wwPDB X-ray Structure Validation Summary Report (i)

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PDB ID	:	1DH3
Title	:	CRYSTAL STRUCTURE OF A CREB BZIP-CRE COMPLEX REVEALS THE BASIS FOR CREB FAIMLY SELECTIVE DIMERIZATION AND DNA BINDING
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Deposited on	:	1999-11-27
Resolution	:	3.00 Å(reported)

This is a wwPDB X-ray Structure Validation Summary 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 (i)) were used in the production of this report:

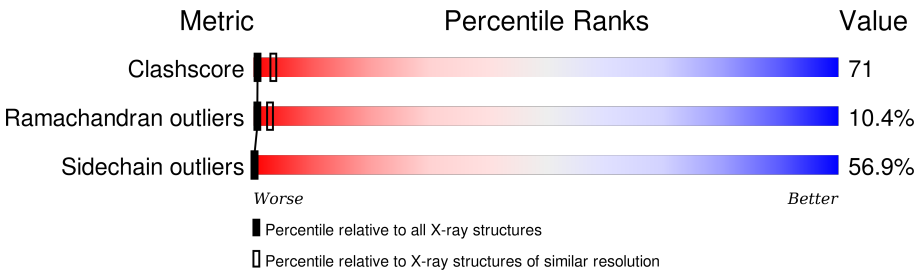
MolProbity	:	4.02b-467
Mogul	:	1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
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 3.00 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))
Clashscore	102246	1912 (3.00-3.00)
Ramachandran outliers	100387	1853 (3.00-3.00)
Sidechain outliers	100360	1856 (3.00-3.00)

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.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	B	21	5% 86% 10%
1	D	21	5% 62% 33%
2	A	55	13% 27% 31% 29%
2	C	55	9% 27% 44% 20%

2 Entry composition (i)

There are 4 unique types of molecules in this entry. The entry contains 1804 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 DNA chain called DNA (5'-D(*CP*CP*TP*TP*GP*GP*CP*TP*GP*AP*CP*GP*TP*CP*AP*GP*CP*CP*AP*AP*G)-3').

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	P			
1	B	21	426	203	79	124	20	0	0	0
1	D	21	426	203	79	124	20	0	0	0

- Molecule 2 is a protein called TRANSCRIPTION FACTOR CREB.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	A	55	467	289	93	84	1	0	0	0
2	C	55	467	289	93	84	1	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	300	SER	CYS	ENGINEERED	UNP Q01147
A	310	SER	CYS	ENGINEERED	UNP Q01147
A	300	SER	CYS	ENGINEERED	UNP Q01147
C	300	SER	CYS	ENGINEERED	UNP Q01147
C	310	SER	CYS	ENGINEERED	UNP Q01147
C	300	SER	CYS	ENGINEERED	UNP Q01147

- Molecule 3 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mg		
3	C	1	1	1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
4	A	5	5	5	0	0
			Total	O		
4	B	2	2	2	0	0
			Total	O		
4	C	9	9	9	0	0
			Total	O		
4	D	1	1	1	0	0

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.

Note EDS was not executed.

• Molecule 1: DNA (5'-D(*CP*CP*TP*TP*GP*GP*CP*TP*GP*AP*CP*GP*TP*CP*AP*GP*CP*CP*AP*AP*G)-3')

Chain B: 5% 86% 10%

C-11 C-10 T-9 T-8 G-7 G-6 C-5 T-4 G-3 A-2 C-1 G1 T2 C3 A4 G5 C6 C7 A8 A9 G10

• Molecule 1: DNA (5'-D(*CP*CP*TP*TP*GP*GP*CP*TP*GP*AP*CP*GP*TP*CP*AP*GP*CP*CP*AP*AP*G)-3')

Chain D: 5% 62% 33%

C-11 C-10 T-9 T-8 G-7 G-6 C-5 T-4 G-3 A-2 C-1 G1 T2 C3 A4 G5 C6 C7 A8 A9 G10

• Molecule 2: TRANSCRIPTION FACTOR CREB

Chain A: 13% 27% 31% 29%

K285 R286 E287 V288 R289 L290 M291 K292 N293 R294 R298 E299 S300 R301 R302 K303 K304 K305 E306 Y307 V308 K309 S310 L311 E312 N313 R314 V315 A316 V317 L318 E319 N320 Q321 N322 K323 T324 L325 I326 E327 E328 L329 K330 A331 L332 K333 D334 L335 Y336 S337 H338 K339

• Molecule 2: TRANSCRIPTION FACTOR CREB

Chain C: 9% 27% 44% 20%

K285 R286 E287 V288 R289 L290 M291 R294 E295 A296 A297 R298 E299 S300 R301 R302 K303 K304 K305 E306 Y307 V308 K309 S310 L311 E312 N313 R314 V315 A316 V317 L318 E319 N320 Q321 N322 K323 T324 L325 I326 E327 E328 L329 K330 A331 L332 K333 D334 L335 Y336 S337 H338 K339

4 Data and refinement statistics (i)

Xtriage (Phenix) and EDS were not executed - this section will therefore be incomplete.

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	110.61Å 49.32Å 79.25Å 90.00° 122.18° 90.00°	Depositor
Resolution (Å)	10.00 – 3.00	Depositor
% Data completeness (in resolution range)	98.0 (10.00-3.00)	Depositor
R_{merge}	0.08	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	TNT	Depositor
R, R_{free}	0.223 , 0.280	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	1804	wwPDB-VP
Average B, all atoms (Å^2)	66.0	wwPDB-VP

5 Model quality (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: MG

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	B	0.99	0/477	1.43	5/734 (0.7%)
1	D	1.18	2/477 (0.4%)	1.80	16/734 (2.2%)
2	A	1.94	10/469 (2.1%)	1.99	16/619 (2.6%)
2	C	1.92	9/469 (1.9%)	2.08	22/619 (3.6%)
All	All	1.57	21/1892 (1.1%)	1.82	59/2706 (2.2%)

The worst 5 of 21 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	339	LYS	CA-C	12.20	1.84	1.52
2	A	339	LYS	C-O	-10.77	1.02	1.23
2	C	339	LYS	N-CA	10.54	1.67	1.46
2	C	339	LYS	CA-C	10.15	1.79	1.52
2	A	315	VAL	CB-CG1	9.71	1.73	1.52

The worst 5 of 59 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	A	329	LEU	CA-CB-CG	-11.46	88.95	115.30
1	D	-8	DT	O4'-C1'-N1	11.33	115.93	108.00
1	D	-8	DT	O4'-C1'-C2'	11.16	114.83	105.90
1	D	-1	DC	O4'-C4'-C3'	-10.80	99.52	106.00
2	A	318	LEU	CB-CG-CD1	9.49	127.14	111.00

There are no chirality outliers.

There are no planarity outliers.

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	B	426	0	237	54	0
1	D	426	0	237	59	0
2	A	467	0	504	65	0
2	C	467	0	504	65	0
3	C	1	0	0	0	0
4	A	5	0	0	0	0
4	B	2	0	0	0	0
4	C	9	0	0	2	0
4	D	1	0	0	0	0
All	All	1804	0	1482	220	0

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 71.

The worst 5 of 220 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:C:339:LYS:CA	2:C:339:LYS:C	1.79	1.49
2:A:339:LYS:CA	2:A:339:LYS:C	1.84	1.44
2:A:289:ARG:HH11	2:A:289:ARG:HG2	1.20	1.02
2:C:317:VAL:HG22	2:C:318:LEU:HD23	1.41	0.99
1:B:9:DA:H1'	1:B:10:DG:H5'	1.46	0.96

There are no symmetry-related clashes.

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
2	A	53/55 (96%)	30 (57%)	16 (30%)	7 (13%)	0 1
2	C	53/55 (96%)	34 (64%)	15 (28%)	4 (8%)	1 6
All	All	106/110 (96%)	64 (60%)	31 (29%)	11 (10%)	1 3

5 of 11 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	A	331	ALA
2	A	332	LEU
2	A	335	LEU
2	C	314	ARG
2	C	338	HIS

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
2	A	51/51 (100%)	20 (39%)	31 (61%)	0 0
2	C	51/51 (100%)	24 (47%)	27 (53%)	0 0
All	All	102/102 (100%)	44 (43%)	58 (57%)	0 0

5 of 58 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	A	333	LYS
2	C	288	VAL
2	C	333	LYS
2	A	334	ASP
2	A	338	HIS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
2	A	313	ASN

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Mol	Chain	Res	Type
2	C	320	ASN

5.3.3 RNA (i)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates (i)

There are no carbohydrates in this entry.

5.6 Ligand geometry (i)

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data (i)

6.1 Protein, DNA and RNA chains (i)

EDS was not executed - this section will therefore be empty.

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

EDS was not executed - this section will therefore be empty.

6.3 Carbohydrates (i)

EDS was not executed - this section will therefore be empty.

6.4 Ligands (i)

EDS was not executed - this section will therefore be empty.

6.5 Other polymers (i)

EDS was not executed - this section will therefore be empty.