCCGAGTTGTTGGCCTTC	qPCR-CtaC-MSMEG4268
MMO214	GCCTGACGATCTACAACGGA	qPCR-CydB-MSMEG3232
MMO215	GAGATGCGCTTGCTGAACAC	qPCR-CydB-MSMEG3232
MMO216	TCATAGGCGACCTGACGTTC	qPCR-MenD-MSMEG1109
MMO217	TTGTCGTTGGACACCACGAT	qPCR-MenD-MSMEG1109
MMO218	GGTGGGTCTGCTCAAGTACC	qPCR-Mqo-MSMEG2613
MMO219	GCGAATTCACGAAGCGTCTC	qPCR-Mqo-MSMEG2613
MMO220	TACGCCGCGAAGATCATCAA	qPCR-Ndh-MSMEG3621
MMO221	TGTCGAAGTACTCGAACGGC	qPCR-Ndh-MSMEG3621
MMO222	CGAGCACATCGCCAAGATCA	qPCR-nuoD-MSMEG2060
MMO223	CCTTCGGTGACGAGCTTGAA	qPCR-nuoD-MSMEG2060
MMO226	TATCGGCATGGTGGTACTGC	qPCR-qcrB-MSMEG4263
MMO227	GAAGTCGCTTGATGATGCCG	qPCR-qcrB-MSMEG4263
MMO228	CGTCATGGGTGGTATCGAGG	qPCR-sdhA1-MSMEG0418
MMO229	AGATCTGACAGCGAGTTGCC	qPCR-sdhA1-MSMEG0418
MMO230	ACAACACCAACGTCATCCCC	qPCR-sdhA2-MSMEG1670
MMO231	TGATGTCCAGCAGCGAGTTG	qPCR-sdhA2-MSMEG1670
MMO270	TGTGGGACGAGGAAGAGTCC	sigA_Msmeg_Fwd qPCR primer_set 1

MMO271	CACCTCTTCTTCGGCGTTGA	sigA_Msmeg_Rev qPCR primer_set 1
MMO300	GACTCTTCCTCGTCCCACAC	sigA_Msmeg_Fwd qPCR primer_set 2
MMO301	GAAGACACCGACCTGGAACT	sigA_Msmeg_Rev qPCR primer_set 2

Table S3: Golden gate cloning protocols		
Oligo annealing protocol		
Component	**Volume**	
Oligo Fwd (100µM)	10 µl	
Oligo Rev (100µM)	10 µl	
H2O	25 µl	
10x T4 ligase buffer	5 µl	
Temperature (℃)	**Duration**	
95	5	
25 (0.1°C/sec)	Time to ramp	
4	forever	
sgRNA module golden gate cloning protocol		
Component	**Volume (µl)**	
10× T4 Ligase Buffer	1	
Single sgRNA expression plasmid uncut (20 ng/µL)	1.25	
Annealed oligo	2.5	
BsmB1 (10,000u/ml)	0.5	
T4 DNA Ligase	0.5	
mQ	4.25	
Temperature (℃)	**Duration**	**Cycle**
42 (digestion)	5 min	30
16 (ligation)	5 min	
4	Forever	1
Multiplex golden gate cloning protocol		
Component	**Volume (µl)**	
10× T4 Ligase Buffer	1	
Single sgRNA expression plasmid uncut (20 ng/µL)	1.25	
Cloned and purified target -promoter-sgRNA-scaffold	2.5	
Sap1 (10,000u/ml)	0.5	
T4 DNA Ligase	0.5	
mQ	4.25	
Temperature (℃)	**Duration**	**Cycle**
37 (digestion)	5 min	30
16 (ligation)	5 min	
4	Forever	1

Table S4: Multiplexed Plasmids Constructed in this Study.

Plasmid name	Target-Species	pCi plasmid backbone	Second sgRNA	Amplification template for second sgRNA	Fwd Primer for amplification of sgRNA module	Rev primer for amplification of sgRNA module
pCiMX40	*M. smegmatis*	pCi49(*ndh*_b)	*sdhA2*_a	pCi4	MMO120	MMO121
pCiMX41	*M. smegmatis*	pCi49(*ndh*_b)	*qcrB*_b	pCi51	MMO120	MMO121
pCiMX42	*M. smegmatis*	pCi49(*ndh*_b)	*ctaC*_b	pCi53	MMO120	MMO121
pCiMX43	*M. smegmatis*	pCi49(*ndh*_b)	*atpE*_a	pCi54	MMO120	MMO121
pCiMX46	*M. smegmatis*	pCi4(*sdhA2*_a)	*qcrB*_b	pCi51	MMO120	MMO121
pCiMX47	*M. smegmatis*	pCi4(*sdhA2*_a)	*ctaC*_b	pCi53	MMO120	MMO121
pCiMX48	*M. smegmatis*	pCi4(*sdhA2*_a)	*atpE*_a	pCi54	MMO120	MMO121
pCiMX49	*M. smegmatis*	pCi51(*qcrB*_b)	*ctaC*_b	pCi53	MMO120	MMO121
pCiMX50	*M. smegmatis*	pCi51(*qcrB*_b)	*atpE*_a	pCi54	MMO120	MMO121
pCiMX51	*M. smegmatis*	pCi53(*ctaC*_b)	*atpE*_a	pCi54	MMO120	MMO121
pCiMX52	*M. smegmatis*	pCi68(*menD*_b)	*ndh*_b	pCi49	MMO120	MMO121
pCiMX53	*M. smegmatis*	pCi68(*menD*_b)	*sdhA2*_a	pCi4	MMO120	MMO121
pCiMX54	*M. smegmatis*	pCi68(*menD*_b)	*qcrB*_b	pCi51	MMO120	MMO121
pCiMX55	*M. smegmatis*	pCi68(*menD*_b)	*ctaC*_b	pCi53	MMO120	MMO121
pCiMX56	*M. smegmatis*	pCi68(*menD*_b)	*atpE*_a	pCi54	MMO120	MMO121
pCiMX57	*M. smegmatis*	pCi60(*mqo*_b)	*ndh*_b	pCi49	MMO120	MMO121
pCiMX58	*M. smegmatis*	pCi60(*mqo*_b)	*sdhA2*_a	pCi4	MMO120	MMO121
pCiMX59	*M. smegmatis*	pCi60(*mqo*_b)	*qcrB*_b	pCi51	MMO120	MMO121
pCiMX60	*M. smegmatis*	pCi60(*mqo*_b)	*ctaC*_b	pCi53	MMO120	MMO121
pCiMX61	*M. smegmatis*	pCi60(*mqo*_b)	*atpE*_a	pCi54	MMO120	MMO121
pCiMX62	*M. smegmatis*	pCi60(*mqo*_b)	*menD*_b	pCi68	MMO120	MMO121
pCiMX237	*M. smegmatis*	pCi3 (*sdhA1*_a)	*ndh*_b	pCi49	MMO120	MMO121
pCiMX238	*M. smegmatis*	pCi3 (*sdhA1*_a)	*sdhA2*_a	pCi4	MMO120	MMO121

pCiMX239	*M. smegmatis*	pCi3 (*sdhA1*_a)	*qcrB*_b	pCi51	MMO120	MMO121
pCiMX240	*M. smegmatis*	pCi3 (*sdhA1*_a)	*ctaC*_b	pCi53	MMO120	MMO121
pCiMX241	*M. smegmatis*	pCi3 (*sdhA1*_a)	*atpE*_a	pCi54	MMO120	MMO121
pCiMX242	*M. smegmatis*	pCi3 (*sdhA1*_a)	*menD*_b	pCi68	MMO120	MMO121
pCiMX243	*M. smegmatis*	pCi3 (*sdhA1*_a)	*mq*o_b	pCi60	MMO120	MMO121
pCiMX244	*M. smegmatis*	pCi66 (*cydB*_b)	*ndh*_b	pCi49	MMO120	MMO121
pCiMX245	*M. smegmatis*	pCi66 (*cydB*_b)	*sdhA2*_a	pCi4	MMO120	MMO121
pCiMX246	*M. smegmatis*	pCi66 (*cydB*_b)	*qcrB*_b	pCi51	MMO120	MMO121
pCiMX247	*M. smegmatis*	pCi66 (*cydB*_b)	*ctaC*_b	pCi53	MMO120	MMO121
pCiMX248	*M. smegmatis*	pCi66 (*cydB*_b)	*atpE*_a	pCi54	MMO120	MMO121
pCiMX249	*M. smegmatis*	pCi66 (*cydB*_b)	*menD*_b	pCi68	MMO120	MMO121
pCiMX250	*M. smegmatis*	pCi66 (*cydB*_b)	*mq*o_b	pCi60	MMO120	MMO121
pCiMX251	*M. smegmatis*	pCi66 (*cydB*_b)	*sdhA1*_a	pCi3	MMO120	MMO121
pCiMX252	*M. smegmatis*	pCi46 (*nuoD*_a)	*ndh*_b	pCi49	MMO120	MMO121
pCiMX253	*M. smegmatis*	pCi46 (*nuoD*_a)	*sdhA2*_a	pCi4	MMO120	MMO121
pCiMX254	*M. smegmatis*	pCi46 (*nuoD*_a)	*qcrB*_b	pCi51	MMO120	MMO121
pCiMX255	*M. smegmatis*	pCi46 (*nuoD*_a)	*ctaC*_b	pCi53	MMO120	MMO121
pCiMX256	*M. smegmatis*	pCi46 (*nuoD*_a)	*atpE*_a	pCi54	MMO120	MMO121
pCiMX257	*M. smegmatis*	pCi46 (*nuoD*_a)	*menD*_b	pCi68	MMO120	MMO121
pCiMX258	*M. smegmatis*	pCi46 (*nuoD*_a)	*mq*o_b	pCi60	MMO120	MMO121
pCiMX259	*M. smegmatis*	pCi46 (*nuoD*_a)	*sdhA1*_a	pCi3	MMO120	MMO121
pCiMX260	*M. smegmatis*	pCi46 (*nuoD*_a)	*cydB*_b	pCi66	MMO120	MMO121
pCiMX262	*M. smegmatis*	pCi4 (*sdhA2*_a)	*ndh*_b_3MM	pCi267	MMO120	MMO121
pCiMX263	*M. smegmatis*	pCi51 (*qcrB*_b)	*ndh*_b_3MM	pCi267	MMO120	MMO121
pCiMX264	*M. smegmatis*	pCi53(*ctaC*_b)	*ndh*_b_3MM	pCi267	MMO120	MMO121
pCiMX265	*M. smegmatis*	pCi54 (*atpE*_a)	*ndh*_b_3MM	pCi267	MMO120	MMO121
pCiMX266	*M. smegmatis*	pCi68(*menD*_b)	*ndh*_b_3MM	pCi267	MMO120	MMO121
pCiMX267	*M. smegmatis*	pCi60(*mqo*_b)	*ndh*_b_3MM	pCi267	MMO120	MMO121
pCiMX268	*M. smegmatis*	pCi3 (*sdhA1*)	*ndh*_b_3MM	pCi267	MMO120	MMO121
pCiMX269	*M. smegmatis*	pCi66 (*cydB*_b)	*ndh*_b_3MM	pCi267	MMO120	MMO121
pCiMX271	*M. smegmatis*	pCi4 (*sdhA2*_a)	*ndh*_b_5MM	pCi268	MMO120	MMO121

pCiMX272	*M. smegmatis*	pCi51 (*qcrB*_b)	*ndh*_b_5MM	pCi268	MMO120	MMO121
pCiMX273	*M. smegmatis*	pCi53(*ctaC*_b)	*ndh*_b_5MM	pCi268	MMO120	MMO121
pCiMX274	*M. smegmatis*	pCi54 (*atpE*_a)	*ndh*_b_5MM	pCi268	MMO120	MMO121
pCiMX275	*M. smegmatis*	pCi68(*menD*_b)	*ndh*_b_5MM	pCi268	MMO120	MMO121
pCiMX276	*M. smegmatis*	pCi60(*mqo*_b)	*ndh*_b_5MM	pCi268	MMO120	MMO121
pCiMX277	*M. smegmatis*	pCi3 (*sdhA1*)	*ndh*_b_5MM	pCi268	MMO120	MMO121
pCiMX278	*M. smegmatis*	pCi66 (*cydB*_b)	*ndh*_b_5MM	pCi268	MMO120	MMO121
pCiMX279	*M. smegmatis*	pCi49 (*ndh*_b)	*atpE*_a_3MM	pCi285	MMO120	MMO121
pCiMX280	*M. smegmatis*	pCi4 (*sdhA2*_a)	*atpE*_a_3MM	pCi285	MMO120	MMO121
pCiMX281	*M. smegmatis*	pCi51 (*qcrB*_b)	*atpE*_a_3MM	pCi285	MMO120	MMO121
pCiMX282	*M. smegmatis*	pCi53 (*ctaC*_b)	*atpE*_a_3MM	pCi285	MMO120	MMO121
pCiMX284	*M. smegmatis*	pCi68 (*menD*_b)	*atpE*_a_3MM	pCi285	MMO120	MMO121
pCiMX285	*M. smegmatis*	pCi60 (*mqo*_b)	*atpE*_a_3MM	pCi285	MMO120	MMO121
pCiMX286	*M. smegmatis*	pCi3 (*sdhA1*)	*atpE*_a_3MM	pCi285	MMO120	MMO121
pCiMX287	*M. smegmatis*	pCi66 (*cydB*_b)	*atpE*_a_3MM	pCi285	MMO120	MMO121
pCiMX288	*M. smegmatis*	pCi285 (*atpE*_a_3MM)	*ndh*_b_3MM	pCi267	MMO120	MMO121
pCiMX289	*M. smegmatis*	pCi285 (*atpE*_a_3MM)	*ndh*_b_5MM	pCi268	MMO120	MMO121