



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 6, 2023 – 01:26 AM EST

PDB ID : 6V19
Title : immune receptor complex
Authors : Lim, J.J.; Rossjohn, J.
Deposited on : 2019-11-20
Resolution : 2.60 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 : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtrriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

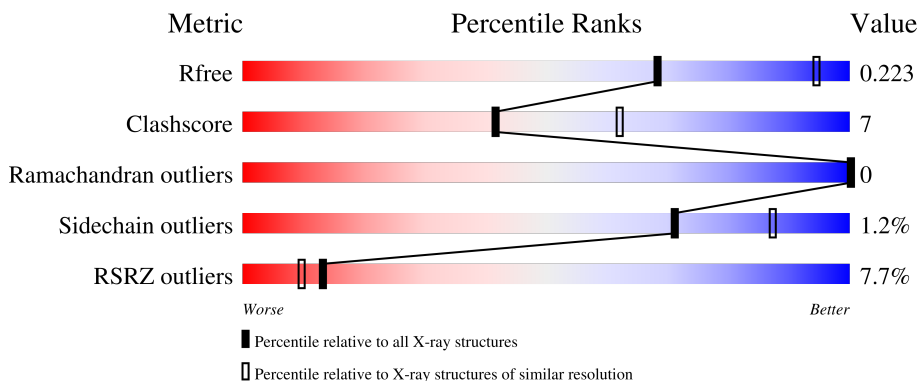
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.60 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}	130704	3163 (2.60-2.60)
Clashscore	141614	3518 (2.60-2.60)
Ramachandran outliers	138981	3455 (2.60-2.60)
Sidechain outliers	138945	3455 (2.60-2.60)
RSRZ outliers	127900	3104 (2.60-2.60)

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	189	 8% 73% 21% 6%
2	B	198	 21% 72% 18% 10%
3	C	13	 77% 23%
4	D	209	 3% 86% 12%
5	E	242	 87% 13%

2 Entry composition

There are 8 unique types of molecules in this entry. The entry contains 6521 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 HLA class II histocompatibility antigen, DR alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	177	1402	912	232	253	5	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	182	THR	-	expression tag	UNP P01903
A	183	SER	-	expression tag	UNP P01903
A	184	GLY	-	expression tag	UNP P01903
A	185	ASP	-	expression tag	UNP P01903
A	186	ASP	-	expression tag	UNP P01903
A	187	ASP	-	expression tag	UNP P01903
A	188	ASP	-	expression tag	UNP P01903
A	189	LYS	-	expression tag	UNP P01903

- Molecule 2 is a protein called HLA class II histocompatibility antigen, DRB1-4 beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	178	1401	885	247	265	4	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	191	THR	-	expression tag	UNP P13760
B	192	GLY	-	expression tag	UNP P13760
B	193	GLY	-	expression tag	UNP P13760
B	194	ASP	-	expression tag	UNP P13760
B	195	ASP	-	expression tag	UNP P13760
B	196	ASP	-	expression tag	UNP P13760
B	197	ASP	-	expression tag	UNP P13760
B	198	LYS	-	expression tag	UNP P13760

- Molecule 3 is a protein called Fibrinogen beta 72,74cit69-81.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	13	89	55	18	16	0	0	0

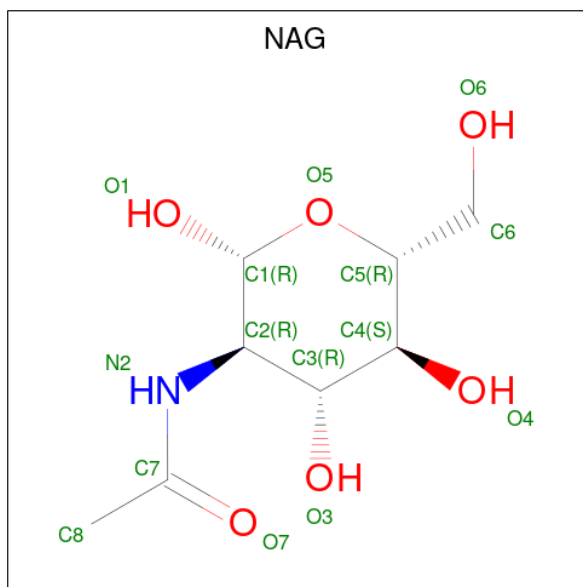
- Molecule 4 is a protein called M134 TCR alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	205	1573	987	254	325	7	0	0	0

- Molecule 5 is a protein called M134 TCR beta chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
5	E	242	1922	1221	336	358	7	0	0	0

- Molecule 6 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
			Total	C	N	O		
6	A	1	14	8	1	5	0	0

- Molecule 7 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
7	A	1	Total C O 6 3 3	0	0
7	B	1	Total C O 6 3 3	0	0
7	D	1	Total C O 6 3 3	0	0
7	D	1	Total C O 6 3 3	0	0
7	D	1	Total C O 6 3 3	0	0
7	D	1	Total C O 6 3 3	0	0
7	E	1	Total C O 6 3 3	0	0
7	E	1	Total C O 6 3 3	0	0
7	E	1	Total C O 6 3 3	0	0

- Molecule 8 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
8	A	1	Total O 1 1	0	0
8	B	12	Total O 12 12	0	0
8	C	2	Total O 2 2	0	0

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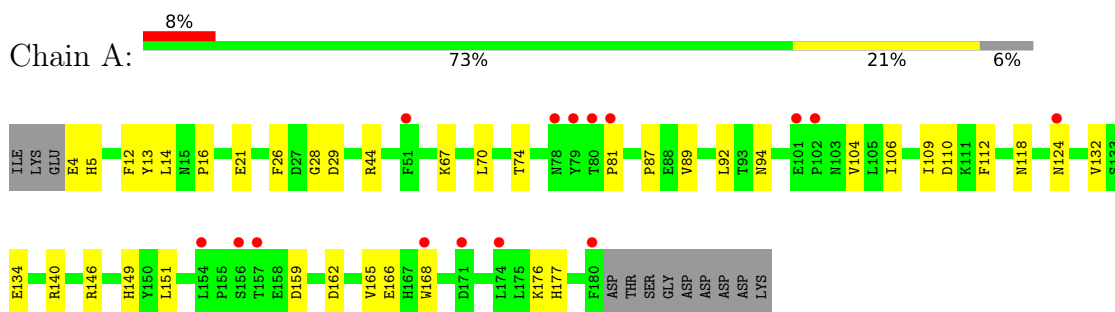
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	D	25	Total	O	0	0
			25	25		
8	E	26	Total	O	0	0
			26	26		

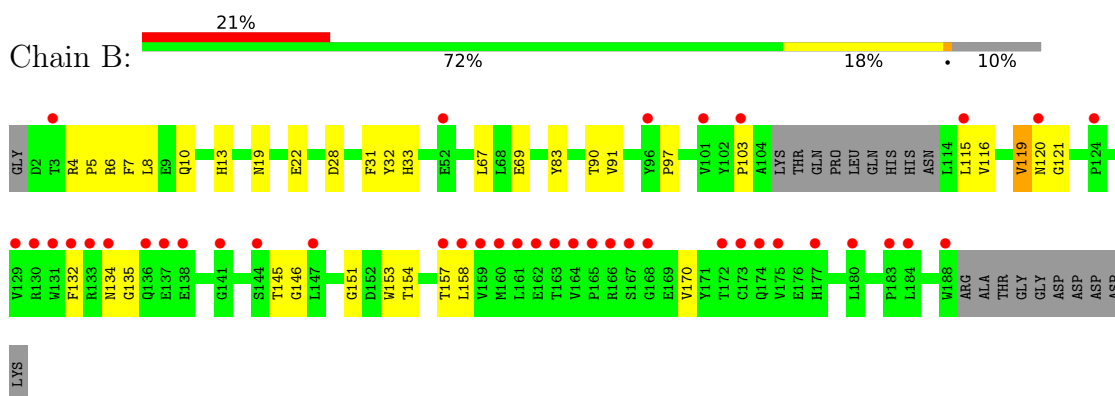
3 Residue-property plots [i](#)

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.

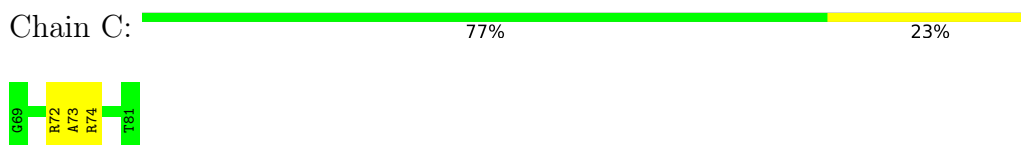
- Molecule 1: HLA class II histocompatibility antigen, DR alpha chain



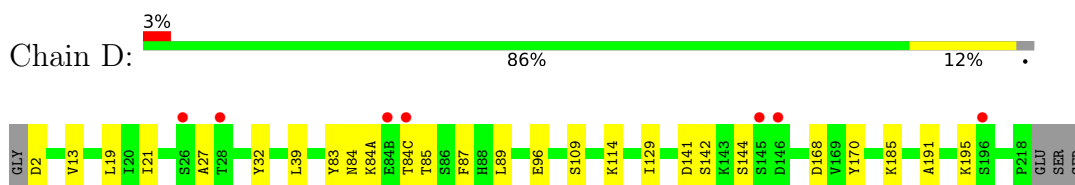
- Molecule 2: HLA class II histocompatibility antigen, DRB1-4 beta chain




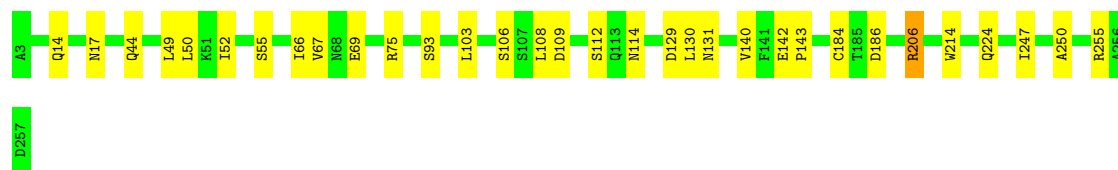
- Molecule 3: Fibrinogen beta 72,74cit69-81



- Molecule 4: M134 TCR alpha chain



● Molecule 5: M134 TCR beta chain

Chain E:  87% 13%

4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	149.46Å 56.85Å 129.76Å 90.00° 91.52° 90.00°	Depositor
Resolution (Å)	49.00 – 2.60 49.01 – 2.60	Depositor EDS
% Data completeness (in resolution range)	99.9 (49.00-2.60) 99.9 (49.01-2.60)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.21 (at 2.61Å)	Xtrriage
Refinement program	PHENIX 1.10.1_2155	Depositor
R, R_{free}	0.202 , 0.224 0.202 , 0.223	Depositor DCC
R_{free} test set	1652 reflections (4.87%)	wwPDB-VP
Wilson B-factor (Å ²)	47.9	Xtrriage
Anisotropy	0.539	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.36 , 49.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtrriage
Estimated twinning fraction	0.021 for -h,-k,l	Xtrriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	6521	wwPDB-VP
Average B, all atoms (Å ²)	60.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.39% 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: NAG, GOL, CIR

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	0.26	0/1447	0.45	0/1981
2	B	0.28	0/1438	0.49	0/1960
3	C	0.70	0/66	0.79	0/85
4	D	0.29	0/1606	0.53	0/2182
5	E	0.28	0/1975	0.48	0/2692
All	All	0.29	0/6532	0.49	0/8900

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
3	C	0	1

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
3	C	73	ALA	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	1402	0	1306	30	0
2	B	1401	0	1248	31	0
3	C	89	0	80	0	0
4	D	1573	0	1495	15	0
5	E	1922	0	1834	20	0
6	A	14	0	13	1	0
7	A	6	0	8	1	0
7	B	6	0	8	1	0
7	D	24	0	30	2	0
7	E	18	0	24	1	0
8	A	1	0	0	0	0
8	B	12	0	0	0	0
8	C	2	0	0	0	0
8	D	25	0	0	0	0
8	E	26	0	0	0	0
All	All	6521	0	6046	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 7.

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)
2:B:7:PHE:HA	2:B:33:HIS:HE1	1.11	1.12
2:B:7:PHE:HA	2:B:33:HIS:CE1	2.03	0.93
5:E:55:SER:HB3	5:E:67:VAL:HB	1.58	0.84
1:A:118:ASN:HB2	1:A:166:GLU:HB2	1.62	0.80
5:E:67:VAL:HA	7:E:501:GOL:H2	1.61	0.80
2:B:145:THR:HG21	2:B:158:LEU:H	1.49	0.78
1:A:162:ASP:OD1	1:A:177:HIS:ND1	2.18	0.75
1:A:89:VAL:HG23	1:A:176:LYS:HG3	1.70	0.73
1:A:87:PRO:HB3	1:A:112:PHE:HB3	1.71	0.70
2:B:10:GLN:HB2	2:B:31:PHE:HB2	1.78	0.64
2:B:97:PRO:HB3	2:B:119:VAL:HG23	1.79	0.63
2:B:103:PRO:HA	2:B:115:LEU:HA	1.82	0.62
2:B:13:HIS:ND1	2:B:28:ASP:OD1	2.31	0.62
1:A:81:PRO:HB3	2:B:5:PRO:HB2	1.83	0.60
2:B:134:ASN:OD1	2:B:135:GLY:N	2.34	0.59
5:E:186:ASP:OD1	5:E:206:ARG:NH1	2.28	0.59
1:A:124:ASN:ND2	1:A:159:ASP:OD1	2.35	0.59
4:D:13:VAL:HG21	4:D:19:LEU:HD13	1.86	0.57
2:B:145:THR:HG23	2:B:146:GLY:O	2.04	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:16:PRO:HD2	2:B:6:ARG:HD3	1.87	0.57
4:D:2:ASP:HA	4:D:27:ALA:HA	1.88	0.56
1:A:4:GLU:HG2	1:A:5:HIS:CD2	2.40	0.55
1:A:70:LEU:O	1:A:74:THR:HG23	2.06	0.55
2:B:119:VAL:HG13	2:B:157:THR:HG23	1.88	0.55
5:E:75:ARG:HD2	5:E:93:SER:O	2.08	0.54
2:B:132:PHE:HB3	2:B:134:ASN:O	2.07	0.54
4:D:39:LEU:HD13	4:D:87:PHE:HB2	1.89	0.54
1:A:132:VAL:HG22	1:A:151:LEU:HD13	1.91	0.53
2:B:119:VAL:O	2:B:119:VAL:HG22	2.09	0.52
4:D:129:ILE:HG23	7:D:303:GOL:H11	1.92	0.52
2:B:145:THR:CG2	2:B:158:LEU:H	2.22	0.51
1:A:16:PRO:HD2	2:B:6:ARG:HH11	1.76	0.51
7:B:300:GOL:O3	7:B:300:GOL:O1	2.28	0.50
1:A:110:ASP:OD1	1:A:140:ARG:NH1	2.43	0.50
5:E:52:ILE:HG23	5:E:69:GLU:HG3	1.93	0.49
5:E:109:ASP:OD1	5:E:114:ASN:ND2	2.43	0.49
1:A:12:PHE:CE2	1:A:21:GLU:HB3	2.48	0.49
1:A:28:GLY:HA2	7:A:202:GOL:O2	2.13	0.48
2:B:8:LEU:H	2:B:33:HIS:CE1	2.32	0.48
4:D:141:ASP:OD1	4:D:142:SER:N	2.47	0.47
4:D:96:GLU:OE1	4:D:185:LYS:NZ	2.23	0.47
1:A:89:VAL:HG12	1:A:109:ILE:HG23	1.95	0.47
1:A:134:GLU:HB2	1:A:149:HIS:CE1	2.50	0.47
1:A:168:TRP:CD1	6:A:201:NAG:H83	2.50	0.46
1:A:109:ILE:HD12	1:A:165:VAL:HG21	1.97	0.46
2:B:4:ARG:HB2	2:B:6:ARG:HH12	1.80	0.46
5:E:143:PRO:HD2	5:E:214:TRP:CZ2	2.50	0.46
1:A:5:HIS:NE2	2:B:91:VAL:HG13	2.31	0.46
1:A:26:PHE:CZ	2:B:90:THR:HB	2.51	0.46
2:B:32:TYR:CZ	2:B:33:HIS:CD2	3.03	0.46
2:B:69:GLU:OE2	2:B:69:GLU:N	2.30	0.45
2:B:116:VAL:HG21	2:B:158:LEU:HD23	1.99	0.45
4:D:114:LYS:HG3	5:E:52:ILE:HG21	1.98	0.45
1:A:29:ASP:OD2	2:B:153:TRP:HA	2.16	0.45
5:E:14:GLN:HB2	5:E:130:LEU:HG	1.99	0.44
2:B:67:LEU:HA	5:E:108:LEU:HD21	1.99	0.44
5:E:129:ASP:OD1	5:E:131:ASN:ND2	2.51	0.44
1:A:14:LEU:HD11	2:B:6:ARG:HB3	1.99	0.44
1:A:94:ASN:HB2	1:A:104:VAL:HG23	1.99	0.44
1:A:92:LEU:HB2	1:A:106:ILE:HB	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
5:E:142:GLU:OE1	5:E:255:ARG:HD2	2.17	0.44
1:A:89:VAL:O	1:A:176:LYS:HE3	2.18	0.43
2:B:4:ARG:HB2	2:B:6:ARG:NH1	2.33	0.43
7:D:303:GOL:O3	7:D:303:GOL:O1	2.32	0.43
5:E:44:GLN:HA	5:E:49:LEU:O	2.18	0.43
4:D:168:ASP:HB2	4:D:195:LYS:NZ	2.34	0.43
5:E:17:ASN:O	5:E:93:SER:HA	2.19	0.43
1:A:146:ARG:HE	1:A:146:ARG:HB2	1.69	0.42
5:E:66:ILE:HG13	5:E:67:VAL:HG23	2.00	0.42
1:A:44:ARG:NH2	2:B:151:GLY:O	2.53	0.42
2:B:83:TYR:CZ	2:B:91:VAL:HG21	2.54	0.42
4:D:170:TYR:O	4:D:191:ALA:HA	2.20	0.42
4:D:141:ASP:HB3	4:D:144:SER:O	2.19	0.42
4:D:21:ILE:HB	4:D:89:LEU:HB3	2.02	0.42
4:D:32:TYR:O	4:D:109:SER:OG	2.32	0.41
5:E:50:LEU:HD11	5:E:103:LEU:HD12	2.02	0.41
4:D:84:ASN:ND2	4:D:84(C):THR:OG1	2.54	0.41
5:E:224:GLN:HG3	5:E:247:ILE:HG23	2.02	0.41
1:A:13:TYR:CZ	1:A:67:LYS:HD2	2.56	0.41
5:E:50:LEU:HD12	5:E:50:LEU:HA	1.91	0.41
4:D:85:THR:HG23	4:D:85:THR:O	2.20	0.41
4:D:109:SER:HA	5:E:112:SER:OG	2.21	0.41
1:A:92:LEU:N	1:A:106:ILE:O	2.45	0.41
5:E:140:VAL:HG23	5:E:250:ALA:HB3	2.01	0.41
2:B:19:ASN:ND2	2:B:22:GLU:OE2	2.46	0.40
1:A:89:VAL:HG11	1:A:165:VAL:HG21	2.04	0.40
2:B:121:GLY:HA2	2:B:154:THR:HB	2.04	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	175/189 (93%)	169 (97%)	6 (3%)	0	100	100
2	B	174/198 (88%)	165 (95%)	9 (5%)	0	100	100
3	C	9/13 (69%)	9 (100%)	0	0	100	100
4	D	203/209 (97%)	194 (96%)	9 (4%)	0	100	100
5	E	240/242 (99%)	236 (98%)	4 (2%)	0	100	100
All	All	801/851 (94%)	773 (96%)	28 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	148/173 (86%)	148 (100%)	0	100	100
2	B	141/177 (80%)	138 (98%)	3 (2%)	53	77
3	C	4/4 (100%)	4 (100%)	0	100	100
4	D	182/187 (97%)	180 (99%)	2 (1%)	73	88
5	E	209/216 (97%)	206 (99%)	3 (1%)	67	85
All	All	684/757 (90%)	676 (99%)	8 (1%)	71	87

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

Mol	Chain	Res	Type
2	B	119	VAL
2	B	120	ASN
2	B	170	VAL
4	D	83	TYR
4	D	84(A)	LYS
5	E	106	SER
5	E	184	CYS
5	E	206	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such

sidechains are listed below:

Mol	Chain	Res	Type
2	B	33	HIS
4	D	84	ASN
5	E	14	GLN
5	E	131	ASN
5	E	238	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](#)

2 non-standard protein/DNA/RNA residues 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	$\# Z > 2$
3	CIR	C	74	3	9,10,11	1.81	2 (22%)	6,11,13	1.79	2 (33%)
3	CIR	C	72	3	9,10,11	1.88	2 (22%)	6,11,13	1.40	1 (16%)

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
3	CIR	C	74	3	-	6/8/9/11	-
3	CIR	C	72	3	-	3/8/9/11	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	74	CIR	O7-C7	-3.76	1.18	1.24

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	72	CIR	C7-N6	-3.43	1.30	1.34
3	C	72	CIR	O7-C7	-3.34	1.19	1.24
3	C	74	CIR	C7-N6	-3.00	1.31	1.34

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	74	CIR	N8-C7-N6	3.15	120.17	116.85
3	C	74	CIR	O7-C7-N8	-2.89	118.26	123.22
3	C	72	CIR	C5-N6-C7	-2.51	119.75	122.73

There are no chirality outliers.

All (9) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	C	72	CIR	O7-C7-N6-C5
3	C	72	CIR	N8-C7-N6-C5
3	C	74	CIR	O7-C7-N6-C5
3	C	74	CIR	N8-C7-N6-C5
3	C	72	CIR	C3-C4-C5-N6
3	C	74	CIR	C3-C4-C5-N6
3	C	74	CIR	CA-C3-C4-C5
3	C	74	CIR	C4-C3-CA-N
3	C	74	CIR	C4-C3-CA-C

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

10 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
7	GOL	D	301	-	5,5,5	0.41	0	5,5,5	0.27	0
6	NAG	A	201	1	14,14,15	0.39	0	17,19,21	0.53	0
7	GOL	E	501	-	5,5,5	0.44	0	5,5,5	0.36	0
7	GOL	E	502	-	5,5,5	0.39	0	5,5,5	0.36	0
7	GOL	D	304	-	5,5,5	0.38	0	5,5,5	0.20	0
7	GOL	E	503	-	5,5,5	0.39	0	5,5,5	0.37	0
7	GOL	D	302	-	5,5,5	0.41	0	5,5,5	0.46	0
7	GOL	B	300	-	5,5,5	0.39	0	5,5,5	0.27	0
7	GOL	D	303	-	5,5,5	0.40	0	5,5,5	0.28	0
7	GOL	A	202	-	5,5,5	0.40	0	5,5,5	0.35	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
7	GOL	D	301	-	-	2/4/4/4	-
6	NAG	A	201	1	-	1/6/23/26	0/1/1/1
7	GOL	E	501	-	-	4/4/4/4	-
7	GOL	E	502	-	-	2/4/4/4	-
7	GOL	D	304	-	-	4/4/4/4	-
7	GOL	E	503	-	-	0/4/4/4	-
7	GOL	D	302	-	-	4/4/4/4	-
7	GOL	B	300	-	-	2/4/4/4	-
7	GOL	D	303	-	-	4/4/4/4	-
7	GOL	A	202	-	-	0/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
7	D	301	GOL	C1-C2-C3-O3

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Mol	Chain	Res	Type	Atoms
7	D	302	GOL	C1-C2-C3-O3
7	E	501	GOL	C1-C2-C3-O3
7	E	502	GOL	O1-C1-C2-C3
7	D	304	GOL	O2-C2-C3-O3
6	A	201	NAG	O5-C5-C6-O6
7	B	300	GOL	O1-C1-C2-C3
7	D	303	GOL	O1-C1-C2-C3
7	D	303	GOL	C1-C2-C3-O3
7	D	304	GOL	O1-C1-C2-C3
7	D	304	GOL	C1-C2-C3-O3
7	E	501	GOL	O1-C1-C2-C3
7	B	300	GOL	O1-C1-C2-O2
7	D	301	GOL	O2-C2-C3-O3
7	D	302	GOL	O2-C2-C3-O3
7	D	303	GOL	O2-C2-C3-O3
7	D	304	GOL	O1-C1-C2-O2
7	E	501	GOL	O2-C2-C3-O3
7	E	501	GOL	O1-C1-C2-O2
7	E	502	GOL	O1-C1-C2-O2
7	D	302	GOL	O1-C1-C2-O2
7	D	303	GOL	O1-C1-C2-O2
7	D	302	GOL	O1-C1-C2-C3

There are no ring outliers.

5 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	201	NAG	1	0
7	E	501	GOL	1	0
7	B	300	GOL	1	0
7	D	303	GOL	2	0
7	A	202	GOL	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 [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, 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	177/189 (93%)	0.58	15 (8%) 10 7	45, 75, 107, 115	0
2	B	178/198 (89%)	1.01	41 (23%) 0 0	41, 71, 126, 140	0
3	C	11/13 (84%)	0.32	0 100 100	47, 51, 57, 66	0
4	D	205/209 (98%)	0.32	7 (3%) 45 38	30, 45, 75, 112	0
5	E	242/242 (100%)	0.24	0 100 100	30, 42, 70, 85	0
All	All	813/851 (95%)	0.50	63 (7%) 13 10	30, 55, 107, 140	0

All (63) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	160	MET	7.1
2	B	136	GLN	5.2
2	B	131	TRP	4.8
4	D	146	ASP	4.7
2	B	133	ARG	4.6
2	B	141	GLY	4.5
2	B	101	VAL	4.3
2	B	180	LEU	4.2
1	A	102	PRO	4.2
1	A	168	TRP	3.9
2	B	163	THR	3.8
2	B	175	VAL	3.7
2	B	161	LEU	3.5
2	B	165	PRO	3.4
1	A	78	ASN	3.4
2	B	177	HIS	3.3
4	D	28	THR	3.2
2	B	159	VAL	3.2
1	A	79	TYR	3.2
2	B	167	SER	3.1

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Mol	Chain	Res	Type	RSRZ
1	A	156	SER	3.1
4	D	26	SER	3.0
2	B	172	THR	3.0
1	A	157	THR	3.0
2	B	132	PHE	3.0
2	B	164	VAL	2.8
2	B	130	ARG	2.8
2	B	3	THR	2.8
1	A	154	LEU	2.7
2	B	137	GLU	2.7
4	D	84(C)	THR	2.7
2	B	115	LEU	2.7
4	D	84(B)	GLU	2.6
1	A	80	THR	2.6
2	B	173	CYS	2.5
2	B	144	SER	2.5
2	B	188	TRP	2.5
2	B	168	GLY	2.4
1	A	124	ASN	2.4
1	A	180	PHE	2.4
2	B	184	LEU	2.4
1	A	81	PRO	2.3
2	B	134	ASN	2.3
2	B	96	TYR	2.3
2	B	138	GLU	2.3
2	B	158	LEU	2.2
2	B	166	ARG	2.2
4	D	145	SER	2.2
2	B	157	THR	2.2
2	B	120	ASN	2.1
1	A	171	ASP	2.1
1	A	51	PHE	2.1
2	B	162	GLU	2.1
1	A	174	LEU	2.1
2	B	147	LEU	2.1
2	B	174	GLN	2.1
1	A	101	GLU	2.1
4	D	196	SER	2.1
2	B	103	PRO	2.0
2	B	183	PRO	2.0
2	B	124	PRO	2.0
2	B	129	VAL	2.0

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Mol	Chain	Res	Type	RSRZ
2	B	52	GLU	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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
3	CIR	C	74	11/12	0.92	0.20	51,58,69,69	0
3	CIR	C	72	11/12	0.93	0.19	49,56,64,65	0

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, 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
7	GOL	E	501	6/6	0.65	0.23	70,76,78,88	0
6	NAG	A	201	14/15	0.78	0.30	97,118,124,124	0
7	GOL	D	304	6/6	0.83	0.31	71,79,84,92	0
7	GOL	D	303	6/6	0.83	0.30	78,81,88,95	0
7	GOL	D	301	6/6	0.84	0.21	60,63,72,81	0
7	GOL	B	300	6/6	0.86	0.28	81,85,89,93	0
7	GOL	E	502	6/6	0.86	0.32	81,94,98,102	0
7	GOL	D	302	6/6	0.89	0.24	76,78,79,79	0
7	GOL	E	503	6/6	0.89	0.30	72,77,83,91	0
7	GOL	A	202	6/6	0.91	0.24	87,88,89,91	0

6.5 Other polymers [i](#)

There are no such residues in this entry.