



SUPPLEMENTARY ONLINE DATA

Chloroplast HCF101 is a scaffold protein for [4Fe-4S] cluster assembly

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Arabidopsis HCF101	: EKDV LKA S Q I I D D F G T D V S C G F V K D I --- G I N E A L G E V S F R E L T T P A C P V K D M F E N K A N E V A A P W V K K V N T M S A	
Oryza sativa	: K K D V L G A S Q I I D D F G T D V S C G F V K D I --- E I S E A L E E V S F R E L T T P A C P I K D M F E E K A N E V A A P W V K K V N T M S A	
Populus	: E S D V L K A S Q I I D D F G T D V S C G F V K D I --- N I D E A Q G E V S F R E L T T P A C P V K D M F E Q K A N E V A L P W V K N V E T M S A	
Vitis vinifera	: E A D V L K A S Q I I D D F G T D V S C G F V K D I --- Q I N E A L G E V S F R E L T T P A C P I K D M F E Q K A N E V A M P W V K N V N T M S A	
Physcomyrella	: K K D V L G A S Q I I D D F G T D V T C G F V K E I --- T V D E S T G E V S F Q E L T T P A C P V K D M F E Q Q A K E V S A P P W V K G V N K M S A	
Selaginella	: G H D V L V A S T I I D D F G A D V T C G F V K E I --- Q A D K S S G E V A F R E L T T P A C P V K D M F E Q Q A K E V A A P P W V T N V K T M S A	
Volvox	: E E Q V L A K R N V I D D F G E D V N C G F V R Q I --- E V D A S V G V S F T E L T T P A C P V K E M F Q R Q S T F V K E P W R K P V S K L A S	
Ostreococcus tauri	: E S E V L S K R R V I D D F G E D V N C G F V K A I --- V I D E S A G S V L F A E L T T P A C P V K A E F E R Q A K A F E E D W V K R V S T M S A	
Micromonas	: E A D V L N A R N V I D D F G E D V N C G F V K D I --- R V S D A G D T F T E L T T P A C P V K E E F D R L S K Q Y V T A E W A K S C N N M S A	
Galdieria maxima	: Q K Q L E L K N I E D D L K Q N V E L G F V Q N E R V A K E D G K Y D V R F T Q L T T P A C P I K E K F Q N A K E W S S L W V R N V E D L R A	
Cyanidioschyzon	: T E Q L S A K A V V D D L G Q D V T L G F V K N I --- Q F G D E H Y G T V S F D E L T T P A C P I K E R F R E E C T R L A E S P F F T R A N R L R L A	
Phaeodactylum	: Q G E V L S T K S V I D D L G S D V T L G F V Q N I --- K L D G R D V S F D E L T T P A C P V K E Q F Q L C Q Q L V Q D P W T N N I Q T M S A	
Thalassiosira	: Q S Q L A A S V I N D D L N A D V S L G F V Q N I --- K I D E S S N I V S L D E L T T P A C P V K D L F V Q C Q D I I N G A W T R G A D T L S S	
Chloroflexus	: E D Q L A A R Q V Q E E L G G D V S R Q M V K H I --- A I C D G I V R C T E L T T P A C P L K Q I R S E A E A A V L A P G V R E V H E F I A	
Cytophaga	: Q E Q L E A K T V P E D L K K D V T L N M R D I --- A I D Q N S F T V L T T P A C P L K E L I R N S T E A H H K V S G T A V V I N M T	
Nostoc punctiforme	: S R S L E I R P V E D E L R K S V E L N M R N I --- K I D G G K V S F T V L T T P A C P L R E F I V E C Q K A K K P G V T D V S E V I A	
Synechococcus	: A A A L E A R P V Q D E L R R S V E L N M R D I --- R V E P G R V A P T V L T T P A C P L R E F I V E E C K A A R Q A P E I A I D T V S A	
Magnetococcus	: E P Q V R D A R M V V D V A G R D V S A G Y V S G I --- E I H A G E V A F Q Q R F P E S A D Y L K Q L Q E C Q A V G L A P G V E R V T N M S G	
Salmonella	: R A M V A G T A N F Q H T L K H N T I T L K A H H V --- A W M D D T H V E V M P F V W N S A F E V L K E C S A D L R I T G A K A I D W K L Y	
Arabidopsis-L1	: -----	
Chlamydomonas-L1	: ----- M G W R Q G A A E W L L S N A A S G W R G A A S A A L A A G G A S G T A R A G A P A G A S R G A	
Homo sapiens	: ----- V C G R Q L S G A S E T L K	
Yarrowia lipolytica	: ----- M R G F R I A I P Q R S I A I I S R L Q P I T A N F H S S P A L R S H E N P L G P K P	
Arabidopsis-L2	: ----- M E N G D I P E D A N E H P G P Q S E S A G K S D S C A C P N Q E A C A T	
Chlamydomonas-L2	: ----- M A S S A S A A P T G E V P D N A N Q H P G T A S D Q A G K S A A C A C P N Q S I C A T	
Homo sapiens	: ----- M E E V H D P G A D S A Q A G R G A S C Q C P N Q R L C A S	
Saccharomyces Nbp35	: ----- M T E I L P H V N D E V L P A E Y E L N Q P E E H P G P E S D M A G K S D A C G C A N K E I C E S	
Drosophila	: -----	
Homo sapiens	: -----	
Danio rerio	: -----	
Saccharomyces Cfb1	: -----	
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Arabidopsis HCF101	: Q P A K P I F A G Q L P F G --- L S P I S N I I A V S S C K G G V G K S T V A V N L A Y T L A G M G A R --- V G I F D A D V Y G P S I P I M V N P S R I I E M N	
Oryza sativa	: Q P A R P A Y A G E L P E G --- L Q I R I S N I I A V S S C K G G V G K S T V A V N L A Y T L A G M G A R --- V G I F D A D V Y G P S I P I M V N P S P N R I I E V M N	
Populus	: Q P A R P V Y A G Q L P Q G --- L Q I T I S N I I A V S S C K G G V G K S T V A V N L A Y T L A G M G A R --- V G I F D A D V Y G P S I P I M V N P S P N R I I E M N	
Vitis vinifera	: Q P A R P V F A G Q L P A G --- L Q I T I S N I I A V S S C K G G V G K S T V A V N L A Y T L A G M G A R --- V G I F D A D V Y G P S I P I M V N P S P N R I I E M N	
Physcomyrella	: Q P A K P L I A D D V P A G --- L K K V S N I I A V S S C K G G V G K S T V A V N L A Y T L A G M G A R --- V G I F D A D V Y G P S I P I M V N P S P N R I I E M N	
Selaginella	: Q P A K A L A A E G L P R S --- L Q N V S N I I A V S S C K G G V G K S T V A V N L A Y T L A G M G A R --- V G I F D A D V Y G P S I P I M V N P S P N R I I E M N	
Volvox	: Q P P K P L L P E S G R P G G --- L A K V R H I I A V S S C K G G V G K S T V S V N L A Y T L A G M G A R --- V G I F D A D V Y G P S I P I M V N P S P N R I I E M N	
Ostreococcus tauri	: Q P A R N D A P E --- T V E G --- L R R V S H I I A V S S C K G G V G K S T S V N L A Y T L A M M G A R --- V G I L D A D V Y G P S I P I M I S P D P V I E M D	
Micromonas	: Q P V T N D M P D --- A V E G --- L K G V R H I I A V S S C K G G V G K S T S V N L A Y T L R M M G A R --- V G I F D A D V Y G P S I P I M I T S P E Q A V I Q M D	
Galdieria maxima	: N E I N R A Q A G D R P --- --- L N K V K H I I A V A S C K G G V G K S T V A V N L A F T T K L G C K --- V G I M D A D I Y G P S I P I L V Q P E N K I Y Q Y K	
Cyanidioschyzon	: Q T P S A A A P E A G G S R D P S Q V S N I V L V S P A K G G V A K S T V A V N L A F V A R L G A R --- V G I L D A D I Y G P S I P I M V N P H N E K R R	
Phaeodactylum	: Q P S V Q E T --- A T L G --- M S Q V G A V I A V S S C K G G V G K S T V A V N L A F S Q R L C A T --- V G I F D A D V Y G P S I P I M I T P D D T V R F V	
Thalassiosira	: Q P T A A P S --- D A P L G --- M S Q I G A V I A V S S C K G G V G K S T V A V N L A F A E S L G A R --- V G I F D A D V Y G P S I P I M V T P E D D N V R F V	
Chloroflexus	: N V R R P A G I P E Q S A --- I P C V A N I I A V A A C K G G V G K S T V A A N L A V A L Q M G A Q --- V G L L D A D V G P S I P I M L G V R G Q P V A V S	
Cytophaga	: A D V T T G R F N S G P V --- L P H V K N I I A V S S C K G G V G K S T I T A N L A V A L S K S C A K --- V G I I D A D I S G P S I P I M F I D V D V R P N V I	
Nostoc punctiforme	: E T P Q Q K S L P D R T G --- I S C V K N I I A V S S C K G G V G K S T V A V N V A V A Q T C A K --- V G L L D A D I Y G P N D P I M L G L A D A Q H V V R	
Synechococcus	: E T P R S P S L P N R Q S --- I P C V R N I I A I S S C K G G V G K T S V S V N V A V A L Q S C A R --- V G L L D A D I Y G P N V P I M L G L D R S V V Q	
Magnetococcus	: N E Q Q Q A E P L --- I P C V K V I I A V A S C K G G V G K S T I T N L A L A Q Q L C A R --- V G I L D A D I Y G P S I P I M V G H I G P R M E A	
Salmonella	: N I A T L K R V K N Q P G --- I N G V K N I I A V S S C K G G V G K S S T A V N L A L A R A E G A K --- V G V L D A D I Y G P S I P I M L G A E D Q R T S P	
Arabidopsis-L1	: Y K F S S A S A G G R T T E L R L H C V Q D I I A V A S C K G G V G K S T V A V N L A V A L A N K C E L K --- I G L L D A D V Y G P S V P I M N I N Q K P Q V N Q	
Chlamydomonas-L1	: A A S R G A A A G P K K L G L K D V Q H I V A I P S A K G G V G K S T V A V N V A V A M T R L G L R --- V G L L D A D V G P S I P I M L N L R G K P E L D K	
Homo sapiens	: Q R R T Q I M S R G L P K Q K P I E G V Q V I V A S C K G G V G K S T V A V N L A L A R A N D S S K A I G L L D V D V Y G P S V P I M N L K G N P E L S Q	
Yarrowia lipolytica	: A S A P R I P R K T R R P E P H A C V K K T H V S S A K G G V G K S T V S V N T L S E A R K R L E --- V G L L D V I Y G P S I P I M F G L S E P R M T H	
Arabidopsis-L2	: - A P K G P D P D L V A I A E R M S T V K H K L V L S C K G G V G K S T F S A Q L S F A G M D H Q --- V G L M D I D I C G P S I P R M L G L E Q E H S S	
Chlamydomonas-L2	: - A P K G P D P D L A A I A E R M S R V K H K L V L S C K G G V G K S T V S A Q L A F A R R R C F E --- V G L L D I D I C G P S V P R M L G L E Q E H S S	
Homo sapiens	: G A G A T P D T A I E E I K E R M K T V K H K L V L S C K G G V G K S T F S A H L A H G A E D E N T O --- I A L L D I D I C G P S I P R M L G L E Q E V H S S	
Saccharomyces Nbp35	: L - P K G P D D I P L I T D N L S C I E H K L V L S C K G G V G K S T F A A M S W A S A D E D L O --- V C A M D D I C G P S I P R M L G I C K E I T E S	
Drosophila	: ----- m l d k v n v i l v l v s c k g g v g k s t v s t q l g l a l r k n f g l --- v g l l d i d i c g p s v p r m l g l e g r d f e g	
Homo sapiens	: ----- m e a a a e p g n l a g v r h i l i l v s c k g g v g k s t i s t e l a l a l r h a s k k --- v g l l d v l d c g p s i p r m l g a g r a v h c	
Danio rerio	: ----- M D G S G K N L D Q V K H V L L V L S C K G G V G K S T I T T E L A L A F R A H C K K --- V G I L D V D L C G P S I P R M L S V G K P V H C	
Saccharomyces Cfb1	: ----- M E E Q E I G V P A A S L A G I K H I I L I L S C K G G V G K S S V T T Q T L T C S M G F K --- V G V L L D I L T G P S I P R M F L E N E S Y Q G	

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Arabisodopsis HCF101 : PEKKT---LIPTEYM--GVKLVSFQFAG---QGRAIMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Oryza sativa : PESRS---LIPTEYL--GVKLVSFQFAG---QGRAIMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Populus : PEKRT---LIPTEYL--GVKLVSFQFAG---QGRAIMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Vitis vinifera : PEKRS---LIPTEYL--GVKLVSFQFAG---QGRAIMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Physcomytrella : PETRA---LIPTEYL--GVKLVSFQFAG---QGSAMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Selaginella : EDTKQ---LIPTEYL--GVKLVSFQFAG---QGTAMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Volvox : PATKA---HFPTEYE--GVKLVSFQFAG---QGSAMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Ostreococcus tauri : KETGT---KPEVEYE--GVKLVSFQFAG---QGSAMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Micromonas : KETGS---LIPTEYE--GVKLVSFQFAG---QGSAMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Galdieria maxima : DGR---LIPTEYE--NVKLVSFQFAG---PESAMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Cyanidioschyzon : LTPDGL--MVELTRA--GVKLVSFQFAG---SDPAMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Phaeodactylum : GRQ---LAPLGRN--GVKLVSFQFAG---DGSAMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Thalassiosira : GRQ---LAPLRRG--DVLVMSFGYVN---EGSAMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Chloroflexus : DANGQPM--MLPLSNH--GKLVMSVGFLLD--ESQPMRGPVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Cytophaga : ENENKPTLIPTEYQ--GVKLVSIQGLFSP--AESAVWRGPMVMSAAROFHSDCDWGELDLVVIDMPPGTDIQLTLCQVAP
Nostoc punctiforme : STETGDI--EPAFNH--GVKLVSMGFLD--RDQPMWRGPMVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Synechococcus : KREDGDEHPELNY--GVKLVSMGLVVG--RDQPMWRGPMVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Magnetococcus : EKGQK---VTMEKY--GVKLVSMGFFMP--EDTFMWRGPMVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Salmonella : DGTH---LAPIMSH--GLATNSIGYLV--DDNAMWRGPMVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Arabisodopsis-L1 : DMK---MPEVBNY--GVKLVSMGLVVG--KADPLWRGPMVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Chlamydomonas-L1 : SGTGAL--MLPEYNY--RVKLVSMGFFLE--GDEPVWRGPMVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Homo sapiens : SNL---LPELNY--GVKLVSMGFLV--ESEPVMRGLMMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Yarrowia lipolytica : EGK---LPEMSKF--GVKLVSMGFLV--PNKAVWRGLVYQKAE--LQDPMWRGPMVMSVGNOLLTTTWGELDLVVIDMPPGTDIQLTLCQVAP
Arabisodopsis-L2 : NLGWS---PVYVEDN--LGVMSIGMFLPNSDEAV--WRGPRKNGKLFKDFKDVWVGLDLVVIDMPPGTDIQLTLCQVAP
Chlamydomonas-L2 : GAGWS---PVYVEDN--LGVMSIGMFLPNSDEAV--WRGPRKNGKLFKDFKDVWVGLDLVVIDMPPGTDIQLTLCQVAP
Homo sapiens : GSGWS---PVYVEDN--LGVMSIGMFLPNSDEAV--WRGPRKNGKLFKDFKDVWVGLDLVVIDMPPGTDIQLTLCQVAP
Saccharomyces Nbp35 : NSGWT---PVYVTDN--LGVMSIGMFLPNSDEAV--WRGPRKNGKLFKDFKDVWVGLDLVVIDMPPGTDIQLTLCQVAP
Drosophila : ddgww--pvytdes--qtlavmsigflkredpva--wrgprkktmmlr--qfildvrdvldvllidppgtdsdehititvackl
Homo sapiens : drgwa--pvyfdre--qslgmsvlgflkredpva--wrgprkktmmlr--qfildvrdvldvllidppgtdsdehititvackl
Danio rerio : DSGWV---PVYADPQQQLA--LMSIAFLLEDSDEAV--WRGPRKKTALGQF--SDVAVWGLDLVVIDMPPGTDIQLTLCQVAP
Saccharomyces Cfb1 : PEGWQPV--KVETNST--GSLVSTISGFLGDRGNSV--WRGPRKKTSMKLF--SDVAVWGLDLVVIDMPPGTDIQLTLCQVAP

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Arabisodopsis HCF101 : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---DAD---GKRYYPGCGSGSQVQQFGIP
Oryza sativa : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---DAD---GKRYYPGCGSGSQVQQFGIP
Populus : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---DAD---GKRYYPGCGSGSQVQQFGIP
Vitis vinifera : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---DAD---GKRYYPGCGSGSQVQQFGIP
Physcomytrella : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---EGD---DKRYYPGCGSGSQVQQFGIP
Selaginella : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---DAD---GKRYYPGCGSGSQVQQFGIP
Volvox : FSA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---EAD---GKRYYPGCGSGSQVQQFGIP
Ostreococcus tauri : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---EVD---GVKHKPFCGSGSQVQQFGIP
Micromonas : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---DGD---GKRYYPGCGSGSQVQQFGIP
Galdieria maxima : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---EPNDIP---DKRYYPGCGSGSQVQQFGIP
Cyanidioschyzon : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KRYDIPGCGSGSQVQQFGIP
Phaeodactylum : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KIQFPCGCGSGSQVQQFGIP
Thalassiosira : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---MIRFPCGCGSGSQVQQFGIP
Chloroflexus : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KRYDIPGCGSGSQVQQFGIP
Cytophaga : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---PAELP---ENKYYIPGCGSGSQVQQFGIP
Nostoc punctiforme : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---QNVFVGLVVENMCH---KRYDIPGCGSGSQVQQFGIP
Synechococcus : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---QGVFVGLVVENMCH---KRYDIPGCGSGSQVQQFGIP
Magnetococcus : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVEVFLVVENMCH---HRAEIPGCGSGSQVQQFGIP
Salmonella : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVEVFLVVENMCH---HHEPFPGCGSGSQVQQFGIP
Arabisodopsis-L1 : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVRVPLVGLVVENMCH---EPSFIPGCGSGSQVQQFGIP
Chlamydomonas-L1 : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVRVPLVGLVVENMCH---HVEHFPGCGSGSQVQQFGIP
Homo sapiens : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---RVHVEVGLVVENMCH---KVTIPGCGSGSQVQQFGIP
Yarrowia lipolytica : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KTYKVLVGLVVENMCH---HETHFPGCGSGSQVQQFGIP
Arabisodopsis-L2 : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVEVFLVGLVVENMCH---KRYDIPGCGSGSQVQQFGIP
Chlamydomonas-L2 : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVEVFLVGLVVENMCH---GGAAR--CADMGPV
Homo sapiens : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVEVFLVGLVVENMCH---SQIFPPTTGAEVQQDLEVP
Saccharomyces Nbp35 : LTA---AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVEVFLVGLVVENMCH---RAGNIPGCGSGSQVQQFGIP
Drosophila : evgchg--aiivttpckl--afidv--akgvrms--k--lvpcvavvenmch---k--rydipg--cgs--sqvqqf--gip
Homo sapiens : pypqlg--alvvttpckl--afidv--akgvrms--k--lvpcvavvenmch---k--rydipg--cgs--sqvqqf--gip
Danio rerio : KHRVDG--AVIVTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVEVFLVGLVVENMCH---SNIPGCGSGSQVQQFGIP
Saccharomyces Cfb1 : YSKPDG--GVVTTTPCKLAFIDVAKGVRMS--KLVPCVAVVENMCH---KVEVFLVGLVVENMCH---TNIIPGCGSGSQVQQFGIP

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Arabisodopsis HCF101 : HFDLPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Oryza sativa : HFDLPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Populus : HFDLPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Vitis vinifera : HFDLPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Physcomytrella : HFDLPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Selaginella : NUFEPPIREEARLYKA--SAAGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDDAMRAIKRVKVP
Volvox : NUVRFPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Ostreococcus tauri : NULQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Micromonas : NUFQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Galdieria maxima : FUESFPIDE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Cyanidioschyzon : STFOPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Phaeodactylum : HSFSPILN---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Thalassiosira : HTYSPIMG---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Chloroflexus : VFGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Cytophaga : LGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Nostoc punctiforme : LGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Synechococcus : LGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Magnetococcus : FGHPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Salmonella : LGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Arabisodopsis-L1 : LGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Chlamydomonas-L1 : VGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Homo sapiens : VGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Yarrowia lipolytica : VGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Arabisodopsis-L2 : LGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Chlamydomonas-L2 : LGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Homo sapiens : LGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Saccharomyces Nbp35 : FGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Drosophila : HGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Homo sapiens : HGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Danio rerio : FGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP
Saccharomyces Cfb1 : YGGQPIRE---TSASGDSCTPEVVDPEL--SDVARTQD--GVCVVQCAKIRO---QVSTAVTYDKYLKAIKRVKVP

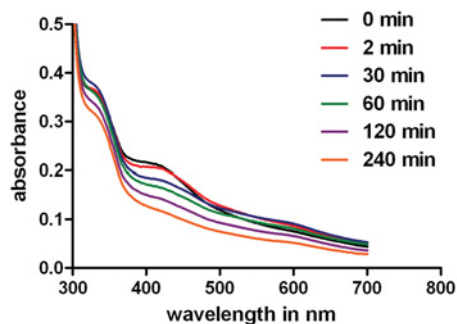
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Arabidopsis HCF101 : NS-----DEEFLHPATVRRNDRSAQS-VDEWTGEQKVLY--GDVAEDIEPEDIRPMGNYAVSITWPDGFSQIAPYDQL
Oryza sativa      : DS-----DEEFLHPATVRRNDRSAQS-VDEWTGEQKVQY--GDIPEDIEPEEIRPMGNYAVSITWPDGFSQIAPYDQL
Populus           : DS-----EEFLLHPATVRRNDRSAQS-VDEWTGEQKLQY--ADVPEDEPEEIRPMGNYAVQITWPDGFSQIAPYDQL
Vitis vinifera    : DS-----EEFLLHPATVRRNDRSAQS-VDEWTGEQKLQY--ADVPEDEPEEIRPMGNYAVSITWPDGFSQIAPYDQL
Physcomytrella    : GT-----TEEFLHPATVRRNDRSAKS-IDEWTSGEQKLRY--TDVAEDLAPESIRPMGNYAAAINWPDGFSQIAPYDQL
Selaginella       : GT-----EEFFLHPATVRRNDRSAKS-IDEWTSGEQKLRY--GDVREDIEPEAIQPLGNYAVMISWPDGFSQIAPYDQL
Volvox            : G-----ETEFLPPVVVRENDTSATS-IDEWTSQQRK-R--DEVQDARPAAINPLGNYAVQISWSDGFSQVASYVELL
Ostreococcus tauri : GENN----DKAFWITAKNVRLSDESARVKGSDSPDRLLNG--APIPDDIAPVEMSVIGNYAMSITWPDGFSQVAAAFSTL
Micromonas        : LRVQLADEGGMPFYVRGCDVRRSDKSAATA-DGESKKADFLMDGVTVPDDIAPVEAHVVGNYAVQISWPDGFSQVATFAQI
Galdieria maxima  : DQGGIAWNENNKVWSPWELRNACSCASC-VDEFTGKRHWK---SVDNRNPKLQIQTAGNYAFSVIWSGDGHSQLYPFERV
Cyanidioschyzon  : D-----HMEERIQPAALRRACRCAAC-VDECTGKQLLDP--NSVDDNIYPMQMMNVGNYALAVNWSGDGHSQIMPWERF
Phaeodactylum  : VGSTDEE--HVATLPPAELRRACRCAAC-VEELTGRQILVP--SSVSKIAPRNMVPTGNYALSVWSDGHSRSLYPYRQI
Thalassiosira     : DIQN-----ATISPAELRRACRCAAC-VEELTGRQILNP--ASISESVKPLNMSPTGNYALSVWSDGHSRSLYPYRQI
Chloroflexus      : :
Cytophaga         : :
Nostoc punctiforme : :
Synechococcus     : :
Magnetococcus     : :
Salmonella        : :
Arabidopsis-L1    : :
Chlamydomonas-L1  : :
Homo sapiens      : :
Yarrowia lipolytica : :
Arabidopsis-L2    : :
Chlamydomonas-L2  : :
Homo sapiens      : :
Saccharomyces Nbp35 : :
Drosophila        : :
Homo sapiens      : :
Danio rerio       : :
Saccharomyces Cfb1 : :

```

Figure S1 Multiple sequence alignment of the FSC-NTPase family

Representative protein sequences of different organisms are shown subdivided according to the proposed four FSC-NTPase classes [23]. Organism names are coloured according to the class affiliation. Green background represents plants and algae taxa belonging to the class I. Yellow background represents eubacterial class I proteins. Grey background corresponds to class II members. Blue and magenta congregate taxa belonging to the class III and class IV respectively. Note that algae and plants class I proteins have a C-terminal extension corresponding to the DUF971 domain (COG3536). The very N-terminal and C-terminal regions are not shown in the alignment as they show little conservation. Amino acids coloured with a black background are 100% conserved. Amino acids coloured with a grey background and with white characters are > 60% conserved. Amino acids coloured with a grey background and written with black characters are > 40% conserved. Cysteine residues conserved in at least two sequences are depicted with a blue background. Numbers above the conserved cysteine residues in plants and algae correspond to the position of the residue in the sequence of the *Arabidopsis* HCF101 protein.



Supplementary Figure S2 Oxygen sensitivity of the reconstituted HCF101 protein

Purified HCF101 protein was reconstituted as described in the Experimental section in the main paper. Decay of the shoulder at 420 nm in the presence of oxygen was monitored by UV-visible spectroscopy.

Supplementary Table S1 Oligonucleotides used for site-directed mutagenesis and cloning

For details please see the Experimental section in the main paper. for, forward primer; rev, reverse primer.

Designation	Sequence
C102S-for	5'-GGAGCTGACAACACCCGCATcTCCAGTCAAAGAC-3'
C102S-rev	5'-GAAACAATATCTGTCCAAAATCAGGATC-3'
C128S-for	5'-CATCATCGCTGTTTCTAGTtctAAGGGTGGTG-3'
C128S-rev	5'-GTGTTGTCAGCTCCAACGGAACGAAACCTC-3'
C184S-for	5'-GATATACAACTGACCTTATctCAGGTTGCGC-3'
C184S-rev	5'-CTAGAAACAGCGATGATGTTCGAAATTC-3'
C303S-for	5'-CTCAAAACTTAAGGTGCCTTctGTTGCTGTTGTG-3'
C303S-rev	5'-TAAGGTCAGTTGTATATCACCAGTTCAG-3'
C339S-for	5'-CTCAAAACTTAAGGTGCCTTctGTTGCTGTTGTG-3'
C339S-rev	5'-GCACCTTAAGTTTTGAGAATCCTTACAC-3'
C347S-for	5'-GCTGTTGTGGAGAATATGTctCACTTGGACGC-3'
C347S-rev	5'-CATATTCTCCACAACAGCAACGCAAGGC-3'
C414S-for	5'-CGTTCAGGATCTTGGTGTATcTGTAGTGCAAC-3'
C414S-rev	5'-CACCAAGATCCTGGAACGTTCTGGCAACG-3'
C419S-for	5'-GTGTATGTGTAGTGCAACAATctGCCAAGATAC-3'
C419S-rev	5'-TGTGACTACACATACACCAAGATCCTGGA-3'
INCORP-for	5'-GTAGAATTCAGCTCAAGCTAGTAGTAGTGTGG-3'
INCORP-rev	5'-GTAGAATTCGACTTCGACTGGAGACAATGGAGG-3'

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