



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 15, 2024 – 04:22 PM EDT

PDB ID : 2G4N  
Title : Anomalous substructure of alpha-lactalbumin  
Authors : Mueller-Dieckmann, C.; Weiss, M.S.  
Deposited on : 2006-02-22  
Resolution : 2.30 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](mailto: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) : 1.20.1  
EDS : 2.37.1  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Refmac : 5.8.0158  
CCP4 : 7.0.044 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.37.1

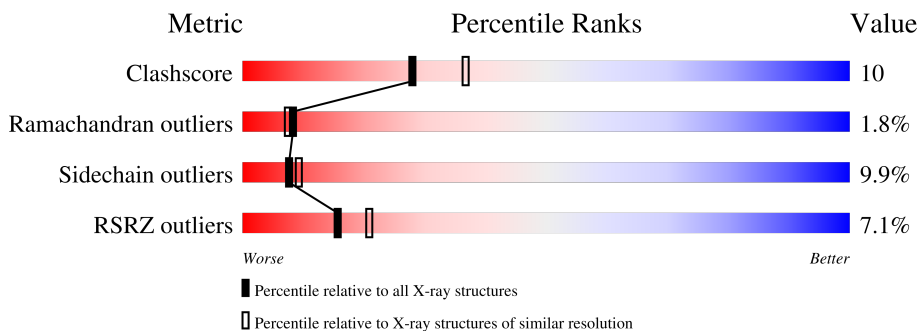
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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  $\geq 3$ , 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  $\leq 5\%$ . 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	123	
1	B	123	
1	C	123	
1	D	123	
1	E	123	
1	F	123	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 5938 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 Alpha-lactalbumin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	122	976	615	160	192	9	0	0	0
1	B	122	976	615	160	192	9	0	0	0
1	C	122	976	615	160	192	9	0	0	0
1	D	122	976	615	160	192	9	0	0	0
1	E	122	976	615	160	192	9	0	0	0
1	F	122	976	615	160	192	9	0	0	0

- Molecule 2 is CALCIUM ION (three-letter code: CA) (formula: Ca).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	1	Total	Ca	0	0
			1	1		
2	B	1	Total	Ca	0	0
			1	1		
2	C	1	Total	Ca	0	0
			1	1		
2	D	1	Total	Ca	0	0
			1	1		
2	E	1	Total	Ca	0	0
			1	1		
2	F	1	Total	Ca	0	0
			1	1		

- Molecule 3 is POTASSIUM ION (three-letter code: K) (formula: K).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total K 1 1	0	0
3	B	1	Total K 1 1	0	0

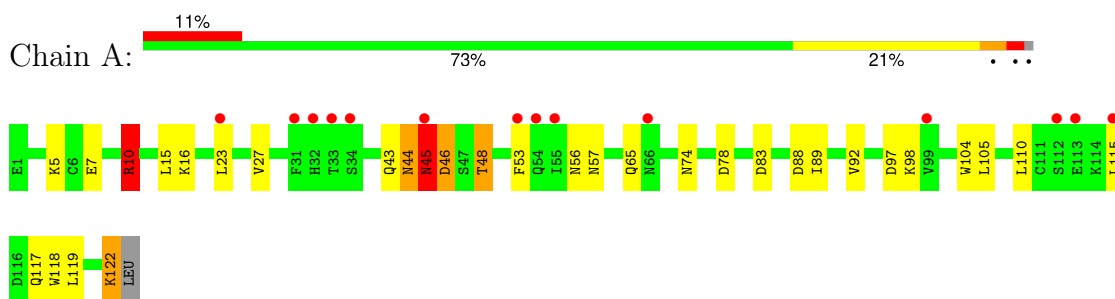
- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	9	Total O 9 9	0	0
4	B	14	Total O 14 14	0	0
4	C	14	Total O 14 14	0	0
4	D	16	Total O 16 16	0	0
4	E	14	Total O 14 14	0	0
4	F	7	Total O 7 7	0	0

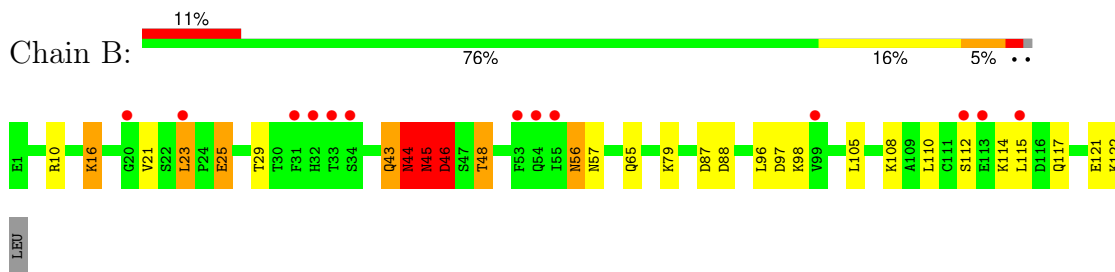
### 3 Residue-property plots [i](#)

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 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.

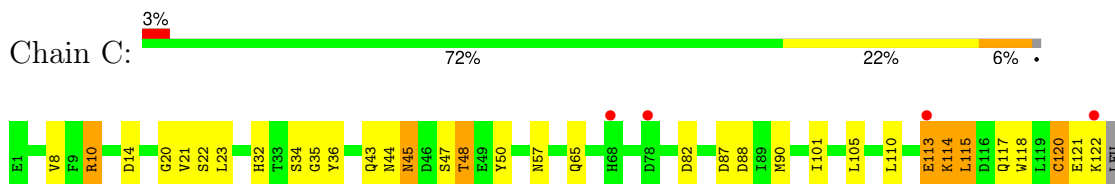
- Molecule 1: Alpha-lactalbumin



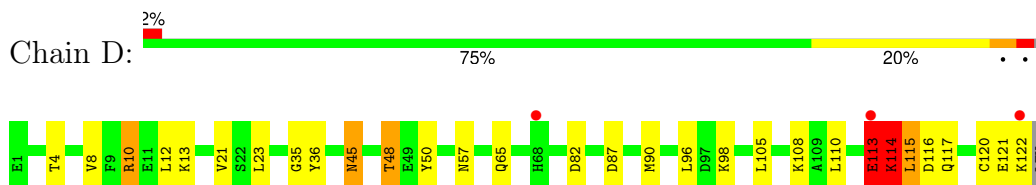
- Molecule 1: Alpha-lactalbumin



- Molecule 1: Alpha-lactalbumin

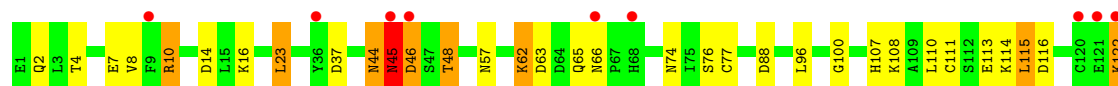


- Molecule 1: Alpha-lactalbumin



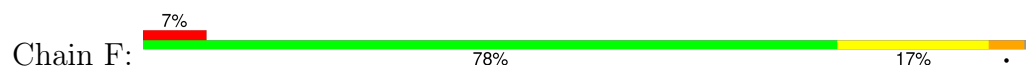
- Molecule 1: Alpha-lactalbumin





LEU

- Molecule 1: Alpha-lactalbumin



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	68.43Å 104.80Å 119.11Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.30 28.72 – 2.30	Depositor EDS
% Data completeness (in resolution range)	91.2 (30.00-2.30) 91.2 (28.72-2.30)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.01 (at 2.31Å)	Xtrriage
Refinement program	REFMAC 5.2.0005	Depositor
R, $R_{free}$	0.296 , 0.359 0.294 , (Not available)	Depositor DCC
$R_{free}$ test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	49.4	Xtrriage
Anisotropy	0.114	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.28 , 37.8	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.51$ , $\langle L^2 \rangle = 0.35$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.93	EDS
Total number of atoms	5938	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	39.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 88.10 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 5.5063e-08. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 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: CA, K

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	1.50	5/996 (0.5%)	1.06	4/1349 (0.3%)
1	B	1.63	4/996 (0.4%)	1.07	4/1349 (0.3%)
1	C	1.17	3/996 (0.3%)	1.07	5/1349 (0.4%)
1	D	1.21	3/996 (0.3%)	1.11	6/1349 (0.4%)
1	E	1.65	3/996 (0.3%)	0.99	4/1349 (0.3%)
1	F	1.08	2/996 (0.2%)	0.99	4/1349 (0.3%)
All	All	1.39	20/5976 (0.3%)	1.05	27/8094 (0.3%)

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	1
1	B	0	3
1	C	0	2
1	F	0	1
All	All	0	7

All (20) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	E	122	LYS	C-O	38.69	1.96	1.23
1	A	122	LYS	C-O	25.33	1.71	1.23
1	B	25	GLU	CD-OE2	20.97	1.48	1.25
1	B	25	GLU	CD-OE1	20.65	1.48	1.25
1	B	16	LYS	CE-NZ	18.41	1.95	1.49
1	A	97	ASP	CG-OD2	10.21	1.48	1.25
1	C	113	GLU	C-O	7.15	1.36	1.23
1	E	122	LYS	CA-C	7.04	1.71	1.52

*Continued on next page...*



*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	21	VAL	C-O	6.99	1.36	1.23
1	F	114	LYS	CE-NZ	6.74	1.65	1.49
1	A	97	ASP	CG-OD1	6.66	1.40	1.25
1	D	113	GLU	C-O	6.27	1.35	1.23
1	A	78	ASP	CB-CG	-5.57	1.40	1.51
1	C	113	GLU	CB-CG	5.30	1.62	1.52
1	F	114	LYS	CD-CE	5.25	1.64	1.51
1	D	21	VAL	CB-CG1	5.22	1.63	1.52
1	A	104	TRP	CB-CG	-5.11	1.41	1.50
1	C	34	SER	CB-OG	-5.11	1.35	1.42
1	D	108	LYS	CD-CE	5.08	1.64	1.51
1	E	77	CYS	CB-SG	5.05	1.90	1.82

All (27) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	D	10	ARG	NE-CZ-NH1	8.19	124.40	120.30
1	C	87	ASP	CB-CG-OD1	7.59	125.13	118.30
1	D	87	ASP	CB-CG-OD1	6.71	124.34	118.30
1	C	115	LEU	CB-CG-CD1	6.69	122.38	111.00
1	F	87	ASP	CB-CG-OD1	6.63	124.27	118.30
1	E	122	LYS	CA-C-O	-6.54	106.36	120.10
1	C	10	ARG	NE-CZ-NH1	6.53	123.56	120.30
1	F	63	ASP	CB-CG-OD1	6.46	124.12	118.30
1	B	16	LYS	CD-CE-NZ	-6.41	96.96	111.70
1	D	98	LYS	CD-CE-NZ	6.29	126.17	111.70
1	D	115	LEU	CB-CG-CD1	6.26	121.64	111.00
1	B	25	GLU	OE1-CD-OE2	5.93	130.41	123.30
1	A	97	ASP	CB-CG-OD2	-5.83	113.05	118.30
1	F	14	ASP	CB-CG-OD2	-5.73	113.14	118.30
1	C	113	GLU	N-CA-C	-5.56	95.98	111.00
1	B	46	ASP	N-CA-C	5.56	126.01	111.00
1	E	14	ASP	CB-CG-OD2	-5.43	113.42	118.30
1	C	10	ARG	NE-CZ-NH2	-5.39	117.61	120.30
1	F	110	LEU	CA-CB-CG	5.31	127.51	115.30
1	A	83	ASP	CB-CG-OD1	5.28	123.05	118.30
1	D	10	ARG	NE-CZ-NH2	-5.21	117.69	120.30
1	A	78	ASP	CB-CG-OD2	-5.17	113.64	118.30
1	B	97	ASP	CB-CG-OD2	-5.12	113.69	118.30
1	D	96	LEU	CB-CG-CD1	-5.02	102.46	111.00
1	E	45	ASN	N-CA-C	5.02	124.56	111.00
1	A	10	ARG	NE-CZ-NH1	5.01	122.81	120.30

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	E	63	ASP	CB-CG-OD1	5.01	122.81	118.30

There are no chirality outliers.

All (7) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	45	ASN	Peptide
1	B	43	GLN	Peptide
1	B	44	ASN	Peptide
1	B	45	ASN	Peptide
1	C	120	CYS	Peptide
1	C	43	GLN	Peptide
1	F	44	ASN	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	976	0	925	19	0
1	B	976	0	925	28	0
1	C	976	0	925	20	0
1	D	976	0	925	17	0
1	E	976	0	925	20	0
1	F	976	0	925	13	0
2	A	1	0	0	0	0
2	B	1	0	0	0	0
2	C	1	0	0	0	0
2	D	1	0	0	0	0
2	E	1	0	0	0	0
2	F	1	0	0	0	0
3	A	1	0	0	0	0
3	B	1	0	0	0	0
4	A	9	0	0	0	0
4	B	14	0	0	2	0
4	C	14	0	0	2	0
4	D	16	0	0	3	0
4	E	14	0	0	1	0

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	F	7	0	0	0	0
All	All	5938	0	5550	113	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 10.

All (113) 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:A:122:LYS:C	1:A:122:LYS:O	1.71	1.29
1:B:16:LYS:CE	1:B:16:LYS:NZ	1.95	1.28
1:E:122:LYS:C	1:E:122:LYS:O	1.96	1.02
1:B:43:GLN:HB3	1:B:48:THR:HB	1.40	1.01
1:B:48:THR:HG22	1:B:65:GLN:HE22	1.22	1.01
1:B:48:THR:HG22	1:B:65:GLN:NE2	1.77	0.98
1:A:48:THR:HG22	1:A:65:GLN:HE22	1.27	0.96
1:D:57:ASN:HD21	1:D:65:GLN:HE21	1.13	0.94
1:A:48:THR:HG22	1:A:65:GLN:NE2	1.81	0.94
1:A:43:GLN:HB3	1:A:48:THR:HB	1.50	0.91
1:C:57:ASN:HD21	1:C:65:GLN:HE21	1.14	0.91
1:A:45:ASN:HB2	1:A:46:ASP:HB2	1.55	0.89
1:B:44:ASN:O	1:B:46:ASP:HB3	1.73	0.88
1:B:44:ASN:C	1:B:45:ASN:OD1	2.18	0.82
1:B:48:THR:CG2	1:B:65:GLN:NE2	2.45	0.78
1:B:44:ASN:O	1:B:45:ASN:OD1	2.03	0.77
1:F:57:ASN:HD21	1:F:65:GLN:HE21	1.31	0.77
1:E:48:THR:HG22	1:E:65:GLN:NE2	2.00	0.76
1:D:57:ASN:HD21	1:D:65:GLN:NE2	1.85	0.75
1:C:48:THR:HG23	1:C:65:GLN:NE2	2.02	0.75
1:A:48:THR:CG2	1:A:65:GLN:NE2	2.49	0.74
1:E:48:THR:HG22	1:E:65:GLN:HE22	1.53	0.73
1:D:48:THR:HG23	1:D:65:GLN:NE2	2.03	0.73
1:D:57:ASN:ND2	1:D:65:GLN:HE21	1.85	0.73
1:F:48:THR:HG22	1:F:65:GLN:NE2	2.06	0.71
1:B:57:ASN:HD21	1:B:65:GLN:HE21	1.36	0.70
1:D:114:LYS:N	4:D:213:HOH:O	2.24	0.70
1:E:57:ASN:HD21	1:E:65:GLN:HE21	1.40	0.69
1:A:57:ASN:HD21	1:A:65:GLN:HE21	1.40	0.69
1:B:44:ASN:O	1:B:44:ASN:CG	2.31	0.68
1:A:44:ASN:ND2	1:A:46:ASP:HB3	2.09	0.67
1:C:57:ASN:ND2	1:C:65:GLN:HE21	1.89	0.66

*Continued on next page...*

*Continued from previous page...*

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:44:ASN:HB3	4:B:217:HOH:O	1.95	0.65
1:E:107:HIS:HA	1:E:111:CYS:HB2	1.78	0.65
1:C:20:GLY:HA3	1:E:115:LEU:HD21	1.79	0.64
1:F:48:THR:HG22	1:F:65:GLN:HE22	1.63	0.64
1:C:113:GLU:HG2	4:C:205:HOH:O	1.98	0.64
1:C:57:ASN:HD21	1:C:65:GLN:NE2	1.90	0.63
1:A:43:GLN:CB	1:A:48:THR:HB	2.29	0.62
1:A:44:ASN:HD21	1:A:46:ASP:HB3	1.65	0.60
1:E:48:THR:CG2	1:E:65:GLN:NE2	2.66	0.59
1:D:4:THR:O	1:D:8:VAL:HG23	2.03	0.58
1:D:113:GLU:C	4:D:213:HOH:O	2.43	0.57
1:A:45:ASN:CB	1:A:46:ASP:HB2	2.33	0.57
1:F:48:THR:CG2	1:F:65:GLN:NE2	2.67	0.56
1:B:57:ASN:ND2	1:B:65:GLN:HE21	2.04	0.56
1:B:16:LYS:NZ	1:B:16:LYS:CD	2.67	0.56
1:E:44:ASN:CG	1:E:44:ASN:O	2.44	0.55
1:D:35:GLY:O	1:D:36:TYR:HB2	2.07	0.54
1:C:120:CYS:O	1:C:122:LYS:N	2.41	0.53
1:D:120:CYS:O	1:D:122:LYS:N	2.42	0.53
1:A:5:LYS:NZ	1:A:119:LEU:O	2.24	0.53
1:D:45:ASN:OD1	1:D:45:ASN:N	2.41	0.53
1:C:20:GLY:O	1:E:115:LEU:CD2	2.58	0.52
1:B:44:ASN:OD1	1:B:45:ASN:OD1	2.27	0.52
1:A:48:THR:CG2	1:A:65:GLN:HE22	2.09	0.51
1:B:16:LYS:O	1:B:16:LYS:HG3	2.10	0.51
1:D:82:ASP:C	1:D:82:ASP:OD1	2.49	0.51
1:C:82:ASP:OD1	1:C:82:ASP:C	2.49	0.51
1:B:45:ASN:CB	1:B:46:ASP:HB2	2.41	0.50
1:B:114:LYS:O	1:B:117:GLN:NE2	2.45	0.49
1:E:62:LYS:HG3	1:E:76:SER:HA	1.94	0.49
1:C:117:GLN:HG2	1:C:118:TRP:CD1	2.47	0.49
1:E:7:GLU:HA	1:E:10:ARG:HD3	1.94	0.49
1:A:16:LYS:O	1:A:16:LYS:HG3	2.13	0.49
1:E:16:LYS:HA	1:E:23:LEU:HD13	1.94	0.49
1:E:44:ASN:O	1:E:46:ASP:N	2.46	0.49
1:A:7:GLU:HA	1:A:10:ARG:NH1	2.28	0.48
1:B:121:GLU:O	1:B:122:LYS:CB	2.61	0.48
1:D:48:THR:CG2	1:D:65:GLN:NE2	2.76	0.48
1:C:22:SER:HB3	1:E:113:GLU:HB3	1.95	0.48
1:C:22:SER:HB3	1:E:113:GLU:CB	2.44	0.48
1:F:107:HIS:HA	1:F:111:CYS:HB2	1.95	0.47

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:35:GLY:O	1:C:36:TYR:HB2	2.14	0.47
1:C:8:VAL:HG21	1:C:36:TYR:CD2	2.50	0.46
1:B:45:ASN:CG	1:B:46:ASP:HB2	2.35	0.46
1:B:16:LYS:CB	1:B:23:LEU:HD13	2.45	0.46
1:B:57:ASN:HD21	1:B:65:GLN:NE2	2.09	0.46
1:A:53:PHE:CD1	1:A:92:VAL:HG21	2.50	0.46
1:C:32:HIS:HE1	4:C:215:HOH:O	1.98	0.46
1:C:47:SER:C	1:C:65:GLN:HE22	2.18	0.46
1:F:8:VAL:HG21	1:F:36:TYR:CD2	2.51	0.45
1:F:34:SER:OG	1:F:52:LEU:HD12	2.17	0.45
1:D:116:ASP:OD2	4:D:209:HOH:O	2.21	0.44
1:E:4:THR:O	1:E:8:VAL:HG23	2.18	0.44
1:B:114:LYS:HB2	1:B:117:GLN:HE22	1.81	0.44
1:E:66:ASN:HB2	4:E:219:HOH:O	2.17	0.44
1:D:8:VAL:HG21	1:D:36:TYR:CD2	2.52	0.44
1:F:105:LEU:HD12	1:F:105:LEU:H	1.83	0.43
1:E:96:LEU:HA	1:E:100:GLY:HA2	2.00	0.43
1:C:117:GLN:HG2	1:C:118:TRP:NE1	2.33	0.43
1:B:79:LYS:HB3	1:B:87:ASP:OD2	2.19	0.42
1:F:15:LEU:O	1:F:16:LYS:C	2.55	0.42
1:F:44:ASN:O	1:F:46:ASP:N	2.52	0.42
1:F:105:LEU:HD12	1:F:105:LEU:N	2.35	0.42
1:A:57:ASN:HD21	1:A:65:GLN:NE2	2.12	0.42
1:A:15:LEU:HD21	1:A:89:ILE:HG23	2.01	0.42
1:D:48:THR:OG1	1:D:50:TYR:CE2	2.73	0.42
1:A:27:VAL:HG12	1:A:118:TRP:CE3	2.55	0.42
1:B:44:ASN:CB	4:B:217:HOH:O	2.60	0.41
1:E:2:GLN:OE1	1:E:37:ASP:HB2	2.20	0.41
1:F:16:LYS:HA	1:F:23:LEU:HD13	2.01	0.41
1:C:113:GLU:O	1:C:113:GLU:CG	2.68	0.41
1:B:25:GLU:O	1:B:29:THR:OG1	2.27	0.41
1:F:22:SER:O	1:F:25:GLU:HB2	2.20	0.41
1:D:12:LEU:O	1:D:13:LYS:C	2.57	0.41
1:B:56:ASN:OD1	1:B:56:ASN:C	2.60	0.40
1:E:44:ASN:O	1:E:44:ASN:ND2	2.54	0.40
1:B:108:LYS:HA	1:B:112:SER:OG	2.21	0.40
1:C:21:VAL:HG21	1:C:101:ILE:HD13	2.04	0.40
1:C:48:THR:OG1	1:C:50:TYR:CE2	2.75	0.40
1:B:96:LEU:HD23	1:B:96:LEU:HA	1.85	0.40
1:D:113:GLU:O	1:D:114:LYS:O	2.39	0.40

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	
1	A	120/123 (98%)	113 (94%)	5 (4%)	2 (2%)	9	8
1	B	120/123 (98%)	111 (92%)	6 (5%)	3 (2%)	5	4
1	C	120/123 (98%)	113 (94%)	3 (2%)	4 (3%)	4	2
1	D	120/123 (98%)	113 (94%)	5 (4%)	2 (2%)	9	8
1	E	120/123 (98%)	114 (95%)	5 (4%)	1 (1%)	19	23
1	F	120/123 (98%)	113 (94%)	6 (5%)	1 (1%)	19	23
All	All	720/738 (98%)	677 (94%)	30 (4%)	13 (2%)	8	7

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	45	ASN
1	A	46	ASP
1	B	46	ASP
1	C	45	ASN
1	C	114	LYS
1	C	121	GLU
1	D	114	LYS
1	D	121	GLU
1	E	45	ASN
1	B	44	ASN
1	B	45	ASN
1	C	44	ASN
1	F	45	ASN

### 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	111/114 (97%)	98 (88%)	13 (12%)	5	6
1	B	111/114 (97%)	101 (91%)	10 (9%)	9	11
1	C	111/114 (97%)	100 (90%)	11 (10%)	8	9
1	D	111/114 (97%)	100 (90%)	11 (10%)	8	9
1	E	111/114 (97%)	97 (87%)	14 (13%)	4	4
1	F	111/114 (97%)	104 (94%)	7 (6%)	18	24
All	All	666/684 (97%)	600 (90%)	66 (10%)	8	9

All (66) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	10	ARG
1	A	23	LEU
1	A	44	ASN
1	A	45	ASN
1	A	48	THR
1	A	56	ASN
1	A	74	ASN
1	A	88	ASP
1	A	98	LYS
1	A	105	LEU
1	A	110	LEU
1	A	115	LEU
1	A	117	GLN
1	B	10	ARG
1	B	23	LEU
1	B	45	ASN
1	B	48	THR
1	B	56	ASN
1	B	88	ASP
1	B	98	LYS
1	B	105	LEU
1	B	110	LEU
1	B	115	LEU
1	C	10	ARG
1	C	14	ASP
1	C	23	LEU
1	C	45	ASN

*Continued on next page...*

*Continued from previous page...*

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	C	48	THR
1	C	88	ASP
1	C	90	MET
1	C	105	LEU
1	C	110	LEU
1	C	114	LYS
1	C	115	LEU
1	D	10	ARG
1	D	23	LEU
1	D	45	ASN
1	D	48	THR
1	D	90	MET
1	D	105	LEU
1	D	110	LEU
1	D	113	GLU
1	D	114	LYS
1	D	115	LEU
1	D	117	GLN
1	E	10	ARG
1	E	23	LEU
1	E	44	ASN
1	E	45	ASN
1	E	46	ASP
1	E	48	THR
1	E	62	LYS
1	E	74	ASN
1	E	88	ASP
1	E	108	LYS
1	E	110	LEU
1	E	114	LYS
1	E	115	LEU
1	E	116	ASP
1	F	23	LEU
1	F	46	ASP
1	F	48	THR
1	F	66	ASN
1	F	110	LEU
1	F	115	LEU
1	F	116	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (24) such sidechains are listed below:



Mol	Chain	Res	Type
1	A	44	ASN
1	A	65	GLN
1	A	66	ASN
1	A	74	ASN
1	B	65	GLN
1	B	66	ASN
1	B	74	ASN
1	B	117	GLN
1	C	32	HIS
1	C	65	GLN
1	C	66	ASN
1	C	74	ASN
1	D	2	GLN
1	D	65	GLN
1	D	66	ASN
1	D	74	ASN
1	E	44	ASN
1	E	65	GLN
1	E	66	ASN
1	E	117	GLN
1	F	2	GLN
1	F	65	GLN
1	F	66	ASN
1	F	117	GLN

### 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 monosaccharides in this entry.

### 5.6 Ligand geometry [i](#)

Of 8 ligands modelled in this entry, 8 are 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](#)

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<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	122/123 (99%)	0.56	14 (11%) 4 7	28, 37, 44, 51	0
1	B	122/123 (99%)	0.59	13 (10%) 6 8	33, 40, 50, 56	0
1	C	122/123 (99%)	0.03	4 (3%) 46 53	33, 38, 49, 55	0
1	D	122/123 (99%)	0.05	3 (2%) 57 64	33, 38, 47, 52	0
1	E	122/123 (99%)	0.22	9 (7%) 14 19	31, 39, 46, 52	0
1	F	122/123 (99%)	0.24	9 (7%) 14 19	28, 39, 48, 52	0
All	All	732/738 (99%)	0.28	52 (7%) 16 21	28, 39, 48, 56	0

All (52) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	122	LYS	5.8
1	E	122	LYS	5.4
1	D	122	LYS	4.8
1	F	9	PHE	4.6
1	B	33	THR	4.4
1	F	122	LYS	4.3
1	E	120	CYS	4.2
1	A	33	THR	3.9
1	E	9	PHE	3.9
1	E	66	ASN	3.6
1	B	23	LEU	3.4
1	F	120	CYS	3.4
1	F	68	HIS	3.3
1	E	36	TYR	3.3
1	A	113	GLU	3.2
1	D	113	GLU	3.1
1	B	20	GLY	3.1
1	B	54	GLN	3.0
1	B	31	PHE	2.8

*Continued on next page...*

*Continued from previous page...*

Mol	Chain	Res	Type	RSRZ
1	B	113	GLU	2.7
1	B	32	HIS	2.7
1	B	53	PHE	2.6
1	F	121	GLU	2.6
1	A	32	HIS	2.6
1	A	54	GLN	2.6
1	B	99	VAL	2.5
1	F	119	LEU	2.5
1	A	55	ILE	2.5
1	F	66	ASN	2.4
1	A	53	PHE	2.4
1	E	46	ASP	2.4
1	E	121	GLU	2.4
1	B	34	SER	2.3
1	A	115	LEU	2.3
1	E	45	ASN	2.3
1	A	34	SER	2.3
1	E	68	HIS	2.3
1	F	36	TYR	2.3
1	B	115	LEU	2.3
1	D	68	HIS	2.3
1	B	55	ILE	2.2
1	A	45	ASN	2.2
1	C	78	ASP	2.2
1	A	23	LEU	2.2
1	A	99	VAL	2.1
1	B	112	SER	2.1
1	A	66	ASN	2.1
1	F	45	ASN	2.1
1	A	31	PHE	2.1
1	C	113	GLU	2.0
1	C	68	HIS	2.0
1	A	112	SER	2.0

## 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 monosaccharides in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å <sup>2</sup> )	Q<0.9
2	CA	C	201	1/1	0.96	0.04	27,27,27,27	1
2	CA	D	202	1/1	0.96	0.05	26,26,26,26	1
2	CA	E	206	1/1	0.97	0.06	18,18,18,18	1
2	CA	B	204	1/1	0.98	0.03	24,24,24,24	1
2	CA	A	203	1/1	0.98	0.04	25,25,25,25	1
3	K	A	208	1/1	0.98	0.11	54,54,54,54	1
3	K	B	207	1/1	0.98	0.05	60,60,60,60	1
2	CA	F	205	1/1	0.99	0.04	16,16,16,16	1

## 6.5 Other polymers [i](#)

There are no such residues in this entry.