WORLDWIDE PDB
PROTEIN DATA BANK

Full wwPDB X-ray Structure Validation Report (i)

Jul 18, 2022 – 04:14 pm BST

PDB ID	:	7P4B
Title	:	HLA-E*01:03 in complex with IL9
Authors	:	Walters, L.C.; Gillespie, G.M.
Deposited on	:	2021-07-10
Resolution	:	1.72 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 (i) 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 (i)) were used in the production of this report:

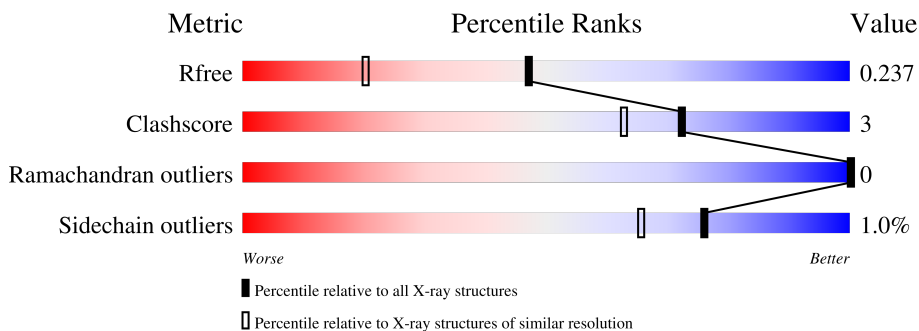|		
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.29
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0267
CCP4	:	7.1.010 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.29

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 1.72 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.

Metric	Percentile Ranks	Value
Rfree		0.237
Clashscore		3
Ramachandran outliers		0
Sidechain outliers		1.0%

Worse   *Better*

■ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_free	130704	5722 (1.74-1.70)
Clashscore	141614	6152 (1.74-1.70)
Ramachandran outliers	138981	6051 (1.74-1.70)
Sidechain outliers	138945	6051 (1.74-1.70)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5%

Mol	Chain	Length	Quality of chain
1	A	277	89% 10%
1	C	277	94% 5%
1	E	277	81% 13% 6%
1	G	277	92% 7%
2	B	100	91% 8% •
2	D	100	90% 10%
2	F	100	95% 5%

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Mol	Chain	Length	Quality of chain
2	H	100	95% · 5%
3	P	9	67% · · · · · · · · · · · 33%
3	Q	9	89% · · · · · · · · · · · · · · · · · · · 11%
3	R	9	100%
3	Z	9	78% · · · · · · · · · · 22%

2 Entry composition ⓘ

There are 8 unique types of molecules in this entry. The entry contains 13836 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, alpha chain E.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	276	Total	C	N	O	S	0	1	0
			2256	1411	405	433	7			
1	C	276	Total	C	N	O	S	0	2	0
			2264	1415	407	435	7			
1	E	260	Total	C	N	O	S	0	0	0
			2123	1331	377	408	7			
1	G	276	Total	C	N	O	S	0	4	0
			2281	1425	411	438	7			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	277	PRO	-	expression tag	UNP P13747
C	277	PRO	-	expression tag	UNP P13747
E	277	PRO	-	expression tag	UNP P13747
G	277	PRO	-	expression tag	UNP P13747

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

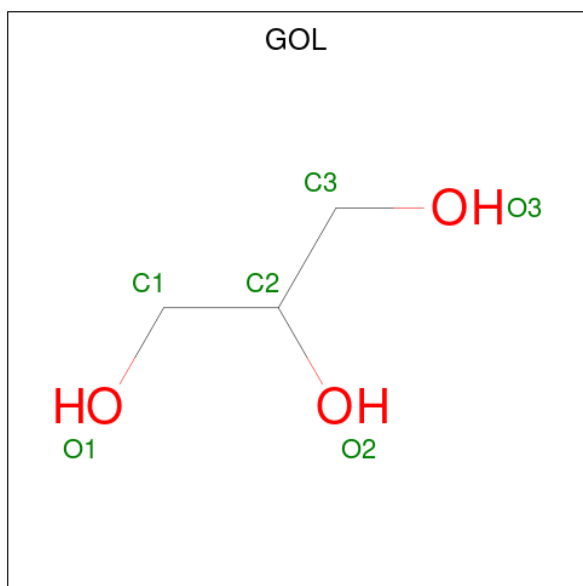| Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			
2	D	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			
2	F	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			
2	H	100	Total	C	N	O	S	0	0	0
			837	533	141	159	4			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	1	MET	-	initiating methionine	UNP P61769
D	1	MET	-	initiating methionine	UNP P61769
F	1	MET	-	initiating methionine	UNP P61769
H	1	MET	-	initiating methionine	UNP P61769

• Molecule 3 is a protein called ESAT-6-like protein EsxH.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	P	9	Total	C	N	O	S	0	0	0
			77	52	10	13	2			
3	Q	9	Total	C	N	O	S	0	0	0
			77	52	10	13	2			
3	R	9	Total	C	N	O	S	0	0	0
			77	52	10	13	2			
3	Z	9	Total	C	N	O	S	0	0	0
			77	52	10	13	2			

• Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: $C_3H_8O_3$).

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		
4	C	1	Total	C	O	0	0
			6	3	3		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	D	1	Total 6	C 3	O 3	0	0
4	D	1	Total 6	C 3	O 3	0	0
4	D	1	Total 6	C 3	O 3	0	0
4	D	1	Total 6	C 3	O 3	0	0
4	G	1	Total 6	C 3	O 3	0	0
4	H	1	Total 6	C 3	O 3	0	0

- Molecule 5 is SULFATE ION (three-letter code: SO4) (formula: O_4S).
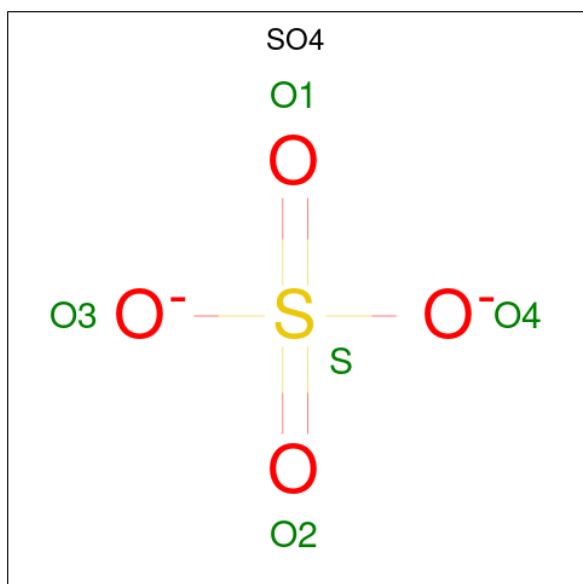
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	A	1	Total 5	O 4	S 1	0	0
5	A	1	Total 5	O 4	S 1	0	0
5	A	1	Total 5	O 4	S 1	0	0
5	C	1	Total 5	O 4	S 1	0	0
5	C	1	Total 5	O 4	S 1	0	0

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	C	1	Total 5	O 4	S 1	0	0
5	D	1	Total 5	O 4	S 1	0	0
5	F	1	Total 5	O 4	S 1	0	0
5	F	1	Total 5	O 4	S 1	0	0
5	G	1	Total 5	O 4	S 1	0	0
5	G	1	Total 5	O 4	S 1	0	0
5	G	1	Total 5	O 4	S 1	0	0
5	H	1	Total 5	O 4	S 1	0	0
5	H	1	Total 5	O 4	S 1	0	0
5	H	1	Total 5	O 4	S 1	0	0
5	H	1	Total 5	O 4	S 1	0	0

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	E	1	Total 1	Zn 1	0	0
6	G	1	Total 1	Zn 1	0	0

- Molecule 7 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).

PO4

O3

O⁻

O2 O⁻ ── P ══ O O1

P

O⁻

O4

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	F	1	Total 5	O 4	P 1	0	0

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	167	Total 167	O 167	0	0
8	B	47	Total 47	O 47	0	0
8	C	250	Total 250	O 250	0	0
8	D	106	Total 106	O 106	0	0
8	E	118	Total 118	O 118	0	0
8	F	77	Total 77	O 77	0	0
8	G	249	Total 249	O 249	0	0
8	H	69	Total 69	O 69	0	0
8	P	8	Total 8	O 8	0	0
8	Q	5	Total 5	O 5	0	0
8	R	5	Total 5	O 5	0	0

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| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	Z	8	Total 8	O 8	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. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.
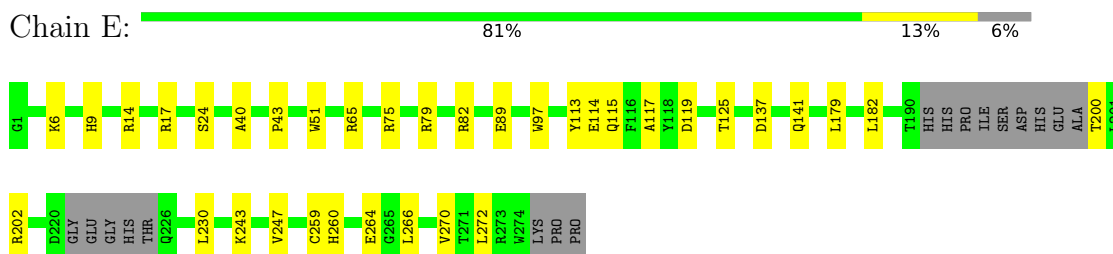
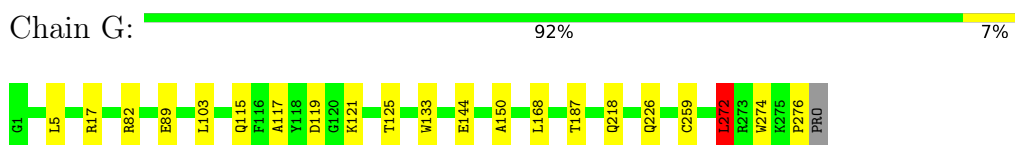• Molecule 1: HLA class I histocompatibility antigen, alpha chain E
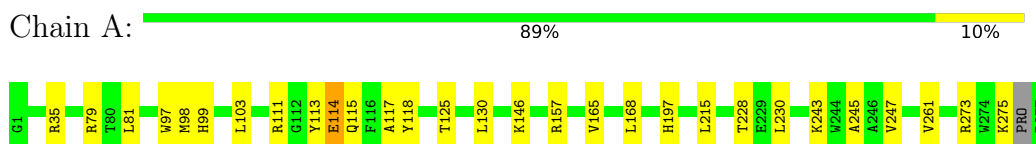
• Molecule 1: HLA class I histocompatibility antigen, alpha chain E
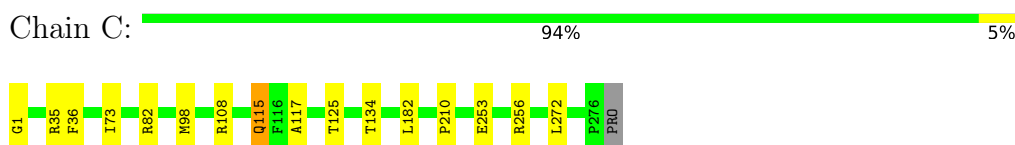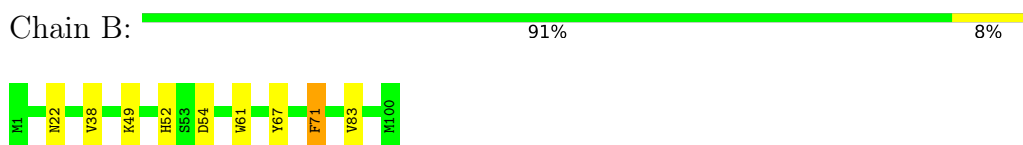

• Molecule 1: HLA class I histocompatibility antigen, alpha chain E

• Molecule 1: HLA class I histocompatibility antigen, alpha chain E

• Molecule 2: Beta-2-microglobulin

• Molecule 2: Beta-2-microglobulin

Chain D:

90% 10%

M1 I2 Q3 I8 D39 R46 W61 F71 T87 K92 R98 D99 M100

• Molecule 2: Beta-2-microglobulin

Chain F:

95% 5%

M1 W61 F71 T74 D77 M100

• Molecule 2: Beta-2-microglobulin

Chain H:

95% 5%

M1 I2 Q9 W61 F71 M100

• Molecule 3: ESAT-6-like protein EsxH

Chain P:

67% 33%

I1 M2 Y3 N4 Y5 L9

• Molecule 3: ESAT-6-like protein EsxH

Chain Q:

89% 11%

I1 N4 L9

• Molecule 3: ESAT-6-like protein EsxH

Chain R:

100%

There are no outlier residues recorded for this chain.

• Molecule 3: ESAT-6-like protein EsxH

Chain Z:

78% 22%

I1 Y5 M8 L9

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α, β, γ	244.56Å 48.53Å 153.16Å 90.00° 116.95° 90.00°	Depositor
Resolution (Å)	75.18 – 1.72 75.18 – 1.72	Depositor EDS
% Data completeness (in resolution range)	99.8 (75.18-1.72) 99.8 (75.18-1.72)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.67 (at 1.72Å)	Xtriage
Refinement program	PHENIX 1.18.2_3874, PHENIX 1.18.2_3874	Depositor
R, R_{free}	0.201 , 0.237 0.201 , 0.237	Depositor DCC
R_{free} test set	8636 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	21.0	Xtriage
Anisotropy	0.695	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	(Not available) , (Not available)	EDS
L-test for twinning[2]	$< |L| > = 0.50, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.93	EDS
Total number of atoms	13836	wwPDB-VP
Average B, all atoms (Å^2)	33.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 27.03 % 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 2.3675e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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[1]Intensities estimated from amplitudes.

[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: SO4, ZN, GOL, PO4

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	0.25	0/2323	0.46	0/3157
1	C	0.28	0/2331	0.48	0/3170
1	E	0.26	0/2182	0.46	0/2964
1	G	0.27	0/2349	0.49	1/3195 (0.0%)
2	B	0.25	0/860	0.45	0/1162
2	D	0.27	0/860	0.49	0/1162
2	F	0.25	0/860	0.45	0/1162
2	H	0.25	0/860	0.46	0/1162
3	P	0.25	0/79	0.45	0/105
3	Q	0.28	0/79	0.60	0/105
3	R	0.26	0/79	0.43	0/105
3	Z	0.29	0/79	0.48	0/105
All	All	0.26	0/12941	0.47	1/17554 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	G	272	LEU	CA-CB-CG	6.87	131.11	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts ⓘ

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2256	0	2094	19	0
1	C	2264	0	2106	13	0
1	E	2123	0	1981	23	0
1	G	2281	0	2118	15	0
2	B	837	0	803	6	0
2	D	837	0	803	6	0
2	F	837	0	803	3	0
2	H	837	0	803	5	0
3	P	77	0	78	2	0
3	Q	77	0	78	1	0
3	R	77	0	78	0	0
3	Z	77	0	78	1	0
4	A	6	0	8	0	0
4	C	18	0	24	0	0
4	D	24	0	32	1	0
4	G	6	0	8	0	0
4	H	6	0	8	2	0
5	A	15	0	0	1	0
5	C	15	0	0	0	0
5	D	5	0	0	0	0
5	F	10	0	0	0	0
5	G	15	0	0	0	0
5	H	20	0	0	0	0
6	E	1	0	0	0	0
6	G	1	0	0	0	0
7	F	5	0	0	0	0
8	A	167	0	0	3	0
8	B	47	0	0	0	0
8	C	250	0	0	4	0
8	D	106	0	0	1	0
8	E	118	0	0	5	0
8	F	77	0	0	0	0
8	G	249	0	0	2	0
8	H	69	0	0	0	0
8	P	8	0	0	1	0
8	Q	5	0	0	0	0
8	R	5	0	0	0	0
8	Z	8	0	0	0	0
All	All	13836	0	11903	83	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 3.

All (83) 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:E:259:CYS:SG	8:E:409:HOH:O	2.44	0.76
2:D:98:ARG:HE	4:D:203:GOL:H11	1.50	0.74
1:E:202:ARG:O	8:E:401:HOH:O	2.08	0.71
1:C:115:GLN:HB3	1:C:125[A]:THR:HG22	1.74	0.69
1:E:200:THR:N	8:E:403:HOH:O	2.27	0.68
1:A:115:GLN:HG2	1:A:125:THR:HG23	1.77	0.67
1:A:273:ARG:HD2	1:A:275:LYS:HE3	1.77	0.65
1:E:200:THR:OG1	1:E:247:VAL:O	2.15	0.65
1:A:98:MET:SD	8:A:567:HOH:O	2.55	0.65
1:A:228:THR:HG22	1:A:247:VAL:HG12	1.77	0.64
1:E:9:HIS:ND1	1:E:24:SER:OG	2.27	0.63
1:E:115:GLN:HG2	1:E:125:THR:HG23	1.81	0.63
1:E:200:THR:N	8:E:404:HOH:O	2.32	0.62
1:C:35:ARG:NH1	8:C:404:HOH:O	2.35	0.60
1:C:108:ARG:NH2	8:C:403:HOH:O	2.32	0.60
1:A:103:LEU:HD21	1:A:165:VAL:HG13	1.84	0.60
1:C:117:ALA:HB2	2:D:61:TRP:CE2	2.37	0.60
1:E:75:ARG:HE	1:E:79:ARG:HH22	1.48	0.59
1:A:103:LEU:HG	1:A:168:LEU:HD23	1.85	0.59
1:A:117:ALA:HB2	2:B:61:TRP:CE2	2.37	0.59
1:A:146:LYS:HG2	1:E:65:ARG:HD2	1.86	0.58
2:F:74:THR:OG1	2:F:77:ASP:OD1	2.20	0.57
1:C:253:GLU:HB3	1:C:256:ARG:HD3	1.85	0.57
1:E:117:ALA:HB2	2:F:61:TRP:CE2	2.40	0.56
1:G:115:GLN:HG2	1:G:125:THR:HG23	1.86	0.56
1:G:117:ALA:HB2	2:H:61:TRP:CE2	2.41	0.55
1:A:35:ARG:NH2	2:B:54:ASP:OD1	2.39	0.55
1:A:125:THR:OG1	8:A:401:HOH:O	2.18	0.54
1:A:99[A]:HIS:NE2	8:A:402:HOH:O	2.23	0.54
1:G:119:ASP:HB3	2:H:1:MET:HG3	1.90	0.53
1:G:82:ARG:NH1	1:G:89:GLU:HG2	2.24	0.53
1:E:79:ARG:HG2	1:E:82:ARG:NH2	2.24	0.52
2:D:39:ASP:OD1	2:D:46:ARG:NH1	2.43	0.52
1:G:121:LYS:HB2	2:H:2:ILE:HD12	1.92	0.52
1:C:98:MET:SD	8:D:339:HOH:O	2.59	0.51
1:C:98:MET:HG3	1:C:115:GLN:HG3	1.92	0.51
1:C:1:GLY:N	8:C:415:HOH:O	2.44	0.50
1:E:260:HIS:N	8:E:409:HOH:O	2.44	0.50
1:G:226:GLN:H	1:G:226:GLN:CD	2.15	0.50
1:C:82:ARG:NE	8:C:407:HOH:O	2.40	0.49
2:B:22:ASN:HB3	2:B:71:PHE:CE2	2.47	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:187:THR:HB	1:G:272:LEU:HD21	1.96	0.48
1:G:17:ARG:NH1	8:G:414:HOH:O	2.44	0.47
2:H:9:GLN:OE1	4:H:201:GOL:H11	2.14	0.47
1:E:119:ASP:HB3	2:F:1:MET:HG3	1.97	0.46
1:C:182:LEU:HD22	1:C:210:PRO:HD3	1.97	0.46
2:D:8:ILE:HD12	2:D:92:LYS:HD2	1.97	0.46
1:G:274:TRP:CH2	1:G:276:PRO:HB3	2.51	0.45
1:A:97:TRP:HE1	1:A:114:GLU:HG2	1.81	0.45
2:D:3:GLN:HB2	2:D:87:THR:HG22	1.97	0.45
1:E:182:LEU:HD21	1:E:264:GLU:HG2	1.97	0.45
1:A:230:LEU:HD11	1:A:243:LYS:HE3	1.99	0.45
1:C:35:ARG:HG2	1:C:36:PHE:N	2.33	0.44
1:A:130:LEU:HB3	1:A:157:ARG:HG2	1.99	0.44
1:E:230:LEU:HG	1:E:243:LYS:HE3	2.00	0.44
2:H:9:GLN:HA	4:H:201:GOL:H32	2.00	0.44
1:A:99[B]:HIS:CD2	1:A:114:GLU:HG3	2.54	0.43
1:E:40:ALA:HB3	1:E:43:PRO:HB3	1.99	0.43
1:A:215:LEU:HD22	1:A:261:VAL:HG22	2.00	0.43
1:E:137:ASP:O	1:E:141:GLN:HG3	2.18	0.43
1:A:79:ARG:NH2	5:A:304:SO4:O3	2.52	0.43
1:E:266:LEU:HD13	1:E:270:VAL:HB	2.00	0.43
1:G:259:CYS:HB3	1:G:272:LEU:HD13	1.99	0.43
2:D:1:MET:SD	2:D:1:MET:N	2.88	0.43
1:E:6:LYS:HE2	1:E:113:TYR:HE2	1.83	0.42
1:G:103:LEU:HG	1:G:168:LEU:HD23	2.00	0.42
1:E:14:ARG:HD2	1:E:17:ARG:HH12	1.84	0.42
1:A:81:LEU:HD13	1:A:118:TYR:CD1	2.54	0.42
1:A:230:LEU:HD13	1:A:245:ALA:HB2	2.01	0.42
1:E:82:ARG:NH1	1:E:89:GLU:HB3	2.34	0.42
1:G:150:ALA:HA	3:Q:4:ASN:HD22	1.84	0.42
3:P:3:TYR:O	8:P:101:HOH:O	2.21	0.42
3:P:4:ASN:HD22	3:P:4:ASN:HA	1.56	0.42
1:E:97:TRP:HE1	1:E:114:GLU:CG	2.33	0.41
1:C:125[A]:THR:OG1	1:C:134:THR:HB	2.21	0.41
1:E:51:TRP:CZ2	1:E:179:LEU:HD11	2.56	0.41
1:G:5:LEU:HB2	1:G:168:LEU:HD13	2.01	0.41
1:G:133:TRP:HB2	1:G:144:GLU:HG3	2.02	0.41
2:B:38:VAL:HG22	2:B:83:VAL:HG22	2.02	0.41
2:B:52:HIS:HB3	2:B:67:TYR:CD2	2.56	0.40
1:C:73:ILE:HD11	3:Z:8:MET:HE1	2.03	0.40
2:B:49:LYS:HE3	2:B:49:LYS:HB2	1.86	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:218:GLN:NE2	8:G:404:HOH:O	2.33	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	274/277 (99%)	268 (98%)	6 (2%)	0	100	100
1	C	276/277 (100%)	270 (98%)	6 (2%)	0	100	100
1	E	254/277 (92%)	246 (97%)	8 (3%)	0	100	100
1	G	278/277 (100%)	276 (99%)	2 (1%)	0	100	100
2	B	98/100 (98%)	98 (100%)	0	0	100	100
2	D	98/100 (98%)	98 (100%)	0	0	100	100
2	F	98/100 (98%)	97 (99%)	1 (1%)	0	100	100
2	H	98/100 (98%)	98 (100%)	0	0	100	100
3	P	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
3	Q	7/9 (78%)	7 (100%)	0	0	100	100
3	R	7/9 (78%)	7 (100%)	0	0	100	100
3	Z	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
All	All	1502/1544 (97%)	1477 (98%)	25 (2%)	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	238/238 (100%)	234 (98%)	4 (2%)	60	44
1	C	239/238 (100%)	237 (99%)	2 (1%)	81	73
1	E	224/238 (94%)	223 (100%)	1 (0%)	91	86
1	G	241/238 (101%)	240 (100%)	1 (0%)	91	86
2	B	95/95 (100%)	94 (99%)	1 (1%)	73	62
2	D	95/95 (100%)	94 (99%)	1 (1%)	73	62
2	F	95/95 (100%)	94 (99%)	1 (1%)	73	62
2	H	95/95 (100%)	94 (99%)	1 (1%)	73	62
3	P	8/8 (100%)	7 (88%)	1 (12%)	4	1
3	Q	8/8 (100%)	8 (100%)	0	100	100
3	R	8/8 (100%)	8 (100%)	0	100	100
3	Z	8/8 (100%)	7 (88%)	1 (12%)	4	1
All	All	1354/1364 (99%)	1340 (99%)	14 (1%)	76	65

All (14) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	111	ARG
1	A	113	TYR
1	A	114	GLU
1	A	197	HIS
2	B	71	PHE
1	C	115	GLN
1	C	272	LEU
2	D	71	PHE
1	E	272	LEU
2	F	71	PHE
1	G	272	LEU
2	H	71	PHE
3	P	5	TYR
3	Z	5	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

There are no non-standard protein/DNA/RNA residues in this entry.

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 29 ligands modelled in this entry, 2 are monoatomic - leaving 27 for Mogul analysis.

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	$\#|Z| > 2$
5	SO4	H	205	-	4,4,4	0.14	0	6,6,6	0.05	0
4	GOL	D	202	-	5,5,5	0.93	0	5,5,5	0.98	0
4	GOL	D	204	-	5,5,5	0.86	0	5,5,5	0.99	0
5	SO4	C	303	-	4,4,4	0.14	0	6,6,6	0.07	0
5	SO4	D	205	-	4,4,4	0.13	0	6,6,6	0.06	0
5	SO4	A	302	-	4,4,4	0.13	0	6,6,6	0.09	0
5	SO4	F	201	-	4,4,4	0.14	0	6,6,6	0.06	0
5	SO4	H	204	-	4,4,4	0.15	0	6,6,6	0.07	0
5	SO4	G	304	-	4,4,4	0.13	0	6,6,6	0.07	0
4	GOL	C	302	-	5,5,5	0.94	0	5,5,5	0.97	0
4	GOL	A	301	-	5,5,5	0.87	0	5,5,5	1.01	0
5	SO4	A	303	-	4,4,4	0.14	0	6,6,6	0.05	0
7	PO4	F	203	-	4,4,4	0.93	0	6,6,6	0.43	0
5	SO4	G	303	-	4,4,4	0.12	0	6,6,6	0.08	0
5	SO4	F	202	-	4,4,4	0.14	0	6,6,6	0.09	0
4	GOL	C	301	-	5,5,5	0.91	0	5,5,5	0.99	0
5	SO4	G	305	-	4,4,4	0.14	0	6,6,6	0.07	0
4	GOL	H	201	-	5,5,5	0.88	0	5,5,5	0.99	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
4	GOL	C	306	-	5,5,5	0.86	0	5,5,5	1.06	0
4	GOL	G	301	-	5,5,5	1.13	0	5,5,5	0.85	0
5	SO4	A	304	-	4,4,4	0.13	0	6,6,6	0.09	0
5	SO4	H	202	-	4,4,4	0.14	0	6,6,6	0.05	0
5	SO4	C	305	-	4,4,4	0.14	0	6,6,6	0.06	0
5	SO4	H	203	-	4,4,4	0.13	0	6,6,6	0.21	0
4	GOL	D	201	-	5,5,5	0.95	0	5,5,5	0.94	0
4	GOL	D	203	-	5,5,5	0.91	0	5,5,5	1.07	0
5	SO4	C	304	-	4,4,4	0.14	0	6,6,6	0.07	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	GOL	C	306	-	-	0/4/4/4	-
4	GOL	D	202	-	-	1/4/4/4	-
4	GOL	D	204	-	-	<mark>2/4/4/4</mark>	-
4	GOL	D	201	-	-	0/4/4/4	-
4	GOL	C	302	-	-	0/4/4/4	-
4	GOL	D	203	-	-	0/4/4/4	-
4	GOL	A	301	-	-	1/4/4/4	-
4	GOL	G	301	-	-	0/4/4/4	-
4	GOL	C	301	-	-	1/4/4/4	-
4	GOL	H	201	-	-	0/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	D	204	GOL	O2-C2-C3-O3
4	A	301	GOL	O1-C1-C2-C3
4	C	301	GOL	C1-C2-C3-O3
4	D	202	GOL	C1-C2-C3-O3
4	D	204	GOL	C1-C2-C3-O3

There are no ring outliers.

3 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	H	201	GOL	2	0
5	A	304	SO4	1	0
4	D	203	GOL	1	0

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

6.3 Carbohydrates ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

6.4 Ligands ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.

6.5 Other polymers ⓘ

Unable to reproduce the depositors R factor - this section is therefore empty.