Full wwPDB X-ray Structure Validation Report ⓘ

Aug 8, 2020 – 05:50 PM BST

PDB ID	:	2Y8R
Title	:	Crystal structure of apo AMA1 mutant (Tyr230Ala) from Toxoplasma gondii
Authors	:	Tonkin, M.L.; Roques, M.; Lamarque, M.H.; Pugniere, M.; Douguet, D.; Crawford, J.; Lebrun, M.; Boulanger, M.J.
Deposited on	:	2011-02-10
Resolution	:	2.45 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 following versions of software and data (see references ①) were used in the production of this report:

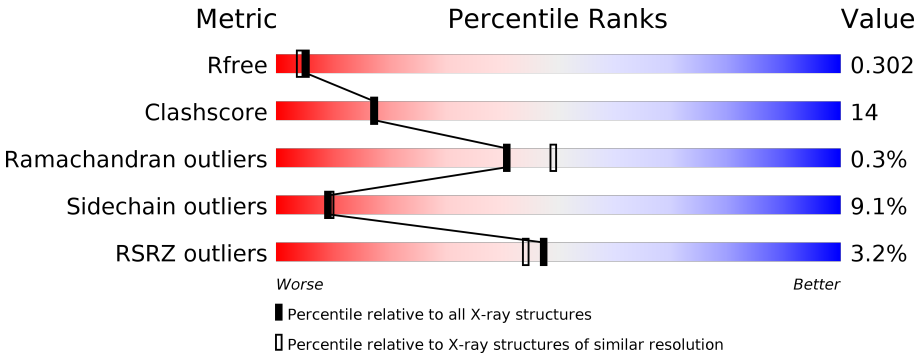
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.13.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.13.1

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 2.45 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}	130704	1544 (2.48-2.44)
Clashscore	141614	1613 (2.48-2.44)
Ramachandran outliers	138981	1598 (2.48-2.44)
Sidechain outliers	138945	1598 (2.48-2.44)
RSRZ outliers	127900	1523 (2.48-2.44)

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 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	432	60% 29% • 8%
1	B	432	2% 65% 23% • 8%
1	D	432	3% 69% 19% 5% 6%
1	E	432	6% 63% 25% • 9%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 13168 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 APICAL MEMBRANE ANTIGEN, PUTATIVE.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	399	Total	C	N	O	S	0	1	0
			3144	1975	538	610	21			
1	B	397	Total	C	N	O	S	0	1	0
			3134	1971	538	603	22			
1	D	406	Total	C	N	O	S	0	0	0
			3197	2009	546	620	22			
1	E	394	Total	C	N	O	S	0	0	0
			3108	1955	530	602	21			

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	59	GLY	-	expression tag	UNP B9QC59
A	60	SER	-	expression tag	UNP B9QC59
A	61	ALA	-	expression tag	UNP B9QC59
A	62	MET	-	expression tag	UNP B9QC59
A	63	GLY	-	expression tag	UNP B9QC59
A	485	ALA	-	expression tag	UNP B9QC59
A	486	ALA	-	expression tag	UNP B9QC59
A	487	LEU	-	expression tag	UNP B9QC59
A	488	VAL	-	expression tag	UNP B9QC59
A	489	PRO	-	expression tag	UNP B9QC59
A	490	ARG	-	expression tag	UNP B9QC59
A	230	ALA	TYR	engineered mutation	UNP B9QC59
B	59	GLY	-	expression tag	UNP B9QC59
B	60	SER	-	expression tag	UNP B9QC59
B	61	ALA	-	expression tag	UNP B9QC59
B	62	MET	-	expression tag	UNP B9QC59
B	63	GLY	-	expression tag	UNP B9QC59
B	485	ALA	-	expression tag	UNP B9QC59
B	486	ALA	-	expression tag	UNP B9QC59
B	487	LEU	-	expression tag	UNP B9QC59
B	488	VAL	-	expression tag	UNP B9QC59

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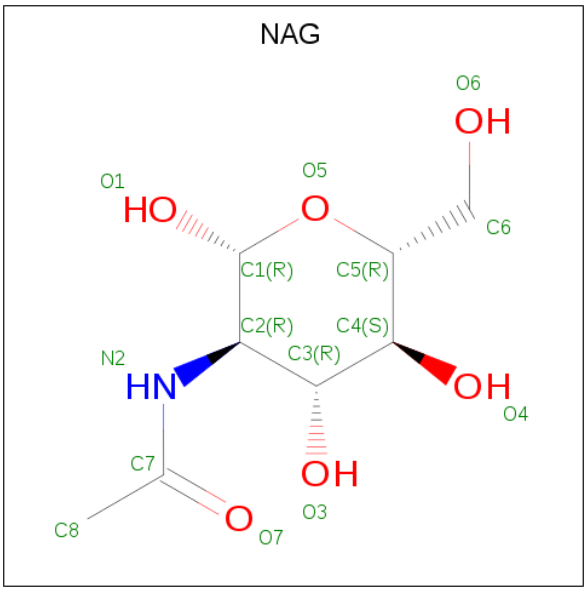
Chain	Residue	Modelled	Actual	Comment	Reference
B	489	PRO	-	expression tag	UNP B9QC59
B	490	ARG	-	expression tag	UNP B9QC59
B	230	ALA	TYR	engineered mutation	UNP B9QC59
D	59	GLY	-	expression tag	UNP B9QC59
D	60	SER	-	expression tag	UNP B9QC59
D	61	ALA	-	expression tag	UNP B9QC59
D	62	MET	-	expression tag	UNP B9QC59
D	63	GLY	-	expression tag	UNP B9QC59
D	485	ALA	-	expression tag	UNP B9QC59
D	486	ALA	-	expression tag	UNP B9QC59
D	487	LEU	-	expression tag	UNP B9QC59
D	488	VAL	-	expression tag	UNP B9QC59
D	489	PRO	-	expression tag	UNP B9QC59
D	490	ARG	-	expression tag	UNP B9QC59
D	230	ALA	TYR	engineered mutation	UNP B9QC59
E	59	GLY	-	expression tag	UNP B9QC59
E	60	SER	-	expression tag	UNP B9QC59
E	61	ALA	-	expression tag	UNP B9QC59
E	62	MET	-	expression tag	UNP B9QC59
E	63	GLY	-	expression tag	UNP B9QC59
E	485	ALA	-	expression tag	UNP B9QC59
E	486	ALA	-	expression tag	UNP B9QC59
E	487	LEU	-	expression tag	UNP B9QC59
E	488	VAL	-	expression tag	UNP B9QC59
E	489	PRO	-	expression tag	UNP B9QC59
E	490	ARG	-	expression tag	UNP B9QC59
E	230	ALA	TYR	engineered mutation	UNP B9QC59

- Molecule 2 is 2-acetamido-2-deoxy-beta-D-glucopyranose (three-letter code: NAG) (formula: $C_8H_{15}NO_6$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	A	1	Total C N O 14 8 1 5	0	0
2	B	1	Total C N O 14 8 1 5	0	0
2	D	1	Total C N O 14 8 1 5	0	0
2	E	1	Total C N O 14 8 1 5	0	0

- Molecule 3 is water.

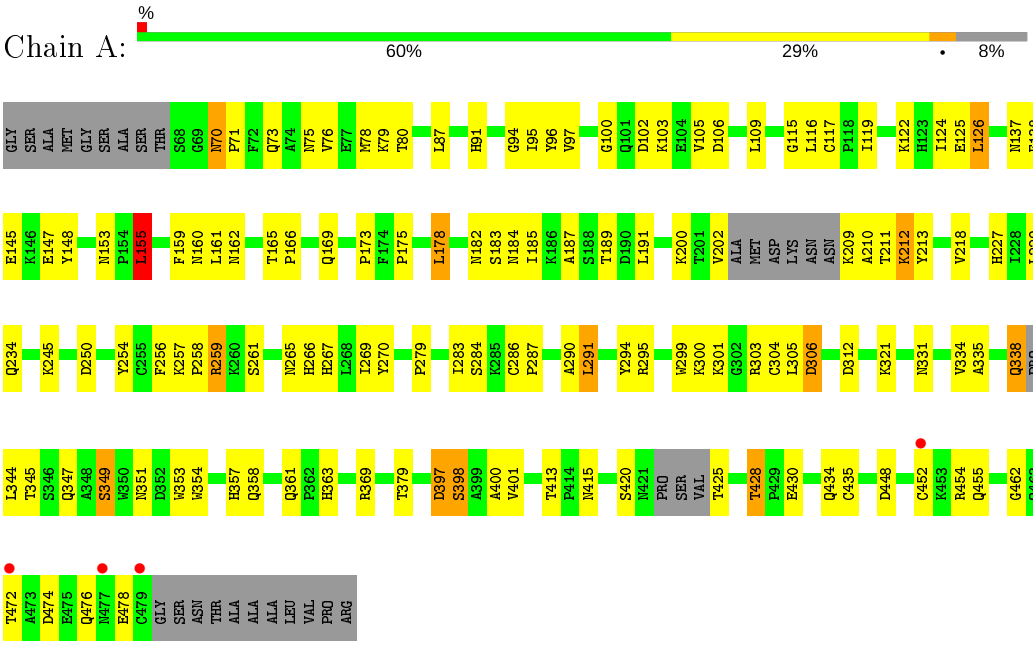
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	154	Total O 154 154	0	0
3	B	134	Total O 134 134	0	0
3	D	107	Total O 107 107	0	0
3	E	134	Total O 134 134	0	0

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.

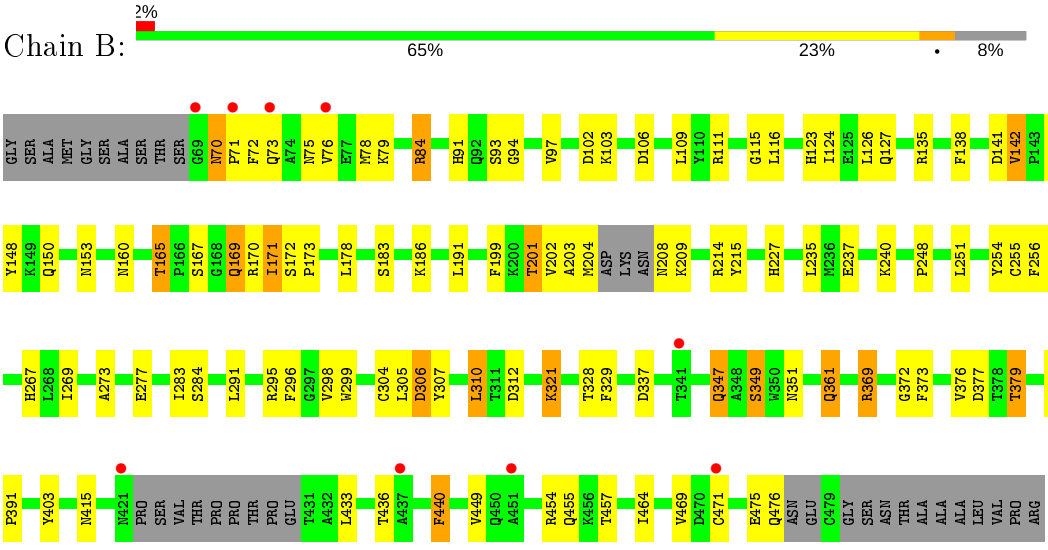
- Molecule 1: APICAL MEMBRANE ANTIGEN, PUTATIVE

Chain A:



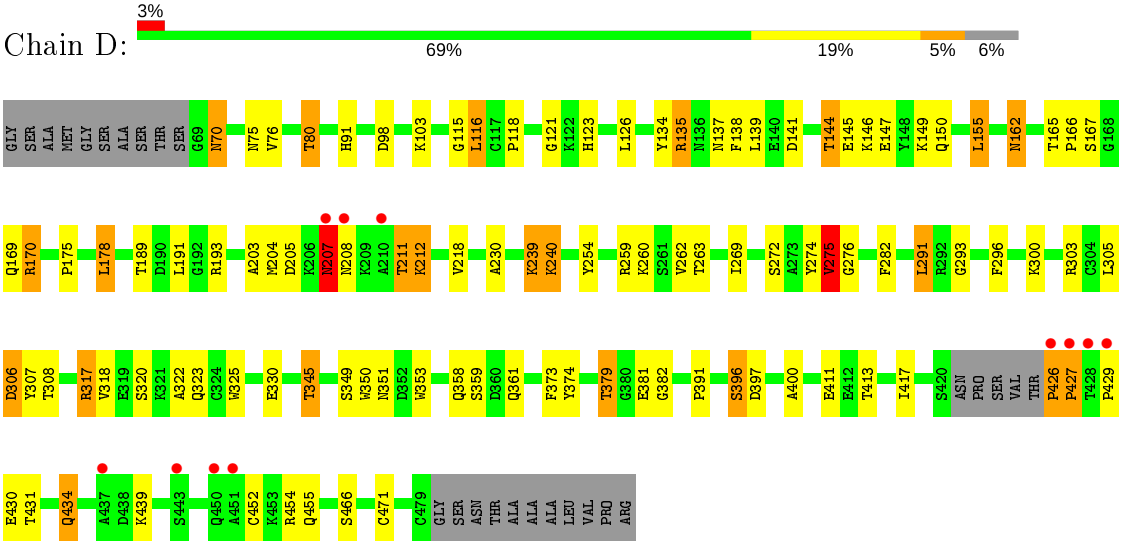
- Molecule 1: APICAL MEMBRANE ANTIGEN, PUTATIVE

Chain B:



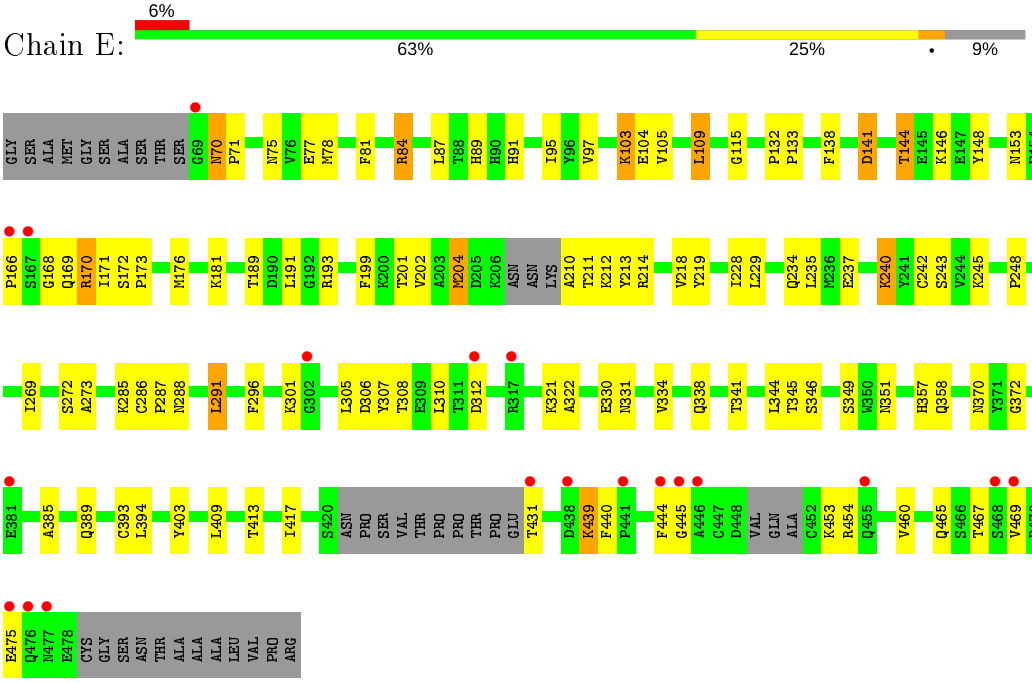
- Molecule 1: APICAL MEMBRANE ANTIGEN, PUTATIVE

Chain D:



• Molecule 1: APICAL MEMBRANE ANTIGEN, PUTATIVE

Chain E:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	67.52Å 76.09Å 88.78Å 71.89° 73.37° 73.50°	Depositor
Resolution (Å)	38.59 – 2.45 38.59 – 2.45	Depositor EDS
% Data completeness (in resolution range)	97.0 (38.59-2.45) 97.0 (38.59-2.45)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	2.45 (at 2.45Å)	Xtriage
Refinement program	REFMAC 5.5.0109	Depositor
R, R_{free}	0.212 , 0.305 0.212 , 0.302	Depositor DCC
R_{free} test set	2834 reflections (5.06%)	wwPDB-VP
Wilson B-factor (Å^2)	30.1	Xtriage
Anisotropy	0.094	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 45.2	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.92	EDS
Total number of atoms	13168	wwPDB-VP
Average B, all atoms (Å^2)	28.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 9.87% 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: NAG

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	0.71	0/3229	0.80	2/4379 (0.0%)
1	B	0.68	0/3219	0.76	0/4364
1	D	0.71	1/3284 (0.0%)	0.80	8/4458 (0.2%)
1	E	0.66	0/3190	0.79	5/4325 (0.1%)
All	All	0.69	1/12922 (0.0%)	0.79	15/17526 (0.1%)

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

Mol	Chain	#Chirality outliers	#Planarity outliers
1	D	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	426	PRO	C-N	-6.20	1.22	1.34

All (15) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	D	427	PRO	N-CA-CB	-7.53	94.27	103.30
1	A	305	LEU	CA-CB-CG	7.15	131.74	115.30
1	E	170	ARG	NE-CZ-NH2	-6.75	116.92	120.30
1	D	170	ARG	NE-CZ-NH2	-6.73	116.93	120.30
1	E	141	ASP	CB-CG-OD1	6.47	124.12	118.30
1	D	426	PRO	CB-CA-C	-6.42	95.94	112.00
1	D	427	PRO	N-CD-CG	-5.90	94.35	103.20
1	E	155	LEU	CA-CB-CG	5.79	128.62	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	E	291	LEU	CA-CB-CG	5.78	128.60	115.30
1	D	98	ASP	CB-CG-OD1	5.77	123.49	118.30
1	D	207	ASN	N-CA-C	-5.50	96.16	111.00
1	A	155	LEU	CA-CB-CG	5.22	127.31	115.30
1	E	141	ASP	CB-CG-OD2	-5.13	113.68	118.30
1	D	170	ARG	NE-CZ-NH1	5.11	122.85	120.30
1	D	291	LEU	CA-CB-CG	5.10	127.02	115.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	D	207	ASN	Peptide

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	3144	0	2980	95	0
1	B	3134	0	2971	79	0
1	D	3197	0	3024	83	0
1	E	3108	0	2937	89	0
2	A	14	0	13	0	0
2	B	14	0	13	0	0
2	D	14	0	13	1	0
2	E	14	0	13	0	0
3	A	154	0	0	12	0
3	B	134	0	0	9	0
3	D	107	0	0	5	0
3	E	134	0	0	6	0
All	All	13168	0	11964	339	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 (339) 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:D:203:ALA:O	1:D:211:THR:HG22	1.53	1.08
1:D:76:VAL:O	1:D:80:THR:HG22	1.54	1.06
1:A:105:VAL:HG13	1:A:211:THR:HG21	1.38	1.02
1:A:144:THR:HG22	1:A:147:GLU:H	1.27	1.00
1:D:203:ALA:O	1:D:211:THR:CG2	2.15	0.94
1:D:358:GLN:H	1:D:361:GLN:NE2	1.68	0.91
1:E:164:VAL:HG13	1:E:168:GLY:HA2	1.50	0.91
1:A:345:THR:HG22	1:A:345:THR:O	1.70	0.89
1:A:210:ALA:HA	3:A:2062:HOH:O	1.72	0.89
1:E:454:ARG:HD3	1:E:471:CYS:HA	1.56	0.86
1:E:165:THR:HB	1:E:166:PRO:HD2	1.59	0.84
1:E:439:LYS:HA	1:E:439:LYS:HE3	1.60	0.84
1:B:165:THR:HG22	1:B:169:GLN:H	1.44	0.81
1:D:358:GLN:H	1:D:361:GLN:HE22	1.24	0.81
1:A:434:GLN:HE22	1:D:382:GLY:H	1.29	0.79
1:D:454:ARG:HD3	1:D:471:CYS:HA	1.65	0.79
1:B:72:PHE:HA	1:B:78:MET:HG2	1.65	0.78
1:D:144:THR:HG22	1:D:147:GLU:H	1.49	0.78
1:E:211:THR:HG22	1:E:212:LYS:N	1.98	0.78
1:B:295:ARG:HD3	1:B:373:PHE:CE2	2.19	0.77
1:D:240:LYS:N	1:D:240:LYS:HD3	2.00	0.76
1:A:428:THR:HG22	3:A:2134:HOH:O	1.83	0.76
1:E:164:VAL:CG1	1:E:168:GLY:HA2	2.14	0.75
1:E:189:THR:O	1:E:193:ARG:HG3	1.87	0.74
1:E:211:THR:HG22	1:E:212:LYS:H	1.52	0.73
1:A:70:ASN:HD22	1:A:71:PRO:HD2	1.55	0.71
1:D:240:LYS:HD2	1:E:285:LYS:NZ	2.06	0.71
1:E:211:THR:HG22	1:E:213:TYR:H	1.56	0.70
1:B:201:THR:CG2	1:B:201:THR:O	2.39	0.69
1:E:75:ASN:HB3	1:E:78:MET:HB2	1.74	0.69
1:A:345:THR:CG2	1:A:345:THR:O	2.40	0.69
1:D:189:THR:O	1:D:193:ARG:HG3	1.93	0.68
1:E:81:PHE:O	1:E:84:ARG:HB3	1.94	0.68
1:E:444:PHE:HE2	1:E:469:VAL:HG21	1.59	0.67
1:E:453:LYS:HD2	1:E:469:VAL:O	1.94	0.67
1:A:304:CYS:H	1:A:455:GLN:NE2	1.93	0.66
1:E:87:LEU:HD13	1:E:95:ILE:HD11	1.77	0.66
1:A:96:TYR:HB2	1:A:334:VAL:HG13	1.78	0.66
1:B:260:LYS:HE3	1:B:329:PHE:CD1	2.31	0.66
1:A:73:GLN:O	1:A:79:LYS:HE2	1.96	0.65
1:E:475:GLU:HG2	3:E:2131:HOH:O	1.97	0.65
1:A:96:TYR:HB2	1:A:334:VAL:CG1	2.27	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:306:ASP:OD1	1:E:308:THR:OG1	2.14	0.65
1:A:165:THR:HB	1:A:166:PRO:HD2	1.77	0.64
1:D:175:PRO:HG2	1:D:178:LEU:HD23	1.79	0.64
1:A:209:LYS:CG	1:A:209:LYS:O	2.44	0.64
1:A:212:LYS:HG3	1:A:212:LYS:O	1.97	0.64
1:A:209:LYS:HG3	1:A:209:LYS:O	1.97	0.64
1:A:145:GLU:HG2	3:A:2044:HOH:O	1.98	0.63
1:D:431:THR:O	1:D:434:GLN:HG3	1.99	0.63
1:D:349:SER:HA	3:D:2073:HOH:O	1.97	0.63
1:B:298:VAL:CG2	1:B:310:LEU:HD21	2.28	0.63
1:B:111:ARG:HH22	1:B:337:ASP:HB3	1.63	0.63
1:D:303:ARG:HB2	1:D:455:GLN:HB2	1.80	0.62
1:D:155:LEU:HD21	1:D:350:TRP:HA	1.81	0.62
1:B:141:ASP:OD1	1:B:170:ARG:NH2	2.32	0.62
1:B:214:ARG:HB3	1:B:273:ALA:CB	2.29	0.62
1:B:321:LYS:HB2	1:B:403:TYR:OH	1.99	0.62
1:B:73:GLN:HA	1:B:79:LYS:HG3	1.81	0.61
1:A:232:SER:OG	1:A:354:TRP:HD1	1.83	0.61
1:A:232:SER:OG	1:A:354:TRP:CD1	2.53	0.61
1:B:186:LYS:HG2	3:B:2050:HOH:O	1.98	0.61
1:E:331:ASN:O	1:E:334:VAL:HG12	2.00	0.61
1:B:141:ASP:CG	1:B:170:ARG:HH22	2.04	0.61
1:D:240:LYS:HD3	1:D:240:LYS:H	1.65	0.60
1:E:70:ASN:HD22	1:E:71:PRO:HD2	1.66	0.60
1:D:162:ASN:H	1:D:162:ASN:HD22	1.50	0.60
1:A:105:VAL:CG1	1:A:211:THR:HG21	2.24	0.60
1:D:145:GLU:HG3	1:D:350:TRP:CH2	2.37	0.60
1:B:372:GLY:HA2	1:B:385:ALA:O	2.00	0.60
1:D:144:THR:CG2	1:D:147:GLU:H	2.15	0.59
1:E:444:PHE:CE2	1:E:469:VAL:HG21	2.37	0.59
1:E:218:VAL:HG23	1:E:229:LEU:HD11	1.84	0.59
1:D:345:THR:O	1:D:345:THR:HG23	2.02	0.58
1:B:298:VAL:HG22	1:B:310:LEU:HD21	1.85	0.58
1:A:218:VAL:HG23	1:A:229:LEU:HD11	1.84	0.58
1:A:162:ASN:HA	3:A:2052:HOH:O	2.03	0.58
1:A:102:ASP:HB3	1:A:109:LEU:HD11	1.86	0.58
1:E:141:ASP:CG	1:E:170:ARG:HH22	2.08	0.58
1:E:235:LEU:HD11	1:E:237:GLU:HG2	1.86	0.58
1:D:146:LYS:HA	1:D:149:LYS:HE2	1.86	0.57
1:B:126:LEU:HG	1:B:254:TYR:CE1	2.40	0.57
1:B:203:ALA:HB2	1:B:215:TYR:CE2	2.39	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:201:THR:O	1:B:201:THR:HG22	2.04	0.57
1:D:303:ARG:CB	1:D:455:GLN:HB2	2.36	0.56
1:A:122:LYS:NZ	1:A:234:GLN:HE21	2.03	0.56
1:E:103:LYS:HD3	1:E:212:LYS:O	2.04	0.56
1:B:70:ASN:HB2	1:B:299:TRP:CG	2.41	0.56
1:A:165:THR:HB	1:A:166:PRO:CD	2.36	0.56
1:B:145:GLU:OE2	3:B:2033:HOH:O	2.17	0.56
1:A:184:ASN:O	1:A:200:LYS:NZ	2.38	0.56
1:B:148:TYR:OH	1:B:153:ASN:ND2	2.39	0.56
1:D:240:LYS:CD	1:D:240:LYS:N	2.69	0.55
1:D:274:TYR:C	1:D:276:GLY:H	2.09	0.55
1:E:344:LEU:HA	1:E:358:GLN:HE22	1.71	0.55
1:B:84:ARG:NH2	1:B:283:ILE:O	2.39	0.55
1:E:240:LYS:NZ	1:E:240:LYS:HB2	2.20	0.55
1:A:125:GLU:HB3	1:A:259:ARG:HG2	1.89	0.54
1:B:144:THR:CG2	1:B:147:GLU:H	2.19	0.54
1:A:100:GLY:HA2	1:A:363:HIS:CD2	2.43	0.54
1:B:70:ASN:HD22	1:B:71:PRO:HD2	1.73	0.54
1:D:379:THR:HG23	1:D:381:GLU:OE1	2.07	0.54
1:E:445:GLY:O	1:E:454:ARG:HB2	2.07	0.54
1:E:199:PHE:HA	1:E:273:ALA:HB1	1.88	0.54
1:A:344:LEU:HA	1:A:358:GLN:HE22	1.72	0.54
1:D:146:LYS:HE2	1:D:150:GLN:NE2	2.23	0.54
1:A:175:PRO:HG2	1:A:178:LEU:HB2	1.90	0.54
1:E:322:ALA:HA	1:E:409:LEU:HD13	1.90	0.54
1:B:165:THR:HB	1:B:169:GLN:O	2.08	0.53
1:D:211:THR:OG1	1:D:212:LYS:N	2.42	0.53
1:E:164:VAL:HG13	1:E:168:GLY:CA	2.32	0.53
1:A:182:ASN:HD22	1:A:185:ILE:HG12	1.73	0.53
1:A:425:THR:N	3:A:2132:HOH:O	2.41	0.53
1:B:106:ASP:HB2	1:B:209:LYS:HE2	1.90	0.53
1:B:306:ASP:C	1:B:306:ASP:OD1	2.46	0.53
1:A:202:VAL:HG21	1:A:213:TYR:O	2.08	0.53
1:E:164:VAL:HG12	1:E:164:VAL:O	2.08	0.53
1:B:94:GLY:HA3	1:B:97:VAL:O	2.08	0.53
1:D:274:TYR:C	1:D:276:GLY:N	2.63	0.53
1:D:218:VAL:HA	1:D:269:ILE:O	2.09	0.52
1:D:307:TYR:HB2	1:D:373:PHE:CE2	2.45	0.52
1:D:358:GLN:N	1:D:361:GLN:NE2	2.49	0.52
1:A:126:LEU:N	3:A:2027:HOH:O	2.34	0.52
1:B:165:THR:HG23	1:B:167:SER:H	1.74	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:369[A]:ARG:NH1	3:B:2113:HOH:O	2.43	0.52
1:A:295:ARG:NH2	1:A:397:ASP:OD2	2.36	0.52
1:B:173:PRO:HB3	1:B:227:HIS:CE1	2.45	0.52
1:B:111:ARG:NH2	1:B:337:ASP:HB3	2.25	0.52
1:A:267:HIS:CD2	1:A:267:HIS:H	2.25	0.52
1:E:322:ALA:HA	1:E:409:LEU:CD1	2.40	0.52
1:A:202:VAL:HG22	3:A:2065:HOH:O	2.11	0.51
1:D:317:ARG:HB2	3:E:2014:HOH:O	2.10	0.51
1:D:240:LYS:HD2	1:E:285:LYS:HZ1	1.73	0.51
1:D:413:THR:HG23	1:D:417:ILE:HD11	1.92	0.51
1:E:460:VAL:HB	1:E:465:GLN:CG	2.41	0.51
1:A:97:VAL:HG11	1:A:338:GLN:HE21	1.75	0.51
1:B:144:THR:HG23	1:B:147:GLU:H	1.75	0.51
1:E:460:VAL:HB	1:E:465:GLN:HG3	1.93	0.51
1:A:105:VAL:HG13	1:A:211:THR:CG2	2.25	0.51
1:D:322:ALA:O	1:D:325:TRP:HB3	2.10	0.51
1:E:218:VAL:HA	1:E:269:ILE:O	2.10	0.51
1:E:338:GLN:O	1:E:338:GLN:HG2	2.10	0.51
1:D:204:MET:HB3	1:D:208:ASN:OD1	2.11	0.51
1:A:349:SER:C	1:A:351:ASN:H	2.13	0.51
1:B:304:CYS:H	1:B:455:GLN:NE2	2.09	0.51
1:B:209:LYS:HD2	3:B:2009:HOH:O	2.11	0.51
1:B:240:LYS:O	1:B:347:GLN:NE2	2.44	0.50
1:E:202:VAL:HG12	1:E:214:ARG:HG2	1.92	0.50
1:E:77:GLU:HB2	3:E:2003:HOH:O	2.10	0.50
1:D:259:ARG:HD3	1:D:330:GLU:OE2	2.12	0.50
1:A:70:ASN:HB2	1:A:299:TRP:CD2	2.47	0.50
1:A:230:ALA:HB1	1:A:353:TRP:CE3	2.47	0.50
1:D:293:GLY:HA2	1:D:397:ASP:O	2.11	0.50
1:A:218:VAL:HA	1:A:269:ILE:O	2.11	0.50
1:A:70:ASN:HD22	1:A:71:PRO:CD	2.24	0.50
1:A:87:LEU:HA	3:A:2007:HOH:O	2.12	0.50
1:B:307:TYR:CD2	1:B:387:SER:HB3	2.46	0.50
1:B:369[B]:ARG:NH1	3:B:2114:HOH:O	2.45	0.49
1:B:214:ARG:HB3	1:B:273:ALA:HB3	1.94	0.49
1:E:211:THR:CG2	1:E:212:LYS:H	2.22	0.49
1:D:396:SER:HB2	1:D:466:SER:H	1.76	0.49
1:E:454:ARG:CD	1:E:471:CYS:HA	2.37	0.49
1:A:96:TYR:CE1	1:A:258:PRO:HB2	2.48	0.49
1:B:269:ILE:N	1:B:269:ILE:HD12	2.28	0.49
1:D:165:THR:OG1	1:D:169:GLN:HB3	2.13	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:439:LYS:HA	1:E:439:LYS:CE	2.34	0.48
1:E:204:MET:CE	1:E:210:ALA:HA	2.43	0.48
1:A:472:THR:O	1:A:476:GLN:HG3	2.13	0.48
1:E:204:MET:HE2	1:E:204:MET:HA	1.95	0.48
1:A:175:PRO:CG	1:A:178:LEU:HD22	2.43	0.48
1:D:141:ASP:CG	1:D:170:ARG:HH22	2.16	0.48
1:B:146:LYS:HE2	1:B:150:GLN:NE2	2.29	0.48
1:B:349:SER:C	1:B:351:ASN:H	2.17	0.48
1:E:148:TYR:OH	1:E:153:ASN:ND2	2.46	0.48
1:E:345:THR:H	1:E:358:GLN:NE2	2.12	0.48
1:B:369[B]:ARG:NH2	3:B:2115:HOH:O	2.47	0.48
1:D:126:LEU:HD13	1:D:138:PHE:HB3	1.93	0.48
1:D:230:ALA:O	1:D:353:TRP:HB3	2.14	0.48
1:D:293:GLY:C	1:D:397:ASP:O	2.51	0.48
1:D:239:LYS:HD3	1:E:89:HIS:NE2	2.29	0.48
1:A:189:THR:HG21	1:A:283:ILE:HD11	1.96	0.47
1:A:304:CYS:H	1:A:455:GLN:HE22	1.61	0.47
1:A:76:VAL:O	1:A:80:THR:HG22	2.14	0.47
1:D:230:ALA:HB1	1:D:353:TRP:CE3	2.48	0.47
1:D:349:SER:C	1:D:351:ASN:H	2.17	0.47
1:A:141:ASP:HA	1:A:160:ASN:HB3	1.96	0.47
1:B:199:PHE:CZ	1:B:277:GLU:HG3	2.48	0.47
1:B:328:THR:HG21	1:B:403:TYR:HB2	1.97	0.47
1:D:239:LYS:NZ	1:E:285:LYS:HZ2	2.12	0.47
1:A:95:ILE:HG23	1:A:119:ILE:HD12	1.97	0.47
1:D:240:LYS:CD	1:D:240:LYS:H	2.26	0.47
1:E:165:THR:HB	1:E:166:PRO:CD	2.39	0.47
1:A:303:ARG:HB2	1:A:455:GLN:HE21	1.79	0.47
1:A:357:HIS:HA	1:A:361:GLN:HE22	1.79	0.47
1:A:234:GLN:O	1:A:258:PRO:HD3	2.14	0.47
1:B:144:THR:HG22	1:B:147:GLU:HB2	1.96	0.47
1:D:165:THR:HB	1:D:166:PRO:CD	2.45	0.47
1:A:175:PRO:HG2	1:A:178:LEU:HD22	1.97	0.47
1:E:242:CYS:C	1:E:251:LEU:HD13	2.35	0.47
1:D:318:VAL:HG12	1:D:323:GLN:HG3	1.97	0.47
1:A:300:LYS:O	1:A:301:LYS:C	2.54	0.47
1:E:172:SER:HA	1:E:173:PRO:C	2.35	0.47
1:E:286:CYS:O	1:E:288:ASN:N	2.45	0.47
1:A:349:SER:C	1:A:351:ASN:N	2.68	0.46
1:D:239:LYS:HZ2	1:E:89:HIS:HD2	1.63	0.46
1:A:161:LEU:HA	1:A:230:ALA:HB2	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:155:LEU:HD22	1:E:252:THR:O	2.16	0.46
1:A:148:TYR:CD1	1:A:155:LEU:HD12	2.50	0.46
1:A:425:THR:N	3:A:2133:HOH:O	2.49	0.46
1:A:122:LYS:HE2	1:A:270:TYR:CD1	2.51	0.46
1:D:134:TYR:HA	3:D:2018:HOH:O	2.15	0.46
1:E:413:THR:HG23	1:E:417:ILE:HD11	1.97	0.46
1:D:126:LEU:CD1	1:D:138:PHE:HB3	2.45	0.46
1:D:374:TYR:O	1:D:400:ALA:HA	2.16	0.46
1:E:84:ARG:O	1:E:287:PRO:HD3	2.16	0.46
1:D:205:ASP:C	1:D:205:ASP:OD1	2.54	0.46
1:A:126:LEU:HG	1:A:254:TYR:CE1	2.51	0.46
1:B:201:THR:O	1:B:201:THR:HG23	2.16	0.46
1:D:121:GLY:O	1:D:123:HIS:HD2	1.99	0.46
1:D:262:VAL:HG23	1:D:263:THR:HG23	1.97	0.46
1:E:87:LEU:HD13	1:E:95:ILE:CD1	2.44	0.46
1:B:111:ARG:HD2	1:B:361:GLN:NE2	2.30	0.46
1:B:471:CYS:HB3	1:B:475:GLU:HB2	1.97	0.46
1:B:102:ASP:HB3	1:B:109:LEU:HD11	1.98	0.46
1:E:240:LYS:HB2	1:E:240:LYS:HZ1	1.80	0.46
1:E:272:SER:HB2	3:E:2017:HOH:O	2.15	0.46
1:A:106:ASP:HB3	3:A:2018:HOH:O	2.16	0.45
1:A:182:ASN:ND2	1:A:185:ILE:HG12	2.31	0.45
1:A:70:ASN:HB2	1:A:299:TRP:CG	2.50	0.45
1:D:118:PRO:HB2	1:D:269:ILE:HG21	1.97	0.45
1:D:296:PHE:HB3	1:D:391:PRO:HB3	1.97	0.45
1:E:334:VAL:HG23	1:E:370:ASN:HD22	1.80	0.45
1:B:454:ARG:HG3	1:B:469:VAL:HG23	1.98	0.45
1:B:84:ARG:HH21	1:B:284:SER:HA	1.82	0.45
1:E:211:THR:CG2	1:E:213:TYR:H	2.27	0.45
1:B:142:VAL:HG22	1:B:160:ASN:O	2.17	0.45
1:E:211:THR:CG2	1:E:212:LYS:N	2.69	0.45
1:D:189:THR:HB	1:D:417:ILE:HA	1.98	0.45
1:B:257:LYS:HE3	1:B:259:ARG:HH11	1.80	0.45
1:E:105:VAL:HG22	1:E:211:THR:HG21	1.98	0.45
1:E:91:HIS:CE1	1:E:115:GLY:HA3	2.51	0.45
1:D:205:ASP:OD1	1:D:207:ASN:O	2.34	0.45
1:A:137:ASN:ND2	3:A:2036:HOH:O	2.44	0.45
1:B:377:ASP:OD1	1:B:379:THR:HG23	2.17	0.44
1:E:132:PRO:HA	1:E:133:PRO:HA	1.67	0.44
1:E:201:THR:HA	3:E:2056:HOH:O	2.16	0.44
1:E:243:SER:HB3	1:E:248:PRO:O	2.17	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:448:ASP:O	1:A:452:CYS:N	2.50	0.44
1:B:135:ARG:HB3	3:B:2024:HOH:O	2.17	0.44
1:D:162:ASN:ND2	1:D:162:ASN:H	2.15	0.44
1:A:122:LYS:HE2	1:A:270:TYR:CG	2.52	0.44
1:D:137:ASN:OD1	1:D:137:ASN:C	2.56	0.44
1:D:70:ASN:C	1:D:70:ASN:HD22	2.20	0.44
1:E:109:LEU:HB3	1:E:357:HIS:CB	2.48	0.44
1:A:291:LEU:HD13	1:A:294:TYR:HB2	1.99	0.44
1:A:331:ASN:OD1	1:A:369[B]:ARG:HD2	2.17	0.44
1:D:239:LYS:HZ2	1:E:89:HIS:CD2	2.35	0.44
1:B:171:ILE:HD13	1:B:171:ILE:HA	1.83	0.44
1:D:320:SER:HB2	3:D:2068:HOH:O	2.17	0.44
1:A:148:TYR:OH	1:A:153:ASN:ND2	2.51	0.44
1:B:144:THR:HG22	1:B:147:GLU:CB	2.48	0.44
1:D:349:SER:C	1:D:351:ASN:N	2.70	0.43
1:A:94:GLY:HA3	1:A:97:VAL:O	2.18	0.43
1:A:124:ILE:HG21	1:A:159:PHE:CE2	2.53	0.43
1:A:290:ALA:HB1	1:A:401:VAL:CG1	2.48	0.43
1:B:296:PHE:HB3	1:B:391:PRO:HB3	2.00	0.43
1:B:440:PHE:HE1	1:B:457:THR:HG22	1.83	0.43
1:D:116:LEU:O	1:D:275:VAL:HB	2.17	0.43
1:E:144:THR:HG22	1:E:146:LYS:N	2.33	0.43
1:D:91:HIS:CE1	1:D:115:GLY:HA3	2.54	0.43
1:A:96:TYR:HB2	1:A:334:VAL:HG11	2.01	0.43
1:E:378:THR:C	1:E:380:GLY:H	2.22	0.43
1:B:123:HIS:HB2	1:B:138:PHE:CE1	2.54	0.43
1:A:218:VAL:CG2	1:A:229:LEU:HD11	2.48	0.43
1:A:398:SER:HB3	3:A:2122:HOH:O	2.18	0.43
1:B:248:PRO:HD2	1:B:251:LEU:HD12	2.00	0.43
1:D:239:LYS:HZ3	1:E:285:LYS:NZ	2.17	0.43
1:B:75:ASN:ND2	1:B:76:VAL:H	2.17	0.43
1:B:204:MET:HA	1:B:209:LYS:O	2.19	0.42
1:B:321:LYS:HG2	1:B:321:LYS:H	1.59	0.42
1:D:307:TYR:HB2	1:D:373:PHE:HE2	1.83	0.42
1:E:172:SER:HG	1:E:228:ILE:H	1.66	0.42
1:E:349:SER:C	1:E:351:ASN:H	2.22	0.42
1:B:235:LEU:HD11	1:B:237:GLU:HG3	2.00	0.42
1:E:472:THR:OG1	1:E:475:GLU:HG3	2.18	0.42
1:E:70:ASN:HD21	1:E:393:CYS:HB3	1.85	0.42
1:B:70:ASN:HB2	1:B:299:TRP:CD2	2.54	0.42
1:B:91:HIS:CE1	1:B:115:GLY:HA3	2.55	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:91:HIS:CE1	1:A:115:GLY:HA3	2.54	0.42
1:E:259:ARG:HA	1:E:259:ARG:HD2	1.89	0.42
1:A:265:ASN:HA	1:A:267:HIS:CD2	2.54	0.42
1:D:260:LYS:HD3	1:D:325:TRP:CZ2	2.55	0.42
1:E:204:MET:CE	1:E:204:MET:HA	2.49	0.42
1:B:257:LYS:HB2	1:B:258:PRO:HD2	2.01	0.42
1:B:93:SER:HA	3:B:2109:HOH:O	2.20	0.42
1:B:202:VAL:HG12	1:B:203:ALA:N	2.34	0.42
1:D:139:LEU:HD23	1:D:139:LEU:HA	1.87	0.42
1:E:321:LYS:HB3	1:E:403:TYR:OH	2.19	0.42
1:B:124:ILE:CG2	1:B:256:PHE:HB2	2.50	0.41
1:D:358:GLN:O	1:D:359:SER:C	2.57	0.41
1:E:141:ASP:OD1	1:E:170:ARG:NH2	2.50	0.41
1:A:187:ALA:HB2	1:A:279:PRO:HB2	2.02	0.41
1:D:426:PRO:HA	1:D:427:PRO:HD3	1.86	0.41
1:A:259:ARG:HD2	1:A:259:ARG:HA	1.80	0.41
1:A:334:VAL:O	1:A:335:ALA:C	2.58	0.41
1:D:126:LEU:HG	1:D:254:TYR:CE1	2.55	0.41
1:A:124:ILE:CG2	1:A:256:PHE:HB2	2.50	0.41
1:B:298:VAL:HG21	1:B:310:LEU:HD21	2.02	0.41
1:E:176:MET:HE3	1:E:219:TYR:CE1	2.56	0.41
1:A:91:HIS:ND1	1:A:117:CYS:HB2	2.36	0.41
1:E:164:VAL:CG1	1:E:164:VAL:O	2.68	0.41
1:E:211:THR:HG22	1:E:213:TYR:N	2.31	0.41
1:E:372:GLY:HA2	1:E:385:ALA:O	2.20	0.41
1:A:160:ASN:ND2	1:A:161:LEU:O	2.54	0.41
1:B:433:LEU:HA	1:B:464:ILE:HD12	2.01	0.41
1:E:377:ASP:O	1:E:380:GLY:N	2.53	0.41
1:E:389:GLN:NE2	3:E:2119:HOH:O	2.53	0.41
1:A:286:CYS:HA	1:A:287:PRO:HD3	1.94	0.41
1:B:203:ALA:CB	1:B:215:TYR:CE2	3.04	0.41
1:E:296:PHE:HA	1:E:394:LEU:HD23	2.03	0.41
1:E:97:VAL:HG13	1:E:234:GLN:HB2	2.03	0.41
1:E:218:VAL:CG2	1:E:229:LEU:HD11	2.49	0.41
1:A:306:ASP:C	1:A:306:ASP:OD1	2.59	0.41
1:A:435:CYS:O	1:A:462:GLY:HA2	2.21	0.41
1:B:127:GLN:OE1	1:B:255:CYS:HB2	2.21	0.41
1:D:282:PHE:C	1:D:282:PHE:CD1	2.94	0.41
1:A:397:ASP:OD2	1:A:400:ALA:HB2	2.21	0.41
1:D:135:ARG:NH1	3:D:2017:HOH:O	2.54	0.41
1:A:173:PRO:HB3	1:A:227:HIS:CE1	2.56	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:118:PRO:HB2	1:D:269:ILE:CG2	2.51	0.40
1:B:144:THR:HG22	1:B:147:GLU:CG	2.51	0.40
2:D:1480:NAG:H61	3:D:2107:HOH:O	2.20	0.40
1:A:454:ARG:HD3	1:A:471:CYS:HA	2.03	0.40
1:A:261:SER:O	1:A:266:HIS:HE1	2.04	0.40
1:A:78:MET:CE	1:A:464:ILE:HD13	2.51	0.40
1:D:306:ASP:OD1	1:D:308:THR:N	2.51	0.40
1:B:138:PHE:HD1	3:B:2028:HOH:O	2.04	0.40
1:B:267:HIS:H	1:B:267:HIS:CD2	2.38	0.40
1:D:239:LYS:HG3	1:D:240:LYS:HD3	2.03	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	392/432 (91%)	370 (94%)	21 (5%)	1 (0%)	41	49
1	B	391/432 (90%)	371 (95%)	18 (5%)	2 (0%)	29	34
1	D	402/432 (93%)	376 (94%)	25 (6%)	1 (0%)	47	57
1	E	386/432 (89%)	358 (93%)	27 (7%)	1 (0%)	41	49
All	All	1571/1728 (91%)	1475 (94%)	91 (6%)	5 (0%)	41	49

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	B	369[A]	ARG
1	B	369[B]	ARG
1	E	307	TYR
1	A	397	ASP
1	D	275	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	348/371 (94%)	314 (90%)	34 (10%)	8 8
1	B	345/371 (93%)	315 (91%)	30 (9%)	10 11
1	D	353/371 (95%)	321 (91%)	32 (9%)	9 10
1	E	342/371 (92%)	312 (91%)	30 (9%)	10 11
All	All	1388/1484 (94%)	1262 (91%)	126 (9%)	9 10

All (126) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	70	ASN
1	A	75	ASN
1	A	103	LYS
1	A	116	LEU
1	A	126	LEU
1	A	138	PHE
1	A	144	THR
1	A	155	LEU
1	A	169	GLN
1	A	178	LEU
1	A	183	SER
1	A	191	LEU
1	A	212	LYS
1	A	245	LYS
1	A	250	ASP
1	A	257	LYS
1	A	259	ARG
1	A	284	SER
1	A	291	LEU
1	A	306	ASP
1	A	312	ASP
1	A	321	LYS
1	A	338	GLN
1	A	347	GLN

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Mol	Chain	Res	Type
1	A	349	SER
1	A	379	THR
1	A	398	SER
1	A	413	THR
1	A	415	ASN
1	A	420	SER
1	A	428	THR
1	A	430	GLU
1	A	474	ASP
1	A	478	GLU
1	B	70	ASN
1	B	84	ARG
1	B	103	LYS
1	B	116	LEU
1	B	142	VAL
1	B	165	THR
1	B	169	GLN
1	B	171	ILE
1	B	172	SER
1	B	178	LEU
1	B	183	SER
1	B	191	LEU
1	B	201	THR
1	B	208	ASN
1	B	291	LEU
1	B	305	LEU
1	B	306	ASP
1	B	310	LEU
1	B	312	ASP
1	B	321	LYS
1	B	347	GLN
1	B	349	SER
1	B	361	GLN
1	B	376	VAL
1	B	379	THR
1	B	415	ASN
1	B	436	THR
1	B	440	PHE
1	B	449	VAL
1	B	476	GLN
1	D	70	ASN
1	D	75	ASN

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Mol	Chain	Res	Type
1	D	80	THR
1	D	103	LYS
1	D	116	LEU
1	D	135	ARG
1	D	144	THR
1	D	155	LEU
1	D	162	ASN
1	D	167	SER
1	D	178	LEU
1	D	191	LEU
1	D	211	THR
1	D	212	LYS
1	D	239	LYS
1	D	240	LYS
1	D	272	SER
1	D	275	VAL
1	D	291	LEU
1	D	300	LYS
1	D	305	LEU
1	D	306	ASP
1	D	317	ARG
1	D	345	THR
1	D	379	THR
1	D	396	SER
1	D	411	GLU
1	D	429	PRO
1	D	430	GLU
1	D	434	GLN
1	D	439	LYS
1	D	452	CYS
1	E	70	ASN
1	E	84	ARG
1	E	103	LYS
1	E	104	GLU
1	E	109	LEU
1	E	138	PHE
1	E	144	THR
1	E	155	LEU
1	E	164	VAL
1	E	169	GLN
1	E	171	ILE
1	E	181	LYS

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Mol	Chain	Res	Type
1	E	191	LEU
1	E	204	MET
1	E	240	LYS
1	E	245	LYS
1	E	291	LEU
1	E	301	LYS
1	E	305	LEU
1	E	310	LEU
1	E	312	ASP
1	E	330	GLU
1	E	341	THR
1	E	346	SER
1	E	378	THR
1	E	431	THR
1	E	439	LYS
1	E	440	PHE
1	E	467	THR
1	E	474	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (47) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	70	ASN
1	A	75	ASN
1	A	150	GLN
1	A	153	ASN
1	A	182	ASN
1	A	234	GLN
1	A	266	HIS
1	A	267	HIS
1	A	289	GLN
1	A	323	GLN
1	A	338	GLN
1	A	358	GLN
1	A	361	GLN
1	A	415	ASN
1	A	434	GLN
1	A	450	GLN
1	A	455	GLN
1	A	463	GLN
1	A	476	GLN
1	B	70	ASN

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Mol	Chain	Res	Type
1	B	75	ASN
1	B	153	ASN
1	B	267	HIS
1	B	338	GLN
1	B	340	HIS
1	B	361	GLN
1	B	455	GLN
1	D	70	ASN
1	D	123	HIS
1	D	150	GLN
1	D	153	ASN
1	D	160	ASN
1	D	162	ASN
1	D	265	ASN
1	D	358	GLN
1	D	361	GLN
1	D	476	GLN
1	E	70	ASN
1	E	75	ASN
1	E	153	ASN
1	E	160	ASN
1	E	289	GLN
1	E	338	GLN
1	E	358	GLN
1	E	370	ASN
1	E	389	GLN
1	E	455	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry (i)

4 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	NAG	A	1480	1	14,14,15	0.64	0	17,19,21	1.83	4 (23%)
2	NAG	D	1480	1	14,14,15	0.56	0	17,19,21	1.76	3 (17%)
2	NAG	B	1480	1	14,14,15	0.62	0	17,19,21	1.52	4 (23%)
2	NAG	E	1479	1	14,14,15	0.51	0	17,19,21	1.40	3 (17%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	A	1480	1	-	4/6/23/26	0/1/1/1
2	NAG	D	1480	1	-	4/6/23/26	0/1/1/1
2	NAG	B	1480	1	-	4/6/23/26	0/1/1/1
2	NAG	E	1479	1	-	2/6/23/26	0/1/1/1

There are no bond length outliers.

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	1480	NAG	C1-O5-C5	5.25	119.30	112.19
2	A	1480	NAG	C1-O5-C5	4.76	118.64	112.19
2	B	1480	NAG	C1-C2-N2	4.15	117.57	110.49
2	A	1480	NAG	O4-C4-C5	3.42	117.78	109.30
2	E	1479	NAG	C1-O5-C5	3.27	116.62	112.19
2	E	1479	NAG	C8-C7-N2	2.82	120.87	116.10
2	B	1480	NAG	C1-O5-C5	2.50	115.58	112.19
2	A	1480	NAG	O7-C7-C8	-2.48	117.46	122.06
2	A	1480	NAG	O5-C5-C6	2.29	110.80	107.20

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	D	1480	NAG	C6-C5-C4	-2.20	107.85	113.00
2	D	1480	NAG	C1-C2-N2	-2.15	106.81	110.49
2	B	1480	NAG	O4-C4-C5	2.07	114.44	109.30
2	B	1480	NAG	O5-C5-C6	2.05	110.42	107.20
2	E	1479	NAG	O7-C7-C8	-2.03	118.29	122.06

There are no chirality outliers.

All (14) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	1480	NAG	C8-C7-N2-C2
2	A	1480	NAG	O7-C7-N2-C2
2	D	1480	NAG	C8-C7-N2-C2
2	D	1480	NAG	O7-C7-N2-C2
2	B	1480	NAG	C8-C7-N2-C2
2	B	1480	NAG	O7-C7-N2-C2
2	E	1479	NAG	C8-C7-N2-C2
2	E	1479	NAG	O7-C7-N2-C2
2	A	1480	NAG	O5-C5-C6-O6
2	A	1480	NAG	C4-C5-C6-O6
2	B	1480	NAG	C4-C5-C6-O6
2	D	1480	NAG	C4-C5-C6-O6
2	D	1480	NAG	O5-C5-C6-O6
2	B	1480	NAG	O5-C5-C6-O6

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	1480	NAG	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, 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	399/432 (92%)	-0.20	6 (1%)	73	71	5, 24, 42, 61	3 (0%)
1	B	397/432 (91%)	-0.08	9 (2%)	60	56	7, 28, 54, 62	6 (1%)
1	D	406/432 (93%)	-0.06	11 (2%)	54	50	9, 26, 52, 63	4 (0%)
1	E	394/432 (91%)	0.10	25 (6%)	20	16	8, 28, 66, 80	1 (0%)
All	All	1596/1728 (92%)	-0.06	51 (3%)	47	44	5, 27, 55, 80	14 (0%)

All (51) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	E	431	THR	4.8
1	E	380	GLY	4.2
1	E	69	GLY	4.1
1	E	469	VAL	4.1
1	E	473	ALA	3.9
1	D	437	ALA	3.9
1	A	471	CYS	3.9
1	E	476	GLN	3.8
1	E	471	CYS	3.8
1	D	426	PRO	3.7
1	D	207	ASN	3.7
1	E	474	ASP	3.5
1	E	166	PRO	3.4
1	E	444	PHE	3.4
1	B	437	ALA	3.2
1	E	468	SER	3.2
1	E	445	GLY	3.2
1	A	477	ASN	3.1
1	E	379	THR	3.1
1	E	472	THR	3.0
1	A	452	CYS	2.9

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Mol	Chain	Res	Type	RSRZ
1	D	427	PRO	2.9
1	D	451	ALA	2.8
1	E	441	PRO	2.7
1	E	317	ARG	2.5
1	E	438	ASP	2.4
1	B	341	THR	2.4
1	B	451	ALA	2.4
1	B	471	CYS	2.4
1	E	475	GLU	2.3
1	E	167	SER	2.3
1	B	76	VAL	2.3
1	E	477	ASN	2.3
1	D	208	ASN	2.2
1	B	421	ASN	2.2
1	E	446	ALA	2.2
1	B	73	GLN	2.2
1	A	479	CYS	2.2
1	E	302	GLY	2.1
1	D	443	SER	2.1
1	A	472	THR	2.1
1	D	429	PRO	2.1
1	E	381	GLU	2.1
1	D	428	THR	2.1
1	B	71	PRO	2.1
1	D	210	ALA	2.1
1	B	69	GLY	2.1
1	A	470	ASP	2.0
1	E	455	GLN	2.0
1	E	312	ASP	2.0
1	D	450	GLN	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 monosaccharides in this entry.

6.4 Ligands

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	NAG	E	1479	14/15	0.85	0.19	43,46,48,51	0
2	NAG	D	1480	14/15	0.90	0.12	28,32,36,36	0
2	NAG	B	1480	14/15	0.92	0.17	22,28,30,32	0
2	NAG	A	1480	14/15	0.92	0.13	20,22,24,25	0

6.5 Other polymers

There are no such residues in this entry.