



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 09:52 PM UTC

PDB ID : 7N6D / pdb_00007n6d
Title : HLA peptide complex
Authors : Chaurasia, P.; Petersen, J.; Rossjohn, J.
Deposited on : 2021-06-08
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

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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

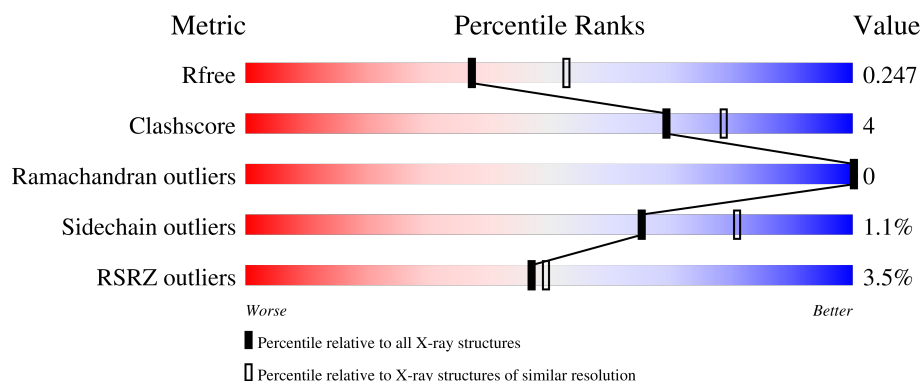
1 Overall quality at a glance

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.



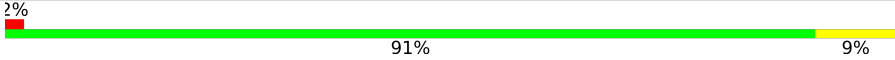
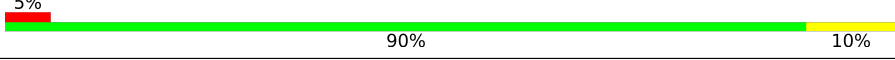
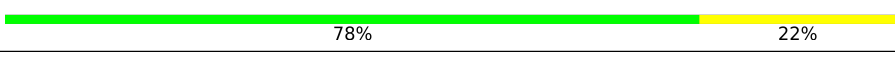
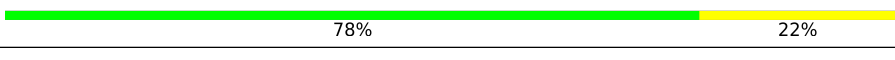
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	6319 (2.30-2.30)
Clashscore	190562	6919 (2.30-2.30)
Ramachandran outliers	187476	6854 (2.30-2.30)
Sidechain outliers	187428	6854 (2.30-2.30)
RSRZ outliers	180081	6325 (2.30-2.30)

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 ≥ 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	278	4% 90% 9%
1	E	278	% 92% 6%
1	I	278	3% 90% 10%
1	M	278	5% 90% 10%
2	B	100	2% 89% 9%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
2	F	100	 2% 91% 9%
2	J	100	 11% 84% 16%
2	N	100	 5% 90% 10%
3	C	9	 67% 33%
3	G	9	 78% 22%
3	K	9	 78% 22%
3	O	9	 78% 22%

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 12939 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 MHC class I antigen.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	275	Total	C	N	O	S	0	3	0
			2257	1411	412	425	9			
1	E	276	Total	C	N	O	S	0	1	0
			2256	1409	412	426	9			
1	I	276	Total	C	N	O	S	0	0	0
			2239	1400	406	424	9			
1	M	276	Total	C	N	O	S	0	1	0
			2250	1407	412	422	9			

- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	99	Total	C	N	O	S	0	1	0
			840	534	144	159	3			
2	F	100	Total	C	N	O	S	0	0	0
			833	530	140	159	4			
2	J	100	Total	C	N	O	S	0	0	0
			831	530	138	159	4			
2	N	100	Total	C	N	O	S	0	1	0
			837	532	143	158	4			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	MET	-	initiating methionine	UNP P61769
F	0	MET	-	initiating methionine	UNP P61769
J	0	MET	-	initiating methionine	UNP P61769
N	0	MET	-	initiating methionine	UNP P61769

- Molecule 3 is a protein called Spike protein S1.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	C	9	Total	C	N	O	0	0	0
			82	56	13	13			
3	G	9	Total	C	N	O	0	0	0
			82	56	13	13			
3	K	9	Total	C	N	O	0	0	0
			82	56	13	13			
3	O	9	Total	C	N	O	0	0	0
			82	56	13	13			

- Molecule 4 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	B	1	Total	C	O	0	0
			4	2	2		
4	C	1	Total	C	O	0	0
			4	2	2		
4	E	1	Total	C	O	0	0
			4	2	2		
4	F	1	Total	C	O	0	0
			4	2	2		
4	F	1	Total	C	O	0	0
			4	2	2		
4	G	1	Total	C	O	0	0
			4	2	2		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	I	1	Total C O 4 2 2	0	0
4	I	1	Total C O 4 2 2	0	0
4	I	1	Total C O 4 2 2	0	0
4	J	1	Total C O 4 2 2	0	0
4	K	1	Total C O 4 2 2	0	0
4	M	1	Total C O 4 2 2	0	0
4	N	1	Total C O 4 2 2	0	0
4	O	1	Total C O 4 2 2	0	0
4	O	1	Total C O 4 2 2	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	32	Total O 32 32	0	0
5	B	18	Total O 18 18	0	0
5	C	3	Total O 3 3	0	0
5	E	44	Total O 44 44	0	0
5	F	22	Total O 22 22	0	0
5	G	2	Total O 2 2	0	0
5	I	34	Total O 34 34	0	0
5	J	5	Total O 5 5	0	0
5	K	3	Total O 3 3	0	0
5	M	29	Total O 29 29	0	0

Continued on next page...

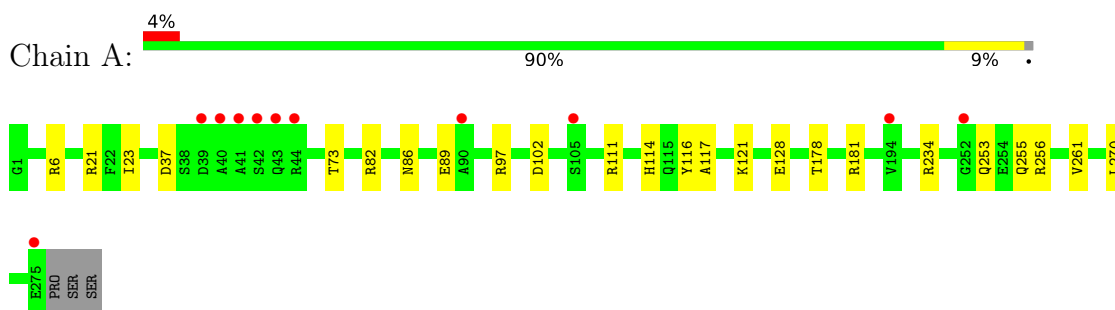
Continued from previous page...

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	N	6	Total	O	0	0
			6	6		
5	O	2	Total	O	0	0
			2	2		

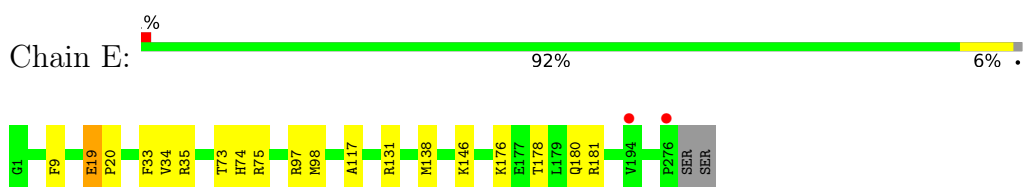
3 Residue-property plots

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 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.

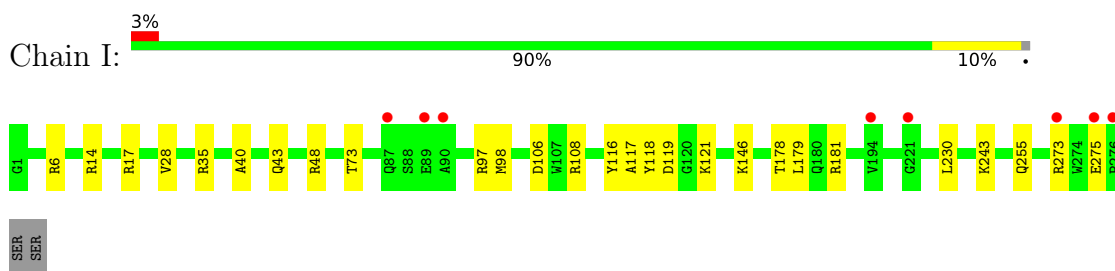
- Molecule 1: MHC class I antigen



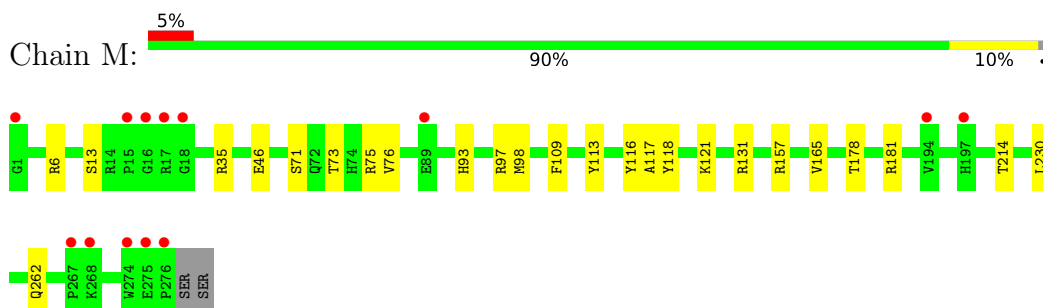
- Molecule 1: MHC class I antigen



- Molecule 1: MHC class I antigen



- Molecule 1: MHC class I antigen

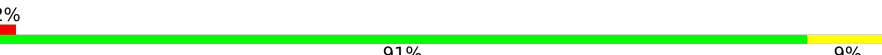


● Molecule 2: Beta-2-microglobulin

Chain B:  2% 89% 9% ..



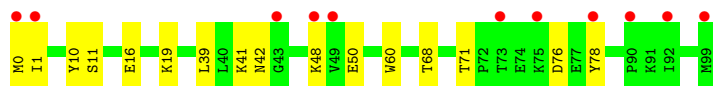
● Molecule 2: Beta-2-microglobulin

Chain F:  2% 91% 9%



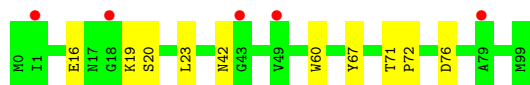
● Molecule 2: Beta-2-microglobulin

Chain J:  11% 84% 16%



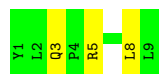
● Molecule 2: Beta-2-microglobulin

Chain N:  5% 90% 10%



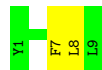
● Molecule 3: Spike protein S1

Chain C:  67% 33%



● Molecule 3: Spike protein S1

Chain G:  78% 22%



● Molecule 3: Spike protein S1

Chain K:  78% 22%



- Molecule 3: Spike protein S1

Chain O:  78% 22%



4 Data and refinement statistics

Property	Value	Source
Space group	P 31 1 2	Depositor
Cell constants a, b, c, α , β , γ	85.20Å 85.20Å 442.85Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	44.28 – 2.30 44.28 – 2.30	Depositor EDS
% Data completeness (in resolution range)	99.9 (44.28-2.30) 99.8 (44.28-2.30)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.70 (at 2.29Å)	Xtriage
Refinement program	PHENIX 1.19.2_4158	Depositor
R, R_{free}	0.213 , 0.247 0.213 , 0.247	Depositor DCC
R_{free} test set	4271 reflections (4.53%)	wwPDB-VP
Wilson B-factor (Å ²)	47.2	Xtriage
Anisotropy	0.510	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 40.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	0.042 for -h,-k,l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	12939	wwPDB-VP
Average B, all atoms (Å ²)	64.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 10.86% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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: EDO

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	0.16	0/2325	0.38	0/3157
1	E	0.16	0/2322	0.36	0/3153
1	I	0.16	0/2305	0.36	0/3133
1	M	0.18	0/2316	0.37	0/3146
2	B	0.16	0/863	0.39	0/1166
2	F	0.16	0/856	0.37	0/1158
2	J	0.14	0/854	0.42	0/1155
2	N	0.15	0/860	0.35	0/1164
3	C	0.18	0/84	0.40	0/112
3	G	0.12	0/84	0.33	0/112
3	K	0.15	0/84	0.29	0/112
3	O	0.16	0/84	0.30	0/112
All	All	0.16	0/13037	0.37	0/17680

There are no bond length outliers.

There are no bond angle outliers.

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	A	2257	0	2099	16	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	E	2256	0	2099	10	0
1	I	2239	0	2077	19	0
1	M	2250	0	2098	16	0
2	B	840	0	806	6	0
2	F	833	0	792	6	0
2	J	831	0	792	12	0
2	N	837	0	791	6	0
3	C	82	0	88	3	0
3	G	82	0	88	2	0
3	K	82	0	88	2	0
3	O	82	0	88	3	0
4	A	4	0	6	1	0
4	B	8	0	12	1	0
4	C	4	0	6	1	0
4	E	4	0	6	2	0
4	F	8	0	12	2	0
4	G	4	0	6	0	0
4	I	12	0	18	4	0
4	J	4	0	6	2	0
4	K	4	0	6	0	0
4	M	4	0	6	0	0
4	N	4	0	6	0	0
4	O	8	0	12	1	0
5	A	32	0	0	0	0
5	B	18	0	0	0	0
5	C	3	0	0	0	0
5	E	44	0	0	0	0
5	F	22	0	0	0	0
5	G	2	0	0	0	0
5	I	34	0	0	0	0
5	J	5	0	0	0	0
5	K	3	0	0	0	0
5	M	29	0	0	0	0
5	N	6	0	0	0	0
5	O	2	0	0	0	0
All	All	12939	0	12008	87	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 4.

All (87) 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:I:255:GLN:O	1:I:273:ARG:NH1	2.21	0.73
2:J:42:ASN:ND2	2:J:76:ASP:OD1	2.24	0.70
1:A:253:GLN:HB3	1:A:256:ARG:HD3	1.76	0.68
1:M:97:ARG:HD3	1:M:116:TYR:CZ	2.29	0.67
1:A:6:ARG:NH2	1:A:102:ASP:OD1	2.22	0.67
1:A:97:ARG:HD3	1:A:116:TYR:CZ	2.29	0.66
1:M:6:ARG:HD2	1:M:98:MET:HE3	1.76	0.66
2:N:16:GLU:OE1	2:N:19:LYS:NZ	2.28	0.65
1:I:97:ARG:HD3	1:I:116:TYR:CZ	2.32	0.64
3:O:4:PRO:HD2	4:O:102:EDO:H12	1.79	0.64
1:I:146:LYS:HE2	4:I:303:EDO:H22	1.80	0.64
1:M:35:ARG:NH2	1:M:46:GLU:OE1	2.31	0.64
1:I:40:ALA:O	1:I:43:GLN:NE2	2.31	0.63
2:J:11:SER:H	4:J:101:EDO:H11	1.66	0.60
1:E:19:GLU:HG2	1:E:20:PRO:HD2	1.83	0.59
2:B:79:ALA:HB2	2:B:94:LYS:HD2	1.84	0.58
1:M:230:LEU:HD11	1:M:243:LYS:HE3	1.87	0.57
2:N:20:SER:HA	2:N:71:THR:HG22	1.87	0.57
2:N:42:ASN:OD1	2:N:76:ASP:HA	2.03	0.57
1:I:230:LEU:HD22	1:I:243:LYS:HE3	1.86	0.56
2:B:97[B]:ARG:HD2	2:B:97[B]:ARG:H	1.70	0.55
1:I:121:LYS:HB3	2:J:1:ILE:HD13	1.89	0.55
2:J:0:MET:SD	2:J:0:MET:N	2.75	0.55
1:M:178:THR:O	1:M:181:ARG:HG2	2.07	0.53
2:N:19:LYS:O	2:N:72:PRO:HD2	2.09	0.53
1:I:35:ARG:HD2	1:I:48:ARG:HD2	1.91	0.52
1:M:117:ALA:HB2	2:N:60:TRP:CE2	2.44	0.52
1:M:73:THR:HG23	3:O:8:LEU:HD23	1.91	0.52
1:I:117:ALA:HB2	2:J:60:TRP:CE2	2.45	0.51
1:E:176:LYS:HG3	1:E:180:GLN:OE1	2.09	0.51
1:I:119:ASP:HB3	2:J:0:MET:HB3	1.93	0.51
1:E:73:THR:HG23	3:G:8:LEU:HD23	1.93	0.51
1:M:214:THR:HB	1:M:262:GLN:HB2	1.91	0.50
1:A:73:THR:HG23	3:C:8:LEU:HD23	1.93	0.50
2:B:73:THR:O	2:B:97[A]:ARG:NH2	2.44	0.50
2:F:43:GLY:HA2	4:F:101:EDO:H11	1.92	0.50
1:I:178:THR:O	1:I:181:ARG:HG2	2.11	0.50
1:I:14:ARG:H	4:I:302:EDO:H12	1.76	0.50
1:M:98:MET:HE1	1:M:113:TYR:HB2	1.94	0.49
4:A:301:EDO:H11	3:K:5:ARG:HD2	1.95	0.49
1:I:28:VAL:HG11	1:I:179:LEU:HD13	1.95	0.49
1:A:178:THR:O	1:A:181:ARG:HG2	2.13	0.48

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:16:GLU:OE1	2:J:19:LYS:HE3	2.12	0.48
1:A:234:ARG:HH21	4:B:102:EDO:H22	1.78	0.48
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.49	0.48
1:A:114:HIS:CE1	3:C:3:GLN:HE22	2.32	0.48
1:I:6:ARG:HD2	1:I:98:MET:HE1	1.95	0.48
1:E:178:THR:O	1:E:181:ARG:HG2	2.14	0.47
1:A:261:VAL:HB	1:A:270:LEU:HB2	1.96	0.47
1:A:86:ASN:ND2	2:F:45:ARG:HB3	2.29	0.47
2:N:23:LEU:O	2:N:67:TYR:HA	2.15	0.46
1:M:109:PHE:HB2	1:M:165:VAL:HG21	1.97	0.45
1:A:23:ILE:HD13	1:A:37:ASP:HA	1.99	0.45
1:E:74:HIS:NE2	1:E:97:ARG:HD3	2.31	0.45
1:M:131:ARG:HH11	1:M:157:ARG:HH12	1.64	0.45
4:E:301:EDO:H12	3:G:7:PHE:HB3	1.98	0.45
1:I:106:ASP:OD2	1:I:108:ARG:HD2	2.17	0.45
1:A:21:ARG:NH2	1:A:23:ILE:HD11	2.31	0.45
1:A:255[B]:GLN:H	1:A:255[B]:GLN:CD	2.25	0.44
3:C:5:ARG:HB2	4:C:101:EDO:H22	1.99	0.44
2:F:17:ASN:ND2	2:F:74:GLU:HG3	2.32	0.44
2:J:10:TYR:HB2	4:J:101:EDO:H12	2.00	0.43
1:E:117:ALA:HB2	2:F:60:TRP:CE2	2.54	0.43
1:E:9:PHE:HB2	1:E:97:ARG:HG2	2.00	0.43
1:I:118:TYR:O	1:I:121:LYS:HG2	2.18	0.43
1:M:13:SER:HB2	1:M:93:HIS:H	1.82	0.43
2:F:23:LEU:O	2:F:67:TYR:HA	2.19	0.43
1:A:82:ARG:HD2	1:A:89:GLU:HA	2.00	0.43
2:B:19:LYS:O	2:B:72:PRO:HD2	2.19	0.43
1:A:111:ARG:HD3	1:A:128:GLU:HG3	2.01	0.42
2:F:43:GLY:H	4:F:101:EDO:H22	1.84	0.42
1:I:73:THR:HG23	3:K:8:LEU:HD23	2.02	0.42
1:I:14:ARG:H	4:I:302:EDO:C1	2.33	0.42
1:E:146:LYS:HE2	4:E:301:EDO:H21	2.01	0.42
2:J:41:LYS:NZ	2:J:78:TYR:OH	2.54	0.41
2:B:4:THR:HG22	2:B:5:PRO:HD2	2.02	0.41
1:I:117:ALA:HB2	2:J:60:TRP:CD2	2.56	0.41
2:J:39:LEU:HD12	2:J:68:THR:HG23	2.02	0.41
1:M:118:TYR:O	1:M:121:LYS:HG2	2.21	0.41
1:E:19:GLU:CG	1:E:75:ARG:HH12	2.34	0.41
1:A:23:ILE:HD11	1:A:37:ASP:OD1	2.21	0.41
1:I:146:LYS:HE2	4:I:303:EDO:C2	2.50	0.40
1:M:71:SER:O	1:M:75:ARG:HG3	2.22	0.40

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:J:48:LYS:HE3	2:J:48:LYS:HB3	1.97	0.40
1:M:76:VAL:HB	3:O:8:LEU:HD22	2.04	0.40
1:M:35:ARG:CZ	1:M:46:GLU:OE1	2.69	0.40
1:E:33:PHE:CD2	1:E:34:VAL:HG13	2.56	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	276/278 (99%)	265 (96%)	11 (4%)	0	100	100
1	E	275/278 (99%)	267 (97%)	8 (3%)	0	100	100
1	I	274/278 (99%)	265 (97%)	9 (3%)	0	100	100
1	M	275/278 (99%)	265 (96%)	10 (4%)	0	100	100
2	B	98/100 (98%)	97 (99%)	1 (1%)	0	100	100
2	F	98/100 (98%)	97 (99%)	1 (1%)	0	100	100
2	J	98/100 (98%)	96 (98%)	2 (2%)	0	100	100
2	N	99/100 (99%)	96 (97%)	3 (3%)	0	100	100
3	C	7/9 (78%)	7 (100%)	0	0	100	100
3	G	7/9 (78%)	7 (100%)	0	0	100	100
3	K	7/9 (78%)	7 (100%)	0	0	100	100
3	O	7/9 (78%)	7 (100%)	0	0	100	100
All	All	1521/1548 (98%)	1476 (97%)	45 (3%)	0	100	100

There are no Ramachandran outliers to report.

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	230/234 (98%)	229 (100%)	1 (0%)	84	92
1	E	231/234 (99%)	226 (98%)	5 (2%)	45	65
1	I	229/234 (98%)	227 (99%)	2 (1%)	70	84
1	M	230/234 (98%)	229 (100%)	1 (0%)	84	92
2	B	95/95 (100%)	93 (98%)	2 (2%)	47	66
2	F	94/95 (99%)	92 (98%)	2 (2%)	47	66
2	J	94/95 (99%)	92 (98%)	2 (2%)	47	66
2	N	93/95 (98%)	93 (100%)	0	100	100
3	C	9/9 (100%)	9 (100%)	0	100	100
3	G	9/9 (100%)	9 (100%)	0	100	100
3	K	9/9 (100%)	9 (100%)	0	100	100
3	O	9/9 (100%)	9 (100%)	0	100	100
All	All	1332/1352 (98%)	1317 (99%)	15 (1%)	65	81

All (15) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	121	LYS
2	B	4	THR
2	B	89	GLN
1	E	19	GLU
1	E	35	ARG
1	E	98	MET
1	E	131	ARG
1	E	138	MET
2	F	0	MET
2	F	1	ILE
1	I	17	ARG
1	I	275	GLU
2	J	50	GLU
2	J	71	THR

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	M	255	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (11) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	141	GLN
1	A	180	GLN
2	B	13	HIS
3	C	3	GLN
1	E	114	HIS
1	E	141	GLN
2	F	13	HIS
3	G	3	GLN
1	I	155	GLN
2	J	13	HIS
2	N	13	HIS

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

17 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. 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 $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
4	EDO	J	101	-	3,3,3	0.43	0	2,2,2	0.31	0
4	EDO	N	101	-	3,3,3	0.43	0	2,2,2	0.41	0
4	EDO	F	102	-	3,3,3	0.46	0	2,2,2	0.25	0
4	EDO	B	102	-	3,3,3	0.45	0	2,2,2	0.27	0
4	EDO	I	302	-	3,3,3	0.40	0	2,2,2	0.40	0
4	EDO	M	301	-	3,3,3	0.43	0	2,2,2	0.42	0
4	EDO	O	101	-	3,3,3	0.37	0	2,2,2	0.45	0
4	EDO	B	101	-	3,3,3	0.36	0	2,2,2	0.46	0
4	EDO	A	301	-	3,3,3	0.34	0	2,2,2	0.39	0
4	EDO	O	102	-	3,3,3	0.39	0	2,2,2	0.37	0
4	EDO	I	303	-	3,3,3	0.38	0	2,2,2	0.34	0
4	EDO	F	101	-	3,3,3	0.35	0	2,2,2	0.41	0
4	EDO	G	101	-	3,3,3	0.46	0	2,2,2	0.17	0
4	EDO	E	301	-	3,3,3	0.36	0	2,2,2	0.52	0
4	EDO	I	301	-	3,3,3	0.42	0	2,2,2	0.42	0
4	EDO	K	101	-	3,3,3	0.39	0	2,2,2	0.45	0
4	EDO	C	101	-	3,3,3	0.42	0	2,2,2	0.42	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	EDO	J	101	-	-	0/1/1/1	-
4	EDO	N	101	-	-	0/1/1/1	-
4	EDO	F	102	-	-	0/1/1/1	-
4	EDO	B	102	-	-	0/1/1/1	-
4	EDO	I	302	-	-	0/1/1/1	-
4	EDO	M	301	-	-	0/1/1/1	-
4	EDO	O	101	-	-	0/1/1/1	-
4	EDO	B	101	-	-	0/1/1/1	-
4	EDO	A	301	-	-	0/1/1/1	-
4	EDO	O	102	-	-	1/1/1/1	-
4	EDO	I	303	-	-	0/1/1/1	-
4	EDO	F	101	-	-	0/1/1/1	-
4	EDO	G	101	-	-	1/1/1/1	-
4	EDO	E	301	-	-	0/1/1/1	-
4	EDO	I	301	-	-	0/1/1/1	-
4	EDO	K	101	-	-	0/1/1/1	-
4	EDO	C	101	-	-	1/1/1/1	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	G	101	EDO	O1-C1-C2-O2
4	O	102	EDO	O1-C1-C2-O2
4	C	101	EDO	O1-C1-C2-O2

There are no ring outliers.

9 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	J	101	EDO	2	0
4	B	102	EDO	1	0
4	I	302	EDO	2	0
4	A	301	EDO	1	0
4	O	102	EDO	1	0
4	I	303	EDO	2	0
4	F	101	EDO	2	0
4	E	301	EDO	2	0
4	C	101	EDO	1	0

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

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	275/278 (98%)	0.28	11 (4%) 42 44	30, 57, 90, 109	3 (1%)
1	E	276/278 (99%)	0.18	2 (0%) 84 85	35, 57, 80, 113	1 (0%)
1	I	276/278 (99%)	0.30	8 (2%) 53 56	40, 60, 96, 155	0
1	M	276/278 (99%)	0.36	13 (4%) 36 38	29, 63, 97, 160	1 (0%)
2	B	99/100 (99%)	0.22	2 (2%) 65 66	43, 58, 93, 115	1 (1%)
2	F	100/100 (100%)	0.12	2 (2%) 65 66	40, 54, 87, 103	0
2	J	100/100 (100%)	0.72	11 (11%) 10 11	44, 82, 136, 175	0
2	N	100/100 (100%)	0.72	5 (5%) 34 35	46, 83, 126, 143	1 (1%)
3	C	9/9 (100%)	-0.09	0 100 100	43, 48, 53, 54	0
3	G	9/9 (100%)	0.12	0 100 100	51, 56, 59, 64	0
3	K	9/9 (100%)	-0.40	0 100 100	44, 50, 51, 53	0
3	O	9/9 (100%)	0.45	0 100 100	51, 53, 56, 62	0
All	All	1538/1548 (99%)	0.32	54 (3%) 47 49	29, 60, 101, 175	7 (0%)

All (54) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	I	276	PRO	4.5
1	A	40	ALA	4.2
1	I	90	ALA	4.1
1	M	276	PRO	4.1
1	M	18	GLY	4.0
1	A	41	ALA	3.8
2	B	1	ILE	3.6
1	A	275	GLU	3.5
1	I	89	GLU	3.4
2	J	0	MET	3.4
2	J	1	ILE	3.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	M	275	GLU	3.3
1	A	44[A]	ARG	3.2
2	N	18	GLY	3.1
2	J	75	LYS	3.0
1	I	194	VAL	3.0
2	N	43	GLY	3.0
1	A	194	VAL	2.9
1	M	194	VAL	2.9
1	M	15	PRO	2.9
2	J	73	THR	2.9
2	J	92	ILE	2.8
1	A	42	SER	2.8
1	M	267	PRO	2.8
2	N	49	VAL	2.6
1	M	274	TRP	2.5
1	E	276	PRO	2.5
2	J	43	GLY	2.5
2	J	78	TYR	2.5
1	A	105	SER	2.4
1	M	17	ARG	2.4
2	J	99	MET	2.4
2	J	90	PRO	2.3
1	M	16	GLY	2.3
2	N	79	ALA	2.3
1	I	273	ARG	2.3
1	I	221	GLY	2.3
1	A	90	ALA	2.3
2	F	1	ILE	2.2
2	J	49	VAL	2.2
1	A	39	ASP	2.2
1	A	43	GLN	2.2
2	B	99	MET	2.2
1	M	89	GLU	2.2
1	M	1	GLY	2.1
2	F	0	MET	2.1
2	J	48	LYS	2.1
1	M	197	HIS	2.1
1	A	252	GLY	2.1
1	I	87	GLN	2.1
2	N	1	ILE	2.1
1	E	194	VAL	2.1
1	M	268	LYS	2.0

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	I	275	GLU	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 oligosaccharides 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, 95th 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 ²)	Q<0.9
4	EDO	N	101	4/4	0.83	0.15	66,69,71,83	0
4	EDO	J	101	4/4	0.84	0.13	70,71,73,81	0
4	EDO	E	301	4/4	0.85	0.19	35,55,58,69	0
4	EDO	M	301	4/4	0.87	0.12	55,59,62,64	0
4	EDO	I	302	4/4	0.88	0.17	51,59,60,68	0
4	EDO	B	101	4/4	0.89	0.17	56,59,63,64	0
4	EDO	I	301	4/4	0.89	0.12	52,57,59,72	0
4	EDO	G	101	4/4	0.91	0.13	44,54,59,59	0
4	EDO	C	101	4/4	0.91	0.13	40,43,54,55	0
4	EDO	O	101	4/4	0.91	0.12	35,50,52,55	0
4	EDO	F	101	4/4	0.92	0.16	47,55,57,64	0
4	EDO	I	303	4/4	0.92	0.12	32,35,44,46	0
4	EDO	F	102	4/4	0.92	0.10	52,55,56,63	0
4	EDO	K	101	4/4	0.93	0.12	48,49,55,55	0
4	EDO	O	102	4/4	0.93	0.11	42,46,48,51	0
4	EDO	B	102	4/4	0.95	0.09	49,51,60,62	0
4	EDO	A	301	4/4	0.96	0.12	35,44,47,50	0

6.5 Other polymers [i](#)

There are no such residues in this entry.