



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 5, 2026 – 09:53 PM UTC

PDB ID : 5C0A / pdb_00005c0a
Title : 1E6 TCR in complex with HLA-A02 carrying MVW peptide
Authors : Rizkallah, P.J.; Bulek, A.M.; Cole, D.K.; Sewell, A.K.
Deposited on : 2015-06-12
Resolution : 2.46 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	:	4-5-2 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

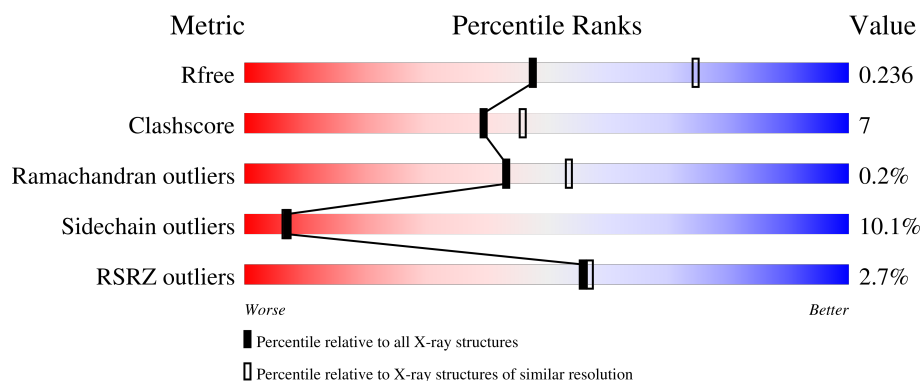
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.46 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.



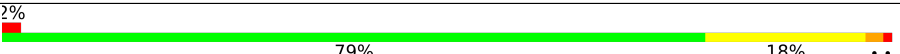
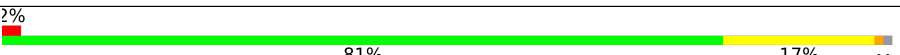
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	180053	1190 (2.46-2.46)
Clashscore	190562	1229 (2.46-2.46)
Ramachandran outliers	187476	1218 (2.46-2.46)
Sidechain outliers	187428	1218 (2.46-2.46)
RSRZ outliers	180081	1190 (2.46-2.46)

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	276	
1	F	276	
2	B	100	
2	G	100	
3	C	10	

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Mol	Chain	Length	Quality of chain
3	H	10	 70% 30%
4	D	197	 6% 81% 15% •
4	I	197	 8% 75% 19% 6% ••
5	E	246	 2% 79% 18% ••
5	J	246	 2% 81% 17% ••

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
6	EDO	A	302	-	-	X	-
6	EDO	J	303	-	-	X	-

2 Entry composition [i](#)

There are 9 unique types of molecules in this entry. The entry contains 13708 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 I histocompatibility antigen, A-2 alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	276	Total	C	N	O	S	0	0	0
			2254	1408	410	427	9			
1	F	276	Total	C	N	O	S	0	2	0
			2273	1419	415	430	9			

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

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			
2	G	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	0	MET	-	initiating methionine	UNP P61769
G	0	MET	-	initiating methionine	UNP P61769

- Molecule 3 is a protein called Marker peptide.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	10	Total	C	N	O	S	0	0	0
			83	57	11	14	1			
3	H	10	Total	C	N	O	S	0	0	0
			83	57	11	14	1			

- Molecule 4 is a protein called 1E6 TCR Alpha Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	D	197	Total	C	N	O	S	0	0	0
			1557	975	256	316	10			

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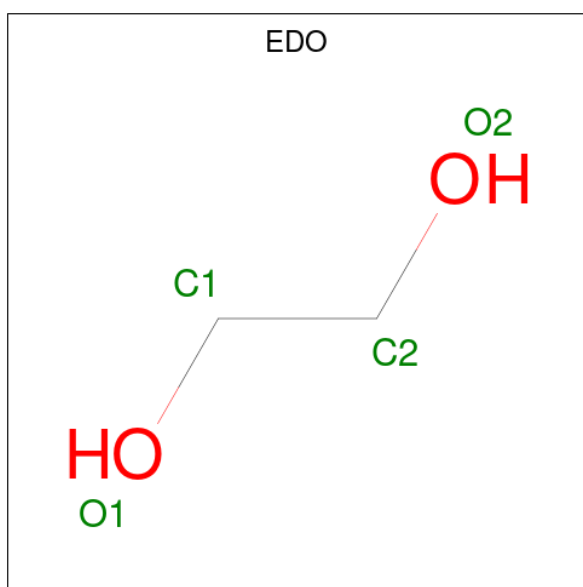
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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	I	197	Total	C	N	O	S	0	0	0
			1557	975	256	316	10			

- Molecule 5 is a protein called 1E6 TCR Beta Chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
5	E	246	Total	C	N	O	S	0	0	0
			1974	1249	341	374	10			
5	J	244	Total	C	N	O	S	0	0	0
			1961	1242	339	370	10			

- Molecule 6 is 1,2-ETHANEDIOL (CCD ID: EDO) (formula: C₂H₆O₂).



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

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	F	1	Total	C	O	0	0
			4	2	2		
6	F	1	Total	C	O	0	0
			4	2	2		
6	H	1	Total	C	O	0	0
			4	2	2		
6	H	1	Total	C	O	0	0
			4	2	2		
6	I	1	Total	C	O	0	0
			4	2	2		
6	J	1	Total	C	O	0	0
			4	2	2		
6	J	1	Total	C	O	0	0
			4	2	2		

- Molecule 7 is SULFATE ION (CCD ID: SO4) (formula: O₄S).



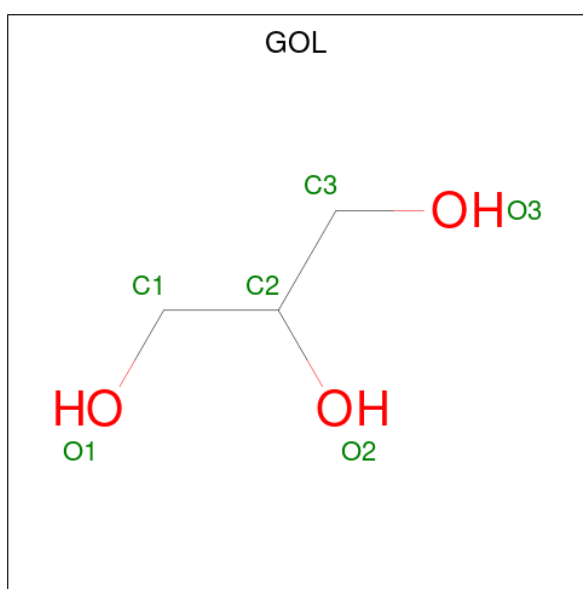
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	1	Total	O	S	0	0
			5	4	1		
7	D	1	Total	O	S	0	0
			5	4	1		
7	E	1	Total	O	S	0	0
			5	4	1		
7	E	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	E	1	Total	O	S	0	0
			5	4	1		
7	F	1	Total	O	S	0	0
			5	4	1		
7	G	1	Total	O	S	0	0
			5	4	1		
7	J	1	Total	O	S	0	0
			5	4	1		

- Molecule 8 is GLYCEROL (CCD ID: GOL) (formula: $C_3H_8O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	B	1	Total	C	O	0	0
			6	3	3		
8	F	1	Total	C	O	0	0
			6	3	3		
8	F	1	Total	C	O	0	0
			6	3	3		
8	G	1	Total	C	O	0	0
			6	3	3		
8	J	1	Total	C	O	0	0
			6	3	3		

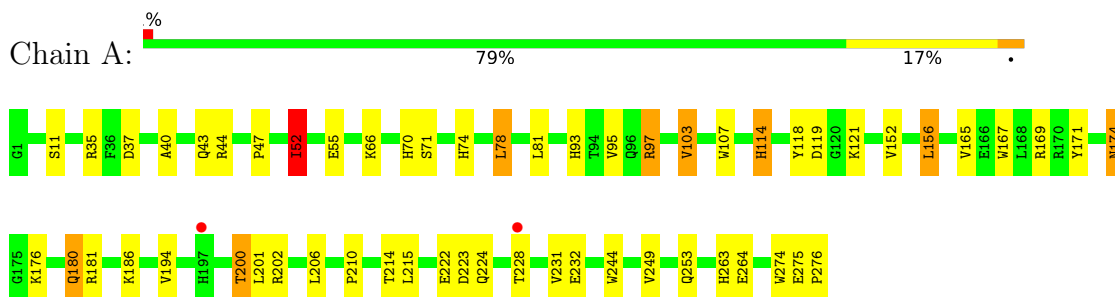
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	18	Total 18	O 18	0	0
9	B	6	Total 6	O 6	0	0
9	C	4	Total 4	O 4	0	0
9	D	8	Total 8	O 8	0	0
9	E	32	Total 32	O 32	0	0
9	F	48	Total 48	O 48	0	0
9	G	12	Total 12	O 12	0	0
9	H	8	Total 8	O 8	0	0
9	I	16	Total 16	O 16	0	0
9	J	18	Total 18	O 18	0	0

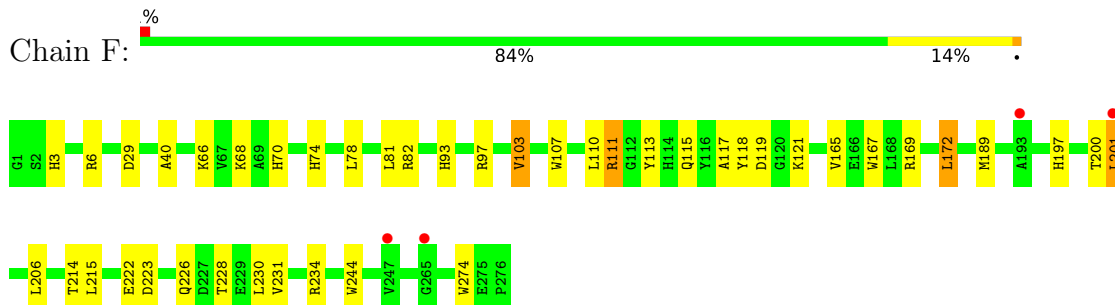
3 Residue-property plots

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.

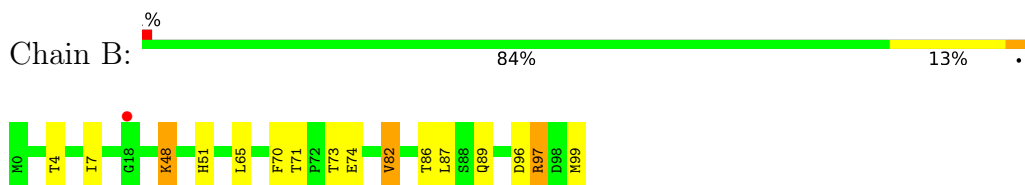
- Molecule 1: HLA class I histocompatibility antigen, A-2 alpha chain



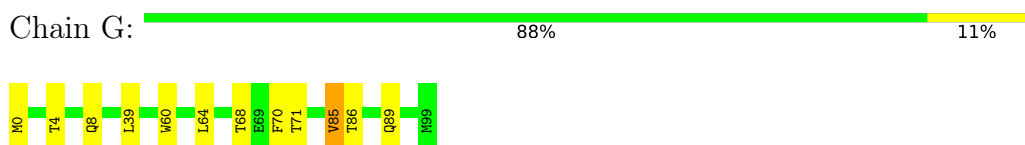
- Molecule 1: HLA class I histocompatibility antigen, A-2 alpha chain



- Molecule 2: Beta-2-microglobulin

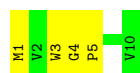


- Molecule 2: Beta-2-microglobulin



- Molecule 3: Marker peptide

Chain C:  60% 40%



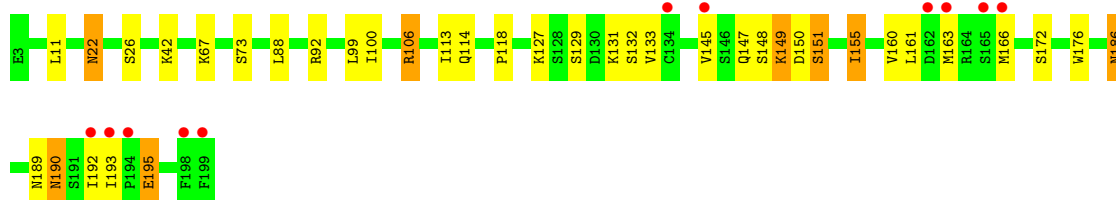
- Molecule 3: Marker peptide

Chain H:  70% 30%



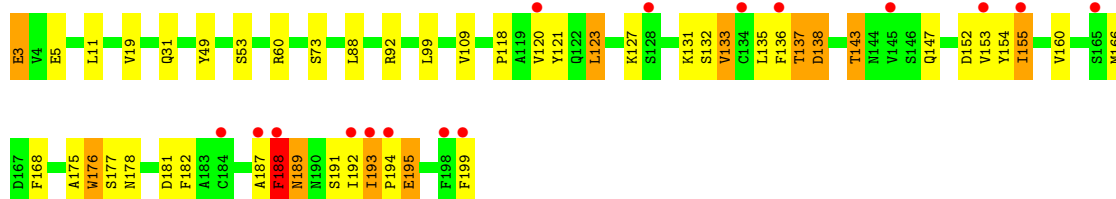
- Molecule 4: 1E6 TCR Alpha Chain

Chain D:  6% 81% 15% .



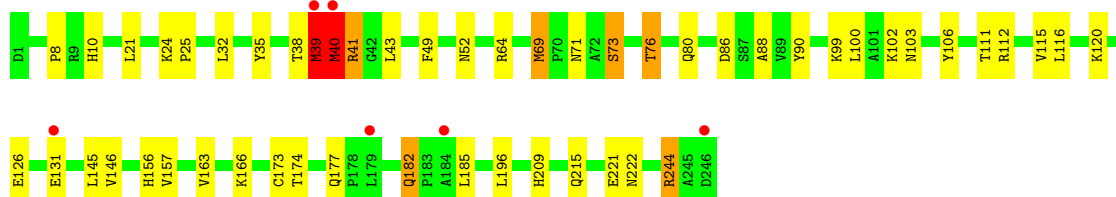
- Molecule 4: 1E6 TCR Alpha Chain

Chain I:  8% 75% 19% 6% .



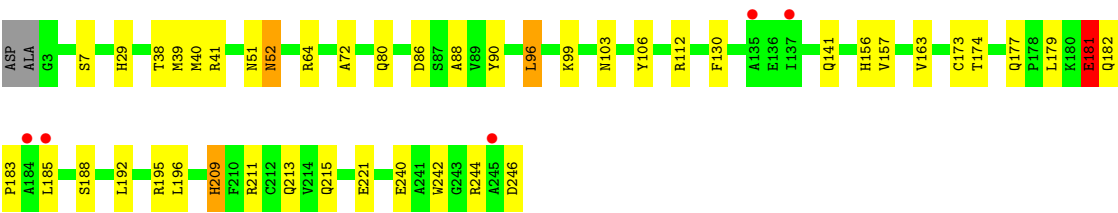
- Molecule 5: 1E6 TCR Beta Chain

Chain E:  2% 79% 18% ..



- Molecule 5: 1E6 TCR Beta Chain

Chain J:  2% 81% 17% ..



4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	43.88Å 100.02Å 123.28Å 96.67° 98.58° 95.80°	Depositor
Resolution (Å)	31.24 – 2.46 31.24 – 2.46	Depositor EDS
% Data completeness (in resolution range)	97.7 (31.24-2.46) 97.7 (31.24-2.46)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.09	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.80 (at 2.45Å)	Xtriage
Refinement program	REFMAC 5.8.0073	Depositor
R, R_{free}	0.193 , 0.232 0.196 , 0.236	Depositor DCC
R_{free} test set	3655 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	52.7	Xtriage
Anisotropy	0.173	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 46.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	13708	wwPDB-VP
Average B, all atoms (Å ²)	68.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.71% 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

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: EDO, GOL, SO4

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	0.87	1/2320 (0.0%)	0.98	5/3149 (0.2%)
1	F	0.94	0/2340	0.97	0/3176
2	B	0.87	0/860	0.99	1/1162 (0.1%)
2	G	0.92	0/860	0.99	2/1162 (0.2%)
3	C	1.09	0/87	1.13	0/119
3	H	1.08	0/87	1.17	0/119
4	D	0.89	0/1592	1.02	3/2154 (0.1%)
4	I	0.90	0/1592	1.06	7/2154 (0.3%)
5	E	1.01	1/2029 (0.0%)	1.03	5/2759 (0.2%)
5	J	0.91	0/2016	1.01	2/2741 (0.1%)
All	All	0.92	2/13783 (0.0%)	1.01	25/18695 (0.1%)

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
4	I	0	5
5	E	0	2
5	J	0	1
All	All	0	8

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	E	76	THR	N-CA	-5.18	1.39	1.46
1	A	114	HIS	N-CA	-5.11	1.40	1.46

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

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	E	41	ARG	N-CA-C	8.89	123.39	112.54
2	G	85	VAL	CB-CA-C	-8.44	100.98	112.04
5	J	181	GLU	N-CA-C	-7.53	98.52	109.59
4	I	189	ASN	N-CA-C	7.06	119.61	108.67
1	A	97	ARG	NE-CZ-NH2	6.76	125.28	119.20

There are no chirality outliers.

5 of 8 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
5	E	39	MET	Peptide
5	E	40	MET	Peptide
4	I	137	THR	Peptide
4	I	152	ASP	Peptide
4	I	176	TRP	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	2254	0	2103	41	0
1	F	2273	0	2116	32	0
2	B	837	0	803	7	0
2	G	837	0	803	10	0
3	C	83	0	80	3	0
3	H	83	0	80	3	0
4	D	1557	0	1469	23	0
4	I	1557	0	1469	17	0
5	E	1974	0	1887	30	0
5	J	1961	0	1875	24	0
6	A	8	0	12	9	0
6	D	8	0	12	1	0
6	E	4	0	6	2	0
6	F	12	0	18	2	0
6	H	8	0	12	2	0
6	I	4	0	6	0	0
6	J	8	0	12	6	0
7	A	5	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
7	D	5	0	0	1	0
7	E	15	0	0	0	0
7	F	5	0	0	0	0
7	G	5	0	0	0	0
7	J	5	0	0	0	0
8	B	6	0	8	0	0
8	F	12	0	16	2	0
8	G	6	0	8	0	0
8	J	6	0	8	1	0
9	A	18	0	0	0	0
9	B	6	0	0	0	0
9	C	4	0	0	0	0
9	D	8	0	0	0	0
9	E	32	0	0	0	0
9	F	48	0	0	2	0
9	G	12	0	0	0	0
9	H	8	0	0	0	0
9	I	16	0	0	0	0
9	J	18	0	0	0	0
All	All	13708	0	12803	176	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.

The worst 5 of 176 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:40:ALA:HB3	6:A:302:EDO:H11	1.53	0.90
1:A:40:ALA:HB3	6:A:302:EDO:C1	2.03	0.88
1:F:189:MET:HE3	1:F:201:LEU:HG	1.63	0.79
3:H:5:PRO:HD2	6:H:102:EDO:H11	1.67	0.77
1:A:78:LEU:HD13	1:A:95:VAL:HG13	1.66	0.76

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	274/276 (99%)	267 (97%)	7 (3%)	0	100	100
1	F	276/276 (100%)	270 (98%)	6 (2%)	0	100	100
2	B	98/100 (98%)	97 (99%)	0	1 (1%)	12	14
2	G	98/100 (98%)	97 (99%)	1 (1%)	0	100	100
3	C	8/10 (80%)	8 (100%)	0	0	100	100
3	H	8/10 (80%)	8 (100%)	0	0	100	100
4	D	195/197 (99%)	181 (93%)	14 (7%)	0	100	100
4	I	195/197 (99%)	174 (89%)	20 (10%)	1 (0%)	24	32
5	E	244/246 (99%)	235 (96%)	9 (4%)	0	100	100
5	J	242/246 (98%)	230 (95%)	11 (4%)	1 (0%)	30	37
All	All	1638/1658 (99%)	1567 (96%)	68 (4%)	3 (0%)	43	54

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	I	188	PHE
2	B	97	ARG
5	J	39	MET

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	232/232 (100%)	213 (92%)	19 (8%)	10	13
1	F	234/232 (101%)	220 (94%)	14 (6%)	17	26
2	B	95/95 (100%)	88 (93%)	7 (7%)	13	16
2	G	95/95 (100%)	89 (94%)	6 (6%)	16	23
3	C	9/9 (100%)	9 (100%)	0	100	100
3	H	9/9 (100%)	9 (100%)	0	100	100
4	D	178/178 (100%)	155 (87%)	23 (13%)	4	3
4	I	178/178 (100%)	147 (83%)	31 (17%)	2	1
5	E	216/216 (100%)	190 (88%)	26 (12%)	5	4
5	J	215/216 (100%)	193 (90%)	22 (10%)	7	6
All	All	1461/1460 (100%)	1313 (90%)	148 (10%)	7	7

5 of 148 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	I	138	ASP
5	J	196	LEU
4	I	177	SER
5	J	52	ASN
4	D	195	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 59 such sidechains are listed below:

Mol	Chain	Res	Type
5	E	50	ASN
5	J	141	GLN
5	E	209	HIS
5	J	103	ASN
4	I	55	ASN

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 [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

26 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	SO4	G	102	-	4,4,4	0.54	0	6,6,6	0.41	0
8	GOL	B	101	-	5,5,5	0.41	0	5,5,5	0.59	0
6	EDO	A	302	-	3,3,3	0.23	0	2,2,2	0.45	0
6	EDO	E	301	-	3,3,3	0.26	0	2,2,2	0.50	0
6	EDO	D	202	-	3,3,3	0.48	0	2,2,2	0.57	0
7	SO4	D	203	-	4,4,4	0.36	0	6,6,6	0.61	0
6	EDO	F	305	-	3,3,3	0.77	0	2,2,2	0.37	0
8	GOL	F	302	-	5,5,5	0.92	0	5,5,5	2.29	3 (60%)
6	EDO	D	201	-	3,3,3	0.36	0	2,2,2	0.32	0
7	SO4	E	302	-	4,4,4	0.47	0	6,6,6	0.17	0
6	EDO	I	201	-	3,3,3	0.55	0	2,2,2	0.19	0
6	EDO	H	101	-	3,3,3	0.41	0	2,2,2	0.15	0
6	EDO	A	301	-	3,3,3	1.13	0	2,2,2	0.68	0
7	SO4	A	303	-	4,4,4	0.43	0	6,6,6	0.50	0
8	GOL	J	301	-	5,5,5	0.43	0	5,5,5	0.65	0
8	GOL	F	301	-	5,5,5	0.52	0	5,5,5	0.29	0
6	EDO	J	303	-	3,3,3	0.69	0	2,2,2	0.27	0
6	EDO	J	302	-	3,3,3	0.51	0	2,2,2	0.16	0
8	GOL	G	101	-	5,5,5	0.32	0	5,5,5	0.43	0
6	EDO	F	303	-	3,3,3	0.33	0	2,2,2	0.37	0
7	SO4	F	306	-	4,4,4	0.53	0	6,6,6	0.19	0
7	SO4	J	304	-	4,4,4	0.50	0	6,6,6	0.20	0
7	SO4	E	304	-	4,4,4	0.62	0	6,6,6	0.89	0
7	SO4	E	303	-	4,4,4	0.54	0	6,6,6	0.10	0
6	EDO	H	102	-	3,3,3	0.36	0	2,2,2	0.45	0
6	EDO	F	304	-	3,3,3	0.50	0	2,2,2	0.55	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
8	GOL	J	301	-	-	4/4/4/4	-
6	EDO	F	305	-	-	1/1/1/1	-
6	EDO	F	304	-	-	1/1/1/1	-
6	EDO	J	303	-	-	0/1/1/1	-
8	GOL	F	301	-	-	4/4/4/4	-
8	GOL	F	302	-	-	0/4/4/4	-
6	EDO	H	102	-	-	0/1/1/1	-
6	EDO	H	101	-	-	0/1/1/1	-
6	EDO	J	302	-	-	1/1/1/1	-
8	GOL	G	101	-	-	2/4/4/4	-
6	EDO	F	303	-	-	0/1/1/1	-
8	GOL	B	101	-	-	2/4/4/4	-
6	EDO	I	201	-	-	1/1/1/1	-
6	EDO	A	302	-	-	0/1/1/1	-
6	EDO	E	301	-	-	1/1/1/1	-
6	EDO	D	202	-	-	1/1/1/1	-
6	EDO	D	201	-	-	1/1/1/1	-
6	EDO	A	301	-	-	1/1/1/1	-

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	F	302	GOL	O3-C3-C2	3.04	124.06	110.38
8	F	302	GOL	O1-C1-C2	2.81	123.03	110.38
8	F	302	GOL	O2-C2-C3	-2.14	100.33	109.18

There are no chirality outliers.

5 of 20 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	F	301	GOL	C1-C2-C3-O3
8	G	101	GOL	C1-C2-C3-O3
8	J	301	GOL	O1-C1-C2-C3
8	J	301	GOL	C1-C2-C3-O3
8	G	101	GOL	O2-C2-C3-O3

There are no ring outliers.

11 monomers are involved in 26 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	A	302	EDO	8	0
6	E	301	EDO	2	0
7	D	203	SO4	1	0
8	F	302	GOL	2	0
6	D	201	EDO	1	0
6	H	101	EDO	1	0
6	A	301	EDO	1	0
8	J	301	GOL	1	0
6	J	303	EDO	6	0
6	F	303	EDO	2	0
6	H	102	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 [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	276/276 (100%)	0.06	2 (0%) 84 86	34, 68, 112, 124	0
1	F	276/276 (100%)	-0.14	4 (1%) 73 75	19, 55, 117, 140	2 (0%)
2	B	100/100 (100%)	-0.05	1 (1%) 79 80	41, 65, 89, 102	0
2	G	100/100 (100%)	-0.17	0 100 100	34, 57, 86, 108	0
3	C	10/10 (100%)	-0.44	0 100 100	36, 43, 51, 61	0
3	H	10/10 (100%)	-0.52	0 100 100	33, 37, 43, 46	0
4	D	197/197 (100%)	0.36	11 (5%) 30 27	37, 69, 133, 152	0
4	I	197/197 (100%)	0.40	16 (8%) 18 16	34, 70, 152, 179	0
5	E	246/246 (100%)	-0.10	6 (2%) 59 62	27, 57, 103, 130	0
5	J	244/246 (99%)	0.14	5 (2%) 65 66	30, 67, 132, 176	0
All	All	1656/1658 (99%)	0.06	45 (2%) 56 57	19, 62, 128, 179	2 (0%)

The worst 5 of 45 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
4	D	193	ILE	4.7
4	D	165	SER	4.1
5	J	185	LEU	3.7
5	E	40	MET	3.3
5	J	135	ALA	3.3

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 ⓘ

There are no oligosaccharides in this entry.

6.4 Ligands ⓘ

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	SO4	E	303	5/5	0.57	0.11	105,107,112,114	0
7	SO4	G	102	5/5	0.68	0.14	107,112,132,134	0
7	SO4	J	304	5/5	0.72	0.10	115,117,133,140	0
7	SO4	E	302	5/5	0.76	0.09	114,115,127,129	0
7	SO4	A	303	5/5	0.80	0.13	66,104,108,113	0
7	SO4	F	306	5/5	0.82	0.14	107,116,121,126	0
8	GOL	F	301	6/6	0.83	0.14	62,74,81,84	0
8	GOL	G	101	6/6	0.84	0.13	73,78,92,95	0
7	SO4	D	203	5/5	0.85	0.12	78,92,100,115	0
6	EDO	I	201	4/4	0.85	0.13	76,81,83,84	0
6	EDO	F	304	4/4	0.86	0.17	57,57,58,61	0
6	EDO	A	301	4/4	0.87	0.19	62,69,69,75	0
8	GOL	J	301	6/6	0.89	0.13	54,78,88,90	0
6	EDO	F	305	4/4	0.90	0.14	65,72,78,80	0
6	EDO	F	303	4/4	0.92	0.30	44,65,67,69	0
6	EDO	A	302	4/4	0.93	0.18	44,48,51,54	0
8	GOL	F	302	6/6	0.93	0.18	43,55,59,60	0
6	EDO	J	303	4/4	0.93	0.11	50,56,57,57	0
7	SO4	E	304	5/5	0.93	0.09	58,59,63,66	0
6	EDO	H	102	4/4	0.94	0.14	45,53,54,55	0
6	EDO	D	202	4/4	0.94	0.12	65,66,68,69	0
6	EDO	H	101	4/4	0.94	0.12	44,46,51,54	0
6	EDO	E	301	4/4	0.95	0.15	55,58,59,60	0
6	EDO	J	302	4/4	0.95	0.09	46,49,52,53	0
6	EDO	D	201	4/4	0.95	0.09	42,44,46,47	0
8	GOL	B	101	6/6	0.96	0.09	73,77,79,82	0

6.5 Other polymers ⓘ

There are no such residues in this entry.