



Full wwPDB X-ray Structure Validation Report ⓘ

Feb 1, 2016 – 10:52 AM GMT

PDB ID : 3NDU
Title : HIV-1 Protease Saquinavir:Ritonavir 1:5 complex structure
Authors : Geremia, S.; Olajuyigbe, F.M.; Demitri, N.
Deposited on : 2010-06-08
Resolution : 1.25 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
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>
with specific help available everywhere you see the ⓘ symbol.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix) : 1.9-1692
EDS : rb-20026688
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac : 5.8.0135
CCP4 : 6.5.0
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : trunk26865

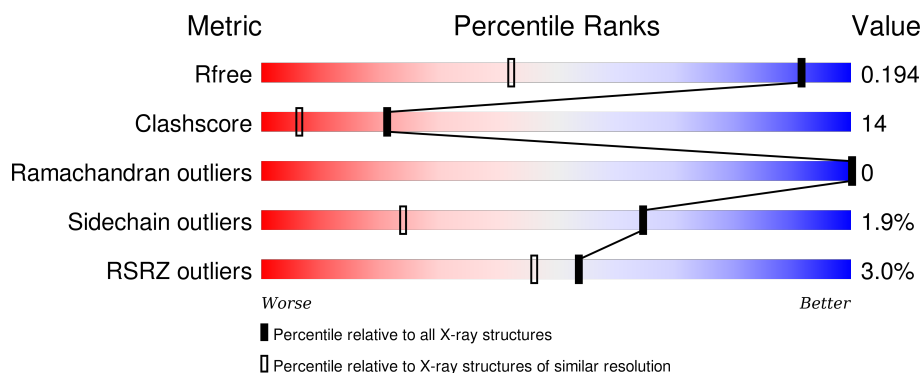
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.25 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}	91344	1442 (1.30-1.22)
Clashscore	102246	1530 (1.30-1.22)
Ramachandran outliers	100387	1467 (1.30-1.22)
Sidechain outliers	100360	1465 (1.30-1.22)
RSRZ outliers	91569	1442 (1.30-1.22)

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 on the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria. 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	100	<div> <div>4%</div> <div>73%</div> <div>23%</div> <div>• •</div> </div>
1	B	100	<div> <div>2%</div> <div>85%</div> <div>12%</div> <div>•</div> </div>
1	C	100	<div> <div>3%</div> <div>82%</div> <div>13%</div> <div>• •</div> </div>
1	D	100	<div> <div>3%</div> <div>77%</div> <div>22%</div> <div>•</div> </div>

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
3	DMS	A	102	-	-	X	X
4	ACT	A	1007	-	-	X	X
4	ACT	B	1016	-	-	X	X
4	ACT	C	1008	-	-	-	X
5	CL	C	1006	-	-	-	X
6	GOL	A	1012	-	-	-	X
6	GOL	B	1001	-	-	-	X
6	GOL	C	1013	-	-	-	X

2 Entry composition [i](#)

There are 8 unique types of molecules in this entry. The entry contains 3812 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 Protease.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	100	Total	C	N	O	S	0	11	0
			831	543	143	143	2			
1	B	100	Total	C	N	O	S	0	12	0
			829	542	143	141	3			
1	C	99	Total	C	N	O	S	0	8	0
			806	530	133	140	3			
1	D	99	Total	C	N	O	S	0	7	0
			800	520	137	141	2			

There are 24 discrepancies between the modelled and reference sequences:

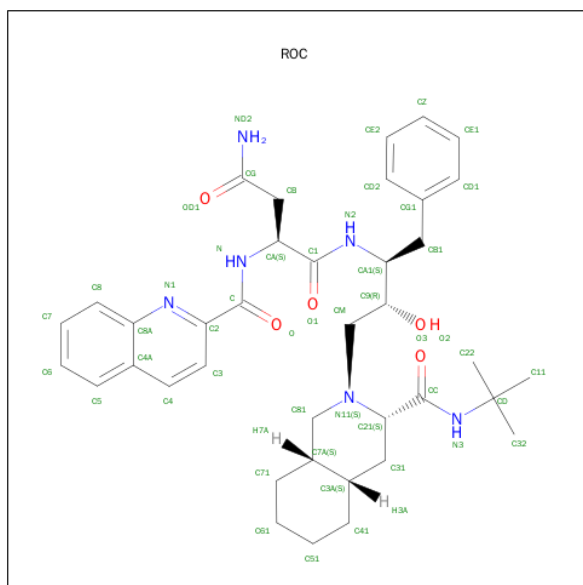
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	ARF	-	INSERTION	UNP Q7SSI0
A	8	LYS	GLN	ENGINEERED MUTATION	UNP Q7SSI0
A	34	ILE	LEU	ENGINEERED MUTATION	UNP Q7SSI0
A	64	ILE	LEU	ENGINEERED MUTATION	UNP Q7SSI0
A	68	ALA	CYS	ENGINEERED MUTATION	UNP Q7SSI0
A	96	ALA	SER	ENGINEERED MUTATION	UNP Q7SSI0
B	1	ARF	-	INSERTION	UNP Q7SSI0
B	8	LYS	GLN	ENGINEERED MUTATION	UNP Q7SSI0
B	34	ILE	LEU	ENGINEERED MUTATION	UNP Q7SSI0
B	64	ILE	LEU	ENGINEERED MUTATION	UNP Q7SSI0
B	68	ALA	CYS	ENGINEERED MUTATION	UNP Q7SSI0
B	96	ALA	SER	ENGINEERED MUTATION	UNP Q7SSI0
C	0	ARF	-	INSERTION	UNP Q7SSI0
C	7	LYS	GLN	ENGINEERED MUTATION	UNP Q7SSI0
C	33	ILE	LEU	ENGINEERED MUTATION	UNP Q7SSI0
C	63	ILE	LEU	ENGINEERED MUTATION	UNP Q7SSI0
C	67	ALA	CYS	ENGINEERED MUTATION	UNP Q7SSI0
C	95	ALA	SER	ENGINEERED MUTATION	UNP Q7SSI0
D	0	ARF	-	INSERTION	UNP Q7SSI0
D	7	LYS	GLN	ENGINEERED MUTATION	UNP Q7SSI0
D	33	ILE	LEU	ENGINEERED MUTATION	UNP Q7SSI0

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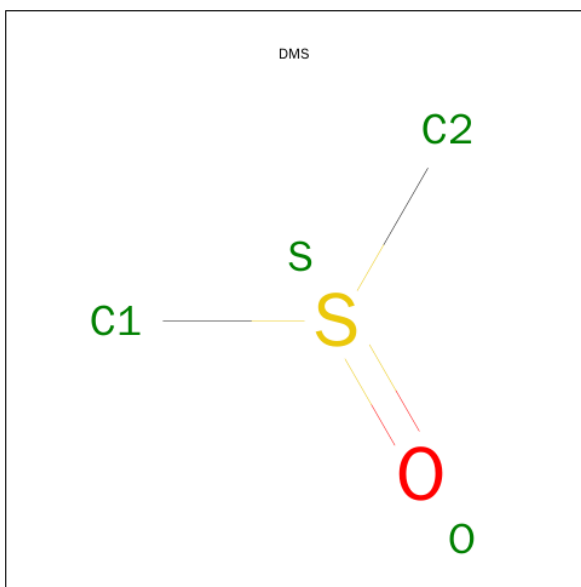
Chain	Residue	Modelled	Actual	Comment	Reference
D	63	ILE	LEU	ENGINEERED MUTATION	UNP Q7SSI0
D	67	ALA	CYS	ENGINEERED MUTATION	UNP Q7SSI0
D	95	ALA	SER	ENGINEERED MUTATION	UNP Q7SSI0

- Molecule 2 is (2S)-N-[(2S,3R)-4-[(2S,3S,4AS,8AS)-3-(TERT-BUTYLCARBAMOYL)-3,4,4A,5,6,7,8,8A-OCTAHYDRO-1H-ISOQUINOLIN-2-YL]-3-HYDROXY-1-PHENYL-BUTAN-2-YL]-2-(QUINOLIN-2-YLCARBONYLAMINO)BUTANEDIAMIDE (three-letter code: ROC) (formula: C₃₈H₅₀N₆O₅).



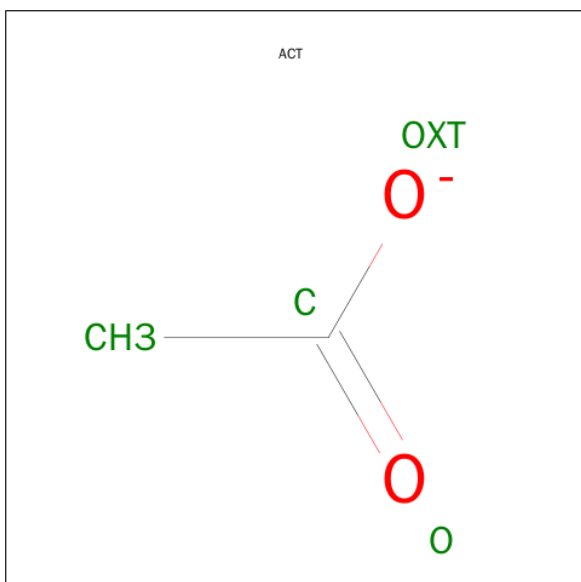
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	O	0	1
			98	76	12	10		
2	D	1	Total	C	N	O	0	1
			98	76	12	10		

- Molecule 3 is DIMETHYL SULFOXIDE (three-letter code: DMS) (formula: C₂H₆OS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	A	1	Total	C	O	S	0	0
			4	2	1	1		
3	B	1	Total	C	O	S	0	0
			4	2	1	1		
3	C	1	Total	C	O	S	0	0
			4	2	1	1		
3	C	1	Total	C	O	S	0	0
			4	2	1	1		
3	D	1	Total	C	O	S	0	1
			8	4	2	2		

- Molecule 4 is ACETATE ION (three-letter code: ACT) (formula: $C_2H_3O_2$).

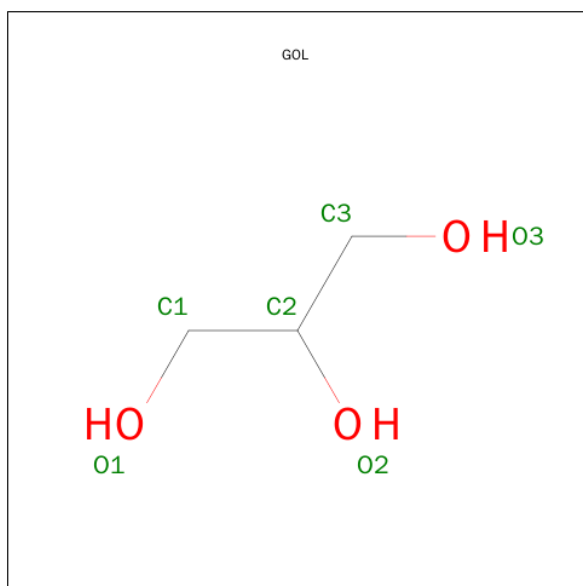


Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 4 2 2	0	0
4	A	1	Total C O 4 2 2	0	0
4	B	1	Total C O 4 2 2	0	0
4	C	1	Total C O 4 2 2	0	0

- Molecule 5 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	B	2	Total Cl 2 2	0	0
5	A	2	Total Cl 3 3	0	1
5	C	2	Total Cl 2 2	0	0

- Molecule 6 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

- Molecule 7 is SODIUM ION (three-letter code: NA) (formula: Na).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	B	2	Total 2	Na 2	0	0
7	A	1	Total 2	Na 2	0	1

- Molecule 8 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
8	A	72	Total 78	O 78	0	6
8	B	60	Total 63	O 63	0	3
8	C	68	Total 74	O 74	0	6
8	D	62	Total 66	O 66	0	4

4 Data and refinement statistics

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α , β , γ	51.19Å 62.70Å 59.30Å 90.00° 98.32° 90.00°	Depositor
Resolution (Å)	10.00 – 1.25 10.36 – 1.25	Depositor EDS
% Data completeness (in resolution range)	93.3 (10.00-1.25) 98.2 (10.36-1.25)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.89 (at 1.25Å)	Xtriage
Refinement program	SHELXL-97	Depositor
R, R_{free}	0.130 , 0.194 0.137 , 0.194	Depositor DCC
R_{free} test set	5026 reflections (5.27%)	DCC
Wilson B-factor (Å ²)	14.0	Xtriage
Anisotropy	0.022	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.51 , 104.7	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Outliers	0 of 100424 reflections	Xtriage
F_o, F_c correlation	0.97	EDS
Total number of atoms	3812	wwPDB-VP
Average B, all atoms (Å ²)	22.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.81% 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, 0.375 respectively for untwinned datasets, and 0.333, 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: GOL, CL, NA, ROC, DMS, ARF, ACT

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	0.57	0/873	1.40	9/1177 (0.8%)
1	B	0.67	0/872	1.33	4/1175 (0.3%)
1	C	0.60	0/840	1.28	7/1134 (0.6%)
1	D	0.60	0/828	1.24	6/1117 (0.5%)
All	All	0.61	0/3413	1.31	26/4603 (0.6%)

There are no bond length outliers.

All (26) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	58	ARG	NE-CZ-NH1	-17.62	111.49	120.30
1	B	9[A]	ARG	NE-CZ-NH1	10.08	125.34	120.30
1	B	9[B]	ARG	NE-CZ-NH1	10.08	125.34	120.30
1	D	41	ARG	NE-CZ-NH2	-9.14	115.73	120.30
1	A	88	ARG	NE-CZ-NH2	-8.68	115.96	120.30
1	C	50[A]	ILE	CA-C-N	7.91	132.02	116.20
1	C	50[B]	ILE	CA-C-N	7.91	132.02	116.20
1	C	57	ARG	NE-CZ-NH1	-7.80	116.40	120.30
1	D	87	ARG	NE-CZ-NH2	-7.57	116.52	120.30
1	A	58	ARG	NE-CZ-NH2	7.21	123.90	120.30
1	B	47[A]	MET	CG-SD-CE	6.71	110.93	100.20
1	B	47[B]	MET	CG-SD-CE	6.71	110.93	100.20
1	D	46	MET	CG-SD-CE	6.63	110.82	100.20
1	A	88	ARG	NE-CZ-NH1	6.42	123.51	120.30
1	C	99	PHE	CB-CG-CD2	6.40	125.28	120.80
1	D	41	ARG	NE-CZ-NH1	6.16	123.38	120.30
1	A	100	PHE	N-CA-CB	6.08	121.55	110.60
1	A	100	PHE	CB-CG-CD2	-5.94	116.64	120.80
1	C	6	TRP	CH2-CZ2-CE2	5.53	122.93	117.40
1	C	30	ASP	CB-CG-OD2	5.38	123.15	118.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	54	PHE	CB-CG-CD1	5.33	124.53	120.80
1	C	99	PHE	CB-CG-CD1	-5.29	117.10	120.80
1	D	6	TRP	CB-CG-CD2	-5.14	119.91	126.60
1	A	5	THR	N-CA-CB	5.13	120.05	110.30
1	D	41	ARG	CD-NE-CZ	5.09	130.73	123.60
1	A	61	ASP	CB-CG-OD1	5.03	122.82	118.30

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	831	0	918	43	0
1	B	829	0	928	23	0
1	C	806	0	891	18	0
1	D	800	0	870	28	0
2	A	98	0	96	14	0
2	D	98	0	98	15	0
3	A	4	0	6	8	0
3	B	4	0	6	0	0
3	C	8	0	12	0	0
3	D	8	0	12	2	0
4	A	8	0	6	2	0
4	B	4	0	3	3	0
4	C	4	0	3	1	0
5	A	3	0	0	1	0
5	B	2	0	0	0	0
5	C	2	0	0	0	0
6	A	6	0	8	2	0
6	B	6	0	8	0	0
6	C	6	0	8	1	0
7	A	2	0	0	0	0
7	B	2	0	0	0	0
8	A	78	0	0	2	0
8	B	63	0	0	6	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
8	C	74	0	0	2	0
8	D	66	0	0	2	0
All	All	3812	0	3873	105	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 14.

All (105) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:A:101[B]:ROC:H51	1:B:82:PRO:HG2	1.44	0.99
1:A:100:PHE:HB3	1:B:96:ALA:HA	1.57	0.87
1:B:13:THR:H	4:B:1016:ACT:H3	1.42	0.83
1:A:82:PRO:HG2	2:A:101[A]:ROC:H51	1.65	0.79
1:A:69:GLY:H	4:A:1007:ACT:H3	1.48	0.79
1:A:18:GLY:H	3:A:102:DMS:H13	1.48	0.79
1:C:81:PRO:HG2	2:D:100[B]:ROC:H51	1.65	0.78
6:C:1013:GOL:H12	8:C:578:HOH:O	1.87	0.74
1:A:85[B]:ILE:HD11	2:A:101[B]:ROC:H321	1.70	0.73
1:A:15[A]:LYS:HD2	3:A:102:DMS:H12	1.73	0.70
1:A:66:GLU:OE2	1:A:69:GLY:HA2	1.94	0.68
4:B:1016:ACT:H1	8:B:576:HOH:O	1.94	0.67
1:C:84:ILE:HD11	2:D:100[B]:ROC:H61	1.78	0.66
1:A:48[A]:ILE:HG21	1:A:77:LEU:HD13	1.78	0.65
1:A:4:ILE:HA	6:A:1012:GOL:O1	1.96	0.64
1:D:79:PRO:HA	8:D:585:HOH:O	1.96	0.64
1:C:42:TRP:CE2	1:C:57:ARG:HD2	2.33	0.63
1:A:15[B]:LYS:HE2	1:A:18:GLY:HA2	1.82	0.62
1:B:42[B]:ARG:HA	1:B:42[B]:ARG:HH11	1.64	0.61
1:B:13:THR:H	4:B:1016:ACT:CH3	2.13	0.60
1:A:49:GLY:O	2:A:101[B]:ROC:H23	2.01	0.60
1:A:4:ILE:HG23	6:A:1012:GOL:O1	2.02	0.59
1:D:42:TRP:CZ3	1:D:57[B]:ARG:HD2	2.38	0.59
1:D:43:LYS:HG3	1:D:45[A]:LYS:HZ2	1.67	0.59
1:C:63[A]:ILE:HD13	1:C:72:ILE:HG12	1.85	0.59
1:D:84:ILE:HD11	2:D:100[B]:ROC:H33	1.84	0.59
1:D:7:LYS:HE2	8:D:559:HOH:O	2.01	0.59
1:D:48:GLY:O	2:D:100[B]:ROC:H23	2.03	0.59
1:B:8[B]:LYS:NZ	1:B:9[B]:ARG:H	2.01	0.58
1:C:81:PRO:CG	2:D:100[B]:ROC:H51	2.34	0.58
1:C:99:PHE:HB3	1:D:95:ALA:HA	1.86	0.58

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:46:LYS:HD2	1:A:59:GLN:OE1	2.04	0.57
1:C:93:ILE:HD12	1:D:99:PHE:CE2	2.39	0.57
1:A:64:ILE:HG23	1:A:71:LYS:HD3	1.87	0.57
1:C:70:LYS:NZ	1:C:70:LYS:H	2.03	0.57
1:A:85[A]:ILE:HD11	2:A:101[A]:ROC:C61	2.36	0.56
1:A:18:GLY:H	3:A:102:DMS:C1	2.16	0.56
1:A:31:ASP:OD2	1:A:48[B]:ILE:HD11	2.06	0.56
1:A:42[A]:ARG:HG3	1:A:43:TRP:N	2.19	0.56
1:B:8[B]:LYS:HZ1	1:B:9[B]:ARG:H	1.53	0.55
1:D:47:ILE:CD1	2:D:100[B]:ROC:H21	2.36	0.55
1:A:15[A]:LYS:CD	3:A:102:DMS:H12	2.36	0.54
1:C:49:GLY:HA3	1:D:50[B]:ILE:HG22	1.89	0.54
1:A:48[A]:ILE:HG21	1:A:77:LEU:CD1	2.37	0.54
1:A:42[B]:ARG:HG3	1:A:43:TRP:N	2.23	0.53
1:A:43:TRP:CE2	1:A:58:ARG:HD2	2.43	0.53
1:C:98:ASN:OD1	1:D:2:GLN:HG3	2.08	0.53
1:C:50[A]:ILE:O	1:D:50[A]:ILE:O	2.27	0.53
1:D:14:LYS:HG2	3:D:101[A]:DMS:O	2.09	0.52
1:C:84:ILE:HD11	2:D:100[B]:ROC:C61	2.38	0.52
2:A:101[A]:ROC:H62	1:B:51[A]:ILE:HD11	1.92	0.52
1:A:15[A]:LYS:HE3	1:A:66:GLU:OE1	2.09	0.52
1:C:43:LYS:HE3	1:C:45:LYS:HE3	1.91	0.51
1:B:70:HIS:HD2	8:B:229:HOH:O	1.93	0.51
1:C:50[A]:ILE:HG22	1:D:49:GLY:HA3	1.92	0.51
1:D:14:LYS:HE2	3:D:101[B]:DMS:S	2.51	0.50
1:B:42[B]:ARG:HG3	1:B:43:TRP:N	2.26	0.50
1:D:43:LYS:HE3	1:D:45[A]:LYS:NZ	2.27	0.50
1:C:99:PHE:HE1	1:D:24:LEU:HD13	1.78	0.49
1:C:70:LYS:HZ2	1:C:70:LYS:H	1.59	0.49
1:A:51[A]:ILE:HD11	1:B:50:GLY:N	2.28	0.49
1:A:48[B]:ILE:HD12	8:A:107:HOH:O	2.12	0.49
1:B:42[B]:ARG:NH1	1:B:42[B]:ARG:HA	2.27	0.49
1:A:69:GLY:N	4:A:1007:ACT:H3	2.24	0.48
1:A:7:TRP:O	1:A:8[B]:LYS:HD3	2.14	0.47
2:A:101[A]:ROC:H62	1:B:51[A]:ILE:CD1	2.44	0.47
1:D:47:ILE:HD12	2:D:100[B]:ROC:H21	1.97	0.47
1:C:95:ALA:HA	1:D:99:PHE:HB3	1.96	0.47
1:B:51[A]:ILE:HA	1:B:51[A]:ILE:HD13	1.59	0.47
1:A:59:GLN:OE1	5:A:1021[A]:CL:CL	2.70	0.47
1:A:100:PHE:O	1:B:2:PRO:HB2	2.15	0.46
1:C:42:TRP:CZ2	1:C:57:ARG:HD2	2.52	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:50[A]:ILE:HG12	2:D:100[A]:ROC:HD1	1.99	0.45
1:A:85[B]:ILE:CD1	2:A:101[B]:ROC:H321	2.45	0.44
2:A:101[B]:ROC:H51	1:B:82:PRO:CG	2.32	0.44
1:B:8[A]:LYS:NZ	8:B:365:HOH:O	2.50	0.44
1:A:15[B]:LYS:HG2	3:A:102:DMS:H12	2.00	0.44
1:A:42[B]:ARG:HA	1:A:42[B]:ARG:HH11	1.82	0.44
4:C:1008:ACT:H3	8:C:301:HOH:O	2.18	0.44
1:A:51[A]:ILE:HG12	2:A:101[A]:ROC:H22	2.00	0.44
1:D:45[A]:LYS:HA	1:D:45[A]:LYS:HD3	1.82	0.43
1:A:8[A]:LYS:HD2	8:A:236:HOH:O	2.18	0.43
1:D:49:GLY:HA2	2:D:100[B]:ROC:H52	2.00	0.43
1:A:50:GLY:HA2	2:A:101[B]:ROC:H32	2.01	0.43
1:A:15[A]:LYS:CG	3:A:102:DMS:H12	2.48	0.43
1:A:85[A]:ILE:HD11	2:A:101[A]:ROC:H71	2.00	0.43
1:B:8[B]:LYS:HE2	8:B:324:HOH:O	2.17	0.43
1:B:8[B]:LYS:HA	1:B:8[B]:LYS:HE2	1.99	0.43
1:A:15[B]:LYS:HG2	3:A:102:DMS:C1	2.48	0.42
1:A:4:ILE:HD11	1:B:100:PHE:CE2	2.55	0.42
1:A:82:PRO:CG	2:A:101[A]:ROC:H51	2.44	0.42
2:D:100[B]:ROC:HC	2:D:100[B]:ROC:H81	1.84	0.42
1:B:62:GLN:NE2	8:B:333:HOH:O	2.53	0.42
1:D:47:ILE:HD13	2:D:100[B]:ROC:H21	2.02	0.42
1:D:49:GLY:HA2	2:D:100[B]:ROC:H32	2.03	0.41
1:B:8[A]:LYS:HG3	1:B:8[A]:LYS:HZ3	1.69	0.41
1:D:44:PRO:O	1:D:45[A]:LYS:HE3	2.20	0.41
1:B:36[A]:GLU:HB2	8:B:109:HOH:O	2.21	0.41
1:A:8[A]:LYS:HD3	1:A:8[A]:LYS:HA	1.91	0.41
1:A:85[A]:ILE:HD11	2:A:101[A]:ROC:H62	2.02	0.41
1:D:56:VAL:C	1:D:57[B]:ARG:HD3	2.42	0.41
2:D:100[B]:ROC:H72	2:D:100[B]:ROC:H32	1.68	0.40
1:D:84:ILE:HD11	2:D:100[B]:ROC:C32	2.51	0.40
1:A:15[A]:LYS:HG2	3:A:102:DMS:H12	2.03	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	110/100 (110%)	110 (100%)	0	0	100	100
1	B	110/100 (110%)	110 (100%)	0	0	100	100
1	C	106/100 (106%)	106 (100%)	0	0	100	100
1	D	104/100 (104%)	103 (99%)	1 (1%)	0	100	100
All	All	430/400 (108%)	429 (100%)	1 (0%)	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	92/81 (114%)	88 (96%)	4 (4%)	35	3
1	B	92/81 (114%)	89 (97%)	3 (3%)	45	7
1	C	89/81 (110%)	88 (99%)	1 (1%)	80	48
1	D	87/81 (107%)	87 (100%)	0	100	100
All	All	360/324 (111%)	352 (98%)	8 (2%)	65	18

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

Mol	Chain	Res	Type
1	A	42[A]	ARG
1	A	42[B]	ARG
1	A	71	LYS
1	A	100	PHE
1	B	8[A]	LYS
1	B	8[B]	LYS
1	B	100	PHE
1	C	70	LYS

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	99	ASN
1	B	3	GLN
1	B	70	HIS

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the chemical component dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\# Z > 2$	Counts	RMSZ	$\# Z > 2$
1	ARF	A	1	1	2,2,2	0.60	0	1,1,1	0.35	0
1	ARF	B	1	1	2,2,2	0.77	0	1,1,1	0.53	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
1	ARF	A	1	1	-	0/0/0/0	0/0/0/0
1	ARF	B	1	1	-	0/0/0/0	0/0/0/0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates

There are no carbohydrates in this entry.

5.6 Ligand geometry

Of 28 ligands modelled in this entry, 11 are monoatomic - leaving 17 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	$\# Z > 2$
4	ACT	A	1007	7	1,3,3	2.59	1 (100%)	0,3,3	0.00	-
2	ROC	A	101[A]	-	53,53,53	1.37	7 (13%)	72,75,75	1.78	18 (25%)
2	ROC	A	101[B]	-	53,53,53	1.40	8 (15%)	72,75,75	1.74	15 (20%)
6	GOL	A	1012	-	5,5,5	0.31	0	5,5,5	0.18	0
4	ACT	A	1017	-	1,3,3	2.41	1 (100%)	0,3,3	0.00	-
3	DMS	A	102	-	3,3,3	0.63	0	3,3,3	0.58	0
6	GOL	B	1001	-	5,5,5	0.34	0	5,5,5	0.43	0
3	DMS	B	101	-	3,3,3	0.50	0	3,3,3	0.67	0
4	ACT	B	1016	-	1,3,3	3.10	1 (100%)	0,3,3	0.00	-
3	DMS	C	100	-	3,3,3	0.44	0	3,3,3	0.61	0
4	ACT	C	1008	-	1,3,3	2.44	1 (100%)	0,3,3	0.00	-
3	DMS	C	101	-	3,3,3	0.58	0	3,3,3	0.69	0
6	GOL	C	1013	-	5,5,5	0.22	0	5,5,5	0.28	0
2	ROC	D	100[A]	-	53,53,53	1.29	9 (16%)	72,75,75	1.59	15 (20%)
2	ROC	D	100[B]	-	53,53,53	1.54	9 (16%)	72,75,75	2.47	22 (30%)
3	DMS	D	101[A]	-	3,3,3	0.60	0	3,3,3	0.67	0
3	DMS	D	101[B]	-	3,3,3	0.57	0	3,3,3	0.69	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	ACT	A	1007	7	-	0/0/0/0	0/0/0/0
2	ROC	A	101[A]	-	-	0/41/64/64	0/5/5/5
2	ROC	A	101[B]	-	-	0/41/64/64	0/5/5/5
6	GOL	A	1012	-	-	0/4/4/4	0/0/0/0
4	ACT	A	1017	-	-	0/0/0/0	0/0/0/0
3	DMS	A	102	-	-	0/0/0/0	0/0/0/0
6	GOL	B	1001	-	-	0/4/4/4	0/0/0/0
3	DMS	B	101	-	-	0/0/0/0	0/0/0/0
4	ACT	B	1016	-	-	0/0/0/0	0/0/0/0
3	DMS	C	100	-	-	0/0/0/0	0/0/0/0
4	ACT	C	1008	-	-	0/0/0/0	0/0/0/0
3	DMS	C	101	-	-	0/0/0/0	0/0/0/0
6	GOL	C	1013	-	-	0/4/4/4	0/0/0/0
2	ROC	D	100[A]	-	-	0/41/64/64	0/5/5/5
2	ROC	D	100[B]	-	-	0/41/64/64	0/5/5/5
3	DMS	D	101[A]	-	-	0/0/0/0	0/0/0/0
3	DMS	D	101[B]	-	-	0/0/0/0	0/0/0/0

All (37) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	D	100[B]	ROC	C22-CD	-4.05	1.41	1.52
2	A	101[B]	ROC	C21-N11	-3.77	1.43	1.48
2	A	101[A]	ROC	C21-N11	-3.69	1.43	1.48
2	A	101[A]	ROC	C22-CD	-3.64	1.43	1.52
2	A	101[B]	ROC	C22-CD	-3.45	1.43	1.52
2	D	100[B]	ROC	C21-N11	-3.37	1.44	1.48
2	A	101[B]	ROC	CM-N11	-3.29	1.40	1.47
2	A	101[A]	ROC	CM-N11	-3.27	1.40	1.47
2	D	100[A]	ROC	C22-CD	-3.22	1.44	1.52
2	D	100[B]	ROC	CG-ND2	-3.21	1.22	1.32
2	D	100[A]	ROC	CM-N11	-3.19	1.40	1.47
2	D	100[B]	ROC	CM-N11	-3.14	1.40	1.47
2	D	100[B]	ROC	CD-N3	-3.02	1.43	1.48
2	D	100[A]	ROC	C81-N11	-3.00	1.42	1.47
2	A	101[A]	ROC	CG-ND2	-2.81	1.23	1.32
2	D	100[B]	ROC	CB-CA	-2.80	1.47	1.53
2	A	101[B]	ROC	CG-ND2	-2.79	1.23	1.32
2	D	100[A]	ROC	CG-ND2	-2.61	1.24	1.32
2	D	100[A]	ROC	CB-CA	-2.39	1.48	1.53
2	A	101[B]	ROC	CB-CA	-2.27	1.48	1.53
2	D	100[B]	ROC	C81-N11	-2.18	1.43	1.47
2	D	100[A]	ROC	C21-N11	-2.11	1.45	1.48

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	101[A]	ROC	CB-CA	-2.06	1.49	1.53
2	A	101[B]	ROC	C4-C3	2.10	1.41	1.36
2	A	101[A]	ROC	C2-N1	2.32	1.38	1.32
2	A	101[B]	ROC	C2-N1	2.32	1.39	1.32
2	D	100[A]	ROC	CA-N	2.35	1.51	1.45
4	A	1017	ACT	CH3-C	2.41	1.52	1.48
4	C	1008	ACT	CH3-C	2.44	1.52	1.48
4	A	1007	ACT	CH3-C	2.59	1.52	1.48
2	D	100[A]	ROC	C2-N1	2.60	1.39	1.32
4	B	1016	ACT	CH3-C	3.10	1.53	1.48
2	D	100[B]	ROC	C2-N1	3.18	1.41	1.32
2	D	100[A]	ROC	O-C	3.44	1.30	1.23
2	A	101[A]	ROC	O-C	4.27	1.31	1.23
2	A	101[B]	ROC	O-C	4.61	1.32	1.23
2	D	100[B]	ROC	O-C	4.84	1.33	1.23

All (70) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	100[B]	ROC	O-C-N	-4.95	113.50	122.44
2	D	100[B]	ROC	C31-C21-CC	-4.89	100.40	111.74
2	D	100[B]	ROC	C32-CD-C22	-4.72	97.71	109.88
2	D	100[B]	ROC	C3-C2-N1	-4.53	118.27	123.49
2	A	101[B]	ROC	C32-CD-C22	-3.97	99.63	109.88
2	D	100[A]	ROC	C31-C21-CC	-3.90	102.69	111.74
2	D	100[B]	ROC	C31-C3A-C7A	-3.90	104.40	110.62
2	A	101[B]	ROC	C31-C21-CC	-3.73	103.08	111.74
2	A	101[A]	ROC	C61-C51-C41	-3.41	104.30	111.44
2	A	101[B]	ROC	C61-C51-C41	-3.04	105.06	111.44
2	D	100[A]	ROC	C61-C51-C41	-3.03	105.09	111.44
2	D	100[B]	ROC	C21-CC-N3	-3.02	107.89	116.38
2	D	100[B]	ROC	C61-C51-C41	-2.97	105.20	111.44
2	A	101[B]	ROC	CA-CB-CG	-2.92	106.42	112.48
2	D	100[A]	ROC	OD1-CG-CB	-2.91	114.61	120.93
2	A	101[A]	ROC	CA-CB-CG	-2.83	106.61	112.48
2	A	101[A]	ROC	C51-C61-C71	-2.78	105.62	111.44
2	D	100[B]	ROC	C51-C61-C71	-2.70	105.78	111.44
2	A	101[B]	ROC	C51-C61-C71	-2.69	105.79	111.44
2	D	100[A]	ROC	C51-C61-C71	-2.69	105.80	111.44
2	A	101[A]	ROC	C31-C21-CC	-2.54	105.84	111.74
2	A	101[A]	ROC	C61-C71-C7A	-2.53	108.02	111.92
2	D	100[B]	ROC	C71-C7A-C3A	-2.52	104.95	110.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	101[A]	ROC	C32-CD-C22	-2.43	103.61	109.88
2	A	101[A]	ROC	C3-C2-N1	-2.38	120.74	123.49
2	A	101[B]	ROC	CE1-CD1-CG1	-2.38	116.87	120.65
2	A	101[A]	ROC	CE1-CD1-CG1	-2.30	116.98	120.65
2	A	101[B]	ROC	C3-C2-N1	-2.14	121.02	123.49
2	D	100[A]	ROC	C32-CD-C22	-2.09	104.48	109.88
2	D	100[A]	ROC	O-C-N	-2.04	118.75	122.44
2	D	100[A]	ROC	O3-CC-C21	-2.02	115.87	120.51
2	D	100[A]	ROC	CD-N3-CC	2.04	128.61	126.15
2	D	100[A]	ROC	CM-N11-C21	2.06	118.03	113.34
2	D	100[B]	ROC	C5-C4A-C8A	2.09	121.70	118.44
2	A	101[B]	ROC	O2-C9-CA1	2.13	114.13	109.21
2	A	101[A]	ROC	C6-C7-C8	2.16	123.59	120.45
2	A	101[A]	ROC	CZ-CE1-CD1	2.18	123.38	120.19
2	A	101[B]	ROC	C9-CM-N11	2.20	116.17	112.12
2	D	100[A]	ROC	CB-CG-ND2	2.21	120.94	116.08
2	A	101[A]	ROC	CM-N11-C21	2.24	118.43	113.34
2	D	100[B]	ROC	C81-C7A-C3A	2.26	112.09	107.94
2	A	101[B]	ROC	CB-CA-N	2.28	115.32	110.70
2	A	101[A]	ROC	C2-N1-C8A	2.31	121.42	117.55
2	A	101[A]	ROC	CB-CG-ND2	2.33	121.21	116.08
2	D	100[A]	ROC	C9-CM-N11	2.33	116.42	112.12
2	D	100[B]	ROC	C3-C2-C	2.34	123.42	119.56
2	D	100[B]	ROC	C31-C21-N11	2.37	113.78	110.04
2	D	100[B]	ROC	CZ-CE1-CD1	2.40	123.69	120.19
2	A	101[A]	ROC	CB-CA-N	2.40	115.56	110.70
2	A	101[A]	ROC	C9-CM-N11	2.41	116.56	112.12
2	D	100[B]	ROC	CM-N11-C21	2.41	118.82	113.34
2	A	101[B]	ROC	C6-C7-C8	2.47	124.04	120.45
2	A	101[B]	ROC	C3-C2-C	2.53	123.74	119.56
2	D	100[B]	ROC	O2-C9-CA1	2.63	115.30	109.21
2	D	100[A]	ROC	C7A-C81-N11	2.95	116.11	112.21
2	A	101[B]	ROC	O3-CC-N3	3.01	130.02	123.04
2	D	100[B]	ROC	C6-C7-C8	3.42	125.42	120.45
2	D	100[A]	ROC	O3-CC-N3	3.49	131.14	123.04
2	A	101[A]	ROC	O3-CC-N3	3.59	131.38	123.04
2	D	100[A]	ROC	C81-N11-C21	3.79	114.75	109.49
2	D	100[A]	ROC	C22-CD-C11	3.96	120.09	109.88
2	D	100[B]	ROC	C81-N11-C21	4.66	115.97	109.49
2	D	100[B]	ROC	O3-CC-N3	4.84	134.26	123.04
2	A	101[A]	ROC	C81-N11-C21	5.01	116.44	109.49
2	A	101[B]	ROC	C22-CD-C11	5.54	124.16	109.88

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	101[A]	ROC	C22-CD-C11	5.78	124.80	109.88
2	D	100[B]	ROC	C22-CD-C11	5.99	125.32	109.88
2	A	101[B]	ROC	C81-N11-C21	6.42	118.40	109.49
2	D	100[B]	ROC	O-C-C2	6.60	135.27	121.23
2	D	100[B]	ROC	CD-N3-CC	7.59	135.29	126.15

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

12 monomers are involved in 48 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	A	1007	ACT	2	0
2	A	101[A]	ROC	8	0
2	A	101[B]	ROC	6	0
6	A	1012	GOL	2	0
3	A	102	DMS	8	0
4	B	1016	ACT	3	0
4	C	1008	ACT	1	0
6	C	1013	GOL	1	0
2	D	100[A]	ROC	1	0
2	D	100[B]	ROC	14	0
3	D	101[A]	DMS	1	0
3	D	101[B]	DMS	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	99/100 (99%)	0.14	4 (4%)	42 34	11, 20, 33, 44	0
1	B	99/100 (99%)	0.04	2 (2%)	68 63	11, 16, 29, 55	0
1	C	99/100 (99%)	0.12	3 (3%)	54 46	11, 20, 32, 55	0
1	D	99/100 (99%)	0.12	3 (3%)	54 46	11, 19, 35, 57	0
All	All	396/400 (99%)	0.10	12 (3%)	54 46	11, 18, 34, 57	0

All (12) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	100	PHE	6.0
1	C	99	PHE	5.9
1	B	100	PHE	5.9
1	D	99	PHE	5.9
1	C	1	PRO	5.5
1	C	41	ARG	3.8
1	D	41	ARG	3.7
1	A	7	TRP	2.9
1	D	1	PRO	2.8
1	A	4	ILE	2.8
1	B	42[A]	ARG	2.6
1	A	42[A]	ARG	2.2

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

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
1	ARF	A	1	3/3	0.94	0.13	-	27,27,30,34	0
1	ARF	B	1	3/3	0.95	0.07	-	17,17,17,20	0

6.3 Carbohydrates [i](#)

There are no carbohydrates 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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors(\AA^2)	Q<0.9
4	ACT	C	1008	4/4	0.31	0.30	45.29	56,58,60,63	0
4	ACT	B	1016	4/4	0.66	0.24	16.39	26,50,50,60	0
6	GOL	A	1012	6/6	0.47	0.36	7.19	46,65,70,72	0
6	GOL	B	1001	6/6	0.77	0.19	7.17	37,42,60,62	0
6	GOL	C	1013	6/6	0.72	0.25	6.77	73,79,85,95	0
5	CL	C	1006	1/1	0.56	0.26	5.26	77,77,77,77	0
4	ACT	A	1007	4/4	0.37	0.23	3.27	41,53,54,66	0
3	DMS	A	102	4/4	0.87	0.16	2.63	22,29,30,34	0
2	ROC	D	100[A]	49/49	0.93	0.11	1.97	12,16,19,19	49
2	ROC	D	100[B]	49/49	0.93	0.11	1.85	9,16,22,28	49
2	ROC	A	101[B]	49/49	0.92	0.11	1.76	10,14,19,20	49
2	ROC	A	101[A]	49/49	0.92	0.11	1.65	10,14,19,20	49
3	DMS	B	101	4/4	0.97	0.11	0.89	20,24,25,33	0
4	ACT	A	1017	4/4	0.91	0.12	0.72	36,52,54,64	0
3	DMS	C	100	4/4	0.96	0.09	0.64	23,24,25,26	0
3	DMS	D	101[A]	4/4	0.93	0.12	0.55	16,16,20,24	4
3	DMS	D	101[B]	4/4	0.93	0.12	0.48	28,30,30,30	4
3	DMS	C	101	4/4	0.98	0.09	-0.59	46,58,65,79	0
5	CL	B	1003	1/1	0.94	0.07	-	51,51,51,51	0
5	CL	B	1005	1/1	0.92	0.08	-	64,64,64,64	0
5	CL	A	1021[B]	1/1	0.63	0.22	-	70,70,70,70	1
7	NA	A	1015[A]	1/1	0.80	0.13	-	44,44,44,44	1
7	NA	A	1015[B]	1/1	0.80	0.13	-	41,41,41,41	1
5	CL	A	1010	1/1	0.88	0.24	-	72,72,72,72	0
5	CL	C	1004	1/1	0.59	0.15	-	69,69,69,69	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	LLDF	B-factors(\AA^2)	Q<0.9
5	CL	A	1021[A]	1/1	0.63	0.22	-	61,61,61,61	1
7	NA	B	1014	1/1	0.78	0.28	-	54,54,54,54	0
7	NA	B	1020	1/1	0.64	0.20	-	64,64,64,64	0

6.5 Other polymers [i](#)

There are no such residues in this entry.