



Full wwPDB X-ray Structure Validation Report ⓘ

Nov 11, 2024 – 12:31 PM EST

PDB ID : 9BE4
Title : The post-condensation state of the dimodular NRPS protein LgrA
Authors : Pistofidis, A.; Schmeing, T.M.
Deposited on : 2024-04-13
Resolution : 3.00 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 : 4.02b-467
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.20.1
EDS : 3.0
buster-report : 1.1.7 (2018)
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.003 (Gargrove)
Density-Fitness : 1.0.11
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.39

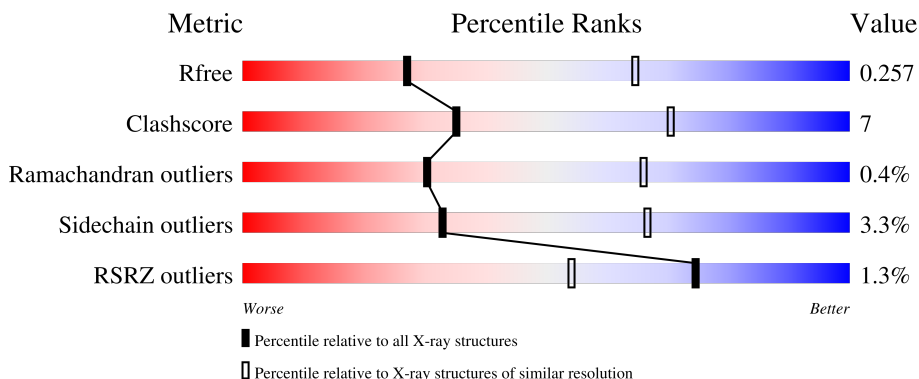
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 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	2511 (3.00-3.00)
Clashscore	180529	2866 (3.00-3.00)
Ramachandran outliers	177936	2778 (3.00-3.00)
Sidechain outliers	177891	2781 (3.00-3.00)
RSRZ outliers	164620	2523 (3.00-3.00)

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	1814	 % 79% 17% ..
1	B	1814	 % 77% 19% ..

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 28158 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 Linear gramicidin synthase subunit A.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
			Total	C	N	O	P	S			
1	A	1762	13959	8927	2376	2596	1	59	0	1	0
1	B	1758	13796	8823	2332	2580	1	60	0	0	0

There are 30 discrepancies between the modelled and reference sequences:

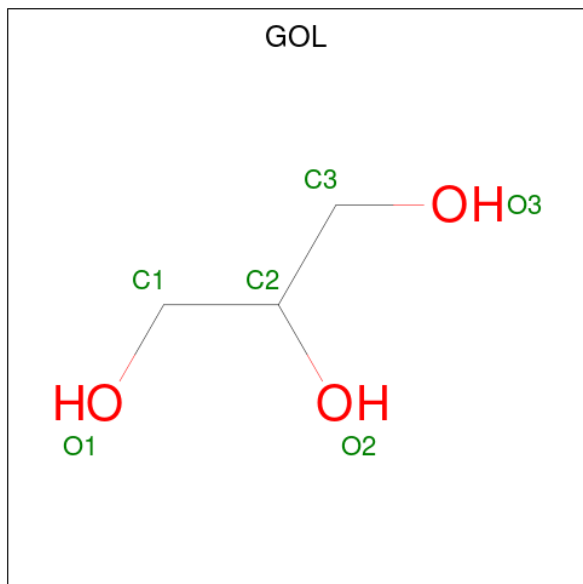
Chain	Residue	Modelled	Actual	Comment	Reference
A	1	MET	-	initiating methionine	UNP Q70LM7
A	2	GLY	-	expression tag	UNP Q70LM7
A	3	ARG	-	expression tag	UNP Q70LM7
A	770A	ASN	-	insertion	UNP Q70LM7
A	770B	GLY	-	insertion	UNP Q70LM7
A	771	LEU	SER	conflict	UNP Q70LM7
A	1804	ALA	-	expression tag	UNP Q70LM7
A	1805	ALA	-	expression tag	UNP Q70LM7
A	1806	ALA	-	expression tag	UNP Q70LM7
A	1807	GLU	-	expression tag	UNP Q70LM7
A	1808	ASN	-	expression tag	UNP Q70LM7
A	1809	LEU	-	expression tag	UNP Q70LM7
A	1810	TYR	-	expression tag	UNP Q70LM7
A	1811	PHE	-	expression tag	UNP Q70LM7
A	1812	GLN	-	expression tag	UNP Q70LM7
B	1	MET	-	initiating methionine	UNP Q70LM7
B	2	GLY	-	expression tag	UNP Q70LM7
B	3	ARG	-	expression tag	UNP Q70LM7
B	770A	ASN	-	insertion	UNP Q70LM7
B	770B	GLY	-	insertion	UNP Q70LM7
B	771	LEU	SER	conflict	UNP Q70LM7
B	1804	ALA	-	expression tag	UNP Q70LM7
B	1805	ALA	-	expression tag	UNP Q70LM7
B	1806	ALA	-	expression tag	UNP Q70LM7
B	1807	GLU	-	expression tag	UNP Q70LM7

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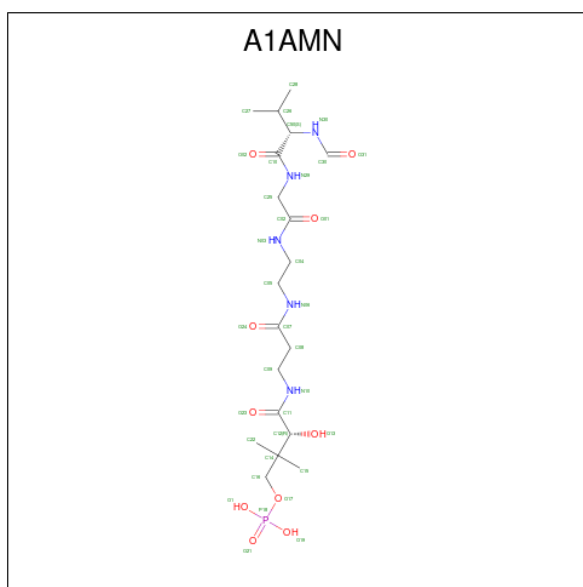
Chain	Residue	Modelled	Actual	Comment	Reference
B	1808	ASN	-	expression tag	UNP Q70LM7
B	1809	LEU	-	expression tag	UNP Q70LM7
B	1810	TYR	-	expression tag	UNP Q70LM7
B	1811	PHE	-	expression tag	UNP Q70LM7
B	1812	GLN	-	expression tag	UNP Q70LM7

- Molecule 2 is GLYCEROL (three-letter code: GOL) (formula: C₃H₈O₃).



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

- Molecule 3 is N-formyl-L-valyl-N-[2-({N-[(2S)-2-hydroxy-4-{{(S)-hydroxy(oxo)-lambda 5 -phosphanyl]oxy}-3,3-dimethylbutanoyl]-beta-alanyl}amino)ethyl]glycinamide (three-letter code: A1AMN) (formula: C₁₉H₃₆N₅O₁₀P) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
3	A	1	34	19	5	9	1	0	0

- Molecule 4 is MANGANESE (II) ION (three-letter code: MN) (formula: Mn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	Mn		
4	B	1	1	1	0	0

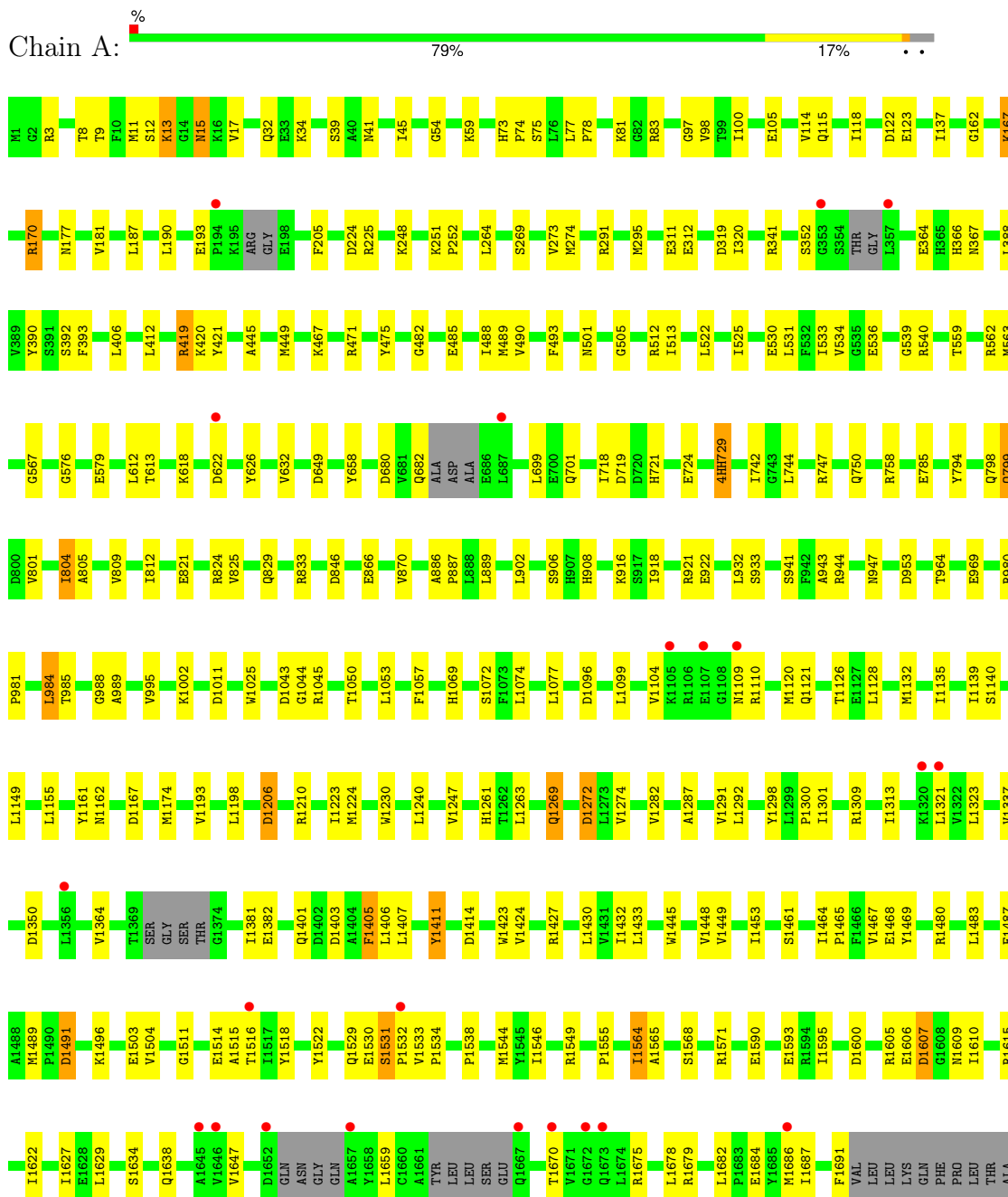
- Molecule 5 is water.

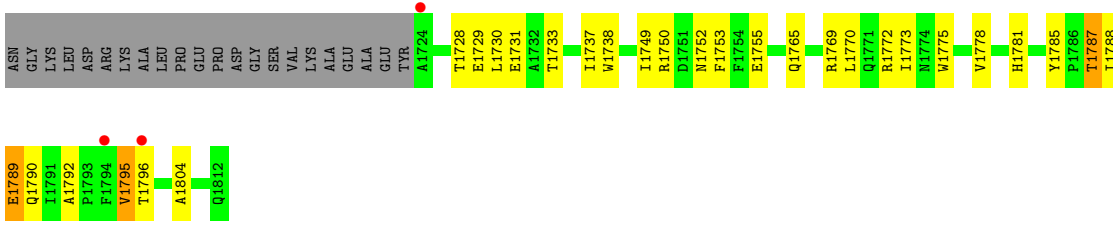
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
			Total	O		
5	A	189	189	189	0	0
5	B	161	161	161	0	0

3 Residue-property plots i

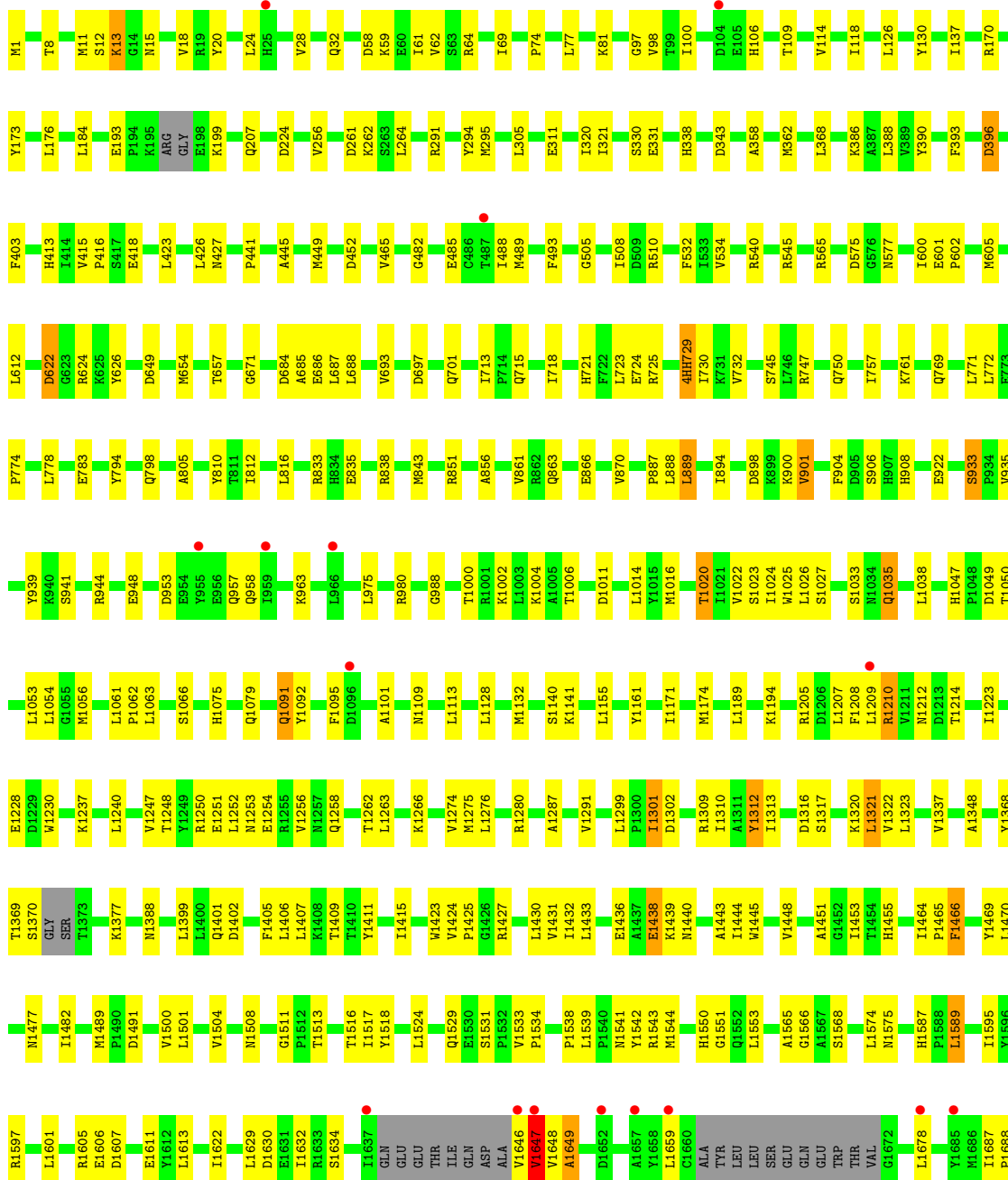
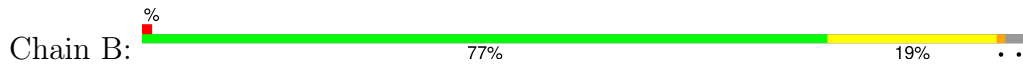
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. 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.

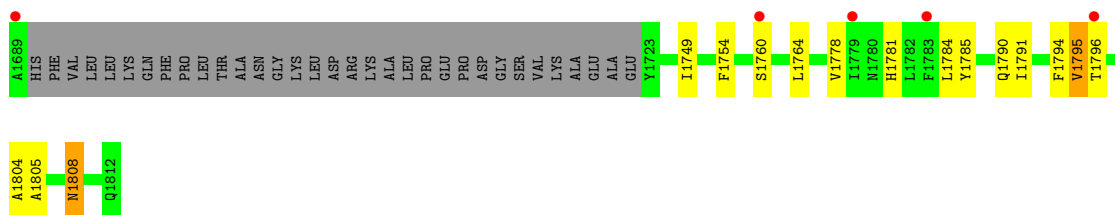
- Molecule 1: Linear gramicidin synthase subunit A





● Molecule 1: Linear gramicidin synthase subunit A





4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, α , β , γ	184.41Å 426.58Å 77.30Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	49.87 – 3.00 49.87 – 3.00	Depositor EDS
% Data completeness (in resolution range)	96.6 (49.87-3.00) 97.2 (49.87-3.00)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.56 (at 3.01Å)	Xtrriage
Refinement program	PHENIX 1.21.1_5286	Depositor
R, R_{free}	0.218 , 0.258 0.218 , 0.257	Depositor DCC
R_{free} test set	120666 reflections (2.18%)	wwPDB-VP
Wilson B-factor (Å ²)	62.0	Xtrriage
Anisotropy	0.259	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.33 , 67.6	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.29$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	28158	wwPDB-VP
Average B, all atoms (Å ²)	61.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 11.64% 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: A1AMN, MN, GOL, 4HH

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	0/14237	0.48	0/19339
1	B	0.27	0/14069	0.49	1/19133 (0.0%)
All	All	0.26	0/28306	0.48	1/38472 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	1321	LEU	CA-CB-CG	6.93	131.25	115.30

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	13959	0	13807	188	1
1	B	13796	0	13548	215	0
2	A	12	0	16	0	0
2	B	6	0	8	0	0
3	A	34	0	0	0	0
4	B	1	0	0	0	0
5	A	189	0	0	0	0
5	B	161	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
All	All	28158	0	27379	403	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 7.

All (403) 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:1678:LEU:HD11	1:B:1688:PRO:HD3	1.51	0.92
1:B:193:GLU:OE1	1:B:193:GLU:N	2.05	0.90
1:B:130:TYR:OH	1:B:170:ARG:NH2	2.10	0.83
1:A:251:LYS:HD3	1:A:252:PRO:HD2	1.57	0.83
1:B:697:ASP:OD2	1:B:761:LYS:NZ	2.14	0.80
1:B:1436:GLU:OE1	1:B:1439:LYS:NZ	2.15	0.77
1:A:123:GLU:OE1	1:A:123:GLU:N	2.18	0.74
1:A:248:LYS:NZ	1:A:319:ASP:OD2	2.14	0.74
1:A:1406:LEU:HB2	1:A:1453:ILE:HD13	1.68	0.74
1:B:729:4HH:HL23	1:B:729:4HH:HB2	1.71	0.73
1:A:785:GLU:OE2	1:A:944:ARG:HD2	1.90	0.72
1:B:622:ASP:OD2	1:B:624:ARG:NE	2.23	0.71
1:B:1320:LYS:O	1:B:1337:VAL:HG22	1.90	0.71
1:A:1050:THR:HA	1:A:1053:LEU:HD13	1.73	0.71
1:A:1590:GLU:HB3	1:A:1593:GLU:HB2	1.72	0.71
1:B:1778:VAL:H	1:B:1795:VAL:HG21	1.55	0.71
1:A:224:ASP:OD1	1:A:225:ARG:NH1	2.24	0.70
1:B:13:LYS:HE3	1:B:32:GLN:HE22	1.56	0.70
1:A:1401:GLN:OE1	1:A:1427:ARG:NH2	2.26	0.69
1:B:1553:LEU:HG	1:B:1589:LEU:HD21	1.73	0.68
1:A:833:ARG:NH2	1:A:933:SER:O	2.26	0.68
1:A:205:PHE:HB3	1:A:274:MET:HE1	1.76	0.67
1:A:170:ARG:NH2	1:A:177:ASN:OD1	2.29	0.66
1:A:539:GLY:O	1:A:562:ARG:NH2	2.28	0.66
1:B:805:ALA:O	1:B:1141:LYS:NZ	2.29	0.66
1:A:1043:ASP:OD1	1:A:1044:GLY:N	2.28	0.65
1:B:833:ARG:NH2	1:B:933:SER:O	2.22	0.65
1:B:1407:LEU:HB2	1:B:1430:LEU:HD11	1.78	0.65
1:B:13:LYS:H	1:B:13:LYS:HD2	1.62	0.64
1:A:649:ASP:HB3	1:A:1002:LYS:HG3	1.79	0.64
1:A:943:ALA:O	1:A:947:ASN:ND2	2.30	0.64
1:B:126:LEU:HD21	1:B:184:LEU:HD22	1.80	0.64
1:B:816:LEU:HD23	1:B:900:LYS:HG3	1.80	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1605:ARG:NH2	1:B:1607:ASP:OD2	2.31	0.64
1:A:366:HIS:ND1	1:A:536:GLU:OE2	2.30	0.63
1:A:13:LYS:HE2	1:A:13:LYS:H	1.64	0.62
1:A:1778:VAL:H	1:A:1795:VAL:HG21	1.64	0.61
1:A:721:HIS:HB3	1:A:724:GLU:HG2	1.80	0.61
1:A:419:ARG:O	1:A:421:TYR:N	2.31	0.60
1:A:1198:LEU:HD23	1:A:1555:PRO:HG3	1.83	0.60
1:A:1627:ILE:HG23	1:A:1686:MET:HG2	1.82	0.60
1:B:693:VAL:HB	1:B:718:ILE:HG12	1.82	0.59
1:B:1489:MET:HE1	1:B:1524:LEU:HD11	1.83	0.59
1:A:1096:ASP:OD1	1:A:1096:ASP:N	2.34	0.59
1:A:1301:ILE:O	1:A:1411:TYR:OH	2.20	0.59
1:B:1210:ARG:NH2	1:B:1606:GLU:O	2.35	0.59
1:B:207:GLN:HG3	1:B:338:HIS:CE1	2.37	0.59
1:B:1539:LEU:HB2	1:B:1542:TYR:CD2	2.37	0.59
1:A:1467:VAL:HG11	1:A:1496:LYS:HB3	1.85	0.58
1:A:467:LYS:NZ	1:A:613:THR:O	2.34	0.58
1:A:1529:GLN:OE1	1:A:1529:GLN:N	2.35	0.58
1:B:1035:GLN:OE1	1:B:1066:SER:OG	2.18	0.58
1:B:988:GLY:HA3	1:B:1140:SER:HB2	1.85	0.58
1:B:1275:MET:HB2	1:B:1322:VAL:HG22	1.85	0.58
1:A:167:LYS:H	1:A:167:LYS:HD2	1.67	0.58
1:B:1778:VAL:HG23	1:B:1795:VAL:HG21	1.84	0.58
1:B:1027:SER:OG	1:B:1033:SER:O	2.22	0.58
1:B:944:ARG:O	1:B:948:GLU:HG2	2.04	0.57
1:B:1047:HIS:HD2	1:B:1049:ASP:HB2	1.69	0.57
1:B:953:ASP:O	1:B:957:GLN:NE2	2.36	0.57
1:A:1491:ASP:N	1:A:1491:ASP:OD1	2.35	0.57
1:B:1539:LEU:HB2	1:B:1542:TYR:HD2	1.69	0.57
1:A:1263:LEU:HD21	1:A:1323:LEU:HD11	1.86	0.57
1:A:1629:LEU:HD23	1:A:1647:VAL:HG22	1.87	0.57
1:B:416:PRO:HB2	1:B:418:GLU:HG3	1.87	0.57
1:B:624:ARG:NH2	1:B:685:ALA:O	2.33	0.57
1:B:889:LEU:HD12	1:B:906:SER:HB2	1.85	0.56
1:A:612:LEU:HB2	1:A:632:VAL:HB	1.87	0.56
1:A:1792:ALA:O	1:A:1796:THR:OG1	2.23	0.56
1:B:1516:THR:HG22	1:B:1517:ILE:HG13	1.87	0.56
1:B:894:ILE:HB	1:B:901:VAL:HG13	1.86	0.56
1:B:77:LEU:HD22	1:B:81:LYS:HG2	1.88	0.56
1:B:1438:GLU:HG2	1:B:1439:LYS:HD3	1.88	0.56
1:A:513:ILE:HD12	1:A:531:LEU:HD21	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:59:LYS:HG3	1:A:105:GLU:OE2	2.06	0.55
1:A:981:PRO:HG2	1:A:985:THR:HG21	1.88	0.55
1:B:1237:LYS:HD2	1:B:1427:ARG:HD3	1.88	0.55
1:B:488:ILE:HG22	1:B:489:MET:HG3	1.87	0.55
1:B:1223:ILE:HD11	1:B:1425:PRO:HD3	1.89	0.55
1:B:532:PHE:CE2	1:B:565:ARG:HG2	2.42	0.55
1:A:390:TYR:CE1	1:A:420:LYS:HG3	2.42	0.55
1:B:1302:ASP:H	1:B:1309:ARG:NH2	2.05	0.55
1:A:980:ARG:HD3	1:A:1109:ASN:HD22	1.72	0.54
1:B:100:ILE:HG13	1:B:137:ILE:HD11	1.90	0.54
1:A:1769:ARG:HD3	1:A:1772:ARG:NH2	2.22	0.54
1:B:1406:LEU:HD11	1:B:1433:LEU:HD13	1.89	0.54
1:B:1601:LEU:HD23	1:B:1613:LEU:HB3	1.88	0.54
1:A:922:GLU:HB3	1:A:932:LEU:HD21	1.90	0.54
1:A:1565:ALA:HB2	1:A:1595:ILE:HG22	1.90	0.54
1:B:745:SER:O	1:B:769:GLN:NE2	2.41	0.54
1:B:1605:ARG:HD3	1:B:1611:GLU:OE2	2.08	0.54
1:A:98:VAL:HB	1:A:137:ILE:HD13	1.90	0.54
1:B:980:ARG:NH2	1:B:1109:ASN:O	2.35	0.54
1:B:1482:ILE:HG13	1:B:1504:VAL:HG21	1.90	0.53
1:A:1099:LEU:HD22	1:A:1104:VAL:HG21	1.90	0.53
1:A:1461:SER:HB3	1:A:1487:GLU:OE2	2.09	0.53
1:B:1470:LEU:HD22	1:B:1501:LEU:HD21	1.91	0.53
1:B:605:MET:HE2	1:B:612:LEU:HA	1.91	0.53
1:A:889:LEU:HD12	1:A:906:SER:HB2	1.89	0.53
1:A:1622:ILE:HB	1:A:1627:ILE:HD11	1.90	0.53
1:A:1785:TYR:HB3	1:A:1790:GLN:HB3	1.90	0.53
1:A:3:ARG:HB3	1:A:45:ILE:HA	1.89	0.53
1:A:921:ARG:HA	1:A:1126:THR:HG21	1.91	0.53
1:B:1047:HIS:O	1:B:1050:THR:HG22	2.09	0.53
1:B:1538:PRO:HB3	1:B:1544:MET:HG3	1.90	0.53
1:A:190:LEU:HD21	1:A:576:GLY:HA2	1.90	0.52
1:A:729:4HH:HU	1:A:1121:GLN:HB2	1.74	0.52
1:A:1750:ARG:HA	1:A:1787:THR:HB	1.91	0.52
1:A:488:ILE:HG22	1:A:489:MET:HG3	1.92	0.52
1:B:1648:VAL:HG22	1:B:1649:ALA:H	1.74	0.52
1:B:1795:VAL:HG22	1:B:1796:THR:H	1.74	0.52
1:A:291:ARG:O	1:A:295:MET:HG3	2.10	0.52
1:B:1263:LEU:HD22	1:B:1321:LEU:HD21	1.91	0.52
1:B:1622:ILE:HG13	1:B:1659:LEU:HD22	1.92	0.52
1:A:445:ALA:O	1:A:449:MET:HG3	2.10	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:83:ARG:HG3	1:A:167:LYS:HG3	1.93	0.51
1:A:1025:TRP:HZ2	1:A:1174:MET:HB3	1.73	0.51
1:B:721:HIS:HB3	1:B:724:GLU:HB2	1.93	0.51
1:A:988:GLY:HA3	1:A:1140:SER:HB2	1.91	0.51
1:B:856:ALA:HB1	1:B:887:PRO:HD3	1.92	0.51
1:A:1321:LEU:HG	1:A:1337:VAL:HB	1.91	0.51
1:A:1538:PRO:HB3	1:A:1544:MET:HG3	1.91	0.51
1:A:1752:ASN:HB3	1:A:1755:GLU:HB2	1.92	0.51
1:A:1287:ALA:O	1:A:1291:VAL:HG23	2.11	0.51
1:A:1678:LEU:HG	1:A:1682:LEU:HD12	1.91	0.51
1:B:953:ASP:N	1:B:953:ASP:OD1	2.38	0.51
1:A:74:PRO:HA	1:A:98:VAL:HG12	1.92	0.51
1:A:97:GLY:HA2	1:A:118:ILE:H	1.75	0.51
1:A:1765:GLN:O	1:A:1769:ARG:HG2	2.10	0.51
1:B:1075:HIS:O	1:B:1079:GLN:HG2	2.11	0.51
1:B:747:ARG:HB2	1:B:750:GLN:HG3	1.93	0.51
1:B:1214:THR:OG1	1:B:1542:TYR:O	2.29	0.51
1:A:1223:ILE:HD11	1:A:1424:VAL:HB	1.92	0.50
1:A:1206:ASP:OD1	1:A:1210:ARG:HG3	2.11	0.50
1:B:1401:GLN:HG3	1:B:1402:ASP:OD1	2.11	0.50
1:A:311:GLU:HG3	1:A:320:ILE:HG12	1.92	0.50
1:B:721:HIS:CE1	1:B:723:LEU:HB2	2.47	0.50
1:B:898:ASP:OD1	1:B:898:ASP:N	2.43	0.50
1:B:1230:TRP:HZ3	1:B:1427:ARG:CZ	2.24	0.50
1:B:1470:LEU:HB2	1:B:1500:VAL:HG13	1.94	0.50
1:A:995:VAL:HB	1:A:1155:LEU:HB2	1.93	0.50
1:A:1464:ILE:HB	1:A:1465:PRO:HD3	1.94	0.50
1:B:688:LEU:HD21	1:B:715:GLN:HB2	1.94	0.50
1:A:9:THR:HB	1:A:54:GLY:H	1.76	0.50
1:A:1309:ARG:O	1:A:1313:ILE:HG13	2.12	0.49
1:B:1004:LYS:HG2	1:B:1014:LEU:HD22	1.94	0.49
1:B:1208:PHE:HD2	1:B:1209:LEU:HD12	1.77	0.49
1:B:58:ASP:HB2	1:B:61:ILE:HD12	1.93	0.49
1:B:1316:ASP:O	1:B:1575:ASN:ND2	2.45	0.49
1:A:1261:HIS:CD2	1:A:1350:ASP:HB3	2.47	0.49
1:A:1514:GLU:OE1	1:A:1514:GLU:N	2.43	0.49
1:A:812:ILE:HG12	1:A:1132:MET:HG2	1.95	0.49
1:A:78:PRO:O	1:A:162:GLY:HA3	2.13	0.49
1:B:1020:THR:O	1:B:1023:SER:N	2.45	0.49
1:A:794:TYR:O	1:A:798:GLN:HG2	2.12	0.49
1:B:1161:TYR:CG	1:B:1171:ILE:HG13	2.48	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:963:LYS:HG3	1:B:1101:ALA:HB1	1.95	0.48
1:B:1423:TRP:CD1	1:B:1430:LEU:HB2	2.48	0.48
1:B:1511:GLY:HA3	1:B:1518:TYR:HA	1.94	0.48
1:B:1301:ILE:HD11	1:B:1310:ILE:HG12	1.95	0.48
1:A:534:VAL:HG22	1:A:563:MET:HG2	1.94	0.48
1:A:1128:LEU:O	1:A:1132:MET:HG3	2.13	0.48
1:B:729:4HH:HL11	1:B:729:4HH:HB3	1.94	0.48
1:B:772:LEU:O	1:B:774:PRO:HD3	2.13	0.48
1:A:501:ASN:OD1	1:A:579:GLU:HG3	2.14	0.48
1:B:1551:GLY:HA3	1:B:1587:HIS:HE2	1.79	0.48
1:B:1781:HIS:O	1:B:1785:TYR:HD1	1.96	0.48
1:A:1298:TYR:CE2	1:A:1300:PRO:HG3	2.49	0.48
1:B:445:ALA:O	1:B:449:MET:HG3	2.14	0.48
1:B:718:ILE:HA	1:B:757:ILE:HB	1.94	0.48
1:A:1752:ASN:OD1	1:A:1755:GLU:N	2.44	0.48
1:B:106:HIS:HB2	1:B:109:THR:HG21	1.95	0.48
1:B:686:GLU:HB3	1:B:688:LEU:HG	1.96	0.48
1:B:1050:THR:HA	1:B:1053:LEU:HG	1.94	0.48
1:A:1511:GLY:HA3	1:A:1518:TYR:HA	1.96	0.48
1:A:846:ASP:OD1	1:A:1772:ARG:NH2	2.39	0.48
1:A:1750:ARG:HE	1:A:1789:GLU:CD	2.17	0.48
1:B:833:ARG:NH1	1:B:922:GLU:OE2	2.47	0.48
1:A:1522:TYR:OH	1:A:1530:GLU:OE2	2.30	0.47
1:A:1544:MET:HE3	1:A:1564:ILE:HD13	1.96	0.47
1:B:482:GLY:HA3	1:B:489:MET:HA	1.94	0.47
1:B:1287:ALA:O	1:B:1291:VAL:HG23	2.14	0.47
1:B:1047:HIS:CD2	1:B:1049:ASP:H	2.32	0.47
1:B:1212:ASN:HB3	1:B:1543:ARG:HG2	1.96	0.47
1:A:1269:GLN:H	1:A:1269:GLN:HG2	1.59	0.47
1:A:1770:LEU:HD23	1:A:1773:ILE:HD11	1.95	0.47
1:B:388:LEU:HD21	1:B:426:LEU:HD11	1.95	0.47
1:B:1317:SER:HA	1:B:1574:LEU:HD21	1.94	0.47
1:B:1399:LEU:HD23	1:B:1455:HIS:CG	2.50	0.47
1:A:1795:VAL:HG22	1:A:1796:THR:H	1.80	0.47
1:B:1448:VAL:HG13	1:B:1453:ILE:HB	1.95	0.47
1:A:1044:GLY:HA3	1:A:1057:PHE:O	2.15	0.47
1:B:8:THR:O	1:B:32:GLN:HA	2.14	0.47
1:B:427:ASN:HD21	1:B:452:ASP:C	2.18	0.47
1:B:622:ASP:OD1	1:B:622:ASP:N	2.46	0.47
1:A:1120:MET:HE3	1:A:1120:MET:HB2	1.76	0.47
1:A:1423:TRP:CD1	1:A:1430:LEU:HB2	2.49	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1263:LEU:HD21	1:B:1323:LEU:HD11	1.97	0.47
1:B:1440:ASN:OD1	1:B:1443:ALA:N	2.38	0.47
1:A:1750:ARG:HG3	1:A:1789:GLU:HG2	1.96	0.47
1:A:805:ALA:HA	1:A:1139:ILE:HG12	1.97	0.47
1:A:1414:ASP:OD1	1:A:1414:ASP:N	2.47	0.47
1:B:1000:THR:HG23	1:B:1155:LEU:HG	1.97	0.47
1:A:73:HIS:CD2	1:A:77:LEU:HD21	2.50	0.46
1:A:269:SER:O	1:A:273:VAL:HG23	2.15	0.46
1:A:1728:THR:HG23	1:A:1731:GLU:H	1.79	0.46
1:B:1275:MET:HG2	1:B:1299:LEU:HD23	1.97	0.46
1:B:1448:VAL:HA	1:B:1453:ILE:HG12	1.97	0.46
1:A:1795:VAL:HG13	1:A:1796:THR:N	2.31	0.46
1:B:1785:TYR:HB3	1:B:1790:GLN:CB	2.45	0.46
1:B:1785:TYR:HB2	1:B:1791:ILE:HG23	1.97	0.46
1:A:1269:GLN:O	1:A:1272:ASP:HB2	2.15	0.46
1:B:330:SER:OG	1:B:331:GLU:N	2.48	0.46
1:B:388:LEU:HG	1:B:415:VAL:CG2	2.45	0.46
1:B:1470:LEU:HB2	1:B:1500:VAL:CG1	2.46	0.46
1:A:190:LEU:HD22	1:A:525:ILE:HD11	1.96	0.46
1:A:1549:ARG:H	1:A:1549:ARG:HG2	1.45	0.46
1:B:100:ILE:HB	1:B:114:VAL:HG23	1.97	0.46
1:B:975:LEU:HD21	1:B:1026:LEU:HD22	1.97	0.46
1:B:199:LYS:O	1:B:510:ARG:NE	2.47	0.46
1:B:224:ASP:HB3	1:B:264:LEU:HG	1.98	0.46
1:B:1061:LEU:HD21	1:B:1091:GLN:HA	1.98	0.46
1:A:1675:ARG:HG2	1:A:1691:PHE:CZ	2.50	0.46
1:A:15:ASN:HB2	1:A:17:VAL:HG22	1.99	0.45
1:A:312:GLU:OE1	1:A:312:GLU:N	2.39	0.45
1:A:485:GLU:OE1	1:A:485:GLU:N	2.45	0.45
1:B:1784:LEU:HB2	1:B:1785:TYR:CE1	2.51	0.45
1:A:493:PHE:HB2	1:A:505:GLY:CA	2.46	0.45
1:A:821:GLU:HB3	1:A:824:ARG:HH21	1.81	0.45
1:B:835:GLU:HG2	1:B:838:ARG:HH21	1.81	0.45
1:A:482:GLY:HA3	1:A:489:MET:HA	1.99	0.45
1:A:658:TYR:OH	1:A:682:GLN:NE2	2.49	0.45
1:A:1445:TRP:O	1:A:1449:VAL:HG23	2.16	0.45
1:A:1531:SER:N	1:A:1532:PRO:HD2	2.32	0.45
1:B:1629:LEU:HD12	1:B:1629:LEU:H	1.82	0.45
1:A:721:HIS:HE1	1:A:1011:ASP:OD1	2.00	0.45
1:A:1069:HIS:HA	1:A:1193:VAL:HB	1.97	0.45
1:B:783:GLU:OE2	1:B:851:ARG:NH1	2.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1388:ASN:HD21	1:B:1541:ASN:HB2	1.81	0.45
1:A:1627:ILE:HG21	1:A:1659:LEU:HD11	1.99	0.45
1:B:20:TYR:CZ	1:B:24:LEU:HD11	2.52	0.45
1:B:1489:MET:CE	1:B:1533:VAL:HG11	2.47	0.45
1:B:1784:LEU:HB2	1:B:1785:TYR:CD1	2.52	0.45
1:A:1749:ILE:HG22	1:A:1788:ILE:HB	1.99	0.45
1:B:173:TYR:HB3	1:B:176:LEU:HD12	1.98	0.45
1:B:684:ASP:OD1	1:B:687:LEU:N	2.50	0.45
1:B:1128:LEU:O	1:B:1132:MET:HG3	2.17	0.45
1:B:1369:THR:HG23	1:B:1377:LYS:O	2.16	0.45
1:B:18:VAL:HG13	1:B:28:VAL:HG11	1.98	0.44
1:B:575:ASP:OD1	1:B:577:ASN:ND2	2.50	0.44
1:B:1063:LEU:HD23	1:B:1063:LEU:HA	1.82	0.44
1:A:719:ASP:OD2	1:A:758:ARG:NH1	2.49	0.44
1:A:989:ALA:HB3	1:A:1161:TYR:CZ	2.53	0.44
1:A:1240:LEU:HD13	1:A:1432:ILE:HD11	2.00	0.44
1:A:1468:GLU:O	1:A:1469:TYR:HB3	2.17	0.44
1:B:305:LEU:HD23	1:B:321:ILE:HB	1.98	0.44
1:B:1050:THR:O	1:B:1050:THR:OG1	2.35	0.44
1:B:1252:LEU:O	1:B:1256:VAL:HG23	2.17	0.44
1:A:785:GLU:OE2	1:A:944:ARG:NH1	2.35	0.44
1:A:1605:ARG:HD3	1:A:1607:ASP:HB2	2.00	0.44
1:A:1733:THR:O	1:A:1737:ILE:HD12	2.17	0.44
1:B:59:LYS:HA	1:B:62:VAL:HG22	2.00	0.44
1:B:1228:GLU:HA	1:B:1253:ASN:ND2	2.33	0.44
1:A:886:ALA:HB1	1:A:887:PRO:HA	1.98	0.44
1:B:12:SER:O	1:B:15:ASN:ND2	2.49	0.44
1:B:1508:ASN:ND2	1:B:1534:PRO:O	2.39	0.44
1:A:78:PRO:O	1:A:81:LYS:HD2	2.18	0.44
1:A:1515:ALA:O	1:A:1516:THR:OG1	2.35	0.44
1:B:62:VAL:HA	1:B:69:ILE:HD12	2.00	0.44
1:A:8:THR:O	1:A:32:GLN:HA	2.18	0.44
1:A:1403:ASP:OD2	1:A:1480:ARG:NH2	2.51	0.44
1:B:441:PRO:HB2	1:B:671:GLY:HA3	2.00	0.44
1:B:1647:VAL:HB	1:B:1648:VAL:H	1.64	0.44
1:A:799:GLN:HE21	1:A:799:GLN:HB3	1.62	0.43
1:A:984:LEU:HD23	1:A:984:LEU:H	1.82	0.43
1:B:939:TYR:OH	1:B:1056:MET:O	2.31	0.43
1:A:1364:VAL:HG12	1:A:1381:ILE:HG22	2.01	0.43
1:B:1274:VAL:HG22	1:B:1321:LEU:HD23	2.00	0.43
1:B:1489:MET:HB3	1:B:1489:MET:HE3	1.52	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:742:ILE:HD13	1:A:742:ILE:HA	1.86	0.43
1:A:1407:LEU:HD12	1:A:1430:LEU:HD21	1.99	0.43
1:A:122:ASP:HA	1:A:181:VAL:HB	2.00	0.43
1:A:367:ASN:ND2	1:A:536:GLU:O	2.47	0.43
1:A:916:LYS:HE3	1:A:916:LYS:HB3	1.72	0.43
1:A:1274:VAL:HG23	1:A:1321:LEU:C	2.39	0.43
1:B:713:ILE:HG21	1:B:725:ARG:NH2	2.33	0.43
1:A:471:ARG:HD3	1:A:475:TYR:CE1	2.54	0.43
1:A:804:ILE:HD13	1:A:804:ILE:H	1.84	0.43
1:A:1781:HIS:ND1	1:A:1795:VAL:HB	2.34	0.43
1:B:600:ILE:HD11	1:B:654:MET:HG2	2.01	0.43
1:B:721:HIS:NE2	1:B:1011:ASP:OD1	2.50	0.43
1:B:1313:ILE:O	1:B:1317:SER:OG	2.18	0.43
1:B:1542:TYR:CZ	1:B:1568:SER:HB2	2.54	0.43
1:A:718:ILE:HG22	1:A:758:ARG:HB2	2.00	0.43
1:A:809:VAL:HB	1:A:1135:ILE:HB	2.01	0.43
1:A:1240:LEU:HD12	1:A:1282:VAL:HG13	2.01	0.43
1:B:1565:ALA:HB2	1:B:1595:ILE:HG22	2.01	0.43
1:A:530:GLU:OE2	1:A:567:GLY:HA2	2.19	0.43
1:B:291:ARG:O	1:B:295:MET:HG3	2.18	0.43
1:A:274:MET:HB3	1:A:274:MET:HE3	1.81	0.43
1:A:406:LEU:HG	1:A:412:LEU:HD11	2.01	0.43
1:A:1684:GLU:HA	1:A:1687:ILE:HG13	1.99	0.43
1:B:1025:TRP:HZ2	1:B:1174:MET:HB3	1.83	0.43
1:A:224:ASP:HB3	1:A:264:LEU:HG	2.00	0.43
1:A:866:GLU:O	1:A:870:VAL:HG23	2.19	0.43
1:B:8:THR:OG1	1:B:11:MET:HB2	2.18	0.43
1:B:396:ASP:OD1	1:B:396:ASP:N	2.38	0.43
1:A:77:LEU:O	1:A:115:GLN:NE2	2.45	0.43
1:A:193:GLU:HG3	1:A:512:ARG:NH2	2.34	0.43
1:A:825:VAL:O	1:A:829:GLN:HG3	2.18	0.43
1:A:985:THR:OG1	1:A:1162:ASN:ND2	2.47	0.43
1:A:1729:GLU:O	1:A:1733:THR:OG1	2.32	0.43
1:B:74:PRO:HA	1:B:98:VAL:HG12	2.01	0.43
1:B:362:MET:HE3	1:B:540:ARG:HB3	2.01	0.43
1:A:187:LEU:HD21	1:A:522:LEU:HG	2.01	0.42
1:A:490:VAL:HG11	1:A:533:ILE:HG21	2.00	0.42
1:A:1634:SER:O	1:A:1638:GLN:HG3	2.19	0.42
1:A:1679:ARG:NH2	1:A:1755:GLU:OE1	2.52	0.42
1:A:1730:LEU:HD13	1:A:1775:TRP:CE2	2.54	0.42
1:B:386:LYS:HD2	1:B:413:HIS:HE2	1.83	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1062:PRO:HG3	1:B:1095:PHE:HE1	1.85	0.42
1:B:1207:LEU:HD12	1:B:1207:LEU:HA	1.87	0.42
1:B:1258:GLN:HB3	1:B:1348:ALA:H	1.84	0.42
1:B:1276:LEU:HD23	1:B:1323:LEU:HB2	2.01	0.42
1:B:485:GLU:OE1	1:B:485:GLU:N	2.51	0.42
1:B:1024:ILE:HD12	1:B:1024:ILE:H	1.83	0.42
1:B:1194:LYS:HB2	1:B:1550:HIS:CE1	2.53	0.42
1:B:1223:ILE:HD11	1:B:1424:VAL:HB	2.02	0.42
1:A:364:GLU:OE2	1:A:540:ARG:NE	2.40	0.42
1:B:294:TYR:OH	1:B:545:ARG:NH2	2.53	0.42
1:B:730:ILE:H	1:B:730:ILE:HG12	1.67	0.42
1:B:1237:LYS:HE3	1:B:1427:ARG:O	2.19	0.42
1:B:1240:LEU:HB2	1:B:1247:VAL:HB	2.02	0.42
1:B:1368:TYR:HA	1:B:1377:LYS:O	2.20	0.42
1:B:311:GLU:HG2	1:B:320:ILE:HG21	2.01	0.42
1:B:1445:TRP:HA	1:B:1445:TRP:CE3	2.55	0.42
1:B:1678:LEU:CD1	1:B:1688:PRO:HD3	2.36	0.42
1:B:1778:VAL:HG23	1:B:1795:VAL:CG2	2.48	0.42
1:A:1600:ASP:OD1	1:A:1615:ARG:NH1	2.53	0.42
1:B:97:GLY:HA2	1:B:118:ILE:H	1.85	0.42
1:B:812:ILE:HG12	1:B:1132:MET:HG2	2.01	0.42
1:A:699:LEU:HD11	1:A:744:LEU:HD11	2.02	0.42
1:A:1263:LEU:HD23	1:A:1263:LEU:HA	1.91	0.42
1:A:1605:ARG:HG2	1:A:1606:GLU:N	2.34	0.42
1:B:262:LYS:NZ	1:B:390:TYR:O	2.47	0.42
1:B:368:LEU:HD21	1:B:403:PHE:CD2	2.54	0.42
1:B:1016:MET:O	1:B:1020:THR:OG1	2.30	0.42
1:B:1022:VAL:HG12	1:B:1038:LEU:HD11	2.01	0.42
1:B:1263:LEU:HD11	1:B:1323:LEU:HD21	2.02	0.42
1:B:1444:ILE:O	1:B:1448:VAL:HG23	2.20	0.42
1:B:1795:VAL:HG13	1:B:1796:THR:N	2.35	0.42
1:A:1074:LEU:HD23	1:A:1077:LEU:HD12	2.00	0.41
1:A:1224:MET:SD	1:A:1292:LEU:HB3	2.60	0.41
1:B:794:TYR:O	1:B:798:GLN:HG2	2.20	0.41
1:B:1678:LEU:HD11	1:B:1687:ILE:HA	2.02	0.41
1:B:1808:ASN:OD1	1:B:1808:ASN:N	2.53	0.41
1:A:1522:TYR:CE2	1:A:1534:PRO:HD2	2.55	0.41
1:B:294:TYR:CE1	1:B:358:ALA:HB3	2.55	0.41
1:B:626:TYR:HB3	1:B:687:LEU:HD21	2.01	0.41
1:B:888:LEU:HD23	1:B:888:LEU:HA	1.84	0.41
1:B:1002:LYS:O	1:B:1006:THR:OG1	2.26	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:364:GLU:OE2	1:A:540:ARG:HG3	2.20	0.41
1:A:812:ILE:HD12	1:A:902:LEU:HD23	2.02	0.41
1:B:1250:ARG:NH1	1:B:1254:GLU:OE2	2.48	0.41
1:A:918:ILE:HG12	1:A:921:ARG:HH22	1.85	0.41
1:A:1405:PHE:HD1	1:A:1406:LEU:H	1.68	0.41
1:B:1466:PHE:O	1:B:1470:LEU:HD12	2.20	0.41
1:A:224:ASP:CB	1:A:264:LEU:HG	2.51	0.41
1:B:1409:THR:HG21	1:B:1415:ILE:HB	2.02	0.41
1:A:1121:GLN:HB3	1:A:1149:LEU:HD23	2.03	0.41
1:B:843:MET:SD	1:B:1764:LEU:HG	2.60	0.41
1:B:1622:ILE:HD13	1:B:1622:ILE:HA	1.92	0.41
1:A:1382:GLU:OE2	1:A:1571:ARG:HG3	2.20	0.41
1:B:493:PHE:HB2	1:B:505:GLY:CA	2.50	0.41
1:B:778:LEU:HD23	1:B:941:SER:HA	2.02	0.41
1:B:1262:THR:O	1:B:1266:LYS:HG2	2.20	0.41
1:B:1489:MET:CE	1:B:1524:LEU:HD11	2.50	0.41
1:B:810:TYR:HB2	1:B:904:PHE:CZ	2.55	0.41
1:B:866:GLU:O	1:B:870:VAL:HG23	2.21	0.41
1:B:1431:VAL:HG11	1:B:1451:ALA:HB1	2.02	0.41
1:B:1543:ARG:NH2	1:B:1566:GLY:HA2	2.35	0.41
1:A:747:ARG:HB2	1:A:750:GLN:HG3	2.03	0.41
1:A:1406:LEU:HD11	1:A:1433:LEU:HB2	2.02	0.41
1:A:1605:ARG:HB3	1:A:1609:ASN:O	2.21	0.41
1:B:1248:THR:HG23	1:B:1251:GLU:H	1.86	0.41
1:B:1280:ARG:NH2	1:B:1438:GLU:OE1	2.53	0.41
1:B:1312:TYR:CE1	1:B:1316:ASP:HB2	2.56	0.41
1:A:618:LYS:HB2	1:A:626:TYR:CZ	2.56	0.41
1:A:1247:VAL:HG21	1:A:1282:VAL:HG11	2.03	0.41
1:A:1381:ILE:HD13	1:A:1381:ILE:HA	1.91	0.41
1:B:1:MET:HE2	1:B:1:MET:HB2	1.95	0.41
1:B:1280:ARG:HG2	1:B:1432:ILE:HG23	2.02	0.41
1:B:1388:ASN:HB3	1:B:1568:SER:OG	2.21	0.41
1:A:100:ILE:HB	1:A:114:VAL:HG23	2.04	0.40
1:B:601:GLU:N	1:B:602:PRO:HD2	2.36	0.40
1:A:1489:MET:HB3	1:A:1533:VAL:HG11	2.04	0.40
1:B:624:ARG:HE	1:B:624:ARG:HB2	1.74	0.40
1:A:1230:TRP:HA	1:A:1230:TRP:CE3	2.56	0.40
1:A:1546:ILE:HD11	1:A:1610:ILE:HG23	2.03	0.40
1:A:1738:TRP:CH2	1:A:1753:PHE:HB2	2.56	0.40
1:B:861:VAL:HG12	1:B:863:GLN:HG3	2.03	0.40
1:B:958:GLN:HE22	1:B:1092:TYR:H	1.69	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:1464:ILE:HB	1:B:1465:PRO:HD3	2.03	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:167:LYS:NZ	1:A:953:ASP:OD2[1_556]	1.85	0.35

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	1746/1814 (96%)	1659 (95%)	83 (5%)	4 (0%)	44 77
1	B	1745/1814 (96%)	1649 (94%)	87 (5%)	9 (0%)	25 61
All	All	3491/3628 (96%)	3308 (95%)	170 (5%)	13 (0%)	30 66

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1795	VAL
1	A	1804	ALA
1	B	1804	ALA
1	B	1805	ALA
1	A	419	ARG
1	B	1113	LEU
1	B	1466	PHE
1	B	1649	ALA
1	B	1795	VAL
1	A	41	ASN
1	B	1020	THR
1	B	508	ILE

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Mol	Chain	Res	Type
1	B	1647	VAL

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	1482/1562 (95%)	1435 (97%)	47 (3%)	34 67
1	B	1453/1562 (93%)	1402 (96%)	51 (4%)	31 65
All	All	2935/3124 (94%)	2837 (97%)	98 (3%)	33 67

All (98) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	11	MET
1	A	12	SER
1	A	13	LYS
1	A	15	ASN
1	A	34	LYS
1	A	39	SER
1	A	75	SER
1	A	167	LYS
1	A	170	ARG
1	A	341	ARG
1	A	352	SER
1	A	388	LEU
1	A	392	SER
1	A	393	PHE
1	A	559	THR
1	A	622	ASP
1	A	680	ASP
1	A	701	GLN
1	A	799	GLN
1	A	801	VAL
1	A	804	ILE
1	A	908	HIS

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Mol	Chain	Res	Type
1	A	941	SER
1	A	964	THR
1	A	969	GLU
1	A	984	LEU
1	A	1045	ARG
1	A	1072	SER
1	A	1110	ARG
1	A	1167	ASP
1	A	1206	ASP
1	A	1269	GLN
1	A	1272	ASP
1	A	1405	PHE
1	A	1411	TYR
1	A	1448	VAL
1	A	1483	LEU
1	A	1491	ASP
1	A	1503	GLU
1	A	1504	VAL
1	A	1531	SER
1	A	1564	ILE
1	A	1568	SER
1	A	1607	ASP
1	A	1670	THR
1	A	1787	THR
1	A	1789	GLU
1	B	13	LYS
1	B	64	ARG
1	B	256	VAL
1	B	261	ASP
1	B	343	ASP
1	B	393	PHE
1	B	396	ASP
1	B	423	LEU
1	B	465	VAL
1	B	534	VAL
1	B	622	ASP
1	B	649	ASP
1	B	657	THR
1	B	701	GLN
1	B	732	VAL
1	B	771	LEU
1	B	889	LEU

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Mol	Chain	Res	Type
1	B	901	VAL
1	B	908	HIS
1	B	933	SER
1	B	935	VAL
1	B	1035	GLN
1	B	1054	LEU
1	B	1091	GLN
1	B	1189	LEU
1	B	1205	ARG
1	B	1210	ARG
1	B	1301	ILE
1	B	1312	TYR
1	B	1370	SER
1	B	1405	PHE
1	B	1411	TYR
1	B	1438	GLU
1	B	1469	TYR
1	B	1477	ASN
1	B	1491	ASP
1	B	1513	THR
1	B	1529	GLN
1	B	1531	SER
1	B	1589	LEU
1	B	1597	ARG
1	B	1630	ASP
1	B	1632	ILE
1	B	1634	SER
1	B	1646	VAL
1	B	1647	VAL
1	B	1749	ILE
1	B	1754	PHE
1	B	1760	SER
1	B	1794	PHE
1	B	1808	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	43	GLN
1	A	175	ASN
1	A	211	GLN
1	A	447	GLN

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Mol	Chain	Res	Type
1	A	648	ASN
1	A	682	GLN
1	A	721	HIS
1	A	799	GLN
1	A	1780	ASN
1	B	32	GLN
1	B	338	HIS
1	B	957	GLN
1	B	958	GLN
1	B	974	GLN
1	B	1010	HIS
1	B	1047	HIS

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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	4HH	B	729	1	22,26,27	2.05	4 (18%)	27,35,37	1.19	1 (3%)
1	4HH	A	729	1	22,26,27	2.15	5 (22%)	27,35,37	1.19	3 (11%)

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	4HH	B	729	1	-	8/33/35/37	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	4HH	A	729	1	-	5/33/35/37	-

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	729	4HH	CQ-NR	5.78	1.47	1.33
1	B	729	4HH	CL3-NN	5.62	1.46	1.33
1	A	729	4HH	CQ-NR	5.58	1.46	1.33
1	A	729	4HH	CL3-NN	5.53	1.46	1.33
1	A	729	4HH	P-O2P	3.92	1.64	1.50
1	A	729	4HH	ON-CL3	-2.45	1.18	1.23
1	B	729	4HH	ON-CL3	-2.39	1.18	1.23
1	A	729	4HH	OR-CQ	-2.12	1.19	1.23
1	B	729	4HH	OR-CQ	-2.06	1.19	1.23

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	729	4HH	OG-CB-CA	3.75	111.79	108.14
1	A	729	4HH	OG-CB-CA	3.17	111.23	108.14
1	A	729	4HH	CT-CS-NR	-2.17	107.38	112.31
1	A	729	4HH	CP-CO-NN	-2.11	107.50	112.00

There are no chirality outliers.

All (13) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
1	B	729	4HH	CB-OG-P-O1P
1	B	729	4HH	O3P-CJ-CK-CL1
1	B	729	4HH	O3P-CJ-CK-CL2
1	B	729	4HH	O3P-CJ-CK-CM
1	B	729	4HH	NN-CO-CP-CQ
1	A	729	4HH	CA-CB-OG-P
1	A	729	4HH	NR-CS-CT-SU
1	B	729	4HH	NR-CS-CT-SU
1	B	729	4HH	CB-OG-P-O2P
1	B	729	4HH	CB-OG-P-O3P
1	A	729	4HH	CL1-CK-CM-CL3
1	A	729	4HH	CL2-CK-CM-OM
1	A	729	4HH	CJ-CK-CM-CL3

There are no ring outliers.

2 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
1	B	729	4HH	2	0
1	A	729	4HH	1	0

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 5 ligands modelled in this entry, 1 is monoatomic - leaving 4 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
3	A1AMN	A	1904	1	28,33,34	2.50	9 (32%)	35,43,46	1.09	3 (8%)
2	GOL	A	1901	-	5,5,5	0.08	0	5,5,5	0.33	0
2	GOL	B	1901	-	5,5,5	0.08	0	5,5,5	0.31	0
2	GOL	A	1902	-	5,5,5	0.08	0	5,5,5	0.31	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	A1AMN	A	1904	1	-	16/43/45/46	-
2	GOL	A	1901	-	-	0/4/4/4	-
2	GOL	B	1901	-	-	0/4/4/4	-
2	GOL	A	1902	-	-	0/4/4/4	-

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	A	1904	A1AMN	C02-N03	5.78	1.47	1.33
3	A	1904	A1AMN	C10-N29	5.77	1.47	1.33
3	A	1904	A1AMN	C07-N06	5.69	1.46	1.33
3	A	1904	A1AMN	C11-N10	5.47	1.46	1.33
3	A	1904	A1AMN	C30-N30	4.06	1.46	1.33
3	A	1904	A1AMN	O02-C10	-2.43	1.18	1.23
3	A	1904	A1AMN	O23-C11	-2.38	1.18	1.23
3	A	1904	A1AMN	O01-C02	-2.31	1.18	1.23
3	A	1904	A1AMN	O24-C07	-2.10	1.19	1.23

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	1904	A1AMN	C50-C10-N29	2.09	119.82	116.38
3	A	1904	A1AMN	C08-C07-N06	2.08	120.14	116.34
3	A	1904	A1AMN	O31-C30-N30	-2.04	120.05	125.32

There are no chirality outliers.

All (16) torsion outliers are listed below:

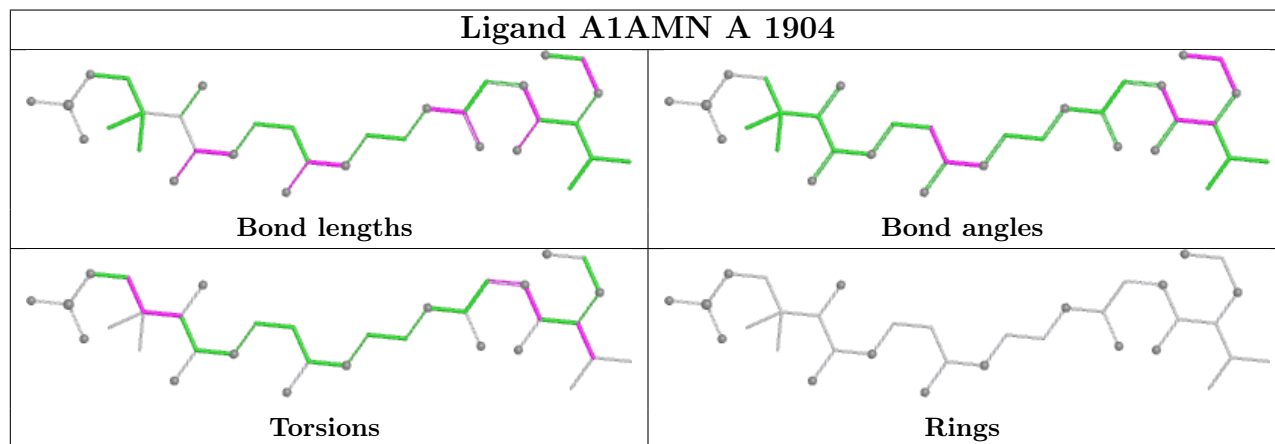
Mol	Chain	Res	Type	Atoms
3	A	1904	A1AMN	C11-C12-C14-C15
3	A	1904	A1AMN	C11-C12-C14-C16
3	A	1904	A1AMN	C11-C12-C14-C22
3	A	1904	A1AMN	O13-C12-C14-C16
3	A	1904	A1AMN	O13-C12-C14-C22
3	A	1904	A1AMN	C12-C14-C16-O17
3	A	1904	A1AMN	C15-C14-C16-O17
3	A	1904	A1AMN	C22-C14-C16-O17
3	A	1904	A1AMN	C28-C26-C50-C10
3	A	1904	A1AMN	C27-C26-C50-N30
3	A	1904	A1AMN	C28-C26-C50-N30
3	A	1904	A1AMN	C27-C26-C50-C10
3	A	1904	A1AMN	O02-C10-N29-C25
3	A	1904	A1AMN	C50-C10-N29-C25
3	A	1904	A1AMN	O13-C12-C14-C15
3	A	1904	A1AMN	C02-C25-N29-C10

There are no ring outliers.

No monomer is involved in short contacts.

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In

addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



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	1761/1814 (97%)	-0.06	25 (1%)	73	52	31, 56, 92, 128	1 (0%)
1	B	1757/1814 (96%)	0.02	21 (1%)	76	56	27, 61, 100, 125	0
All	All	3518/3628 (96%)	-0.02	46 (1%)	74	54	27, 59, 96, 128	1 (0%)

All (46) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1794	PHE	4.7
1	B	955	TYR	4.1
1	A	1652	ASP	3.8
1	B	1659	LEU	3.4
1	A	1105	LYS	3.3
1	B	1647	VAL	3.1
1	A	1667	GLN	2.9
1	A	1516	THR	2.8
1	B	1796	THR	2.8
1	A	194	PRO	2.8
1	A	1670	THR	2.8
1	B	1652	ASP	2.7
1	B	1783	PHE	2.6
1	A	1320	LYS	2.6
1	B	1689	ALA	2.6
1	B	25	HIS	2.5
1	B	959	ILE	2.5
1	B	1685	TYR	2.5
1	A	1646	VAL	2.5
1	A	353	GLY	2.5
1	A	1657	ALA	2.5
1	A	1672	GLY	2.4
1	A	622	ASP	2.4
1	A	1107	GLU	2.3

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Mol	Chain	Res	Type	RSRZ
1	A	1109	ASN	2.3
1	B	1096	ASP	2.3
1	A	1532	PRO	2.3
1	B	1760	SER	2.3
1	A	1356	LEU	2.2
1	B	1779	ILE	2.2
1	A	1645	ALA	2.2
1	A	1673	GLN	2.2
1	A	687	LEU	2.2
1	A	1796	THR	2.2
1	A	357	LEU	2.2
1	B	1637	ILE	2.2
1	A	1321	LEU	2.1
1	B	104	ASP	2.1
1	B	966	LEU	2.1
1	A	1724	ALA	2.1
1	A	1686	MET	2.1
1	B	1678	LEU	2.1
1	B	1646	VAL	2.1
1	B	1209	LEU	2.0
1	B	1657	ALA	2.0
1	B	487	THR	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [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(Å ²)	Q<0.9
1	4HH	B	729	27/28	0.89	0.15	43,60,77,86	0
1	4HH	A	729	27/28	0.96	0.10	28,48,72,107	0

6.3 Carbohydrates [i](#)

There are no monosaccharides in this entry.

6.4 Ligands [i](#)

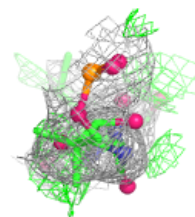
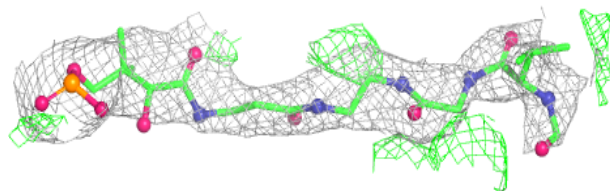
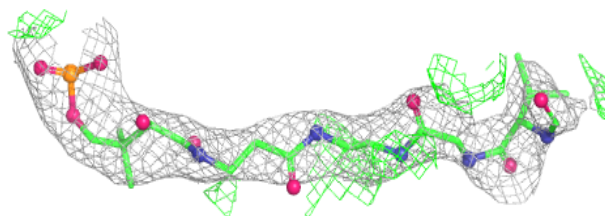
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	GOL	B	1901	6/6	0.72	0.18	66,83,85,86	0
2	GOL	A	1902	6/6	0.81	0.18	39,47,65,68	0
3	A1AMN	A	1904	34/35	0.87	0.18	58,79,94,101	0
4	MN	B	1903	1/1	0.89	0.19	117,117,117,117	0
2	GOL	A	1901	6/6	0.92	0.13	48,54,55,57	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

Electron density around A1AMN A 1904:

2mF_o-DF_c (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
 and green (positive)



6.5 Other polymers [i](#)

There are no such residues in this entry.