



Full wwPDB X-ray Structure Validation Report ⓘ

Aug 9, 2020 – 12:50 PM BST

PDB ID : 2PHL
Title : THE STRUCTURE OF PHASEOLIN AT 2.2 ANGSTROMS RESOLUTION:
IMPLICATIONS FOR A COMMON VICILIN(SLASH)LEGUMIN STRUCTURE AND THE GENETIC ENGINEERING OF SEED STORAGE PROTEINS
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Deposited on : 1994-07-07
Resolution : 2.20 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 ⓘ](#)) 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

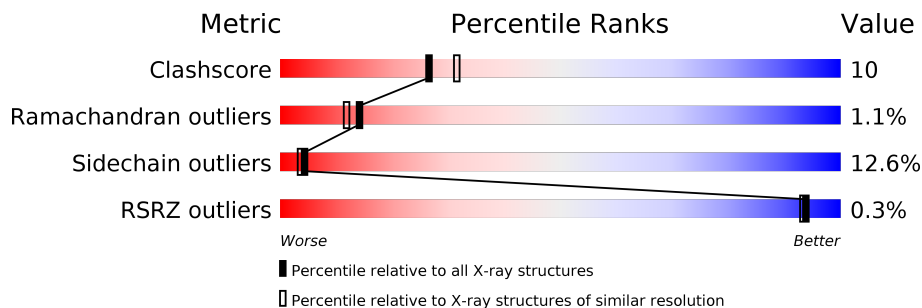
1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.20 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))
Clashscore	141614	5594 (2.20-2.20)
Ramachandran outliers	138981	5503 (2.20-2.20)
Sidechain outliers	138945	5504 (2.20-2.20)
RSRZ outliers	127900	4800 (2.20-2.20)

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 $\leq 5\%$. 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	397	<div style="display: flex; align-items: center;"> <div style="width: 10px; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 100%; height: 15px; position: relative;"> <div style="width: 66%; height: 100%; background-color: green;"></div> <div style="width: 20%; height: 100%; background-color: yellow;"></div> <div style="width: 5%; height: 100%; background-color: orange;"></div> <div style="width: 9%; height: 100%; background-color: grey;"></div> </div> </div> <p style="text-align: center;">66% 20% 5% 9%</p>
1	B	397	<div style="width: 100%; height: 15px; position: relative;"> <div style="width: 59%; height: 100%; background-color: green;"></div> <div style="width: 27%; height: 100%; background-color: yellow;"></div> <div style="width: 1%; height: 100%; background-color: orange;"></div> <div style="width: 9%; height: 100%; background-color: grey;"></div> </div> <p style="text-align: center;">59% 27% • 9%</p>
1	C	397	<div style="width: 100%; height: 15px; position: relative;"> <div style="width: 62%; height: 100%; background-color: green;"></div> <div style="width: 24%; height: 100%; background-color: yellow;"></div> <div style="width: 5%; height: 100%; background-color: orange;"></div> <div style="width: 9%; height: 100%; background-color: grey;"></div> </div> <p style="text-align: center;">62% 24% 5% 9%</p>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	NAG	C	902	X	-	-	-

2 Entry composition [i](#)

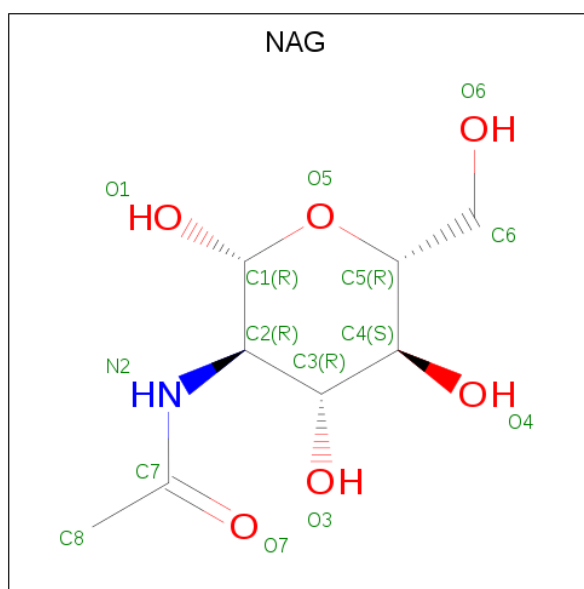
There are 4 unique types of molecules in this entry. The entry contains 8746 atoms, of which 0 are hydrogens and 0 are deuteriums.

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 PHASEOLIN.

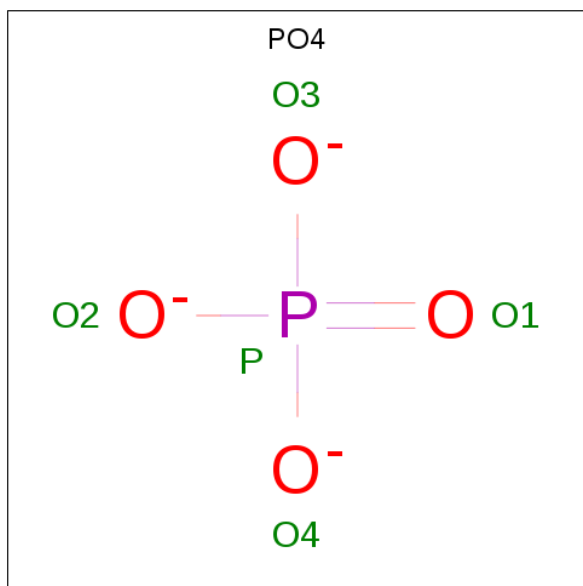
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	360	Total 2870	C 1819	N 484	O 564	S 3	0	0	0
1	B	360	Total 2870	C 1819	N 484	O 564	S 3	0	0	0
1	C	361	Total 2879	C 1824	N 486	O 566	S 3	0	0	0

- 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
			Total	C	N	O		
2	A	1	Total 14	C 8	N 1	O 5	0	0
2	B	1	Total 14	C 8	N 1	O 5	0	0
2	C	1	Total 14	C 8	N 1	O 5	0	0

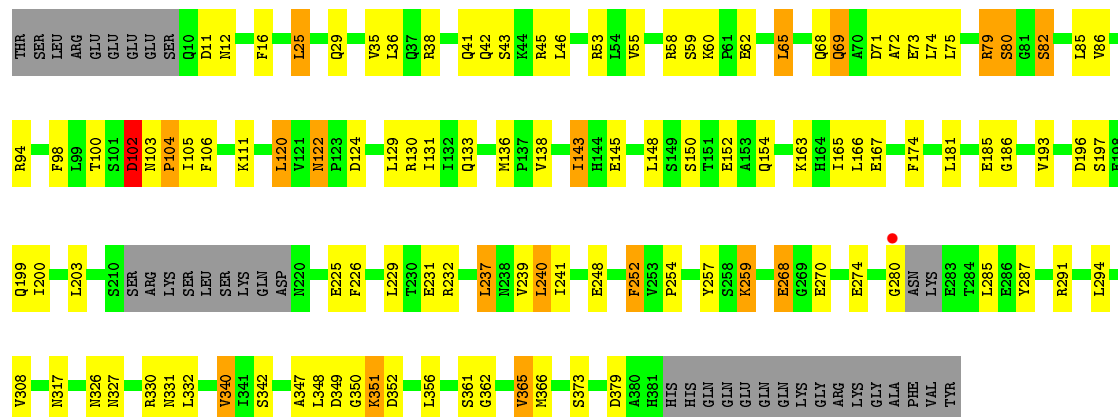
- Molecule 3 is PHOSPHATE ION (three-letter code: PO4) (formula: O₄P).



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

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	24	Total O 24 24	0	0
4	B	24	Total O 24 24	0	0
4	C	22	Total O 22 22	0	0



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	89.81Å 114.08Å 137.08Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	6.00 – 2.20 6.00 – 2.20	Depositor EDS
% Data completeness (in resolution range)	(Not available) (6.00-2.20) 51.7 (6.00-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$	-	Xtrriage
Refinement program	X-PLOR	Depositor
R, R_{free}	0.178 , (Not available) 0.173 , (Not available)	Depositor DCC
R_{free} test set	No test flags present.	wwPDB-VP
Wilson B-factor (Å ²)	30.7	Xtrriage
Anisotropy	0.339	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.34 , 109.9	EDS
L-test for twinning ¹	$\langle L \rangle = 0.44$, $\langle L^2 \rangle = 0.27$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	8746	wwPDB-VP
Average B, all atoms (Å ²)	33.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.42% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Theoretical 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: PO4, 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	0.54	0/2925	0.82	1/3958 (0.0%)
1	B	0.55	1/2925 (0.0%)	0.82	4/3958 (0.1%)
1	C	0.54	0/2934	0.84	5/3970 (0.1%)
All	All	0.54	1/8784 (0.0%)	0.83	10/11886 (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	A	0	1
1	C	0	1
All	All	0	2

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	93	ARG	CZ-NH1	5.56	1.40	1.33

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed($^{\circ}$)	Ideal($^{\circ}$)
1	C	120	LEU	CA-CB-CG	5.87	128.81	115.30
1	B	120	LEU	CA-CB-CG	5.79	128.63	115.30
1	B	240	LEU	CA-CB-CG	5.61	128.19	115.30
1	C	240	LEU	CA-CB-CG	5.56	128.09	115.30
1	B	350	GLY	N-CA-C	5.37	126.52	113.10
1	A	102	ASP	N-CA-C	5.33	125.39	111.00
1	C	181	LEU	CA-CB-CG	5.23	127.33	115.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	74	LEU	CA-CB-CG	5.14	127.12	115.30
1	C	252	PHE	N-CA-C	-5.08	97.29	111.00
1	C	102	ASP	N-CA-C	5.01	124.53	111.00

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	287	TYR	Sidechain
1	C	287	TYR	Sidechain

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	2870	0	2797	55	0
1	B	2870	0	2797	73	0
1	C	2879	0	2805	59	0
2	A	14	0	13	1	0
2	B	14	0	13	0	0
2	C	14	0	13	0	0
3	A	5	0	0	0	0
3	B	5	0	0	0	0
3	C	5	0	0	1	0
4	A	24	0	0	0	0
4	B	24	0	0	1	0
4	C	22	0	0	1	0
All	All	8746	0	8438	176	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 10.

All (176) 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:A:340:VAL:HG11	1:B:117:ILE:HD12	1.63	0.81

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:17:ASN:HD21	1:B:19:ASP:HB2	1.50	0.76
1:A:229:LEU:HD23	1:A:330:ARG:HH21	1.51	0.75
1:B:140:ASN:HB2	1:B:141:PRO:HD2	1.70	0.73
1:C:43:SER:HB3	1:C:46:LEU:HD13	1.72	0.70
1:B:257:TYR:CE1	1:B:330:ARG:HG3	2.28	0.69
1:B:17:ASN:ND2	1:B:19:ASP:HB2	2.08	0.69
1:B:361:SER:O	1:B:365:VAL:HG13	1.93	0.69
1:B:41:GLN:HE21	1:B:41:GLN:HA	1.58	0.68
1:A:111:LYS:HE2	1:A:237:LEU:HG	1.76	0.68
1:B:366:MET:HE2	1:B:369:ILE:HG21	1.76	0.66
1:C:85:LEU:HD13	1:C:120:LEU:HD13	1.77	0.66
1:A:229:LEU:CD2	1:A:330:ARG:HH21	2.09	0.65
1:B:195:ILE:HD13	1:B:200:ILE:HG21	1.79	0.64
1:B:176:GLU:O	1:B:180:VAL:HG23	1.98	0.63
1:C:68:GLN:NE2	1:C:145:GLU:HB3	2.11	0.63
1:C:75:LEU:HD21	1:C:241:ILE:HD11	1.79	0.63
1:C:103:ASN:ND2	1:C:105:ILE:HD11	2.13	0.63
1:C:226:PHE:CZ	1:C:379:ASP:HB2	2.36	0.61
1:A:257:TYR:CE1	1:A:330:ARG:HG3	2.35	0.60
1:A:193:VAL:HG11	1:C:356:LEU:HD22	1.84	0.60
1:A:87:LEU:O	1:A:94:ARG:HA	2.02	0.59
1:A:61:PRO:HA	1:A:122:ASN:OD1	2.03	0.59
1:A:361:SER:O	1:A:365:VAL:HG13	2.03	0.59
1:A:223:GLY:HA3	1:A:228:ASN:OD1	2.03	0.59
1:B:80:SER:HB3	1:B:130:ARG:HB2	1.84	0.58
1:A:162:SER:OG	1:A:165:ILE:HD13	2.04	0.58
1:A:362:GLY:O	1:A:366:MET:HB2	2.04	0.58
1:B:21:SER:HB3	1:B:36:LEU:CD1	2.33	0.58
1:C:38:ARG:HB2	1:C:41:GLN:HG2	1.85	0.58
1:A:222:ILE:HD12	1:A:330:ARG:HH22	1.69	0.57
1:B:30:TYR:HA	1:B:60:LYS:HG3	1.85	0.57
1:C:103:ASN:HD22	1:C:105:ILE:HD11	1.70	0.57
1:B:44:LYS:HE3	1:B:47:GLN:HE21	1.69	0.57
1:C:257:TYR:CE1	1:C:330:ARG:HG2	2.40	0.56
1:C:36:LEU:O	1:C:53:ARG:NH1	2.38	0.56
1:B:44:LYS:HE3	1:B:47:GLN:NE2	2.19	0.56
1:C:361:SER:O	1:C:365:VAL:HG13	2.05	0.56
1:B:347:ALA:HA	1:C:94:ARG:HD2	1.87	0.56
1:B:161:PHE:HB2	1:B:166:LEU:HD21	1.88	0.56
1:B:100:THR:HG21	1:B:103:ASN:OD1	2.06	0.56
1:B:226:PHE:CE2	1:B:379:ASP:HB2	2.41	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:82:SER:OG	1:A:100:THR:HG22	2.07	0.55
1:C:45:ARG:NH2	1:C:280:GLY:HA2	2.21	0.54
1:C:351:LYS:NZ	1:C:351:LYS:HB2	2.21	0.54
1:C:79:ARG:O	1:C:80:SER:HB3	2.07	0.54
1:A:44:LYS:HB2	1:A:44:LYS:NZ	2.23	0.53
1:A:206:HIS:HD2	1:C:348:LEU:HG	1.73	0.53
1:C:163:LYS:O	1:C:167:GLU:HG3	2.09	0.53
1:C:105:ILE:HG13	1:C:106:PHE:CD1	2.44	0.53
1:C:35:VAL:HG12	1:C:53:ARG:NH1	2.23	0.53
1:A:232:ARG:HB2	1:A:241:ILE:HG12	1.91	0.53
1:A:323:ILE:O	1:A:324:ASN:HB3	2.08	0.53
1:C:68:GLN:HE22	1:C:145:GLU:HB3	1.74	0.52
1:C:331:ASN:HD22	1:C:340:VAL:CG1	2.23	0.51
1:B:354:LEU:HD13	1:B:365:VAL:CG2	2.41	0.51
1:B:163:LYS:O	1:B:167:GLU:HG3	2.11	0.51
1:B:196:ASP:HB3	1:B:199:GLN:NE2	2.25	0.51
1:B:30:TYR:CZ	1:B:194:ASN:HB2	2.45	0.51
1:B:61:PRO:HB3	1:B:124:ASP:O	2.11	0.51
1:B:326:ASN:O	1:B:327:ASN:HB2	2.11	0.50
1:A:25:LEU:HD12	1:C:285:LEU:HD21	1.94	0.50
1:B:93:ARG:HH21	1:B:95:GLU:HG3	1.77	0.50
1:A:94:ARG:HD3	1:C:347:ALA:HA	1.92	0.50
1:B:129:LEU:HD22	1:B:131:ILE:HG13	1.94	0.49
1:A:16:PHE:HB2	1:A:299:VAL:HB	1.93	0.49
1:A:103:ASN:ND2	1:A:105:ILE:HG12	2.26	0.49
1:C:274:GLU:HG2	1:C:291:ARG:HG2	1.95	0.49
1:C:60:LYS:HE2	1:C:60:LYS:HA	1.95	0.49
1:C:58:ARG:NH1	3:C:952:PO4:O2	2.43	0.49
1:B:76:LEU:O	1:B:109:HIS:HA	2.13	0.49
1:C:196:ASP:HB3	1:C:199:GLN:HG3	1.94	0.48
1:B:285:LEU:HD21	1:C:25:LEU:HD13	1.96	0.48
1:B:195:ILE:HD13	1:B:200:ILE:CG2	2.44	0.48
1:C:254:PRO:HA	1:C:308:VAL:O	2.13	0.48
1:C:79:ARG:HG3	1:C:130:ARG:O	2.12	0.48
1:B:366:MET:O	1:B:369:ILE:HG22	2.13	0.48
1:A:194:ASN:HD22	1:A:195:ILE:N	2.12	0.48
1:A:194:ASN:C	1:A:194:ASN:HD22	2.18	0.47
1:B:244:ILE:O	1:B:317:ASN:HA	2.14	0.47
1:C:82:SER:HB3	1:C:98:PHE:CZ	2.49	0.47
1:A:348:LEU:HD13	1:B:203:LEU:HA	1.96	0.47
1:C:62:GLU:HA	1:C:122:ASN:O	2.15	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:35:VAL:HG12	1:C:53:ARG:HH12	1.79	0.47
1:C:362:GLY:O	1:C:366:MET:HB2	2.15	0.47
1:B:240:LEU:HB2	1:B:325:ALA:CB	2.45	0.46
1:B:44:LYS:HD2	1:B:44:LYS:HA	1.42	0.46
1:B:98:PHE:HE1	1:B:100:THR:OG1	1.97	0.46
1:A:87:LEU:HD22	1:A:97:PHE:HE2	1.81	0.46
1:B:35:VAL:HG22	1:B:55:VAL:HG22	1.97	0.46
1:C:38:ARG:CB	1:C:41:GLN:HG2	2.46	0.46
1:B:35:VAL:HG12	1:B:53:ARG:HH12	1.81	0.46
1:A:140:ASN:HB2	1:A:141:PRO:CD	2.46	0.46
1:A:275:LEU:HD11	1:A:306:TYR:HB3	1.98	0.46
1:C:163:LYS:HE2	1:C:174:PHE:CD2	2.51	0.46
1:B:36:LEU:HD22	1:B:299:VAL:HG21	1.98	0.45
1:B:172:SER:HB2	1:B:177:ILE:HG13	1.98	0.45
1:A:27:LYS:HB2	1:A:27:LYS:HE3	1.67	0.45
1:A:80:SER:HB2	1:A:130:ARG:HB2	1.99	0.45
1:B:378:VAL:CG1	1:B:379:ASP:N	2.79	0.45
1:B:36:LEU:O	1:B:53:ARG:NH1	2.49	0.45
1:B:156:SER:O	1:B:159:GLN:HB2	2.17	0.45
1:B:58:ARG:NH1	1:B:130:ARG:HD2	2.32	0.45
1:A:58:ARG:HA	1:A:129:LEU:O	2.17	0.45
1:B:265:VAL:HG22	1:B:299:VAL:HG22	1.98	0.45
1:A:184:GLU:O	1:A:187:GLN:HG2	2.17	0.44
1:A:240:LEU:CD2	1:A:322:GLY:HA3	2.47	0.44
1:B:34:ARG:HD3	1:B:56:GLU:OE1	2.17	0.44
1:A:66:LEU:HD12	1:A:191:VAL:HA	2.00	0.44
1:B:135:ALA:C	1:B:136:MET:HG3	2.36	0.44
1:B:41:GLN:NE2	1:B:41:GLN:HA	2.28	0.44
1:C:231:GLU:C	1:C:232:ARG:HG3	2.38	0.44
1:B:177:ILE:O	1:B:181:LEU:HB2	2.17	0.44
1:B:237:LEU:O	1:B:238:ASN:HB3	2.18	0.44
1:C:331:ASN:HD22	1:C:340:VAL:HG11	1.82	0.44
1:A:241:ILE:HD13	1:A:241:ILE:N	2.33	0.44
1:B:61:PRO:HD3	1:B:128:ASP:OD1	2.18	0.44
1:B:53:ARG:HD2	1:B:141:PRO:O	2.17	0.44
1:A:199:GLN:HG3	1:C:352:ASP:OD2	2.17	0.44
1:A:221:THR:HA	1:A:229:LEU:O	2.18	0.44
1:C:71:ASP:O	1:C:138:VAL:HG23	2.17	0.44
1:B:336:LYS:HG2	1:B:336:LYS:O	2.17	0.44
1:C:55:VAL:HB	1:C:133:GLN:HG3	1.99	0.44
1:C:268:GLU:HB2	1:C:317:ASN:OD1	2.17	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:251:LEU:HB3	1:A:378:VAL:HG12	2.00	0.43
1:B:330:ARG:HD2	1:B:376:TYR:OH	2.18	0.43
1:B:84:ILE:HB	1:B:121:VAL:HB	1.99	0.43
1:C:349:ASP:N	1:C:349:ASP:OD1	2.51	0.43
1:A:162:SER:HG	1:A:165:ILE:HD13	1.81	0.43
1:A:332:LEU:HB2	1:A:338:ASP:O	2.18	0.43
1:B:238:ASN:HD21	1:B:324:ASN:HA	1.81	0.43
1:A:273:VAL:O	1:A:291:ARG:HA	2.18	0.43
1:A:170:PHE:O	1:A:171:ASN:HB3	2.18	0.43
1:C:69:GLN:HE21	1:C:69:GLN:HB3	1.60	0.43
1:B:161:PHE:HB2	1:B:166:LEU:CD2	2.49	0.43
1:A:306:TYR:HH	1:B:144:HIS:CE1	2.36	0.42
1:A:206:HIS:CD2	1:C:348:LEU:HG	2.54	0.42
1:B:52:TYR:CE1	1:B:136:MET:HG2	2.54	0.42
1:C:326:ASN:O	1:C:327:ASN:HB2	2.17	0.42
1:A:229:LEU:HD23	1:A:330:ARG:NH2	2.27	0.42
1:A:52:TYR:O	1:A:53:ARG:HD2	2.20	0.42
1:C:237:LEU:O	1:C:239:VAL:HG23	2.19	0.42
1:A:301:VAL:O	1:A:303:PRO:HD3	2.19	0.42
1:B:166:LEU:HD12	1:B:170:PHE:HE2	1.85	0.42
1:B:27:LYS:HG3	1:B:32:HIS:HB3	2.01	0.42
1:C:120:LEU:HD21	1:C:131:ILE:CD1	2.49	0.42
1:C:16:PHE:CZ	1:C:42:GLN:NE2	2.88	0.42
1:C:72:ALA:CB	1:C:143:ILE:HD13	2.50	0.42
1:B:264:LEU:O	1:B:299:VAL:HA	2.19	0.41
1:A:228:ASN:ND2	2:A:900:NAG:O7	2.53	0.41
1:A:25:LEU:HD23	1:A:35:VAL:HG23	2.03	0.41
1:C:111:LYS:HG3	1:C:111:LYS:O	2.20	0.41
1:B:164:HIS:HA	1:B:167:GLU:HG3	2.01	0.41
1:A:49:LEU:HD11	1:A:261:ILE:HD11	2.02	0.41
1:B:175:GLU:CD	1:B:175:GLU:H	2.23	0.41
1:B:247:GLU:HA	1:B:315:ASN:ND2	2.35	0.41
1:C:11:ASP:CG	1:C:12:ASN:H	2.22	0.41
1:B:30:TYR:CE1	1:B:194:ASN:HB2	2.55	0.41
1:B:223:GLY:HA3	1:B:228:ASN:HA	2.03	0.41
1:B:240:LEU:HB2	1:B:325:ALA:HB1	2.01	0.41
1:B:267:ASN:HB2	1:B:317:ASN:OD1	2.20	0.41
1:B:68:GLN:O	1:B:117:ILE:HA	2.20	0.41
1:C:102:ASP:O	1:C:104:PRO:HD3	2.21	0.41
1:B:312:ALA:HB1	1:B:314:SER:O	2.20	0.41
1:B:238:ASN:OD1	1:B:326:ASN:ND2	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:103:ASN:O	1:C:105:ILE:N	2.53	0.41
1:C:351:LYS:HB2	1:C:351:LYS:HZ3	1.85	0.41
1:A:257:TYR:CZ	1:A:330:ARG:HD2	2.56	0.41
1:A:259:LYS:HG3	1:A:328:ASN:HA	2.02	0.41
1:C:365:VAL:CG2	1:C:366:MET:N	2.83	0.41
1:C:259:LYS:HE3	1:C:259:LYS:HB3	1.62	0.41
1:A:23:ASN:O	1:A:34:ARG:HA	2.21	0.40
1:B:41:GLN:HG2	4:B:506:HOH:O	2.20	0.40
1:A:304:ALA:O	1:A:305:ALA:HB3	2.21	0.40
1:C:65:LEU:HD13	4:C:534:HOH:O	2.22	0.40
1:A:273:VAL:HG12	1:A:294:LEU:HD13	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	354/397 (89%)	326 (92%)	27 (8%)	1 (0%)	41	46
1	B	354/397 (89%)	323 (91%)	25 (7%)	6 (2%)	9	6
1	C	355/397 (89%)	325 (92%)	25 (7%)	5 (1%)	11	8
All	All	1063/1191 (89%)	974 (92%)	77 (7%)	12 (1%)	14	12

All (12) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	350	GLY
1	A	29	GLN
1	C	80	SER
1	C	104	PRO
1	B	80	SER
1	B	104	PRO

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Mol	Chain	Res	Type
1	C	186	GLY
1	B	197	SER
1	B	279	LYS
1	B	376	TYR
1	B	324	ASN
1	C	200	ILE

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	320/354 (90%)	279 (87%)	41 (13%)	4 3
1	B	320/354 (90%)	283 (88%)	37 (12%)	5 5
1	C	321/354 (91%)	278 (87%)	43 (13%)	4 3
All	All	961/1062 (90%)	840 (87%)	121 (13%)	4 3

All (121) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	20	ASN
1	A	23	ASN
1	A	25	LEU
1	A	29	GLN
1	A	43	SER
1	A	65	LEU
1	A	68	GLN
1	A	69	GLN
1	A	74	LEU
1	A	86	VAL
1	A	87	LEU
1	A	94	ARG
1	A	95	GLU
1	A	103	ASN
1	A	122	ASN
1	A	129	LEU

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Mol	Chain	Res	Type
1	A	143	ILE
1	A	148	LEU
1	A	150	SER
1	A	154	GLN
1	A	166	LEU
1	A	174	PHE
1	A	184	GLU
1	A	194	ASN
1	A	203	LEU
1	A	206	HIS
1	A	210	SER
1	A	237	LEU
1	A	240	LEU
1	A	241	ILE
1	A	252	PHE
1	A	259	LYS
1	A	261	ILE
1	A	274	GLU
1	A	323	ILE
1	A	330	ARG
1	A	340	VAL
1	A	352	ASP
1	A	363	ASP
1	A	365	VAL
1	A	378	VAL
1	B	24	THR
1	B	29	GLN
1	B	38	ARG
1	B	41	GLN
1	B	44	LYS
1	B	46	LEU
1	B	56	GLU
1	B	60	LYS
1	B	64	LEU
1	B	65	LEU
1	B	69	GLN
1	B	79	ARG
1	B	86	VAL
1	B	93	ARG
1	B	94	ARG
1	B	99	LEU
1	B	103	ASN

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Mol	Chain	Res	Type
1	B	124	ASP
1	B	127	GLU
1	B	129	LEU
1	B	154	GLN
1	B	165	ILE
1	B	181	LEU
1	B	183	GLU
1	B	198	GLU
1	B	203	LEU
1	B	232	ARG
1	B	252	PHE
1	B	293	GLU
1	B	294	LEU
1	B	323	ILE
1	B	336	LYS
1	B	340	VAL
1	B	365	VAL
1	B	367	LYS
1	B	373	SER
1	B	381	HIS
1	C	25	LEU
1	C	29	GLN
1	C	59	SER
1	C	65	LEU
1	C	69	GLN
1	C	73	GLU
1	C	74	LEU
1	C	79	ARG
1	C	82	SER
1	C	86	VAL
1	C	100	THR
1	C	102	ASP
1	C	122	ASN
1	C	124	ASP
1	C	129	LEU
1	C	136	MET
1	C	143	ILE
1	C	148	LEU
1	C	150	SER
1	C	152	GLU
1	C	154	GLN
1	C	165	ILE

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Mol	Chain	Res	Type
1	C	166	LEU
1	C	185	GLU
1	C	193	VAL
1	C	197	SER
1	C	203	LEU
1	C	225	GLU
1	C	229	LEU
1	C	237	LEU
1	C	240	LEU
1	C	248	GLU
1	C	252	PHE
1	C	259	LYS
1	C	268	GLU
1	C	270	GLU
1	C	294	LEU
1	C	332	LEU
1	C	340	VAL
1	C	342	SER
1	C	351	LYS
1	C	365	VAL
1	C	373	SER

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (30) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	20	ASN
1	A	68	GLN
1	A	69	GLN
1	A	103	ASN
1	A	194	ASN
1	A	206	HIS
1	A	329	ASN
1	A	331	ASN
1	B	17	ASN
1	B	41	GLN
1	B	47	GLN
1	B	110	GLN
1	B	164	HIS
1	B	187	GLN
1	B	194	ASN
1	B	238	ASN
1	B	315	ASN

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Mol	Chain	Res	Type
1	B	326	ASN
1	B	381	HIS
1	C	42	GLN
1	C	68	GLN
1	C	69	GLN
1	C	103	ASN
1	C	122	ASN
1	C	159	GLN
1	C	194	ASN
1	C	206	HIS
1	C	329	ASN
1	C	331	ASN
1	C	381	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](#)

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

6 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	B	901	1	14,14,15	1.07	1 (7%)	17,19,21	1.78	5 (29%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	NAG	A	900	1	14,14,15	1.74	2 (14%)	17,19,21	2.50	5 (29%)
3	PO4	A	950	-	4,4,4	1.30	0	6,6,6	1.05	0
3	PO4	B	951	-	4,4,4	1.97	2 (50%)	6,6,6	1.28	1 (16%)
2	NAG	C	902	1	14,14,15	1.46	3 (21%)	17,19,21	3.36	11 (64%)
3	PO4	C	952	-	4,4,4	2.09	2 (50%)	6,6,6	1.13	0

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	NAG	C	902	1	1/1/5/7	2/6/23/26	0/1/1/1
2	NAG	B	901	1	-	1/6/23/26	0/1/1/1
2	NAG	A	900	1	-	1/6/23/26	0/1/1/1

All (10) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	900	NAG	C1-C2	4.39	1.58	1.52
2	A	900	NAG	C4-C5	-4.08	1.44	1.53
2	C	902	NAG	C4-C5	3.14	1.59	1.53
3	C	952	PO4	P-O2	-2.86	1.46	1.54
3	B	951	PO4	P-O2	-2.76	1.46	1.54
2	C	902	NAG	C4-C3	2.38	1.58	1.52
3	C	952	PO4	P-O3	-2.19	1.48	1.54
2	B	901	NAG	C1-C2	2.13	1.55	1.52
3	B	951	PO4	P-O4	-2.06	1.48	1.54
2	C	902	NAG	C3-C2	2.03	1.56	1.52

All (22) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	C	902	NAG	C1-C2-N2	8.00	124.15	110.49
2	A	900	NAG	C1-C2-N2	6.45	121.51	110.49
2	C	902	NAG	O5-C1-C2	6.37	121.35	111.29
2	C	902	NAG	C6-C5-C4	6.02	127.11	113.00
2	A	900	NAG	C1-O5-C5	5.31	119.38	112.19
2	B	901	NAG	C1-O5-C5	3.89	117.46	112.19
2	C	902	NAG	O5-C5-C4	-3.30	102.79	110.83
2	B	901	NAG	O7-C7-C8	-3.01	116.46	122.06

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	900	NAG	O5-C5-C6	3.00	111.91	107.20
2	B	901	NAG	C2-N2-C7	2.71	126.77	122.90
2	B	901	NAG	C8-C7-N2	2.65	120.58	116.10
2	C	902	NAG	O3-C3-C2	2.58	114.80	109.47
2	C	902	NAG	C3-C4-C5	-2.57	105.66	110.24
2	A	900	NAG	C4-C3-C2	-2.54	107.29	111.02
2	C	902	NAG	O7-C7-C8	-2.40	117.60	122.06
2	C	902	NAG	C4-C3-C2	-2.26	107.71	111.02
2	B	901	NAG	C4-C3-C2	-2.23	107.74	111.02
2	C	902	NAG	C2-N2-C7	-2.21	119.76	122.90
2	C	902	NAG	C8-C7-N2	2.17	119.78	116.10
3	B	951	PO4	O4-P-O1	-2.07	103.34	110.89
2	A	900	NAG	O5-C1-C2	-2.06	108.04	111.29
2	C	902	NAG	O4-C4-C5	2.02	114.31	109.30

All (1) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	C	902	NAG	C1

All (4) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	900	NAG	C1-C2-N2-C7
2	B	901	NAG	C3-C2-N2-C7
2	C	902	NAG	C1-C2-N2-C7
2	C	902	NAG	C3-C2-N2-C7

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	900	NAG	1	0
3	C	952	PO4	1	0

5.7 Other polymers [\(i\)](#)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	360/397 (90%)	-1.12	2 (0%) 89 88	8, 28, 54, 84	0
1	B	360/397 (90%)	-0.98	0 100 100	13, 34, 61, 89	0
1	C	361/397 (90%)	-1.08	1 (0%) 94 93	12, 29, 57, 80	0
All	All	1081/1191 (90%)	-1.06	3 (0%) 94 93	8, 30, 58, 89	0

All (3) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	103	ASN	2.7
1	A	102	ASP	2.5
1	C	280	GLY	2.4

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 [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	NAG	B	901	14/15	0.80	0.21	71,77,90,94	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
2	NAG	A	900	14/15	0.89	0.17	53,57,64,67	0
2	NAG	C	902	14/15	0.90	0.15	49,63,78,78	0
3	PO4	C	952	5/5	0.98	0.11	57,60,65,65	0
3	PO4	A	950	5/5	0.99	0.05	38,39,45,45	0
3	PO4	B	951	5/5	0.99	0.06	33,39,43,43	0

6.5 Other polymers [i](#)

There are no such residues in this entry.