Full wwPDB X-ray Structure Validation Report (i)

Jun 24, 2024 – 02:53 PM EDT

PDB ID	:	5WLI
Title	:	Crystal Structure of H-2Db with the GAP501 peptide (SQL)
Authors	:	Gras, S.; Farenc, C.; Josephs, T.; Rossjohn, J.
Deposited on	:	2017-07-27
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 (i) 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 (i)) were used in the production of this report:

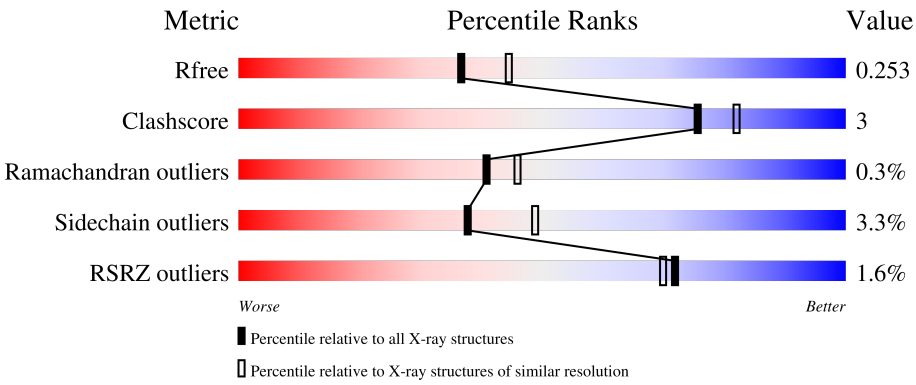
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.37.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

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))
R_{free}	130704	4898 (2.20-2.20)
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 of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=5% The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	278	.% 87% 12% •
1	D	278	3% 92% 7% •
1	G	278	3% 92% 7% •
1	J	278	.% 90% 9% ••
2	B	99	87% 12% •

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Mol	Chain	Length	Quality of chain
2	E	99	87% 11%
2	H	99	2% 84% 15%
2	K	99	88% 11%
3	C	9	67% 33%
3	F	9	67% 33%
3	I	9	67% 22% 11%
3	L	9	100%

2 Entry composition (i)

There are 5 unique types of molecules in this entry. The entry contains 13917 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 H-2 class I histocompatibility antigen, D-B alpha chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	276	2264	1430	400	425	9	0	0	0
1	D	277	2293	1447	409	428	9	0	2	0
1	G	276	2264	1430	400	425	9	0	0	0
1	J	276	2275	1436	404	426	9	0	1	0

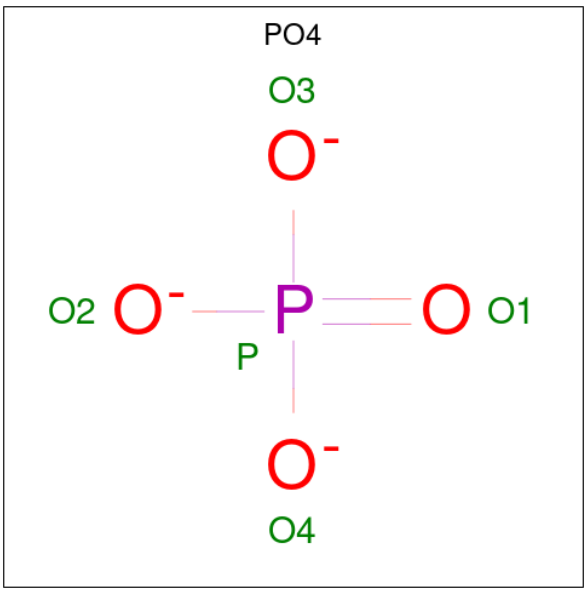
- Molecule 2 is a protein called Beta-2-microglobulin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	98	810	517	137	149	7	0	0	0
2	E	98	810	517	137	149	7	0	0	0
2	H	99	818	523	138	150	7	0	0	0
2	K	98	810	517	137	149	7	0	0	0

- Molecule 3 is a protein called GAP50 peptide.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	C	9	74	48	12	14	0	0	0
3	F	9	74	48	12	14	0	0	0
3	I	9	74	48	12	14	0	0	0
3	L	9	74	48	12	14	0	0	0

- Molecule 4 is PHOSPHATE ION (three-letter code: PO4) (formula: O_4P).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total O P 5 4 1	0	0
4	H	1	Total O P 5 4 1	0	0
4	J	1	Total O P 5 4 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	205	Total O 205 205	0	0
5	B	94	Total O 94 94	0	0
5	C	4	Total O 4 4	0	0
5	D	227	Total O 227 227	0	0
5	E	95	Total O 95 95	0	0
5	F	3	Total O 3 3	0	0
5	G	221	Total O 221 221	0	0
5	H	79	Total O 79 79	0	0

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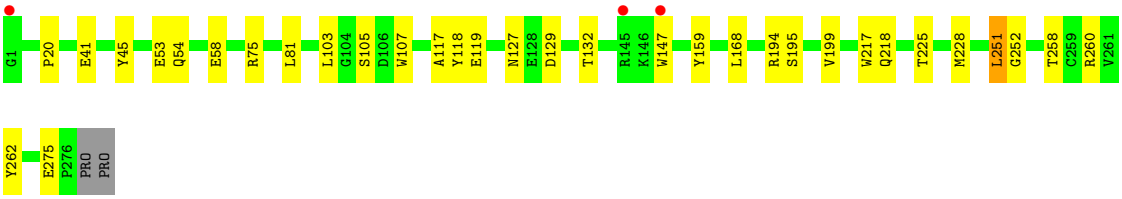
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	I	6	Total O 6 6	0	0
5	J	238	Total O 238 238	0	0
5	K	85	Total O 85 85	0	0
5	L	5	Total O 5 5	0	0

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.

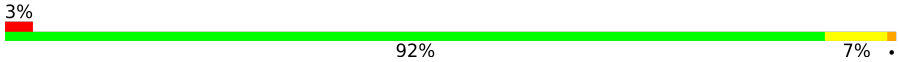
• Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain

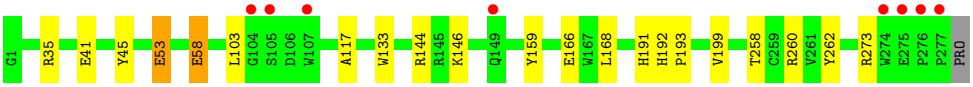
Chain A:



• Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain

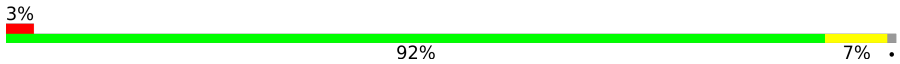
Chain D:





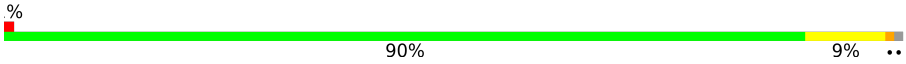
• Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain

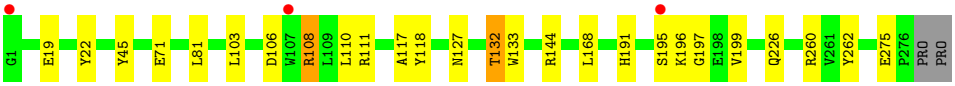
Chain G:



• Molecule 1: H-2 class I histocompatibility antigen, D-B alpha chain

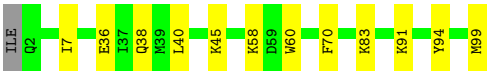
Chain J:





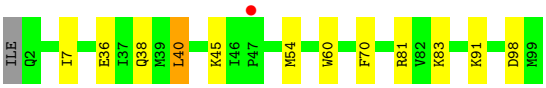
• Molecule 2: Beta-2-microglobulin

Chain B:



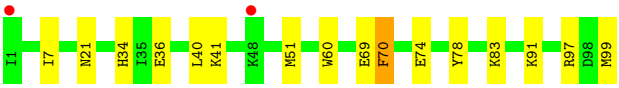
• Molecule 2: Beta-2-microglobulin

Chain E:



• Molecule 2: Beta-2-microglobulin

Chain H:

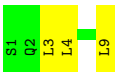


• Molecule 2: Beta-2-microglobulin

Chain K:

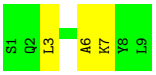
• Molecule 3: GAP50 peptide

Chain C:



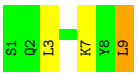
• Molecule 3: GAP50 peptide

Chain F:



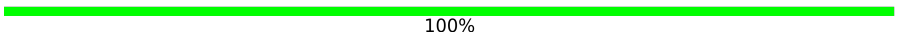
• Molecule 3: GAP50 peptide

Chain I:



• Molecule 3: GAP50 peptide

Chain L:



There are no outlier residues recorded for this chain.

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	53.27Å 159.92Å 108.46Å 90.00° 92.33° 90.00°	Depositor
Resolution (Å)	48.56 – 2.20 48.56 – 2.20	Depositor EDS
% Data completeness (in resolution range)	99.6 (48.56-2.20) 99.6 (48.56-2.20)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.87 (at 2.20Å)	Xtriage
Refinement program	BUSTER 2.10.3	Depositor
R, R_{free}	0.209 , 0.247 0.212 , 0.253	Depositor DCC
R_{free} test set	4595 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å^2)	26.1	Xtriage
Anisotropy	0.363	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.32 , 51.6	EDS
L-test for twinning[2]	$< \|L\| > = 0.49$, $< L^2 > = 0.32$	Xtriage
Estimated twinning fraction	0.036 for h,-k,-l	Xtriage
F_o,F_c correlation	0.94	EDS
Total number of atoms	13917	wwPDB-VP
Average B, all atoms (Å^2)	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 31.43 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 1.1078e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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 (i)

5.1 Standard geometry (i)

Bond lengths and bond angles in the following residue types are not validated in this section: PO4

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	0.39	0/2331	0.65	0/3166
1	D	0.36	0/2361	0.64	0/3206
1	G	0.37	0/2331	0.66	0/3166
1	J	0.39	0/2342	0.67	0/3180
2	B	0.37	0/836	0.66	0/1133
2	E	0.39	0/836	0.67	0/1133
2	H	0.42	0/844	0.69	0/1144
2	K	0.37	0/836	0.68	0/1133
3	C	0.45	0/74	0.87	0/97
3	F	0.35	0/74	0.71	0/97
3	I	0.39	0/74	0.83	0/97
3	L	0.40	0/74	0.68	0/97
All	All	0.38	0/13013	0.67	0/17649

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts (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	2264	0	2136	19	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	D	2293	0	2167	14	1
1	G	2264	0	2136	11	0
1	J	2275	0	2148	17	1
2	B	810	0	783	6	0
2	E	810	0	783	7	0
2	H	818	0	797	7	0
2	K	810	0	783	5	0
3	C	74	0	81	2	0
3	F	74	0	81	2	0
3	I	74	0	81	3	0
3	L	74	0	81	0	0
4	A	5	0	0	0	0
4	H	5	0	0	0	0
4	J	5	0	0	0	0
5	A	205	0	0	2	0
5	B	94	0	0	0	0
5	C	4	0	0	0	0
5	D	227	0	0	1	0
5	E	95	0	0	0	0
5	F	3	0	0	0	0
5	G	221	0	0	2	0
5	H	79	0	0	0	0
5	I	6	0	0	0	0
5	J	238	0	0	0	0
5	K	85	0	0	0	0
5	L	5	0	0	0	0
All	All	13917	0	12057	77	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 3.

All (77) 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:J:106:ASP:OD2	1:J:108:ARG:HG3	1.44	1.14
1:J:106:ASP:CG	1:J:108:ARG:HG3	1.77	1.05
1:A:127:ASN:HD22	1:A:132:THR:HG23	1.29	0.96
1:J:127:ASN:HD22	1:J:132:THR:HG23	1.31	0.94
1:A:217:TRP:H	1:A:228:MET:HE2	1.49	0.78
1:J:106:ASP:OD2	1:J:108:ARG:CG	2.30	0.73
1:D:191:HIS:CE1	1:D:199:VAL:HG21	2.29	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:127:ASN:ND2	1:J:132:THR:HG23	2.09	0.66
1:J:127:ASN:HD22	1:J:132:THR:CG2	2.08	0.63
2:E:7:ILE:HD12	2:E:91:LYS:HE2	1.81	0.62
1:A:127:ASN:ND2	1:A:132:THR:HG23	2.10	0.60
2:H:7:ILE:HD12	2:H:91:LYS:HE2	1.85	0.58
2:K:81:ARG:HH11	2:K:81:ARG:HG3	1.69	0.57
1:J:191:HIS:CE1	1:J:199:VAL:HG21	2.41	0.55
1:G:133:TRP:HB2	1:G:144:ARG:HG3	1.87	0.55
1:J:191:HIS:NE2	1:J:199:VAL:HG21	2.22	0.54
2:E:38:GLN:HE21	2:E:45:LYS:HD2	1.73	0.54
1:J:22:TYR:HB3	1:J:71:GLU:HG3	1.90	0.53
1:A:217:TRP:N	1:A:228:MET:HE2	2.21	0.53
1:A:225:THR:HA	1:A:228:MET:HE3	1.92	0.52
2:B:7:ILE:HD12	2:B:91:LYS:HE2	1.91	0.52
1:G:244:TRP:CZ2	2:H:99:MET:HG2	2.45	0.51
1:D:258:THR:HG22	1:D:273:ARG:HG3	1.92	0.51
1:J:106:ASP:CG	1:J:108:ARG:CG	2.66	0.49
1:A:117:ALA:HB2	2:B:60:TRP:CE2	2.48	0.49
1:J:117:ALA:HB2	2:K:60:TRP:CE2	2.47	0.49
2:K:7:ILE:HD12	2:K:91:LYS:HE2	1.94	0.49
1:J:103:LEU:HD13	1:J:168:LEU:HD23	1.93	0.49
2:H:36:GLU:HB2	2:H:83:LYS:HB3	1.94	0.49
2:B:38:GLN:HE21	2:B:45:LYS:HD2	1.77	0.49
1:A:217:TRP:H	1:A:228:MET:CE	2.21	0.48
1:G:117:ALA:HB2	2:H:60:TRP:CE2	2.48	0.48
1:G:246:SER:HB3	5:G:459:HOH:O	2.14	0.48
1:D:103:LEU:HD13	1:D:168:LEU:HD23	1.95	0.48
2:B:94:TYR:CG	1:D:166:GLU:HG3	2.49	0.48
2:E:36:GLU:HB2	2:E:83:LYS:HB3	1.95	0.48
1:A:260:ARG:HG3	1:A:262:TYR:CE2	2.49	0.47
1:D:58:GLU:HG2	5:D:422:HOH:O	2.14	0.47
2:H:21:ASN:HB3	2:H:70:PHE:CE2	2.50	0.47
2:K:36:GLU:HB2	2:K:83:LYS:HB2	1.96	0.47
1:G:146:LYS:HG2	3:I:7:LYS:HD3	1.95	0.47
1:A:129:ASP:OD2	1:A:132:THR:HG22	2.15	0.47
1:G:143:THR:HG21	3:I:9:LEU:HD12	1.97	0.47
1:D:191:HIS:NE2	1:D:199:VAL:HG21	2.31	0.46
2:B:36:GLU:HB2	2:B:83:LYS:HB2	1.98	0.46
2:K:42:ASN:ND2	2:K:77:THR:H	2.12	0.46
1:A:218:GLN:OE1	1:A:258:THR:HG23	2.16	0.46
1:A:75:ARG:HG3	5:A:423:HOH:O	2.15	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:159:TYR:CE2	3:C:3:LEU:HB2	2.51	0.45
1:A:251:LEU:HA	1:A:252:GLY:HA2	1.79	0.45
1:J:133:TRP:HB2	1:J:144:ARG:HG3	1.97	0.45
1:A:147:TRP:CZ2	3:C:9:LEU:HD23	2.52	0.44
5:G:449:HOH:O	2:H:34:HIS:HD2	1.99	0.44
1:D:133:TRP:HB2	1:D:144:ARG:HG3	1.99	0.44
1:D:117:ALA:HB2	2:E:60:TRP:CE2	2.52	0.44
1:G:103:LEU:HD13	1:G:168:LEU:HD23	1.98	0.44
1:A:103:LEU:HD13	1:A:168:LEU:HD23	2.00	0.43
1:D:146:LYS:HG2	3:F:7:LYS:HD3	2.00	0.43
1:J:260:ARG:HG3	1:J:262:TYR:CE2	2.53	0.43
2:H:41:LYS:HE3	2:H:78:TYR:OH	2.19	0.43
1:A:20:PRO:HD2	1:A:75:ARG:HG2	2.01	0.42
1:D:193:PRO:HA	1:D:199:VAL:HG23	2.02	0.42
2:E:40:LEU:HD11	2:E:81:ARG:HB2	2.01	0.42
1:G:260:ARG:HG3	1:G:262:TYR:CE2	2.55	0.42
1:J:196:LYS:HA	1:J:197:GLY:HA2	1.78	0.42
1:A:218:GLN:HB2	1:A:258:THR:HG22	2.02	0.42
1:D:260:ARG:HG3	1:D:262:TYR:CE2	2.55	0.42
1:J:106:ASP:OD2	1:J:108:ARG:CD	2.68	0.41
1:D:35:ARG:NH2	2:E:54:MET:O	2.47	0.41
1:A:81:LEU:HD13	1:A:118:TYR:CD1	2.55	0.41
1:A:258:THR:HG22	5:A:492:HOH:O	2.19	0.41
1:G:141:GLN:NE2	1:G:144:ARG:HE	2.19	0.41
1:D:159:TYR:CE2	3:F:3:LEU:HB2	2.56	0.41
1:J:81:LEU:HD13	1:J:118:TYR:CD1	2.56	0.41
2:B:58:LYS:HD2	1:G:220:ASN:HB3	2.03	0.41
1:G:159:TYR:CE2	3:I:3:LEU:HB2	2.56	0.40
1:D:192:HIS:CE1	2:E:98:ASP:HB3	2.56	0.40

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

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:53:GLU:OE1	1:J:19:GLU:OE1[2_547]	2.10	0.10

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	274/278 (99%)	268 (98%)	4 (2%)	2 (1%)	22	22
1	D	277/278 (100%)	272 (98%)	5 (2%)	0	100	100
1	G	274/278 (99%)	269 (98%)	4 (2%)	1 (0%)	34	37
1	J	275/278 (99%)	267 (97%)	7 (2%)	1 (0%)	34	37
2	B	96/99 (97%)	94 (98%)	2 (2%)	0	100	100
2	E	96/99 (97%)	95 (99%)	1 (1%)	0	100	100
2	H	97/99 (98%)	96 (99%)	1 (1%)	0	100	100
2	K	96/99 (97%)	95 (99%)	1 (1%)	0	100	100
3	C	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
3	F	7/9 (78%)	6 (86%)	0	1 (14%)	0	0
3	I	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
3	L	7/9 (78%)	6 (86%)	1 (14%)	0	100	100
All	All	1513/1544 (98%)	1480 (98%)	28 (2%)	5 (0%)	41	46

All (5) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	107	TRP
1	J	226	GLN
1	G	195	SER
1	A	195	SER
3	F	6	ALA

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	234/236 (99%)	223 (95%)	11 (5%)	26	33
1	D	237/236 (100%)	233 (98%)	4 (2%)	60	74
1	G	234/236 (99%)	228 (97%)	6 (3%)	46	58
1	J	235/236 (100%)	228 (97%)	7 (3%)	41	53
2	B	92/93 (99%)	89 (97%)	3 (3%)	38	49
2	E	92/93 (99%)	90 (98%)	2 (2%)	52	65
2	H	93/93 (100%)	87 (94%)	6 (6%)	17	19
2	K	92/93 (99%)	89 (97%)	3 (3%)	38	49
3	C	8/8 (100%)	7 (88%)	1 (12%)	4	4
3	F	8/8 (100%)	8 (100%)	0	100	100
3	I	8/8 (100%)	7 (88%)	1 (12%)	4	4
3	L	8/8 (100%)	8 (100%)	0	100	100
All	All	1341/1348 (100%)	1297 (97%)	44 (3%)	38	49

All (44) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	GLU
1	A	45	TYR
1	A	53	GLU
1	A	54	GLN
1	A	58	GLU
1	A	105	SER
1	A	119	GLU
1	A	194	ARG
1	A	199	VAL
1	A	251	LEU
1	A	275	GLU
2	B	40	LEU
2	B	70	PHE
2	B	99	MET
3	C	4	LEU
1	D	41	GLU
1	D	45	TYR
1	D	53	GLU
1	D	58	GLU

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Mol	Chain	Res	Type
2	E	40	LEU
2	E	70	PHE
1	G	45	TYR
1	G	58	GLU
1	G	166	GLU
1	G	195	SER
1	G	272	LEU
1	G	275	GLU
2	H	40	LEU
2	H	51	MET
2	H	69	GLU
2	H	70	PHE
2	H	74	GLU
2	H	97	ARG
3	I	9	LEU
1	J	45	TYR
1	J	108	ARG
1	J	110	LEU
1	J	111	ARG
1	J	132	THR
1	J	195	SER
1	J	275	GLU
2	K	40	LEU
2	K	69	GLU
2	K	70	PHE

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (8) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	127	ASN
2	B	13	HIS
2	B	38	GLN
1	D	54	GLN
1	G	141	GLN
1	J	127	ASN
1	J	192	HIS
2	K	42	ASN

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)

3 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	$\#\|Z\| > 2$
4	PO4	A	301	-	4,4,4	2.45	1 (25%)	6,6,6	0.49	0
4	PO4	H	101	-	4,4,4	1.95	0	6,6,6	0.49	0
4	PO4	J	301	-	4,4,4	1.88	0	6,6,6	0.64	0

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	A	301	PO4	P-O1	4.05	1.60	1.50

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.7 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 (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	276/278 (99%)	-0.01	3 (1%)	80	79	16, 32, 58, 74	4 (1%)
1	D	277/278 (99%)	-0.08	8 (2%)	51	49	14, 27, 55, 77	4 (1%)
1	G	276/278 (99%)	-0.13	8 (2%)	51	49	14, 30, 59, 81	4 (1%)
1	J	276/278 (99%)	-0.25	3 (1%)	80	79	14, 27, 53, 68	5 (1%)
2	B	98/99 (98%)	-0.22	0	100	100	18, 28, 51, 65	1 (1%)
2	E	98/99 (98%)	-0.09	1 (1%)	82	81	15, 29, 50, 69	1 (1%)
2	H	99/99 (100%)	-0.24	2 (2%)	65	63	18, 28, 55, 68	1 (1%)
2	K	98/99 (98%)	-0.36	0	100	100	15, 27, 49, 61	1 (1%)
3	C	9/9 (100%)	-0.12	0	100	100	27, 30, 38, 52	0
3	F	9/9 (100%)	-0.34	0	100	100	19, 23, 27, 46	0
3	I	9/9 (100%)	-0.48	0	100	100	20, 25, 30, 41	0
3	L	9/9 (100%)	-0.48	0	100	100	18, 21, 30, 44	0
All	All	1534/1544 (99%)	-0.15	25 (1%)	72	70	14, 28, 56, 81	21 (1%)

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	G	105	SER	5.5
1	D	277	PRO	5.2
1	J	195	SER	4.8
1	G	107	TRP	4.3
1	J	1	GLY	3.8
1	D	104	GLY	3.8
1	D	105	SER	3.4
1	J	107	TRP	3.2
1	G	1	GLY	3.1
1	A	145	ARG	3.1
1	G	17	LEU	2.9

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Mol	Chain	Res	Type	RSRZ
1	G	142	ILE	2.8
1	D	275	GLU	2.6
2	H	1	ILE	2.6
1	G	193	PRO	2.6
2	H	48	LYS	2.4
2	E	47	PRO	2.3
1	D	276	PRO	2.2
1	D	149	GLN	2.2
1	G	104	GLY	2.2
1	A	147	TRP	2.2
1	D	274	TRP	2.2
1	G	18	GLU	2.2
1	D	107	TRP	2.0
1	A	1	GLY	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 (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
4	PO4	H	101	5/5	0.93	0.12	69,70,70,71	0
4	PO4	J	301	5/5	0.94	0.17	49,50,50,51	0
4	PO4	A	301	5/5	0.96	0.19	53,53,54,54	0

6.5 Other polymers (i)

There are no such residues in this entry.