Full wwPDB X-ray Structure Validation Report ⓘ

Aug 24, 2025 – 11:26 pm BST

PDB ID	:	9GI6 / pdb_00009gi6
Title	:	Structure of SARS-CoV-2 Main Protease (Mpro) with mutation of N214A
Authors	:	Creon, A.; Scheer, T.E.S.; Lane, T.J.; Rahmani Mashhour, A.; Guenther, S.; Reinke, P.Y.A.; Meents, A.; Chapman, H.N.
Deposited on	:	2024-08-17
Resolution	:	1.83 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:

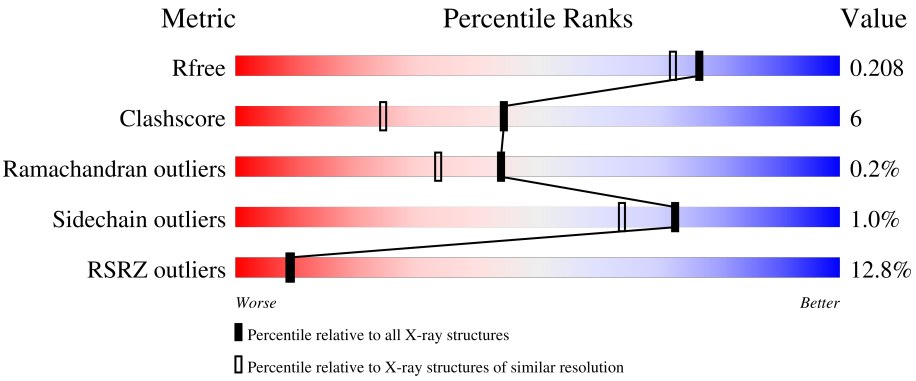
MolProbity	:	4-5-2 with Phenix2.0rc1
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	2.0rc1
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.006 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.45.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.83 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}	164625	1150 (1.84-1.84)
Clashscore	180529	1248 (1.84-1.84)
Ramachandran outliers	177936	1240 (1.84-1.84)
Sidechain outliers	177891	1240 (1.84-1.84)
RSRZ outliers	164620	1149 (1.84-1.84)

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% 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	306	8% 87% 10%
1	B	306	17% 88% 10%

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
2	PEG	B	401	-	-	X	-

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 5229 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.

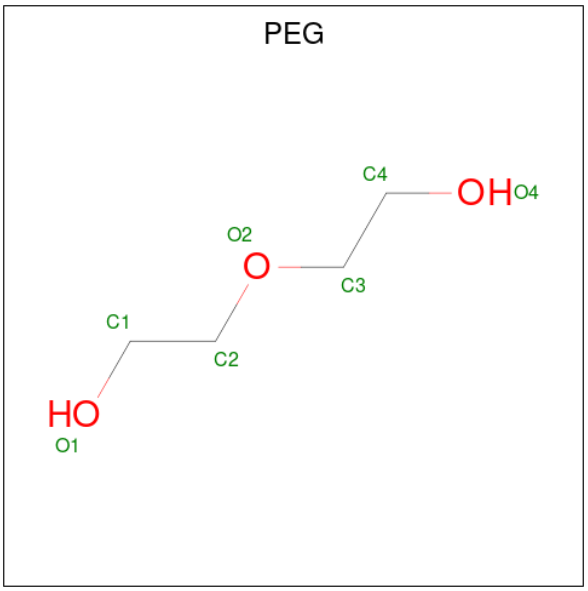
- Molecule 1 is a protein called Replicase polyprotein 1a.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	301	Total	C	N	O	S	0	10	0
			2383	1506	404	449	24			
1	B	301	Total	C	N	O	S	0	7	0
			2372	1503	404	443	22			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	214	ALA	ASN	engineered mutation	UNP A0A6M4EPN9
B	214	ALA	ASN	engineered mutation	UNP A0A6M4EPN9

- Molecule 2 is DI(HYDROXYETHYL)ETHER (CCD ID: PEG) (formula: $C_4H_{10}O_3$).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	C	O	0	0
			7	4	3		

Continued on next page...

Continued from previous page...

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

Continued on next page...

Continued from previous page...

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

- Molecule 3 is CHLORIDE ION (CCD ID: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Cl 1 1	0	0

- Molecule 4 is SODIUM ION (CCD ID: NA) (formula: Na).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Na 1 1	0	0
4	B	1	Total Na 1 1	0	0

- Molecule 5 is water.

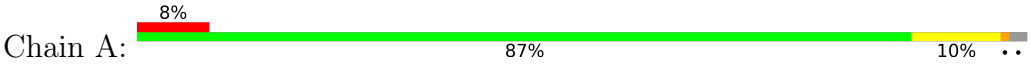
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	204	Total O 204 204	0	0
5	B	106	Total O 106 106	0	0

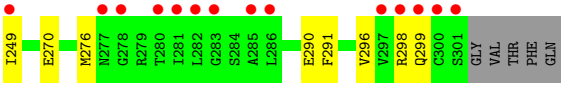
3 Residue-property plots (i)

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: Replicase polyprotein 1a

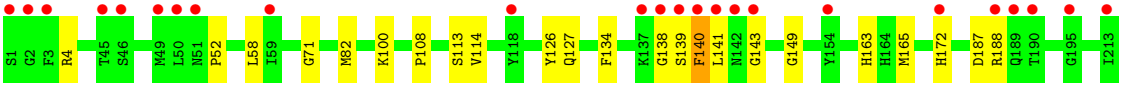
Chain A:

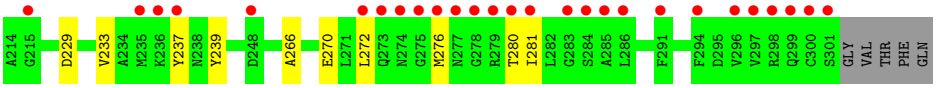




• Molecule 1: Replicase polyprotein 1a

Chain B:





4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	67.81Å 100.57Å 102.18Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	55.28 – 1.83 55.28 – 1.83	Depositor EDS
% Data completeness (in resolution range)	68.9 (55.28-1.83) 68.9 (55.28-1.83)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.92 (at 1.83Å)	Xtriage
Refinement program	PHENIX 1.20.1_4487, PHENIX 1.20.1_4487	Depositor
R, R_{free}	0.174 , 0.207 0.174 , 0.208	Depositor DCC
R_{free} test set	2011 reflections (3.23%)	wwPDB-VP
Wilson B-factor (Å^2)	21.8	Xtriage
Anisotropy	0.046	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.39 , 68.7	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.018 for -h,l,k	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	5229	wwPDB-VP
Average B, all atoms (Å^2)	36.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.04% of the height of the origin peak. No significant pseudotranslation is detected.*

[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: PEG, CL, NA

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	0.33	0/2435	0.52	0/3310
1	B	0.30	0/2426	0.48	0/3297
All	All	0.32	0/4861	0.50	0/6607

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts

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	2383	0	2321	28	1
1	B	2372	0	2315	30	0
2	A	98	0	140	8	0
2	B	63	0	90	11	0
3	A	1	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
5	A	204	0	0	4	0
5	B	106	0	0	2	1
All	All	5229	0	4866	58	1

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 6.

All (58) 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:B:100[B]:LYS:HG3	2:B:404:PEG:H32	1.66	0.78
2:A:404:PEG:HO1	2:A:408:PEG:HO1	1.31	0.77
1:B:140:PHE:HA	2:B:402:PEG:H31	1.69	0.73
1:A:49:MET:HB3	1:A:189:GLN:HG3	1.75	0.67
1:A:55[B]:GLU:OE2	5:A:501:HOH:O	2.13	0.66
1:A:55[B]:GLU:HG3	1:A:82:MET:HE1	1.77	0.66
1:B:165:MET:HE1	1:B:187:ASP:HA	1.79	0.65
1:B:280:THR:O	5:B:501:HOH:O	2.15	0.64
1:A:90:LYS:HB2	2:A:402:PEG:H22	1.79	0.64
1:B:58:LEU:HD22	1:B:82:MET:HE3	1.80	0.63
1:B:126:TYR:HA	2:B:401:PEG:H31	1.85	0.59
1:A:90:LYS:HE3	2:A:402:PEG:H32	1.86	0.58
1:A:189:GLN:HG2	2:A:401:PEG:H41	1.85	0.58
1:A:299:GLN:HB3	2:B:402:PEG:H42	1.85	0.57
1:A:202:VAL:HG21	1:A:249[B]:ILE:HD11	1.87	0.57
1:B:100[A]:LYS:HD2	2:B:404:PEG:H21	1.87	0.55
1:B:163:HIS:CD2	1:B:172[B]:HIS:HB2	2.43	0.54
1:A:139:SER:O	5:A:503:HOH:O	2.19	0.54
1:B:266:ALA:O	1:B:270:GLU:HG2	2.09	0.52
1:A:290:GLU:OE1	5:A:502:HOH:O	2.18	0.51
1:A:126:TYR:CD1	1:B:4:ARG:HD2	2.47	0.50
1:B:139:SER:HA	1:B:172[A]:HIS:NE2	2.26	0.50
1:B:52:PRO:HD2	1:B:188:ARG:HG2	1.93	0.50
1:A:23:GLY:HA3	2:A:408:PEG:H22	1.93	0.49
1:A:113:SER:O	1:A:149:GLY:HA2	2.13	0.49
1:A:298:ARG:HH21	2:A:412:PEG:H21	1.79	0.48
1:A:198:THR:OG1	1:A:240:GLU:OE2	2.20	0.48
1:B:239:TYR:CZ	1:B:272:LEU:HD21	2.50	0.47
1:A:86:VAL:HG23	1:A:179:GLY:HA2	1.96	0.46
1:B:143:GLY:O	5:B:502:HOH:O	2.21	0.46
1:A:5:LYS:HE2	5:A:502:HOH:O	2.15	0.46
1:B:127:GLN:H	2:B:401:PEG:H31	1.81	0.45
1:B:113:SER:O	1:B:149:GLY:HA2	2.16	0.45
2:B:403:PEG:H32	2:B:403:PEG:H11	1.77	0.45
1:B:127:GLN:H	2:B:401:PEG:C3	2.31	0.43
1:A:31:TRP:CD2	1:A:95:ASN:HB2	2.52	0.43
1:B:126:TYR:CA	2:B:401:PEG:H31	2.48	0.43
1:B:163:HIS:CD2	1:B:172[A]:HIS:HB3	2.53	0.43

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:140:PHE:HD1	1:A:144:SER:OG	2.02	0.43
1:B:114:VAL:HG11	1:B:140:PHE:HE2	1.84	0.43
1:B:276:MET:HE1	1:B:281:ILE:N	2.33	0.43
1:A:2:GLY:O	1:B:139:SER:HB2	2.19	0.42
1:B:114:VAL:HG11	1:B:140:PHE:CE2	2.54	0.42
1:B:165:MET:HB3	1:B:165:MET:HE2	1.61	0.42
1:A:276:MET:HE3	1:A:276:MET:HB3	1.90	0.42
1:A:25:THR:OG1	2:A:408:PEG:H32	2.19	0.42
1:B:140:PHE:CD1	1:B:140:PHE:N	2.84	0.41
1:B:108:PRO:HG3	1:B:134:PHE:CE1	2.56	0.41
1:A:298:ARG:HH21	2:A:412:PEG:C2	2.34	0.41
1:B:71:GLY:H	2:B:409:PEG:H11	1.86	0.41
1:A:31:TRP:CE2	1:A:95:ASN:HB2	2.56	0.41
1:B:229:ASP:O	1:B:233:VAL:HG23	2.21	0.41
1:B:233:VAL:O	1:B:237:TYR:HD1	2.04	0.41
1:A:4:ARG:HE	1:B:138:GLY:HA2	1.86	0.41
2:B:401:PEG:H32	2:B:401:PEG:H12	1.65	0.41
1:A:109:GLY:HA2	1:A:200:ILE:HD13	2.02	0.40
1:A:291:PHE:CD2	1:A:296:VAL:HG22	2.57	0.40
1:A:291:PHE:CE2	1:A:296:VAL:HG22	2.56	0.40

All (1) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:270:GLU:OE2	5:B:547:HOH:O[2_555]	2.15	0.05

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	307/306 (100%)	292 (95%)	15 (5%)	0	100	100

Continued on next page...

Continued from previous page...

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles
1	B	304/306 (99%)	296 (97%)	7 (2%)	1 (0%)	37 25
All	All	611/612 (100%)	588 (96%)	22 (4%)	1 (0%)	44 33

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	141	LEU

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	266/262 (102%)	262 (98%)	4 (2%)	60 47
1	B	263/262 (100%)	262 (100%)	1 (0%)	89 87
All	All	529/524 (101%)	524 (99%)	5 (1%)	73 67

All (5) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	5	LYS
1	A	49	MET
1	A	62	SER
1	A	144	SER
1	B	140	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (7) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	19	GLN
1	A	107	GLN
1	A	163	HIS
1	A	180	ASN
1	B	69	GLN

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	B	180	ASN
1	B	244	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)

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)

Of 26 ligands modelled in this entry, 3 are monoatomic - leaving 23 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	$\#\|Z\| > 2$
2	PEG	A	413	-	6,6,6	0.23	0	5,5,5	0.09	0
2	PEG	B	407	-	6,6,6	0.19	0	5,5,5	0.07	0
2	PEG	A	407	-	6,6,6	0.23	0	5,5,5	0.09	0
2	PEG	B	403	-	6,6,6	0.17	0	5,5,5	0.08	0
2	PEG	B	401	-	6,6,6	0.36	0	5,5,5	0.14	0
2	PEG	B	404	-	6,6,6	0.14	0	5,5,5	0.11	0
2	PEG	A	401	-	6,6,6	0.26	0	5,5,5	0.08	0
2	PEG	B	409	-	6,6,6	0.16	0	5,5,5	0.08	0
2	PEG	A	409	-	6,6,6	0.15	0	5,5,5	0.09	0
2	PEG	A	411	-	6,6,6	0.16	0	5,5,5	0.07	0
2	PEG	B	406	-	6,6,6	0.19	0	5,5,5	0.11	0
2	PEG	B	402	-	6,6,6	0.14	0	5,5,5	0.08	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\|>2$	Counts	RMSZ	$\#\|Z\|>2$
2	PEG	A	402	-	6,6,6	0.18	0	5,5,5	0.06	0
2	PEG	B	405	-	6,6,6	0.16	0	5,5,5	0.08	0
2	PEG	A	405	-	6,6,6	0.18	0	5,5,5	0.11	0
2	PEG	A	403	-	6,6,6	0.15	0	5,5,5	0.20	0
2	PEG	A	406	-	6,6,6	0.19	0	5,5,5	0.12	0
2	PEG	A	414	-	6,6,6	0.15	0	5,5,5	0.09	0
2	PEG	A	404	-	6,6,6	0.18	0	5,5,5	0.07	0
2	PEG	A	408	-	6,6,6	0.18	0	5,5,5	0.08	0
2	PEG	A	410	-	6,6,6	0.14	0	5,5,5	0.10	0
2	PEG	A	412	-	6,6,6	0.17	0	5,5,5	0.07	0
2	PEG	B	408	-	6,6,6	0.18	0	5,5,5	0.13	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
2	PEG	A	413	-	-	2/4/4/4	-
2	PEG	B	407	-	-	1/4/4/4	-
2	PEG	A	407	-	-	3/4/4/4	-
2	PEG	B	403	-	-	3/4/4/4	-
2	PEG	B	401	-	-	1/4/4/4	-
2	PEG	B	404	-	-	2/4/4/4	-
2	PEG	A	401	-	-	4/4/4/4	-
2	PEG	B	409	-	-	2/4/4/4	-
2	PEG	A	409	-	-	1/4/4/4	-
2	PEG	A	411	-	-	3/4/4/4	-
2	PEG	B	406	-	-	2/4/4/4	-
2	PEG	B	402	-	-	1/4/4/4	-
2	PEG	A	402	-	-	3/4/4/4	-
2	PEG	B	405	-	-	2/4/4/4	-
2	PEG	A	405	-	-	2/4/4/4	-
2	PEG	A	403	-	-	1/4/4/4	-
2	PEG	A	406	-	-	2/4/4/4	-
2	PEG	A	414	-	-	1/4/4/4	-
2	PEG	A	404	-	-	3/4/4/4	-
2	PEG	A	408	-	-	3/4/4/4	-
2	PEG	A	410	-	-	3/4/4/4	-

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	PEG	A	412	-	-	3/4/4/4	-
2	PEG	B	408	-	-	2/4/4/4	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (50) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	B	406	PEG	C4-C3-O2-C2
2	B	401	PEG	C1-C2-O2-C3
2	A	408	PEG	O2-C3-C4-O4
2	A	413	PEG	O2-C3-C4-O4
2	A	404	PEG	O1-C1-C2-O2
2	A	404	PEG	O2-C3-C4-O4
2	A	405	PEG	O1-C1-C2-O2
2	A	410	PEG	O2-C3-C4-O4
2	B	403	PEG	O2-C3-C4-O4
2	B	404	PEG	O1-C1-C2-O2
2	B	404	PEG	O2-C3-C4-O4
2	A	412	PEG	O1-C1-C2-O2
2	A	405	PEG	O2-C3-C4-O4
2	B	409	PEG	O1-C1-C2-O2
2	B	409	PEG	O2-C3-C4-O4
2	A	401	PEG	O2-C3-C4-O4
2	B	403	PEG	O1-C1-C2-O2
2	A	407	PEG	C4-C3-O2-C2
2	B	406	PEG	O1-C1-C2-O2
2	A	412	PEG	C1-C2-O2-C3
2	A	414	PEG	C1-C2-O2-C3
2	A	409	PEG	C1-C2-O2-C3
2	A	413	PEG	C1-C2-O2-C3
2	A	407	PEG	C1-C2-O2-C3
2	A	406	PEG	C1-C2-O2-C3
2	A	412	PEG	O2-C3-C4-O4
2	A	402	PEG	C1-C2-O2-C3
2	A	408	PEG	C4-C3-O2-C2
2	A	401	PEG	O1-C1-C2-O2
2	A	408	PEG	O1-C1-C2-O2
2	B	405	PEG	O2-C3-C4-O4

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	Atoms
2	B	408	PEG	C1-C2-O2-C3
2	A	402	PEG	O1-C1-C2-O2
2	A	403	PEG	O1-C1-C2-O2
2	A	411	PEG	O1-C1-C2-O2
2	A	411	PEG	O2-C3-C4-O4
2	B	408	PEG	C4-C3-O2-C2
2	A	402	PEG	O2-C3-C4-O4
2	A	406	PEG	C4-C3-O2-C2
2	A	411	PEG	C4-C3-O2-C2
2	B	405	PEG	C1-C2-O2-C3
2	A	410	PEG	C1-C2-O2-C3
2	B	403	PEG	C1-C2-O2-C3
2	B	407	PEG	O2-C3-C4-O4
2	B	402	PEG	C4-C3-O2-C2
2	A	404	PEG	C1-C2-O2-C3
2	A	401	PEG	C1-C2-O2-C3
2	A	407	PEG	O2-C3-C4-O4
2	A	410	PEG	C4-C3-O2-C2
2	A	401	PEG	C4-C3-O2-C2

There are no ring outliers.

10 monomers are involved in 19 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	403	PEG	1	0
2	B	401	PEG	5	0
2	B	404	PEG	2	0
2	A	401	PEG	1	0
2	B	409	PEG	1	0
2	B	402	PEG	2	0
2	A	402	PEG	2	0
2	A	404	PEG	1	0
2	A	408	PEG	3	0
2	A	412	PEG	2	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, 95^{th} 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	301/306 (98%)	0.09	26 (8%) 18 18	11, 28, 62, 109	8 (2%)
1	B	301/306 (98%)	0.67	51 (16%) 5 4	14, 36, 80, 137	5 (1%)
All	All	602/612 (98%)	0.38	77 (12%) 9 9	11, 30, 74, 137	13 (2%)

All (77) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	140	PHE	9.2
1	B	294[A]	PHE	6.8
1	A	3	PHE	6.6
1	B	141	LEU	6.2
1	B	3	PHE	6.1
1	A	300	CYS	5.1
1	A	140	PHE	5.1
1	A	1	SER	5.1
1	A	2	GLY	4.8
1	A	141	LEU	4.6
1	B	143	GLY	4.4
1	B	154	TYR	4.3
1	B	50	LEU	4.3
1	A	154	TYR	4.2
1	A	142	ASN	4.2
1	B	138	GLY	4.0
1	B	300	CYS	4.0
1	B	1	SER	3.8
1	B	275	GLY	3.7
1	B	51	ASN	3.6
1	B	274	ASN	3.5
1	B	142	ASN	3.4
1	B	286	LEU	3.3
1	B	189	GLN	3.3

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	272	LEU	3.3
1	A	301	SER	3.3
1	B	190	THR	3.2
1	B	285	ALA	3.2
1	A	283	GLY	3.1
1	B	139	SER	3.1
1	B	301	SER	3.1
1	B	284	SER	3.0
1	A	282	LEU	3.0
1	A	143	GLY	2.9
1	A	299	GLN	2.8
1	A	4	ARG	2.7
1	B	291	PHE	2.7
1	B	172[A]	HIS	2.7
1	A	298	ARG	2.7
1	A	155	ASP	2.7
1	B	296	VAL	2.6
1	B	297	VAL	2.6
1	B	277	ASN	2.6
1	B	283	GLY	2.6
1	A	278	GLY	2.6
1	B	281	ILE	2.5
1	B	280	THR	2.5
1	B	2	GLY	2.5
1	A	285	ALA	2.5
1	B	276	MET	2.4
1	A	281	ILE	2.4
1	B	298	ARG	2.4
1	A	280	THR	2.4
1	B	137	LYS	2.3
1	B	278	GLY	2.3
1	A	286	LEU	2.3
1	A	249[A]	ILE	2.3
1	B	215	GLY	2.3
1	B	118	TYR	2.3
1	B	248	ASP	2.3
1	B	299	GLN	2.3
1	B	46	SER	2.3
1	B	59	ILE	2.2
1	B	195	GLY	2.2
1	B	49	MET	2.2
1	A	47	GLU	2.2

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	B	235	MET	2.2
1	B	237	TYR	2.1
1	A	277	ASN	2.1
1	A	297	VAL	2.1
1	B	279	ARG	2.1
1	B	236	LYS	2.1
1	B	45	THR	2.1
1	B	188	ARG	2.1
1	B	273	GLN	2.0
1	B	213	ILE	2.0
1	A	72[A]	ASN	2.0

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

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

6.3 Carbohydrates (i)

There are no oligosaccharides in this entry.

6.4 Ligands (i)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} 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
2	PEG	B	405	7/7	0.75	0.20	63,71,74,76	0
2	PEG	B	402	7/7	0.79	0.21	66,71,75,78	0
2	PEG	A	410	7/7	0.80	0.15	50,52,66,67	0
2	PEG	B	406	7/7	0.81	0.16	44,49,57,59	0
2	PEG	A	407	7/7	0.82	0.16	49,55,66,67	0
2	PEG	A	413	7/7	0.83	0.17	47,50,63,63	0
2	PEG	A	406	7/7	0.83	0.15	50,51,56,59	0
2	PEG	A	405	7/7	0.84	0.15	43,48,59,65	0
2	PEG	A	412	7/7	0.84	0.17	40,46,53,59	0
2	PEG	A	409	7/7	0.84	0.20	63,64,66,67	0
2	PEG	A	401	7/7	0.85	0.11	28,33,42,44	0
2	PEG	A	408	7/7	0.85	0.15	50,54,57,61	0

Continued on next page...

Continued from previous page...

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	PEG	A	414	7/7	0.85	0.15	51,59,60,65	0
2	PEG	B	403	7/7	0.86	0.14	44,47,55,58	0
2	PEG	B	407	7/7	0.87	0.13	45,50,56,61	0
2	PEG	B	408	7/7	0.87	0.13	36,38,50,53	0
2	PEG	B	409	7/7	0.87	0.13	44,51,64,67	0
2	PEG	A	404	7/7	0.88	0.13	43,48,56,59	0
2	PEG	A	403	7/7	0.88	0.13	41,47,52,59	0
2	PEG	B	404	7/7	0.88	0.13	35,40,49,52	0
2	PEG	B	401	7/7	0.88	0.11	32,32,39,42	0
2	PEG	A	411	7/7	0.91	0.10	37,42,56,56	0
2	PEG	A	402	7/7	0.93	0.09	35,39,44,51	0
4	NA	B	410	1/1	0.97	0.07	33,33,33,33	0
4	NA	A	416	1/1	0.99	0.06	27,27,27,27	0
3	CL	A	415	1/1	1.00	0.03	22,22,22,22	0

6.5 Other polymers (i)

There are no such residues in this entry.