



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 5, 2026 – 08:57 PM UTC

PDB ID : 3QV4 / pdb_00003qv4
Title : Crystal structure of the complex of peptidoglycan recognition protein (PGRP-S) with dipeptide L-ALA D-GLU at 2.7 Å resolution
Authors : Shukla, P.K.; Sharma, P.; Sinha, M.; Kaur, P.; Sharma, S.; Singh, T.P.
Deposited on : 2011-02-25
Resolution : 2.70 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

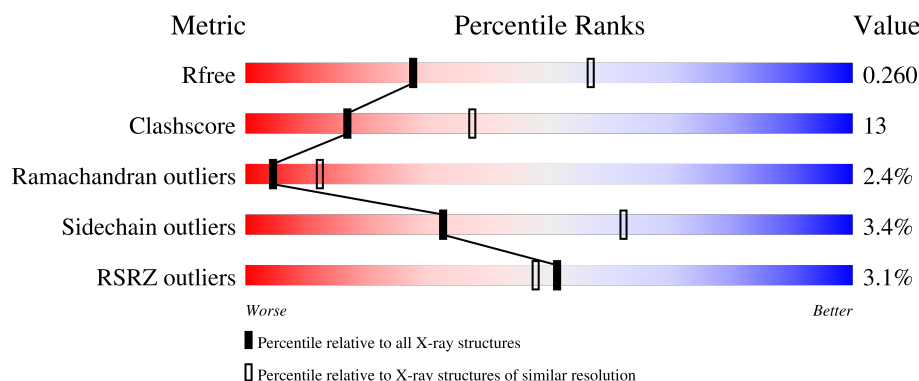
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.70 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	3538 (2.70-2.70)
Clashscore	190562	3843 (2.70-2.70)
Ramachandran outliers	187476	3778 (2.70-2.70)
Sidechain outliers	187428	3778 (2.70-2.70)
RSRZ outliers	180081	3538 (2.70-2.70)

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 $\leq 5\%$. 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	171	2% 75% 21% ..
1	B	171	4% 64% 29% 6% .
1	C	171	3% 70% 27% ..
1	D	171	3% 59% 34% 5% .
2	E	3	33% 67%

2 Entry composition [i](#)

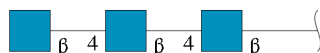
There are 9 unique types of molecules in this entry. The entry contains 5730 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 Peptidoglycan recognition protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	171	Total	C	N	O	S	0	0	0
			1337	834	254	241	8			
1	B	171	Total	C	N	O	S	0	0	0
			1337	834	254	241	8			
1	C	171	Total	C	N	O	S	0	0	0
			1337	834	254	241	8			
1	D	171	Total	C	N	O	S	0	0	0
			1337	834	254	241	8			

- Molecule 2 is an oligosaccharide called 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose.



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
2	E	3	Total	C	N	O	0	0	0
			43	24	3	16			

- Molecule 3 is GLYCEROL (CCD ID: GOL) (formula: C₃H₈O₃).



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

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



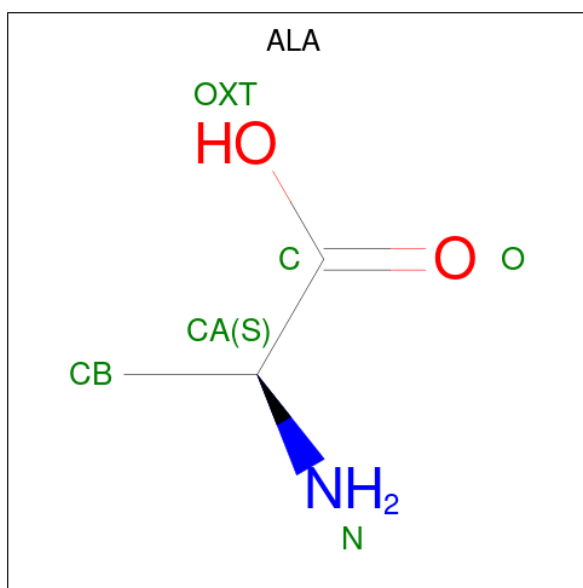
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	C	O	0	0
			4	2	2		

- Molecule 5 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



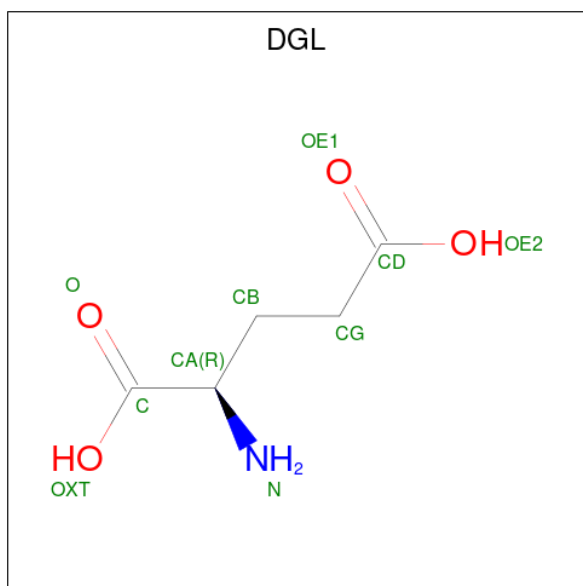
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
5	B	1	Total	C	O	0	0
			7	4	3		

- Molecule 6 is ALANINE (CCD ID: ALA) (formula: $C_3H_7NO_2$).



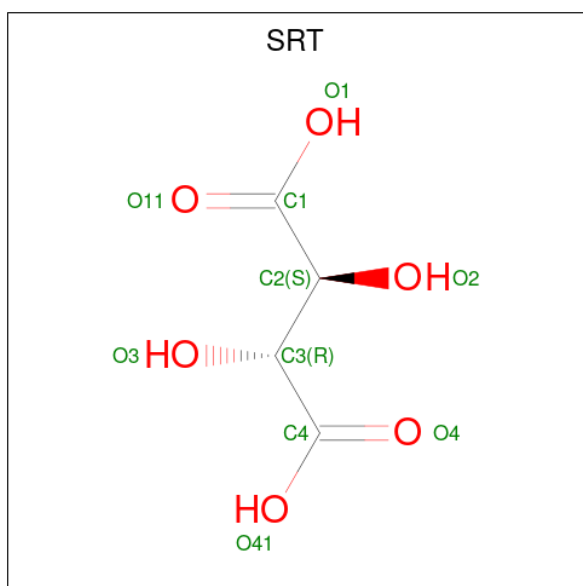
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
6	C	1	Total	C	N	O	0	0
			5	3	1	1		

- Molecule 7 is D-GLUTAMIC ACID (CCD ID: DGL) (formula: $C_5H_9NO_4$).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
7	C	1	Total	C	N	O	0	0
			10	5	1	4		

- Molecule 8 is S,R MESO-TARTARIC ACID (CCD ID: SRT) (formula: $C_4H_6O_6$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
8	D	1	Total	C	O	0	0
			10	4	6		

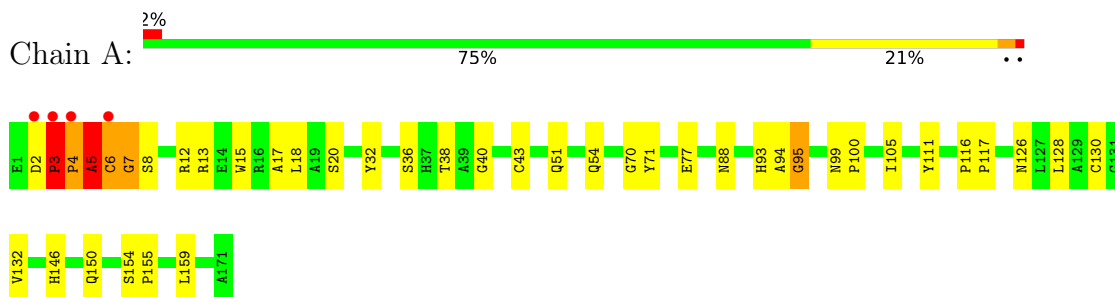
- Molecule 9 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
9	A	83	Total	O	0	0
			83	83		
9	B	67	Total	O	0	0
			67	67		
9	C	61	Total	O	0	0
			61	61		
9	D	62	Total	O	0	0
			62	62		

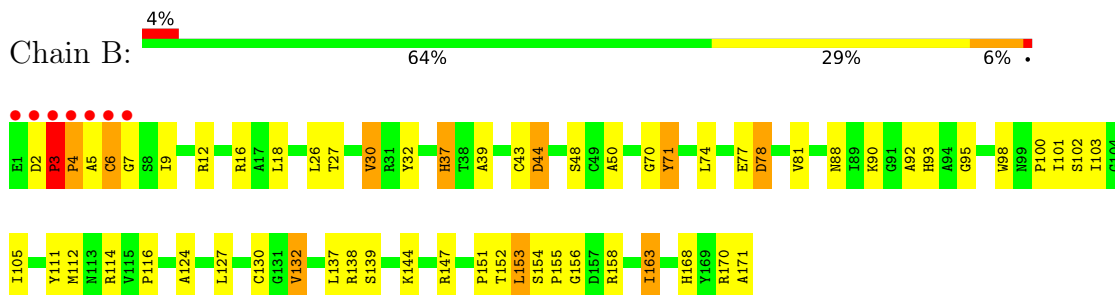
3 Residue-property plots [i](#)

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.

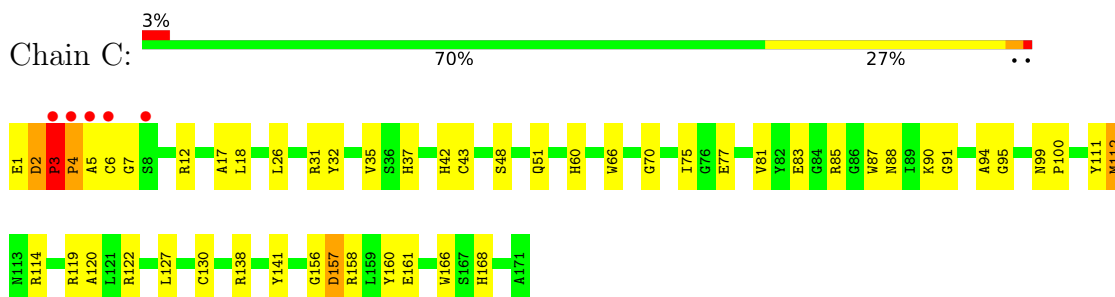
- Molecule 1: Peptidoglycan recognition protein 1



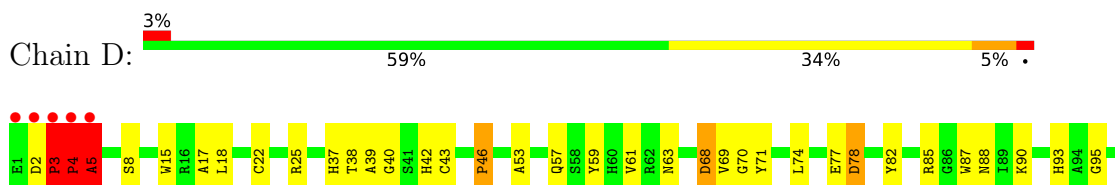
- Molecule 1: Peptidoglycan recognition protein 1

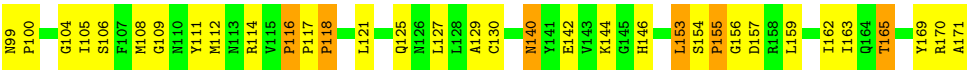


- Molecule 1: Peptidoglycan recognition protein 1



- Molecule 1: Peptidoglycan recognition protein 1





- Molecule 2: 2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose-(1-4)-2-acetamido-2-deoxy-beta-D-glucopyranose



4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, α , β , γ	89.09Å 101.15Å 163.69Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	48.02 – 2.70 48.02 – 2.70	Depositor EDS
% Data completeness (in resolution range)	98.8 (48.02-2.70) 98.9 (48.02-2.70)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	4.49 (at 2.69Å)	Xtriage
Refinement program	CNS 1.2	Depositor
R, R_{free}	0.210 , 0.241 0.209 , 0.260	Depositor DCC
R_{free} test set	1045 reflections (5.10%)	wwPDB-VP
Wilson B-factor (Å ²)	50.7	Xtriage
Anisotropy	0.730	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 35.5	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	5730	wwPDB-VP
Average B, all atoms (Å ²)	49.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 5.46% 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: SRT, GOL, PEG, NAG, EDO, DGL

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	0.59	1/1374 (0.1%)	1.22	14/1871 (0.7%)
1	B	0.60	1/1374 (0.1%)	1.29	25/1871 (1.3%)
1	C	0.52	0/1374	1.25	22/1871 (1.2%)
1	D	0.62	1/1374 (0.1%)	1.19	13/1871 (0.7%)
All	All	0.58	3/5496 (0.1%)	1.24	74/7484 (1.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	2

All (3) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	5	ALA	C-N	7.81	1.43	1.33
1	A	5	ALA	C-N	-7.05	1.24	1.33
1	B	92	ALA	CA-C	-5.10	1.48	1.53

All (74) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	124	ALA	N-CA-C	9.72	121.63	111.14
1	B	132	VAL	N-CA-C	9.62	120.46	110.36
1	B	132	VAL	CB-CA-C	-9.11	100.22	111.88
1	C	157	ASP	N-CA-C	8.56	120.30	110.97
1	C	95	GLY	CA-C-N	8.55	128.68	119.28
1	C	95	GLY	C-N-CA	8.55	128.68	119.28

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	111	TYR	N-CA-C	8.17	122.82	113.02
1	D	70	GLY	N-CA-C	8.07	121.86	112.50
1	C	94	ALA	N-CA-CB	-7.91	99.72	111.43
1	C	3	PRO	N-CA-C	-7.87	101.10	110.70
1	C	5	ALA	N-CA-C	-7.76	100.92	111.55
1	D	116	PRO	N-CA-C	-7.70	101.30	110.70
1	D	78	ASP	N-CA-C	-7.58	104.01	113.18
1	C	94	ALA	N-CA-C	7.41	121.90	111.30
1	B	9	ILE	N-CA-C	7.24	119.15	109.37
1	C	112	MET	N-CA-C	-7.14	102.91	111.69
1	A	88	ASN	N-CA-C	7.13	122.07	113.23
1	C	70	GLY	N-CA-C	7.08	122.86	113.37
1	C	18	LEU	N-CA-C	-7.07	100.01	110.48
1	D	25	ARG	N-CA-C	6.90	120.83	110.14
1	C	141	TYR	N-CA-C	6.81	119.09	110.24
1	C	156	GLY	N-CA-C	-6.74	103.15	112.18
1	C	32	TYR	N-CA-C	6.70	120.43	109.85
1	B	18	LEU	N-CA-C	-6.69	101.25	110.35
1	C	160	TYR	N-CA-C	-6.63	104.05	111.28
1	A	71	TYR	N-CA-C	6.57	119.42	110.55
1	B	153	LEU	N-CA-C	-6.53	105.28	113.18
1	D	88	ASN	N-CA-C	6.53	121.53	113.50
1	B	12	ARG	CB-CA-C	-6.43	100.51	110.81
1	B	44	ASP	CB-CA-C	6.39	119.75	109.27
1	B	98	TRP	N-CA-C	6.38	121.26	112.90
1	B	3	PRO	CA-C-N	6.33	127.75	119.84
1	B	3	PRO	C-N-CA	6.33	127.75	119.84
1	A	116	PRO	N-CA-C	-6.32	102.99	110.70
1	A	93	HIS	N-CA-CB	-6.17	101.46	110.47
1	D	95	GLY	CA-C-N	6.09	125.77	119.56
1	D	95	GLY	C-N-CA	6.09	125.77	119.56
1	B	124	ALA	CB-CA-C	-6.04	101.36	110.90
1	B	50	ALA	N-CA-C	-6.00	104.66	111.14
1	B	70	GLY	N-CA-C	5.89	119.34	112.50
1	C	120	ALA	N-CA-C	-5.88	104.46	111.69
1	A	32	TYR	N-CA-C	5.82	119.03	109.72
1	A	5	ALA	CB-CA-C	5.80	121.96	110.42
1	B	71	TYR	N-CA-C	5.79	118.66	110.50
1	B	78	ASP	N-CA-C	-5.77	106.09	113.01
1	A	3	PRO	N-CA-C	5.75	117.72	110.70
1	C	168	HIS	N-CA-C	5.75	120.16	113.20
1	C	88	ASN	N-CA-C	5.69	120.50	113.50

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	95	GLY	CA-C-N	5.66	125.51	119.28
1	B	95	GLY	C-N-CA	5.66	125.51	119.28
1	B	116	PRO	CA-C-N	5.62	123.77	119.66
1	B	116	PRO	C-N-CA	5.62	123.77	119.66
1	C	166	TRP	N-CA-C	5.61	118.14	110.24
1	D	46	PRO	N-CA-C	5.56	122.78	113.78
1	C	37	HIS	N-CA-C	-5.55	100.91	109.52
1	D	87	TRP	N-CA-C	5.52	118.23	111.82
1	A	94	ALA	N-CA-C	5.44	117.85	110.88
1	D	68	ASP	CB-CA-C	5.42	120.70	110.95
1	D	157	ASP	N-CA-C	5.39	117.58	111.11
1	C	35	VAL	N-CA-C	5.38	115.84	107.99
1	C	87	TRP	N-CA-C	5.33	118.00	111.82
1	B	27	THR	N-CA-C	5.31	117.99	108.17
1	D	153	LEU	N-CA-C	-5.30	106.81	113.28
1	B	158	ARG	N-CA-C	5.28	117.04	111.28
1	A	18	LEU	N-CA-C	-5.23	103.13	110.50
1	A	70	GLY	N-CA-C	5.17	118.94	112.73
1	B	30	VAL	N-CA-C	5.16	116.72	108.87
1	A	6	CYS	CA-CB-SG	-5.16	102.54	114.40
1	D	129	ALA	N-CA-C	-5.10	105.72	111.28
1	A	95	GLY	CA-C-N	5.10	124.71	119.56
1	A	95	GLY	C-N-CA	5.10	124.71	119.56
1	C	111	TYR	N-CA-C	5.09	119.65	111.81
1	B	88	ASN	N-CA-C	5.08	120.47	113.97
1	B	12	ARG	N-CA-C	5.01	117.12	111.11

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	5	ALA	Peptide,Mainchain

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	1337	0	1288	23	0
1	B	1337	0	1288	40	0
1	C	1337	0	1288	27	0
1	D	1337	0	1288	45	0
2	E	43	0	38	4	0
3	A	24	0	32	1	0
3	D	6	0	8	1	0
4	A	4	0	6	1	0
5	B	7	0	10	1	0
6	C	5	0	4	2	0
7	C	10	0	6	1	0
8	D	10	0	3	0	0
9	A	83	0	0	4	0
9	B	67	0	0	3	0
9	C	61	0	0	0	0
9	D	62	0	0	0	0
All	All	5730	0	5259	137	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 13.

All (137) 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)
9:A:197:HOH:O	5:B:6073:PEG:H41	1.50	1.09
1:D:74:LEU:HD22	1:D:108:MET:HE3	1.38	1.03
1:D:112:MET:HE2	1:D:156:GLY:HA2	1.40	1.02
1:B:112:MET:HE2	1:B:156:GLY:HA2	1.49	0.95
1:D:112:MET:HE3	1:D:153:LEU:HB3	1.49	0.94
1:B:39:ALA:HB3	2:E:1:NAG:H5	1.56	0.87
1:D:112:MET:CE	1:D:153:LEU:HB3	2.08	0.83
1:C:3:PRO:CB	1:C:4:PRO:HA	2.10	0.81
1:C:66:TRP:CD1	6:C:2991:ALA:HA	2.15	0.81
1:C:31:ARG:HD2	1:C:138:ARG:NH1	1.98	0.78
1:D:162:ILE:O	1:D:165:THR:HB	1.86	0.75
1:D:140:ASN:H	1:D:140:ASN:HD22	1.32	0.75
1:C:3:PRO:HB3	1:C:4:PRO:HA	1.74	0.70
1:A:3:PRO:N	1:A:4:PRO:HD3	2.07	0.70
1:C:2:ASP:HB3	1:C:3:PRO:HD2	1.74	0.69
1:C:2:ASP:HB3	1:C:3:PRO:CD	2.21	0.69
1:B:37:HIS:HD2	1:B:111:TYR:H	1.41	0.68
1:B:112:MET:HE3	1:B:153:LEU:HG	1.76	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:74:LEU:CD2	1:D:108:MET:HE3	2.21	0.68
1:B:26:LEU:HD13	1:B:90:LYS:HA	1.76	0.67
1:A:99:ASN:N	1:A:100:PRO:HD2	2.09	0.67
1:B:112:MET:CE	1:B:153:LEU:HG	2.25	0.67
1:C:85:ARG:HD2	1:C:91:GLY:HA2	1.80	0.64
4:A:3318:EDO:H12	9:A:197:HOH:O	1.99	0.63
1:D:105:ILE:O	1:D:105:ILE:HG13	1.96	0.63
1:B:93:HIS:HE1	9:B:193:HOH:O	1.83	0.62
1:D:71:TYR:OH	3:D:503:GOL:H31	1.99	0.61
1:B:43:CYS:HB2	1:B:48:SER:OG	1.99	0.61
1:C:4:PRO:HG2	1:C:6:CYS:HB3	1.83	0.61
1:D:4:PRO:O	1:D:5:ALA:HB3	2.00	0.61
1:B:39:ALA:CB	2:E:1:NAG:H5	2.29	0.61
1:A:155:PRO:HB2	1:A:159:LEU:HD23	1.84	0.60
1:B:30:VAL:HG13	1:B:101:ILE:O	2.02	0.59
1:C:3:PRO:CB	1:C:4:PRO:CA	2.81	0.59
1:B:71:TYR:HD1	1:B:74:LEU:HD11	1.66	0.58
6:C:2991:ALA:O	7:C:2992:DGL:HG3	2.04	0.58
1:C:12:ARG:HG3	1:C:83:GLU:OE1	2.04	0.58
1:D:38:THR:OG1	1:D:109:GLY:N	2.36	0.57
1:C:43:CYS:O	1:C:77:GLU:HB2	2.04	0.57
1:B:37:HIS:HE1	2:E:2:NAG:O7	1.87	0.57
1:D:3:PRO:O	1:D:4:PRO:C	2.47	0.57
1:B:144:LYS:NZ	1:B:171:ALA:O	2.39	0.56
1:B:71:TYR:CD1	1:B:74:LEU:HD11	2.40	0.56
1:B:81:VAL:HG11	1:B:127:LEU:HD13	1.87	0.56
1:C:3:PRO:HB2	1:C:4:PRO:HA	1.87	0.56
1:A:43:CYS:O	1:A:77:GLU:HB2	2.06	0.55
1:D:155:PRO:HB2	1:D:159:LEU:HD23	1.89	0.55
1:B:37:HIS:CD2	1:B:111:TYR:H	2.22	0.55
1:B:44:ASP:O	1:B:78:ASP:HA	2.06	0.55
1:B:112:MET:HE2	1:B:156:GLY:CA	2.30	0.54
1:B:32:TYR:HB2	1:B:102:SER:HB3	1.89	0.54
1:D:38:THR:C	1:D:40:GLY:H	2.16	0.53
1:D:2:ASP:O	1:D:3:PRO:C	2.51	0.53
1:D:121:LEU:O	1:D:125:GLN:HG3	2.07	0.53
1:B:132:VAL:HA	1:B:137:LEU:O	2.09	0.53
1:B:30:VAL:O	1:B:138:ARG:HG2	2.08	0.52
1:A:15:TRP:CZ3	1:A:17:ALA:HB2	2.45	0.51
1:A:36:SER:HA	1:A:155:PRO:HB3	1.91	0.51
1:C:31:ARG:HD2	1:C:138:ARG:HH12	1.73	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:126:ASN:ND2	1:B:5:ALA:HA	2.25	0.51
1:D:140:ASN:HD22	1:D:140:ASN:N	2.03	0.51
1:D:53:ALA:HA	1:D:108:MET:HE1	1.93	0.50
1:D:59:TYR:HD1	1:D:63:ASN:HB2	1.76	0.50
1:B:2:ASP:O	1:B:3:PRO:C	2.55	0.50
1:A:117:PRO:HB3	3:A:172:GOL:H12	1.93	0.50
1:D:43:CYS:O	1:D:77:GLU:HB2	2.12	0.50
1:D:68:ASP:OD1	1:D:69:VAL:N	2.43	0.49
1:D:112:MET:HE2	1:D:156:GLY:CA	2.27	0.49
1:B:105:ILE:O	1:B:105:ILE:HG13	2.13	0.48
1:D:42:HIS:CE1	1:D:114:ARG:NH1	2.82	0.48
1:D:71:TYR:CD2	1:D:106:SER:HB2	2.48	0.48
1:B:77:GLU:OE2	1:B:114:ARG:NH2	2.46	0.48
1:C:12:ARG:HB3	1:C:17:ALA:HB3	1.95	0.48
1:C:112:MET:HA	1:C:157:ASP:H	1.78	0.48
1:C:99:ASN:N	1:C:100:PRO:CD	2.77	0.47
1:C:119:ARG:HB3	1:C:122:ARG:NH1	2.29	0.47
1:D:112:MET:HE1	1:D:153:LEU:HB3	1.96	0.47
1:D:142:GLU:OE1	1:D:144:LYS:NZ	2.47	0.47
1:D:146:HIS:HD1	1:D:154:SER:CB	2.28	0.47
1:D:85:ARG:NH1	1:D:90:LYS:O	2.48	0.47
1:C:75:ILE:HD13	1:C:81:VAL:HG22	1.96	0.46
1:B:3:PRO:HA	1:B:4:PRO:HD2	1.68	0.46
1:D:93:HIS:CE1	1:D:104:GLY:HA3	2.50	0.46
1:C:75:ILE:CD1	1:C:81:VAL:HG22	2.46	0.46
1:D:15:TRP:CH2	1:D:17:ALA:HB2	2.50	0.46
1:C:127:LEU:O	1:C:130:CYS:HB3	2.16	0.46
1:A:4:PRO:HB2	1:A:5:ALA:H	1.43	0.45
1:A:99:ASN:N	1:A:100:PRO:CD	2.79	0.45
1:D:4:PRO:O	1:D:5:ALA:CB	2.63	0.45
1:C:42:HIS:CE1	1:C:114:ARG:NH1	2.85	0.45
1:A:13:ARG:HA	9:A:221:HOH:O	2.17	0.45
1:B:37:HIS:CE1	2:E:2:NAG:O7	2.69	0.44
1:A:95:GLY:HA3	1:A:150:GLN:NE2	2.31	0.44
1:B:112:MET:HE1	1:B:147:ARG:HH21	1.83	0.44
1:D:57:GLN:O	1:D:61:VAL:HG23	2.17	0.44
1:D:142:GLU:CD	1:D:170:ARG:HD3	2.42	0.44
1:B:43:CYS:O	1:B:77:GLU:HB2	2.18	0.44
1:B:170:ARG:NH1	9:B:278:HOH:O	2.51	0.44
1:B:71:TYR:CD1	1:B:74:LEU:CD1	3.01	0.43
1:B:93:HIS:CE1	9:B:193:HOH:O	2.64	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:4:PRO:O	1:A:5:ALA:C	2.62	0.43
1:A:12:ARG:NH1	1:A:20:SER:HB2	2.34	0.43
1:A:38:THR:C	1:A:40:GLY:N	2.75	0.43
1:C:3:PRO:HB2	1:C:4:PRO:CA	2.47	0.43
1:C:99:ASN:N	1:C:100:PRO:HD3	2.33	0.43
1:D:78:ASP:OD2	1:D:82:TYR:OH	2.35	0.43
1:D:169:TYR:CE2	1:D:171:ALA:HB2	2.54	0.43
1:A:2:ASP:C	1:A:4:PRO:HD3	2.43	0.43
1:D:127:LEU:O	1:D:130:CYS:HB3	2.19	0.43
1:B:112:MET:HE1	1:B:147:ARG:NH2	2.33	0.43
1:D:117:PRO:O	1:D:118:PRO:C	2.62	0.43
1:C:26:LEU:HG	1:C:90:LYS:HA	2.00	0.43
1:B:90:LYS:HG3	1:B:100:PRO:HA	2.01	0.43
1:A:3:PRO:N	1:A:4:PRO:CD	2.80	0.42
1:C:48:SER:O	1:C:51:GLN:HB3	2.19	0.42
1:A:8:SER:HA	9:A:188:HOH:O	2.19	0.42
1:D:22:CYS:SG	1:D:68:ASP:HB3	2.59	0.42
1:D:37:HIS:C	1:D:37:HIS:CD2	2.97	0.42
1:B:37:HIS:CE1	1:B:154:SER:HA	2.54	0.42
1:B:137:LEU:HD23	1:B:137:LEU:HA	1.91	0.42
1:D:38:THR:C	1:D:40:GLY:N	2.78	0.42
1:A:128:LEU:O	1:A:132:VAL:HG23	2.20	0.41
1:D:17:ALA:O	1:D:18:LEU:C	2.60	0.41
1:C:60:HIS:O	1:C:66:TRP:HB2	2.20	0.41
1:D:111:TYR:CD1	1:D:111:TYR:N	2.87	0.41
1:D:111:TYR:CD2	1:D:116:PRO:HG3	2.55	0.41
1:B:153:LEU:HD12	1:B:153:LEU:HA	1.93	0.41
1:A:146:HIS:HB3	1:A:154:SER:HB3	2.03	0.41
1:C:158:ARG:O	1:C:161:GLU:HB3	2.21	0.41
1:D:99:ASN:N	1:D:100:PRO:CD	2.84	0.41
1:B:16:ARG:HG2	1:B:16:ARG:HH11	1.85	0.40
1:B:163:ILE:HD13	1:B:163:ILE:HA	1.76	0.40
1:D:163:ILE:C	1:D:165:THR:N	2.80	0.40
1:A:51:GLN:O	1:A:54:GLN:HB3	2.21	0.40
1:B:6:CYS:HB3	1:B:7:GLY:H	1.62	0.40
1:A:7:GLY:N	1:A:130:CYS:SG	2.83	0.40
1:A:15:TRP:CE3	1:A:17:ALA:HB2	2.56	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	169/171 (99%)	155 (92%)	11 (6%)	3 (2%)	6	18
1	B	169/171 (99%)	151 (89%)	13 (8%)	5 (3%)	3	8
1	C	169/171 (99%)	157 (93%)	8 (5%)	4 (2%)	4	12
1	D	169/171 (99%)	155 (92%)	10 (6%)	4 (2%)	4	12
All	All	676/684 (99%)	618 (91%)	42 (6%)	16 (2%)	4	12

All (16) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	4	PRO
1	D	4	PRO
1	A	7	GLY
1	B	139	SER
1	C	3	PRO
1	C	7	GLY
1	A	4	PRO
1	B	151	PRO
1	B	168	HIS
1	D	3	PRO
1	D	5	ALA
1	B	3	PRO
1	C	2	ASP
1	A	3	PRO
1	D	39	ALA
1	C	4	PRO

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	139/139 (100%)	137 (99%)	2 (1%)	59	82
1	B	139/139 (100%)	132 (95%)	7 (5%)	22	48
1	C	139/139 (100%)	137 (99%)	2 (1%)	59	82
1	D	139/139 (100%)	131 (94%)	8 (6%)	18	42
All	All	556/556 (100%)	537 (97%)	19 (3%)	32	62

All (19) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	CYS
1	A	105	ILE
1	B	6	CYS
1	B	37	HIS
1	B	103	ILE
1	B	130	CYS
1	B	152	THR
1	B	155	PRO
1	B	163	ILE
1	C	1	GLU
1	C	3	PRO
1	D	3	PRO
1	D	4	PRO
1	D	8	SER
1	D	46	PRO
1	D	118	PRO
1	D	140	ASN
1	D	155	PRO
1	D	165	THR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	52	GLN
1	A	125	GLN
1	A	150	GLN
1	B	37	HIS
1	B	51	GLN
1	B	88	ASN

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Mol	Chain	Res	Type
1	B	93	HIS
1	B	110	ASN
1	B	113	ASN
1	B	168	HIS
1	C	52	GLN
1	D	42	HIS
1	D	54	GLN
1	D	63	ASN
1	D	93	HIS
1	D	140	ASN
1	D	150	GLN

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 ⓘ

3 monosaccharides 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
2	NAG	E	1	2	15,15,15	1.31	2 (13%)	21,21,21	1.04	1 (4%)
2	NAG	E	2	2	14,14,15	1.73	2 (14%)	17,19,21	1.49	3 (17%)
2	NAG	E	3	2	14,14,15	1.53	3 (21%)	17,19,21	2.13	5 (29%)

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
2	NAG	E	1	2	-	0/6/26/26	0/1/1/1
2	NAG	E	2	2	-	0/6/23/26	0/1/1/1
2	NAG	E	3	2	-	1/6/23/26	0/1/1/1

All (7) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	E	2	NAG	O5-C1	4.53	1.51	1.43
2	E	2	NAG	C1-C2	3.92	1.57	1.52
2	E	3	NAG	C1-C2	3.27	1.56	1.52
2	E	1	NAG	C1-C2	2.71	1.56	1.52
2	E	3	NAG	C2-N2	2.10	1.49	1.46
2	E	1	NAG	C4-C5	2.08	1.57	1.53
2	E	3	NAG	C7-N2	2.04	1.40	1.34

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	E	3	NAG	O7-C7-C8	-5.13	112.93	122.05
2	E	3	NAG	C8-C7-N2	4.18	123.05	116.12
2	E	3	NAG	C2-N2-C7	-3.64	118.02	122.90
2	E	2	NAG	C1-O5-C5	-3.32	107.74	112.19
2	E	2	NAG	C2-N2-C7	-2.46	119.60	122.90
2	E	2	NAG	C8-C7-N2	2.38	120.07	116.12
2	E	1	NAG	C1-O5-C5	-2.35	109.11	113.65
2	E	3	NAG	C6-C5-C4	-2.31	107.35	113.02
2	E	3	NAG	O5-C1-C2	-2.20	107.88	111.29

There are no chirality outliers.

All (1) torsion outliers are listed below:

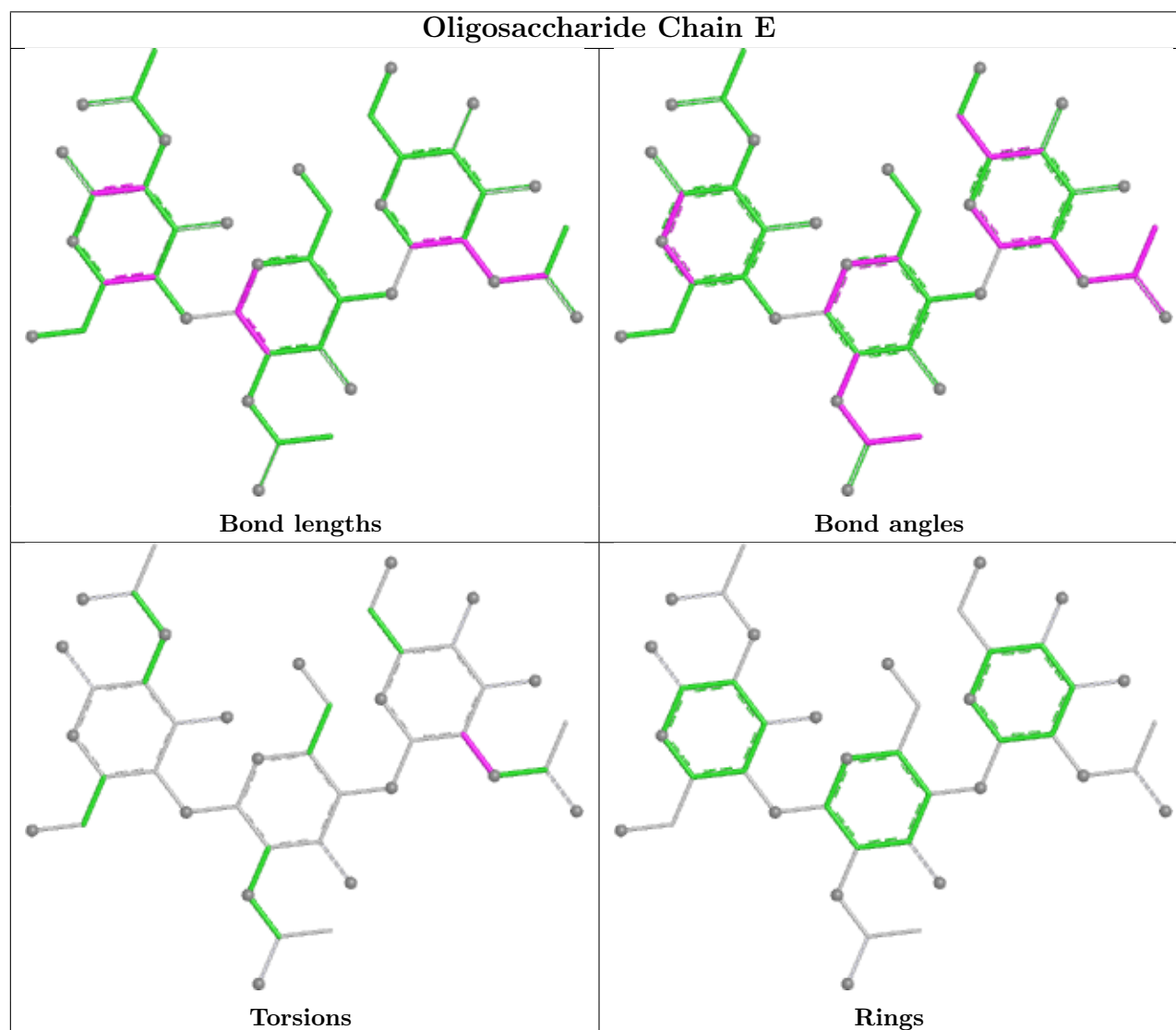
Mol	Chain	Res	Type	Atoms
2	E	3	NAG	C1-C2-N2-C7

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	1	NAG	2	0
2	E	2	NAG	2	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for oligosaccharide.



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
3	GOL	A	175	-	5,5,5	0.46	0	5,5,5	0.28	0
8	SRT	D	172	-	9,9,9	4.12	4 (44%)	12,12,12	1.33	1 (8%)
5	PEG	B	6073	-	6,6,6	1.43	1 (16%)	5,5,5	1.05	1 (20%)
7	DGL	C	2992	6	8,9,9	0.98	0	8,11,11	0.96	0
3	GOL	A	173	-	5,5,5	0.58	0	5,5,5	0.26	0
6	ALA	C	2991	7	3,4,5	1.01	0	2,4,6	1.13	0
3	GOL	D	503	-	5,5,5	0.44	0	5,5,5	0.30	0
3	GOL	A	174	-	5,5,5	0.83	0	5,5,5	0.23	0
4	EDO	A	3318	-	3,3,3	0.56	0	2,2,2	0.39	0
3	GOL	A	172	-	5,5,5	0.73	0	5,5,5	0.44	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
3	GOL	A	175	-	-	0/4/4/4	-
8	SRT	D	172	-	-	4/12/12/12	-
5	PEG	B	6073	-	-	1/4/4/4	-
7	DGL	C	2992	6	-	4/9/9/9	-
3	GOL	A	173	-	-	0/4/4/4	-
6	ALA	C	2991	7	-	0/1/2/4	-
3	GOL	D	503	-	-	0/4/4/4	-
3	GOL	A	174	-	-	1/4/4/4	-
4	EDO	A	3318	-	-	0/1/1/1	-
3	GOL	A	172	-	-	0/4/4/4	-

All (5) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
8	D	172	SRT	O2-C2	-11.23	1.20	1.42
8	D	172	SRT	O11-C1	2.86	1.30	1.22
8	D	172	SRT	O1-C1	-2.50	1.22	1.30
8	D	172	SRT	O4-C4	2.48	1.29	1.22
5	B	6073	PEG	O1-C1	2.39	1.54	1.42

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
8	D	172	SRT	O41-C4-C3	2.79	121.06	113.31

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	B	6073	PEG	C3-O2-C2	-2.02	104.41	113.26

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
8	D	172	SRT	O2-C2-C3-O3
8	D	172	SRT	O3-C3-C4-O4
8	D	172	SRT	O3-C3-C4-O41
3	A	174	GOL	O1-C1-C2-O2
5	B	6073	PEG	O2-C3-C4-O4
7	C	2992	DGL	OE2-CD-CG-CB
7	C	2992	DGL	OE1-CD-CG-CB
7	C	2992	DGL	OXT-C-CA-CB
7	C	2992	DGL	O-C-CA-CB
8	D	172	SRT	C1-C2-C3-O3

There are no ring outliers.

6 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	B	6073	PEG	1	0
7	C	2992	DGL	1	0
6	C	2991	ALA	2	0
3	D	503	GOL	1	0
4	A	3318	EDO	1	0
3	A	172	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

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	171/171 (100%)	-0.27	4 (2%) 61 58	29, 45, 63, 100	0
1	B	171/171 (100%)	0.07	7 (4%) 41 37	33, 54, 87, 101	0
1	C	171/171 (100%)	-0.22	5 (2%) 53 50	28, 41, 60, 100	0
1	D	171/171 (100%)	-0.09	5 (2%) 53 50	29, 44, 65, 100	0
All	All	684/684 (100%)	-0.13	21 (3%) 51 48	28, 45, 77, 101	0

All (21) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	D	3	PRO	5.1
1	C	3	PRO	4.2
1	D	5	ALA	4.2
1	D	4	PRO	4.1
1	C	5	ALA	4.0
1	A	2	ASP	4.0
1	A	3	PRO	3.7
1	B	3	PRO	3.5
1	B	5	ALA	3.5
1	C	6	CYS	3.3
1	B	2	ASP	3.1
1	A	4	PRO	2.6
1	C	4	PRO	2.6
1	D	2	ASP	2.5
1	B	1	GLU	2.5
1	D	1	GLU	2.5
1	A	6	CYS	2.4
1	B	4	PRO	2.4
1	B	6	CYS	2.2
1	B	7	GLY	2.2
1	C	8	SER	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

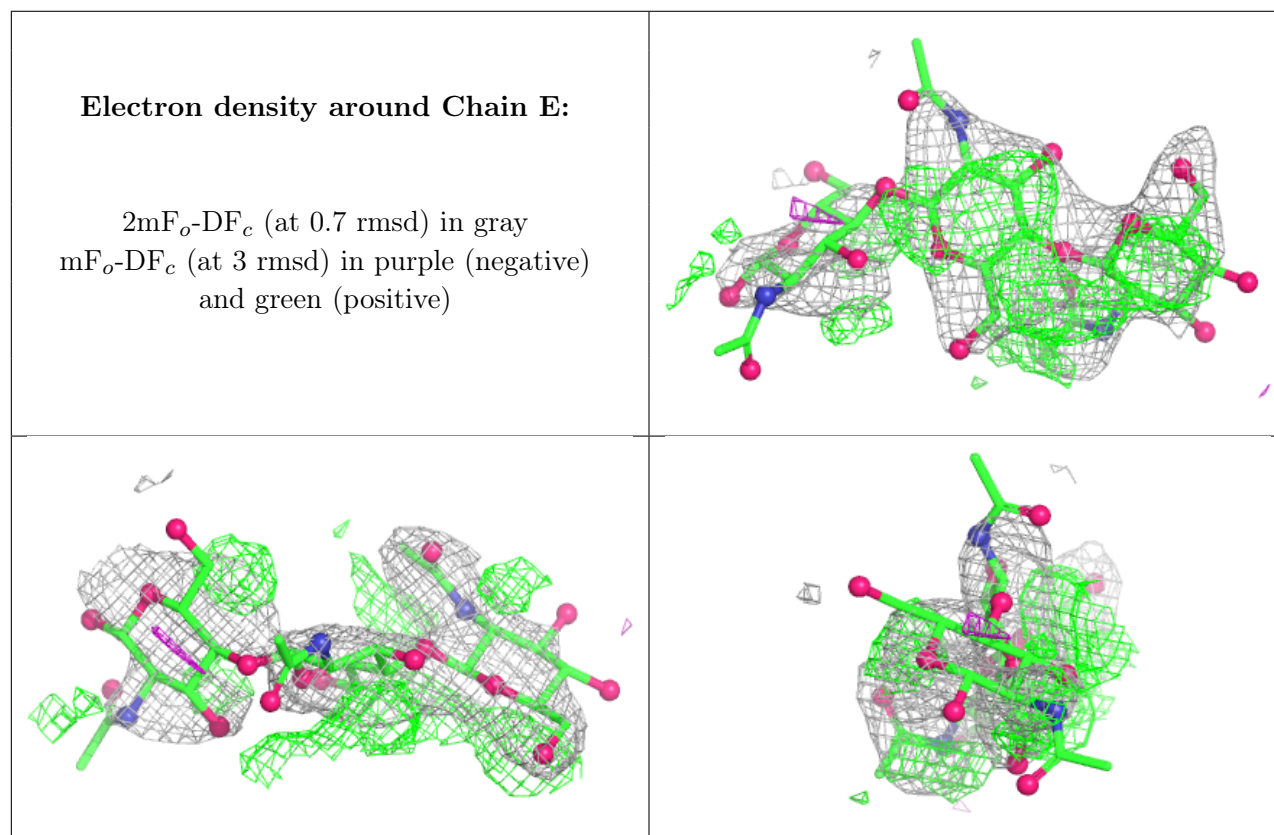
There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates [i](#)

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($\text{\AA}^2$)	Q<0.9
2	NAG	E	3	14/15	0.49	0.19	50,55,57,59	14
2	NAG	E	1	15/15	0.60	0.23	53,54,55,56	15
2	NAG	E	2	14/15	0.71	0.20	48,52,55,57	14

The following is a graphical depiction of the model fit to experimental electron density for oligosaccharide. Each fit is shown from different orientation to approximate a three-dimensional view.



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($\text{\AA}^2$)	Q<0.9
3	GOL	A	172	6/6	0.55	0.30	74,75,75,75	6
3	GOL	A	173	6/6	0.56	0.34	67,68,68,69	6
4	EDO	A	3318	4/4	0.57	0.26	45,46,46,46	4
5	PEG	B	6073	7/7	0.60	0.23	45,48,49,50	7
3	GOL	A	174	6/6	0.66	0.30	62,64,64,64	6
3	GOL	A	175	6/6	0.66	0.36	74,75,75,75	6
7	DGL	C	2992	10/10	0.67	0.21	49,51,52,52	10
6	ALA	C	2991	5/6	0.68	0.24	51,51,53,53	5
8	SRT	D	172	10/10	0.84	0.13	64,68,70,72	0
3	GOL	D	503	6/6	0.86	0.14	59,60,62,64	0

6.5 Other polymers [i](#)

There are no such residues in this entry.