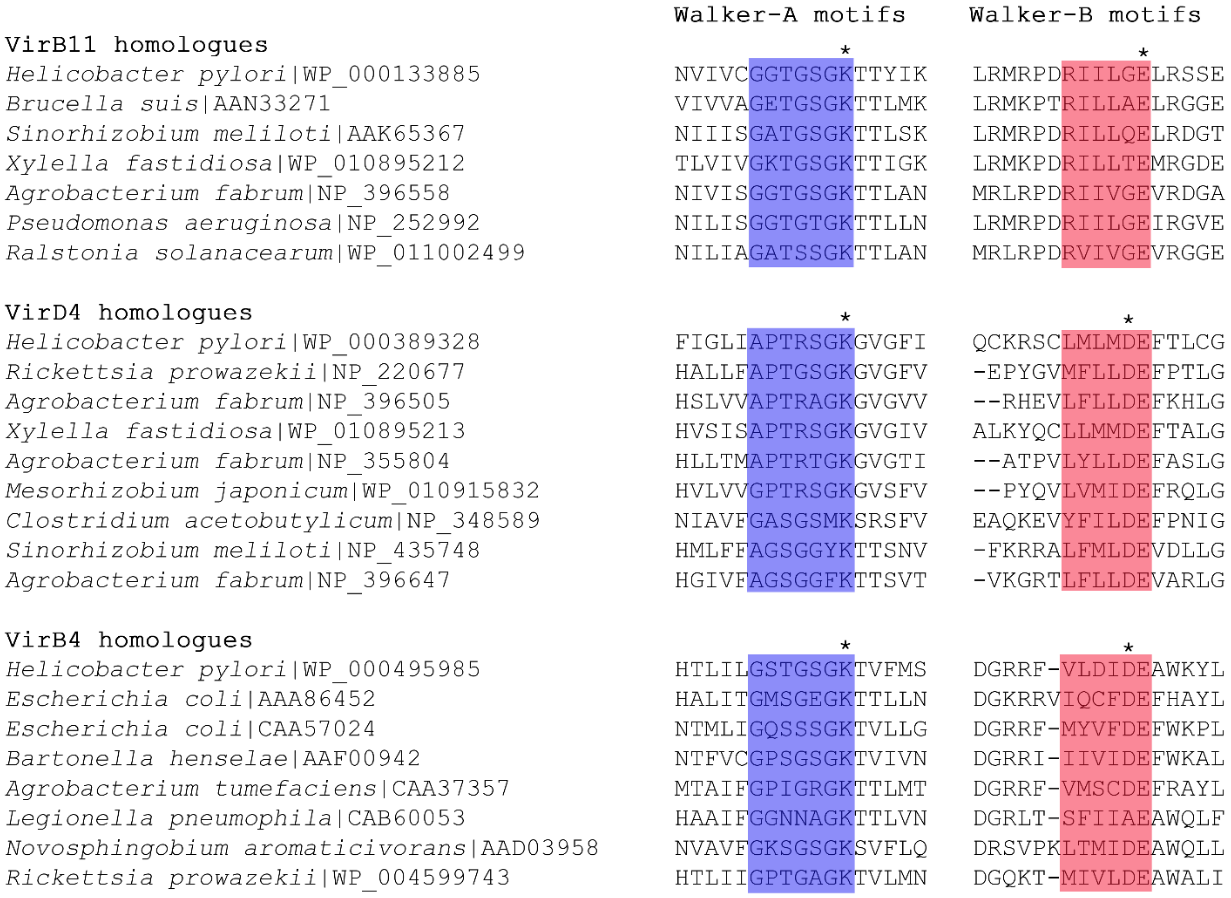

	Walker-A motifs	Walker-B motifs
VirB11 homologues	*	*
Helicobacter pylori|WP_000133885	NVIVCGGTGSGKTTYIK	LRMRPDRIILGELRSSE
Brucella suis|AAN33271	VIVVAGETGSGKTTLMK	LRMKPTRILLAELRGGE
Sinorhizobium meliloti|AAK65367	NIIISGATGSGKTTLSK	LRMRPDRILLQELRDGT
Xylella fastidiosa|WP_010895212	TLVIVGKTGSGKTTIGK	LRMKPDRILLTEMRGDE
Agrobacterium fabrum|NP_396558	NIVISGGTGSGKTTLAN	MRLRPDRIIVGEVRDGA
Pseudomonas aeruginosa|NP_252992	NILISGGTGTGKTTLLN	LRMRPDRIILGEIRGVE
Ralstonia solanacearum|WP_011002499	NILIAGATSSGKTTLAN	MRLRPDRVIVGEVRGGE
VirD4 homologues	*	*
Helicobacter pylori|WP_000389328	FIGLIAPTRSGKGVGFI	QCKRSCLMLMDEFTLCG
Rickettsia prowazekii|NP_220677	HALLFAPTGSGKGVGFV	-EPYGVMFLLDEFPTLG
Agrobacterium fabrum|NP_396505	HSLVVAPTRAGKGVGVV	--RHEVLFLLDEFKHLG
Xylella fastidiosa|WP_010895213	HVSISAPTRSGKGVGIV	ALKYQCLLMMDEFTALG
Agrobacterium fabrum|NP_355804	HLLTMAPTRTGKGVGTI	--ATPVLYLLDEFASLG
Mesorhizobium japonicum|WP_010915832	HVLVVGPTRSGKGVSFV	--PYQVLVMIDEFRQLG
Clostridium acetobutylicum|NP_348589	NIAVFGASGSMKSRSFV	EAQKEVYFILDEFPNIG
Sinorhizobium meliloti|NP_435748	HMLFFAGSGGYKTTSNV	-FKRRALFMLDEVDLLG
Agrobacterium fabrum|NP_396647	HGIVFAGSGGFKTTSVT	-VKGRTLFLLDEVARLG
VirB4 homologues	*	*
Helicobacter pylori|WP_000495985	HTLILGSTGSGKTVFMS	DGRRF-VLDIDEAWKYL
Escherichia coli|AAA86452	HALITGMSGEGKTTLLN	DGKRRVIQCFDEFHAYL
Escherichia coli|CAA57024	NTMLIGQSSSGKTVLLG	DGRRF-MYVFDEFWKPL
Bartonella henselae|AAF00942	NTFVCGPSGSGKTVIVN	DGRRI-IIVIDEFWKAL
Agrobacterium tumefaciens|CAA37357	MTAIFGPIGRGKTTLMT	DGRRF-VMSCDEFRAYL
Legionella pneumophila|CAB60053	HAAIFGGNNAGKTTLVN	DGRLT-SFIIAEAWQLF
Novosphingobium aromaticivorans|AAD03958	NVAVFGKSGSGKSVFLQ	DRSVPKLTMIDEAWQLL
Rickettsia prowazekii|WP_004599743	HTLIIGPTGAGKTVLMN	DGQKT-MIVLDEAWALI

Supplemental Figure 1: **Identification of Walker boxes in Cag T4SS ATPases.** The sequences of *H. pylori* Cag T4SS ATPases were aligned with sequences of the most closely related T4SS ATPases in other bacterial species. Genbank accession numbers are listed for each sequence. Blue boxes and red boxes indicate Walker-A motifs and Walker-B motifs, respectively. Asterisks indicate the amino acids targeted for mutagenesis.