|  |
| --- |
| a |
| *(a*) Fe-s cluster domain(N-terminal) DNA binding (C-terminal)  3 17 18 60  KS WhiB1 ------------------MDWRSKAACLDEDPELFFPIGNT-GPA-IEQIEKAKKVCARCEVTETCLQWAIETGQDAGVWGGLSEDERRALKRRNA--RARRAS--- 82  KS WhiB2 ----VHELQIVGHPEQAVPSWQERALCAQTDPEAFFPEKGG-S------TREAKRVCTGCDVRSECLDYALENDERFGIWGGLSERERRKLKRRAV--FTA------ 88  KS WhiB3 ----MDSTARQPGPVADLWDWQFEGLCRTTDPEEFFHPEGERGSARRLRDERAKRVCQRCPVILECREHALAAKEPYGVWGGLSEDEREQELARRS---RRGLRGA- 99  KS WhiB7 ----MLALADHQTLIDQARVAGRPLPCLENDPDTWFADTPT-G------VEYAKSLCHACPVRTLCLEGALERREPWGVWGGELIEAGRVLPRKRPRGRPRKHPIAA 96  3 17 18 60  Mtb whiB1 ------------------MDWRHKAVCRDEDPELFFPVGNS-GPA-LAQIADAKLVCNRCPVTTECLSWALNTGQDSGVWGGMSEDERRALKRRNA--RTKARTGV- 93  Mtb whiB2 LVPEAPAPFEEPLPPEATDQWQDRALCAQTDPEAFFPEKGG-S------TREAKKICMGCEVRHECLEYALAHDERFGIWGGLSERERRRLKRGII----------- 89  Mtb whiB3 ----MPQPEQLPGPNADIWNWQLQGLCRGMDSSMFFHPDGERGRARTQREQRAKEMCRRCPVIEACRSHALEVGEPYGVWGGLSESERDLLLKGTM-GRTRGIRRTA 103  Mtb whiB7 -------VSVLTVPRQTPRQRLPVLPCHVGDPDLWFADTPA-G------LEVAKTLCVSCPIRRQCLAAALQRAEPWGVWGGEIFDQGSIVSHKRPRGRPRKDAVA- 92  \* \* . :\* . \*\* :\* \* : \* \*: : \*:\*\*\*  Variable region functional region |
| b |
| *(* ND1  Mtb SigA ------------------------------------------------------------------------------------------------------ 102  KS SigA VTPPTSEKSAETPTVSEPVTAVLGKQLLDKPGLIEFVERAVDNGKVATDKVQQAIEGASLTPTQAQRLLKNLRSQGVEVHFDQETAARLAQEQRGVKPRASR 0  ND1    Mtb SigA VAAT-----KASTATDEPVKRTATKSPAASASGAK-TGAKRTAAKSASGSPP-AKR—-ATKPAARSVKPASAPQDTTTSTIPKRKTRAAAKSAAAKAPSARG 203  KS SigA SRTTRSTTAKTATAKSTTAKSTATKSTTAKSTAAKSTTAKSTAAKSTAAKSTTAKSTTAKSTAAKSTTAASGTSAKGT-ASTTRKATTAAKGTAAKSTTAKG 93  :\* \*::\*\*.. .\* \*\*\*\*\* :\*.::.\*\* \* \*\* \*\*\*\*\*::.. \*\* \*.. \*\*:\*.. \*\*. . . \* : .\*\*: :\*\*\*.:\*\*\*: :\*:\*  ND1  Mtb SigA HATKPRAPKDAQHEAATDPEDALDSVEELDAEPDLDVEPGEDLDLDAADLNLDDLEDDVAPDADDDLDSGDDEDHEDLEAEAAVAPGQTADDDEEIAEPTEK 270  KS SigA RTAAKGTTKSAAE---TNARNA------AADAPELDEIAAEDEAEERAA-----------------LA-GK—-D------TVELVAGETSQAAPQKAESTEE 195  ::: : \*.\* . \*: .:\* \*:\*\* .\*\* : \* \* \*. \* . :. \*:\*:: : \*\* \*\*:  ND1  Mtb SigA DKASGDFVWDEDESEALRQARKDAELTASADSVRAYLKQIGKVALLNAEEEVELAKRIEAGLYATQLMTELSERGEKLPAAQRRDMMWICRDGDRAKNHLLE 367  KS SigA ESESRGFVLRADDEDDA-PAQQVVTAGATADAVKDYLKQIGKVALLNAEQEVDLAKRIEAGLFAEQRL----NSGDKIDAKLKRELWWVASDGKNAKNHLLE 297  :. \* .\*\* \*:.: \*:: . \*:\*\*:\*: \*\*\*\*\*\*\*\*\*\*\*\*\*\*:\*\*:\*\*\*\*\*\*\*\*\*:\* \* : : \*:\*: \* :\*:: \*:. \*\*..\*\*\*\*\*\*\*  ND1 ND2  Mtb SigA ANLRLVVSLAKRYTGRGMAFLDLIQEGNLGLIRAVEKFDYTKGYKFSTYATWWIRQAITRAMADQARTIRIPVHMVEVINKLGRIQRELLQDLGREPTPEEL 469  KS SigA ANLRLVVSLAKRYTGRGMLFLDLIQEGNLGLIRAVEKFDYTKGYKFSTYATWWIRQAITRAMADQARTIRIPVHMVEVINKLARVQRQMLQDLGREPTPEEL 399  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*.\*:\*\*::\*\*\*\*\*\*\*\*\*\*\*\*\*  ND2 LD CD    Mtb SigA AKEMDITPEKVLEIQQYAREPISLDQTIGDEGDSQLGDFIEDSEAVVAVDAVSFTLLQDQLQSVLDTLSEREAGVVRLRFGLTDGQPRTLDEIGQVYGVTRE 571  KS SigA AKELDMTPEKVVEVQKYGREPISLHTPLGEDGDSEFGDLIEDSEAVVPSDAVSFTLLQEQLHSVLDTLSEREAGVVSMRFGLADGQPKTLDEIGRVYGVTRE 501  \*\*\*:\*:\*\*\*\*\*:\*:\*:\*.\*\*\*\*\*\*. :\*::\*\*\*::\*\*:\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*:\*\*:\*\*\*\*\*\*\*\*\*\*\*\*\*\* :\*\*\*\*:\*\*\*\*:\*\*\*\*\*\*:\*\*\*\*\*\*\*  CD  Mtb SigA RIRQIESKTMSKLRHPSRSQVLRDYLD 598  KS SigA RIRQIESKTMSKLRHPSRSQVLRDYLD 528  \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* |
| c |
| KS SigB VIHDDFPARTHGASHAVPD----Q-ALVRRRLTAAHALPEQHRQQELIDVIADHIPFARR 55  Mtb SigF -----MTARAAGGSASRANEYADVPEMFRELVGLPAGSPEFQR--HRDKIVQRCLPLADH 53  : \*\*: \*.\* : : :.\*. : . \*\* :\* . .:: :\*:\* :  KS SigB LGRRFAPTPSLVDDCEQVACMALVLAVQRWDPAFDANLSSYAQPTILGELRRFLRDSTWW 115  Mtb SigF IARRFEGRGEPRDDLIQVARVGLVNAAVRFDVKTGSDFVSFAVPTIMGEVRRHFRDNSWS 113  :.\*\*\* . \*\* \*\*\* :.\*\* \*. \*:\* .::: \*:\* \*\*\*:\*\*:\*\*.:\*\*.:\*  KS SigB VRPPRRIQELAALVRSTEEELRHSTGREPTAQEVARAVGASPDEVSEARVAAAGRYVASV 175  Mtb SigF VKVPRRLKELHLRLGTATADLSQRLGRAPSASELAAELGMDRAEVIEGLLAGSSYHTLSI 173  \*: \*\*\*::\*\* : :: :\* : \*\* \*:\*.\*:\* :\* . \*\* \*. :\*.:. :. \*:  KS SigB DEEDPETG---RLVHL-----VHSPAVDEWVSLHPHIQALDPRDRCVLLRRYLEDETQAS 227  Mtb SigF DSGGGSDDDARAITDTLGDVDAGLDQIENREVLRPLLEALPERERTVLVLRFFDSMTQTQ 233  \*. . . . :.. . ::: \*:\* ::\*\* \*:\* \*\*: \*:::. \*\*:.  KS SigB IARALGISQAQVSRRLKRALDTLREQVPGGLSNA 261  Mtb SigF IAERVGISQMHVSRLLAKSLARLRDQLE------ 261  \*\*. :\*\*\*\* :\*\*\* \* ::\* \*\*:\*: |
| d |
| KS SigH MTPTTSEKPRSEVNSDPAEVDVATETPQERAARFEREALPHLDQLYSAALRTTRNPTDAE 60  Mtb SigH MADIDGV-----TGSAGLQPGPSEETDEELTARFERDAIPLLDQLYGGALRMTRNPADAE 55  \*: . ..\* : . : \*\* :\* :\*\*\*\*\*:\*:\* \*\*\*\*\*..\*\*\* \*\*\*\*:\*\*\*  KS SigH DLVQETYAKAYAAFHQYKPGTNLKAWMYRILTNTYINTYRKKQRQPLQSDAAEVEDYQLA 120  Mtb SigH DLLQETMVKAYAGFRSFRHGTNLKAWLYRILTNTYINSYRKKQRQPAEYPTEQITDWQLA 115  \*\*:\*\*\* .\*\*\*\*.\*:.:: \*\*\*\*\*\*\*:\*\*\*\*\*\*\*\*\*\*:\*\*\*\*\*\*\*\* : : :: \*:\*\*\*  KS SigH AAESHTAKGLRSAETEALDHIADSQVTDALAQLSEEFRLAVYLADVEGFAYKEIAEIMDT 180  Mtb SigH SNAEHSSTGLRSAEVEALEALPDTEIKEALQALPEEFRMAVYYADVEGFPYKEIAEIMDT 175  : .\*::.\*\*\*\*\*\*.\*\*\*: : \*:::.:\*\* \* \*\*\*\*:\*\*\* \*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*  KS SigH PIGTVMSRLHRGRKQLRELLAEYGAERGFGRQSQGKEVSS- 220  Mtb SigH PIGTVMSRLHRGRRQLRGLLADVARDRGFARGEQAHEGVSS 216  \*\*\*\*\*\*\*\*\*\*\*\*\*:\*\*\* \*\*\*: . :\*\*\*.\* .\*.:\* \* |
| e |
| KS SigJ MEMSRVDLERFEVARGRLGAVAYRLLGSASEAEDVVQESFVRWQAADRGRIEVPVAWLTK 60  Mtb SigJ -----MEVSEFEALRQHLMSVAYRLTGTVADAEDIVQEAWLRWDSPDT-VIADPRAWLTT 54  :::..\*\*. \* :\* :\*\*\*\*\* \*:.::\*\*\*:\*\*\*:::\*\*:: \* \* \* \*\*\*\*.  KS SigJ VVTNLCLNQLTSARSRREEYVGQWLPEPLLDGDPMLGPAETLEQRGSVSLAMLMILETLS 120  Mtb SigJ VVSRLGLDKLRSAAHRRETYTGTWLPEPVVTGLDATDPLAAVVAAEDARFAAMVVLERLR 114  \*\*:.\* \*::\* \*\* \*\*\* \*.\* \*\*\*\*\*:: \* .\* :: .. :\* :::\*\* \*  KS SigJ PTERAVYVLREAFAVPHGEIAEILETTPAATQQALSRAKSRIASLSHRHRTEADPVAARA 180  Mtb SigJ PDQRVAFVLHDGFAVPFAEVAEVLGTSEAAARQLASRARKAVTAQPALISGDPDPA-HNE 173  \* :\*..:\*\*::.\*\*\*\*..\*:\*\*:\* \*: \*\*::\* \*\*\*:. ::: : \*\*. .  KS SigJ IVEEFLAAATSGRVENLVRLLTDDAFGIGDGGGAVPARPKPVLGAQSVAKMLRGLAVPSA 240  Mtb SigJ VVGRLMAAMAAGDLDTVVSLLHPDVTFTGDSNGKAPTAVRAVRGSDKVVRFILGLVQRYG 233  :\* .::\*\* ::\* ::.:\* \*\* \*. \*\*..\* .\*: : \* \*::.\*.::: \*\*. .  KS SigJ A------KRELAGGSLDCHFALVNTSPALVAVVAGRVVGVIVLDIADGRISVVRIQANPH 294  Mtb SigJ PGLFGANQLALVNGELGAYTAGL---PGVDG-YRAMAPRITAITVRDGKVCALWDIANPD 289  : \*..\*.\*..: \* : \*.: . . . : .: : \*\*::..: \*\*\*.  KS SigJ KLDRATR-RWAASPHGRPLLSGW 316  Mtb SigJ KFTGSPLKERRAQPTGRGRHHRN 312  \*: : . \*.\* \*\* |
| Supplementary fig 2: Alignment of Wbl and major sigma factor A,B, H and J proteins between *K. sedentarius* MBB13 (KS) and *M. tuberculosis* H37Rv (Mtb) amino acid sequences. (a) The conserved cysteines residues, unique G(I/V)WGG domain (tryptophan containing) and AT-hook (of Wbl7) of Wbl proteins are highlighted. The conserved residues, Trp3, Phe17, Phe18 and Trp60 of the [4Fe–4S] cluster binding pocket of WhiB1 are underlined. (b) The Sigma factor N-terminal 1 and 2, linker and C-terminal domains are indicated as ND1, ND2, LD and SD respectively. The conserved residues, His516 and Pro517 of Sigma factor ACTD are underlined (c, d and e) Sigma factors similarity B, H and J respectively. *Mycobacterium tuberculosis* H37Rv was obtained from [ncbi.nlm.nih.gov](file:///C:\Users\mahadlaq\Desktop\رد%20جف\ncbi.nlm.nih.gov) (RefSeq NC\_000962.3). |