



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2014 – 08:21 PM EDT

PDB ID : 4C8H
Title : Crystal structure of the C-terminal region of yeast Ctf4, selenomethionine protein.
Authors : Simon, A.C.; Pellegrini, L.
Deposited on : 2013-10-01
Resolution : 2.69 Å(reported)

This is a full wwPDB validation report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

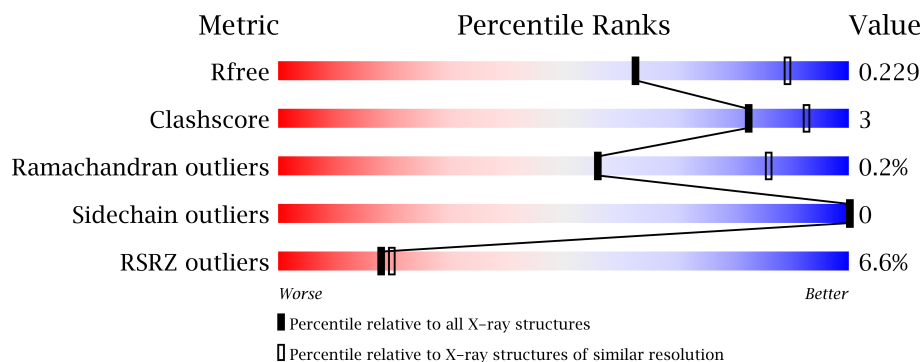
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.16 November 2013
Xtriage (Phenix) : dev-1439
EDS : stable23161
Percentile statistics : 21963
Refmac : 5.8.0049
CCP4 : 6.3.0 (Settle)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : stable23161

1 Overall quality at a glance

The reported resolution of this entry is 2.69 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	66092	1557 (2.70-2.70)
Clashscore	79885	1939 (2.70-2.70)
Ramachandran outliers	78287	1905 (2.70-2.70)
Sidechain outliers	78261	1905 (2.70-2.70)
RSRZ outliers	66119	1559 (2.70-2.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	478	
1	B	478	
1	C	478	

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 10421 atoms, of which 0 are hydrogen and 0 are deuterium.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called CTF4.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	431	Total	C	N	O	S	Se	0	1	0
			3475	2233	577	649	5	11			
1	B	419	Total	C	N	O	S	Se	0	0	0
			3371	2170	557	629	5	10			
1	C	425	Total	C	N	O	S	Se	0	0	0
			3412	2192	565	640	5	10			

- Molecule 2 is water.

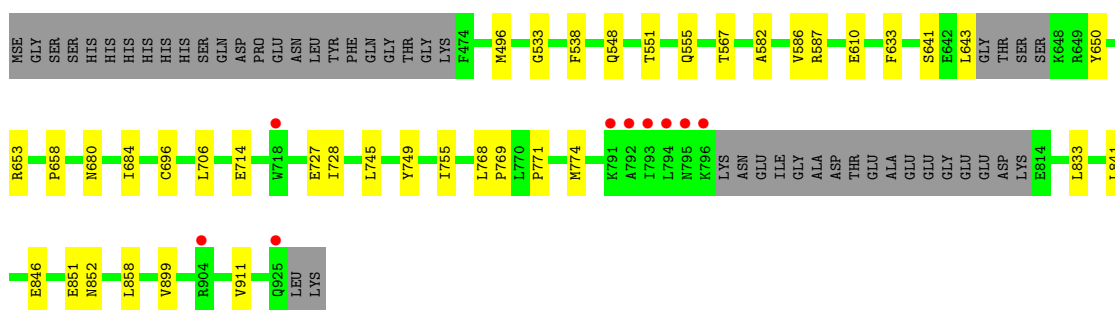
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	113	Total	O	0	0
			113	113		
2	B	15	Total	O	0	0
			15	15		
2	C	35	Total	O	0	0
			35	35		

3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

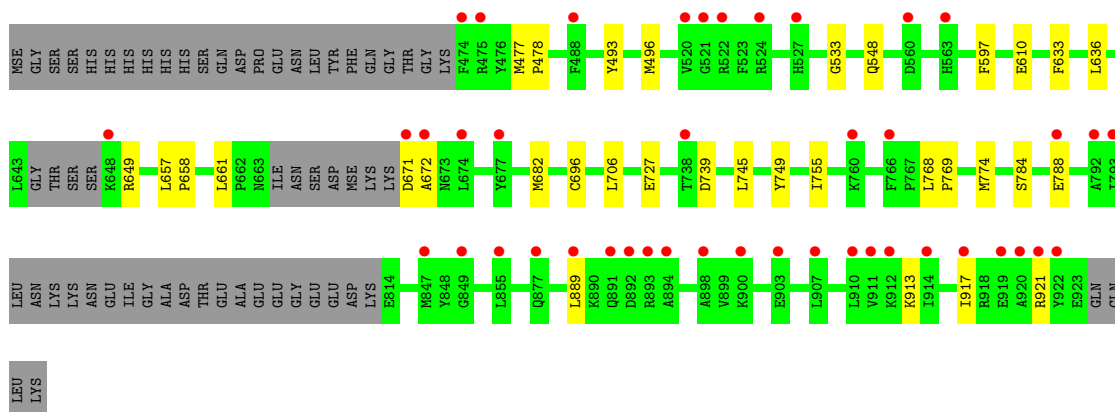
• Molecule 1: CTF4

Chain A: 



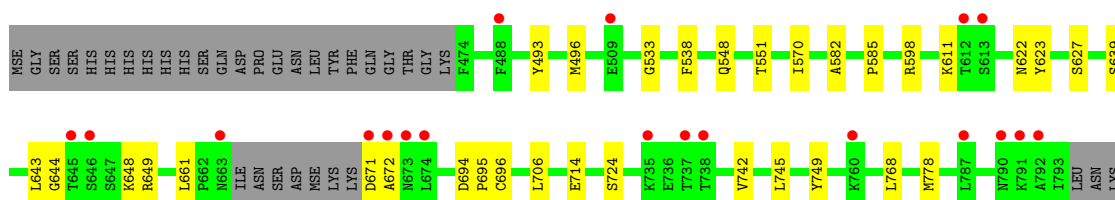
• Molecule 1: CTF4

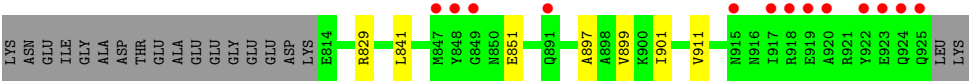
Chain B: 



• Molecule 1: CTF4

Chain C: 





4 Data and refinement statistics

Property	Value	Source
Space group	P 2 ₁ 2 ₁ 2 ₁	Depositor
Cell constants a, b, c, α , β , γ	107.29Å 118.43Å 155.70Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.19 – 2.69 49.19 – 2.69	Depositor EDS
% Data completeness (in resolution range)	99.3 (49.19-2.69) 99.4 (49.19-2.69)	Depositor EDS
R_{merge}	0.23	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.21 (at 2.69Å)	Xtriage
Refinement program	PHENIX (PHENIX.REFINE)	Depositor
R, R_{free}	0.190 , 0.225 0.194 , 0.229	Depositor DCC
R_{free} test set	2812 reflections (5.08%)	DCC
Wilson B-factor (Å ²)	63.7	Xtriage
Anisotropy	0.564	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 51.1	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtriage
Outliers	0 of 55384 reflections	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	10421	wwPDB-VP
Average B, all atoms (Å ²)	73.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.55% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality

5.1 Standard geometry

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	A	0.23	0/3552	0.39	0/4790
1	B	0.22	0/3445	0.39	0/4649
1	C	0.23	0/3487	0.40	0/4707
All	All	0.22	0/10484	0.39	0/14146

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Close contacts

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3475	0	3433	26	0
1	B	3371	0	3319	20	0
1	C	3412	0	3356	23	0
2	A	113	0	0	0	0
2	B	15	0	0	0	0
2	C	35	0	0	0	0
All	All	10421	0	10108	63	0

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 3.

All (63) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:496:MSE:HE2	1:A:745:LEU:HD21	1.63	0.79
1:B:496:MSE:HE2	1:B:745:LEU:HD21	1.68	0.76
1:C:496:MSE:HE2	1:C:745:LEU:HD21	1.70	0.73
1:C:778:MSE:HE3	1:C:829:ARG:HA	1.77	0.66
1:B:533:GLY:O	1:B:548:GLN:NE2	2.28	0.66
1:A:768:LEU:HD12	1:A:769:PRO:HD2	1.81	0.63
1:A:846:GLU:OE2	1:A:852:ASN:ND2	2.30	0.61
1:B:477:MSE:HE3	1:B:478:PRO:HD2	1.81	0.61
1:A:533:GLY:O	1:A:548:GLN:NE2	2.34	0.60
1:B:768:LEU:HD12	1:B:769:PRO:HD2	1.83	0.60
1:C:533:GLY:O	1:C:548:GLN:NE2	2.35	0.59
1:C:643:LEU:HD13	1:C:648:LYS:HG2	1.84	0.59
1:B:496:MSE:HE1	1:B:755:ILE:HG13	1.84	0.58
1:A:496:MSE:HE1	1:A:755:ILE:HG13	1.86	0.57
1:B:727:GLU:HB2	1:B:774:MSE:HE2	1.88	0.56
1:A:899:VAL:HG13	1:A:911:VAL:HG13	1.88	0.55
1:A:833:LEU:HB3	1:A:858:LEU:HD21	1.91	0.53
1:C:841:LEU:HD21	1:C:851:GLU:HB3	1.91	0.52
1:B:889:LEU:O	1:B:921:ARG:NH1	2.42	0.51
1:B:671:ASP:OD1	1:B:672:ALA:N	2.45	0.50
1:A:714:GLU:OE1	1:C:649:ARG:NH1	2.45	0.50
1:A:728:ILE:HG13	1:A:774:MSE:HE1	1.95	0.49
1:B:696:CYS:SG	1:B:706:LEU:HD13	2.53	0.48
1:A:658:PRO:HB2	1:C:611:LYS:HG3	1.95	0.48
1:B:633:PHE:CG	1:C:661:LEU:HD12	2.48	0.48
1:A:841:LEU:HD21	1:A:851:GLU:HB3	1.97	0.47
1:B:739:ASP:OD1	1:B:739:ASP:N	2.48	0.47
1:A:633:PHE:CG	1:B:661:LEU:HD12	2.50	0.47
1:B:493:TYR:OH	1:B:768:LEU:HB2	2.14	0.46
1:C:671:ASP:OD1	1:C:672:ALA:N	2.48	0.46
1:C:548:GLN:HG3	1:C:551:THR:H	1.81	0.46
1:C:585:PRO:HD2	1:C:622:ASN:O	2.16	0.46
1:A:633:PHE:CD2	1:B:661:LEU:HD12	2.50	0.46
1:A:641:SER:HB3	1:A:650:TYR:CD2	2.51	0.46
1:A:555:GLN:HG3	1:A:567:THR:HG22	1.99	0.45
1:A:696:CYS:SG	1:A:706:LEU:HD13	2.57	0.45
1:C:623:TYR:CD1	1:C:644:GLY:HA2	2.52	0.44
1:B:636:LEU:HD13	1:B:682:MSE:HE1	2.00	0.44
1:A:755:ILE:HD13	1:A:771:PRO:HA	2.00	0.44
1:C:493:TYR:OH	1:C:768:LEU:HG	2.19	0.43
1:C:851:GLU:N	1:C:851:GLU:OE1	2.50	0.43
1:C:899:VAL:HG13	1:C:911:VAL:HG13	1.99	0.43
1:B:649:ARG:NE	1:C:714:GLU:OE1	2.46	0.43

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:727:GLU:HB2	1:A:774:MSE:HE2	2.01	0.43
1:C:570:ILE:HG23	1:C:598:ARG:HD2	2.00	0.43
1:A:680:ASN:ND2	1:A:684:ILE:O	2.48	0.42
1:A:586:VAL:O	1:A:587:ARG:NH1	2.47	0.42
1:C:696:CYS:SG	1:C:706:LEU:HD13	2.59	0.42
1:B:784:SER:O	1:B:788:GLU:HG3	2.18	0.42
1:A:841:LEU:HD21	1:A:851:GLU:CB	2.49	0.42
1:A:610:GLU:OE2	1:A:653:ARG:NH2	2.50	0.42
1:A:548:GLN:HG3	1:A:551:THR:H	1.84	0.42
1:A:587:ARG:HE	1:A:643:LEU:CD2	2.33	0.41
1:C:897:ALA:O	1:C:901:ILE:HG13	2.21	0.41
1:A:610:GLU:OE1	1:A:650:TYR:OH	2.36	0.41
1:B:657:LEU:HA	1:B:658:PRO:HD3	1.78	0.41
1:A:538:PHE:CG	1:A:582:ALA:HA	2.55	0.41
1:B:913:LYS:O	1:B:917:ILE:HG13	2.21	0.41
1:C:694:ASP:HA	1:C:695:PRO:HD3	1.85	0.40
1:C:538:PHE:CG	1:C:582:ALA:HA	2.56	0.40
1:C:627:SER:OG	1:C:639:SER:HB2	2.21	0.40
1:C:724:SER:HB2	1:C:742:VAL:HG21	2.02	0.40
1:B:597:PHE:HB3	1:B:610:GLU:HB2	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution. The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	426/478 (89%)	417 (98%)	8 (2%)	1 (0%)	56	86
1	B	411/478 (86%)	401 (98%)	9 (2%)	1 (0%)	56	86
1	C	419/478 (88%)	410 (98%)	8 (2%)	1 (0%)	56	86
All	All	1256/1434 (88%)	1228 (98%)	25 (2%)	3 (0%)	56	86

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	749	TYR
1	B	749	TYR
1	C	749	TYR

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution. The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	384/410 (94%)	384 (100%)	0	100	100
1	B	371/410 (90%)	371 (100%)	0	100	100
1	C	376/410 (92%)	376 (100%)	0	100	100
All	All	1131/1230 (92%)	1131 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

There are no RNA chains in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no carbohydrates in this entry.

5.6 Ligand geometry ⓘ

There are no ligands in this entry.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	431/478 (90%)	0.21	9 (2%) 60 67	35, 57, 92, 134	0
1	B	419/478 (87%)	0.66	43 (10%) 7 7	50, 83, 124, 160	0
1	C	425/478 (88%)	0.46	32 (7%) 14 15	40, 71, 109, 151	0
All	All	1275/1434 (88%)	0.44	84 (6%) 18 20	35, 70, 116, 160	0

All (84) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	488	PHE	6.9
1	C	922	TYR	6.8
1	B	917	ILE	6.4
1	A	793	ILE	6.1
1	C	646	SER	6.0
1	B	910	LEU	5.8
1	C	488	PHE	5.4
1	C	645	THR	5.2
1	C	923	GLU	5.1
1	C	925	GLN	4.9
1	B	900	LYS	4.9
1	B	922	TYR	4.5
1	B	793	ILE	4.5
1	A	794	LEU	4.3
1	B	893	ARG	4.3
1	A	796	LYS	4.2
1	B	474	PHE	4.2
1	C	672	ALA	4.2
1	B	920	ALA	4.1
1	B	907	LEU	3.9
1	A	792	ALA	3.9
1	B	738	THR	3.7
1	C	760	LYS	3.7

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Mol	Chain	Res	Type	RSRZ
1	C	891	GLN	3.6
1	C	924	GLN	3.5
1	B	911	VAL	3.5
1	C	919	GLU	3.5
1	B	524	ARG	3.4
1	B	527	HIS	3.4
1	B	521	GLY	3.4
1	B	921	ARG	3.4
1	B	792	ALA	3.3
1	B	894	ALA	3.3
1	B	919	GLU	3.2
1	A	795	ASN	3.2
1	C	663	ASN	3.1
1	C	917	ILE	3.1
1	C	920	ALA	3.0
1	C	509	GLU	3.0
1	B	889	LEU	3.0
1	C	674	LEU	3.0
1	C	790	ASN	3.0
1	B	677	TYR	3.0
1	B	520	VAL	3.0
1	B	912	LYS	2.9
1	B	475	ARG	2.9
1	B	674	LEU	2.9
1	B	892	ASP	2.8
1	C	848	TYR	2.8
1	A	791	LYS	2.8
1	B	671	ASP	2.8
1	B	855	LEU	2.8
1	B	914	ILE	2.8
1	C	918	ARG	2.7
1	C	673	ASN	2.6
1	C	738	THR	2.6
1	C	915	ASN	2.6
1	A	904	ARG	2.5
1	C	787	LEU	2.5
1	C	735	LYS	2.5
1	B	847	MSE	2.5
1	B	849	GLY	2.5
1	B	672	ALA	2.4
1	B	522	ARG	2.4
1	B	766	PHE	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	648	LYS	2.4
1	B	877	GLN	2.4
1	C	849	GLY	2.3
1	C	792	ALA	2.3
1	B	760	LYS	2.2
1	B	563	HIS	2.2
1	B	560	ASP	2.2
1	C	612	THR	2.2
1	A	925	GLN	2.2
1	C	671	ASP	2.2
1	C	613	SER	2.1
1	B	903	GLU	2.1
1	B	891	GLN	2.1
1	C	847	MSE	2.1
1	C	737	THR	2.1
1	B	788	GLU	2.1
1	C	791	LYS	2.0
1	B	898	ALA	2.0
1	A	718	TRP	2.0

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates ⓘ

There are no carbohydrates in this entry.

6.4 Ligands ⓘ

There are no ligands in this entry.

6.5 Other polymers ⓘ

There are no such residues in this entry.