

Supplementary 3.

Multiple alignment of the amino acid sequence of the RecD proteins of the genus Francisella

Strain	RecD protein accession number
F. t. subsp. tularensis WY96-3418	ABO46414.1
F.t. subsp.holarctica LVS	AJI59740.1
F.t.subsp.holarctica FTNF002-00	ABU61181.1
F. t.subsp.mediasiatica FSC147	ACD30618.1
F.philomiragia ATCC 25017	AJI55965.1
F.t.subsp novicida U112	ABK90231.1
F.t.subsp. holarctica OSU18	ABI82625.1
F.t.subsp.tularensis FSC198	CAL09409.1
F.t.subsp.tularensis SCHU S4	CAG46026.1

		1	50
F. t. subsp. tularensis WY96-3418 RecD	(1)	-----MYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
F.t. subsp.holarctica LVS RecD	(1)	-----MYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
F.t.subsp.holarctica FTNF002-00 RecD	(1)	-----MYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
F. t.subsp.mediasiatica FSC147 RecD	(1)	MLVYLMEMIMYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
F.philomiragia ATCC 25017 RecD	(1)	-----MYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
F.t.subsp novicida U112 RecD	(1)	MLVYLMEMIMYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
F.t.subsp. holarctica OSU18 RecD	(1)	MLVYLMEMIMYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
F.t.subsp.tularensis FSC198 RecD	(1)	MLVYLMEMIMYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
F.t.subsp.tularensis SCHU S4 RecD	(1)	MLVYLMEMIMYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
Consensus	(1)	MLVYLMEMIMYKTFHKACEQLADIRAIDFFFAKEVFDLVKKTTPSMTTLS	
		51	100
F. t. subsp. tularensis WY96-3418 RecD	(42)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
F.t. subsp.holarctica LVS RecD	(42)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
F.t.subsp.holarctica FTNF002-00 RecD	(42)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
F. t.subsp.mediasiatica FSC147 RecD	(51)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
F.philomiragia ATCC 25017 RecD	(42)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
F.t.subsp novicida U112 RecD	(51)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
F.t.subsp. holarctica OSU18 RecD	(51)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
F.t.subsp.tularensis FSC198 RecD	(51)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
F.t.subsp.tularensis SCHU S4 RecD	(51)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
Consensus	(51)	SESYPPFHGAGNDLEQKSNELFHILMKLMHVYSHGHSCSKIADISNKT	
		101	150
F. t. subsp. tularensis WY96-3418 RecD	(92)	IFASEQSNQSDAKVGFKMPSSSEKIASILDNINVDNLPIYFAKQYDSLYIK	
F.t. subsp.holarctica LVS RecD	(92)	IFASEQSNQSDAKVGFKMPSSSEKIASILDNINVDNLPIYFAKQYDSLYIK	
F.t.subsp.holarctica FTNF002-00 RecD	(92)	IFASEQSNQSDAKVGFKMPSSSEKIASILDNINVDNLPIYFAKQYDSLYIK	
F. t.subsp.mediasiatica FSC147 RecD	(101)	IFASEQSNQSDAKVGFKMPSSSEKIASILDNINVDNLPIYFAKQYDSLYIK	
F.philomiragia ATCC 25017 RecD	(92)	IFASEQSNQSDAKVGFKMPSSSEKIASILDNINVDNLPIYFAKQYDSLYIK	
F.t.subsp novicida U112 RecD	(101)	IFASEQSNQSDAKVGFKMPSSSEKIASILDNINVDNLPIYFAKQYDSLYIK	

F.t.subsp. holarctica OSU18 RecD	(101)	IFASEQSNQSDAKVGFKMPSSDKIASILDNLNYDNLPIYFAKQYDSLYIK
F.t.subsp.tularensis FSC198 RecD	(101)	IFASEQSNQSDAKVGFKMPSSDKIASILDNLNYDNLPIYFAKQYDSLYIK
F.t.subsp.tularensis SCHU S4 RecD	(101)	IFASEQSNQSDAKVGFKMPSSDKIASILDNLNYDNLPIYFAKQYDSLYIK
Consensus	(101)	IFASEQSNQSDAKVGFKMPSSDKIASILDNLNYDNLPIYFAKQYDSLYIK
	151	200
F. t. subsp. tularensis WY96-3418 RecD	(142)	RLWNYENSIANFIKLTQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
F.t. subsp.holarctica LVS RecD	(142)	RLWNYENSIANFIKLTQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
F.t.subsp.holarctica FTNF002-00 RecD	(142)	RLWNYENSIANFIKLTQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
F. t.subsp.mediasiatica FSC147 RecD	(151)	RLWNYENSIANFIKLTQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
F.philomiragia ATCC 25017 RecD	(142)	RLWNYEVENSIANFIKSTIQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
F.t.subsp novicida U112 RecD	(151)	RLWNYENSIANFIKLTQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
F.t.subsp. holarctica OSU18 RecD	(151)	RLWNYENSIANFIKLTQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
F.t.subsp.tularensis FSC198 RecD	(151)	RLWNYENSIANFIKLTQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
F.t.subsp.tularensis SCHU S4 RecD	(151)	RLWNYENSIANFIKLTQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
Consensus	(151)	RLWNYENSIANFIKLTQNTQKDNRIEEVVDKLFEPAGEINWQKQAVIK
	201	250
F. t. subsp. tularensis WY96-3418 RecD	(192)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
F.t. subsp.holarctica LVS RecD	(192)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
F.t.subsp.holarctica FTNF002-00 RecD	(192)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
F. t.subsp.mediasiatica FSC147 RecD	(201)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
F.philomiragia ATCC 25017 RecD	(192)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
F.t.subsp novicida U112 RecD	(201)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
F.t.subsp. holarctica OSU18 RecD	(201)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
F.t.subsp.tularensis FSC198 RecD	(201)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
F.t.subsp.tularensis SCHU S4 RecD	(201)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
Consensus	(201)	SLNYNFSIISGGPGTGKTTTVAKLLLAIQMLNQNQRIALLAPTGKAAQR
	251	300
F. t. subsp. tularensis WY96-3418 RecD	(242)	MTESLKNTLATVIPSSLTTESTIQKNDIFKQVQDELNSVAQYLNLEAQT
F.t. subsp.holarctica LVS RecD	(242)	MTESLKNTLATVIPSSLTTESTIQKNDIFKQVQDELNSVAQYLNLEAQT
F.t.subsp.holarctica FTNF002-00 RecD	(242)	MTESLKNTLATVIPSSLTTESTIQKNDIFKQVQDELNSVAQYLNLEAQT
F. t.subsp.mediasiatica FSC147 RecD	(251)	MTESLKNTLATVIPSSLTTESTIQKNDIFKQVQDELNSVAQYLNLEAQT
F.philomiragia ATCC 25017 RecD	(242)	MRESINSVLSKRVNDNSYLG-----LSNLEAQT
F.t.subsp novicida U112 RecD	(251)	MTESINSVLSKRVNDNSYLG-----LSNLEAQT
F.t.subsp. holarctica OSU18 RecD	(251)	MTESLKNTLATVIPSSLTTESTIQKNDIFKQVQDELNSVAQYLNLEAQT
F.t.subsp.tularensis FSC198 RecD	(251)	MTESLKNTLATVIPSSLTTESTIQKNDIFKQVQDELNSVAQYLNLEAQT
F.t.subsp.tularensis SCHU S4 RecD	(251)	MTESLKNTLATVIPSSLTTESTIQKNDIFKQVQDELNSVAQYLNLEAQT
Consensus	(251)	MTESLKNTLATVIPSSLTTESTIQKNDIFKQVQDELNSVAQYLNLEAQT
	301	350
F. t. subsp. tularensis WY96-3418 RecD	(292)	IHRFLGLEPNSTVVKYNQSKAPFDVIIVDEASMLDMNIFIKLIRAVAN
F.t. subsp.holarctica LVS RecD	(292)	IHRFLGLEPNSTVVKYNQSKAPFDVIIVDEASMLDMNIFIKLIRAVAN

F.t.subsp.holarctica FTNF002-00 RecD	(292)	IHRFLGLRPNSTYVKYNEQSKAPFDVIIVDEASMLDMNIFIKLIRAVADN
F. t.subsp.mediasiatica FSC147 RecD	(301)	IHRFLGLRPNSTYVKYNEQSKAPFDVIIVDEASMLDMNIFIKLIRAVADN
F.philomiragia ATCC 25017 RecD	(270)	IHRFLGLRPNSTYVKYNEQSKAPFDVIIVDEASMLDMNIFIKLIRAVADN
F.t.subsp novicida U112 RecD	(279)	IHRFLGLRPNSTYVKYSKQSKAPFDVIIVDEASMLDMNIFIKLIRAVADN
F.t.subsp. holarctica OSU18 RecD	(301)	IHRFLGLRPNSTYVKYNEQSKAPFDVIIVDEASMLDMNIFIKLIRAVADN
F.t.subsp.tularensis FSC198 RecD	(301)	IHRFLGLRPNSTYVKYNEQSKAPFDVIIVDEASMLDMNIFIKLIRAVADN
F.t.subsp.tularensis SCHU S4 RecD	(301)	IHRFLGLRPNSTYVKYNEQSKAPFDVIIVDEASMLDMNIFIKLIRAVADN
Consensus	(301)	IHRFLGLRPNSTYVKYNEQSKAPFDVIIVDEASMLDMNIFIKLIRAVADN
	351	400
F. t. subsp. tularensis WY96-3418 RecD	(342)	TKLILIGDTNQLPSVEAGSLLANFTHDKYGSITPYTTLLIKNYRSQQYIN
F.t. subsp.holarctica LVS RecD	(342)	TKLILIGDTNQLPSVEAGSLLANFTHDKYGSITPYTTLLIKNYRSQQYIN
F.t.subsp.holarctica FTNF002-00 RecD	(342)	TKLILIGDTNQLPSVEAGSLLANFTHDKYGSITPYTTLLIKNYRSQQYIN
F. t.subsp.mediasiatica FSC147 RecD	(351)	TKLILIGDTNQLPSVEAGSLLANFTHDKYGSITPYTTLLIKNYRSQQYIN
F.philomiragia ATCC 25017 RecD	(320)	TKLILIGDTNQLPSVEAGSLLANFTHHDDGITPYTTLLIKNYRSQQYIN
F.t.subsp novicida U112 RecD	(329)	TKLILIGDTNQLPSVEAGSLLANFTHDKYGSITPYTTLLIKNYRSQQYIN
F.t.subsp. holarctica OSU18 RecD	(351)	TKLILIGDTNQLPSVEAGSLLANFTHDKYGSITPYTTLLIKNYRSQQYIN
F.t.subsp.tularensis FSC198 RecD	(351)	TKLILIGDTNQLPSVEAGSLLANFTHDKYGSITPYTTLLIKNYRSQQYIN
F.t.subsp.tularensis SCHU S4 RecD	(351)	TKLILIGDTNQLPSVEAGSLLANFTHDKYGSITPYTTLLIKNYRSQQYIN
Consensus	(351)	TKLILIGDTNQLPSVEAGSLLANFTHDKYGSITPYTTLLIKNYRSQQYIN
	401	450
F. t. subsp. tularensis WY96-3418 RecD	(392)	NLAASVLKGDVNIIDSQQNENIKFHSLRNLDTYLREYAKRYSQLEKCRDYK
F.t. subsp.holarctica LVS RecD	(392)	NLAASVLKGDVNIIDSQQNENIKFHSLRNLDTYLREYAKRYSQLEKCRDYK
F.t.subsp.holarctica FTNF002-00 RecD	(392)	NLAASVLKGDVNIIDSQQNENIKFHSLRNLDTYLREYAKRYSQLEKCRDYK
F. t.subsp.mediasiatica FSC147 RecD	(401)	NLAASVLKGDVNIIDSQQNENIKFHSLRNLDTYLREYAKRYSQLEKCRDYK
F.philomiragia ATCC 25017 RecD	(370)	NLAASVLKGDVNTDHNHQNENINFHSLRNLDTYLREYAKRYSQLEKCRDYK
F.t.subsp novicida U112 RecD	(379)	NLAASVLKGDVNIIDSHQNENINFHSLRNLDTYLREYAKRYSQLEKCRNDYK
F.t.subsp. holarctica OSU18 RecD	(401)	NLAASVLKGDVNIIDSQQNENIKFHSLRNLDTYLREYAKRYSQLEKCRDYK
F.t.subsp.tularensis FSC198 RecD	(401)	NLAASVLKGDVNIIDSQQNENIKFHSLRNLDTYLREYAKRYSQLEKCRDYK
F.t.subsp.tularensis SCHU S4 RecD	(401)	NLAASVLKGDVNIIDSQQNENIKFHSLRNLDTYLREYAKRYSQLEKCRDYK
Consensus	(401)	NLAASVLKGDVNIIDSQQNENIKFHSLRNLDTYLREYAKRYSQLEKCRDYK
	451	500
F. t. subsp. tularensis WY96-3418 RecD	(442)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
F.t. subsp.holarctica LVS RecD	(442)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
F.t.subsp.holarctica FTNF002-00 RecD	(442)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
F. t.subsp.mediasiatica FSC147 RecD	(451)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
F.philomiragia ATCC 25017 RecD	(420)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
F.t.subsp novicida U112 RecD	(429)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
F.t.subsp. holarctica OSU18 RecD	(451)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
F.t.subsp.tularensis FSC198 RecD	(451)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
F.t.subsp.tularensis SCHU S4 RecD	(451)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
Consensus	(451)	EALTELNKFRILVANKNLEIGTDKLNQKIEKFMSKPIDSNYKGRFIMITQ
	501	550
F. t. subsp. tularensis WY96-3418 RecD	(492)	NSYSLGLFNGDVGILWPDDTGKLELYFDGKDAKAFSLNMLPKYESVYAMT

F.t. subsp.holarctica LVS RecD	(492)	NSYSLGLFNGDVGIMW	PDDTGKLR	YFDGKDAKAFSLNMLPKYESVYAMT
F.t.subsp.holarctica FTNF002-00 RecD	(492)	NSYSLGLFNGDVGIMW	PDDTGKLR	YFDGKDAKAFSLNMLPKYESVYAMT
F. t.subsp.mediasiatica FSC147 RecD	(501)	NSYSLGLFNGDVGIMW	PDDTGKLR	YFDGKDAKAFSLNMLPKYESVYAMT
F.philomiragia ATCC 25017 RecD	(470)	NSYSLGLFNGDVGIMW	PDDTGKLR	YFDGKDAKAFSLNMLPKYESVYAMT
F.t.subsp novicida U112 RecD	(479)	NSYSLGLFNGDVGIMW	PDDTGKLR	YFDGKDAKAFSLNMLPKYESVYAMT
F.t.subsp. holarctica OSU18 RecD	(501)	NSYSLGLFNGDVGIMW	PDDTGKLR	YFDGKDAKAFSLNMLPKYESVYAMT
F.t.subsp.tularensis FSC198 RecD	(501)	NSYSLGLFNGDVGIMW	PDDTGKLR	YFDGKDAKAFSLNMLPKYESVYAMT
F.t.subsp.tularensis SCHU S4 RecD	(501)	NSYSLGLFNGDVGIMW	PDDTGKLR	YFDGKDAKAFSLNMLPKYESVYAMT
Consensus	(501)	NSYSLGLFNGDVGIMW	PDDTGKLR	YFDGKDAKAFSLNMLPKYESVYAMT
		551		600
F. t. subsp. tularensis WY96-3418 RecD	(542)	IHK	TQGSEFDEIVII	LPAEDNEALSKQLLYTAITRAKYKLTIISEQSSLR
F.t. subsp.holarctica LVS RecD	(542)	IHK	TQGSEFDEIVII	LPAEDNEALSKQLLYTAITRAKYKLTIISEQSSLR
F.t.subsp.holarctica FTNF002-00 RecD	(542)	IHK	TQGSEFDEIVII	LPAEDNEALSKQLLYTAITRAKYKLTIISEQSSLR
F. t.subsp.mediasiatica FSC147 RecD	(551)	IHK	TQGSEFDEIVII	LPAEDNEALSKQLLYTAITRAKYKLTIISEQSSLR
F.philomiragia ATCC 25017 RecD	(520)	IHK	TQGSEFDEIVII	LPAEDNEALCKQLLYTAITRAKYKLTIISEQSSLR
F.t.subsp novicida U112 RecD	(529)	IHK	TQGSEFDEIVII	LPAEDNEALSKQLLYTAITRAKYKLTIISEQSSLR
F.t.subsp. holarctica OSU18 RecD	(551)	IHK	TQGSEFDEIVII	LPAEDNEALSKQLLYTAITRAKYKLTIISEQSSLR
F.t.subsp.tularensis FSC198 RecD	(551)	IHK	TQGSEFDEIVII	LPAEDNEALSKQLLYTAITRAKYKLTIISEQSSLR
F.t.subsp.tularensis SCHU S4 RecD	(551)	IHK	TQGSEFDEIVII	LPAEDNEALSKQLLYTAITRAKYKLTIISEQSSLR
Consensus	(551)	IHK	TQGSEFDEIVII	LPAEDNEALSKQLLYTAITRAKYKLTIISEQSSLR
		601		622
F. t. subsp. tularensis WY96-3418 RecD	(592)	DIAQKIDIRNSNISELVSL	STQ	
F.t. subsp.holarctica LVS RecD	(592)	DIAQKIDIRNSNISELVSL	STQ	
F.t.subsp.holarctica FTNF002-00 RecD	(592)	DIAQKIDIRNSNISELVSL	STQ	
F. t.subsp.mediasiatica FSC147 RecD	(601)	DIAQKIDIRNSNISELVSL	STQ	
F.philomiragia ATCC 25017 RecD	(570)	DIAQKIDIRNSNISELVSL	NN-	
F.t.subsp novicida U112 RecD	(579)	DIAQKIDIRNSNISELVSL	SD-	
F.t.subsp. holarctica OSU18 RecD	(601)	DIAQKIDIRNSNISELVSL	STQ	
F.t.subsp.tularensis FSC198 RecD	(601)	DIAQKIDIRNSNISELVSL	STQ	
F.t.subsp.tularensis SCHU S4 RecD	(601)	DIAQKIDIRNSNISELVSL	STQ	
Consensus	(601)	DIAQKIDIRNSNISELVSL	STQ	