Full wwPDB X-ray Structure Validation Report (i)

Jan 31, 2016 – 07:20 PM GMT

PDB ID	:	1F60
Title	:	CRYSTAL STRUCTURE OF THE YEAST ELONGATION FACTOR COMPLEX EEF1A:EEF1BA
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Deposited on	:	2000-06-19
Resolution	:	1.67 Å(reported)

This is a Full wwPDB X-ray Structure 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/validation/2016/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The following versions of software and data (see references (1)) were used in the production of this report:

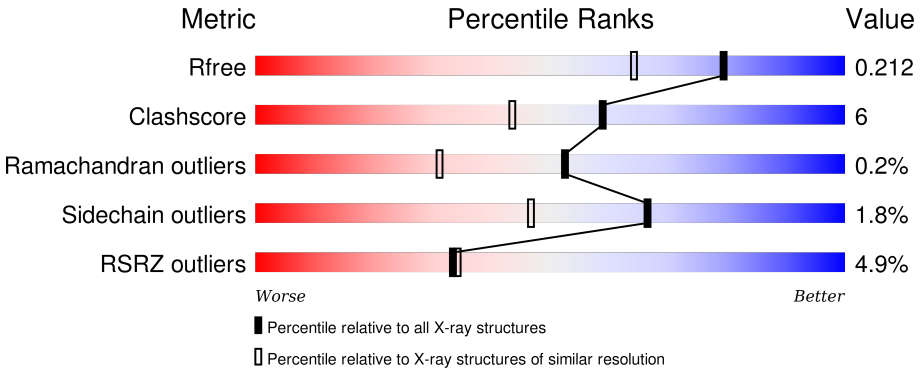
MolProbity	:	4.02b-467
Mogul	:	1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20026688
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	trunk26865

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.67 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}	91344	4802 (1.70-1.66)
Clashscore	102246	5317 (1.70-1.66)
Ramachandran outliers	100387	5225 (1.70-1.66)
Sidechain outliers	100360	5224 (1.70-1.66)
RSRZ outliers	91569	4813 (1.70-1.66)

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. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	458	5%, 83%, 10%
2	B	94	%, 82%, 13%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 4824 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 ELONGATION FACTOR EEF1A.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	440	Total	C	N	O	S	0	0	0
			3388	2152	592	630	14			

- Molecule 2 is a protein called ELONGATION FACTOR EEF1BA.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	90	Total	C	N	O	S	0	0	0
			703	441	112	146	4			

- Molecule 3 is water.

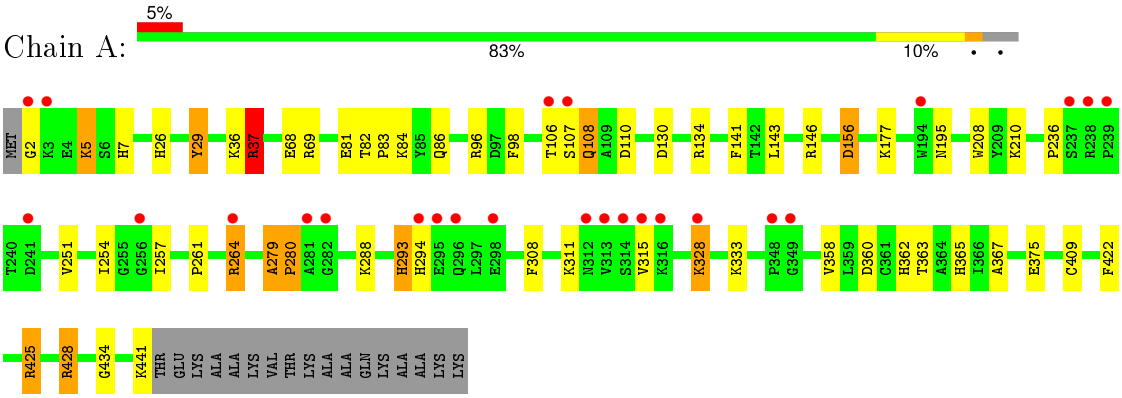
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	567	Total	O	0	0
			567	567		
3	B	166	Total	O	0	0
			166	166		

3 Residue-property plots (i)

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.

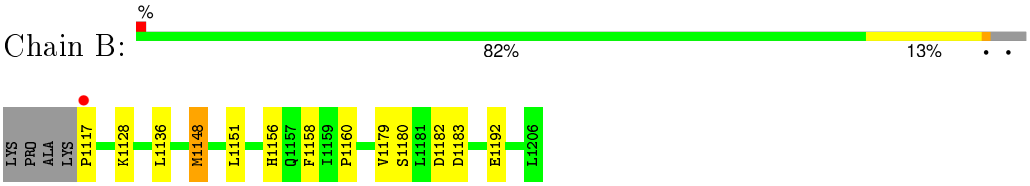
- Molecule 1: ELONGATION FACTOR EEF1A

Chain A:



- Molecule 2: ELONGATION FACTOR EEF1BA

Chain B:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	63.85Å 91.81Å 92.98Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 1.67 19.72 – 1.67	Depositor EDS
% Data completeness (in resolution range)	99.3 (20.00-1.67) 99.2 (19.72-1.67)	Depositor EDS
R_{merge}	0.04	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	6.79 (at 1.67Å)	Xtriage
Refinement program	REFMAC	Depositor
R, R_{free}	0.187 , 0.221 0.179 , 0.212	Depositor DCC
R_{free} test set	3217 reflections (5.33%)	DCC
Wilson B-factor (Å^2)	14.4	Xtriage
Anisotropy	0.334	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 53.7	EDS
Estimated twinning fraction	0.004 for -h,l,k	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Outliers	0 of 63533 reflections	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	4824	wwPDB-VP
Average B, all atoms (Å^2)	19.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.47% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

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	0.60	0/3458	1.31	24/4674 (0.5%)
2	B	0.58	0/713	1.14	2/964 (0.2%)
All	All	0.59	0/4171	1.29	26/5638 (0.5%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2

There are no bond length outliers.

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	29	TYR	CB-CG-CD2	-11.39	114.16	121.00
1	A	69	ARG	NE-CZ-NH1	10.63	125.61	120.30
1	A	69	ARG	NE-CZ-NH2	-9.95	115.32	120.30
1	A	146	ARG	NE-CZ-NH2	-9.94	115.33	120.30
1	A	29	TYR	CB-CG-CD1	9.02	126.41	121.00
1	A	279	ALA	CA-C-O	-8.94	101.32	120.10
1	A	37	ARG	CD-NE-CZ	8.63	135.68	123.60
1	A	96	ARG	NE-CZ-NH2	-8.02	116.29	120.30
1	A	280	PRO	CA-N-CD	-7.98	100.33	111.50
1	A	280	PRO	N-CA-CB	7.83	112.69	103.30
1	A	69	ARG	CD-NE-CZ	6.99	133.39	123.60
1	A	5	LYS	CB-CG-CD	6.82	129.33	111.60
1	A	280	PRO	N-CD-CG	6.51	112.97	103.20
2	B	1182	ASP	CB-CG-OD2	-6.41	112.53	118.30
1	A	134	ARG	NE-CZ-NH2	-6.28	117.16	120.30
1	A	98	PHE	CB-CG-CD1	-6.15	116.50	120.80

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	264	ARG	NE-CZ-NH2	6.09	123.35	120.30
1	A	146	ARG	NH1-CZ-NH2	5.65	125.61	119.40
1	A	428	ARG	NE-CZ-NH2	-5.65	117.48	120.30
1	A	37	ARG	NE-CZ-NH1	5.54	123.07	120.30
1	A	130	ASP	CB-CG-OD1	5.48	123.23	118.30
1	A	141	PHE	CB-CG-CD1	-5.27	117.11	120.80
1	A	68	GLU	OE1-CD-OE2	-5.24	117.01	123.30
1	A	156	ASP	CB-CG-OD1	-5.19	113.63	118.30
2	B	1148	MET	CA-CB-CG	5.02	121.83	113.30
1	A	375	GLU	CB-CA-C	-5.01	100.37	110.40

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	279	ALA	Mainchain,Peptide

5.2 Too-close contacts (i)

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 hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3388	0	3440	41	0
2	B	703	0	688	8	0
3	A	567	0	0	11	1
3	B	166	0	0	4	0
All	All	4824	0	4128	48	1

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 6.

All (48) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:1148:MET:HE2	2:B:1151:LEU:HD22	1.28	1.10
1:A:2:GLY:HA3	3:A:2698:HOH:O	1.71	0.90

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:425:ARG:NH2	1:A:428:ARG:H	1.76	0.83
1:A:108:GLN:HG3	3:A:2474:HOH:O	1.82	0.80
1:A:294:HIS:CE1	2:B:1160:PRO:HG2	2.17	0.79
1:A:261:PRO:HD2	1:A:308:PHE:O	1.96	0.66
1:A:288:LYS:HE2	1:A:311:LYS:HG2	1.79	0.64
1:A:362:HIS:CD2	1:A:363:THR:H	2.16	0.64
1:A:251:VAL:HG12	1:A:315:VAL:HG12	1.81	0.61
1:A:333:LYS:HE3	1:A:441:LYS:HD3	1.82	0.61
1:A:37:ARG:HG2	1:A:37:ARG:HH11	1.66	0.60
2:B:1148:MET:CE	2:B:1151:LEU:HD22	2.18	0.60
1:A:36:LYS:HE2	3:A:2545:HOH:O	2.01	0.59
1:A:106:THR:HB	1:A:264:ARG:NH1	2.18	0.58
1:A:107:SER:H	1:A:264:ARG:HH12	1.52	0.57
2:B:1156:HIS:HD2	3:B:2171:HOH:O	1.87	0.56
1:A:365:HIS:HE1	3:A:2333:HOH:O	1.87	0.56
1:A:360:ASP:OD1	1:A:365:HIS:HD2	1.89	0.55
1:A:328:LYS:HD2	3:A:2329:HOH:O	2.06	0.54
1:A:26:HIS:HD2	3:A:2060:HOH:O	1.89	0.54
1:A:26:HIS:HE1	3:A:2042:HOH:O	1.91	0.52
1:A:2:GLY:CA	3:A:2698:HOH:O	2.42	0.52
1:A:156:ASP:OD2	1:A:195:ASN:ND2	2.41	0.52
1:A:362:HIS:HD2	1:A:363:THR:H	1.56	0.51
1:A:293:HIS:HD2	3:B:2515:HOH:O	1.94	0.50
1:A:358:VAL:HA	1:A:367:ALA:HA	1.94	0.50
1:A:362:HIS:HE1	1:A:409:CYS:O	1.95	0.50
1:A:208:TRP:O	1:A:210:LYS:HD2	2.12	0.49
1:A:108:GLN:OE1	1:A:143:LEU:HD13	2.15	0.47
1:A:5:LYS:HE2	1:A:81:GLU:OE1	2.14	0.46
2:B:1136:LEU:HB3	2:B:1158:PHE:CE1	2.52	0.45
2:B:1117:PRO:N	3:B:2582:HOH:O	2.48	0.45
2:B:1180:SER:HB3	2:B:1183:ASP:HB2	1.98	0.45
2:B:1148:MET:CE	2:B:1179:VAL:HG13	2.47	0.45
1:A:26:HIS:CE1	3:A:2042:HOH:O	2.69	0.44
1:A:425:ARG:NH2	1:A:428:ARG:N	2.56	0.43
1:A:254:ILE:CG2	1:A:257:ILE:HD12	2.49	0.43
1:A:84:LYS:HE3	3:A:2306:HOH:O	2.18	0.43
1:A:110:ASP:OD2	1:A:236:PRO:HG3	2.19	0.42
1:A:422:PHE:CZ	1:A:434:GLY:HA3	2.54	0.42
1:A:425:ARG:HG3	3:B:2621:HOH:O	2.19	0.42
1:A:7:HIS:CE1	1:A:86:GLN:OE1	2.73	0.42
1:A:107:SER:H	1:A:264:ARG:NH1	2.17	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:82:THR:HB	1:A:83:PRO:HD2	2.01	0.41
1:A:5:LYS:HE3	1:A:82:THR:O	2.21	0.41
1:A:177:LYS:HE2	3:A:2561:HOH:O	2.19	0.41
1:A:37:ARG:HD3	1:A:37:ARG:HA	1.73	0.41
1:A:82:THR:HB	1:A:83:PRO:CD	2.51	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:A:2165:HOH:O	3:A:2307:HOH:O[1_655]	2.11	0.09

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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	438/458 (96%)	426 (97%)	11 (2%)	1 (0%)	52 31
2	B	88/94 (94%)	88 (100%)	0	0	100 100
All	All	526/552 (95%)	514 (98%)	11 (2%)	1 (0%)	52 31

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	280	PRO

5.3.2 Protein sidechains (i)

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	367/379 (97%)	361 (98%)	6 (2%)	70 52
2	B	79/82 (96%)	77 (98%)	2 (2%)	55 31
All	All	446/461 (97%)	438 (98%)	8 (2%)	66 47

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	29	TYR
1	A	37	ARG
1	A	108	GLN
1	A	293	HIS
1	A	328	LYS
1	A	425	ARG
2	B	1128	LYS
2	B	1192	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	7	HIS
1	A	26	HIS
1	A	86	GLN
1	A	205	ASN
1	A	293	HIS
1	A	294	HIS
1	A	296	GLN
1	A	362	HIS
1	A	365	HIS
1	A	377	ASN
1	A	388	HIS
2	B	1142	ASN
2	B	1156	HIS

5.3.3 RNA

There are no RNA molecules 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, 95^{th} 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	440/458 (96%)	0.22	25 (5%) 27 27	8, 15, 35, 45	0
2	B	90/94 (95%)	-0.09	1 (1%) 82 85	9, 14, 23, 29	0
All	All	530/552 (96%)	0.16	26 (4%) 33 34	8, 15, 33, 45	0

All (26) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	106	THR	7.0
1	A	294	HIS	5.7
1	A	107	SER	5.6
1	A	315	VAL	4.9
1	A	194	TRP	4.4
1	A	316	LYS	4.1
1	A	348	PRO	4.1
1	A	314	SER	3.7
1	A	312	ASN	3.6
1	A	237	SER	3.6
1	A	256	GLY	3.5
1	A	349	GLY	3.5
1	A	328	LYS	3.1
2	B	1117	PRO	3.0
1	A	2	GLY	3.0
1	A	298	GLU	2.9
1	A	239	PRO	2.8
1	A	3	LYS	2.7
1	A	313	VAL	2.7
1	A	295	GLU	2.6
1	A	238	ARG	2.5
1	A	296	GLN	2.5
1	A	282	GLY	2.3
1	A	241	ASP	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	281	ALA	2.2
1	A	264	ARG	2.1

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

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

6.3 Carbohydrates (i)

There are no carbohydrates in this entry.

6.4 Ligands (i)

There are no ligands in this entry.

6.5 Other polymers (i)

There are no such residues in this entry.