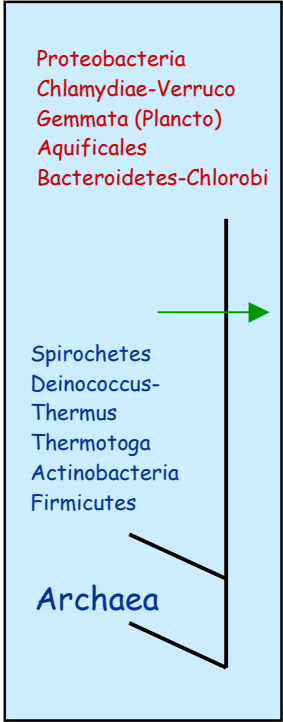


Main Line Signature in Alanine t-RNA Synthetase

Gupta, R.S.(1998) Microbiol.Mol.Biol.Rev 62:1435-91;
Griffiths and Gupta (2004) Int. Microbiol. 7, 41-52

		57		100
Proteobacteria	E. coli	145220	RNYSRATTSQRCVRA	GGKH NDLENVGYTARHHTFFEMLGNFSFG
	V. cholerae	2500962	-A-T----A-----	-----F-----
	Pse. putida	NP_249594	-A-T--V---K----	-----F-----
	Pas. multocida	NP_246224	-P-----A-----	-----F-----
	Nei. meningitidis	NP_274601	-P-----A-K----	-----M-----
	Ral. solanacearum	NP_518918	-P-V--ASV---L---	-----W---
	A. tumefaciens	NP_532553	-P--T-ASA-K----	---D-----
	Ri. prowazekii	e1343125	-S-NK-V--KSL---	-----H-----
	Hel. pylori	2314404	PSIP--AS--L-M---	-----L-----
	Camp. jejuni	YP_178628	--PP-K-SC-T-I---	---D-----
Aquificales	Bde. bacteriovorus	NP_967487	-D---V-A-K----	-----F-----V-----
	Geo. sulfurreducens	NP_951210	K-D-V--C--K----	-----R-----
	Sul. azorense	TIGR	-P-K--ASC-KVF-V	S--- --D---P-----
	Per. marina	TIGR	-P-K--VSC-KVF-V	S--- --D---P-----
Chlamydiale	Aqu. aeolicus	2983727	-P-K--SC-K-L-V	S--- --Q---S-----
	Proto. amoebophila	YP_008518	-D-N--A---K-I-V	-----H-S-----
	Sim. negevensis	TIGR	-D-T--AS--K-I-V	---D---H-K-I-----
	Chl. trachomatis	6758113	TS-T-----K-I--	-----H-S--L---
	Chl. pneumoniae	AA019030	TS-----K-I--	---D---H-S--L---
	Chl. muridarum	AAF39003	TS-T-- --K-I--	-----H-S--L---
	Chlam. abortus	YP_220230	TS-----K-I--	---D---H-S--L---
Verrucomicrobium and Gemmata	Chlam. felis	YP_515057	TS-----K-I--	---D---H-S--L---
	Chlam. caviae	NP_829739	TS-----K-I--	---D---H-S--L---
Bacteroidetes-Chlorobi Group	Ver. spinosum	TIGR	GLPT--ADT-K-I--	---N--D--LDTY-----W---
	Gem. oscuriglobus	TIGR	PPVV-VANT-K-I--	---DD--RDTY-----W---
Other Planctomycetes	Por. gingivalis	NP_905430	AK-T-VAD--K-L-V	S--- --E--HDTY---M---W---
	Bact. fragilis	YP_210392	AK-H-VAD--K-L-V	S--- --E--HDTY---M---W---
Spirochetes	Ch. tepidum	NP_66107	-E-T--ADT-K-I--	S--- --D--RDTY-----W---
	Bla. marina	EA081993	-DFT----C-K-L-T	G-ID--R--Y-----
Cyanobacteria	Rho. baltica	NP_868425	-DFT----C-K-L-T	G-ID--R--F-----
	Bor. burgdorferi	2688110	PSGDMLVN-V-K-L-T	-G-IDE--DLS-L-----W-L-
Deinococcus-Thermus Group	Tre. pallidum	AE001269	PAGT-LVNA-K-L-T	G-IDA--DNS -L-----W-L-
	Gloe. violaceus	NP_925294	-PAP-V----K---T	--I---R-----
Actinobacteria	Nostoc sp. PCC 7120	NP_486458	PEFK-----K-I-T	--I---R-K--Q-----
	D. radiodurans	AAF11848	QPSK-V--A-K---V	G-I---R-R--LSL---M-----
Firmicutes	The. thermophilus	2500960	-EWR-V--C-E-L-V	G-I---R-S--N-Y-----
	T. maritima	4981959	PV-T-VA-C-K-L-T	V-I---K-P-----
Firmicutes	Cor. glutamicum	NP_600486	PFENG--SI-K---T	L-I-E--I-T--N---Q-A-----
	Bif. longum	NP_696059	PPKR-MASN-K---T	L-IDE--K-T--G---Q-----
Firmicutes	Str. coelicolor	CAB93381	PPFD-ATSV-K---T	P-I---K-T--G---Q-C---F-
	Myc. tuberculosis	2213532	PP-PT--SI-K-I-T	P-IDE--I-T--N---Q-A-----
Firmicutes	Bac. subtilis	2635186	PENP-IVNA-KAI-T	--I---K-----I-
	Clo. acetobutylicum	NP_348304	PPKT-V--C-K-I-T	G-I--I-K-S--G-----I-
Firmicutes	Strep. pneumoniae	NP_358833	PENP-I-NA-KAI-T	--I---K-----M-----I-
	Sta. aureus	NP_516959	PKKP-IVN--KAI-T	--I---F-----I-



A conserved insert (4 aa) in AlaRS homologs (boxed) in various species belonging to Proteobacteria, Bacteroidetes-Chlorobi, Chlamydiales, Gemmata, V. spinosum and Aquificales phyla. The absence of this insert in various other phyla as well as archaeal homologs indicates that the groups lacking this insert are ancestral. The genetic change (RGC) responsible for this insert likely occurred at the evolutionary stage indicated in interpretive diagram on the right. Unlike the insert in RpoB, the Planctomycetes species behaved heterogeneously in terms of this insert, which could be due to LGT. The Dashes in the alignment show identity with the amino acid on the top line. Sequence information for only representative species is presented. However, all other available sequences from these groups behaved in the indicated manner. Sequences for a few species (marked TIGR) were obtained by blast searches at The Institute for Genomic Research website at <http://www.tigr.org>.