



# Full wwPDB X-ray Structure Validation Report ⓘ

Mar 10, 2018 – 03:56 am GMT

PDB ID : 5DQ9  
Title : Structure of S55-3 Fab in complex with Lipid A  
Authors : Haji-Ghassemi, O.; Evans, S.V.  
Deposited on : 2015-09-14  
Resolution : 1.95 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](mailto: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.

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

MolProbity : 4.02b-467  
Mogul : 1.7.3 (157068), CSD as539be (2018)  
Xtriage (Phenix) : 1.13  
EDS : trunk30967  
Percentile statistics : 20171227.v01 (using entries in the PDB archive December 27th 2017)  
Refmac : 5.8.0158  
CCP4 : 7.0 (Gargrove)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk30967

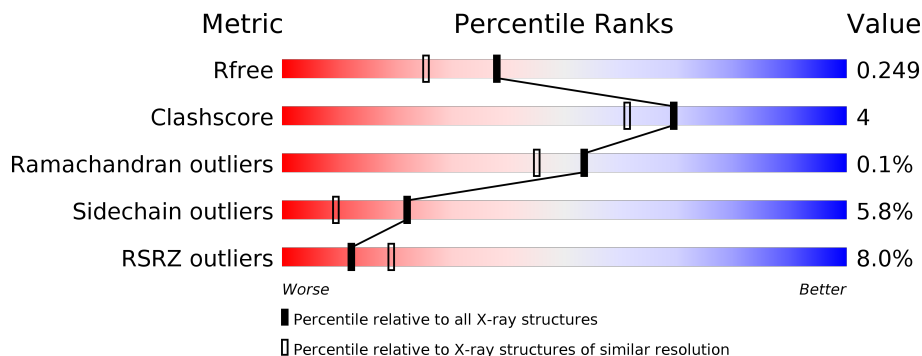
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.95 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))
$R_{free}$	111664	2220 (1.96-1.96)
Clashscore	122126	2333 (1.96-1.96)
Ramachandran outliers	120053	2314 (1.96-1.96)
Sidechain outliers	120020	2314 (1.96-1.96)
RSRZ outliers	108989	2174 (1.96-1.96)

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  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions  $\leq 5\%$ . The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	222	 5% 86% 11%
1	C	222	 9% 89% 9%
1	H	222	 6% 91% 9%
2	B	218	 13% 83% 11%
2	D	218	 10% 84% 12%
2	L	218	 5% 83% 11%

## 2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 10397 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.

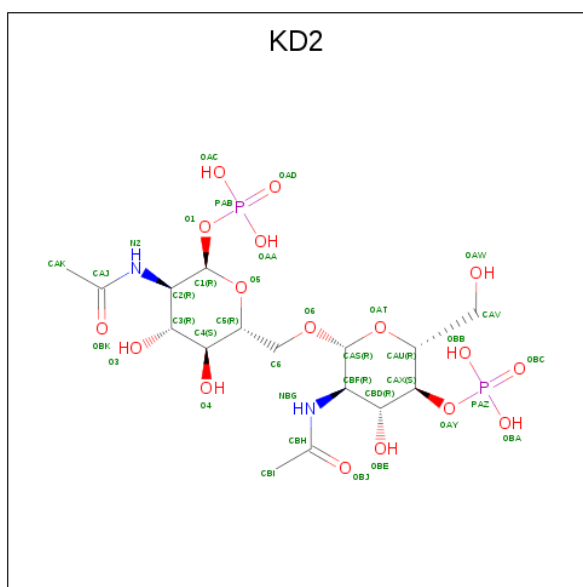
- Molecule 1 is a protein called S55-3 Fab (IgG2b) heavy chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	218	Total 1615	C 1011	N 267	O 328	S 9	0	0	0
1	C	217	Total 1609	C 1008	N 266	O 326	S 9	0	0	0
1	H	222	Total 1639	C 1025	N 271	O 334	S 9	0	0	0

- Molecule 2 is a protein called MAb 44B1 light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	212	Total 1648	C 1026	N 283	O 333	S 6	0	0	0
2	D	211	Total 1641	C 1022	N 282	O 331	S 6	0	0	0
2	L	212	Total 1649	C 1026	N 284	O 333	S 6	0	0	0

- Molecule 3 is 2-(acetylamino)-6-O-[2-(acetylamino)-2-deoxy-4-O-phosphono-beta-D-glucopyranosyl]-2-deoxy-1-O-phosphono-alpha-D-glucopyranose (three-letter code: KD2) (formula: C<sub>16</sub>H<sub>30</sub>N<sub>2</sub>O<sub>17</sub>P<sub>2</sub>).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	
3	A	1	Total	C	N	O	P	0	0
			37	16	2	17	2		
3	C	1	Total	C	N	O	P	0	0
			37	16	2	17	2		
3	H	1	Total	C	N	O	P	0	0
			37	16	2	17	2		

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	H	1	Total	Cl	0	0
			1	1		
4	C	1	Total	Cl	0	0
			1	1		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	89	Total	O	0	0
			89	89		
5	B	60	Total	O	0	0
			60	60		
5	C	89	Total	O	0	0
			89	89		
5	D	66	Total	O	0	0
			66	66		

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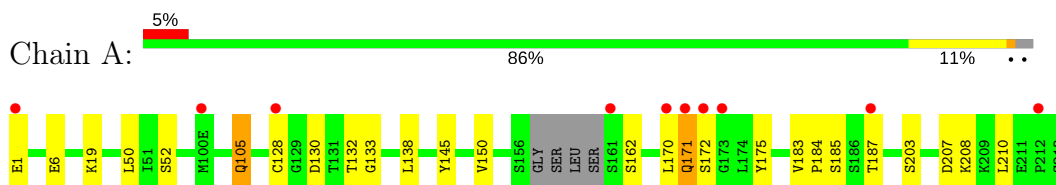
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<b>Mol</b>	<b>Chain</b>	<b>Residues</b>	<b>Atoms</b>		<b>ZeroOcc</b>	<b>AltConf</b>
5	H	96	Total	O	0	0
			96	96		
5	L	83	Total	O	0	0
			83	83		

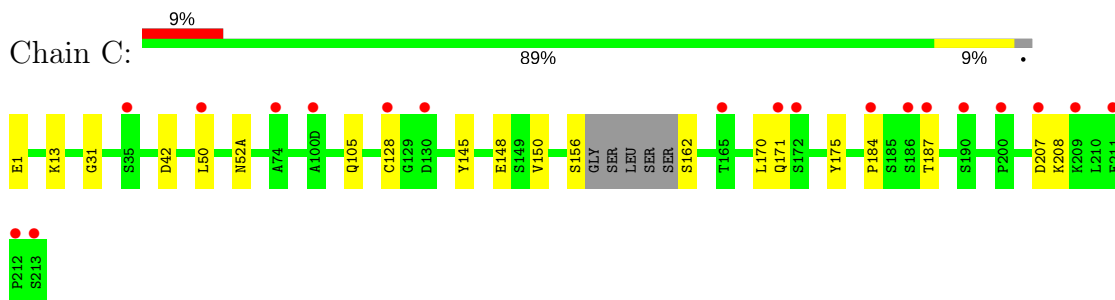
### 3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA and DNA 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.

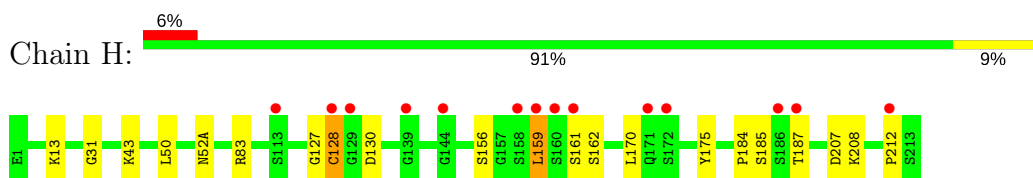
- Molecule 1: S55-3 Fab (IgG2b) heavy chain



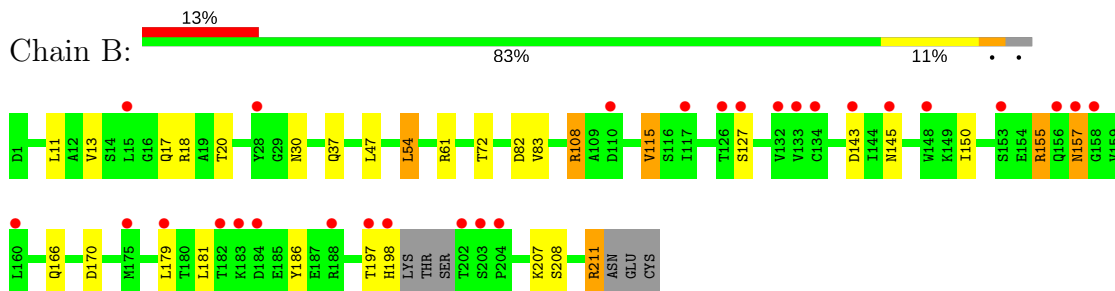
- Molecule 1: S55-3 Fab (IgG2b) heavy chain



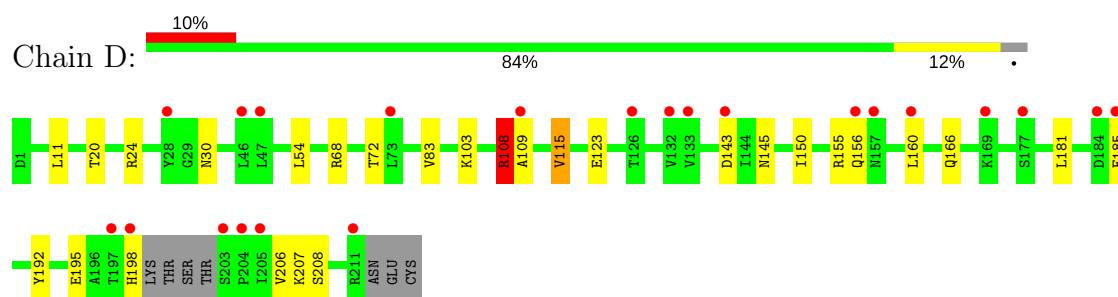
- Molecule 1: S55-3 Fab (IgG2b) heavy chain



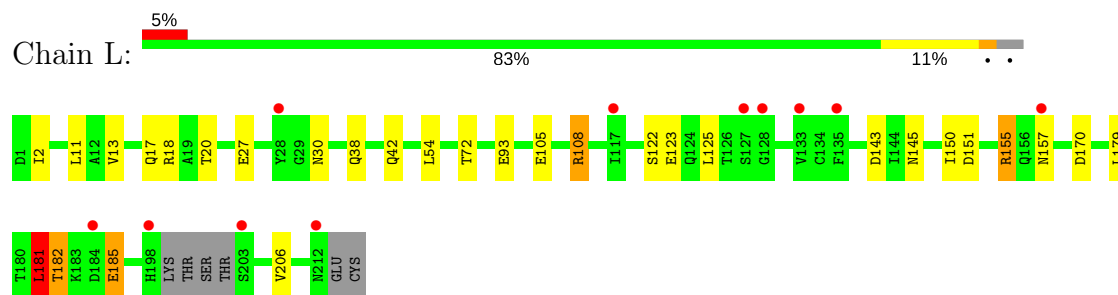
- Molecule 2: MAb 44B1 light chain



- Molecule 2: MAb 44B1 light chain



- Molecule 2: MAb 44B1 light chain



## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	338.12Å 52.87Å 75.39Å 90.00° 100.95° 90.00°	Depositor
Resolution (Å)	25.00 – 1.95 24.98 – 1.95	Depositor EDS
% Data completeness (in resolution range)	98.3 (25.00-1.95) 98.4 (24.98-1.95)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.20 (at 1.95Å)	Xtrriage
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.212 , 0.245 0.220 , 0.249	Depositor DCC
$R_{free}$ test set	4730 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	30.0	Xtrriage
Anisotropy	0.083	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 51.7	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.47$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.014 for -h-2*1,-k,l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	10397	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	39.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 29.18 % 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 1.6189e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: KD2, CL

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	0.51	0/1653	0.69	0/2253
1	C	0.49	0/1647	0.71	2/2245 (0.1%)
1	H	0.51	0/1678	0.68	0/2288
2	B	0.47	0/1685	0.74	3/2289 (0.1%)
2	D	0.48	0/1678	0.82	2/2279 (0.1%)
2	L	0.50	0/1686	0.74	4/2290 (0.2%)
All	All	0.49	0/10027	0.73	11/13644 (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
2	B	0	1
All	All	0	2

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	108	ARG	NE-CZ-NH1	14.60	127.60	120.30
2	D	108	ARG	NE-CZ-NH2	-13.52	113.54	120.30
2	L	18	ARG	NE-CZ-NH1	5.98	123.29	120.30
2	B	108	ARG	NE-CZ-NH1	-5.72	117.44	120.30
2	B	155	ARG	CG-CD-NE	5.57	123.50	111.80
2	L	151	ASP	CB-CG-OD2	-5.57	113.29	118.30
2	L	108	ARG	NE-CZ-NH1	-5.50	117.55	120.30
1	C	42	ASP	N-CA-C	5.43	125.66	111.00

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	108	ARG	NE-CZ-NH2	5.25	122.92	120.30
2	L	181	LEU	CA-CB-CG	5.08	126.98	115.30
1	C	148	GLU	N-CA-C	-5.01	97.48	111.00

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	132	THR	Peptide
2	B	157	ASN	Peptide

## 5.2 Too-close contacts

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1615	0	1567	16	1
1	C	1609	0	1562	9	0
1	H	1639	0	1592	15	0
2	B	1648	0	1576	18	0
2	D	1641	0	1569	11	0
2	L	1649	0	1575	11	0
3	A	37	0	0	2	0
3	C	37	0	0	0	0
3	H	37	0	0	0	0
4	C	1	0	0	0	0
4	H	1	0	0	0	0
5	A	89	0	0	3	0
5	B	60	0	0	3	0
5	C	89	0	0	0	0
5	D	66	0	0	1	0
5	H	96	0	0	3	0
5	L	83	0	0	0	0
All	All	10397	0	9441	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 4.

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)
2:B:61:ARG:HH12	2:B:82:ASP:CG	1.58	1.05
2:B:61:ARG:NH1	2:B:82:ASP:OD2	2.00	0.94
1:A:52:SER:HA	3:A:301:KD2:OAW	1.69	0.92
1:H:127:GLY:O	1:H:130:ASP:HB2	1.77	0.84
2:B:61:ARG:NH1	2:B:82:ASP:OD1	2.10	0.83
2:B:61:ARG:NH1	2:B:82:ASP:CG	2.33	0.81
2:L:182:THR:HG22	2:L:185:GLU:HG3	1.64	0.80
1:H:159:LEU:HD11	5:H:407:HOH:O	1.81	0.80
1:H:159:LEU:HD13	1:H:187:THR:HG21	1.71	0.72
1:H:128:CYS:HB2	1:H:212:PRO:CB	2.20	0.71
1:H:159:LEU:HD13	1:H:187:THR:CG2	2.21	0.70
1:A:1:GLU:HG2	5:A:426:HOH:O	1.94	0.68
2:L:150:ILE:HD11	2:L:179:LEU:HD21	1.78	0.65
2:B:150:ILE:HD11	2:B:179:LEU:HD21	1.78	0.63
2:D:195:GLU:HG2	2:D:206:VAL:HG22	1.80	0.63
1:H:128:CYS:HB2	1:H:212:PRO:HB3	1.80	0.62
1:A:6:GLU:H	1:A:105:GLN:HE22	1.47	0.62
1:C:1:GLU:O	1:C:1:GLU:HG2	1.99	0.62
1:A:138:LEU:HB3	1:A:210:LEU:HD23	1.82	0.61
2:D:150:ILE:HD12	2:D:192:TYR:CD2	2.37	0.60
1:H:184:PRO:O	1:H:187:THR:HG22	2.01	0.60
1:C:184:PRO:O	1:C:187:THR:HG22	2.02	0.59
1:H:208:LYS:NZ	2:L:123:GLU:OE1	2.32	0.59
2:B:83:VAL:HG21	2:B:166:GLN:HB3	1.86	0.57
2:D:108:ARG:HD3	2:D:109:ALA:O	2.04	0.57
1:A:184:PRO:HB2	1:A:187:THR:HG23	1.86	0.56
2:D:83:VAL:HG21	2:D:166:GLN:HB3	1.87	0.56
2:L:38:GLN:OE1	2:L:42:GLN:O	2.24	0.56
1:H:156:SER:O	1:H:159:LEU:HG	2.06	0.56
1:A:19:LYS:NZ	5:A:402:HOH:O	2.35	0.54
1:C:31:GLY:H	1:C:52(A):ASN:ND2	2.06	0.53
1:C:50:LEU:HD12	1:C:50:LEU:C	2.29	0.53
2:B:83:VAL:CG2	5:B:337:HOH:O	2.56	0.53
1:A:50:LEU:HD12	1:A:50:LEU:C	2.30	0.52
1:H:31:GLY:H	1:H:52(A):ASN:ND2	2.08	0.52
1:H:50:LEU:C	1:H:50:LEU:HD12	2.30	0.52
2:B:83:VAL:HG23	5:B:337:HOH:O	2.09	0.51
1:A:145:TYR:CE2	1:A:150:VAL:CG1	2.94	0.51
2:B:197:THR:O	2:B:198:HIS:HB2	2.10	0.50
1:A:1:GLU:HB3	5:A:461:HOH:O	2.13	0.49
2:D:150:ILE:HD12	2:D:192:TYR:CE2	2.48	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:145:TYR:CE2	1:C:150:VAL:CG1	2.96	0.49
2:L:181:LEU:N	2:L:181:LEU:HD23	2.28	0.48
1:H:128:CYS:HB3	5:H:492:HOH:O	2.13	0.48
2:L:179:LEU:HG	2:L:181:LEU:HD22	1.97	0.47
2:B:186:TYR:CE2	2:B:211:ARG:HD2	2.50	0.47
1:A:133:GLY:HA2	1:A:185:SER:OG	2.16	0.45
2:B:115:VAL:HG22	2:B:207:LYS:CG	2.47	0.45
2:D:115:VAL:HG22	2:D:207:LYS:HG3	1.99	0.45
1:A:171:GLN:O	1:A:172:SER:HB3	2.17	0.45
2:D:115:VAL:HG22	2:D:207:LYS:CG	2.47	0.44
2:B:54:LEU:HD13	5:B:310:HOH:O	2.17	0.44
2:L:20:THR:HG23	2:L:72:THR:CG2	2.48	0.43
1:A:52:SER:CA	3:A:301:KD2:OAW	2.55	0.43
1:C:105:GLN:HG3	1:C:105:GLN:O	2.17	0.43
2:B:13:VAL:HG13	2:B:17:GLN:HB2	2.01	0.42
2:B:20:THR:HG23	2:B:72:THR:CG2	2.49	0.42
2:D:20:THR:HG23	2:D:72:THR:CG2	2.49	0.42
1:H:128:CYS:HB2	1:H:212:PRO:HB2	1.98	0.42
1:H:208:LYS:NZ	5:H:406:HOH:O	2.53	0.42
1:C:171:GLN:HB2	2:D:160:LEU:HD21	2.01	0.42
2:L:2:ILE:CD1	2:L:93:GLU:HG2	2.50	0.42
1:C:170:LEU:HD13	1:C:175:TYR:CZ	2.55	0.41
1:A:105:GLN:HE21	1:A:105:GLN:H	1.68	0.41
1:H:170:LEU:HD13	1:H:175:TYR:CZ	2.54	0.41
2:B:37:GLN:HB2	2:B:47:LEU:HD11	2.03	0.41
2:L:13:VAL:HG13	2:L:17:GLN:HB2	2.03	0.41
2:D:24:ARG:HD3	5:D:316:HOH:O	2.21	0.41
1:A:170:LEU:HD13	1:A:175:TYR:CZ	2.56	0.41
2:B:115:VAL:HG22	2:B:207:LYS:HG3	2.01	0.41
2:L:108:ARG:HD2	2:L:170:ASP:O	2.21	0.41
1:C:208:LYS:NZ	2:D:123:GLU:OE1	2.40	0.41
1:A:138:LEU:HB3	1:A:210:LEU:CD2	2.49	0.41
1:A:171:GLN:O	1:A:171:GLN:HG3	2.21	0.40
2:B:186:TYR:CZ	2:B:211:ARG:HD2	2.56	0.40
2:L:150:ILE:HD12	2:L:155:ARG:HG3	2.04	0.40
2:B:108:ARG:HD2	2:B:170:ASP:O	2.22	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:130:ASP:OD1	1:A:130:ASP:OD1[2_555]	1.65	0.55

### 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	214/222 (96%)	210 (98%)	4 (2%)	0	100	100
1	C	213/222 (96%)	210 (99%)	3 (1%)	0	100	100
1	H	220/222 (99%)	217 (99%)	3 (1%)	0	100	100
2	B	208/218 (95%)	201 (97%)	7 (3%)	0	100	100
2	D	207/218 (95%)	200 (97%)	6 (3%)	1 (0%)	31	18
2	L	208/218 (95%)	202 (97%)	6 (3%)	0	100	100
All	All	1270/1320 (96%)	1240 (98%)	29 (2%)	1 (0%)	53	45

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	68	ARG

#### 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	184/187 (98%)	176 (96%)	8 (4%)	32	18
1	C	183/187 (98%)	178 (97%)	5 (3%)	48	37

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	H	187/187 (100%)	178 (95%)	9 (5%)	28	13
2	B	186/192 (97%)	173 (93%)	13 (7%)	16	6
2	D	185/192 (96%)	171 (92%)	14 (8%)	14	4
2	L	186/192 (97%)	171 (92%)	15 (8%)	13	4
All	All	1111/1137 (98%)	1047 (94%)	64 (6%)	22	9

All (64) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	105	GLN
1	A	128	CYS
1	A	162	SER
1	A	171	GLN
1	A	183	VAL
1	A	203	SER
1	A	207	ASP
1	A	208	LYS
2	B	11	LEU
2	B	18	ARG
2	B	30	ASN
2	B	54	LEU
2	B	115	VAL
2	B	127	SER
2	B	143	ASP
2	B	145	ASN
2	B	155	ARG
2	B	157	ASN
2	B	181	LEU
2	B	208	SER
2	B	211	ARG
1	C	13	LYS
1	C	128	CYS
1	C	156	SER
1	C	162	SER
1	C	207	ASP
2	D	11	LEU
2	D	30	ASN
2	D	54	LEU
2	D	103	LYS
2	D	108	ARG
2	D	115	VAL

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Mol	Chain	Res	Type
2	D	143	ASP
2	D	145	ASN
2	D	155	ARG
2	D	156	GLN
2	D	181	LEU
2	D	185	GLU
2	D	198	HIS
2	D	208	SER
1	H	13	LYS
1	H	43	LYS
1	H	83	ARG
1	H	128	CYS
1	H	159	LEU
1	H	161	SER
1	H	162	SER
1	H	185	SER
1	H	207	ASP
2	L	11	LEU
2	L	27	GLU
2	L	30	ASN
2	L	54	LEU
2	L	105	GLU
2	L	122	SER
2	L	125	LEU
2	L	143	ASP
2	L	145	ASN
2	L	155	ARG
2	L	157	ASN
2	L	181	LEU
2	L	182	THR
2	L	185	GLU
2	L	206	VAL

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (5) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	105	GLN
1	A	171	GLN
2	B	76	ASN
1	C	52(A)	ASN
1	H	52(A)	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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

Of 5 ligands modelled in this entry, 2 are monoatomic - leaving 3 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	KD2	A	301	-	37,38,38	1.95	10 (27%)	54,57,57	1.41	7 (12%)
3	KD2	C	302	-	37,38,38	2.80	14 (37%)	54,57,57	1.40	6 (11%)
3	KD2	H	302	-	37,38,38	1.98	9 (24%)	54,57,57	1.22	5 (9%)

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	KD2	A	301	-	-	0/24/65/65	0/2/2/2
3	KD2	C	302	-	-	0/24/65/65	0/2/2/2
3	KD2	H	302	-	-	0/24/65/65	0/2/2/2

All (33) bond length outliers are listed below:



Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	302	KD2	PAB-O1	-6.27	1.47	1.59
3	C	302	KD2	PAZ-OAY	-6.07	1.47	1.59
3	C	302	KD2	PAB-OAC	-5.27	1.33	1.54
3	C	302	KD2	PAZ-OBA	-4.91	1.35	1.54
3	C	302	KD2	PAZ-OB	-4.89	1.35	1.54
3	C	302	KD2	PAB-OAA	-4.86	1.35	1.54
3	C	302	KD2	PAB-OAD	-4.53	1.35	1.50
3	H	302	KD2	PAB-O1	-4.51	1.50	1.59
3	H	302	KD2	PAZ-OAY	-4.51	1.50	1.59
3	A	301	KD2	PAZ-OAY	-4.48	1.50	1.59
3	C	302	KD2	O6-C6	-4.31	1.36	1.43
3	H	302	KD2	PAB-OAC	-4.13	1.38	1.54
3	A	301	KD2	PAZ-OB	-4.12	1.38	1.54
3	A	301	KD2	PAB-OAA	-3.94	1.39	1.54
3	A	301	KD2	PAB-OAC	-3.89	1.39	1.54
3	C	302	KD2	PAZ-OBC	-3.75	1.38	1.50
3	H	302	KD2	PAZ-OB	-3.70	1.39	1.54
3	A	301	KD2	PAB-OAD	-3.51	1.38	1.50
3	H	302	KD2	PAB-OAA	-3.48	1.40	1.54
3	H	302	KD2	PAZ-OBA	-3.46	1.40	1.54
3	A	301	KD2	PAZ-OBC	-3.39	1.39	1.50
3	A	301	KD2	PAZ-OBA	-3.37	1.41	1.54
3	H	302	KD2	PAB-OAD	-3.23	1.39	1.50
3	H	302	KD2	O6-CAS	-3.17	1.34	1.40
3	C	302	KD2	O5-C5	-2.97	1.37	1.44
3	A	301	KD2	OAW-CAV	-2.91	1.30	1.42
3	C	302	KD2	O6-CAS	-2.49	1.35	1.40
3	C	302	KD2	O4-C4	-2.40	1.37	1.43
3	C	302	KD2	OAT-CAU	-2.24	1.38	1.44
3	H	302	KD2	PAZ-OBC	-2.14	1.43	1.50
3	A	301	KD2	PAB-O1	-2.03	1.55	1.59
3	A	301	KD2	C1-C2	2.22	1.56	1.53
3	C	302	KD2	C4-C5	2.45	1.58	1.53

All (18) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	A	301	KD2	CAV-CAU-CAX	-3.32	103.54	113.31
3	A	301	KD2	OAY-PAZ-OBC	-2.69	99.01	109.39
3	A	301	KD2	CAS-CBF-NBG	-2.59	106.37	111.00
3	A	301	KD2	O1-PAB-OAD	-2.48	99.83	109.39
3	H	302	KD2	CAS-CBF-NBG	-2.30	106.89	111.00
3	H	302	KD2	O1-PAB-OAD	-2.27	100.64	109.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	302	KD2	C4-C3-C2	-2.26	106.97	110.33
3	C	302	KD2	OBK-CAJ-CAK	-2.23	118.05	122.07
3	H	302	KD2	C1-O5-C5	2.01	117.67	113.71
3	C	302	KD2	OAT-CAU-CAV	2.05	111.59	106.43
3	H	302	KD2	OAT-CAU-CAV	2.23	112.05	106.43
3	A	301	KD2	OAC-PAB-OAA	2.58	117.79	107.59
3	H	302	KD2	O5-C5-C4	2.68	114.60	109.69
3	C	302	KD2	C1-O5-C5	2.77	119.17	113.71
3	A	301	KD2	CAS-OAT-CAU	2.96	119.55	113.71
3	C	302	KD2	O1-C1-C2	3.32	114.41	108.40
3	A	301	KD2	OAT-CAU-CAV	3.53	115.31	106.43
3	C	302	KD2	O5-C1-O1	4.21	116.87	111.36

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	A	301	KD2	2	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 [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, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
1	A	218/222 (98%)	0.36	10 (4%) 32 42	19, 35, 62, 75	0
1	C	217/222 (97%)	0.61	19 (8%) 10 16	21, 39, 63, 74	0
1	H	222/222 (100%)	0.45	14 (6%) 20 29	18, 37, 57, 74	0
2	B	212/218 (97%)	0.87	28 (13%) 3 5	22, 43, 70, 97	0
2	D	211/218 (96%)	0.63	22 (10%) 6 11	22, 40, 65, 87	0
2	L	212/218 (97%)	0.48	11 (5%) 27 37	19, 35, 61, 89	0
All	All	1292/1320 (97%)	0.56	104 (8%) 12 19	18, 38, 65, 97	0

All (104) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	202	THR	6.9
2	L	203	SER	6.3
2	L	212	ASN	5.6
2	L	198	HIS	5.1
1	H	160	SER	4.9
1	A	128	CYS	4.7
2	B	183	LYS	4.7
2	B	203	SER	4.7
2	D	203	SER	4.7
2	D	198	HIS	4.4
2	L	128	GLY	3.9
2	D	184	ASP	3.9
2	B	133	VAL	3.9
2	B	132	VAL	3.9
2	B	188	ARG	3.8
1	A	171	GLN	3.8
2	B	157	ASN	3.7
2	D	197	THR	3.7
1	C	172	SER	3.7

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
2	B	197	THR	3.6
2	B	198	HIS	3.5
2	D	156	GLN	3.5
1	H	159	LEU	3.5
1	H	129	GLY	3.4
1	C	209	LYS	3.4
2	B	184	ASP	3.3
2	B	182	THR	3.3
2	D	169	LYS	3.3
2	L	184	ASP	3.3
2	B	127	SER	3.3
2	B	143	ASP	3.3
1	H	128	CYS	3.2
2	D	126	THR	3.2
1	C	165	THR	3.1
1	H	158	SER	3.1
1	A	212	PRO	3.1
1	A	172	SER	3.1
2	D	157	ASN	3.1
1	C	128	CYS	3.0
2	L	133	VAL	3.0
2	D	205	ILE	2.9
1	H	187	THR	2.8
2	B	153	SER	2.8
2	B	28	TYR	2.8
2	B	148	TRP	2.7
2	L	28	TYR	2.7
1	C	130	ASP	2.7
1	C	186	SER	2.7
1	A	187	THR	2.7
2	B	117	ILE	2.6
2	D	28	TYR	2.6
2	D	160	LEU	2.6
1	C	171	GLN	2.6
2	B	158	GLY	2.6
1	C	50	LEU	2.6
1	C	190	SER	2.6
1	H	212	PRO	2.6
2	D	46	LEU	2.5
1	C	213	SER	2.5
1	C	35	SER	2.5
1	H	186	SER	2.5

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	C	212	PRO	2.4
2	B	134	CYS	2.4
2	D	133	VAL	2.4
2	B	110	ASP	2.4
2	D	143	ASP	2.4
1	A	170	LEU	2.3
2	B	179	LEU	2.3
2	B	204	PRO	2.3
2	B	145	ASN	2.3
2	B	15	LEU	2.3
1	A	100(E)	MET	2.2
2	L	117	ILE	2.2
2	D	73	LEU	2.2
1	A	1	GLU	2.2
1	A	161	SER	2.2
2	D	109	ALA	2.2
2	D	47	LEU	2.2
2	L	127	SER	2.2
1	C	74	ALA	2.2
2	B	156	GLN	2.2
1	A	173	GLY	2.2
1	C	207	ASP	2.2
1	H	172	SER	2.2
2	D	204	PRO	2.2
1	C	100(D)	ALA	2.2
2	D	185	GLU	2.2
1	C	184	PRO	2.2
1	H	144	GLY	2.2
1	H	171	GLN	2.2
1	C	187	THR	2.1
1	C	200	PRO	2.1
1	H	113	SER	2.1
2	B	126	THR	2.1
1	H	139	GLY	2.1
2	D	211	ARG	2.0
2	B	175	MET	2.0
1	H	161	SER	2.0
2	L	157	ASN	2.0
2	D	132	VAL	2.0
2	L	135	PHE	2.0
1	C	211	GLU	2.0
2	D	177	SER	2.0

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Mol	Chain	Res	Type	RSRZ
2	B	160	LEU	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 carbohydrates in this entry.

## 6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95<sup>th</sup> 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 <sup>2</sup> )	Q<0.9
3	KD2	A	301	37/37	0.93	0.10	20,20,20,20	0
3	KD2	C	302	37/37	0.95	0.10	20,20,20,20	0
3	KD2	H	302	37/37	0.96	0.08	20,20,20,20	0
4	CL	H	301	1/1	0.99	0.10	26,26,26,26	0
4	CL	C	301	1/1	1.00	0.08	23,23,23,23	1

## 6.5 Other polymers [i](#)

There are no such residues in this entry.