

# Alignment of all alleles observed in PF10\_0348 (reference strain 3D7 from PlasmoDB included for comparison)

PlasmoDB 3D7 ref MKKIYSIFFSLFILNLHIYIKNIKCNLDLINYNDNLNRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
*Plasmodium reichenowi* DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVASSKIINAND  
3D7 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
RO33 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
FCR3 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
Wellcome DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
T996 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
T9102 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
K1 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
Dd2 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
D10 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
FCC2 A DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
D6 A DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
Palo Alto A DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
HB3 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
7G8 DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
FCC2 B DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
D6 B DSNLRNGLLNNSLDLTNGLNKKDNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND  
Palo Alto B NKNKNSFIDSKIEEHENKSYQNKDNNISIVGQDVPITSVYSSKIINAND

PlasmoDB 3D7 ref LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
*Plasmodium reichenowi* LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
3D7 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
RO33 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
FCR3 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
Wellcome LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
T996 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
T9102 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
K1 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
Dd2 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
D10 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
FCC2 A LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
D6 A LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
Palo Alto A LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
HB3 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
7G8 LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
FCC2 B LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
D6 B LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N  
Palo Alto B LEGNSIDDTKGLSVTNSGFDDGSAFGGGLPFSGYSPLOQGNHNKCPDENFCCKGIKNVLSCPPKKNSTGRNGDWISVAVKESSTTNKGVLVPPRRTKLCLR-N

PlasmoDB 3D7 ref  
*Plasmodium reichenowi*  
D7

INKVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILRNETSNDKIKKRVDDWEANKSA  
ITHIWRINDEKNFKEEFVKVALGESNALIKYYKEKNLNPLTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILCNERSNAEIKNRRVDWEANKSE  
INKVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILRNETSNDKIKKRVDDWEANKSA  
RO33  
INKVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILCNETSNDKIKKRVDDWEANKSA  
FCR3  
INKVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILCNETSNDKIKKRVDDWEANKSA  
Wellcome  
INKVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILCNETSNDKIKKRVDDWEANKSA  
T996  
INOVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILCNETSNDKIKKRVDDWEANKSA  
T9102  
INOVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILCNETSNDKIKKRVDDWEANKSA  
K1  
INKVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILCNETSNDKIKKRVDDWEANKSA  
Dd2  
INKVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILCNETSNDKIKKRVDDWEANKSA  
D10  
INKVWHR IKDEKNFKEEFVKVALGESNALMKHYKEKNLNALTAIKYGFSDMGDIKGTDLIDYQITKNINRALDKILCNETSNDKIKKRVDDWEANKSA  
FCC2 A  
INNFPELKKTEGKFEENFIYSSAGSEAKQLIKLYGNNTAKALQAMKYGFADIGNIVQGNMIDTPTSNTKTYLEEVLGKQYKNVNDPKDAKTWWIQNKHR  
D6 A  
INNFPELKKTEGKFEENFIYSSAGSEAKQLIKLYGNNTAKALQAMKYGFADIGNIVQGNMIDTPTSNTKTYLEEVLGKQYKNVNDPKDAKTWWIQNKHR  
Palo Alto A  
INNFPELKKTEGKFEENFIYSSAGSEAKQLIKLYGNNTAKALQAMKYGFADIGNIVQGNMIDTPTSNTKTYLEEVLGKQYKNVNDPKDAKTWWIQNKHR  
HB3  
INNFPELKKTEGKFEENFIYSSAGSEAKQLIKLYGNNTAKALQAMKYGFADIGNIVQGNMIDTPTSNTKTYLEEVLGKQYKNVNDPKDAKTWWIQNKHR  
7G8  
INNFPELKKTEGKFEENFIYSSAGSEAKQLIKLYGNNTAKALQAMKYGFADIGNIVQGNMIDTPTSNTKTYLEEVLGKQYKNVNDPKDAKTWWIQNKHR  
FCC2 B  
INNFPELKKTEGKFEENFIYSSAGSEAKQLIKLYGNNTAKALQAMKYGFADIGNIVQGNMIDTPTSNTKTYLEEVLGKQYKNVNDPKDAKTWWIQNKHR  
D6 B  
INNFPELKKTEGKFEENFIYSSAGSEAKQLIKLYGNNTAKALQAMKYGFADIGNIVQGNMIDTPTSNTKTYLEEVLGKQYKNVNDPKDAKTWWIQNKHR  
Palo Alto B  
INNFPELKKTEGKFEENFIYSSAGSEAKQLIKLYGNNTAKALQAMKYGFADIGNIVQGNMIDTPTSNTKTYLEEVLGKQYKNVNDPKDAKTWWIQNKHR

PlasmoDB 3D7 ref  
*Plasmodium reichenowi*  
3D7

FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFEDVIKLCNIQQFTNQDQSLLLEISKDKCKEALKHYE EWVNRPRPEWKGQC  
LWDAFMCGYKTHIGNKACPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIKLCNIQQFTNQDQSLLLEISNDKCKEALKHYE EWVNRPRPEWKGQC  
FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFEDVIKLCNIQQFTNQDQSLLLEISKDKCKEALKHYE EWVNRPRPEWKGQC  
RO33  
FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIELCNVRCITNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
FCR3  
FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIELCNVRCITNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
Wellcome  
FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIELCNVRCITNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
T996  
FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFEDVIKLCNIQQFTNQDQSLLLEISKDKCKEALKHYE EWVNRPRPEWKGQC  
T9102  
FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIELCNVRCITNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
K1  
FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIELCNVRCITNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
Dd2  
FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIELCNVRCITNQDQSLLLEISKDKCKEALKHYE EWVNRPRPEWKGQC  
D10  
FWDAFMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFEDVIKLCNIQQFTNQDQSLLLEISKDKCKEALKHYE EWVNRPRPEWKGQC  
FCC2 A  
VWDAMMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIELCNVRCITNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
D6 A  
VWDAMMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIELCNVRCITNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
Palo Alto A  
VWDAMMCGYKVHIGNKPCPEHDNMDRIPQYLRWFREWGTYVCSEYKNKFENVIELCNVRCITNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
HB3  
VWDAMMCGYQYEKKDNKCTGYGNIYDIPQYLRWFREWGTYVCSEYKNKFEDVIKLCNIQQFTNQDQSLLLEISKDKCKEALKHYE EWVNRPRPEWKGQC  
7G8  
VWDAMMCGYQYEKKDNKCTGYGNIYDIPQYLRWFREWGTYVCSEYKNKFEDVIKLCNIQQFTNQDQSLLLEISKDKCKEALKHYE EWVNRPRPEWKGQC  
FCC2 B  
VWEAMMCGYQSAQKDNQCTGYGNIYDIPQYLRWFREWGTYVCSEYKNKFEDVIKLCNIQQFTNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
D6 B  
VWEAMMCGYQSAQKDNQCTGYGNIYDIPQYLRWFREWGTYVCSEYKNKFEDVIKLCNIQQFTNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC  
Palo Alto B  
VWEAMMCGYQSAQKDNQCTGYGNIYDIPQYLRWFREWGTYVCSEYKNKFEDVIKLCNIQQFTNQDQSLLLEISKDKCKGALKHYE EWVNRPRPEWKGQC



PlasmoDB 3D7 ref	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
<i>Plasmodium reichenowi</i>	DEEELENEGETTKEEDDEEKNETNDT-----IIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
3D7	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
RO33	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
FCR3	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
Wellcome	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
T996	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
T9102	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
K1	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
Dd2	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
D10	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
FCC2 A	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
D6 A	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
Palo Alto A	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
HB3	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
7G8	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
FCC2 B	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
D6 B	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN
Palo Alto B	-----TKEEDDEEKNETNDT-----TDDTEDIEDIIEENKEKELSNQQQSEKKSISKVDEDSYRILSVSYKDNNEVKNVAESIVKKLFLFNDN

PlasmoDB 3D7 ref	NNLETIFKGLTEDMTDLFQK
<i>Plasmodium reichenowi</i>	NNLETIFKGLTEDMTDLFQK
3D7	NNLETIFKGLTED
RO33	NNLETIFKGLTED
FCR3	NNLETIFKGLTED
Wellcome	NNLETIFKGLTED
T996	NNLETIFKGLTED
T9102	NNLETIFKGLTED
K1	NNLETIFKGLTED
Dd2	NNLETIFKGLTED
D10	NNLETIFKGLTED
FCC2 A	NNLETIFKGLTED
D6 A	NNLETIFKGLTED
Palo Alto A	NNLETIFKGLTED
HB3	NNLETIFKGLTED
7G8	NNLETIFKGLTED
FCC2 B	NNLETIFKGLTED
D6 B	NNLETIFKGLTED
Palo Alto B	NNLETIFKGLTED

This alignment represents all sequences observed, all B sequences were removed for MK analysis. The stop codon in RO33 is represented here in red but removed from analysis.