WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 27, 2024 – 10:47 AM EST

PDB ID : 1BLB
Title : CLOSE PACKING OF AN OLIGOMERIC EYE LENS BETA-CRYSTALLIN
INDUCES LOSS OF SYMMETRY AND ORDERING OF SEQUENCE EX-
TENSIONS
Authors : Nalini, V.; Bax, B.; Driessen, H.; Moss, D.S.; Lindley, P.F.; Slingsby, C.
Deposited on : 1993-12-22
Resolution : 3.30 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
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

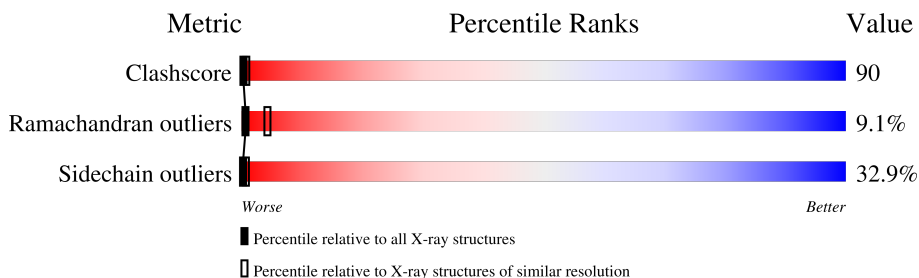|		
MolProbity	:	4.02b-467
Xtriage (Phenix)	:	NOT EXECUTED
EDS	:	NOT EXECUTED
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

1 Overall quality at a glance ⓘ

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

The reported resolution of this entry is 3.30 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	Percentile Ranks	Value
Clashscore		90
Ramachandran outliers		9.1%
Sidechain outliers		32.9%

Worse   *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	1205 (3.34-3.26)
Ramachandran outliers	138981	1183 (3.34-3.26)
Sidechain outliers	138945	1182 (3.34-3.26)

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 of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. 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%

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	204	8% 43% 32% 7% 9%
1	B	204	15% 36% 29% 9% 11%
1	C	204	13% 47% 25% 7% 8%
1	D	204	16% 40% 23% 11% 10%

2 Entry composition (i)

There is only 1 type of molecule in this entry. The entry contains 5941 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 BETA B2-CRYSTALLIN.

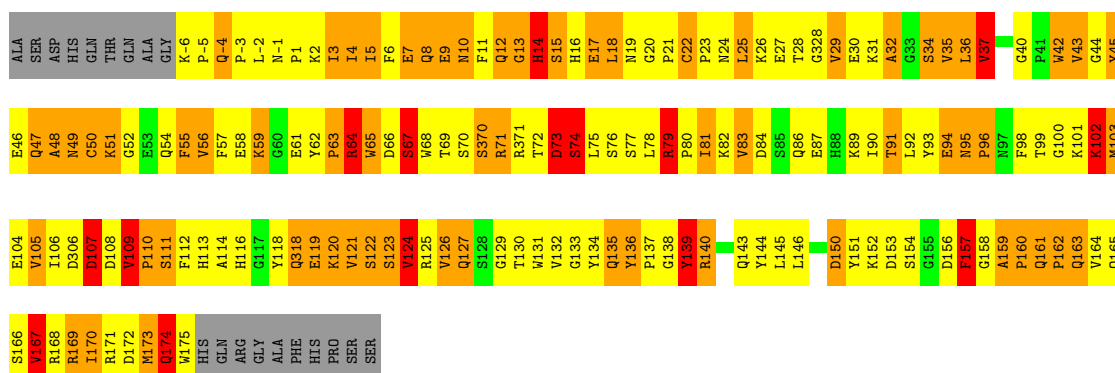| Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	185	Total	C	N	O	S	0	0	0
			1492	942	261	285	4			
1	B	181	Total	C	N	O	S	0	0	0
			1464	924	256	280	4			
1	C	187	Total	C	N	O	S	0	0	0
			1505	950	264	287	4			
1	D	183	Total	C	N	O	S	0	0	0
			1480	934	259	283	4			

3 Residue-property plots ⓘ

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. 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. 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.
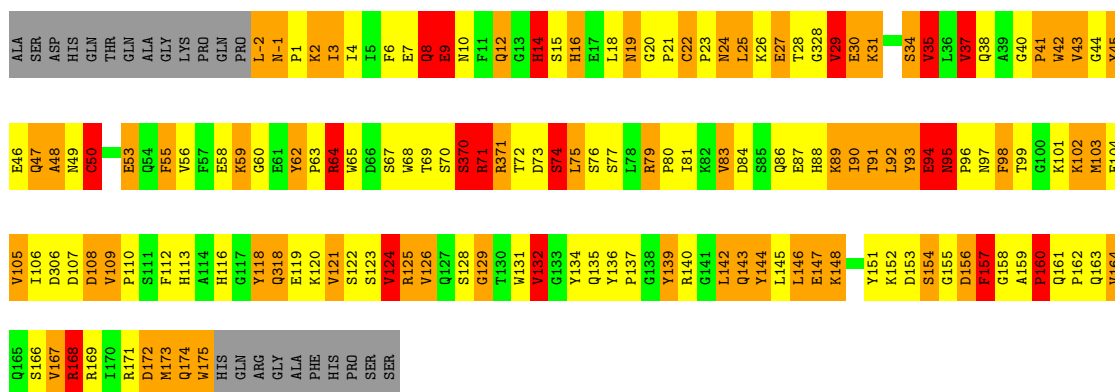
Note EDS was not executed.

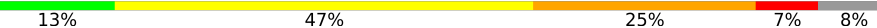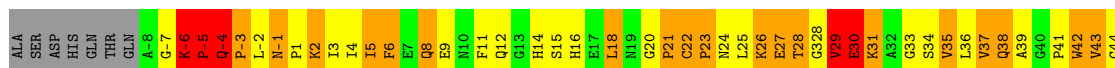• Molecule 1: BETA B2-CRYSTALLIN
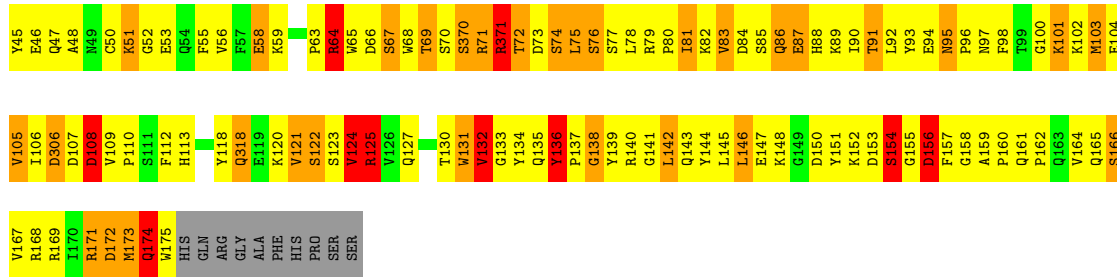
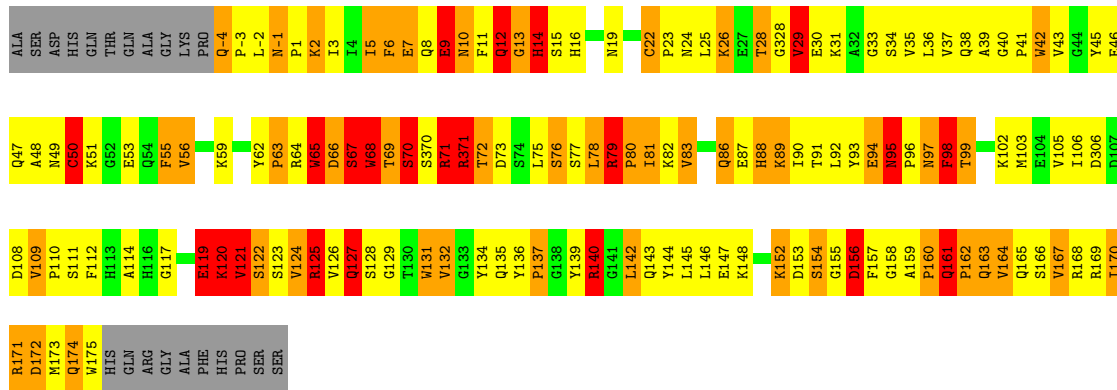Chain A:

• Molecule 1: BETA B2-CRYSTALLIN

Chain B:

• Molecule 1: BETA B2-CRYSTALLIN

Chain C:

Y45 E46 Q47 A48 N49 C50 K51 G52 E53 Q54 F55 V56 F57 E58 K59 P63 R64 W65 D66 S67 T69 S70 S370 R71 R37t T72 D73 S74 L75 S76 S77 L78 R79 P80 I81 K82 V83 D84 S85 Q86 E87 H88 K89 I90 T91 L92 Y93 E94 N95 P96 N97 F98 T99 G100 K101 K102 M103 E104

V105 I106 D306 D107 D108 V109 P110 S111 F112 H113 Y118 Q318 E119 K120 V121 S122 S123 V124 R125 V126 Q127 T130 W131 V132 G133 Y134 Q135 Y136 P137 G138 Y139 R140 G141 L142 Q143 Y144 L145 L146 E147 K148 G149 D150 Y151 K152 D153 S154 G155 D156 F157 G158 A159 P160 Q161 P162 Q163 V164 Q165 S166

V167 R168 R169 I170 R171 D172 M173 Q174 W175 HIS GLN ARG GLY ALA PHE HIS PRO SER SER

• Molecule 1: BETA B2-CRYSTALLIN

Chain D: [16%] [40%] [23%] [11%] [10%]

ALA SER ASP HIS GLN THR GLN ALA GLY LYS PRO Q-4 P-3 L-2 N-1 P1 K2 I3 I4 I5 F6 E7 Q8 E9 N10 F11 Q12 G13 H14 S15 H16 N19 C22 P23 N24 L25 K26 E27 T28 G328 V29 E30 K31 A32 G33 S34 V35 L36 V37 Q38 A39 G40 P41 W42 V43 G44 Y45 E46

Q47 A48 N49 C50 K51 G52 Q54 E53 F55 V56 K59 Y62 P63 R64 W65 D66 S67 W68 T69 S70 S370 R71 R371 T72 D73 S74 L75 S76 S77 L78 R79 P80 I81 K82 V83 Q86 E87 H88 K89 I90 T91 L92 Y93 E94 N95 P96 N97 F98 T99 K102 M103 E104 V105 I106 D306 D107

D108 V109 P110 S111 F112 H113 A114 H116 G117 E119 K120 V121 S122 S123 V124 R125 V126 Q127 S128 G129 T130 W131 V132 G133 Y134 Q135 Y136 P137 G138 Y139 R140 G141 L142 Q143 Y144 L145 L146 E147 K148 K152 D153 S154 G155 D156 F157 G158 A159 P160 Q161 P162 Q163 V164 Q165 S166 V167 R168 R169 I170

R171 D172 M173 Q174 W175 HIS GLN ARG GLY ALA PHE HIS PRO SER SER

4 Data and refinement statistics ⓘ

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

Property	Value	Source
Space group	C 2 2 2	Depositor
Cell constants a, b, c, α, β, γ	154.71Å　　165.90Å　　78.48Å 90.00°　　90.00°　　90.00°	Depositor
Resolution (Å)	(Not available) – 3.30	Depositor
% Data completeness (in resolution range)	(Not available) ((Not available)-3.30)	Depositor
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
Refinement program	RESTRAIN, X-PLOR	Depositor
R, R_{free}	(Not available) , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	5941	wwPDB-VP
Average B, all atoms (Å^2)	0.0	wwPDB-VP

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	1.31	6/1535 (0.4%)	1.83	34/2080 (1.6%)
1	B	1.30	6/1505 (0.4%)	1.77	38/2037 (1.9%)
1	C	1.28	6/1548 (0.4%)	1.80	29/2096 (1.4%)
1	D	1.30	7/1522 (0.5%)	1.80	39/2061 (1.9%)
All	All	1.30	25/6110 (0.4%)	1.80	140/8274 (1.7%)

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	2	5
1	B	1	7
1	C	3	5
1	D	5	7
All	All	11	24

The worst 5 of 25 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	8	GLN	CD-OE1	5.69	1.36	1.24
1	B	12	GLN	CD-OE1	5.58	1.36	1.24
1	D	42	TRP	NE1-CE2	-5.51	1.30	1.37
1	B	131	TRP	NE1-CE2	-5.49	1.30	1.37
1	B	74	SER	N-CA	5.48	1.57	1.46

The worst 5 of 140 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	13	GLY	C-N-CA	16.12	162.01	121.70
1	C	132	VAL	CA-CB-CG2	11.88	128.71	110.90
1	A	167	VAL	CA-CB-CG1	11.19	127.68	110.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	167	VAL	CA-CB-CG2	11.00	127.40	110.90
1	D	109	VAL	CA-CB-CG2	10.44	126.57	110.90

5 of 11 chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
1	A	-6	LYS	CA
1	A	67	SER	CA
1	B	86	GLN	CA
1	C	-5	PRO	CA
1	C	37	VAL	CA

5 of 24 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	140	ARG	Sidechain
1	A	168	ARG	Sidechain
1	A	169	ARG	Sidechain
1	A	71	ARG	Sidechain
1	A	79	ARG	Sidechain

5.2   Too-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 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	1492	0	1416	270	2
1	B	1464	0	1391	274	0
1	C	1505	0	1435	286	1
1	D	1480	0	1406	270	1
All	All	5941	0	5648	1041	3

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 90.

The worst 5 of 1041 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)
1:D:41:PRO:HB2	1:D:81:ILE:CD1	1.47	1.43
1:C:43:VAL:HG12	1:C:81:ILE:CD1	1.50	1.39
1:D:154:SER:HB2	1:D:159:ALA:CB	1.51	1.39
1:D:41:PRO:CB	1:D:81:ILE:HD11	1.55	1.36
1:D:154:SER:CB	1:D:159:ALA:HB3	1.61	1.31

All (3) 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)
1:A:19:ASN:ND2	1:D:-4:GLN:O[1_554]	1.99	0.21
1:A:67:SER:OG	1:A:136:TYR:CD2[3_555]	2.02	0.18
1:C:371:ARG:CD	1:C:371:ARG:CD[4_555]	2.03	0.17

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	183/204 (90%)	144 (79%)	21 (12%)	18 (10%)	0	3
1	B	179/204 (88%)	130 (73%)	34 (19%)	15 (8%)	1	5
1	C	185/204 (91%)	137 (74%)	31 (17%)	17 (9%)	1	4
1	D	181/204 (89%)	136 (75%)	29 (16%)	16 (9%)	1	5
All	All	728/816 (89%)	547 (75%)	115 (16%)	66 (9%)	1	4

5 of 66 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3	ILE
1	A	48	ALA
1	A	65	TRP
1	A	73	ASP

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Mol	Chain	Res	Type
1	A	96	PRO

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	162/177 (92%)	104 (64%)	58 (36%)	0	0
1	B	159/177 (90%)	104 (65%)	55 (35%)	0	1
1	C	163/177 (92%)	111 (68%)	52 (32%)	0	1
1	D	161/177 (91%)	114 (71%)	47 (29%)	0	1
All	All	645/708 (91%)	433 (67%)	212 (33%)	0	1

5 of 212 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	C	-2	LEU
1	C	87	GLU
1	D	120	LYS
1	C	6	PHE
1	C	64	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 25 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	-1	ASN
1	C	113	HIS
1	D	135	GLN
1	C	95	ASN
1	C	127	GLN

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 monosaccharides 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 ⓘ

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

6.3 Carbohydrates ⓘ

EDS was not executed - this section is therefore empty.

6.4 Ligands ⓘ

EDS was not executed - this section is therefore empty.

6.5 Other polymers ⓘ

EDS was not executed - this section is therefore empty.