



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 16, 2024 – 06:36 PM EDT

PDB ID : 3BZD  
Title : Manipulating the coupled folding and binding process drives affinity maturation in a protein-protein complex  
Authors : Cho, S.  
Deposited on : 2008-01-17  
Resolution : 2.30 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.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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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	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
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

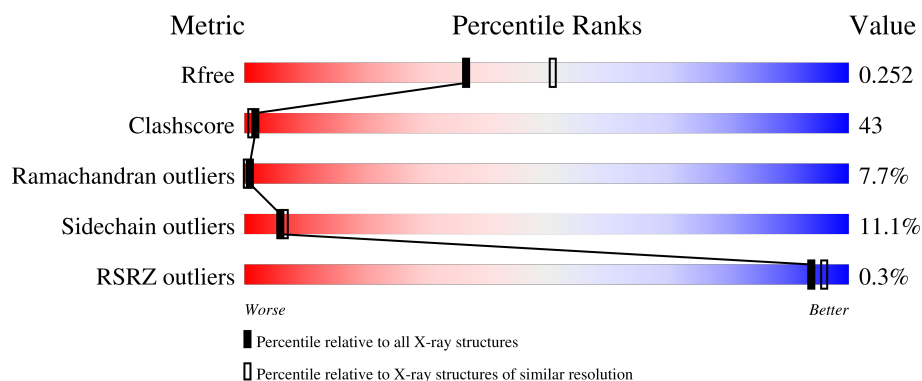
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.30 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	5042 (2.30-2.30)
Clashscore	141614	5643 (2.30-2.30)
Ramachandran outliers	138981	5575 (2.30-2.30)
Sidechain outliers	138945	5575 (2.30-2.30)
RSRZ outliers	127900	4938 (2.30-2.30)

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  $\geq 3$ , 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	109	 31% 61% 7% .
2	B	237	 30% 51% 16% ..

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 2849 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 T cell receptor beta chain 8.2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	109	Total	C	N	O	S	0	0	0
			828	513	147	165	3			

- Molecule 2 is a protein called Enterotoxin type C-3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	234	Total	C	N	O	S	0	0	0
			1926	1225	316	375	10			

There are 5 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	?	-	GLY	SEE REMARK 999	UNP P0A0L5
B	?	-	LYS	SEE REMARK 999	UNP P0A0L5
B	102	TRP	VAL	SEE REMARK 999	UNP P0A0L5
B	103	TRP	THR	SEE REMARK 999	UNP P0A0L5
B	104	HIS	GLY	SEE REMARK 999	UNP P0A0L5

- Molecule 3 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total	O	S	0	0
			5	4	1		
3	B	1	Total	O	S	0	0
			5	4	1		

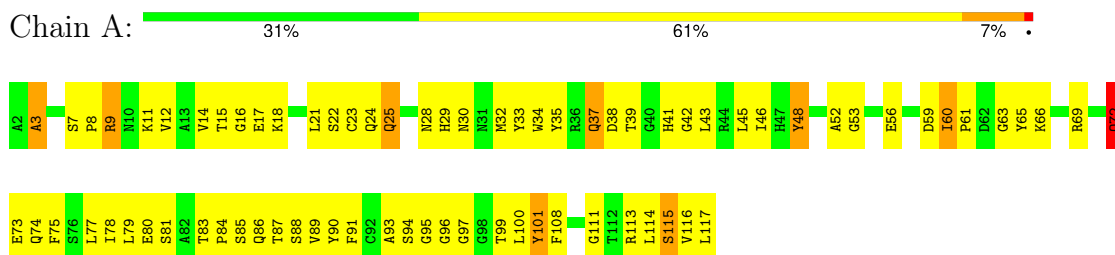
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	25	Total	O	0	0
			25	25		
4	B	60	Total	O	0	0
			60	60		

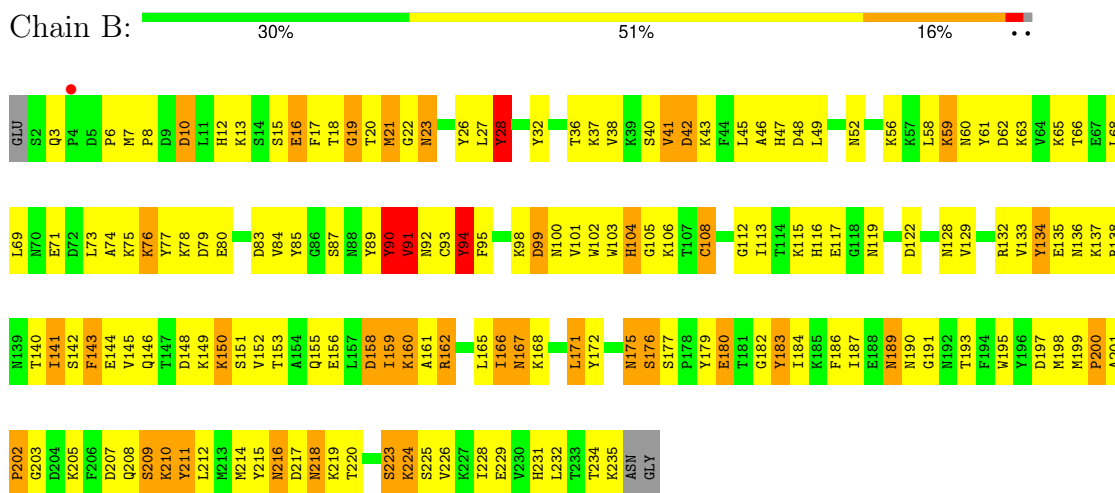
### 3 Residue-property plots

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: T cell receptor beta chain 8.2



- Molecule 2: Enterotoxin type C-3



## 4 Data and refinement statistics

Property	Value	Source
Space group	P 65	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	96.97Å 96.97Å 92.51Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	27.99 – 2.30 27.99 – 2.30	Depositor EDS
% Data completeness (in resolution range)	100.0 (27.99-2.30) 99.7 (27.99-2.30)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	17.14 (at 2.31Å)	Xtriage
Refinement program	REFMAC 5.2.0019	Depositor
R, $R_{free}$	0.210 , 0.258 0.209 , 0.252	Depositor DCC
$R_{free}$ test set	1073 reflections (4.89%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	17.4	Xtriage
Anisotropy	0.446	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.04 , 55.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.40$ , $\langle L^2 \rangle = 0.24$	Xtriage
Estimated twinning fraction	0.119 for h,-h-k,-l	Xtriage
$F_o, F_c$ correlation	0.90	EDS
Total number of atoms	2849	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	18.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.90% of the height of the origin peak. No significant pseudotranslation is detected.*

<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 [i](#)

### 5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	1.52	5/846 (0.6%)	1.13	1/1145 (0.1%)
2	B	1.57	21/1972 (1.1%)	1.20	5/2660 (0.2%)
All	All	1.56	26/2818 (0.9%)	1.18	6/3805 (0.2%)

All (26) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	101	TYR	C-N	17.59	1.74	1.34
1	A	63	GLY	C-N	11.33	1.60	1.34
2	B	90	TYR	CD1-CE1	10.24	1.54	1.39
2	B	38	VAL	CB-CG2	7.57	1.68	1.52
2	B	211	TYR	CB-CG	7.07	1.62	1.51
2	B	219	LYS	CD-CE	6.92	1.68	1.51
2	B	179	TYR	CG-CD2	6.32	1.47	1.39
2	B	108	CYS	CB-SG	6.16	1.92	1.82
2	B	229	GLU	CG-CD	5.80	1.60	1.51
2	B	94	TYR	CE2-CZ	5.73	1.46	1.38
2	B	183	TYR	CD1-CE1	-5.66	1.30	1.39
2	B	172	TYR	CE2-CZ	-5.65	1.31	1.38
2	B	150	LYS	N-CA	5.60	1.57	1.46
2	B	91	VAL	CB-CG2	-5.60	1.41	1.52
1	A	33	TYR	CE2-CZ	-5.53	1.31	1.38
2	B	41	VAL	CB-CG1	5.53	1.64	1.52
2	B	202	PRO	N-CA	-5.38	1.38	1.47
2	B	28	TYR	CD1-CE1	-5.24	1.31	1.39
2	B	180	GLU	CB-CG	5.22	1.62	1.52
2	B	134	TYR	CZ-OH	5.20	1.46	1.37
2	B	16	GLU	CB-CG	5.18	1.61	1.52
2	B	94	TYR	CG-CD1	5.16	1.45	1.39
1	A	91	PHE	CE2-CZ	5.13	1.47	1.37
1	A	35	TYR	CD1-CE1	5.13	1.47	1.39

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	179	TYR	CZ-OH	-5.09	1.29	1.37
2	B	151	SER	CB-OG	5.09	1.48	1.42

All (6) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	101	TYR	C-N-CA	-8.93	99.37	121.70
2	B	162	ARG	NE-CZ-NH2	6.26	123.43	120.30
2	B	160	LYS	CD-CE-NZ	6.12	125.78	111.70
2	B	158	ASP	CB-CG-OD2	-5.89	113.00	118.30
2	B	65	LYS	CD-CE-NZ	5.76	124.94	111.70
2	B	171	LEU	CB-CG-CD2	-5.54	101.59	111.00

There are no chirality outliers.

There are no planarity outliers.

## 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	828	0	787	74	0
2	B	1926	0	1854	160	0
3	B	10	0	0	1	0
4	A	25	0	0	1	0
4	B	60	0	0	2	0
All	All	2849	0	2641	232	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 43.

All (232) 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:101:TYR:C	1:A:108:PHE:N	1.74	1.40
2:B:58:LEU:HD12	2:B:60:ASN:ND2	1.51	1.22

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:58:LEU:CD1	2:B:60:ASN:HD21	1.61	1.12
2:B:80:GLU:HB3	2:B:115:LYS:HE3	1.22	1.12
2:B:80:GLU:HB3	2:B:115:LYS:CE	1.96	0.95
2:B:85:TYR:CD2	2:B:156:GLU:HG3	2.07	0.90
2:B:94:TYR:H	2:B:94:TYR:HD1	1.17	0.90
1:A:84:PRO:HA	1:A:116:VAL:HB	1.53	0.89
2:B:80:GLU:HG3	2:B:115:LYS:HZ2	1.35	0.89
2:B:61:TYR:HA	2:B:105:GLY:HA2	1.52	0.89
1:A:117:LEU:OXT	1:A:117:LEU:HD12	1.73	0.86
2:B:223:SER:O	2:B:225:SER:N	2.10	0.85
2:B:152:VAL:HG22	2:B:153:THR:N	1.90	0.84
2:B:80:GLU:HG3	2:B:115:LYS:NZ	1.91	0.84
1:A:30:ASN:HA	1:A:72:GLN:HE22	1.41	0.84
1:A:101:TYR:C	1:A:108:PHE:CA	2.46	0.83
1:A:30:ASN:HA	1:A:72:GLN:NE2	1.93	0.82
2:B:42:ASP:OD2	2:B:43:LYS:N	2.11	0.82
1:A:25:GLN:HE21	1:A:73:GLU:HA	1.44	0.81
2:B:37:LYS:HB2	2:B:116:HIS:HD2	1.46	0.80
2:B:3:GLN:NE2	2:B:195:TRP:H	1.79	0.79
1:A:61:PRO:HG2	4:A:139:HOH:O	1.83	0.78
1:A:38:ASP:HB2	1:A:41:HIS:HB2	1.64	0.78
2:B:148:ASP:OD2	2:B:149:LYS:HD3	1.85	0.77
1:A:37:GLN:HB2	1:A:42:GLY:O	1.86	0.75
2:B:37:LYS:HB2	2:B:116:HIS:CD2	2.21	0.75
2:B:58:LEU:HD12	2:B:60:ASN:HD21	0.69	0.74
2:B:112:GLY:HA2	2:B:153:THR:HG21	1.70	0.74
2:B:152:VAL:CG2	2:B:153:THR:N	2.51	0.73
1:A:25:GLN:NE2	1:A:73:GLU:HA	2.03	0.72
1:A:37:GLN:HB2	1:A:42:GLY:C	2.09	0.72
1:A:45:LEU:O	1:A:59:ASP:N	2.23	0.72
2:B:140:THR:OG1	2:B:141:ILE:HG22	1.90	0.72
2:B:158:ASP:OD1	2:B:184:ILE:HG21	1.90	0.71
1:A:65:TYR:HE1	1:A:79:LEU:HD21	1.55	0.71
2:B:42:ASP:CG	2:B:43:LYS:H	1.91	0.71
2:B:98:LYS:HG2	2:B:101:VAL:HG23	1.73	0.71
1:A:88:SER:OG	1:A:89:VAL:N	2.24	0.70
2:B:62:ASP:OD2	2:B:63:LYS:HG3	1.91	0.70
2:B:116:HIS:ND1	2:B:116:HIS:C	2.44	0.70
2:B:83:ASP:O	2:B:113:ILE:HA	1.94	0.68
1:A:25:GLN:NE2	1:A:28:ASN:HA	2.10	0.67
2:B:162:ARG:O	2:B:166:ILE:HD13	1.94	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:129:VAL:HB	2:B:145:VAL:CG2	2.24	0.67
2:B:197:ASP:OD1	2:B:199:MET:N	2.24	0.67
2:B:62:ASP:OD1	2:B:105:GLY:HA3	1.96	0.65
1:A:11:LYS:O	1:A:114:LEU:HD12	1.97	0.65
1:A:25:GLN:HE21	1:A:73:GLU:CA	2.09	0.65
2:B:132:ARG:HH11	2:B:132:ARG:HG2	1.62	0.65
1:A:101:TYR:O	1:A:108:PHE:HA	1.96	0.65
1:A:83:THR:C	1:A:116:VAL:HG11	2.17	0.64
2:B:75:LYS:O	2:B:77:TYR:N	2.31	0.64
2:B:7:MET:HB2	2:B:10:ASP:HB2	1.79	0.64
2:B:187:ILE:HG12	2:B:193:THR:HG22	1.80	0.64
1:A:15:THR:HG23	1:A:83:THR:HA	1.79	0.64
1:A:37:GLN:CB	1:A:43:LEU:HA	2.28	0.64
1:A:90:TYR:O	1:A:111:GLY:HA2	1.98	0.63
2:B:32:TYR:CD1	2:B:32:TYR:C	2.70	0.63
2:B:75:LYS:O	2:B:76:LYS:C	2.37	0.62
2:B:80:GLU:CG	2:B:115:LYS:NZ	2.62	0.62
2:B:28:TYR:N	2:B:28:TYR:CD1	2.65	0.62
1:A:53:GLY:HA3	2:B:26:TYR:CE2	2.35	0.62
2:B:61:TYR:HA	2:B:105:GLY:CA	2.27	0.62
1:A:24:GLN:HB3	1:A:74:GLN:NE2	2.15	0.62
2:B:133:VAL:HB	2:B:141:ILE:HG23	1.82	0.62
1:A:14:VAL:HA	1:A:117:LEU:OXT	2.00	0.62
2:B:186:PHE:O	2:B:193:THR:HA	2.00	0.61
1:A:24:GLN:HB3	1:A:74:GLN:HE22	1.65	0.61
2:B:13:LYS:HD2	2:B:16:GLU:OE1	2.01	0.61
2:B:68:LEU:HD23	2:B:73:LEU:HG	1.81	0.61
1:A:37:GLN:HB3	1:A:43:LEU:HA	1.82	0.61
1:A:94:SER:O	1:A:101:TYR:N	2.34	0.60
2:B:94:TYR:HD1	2:B:94:TYR:N	1.93	0.60
1:A:65:TYR:CE1	1:A:79:LEU:HD21	2.37	0.60
2:B:23:ASN:N	2:B:23:ASN:HD22	1.98	0.60
1:A:48:TYR:CE1	1:A:56:GLU:HB2	2.37	0.59
2:B:117:GLU:H	2:B:117:GLU:CD	2.06	0.59
2:B:214:MET:HE2	2:B:215:TYR:CZ	2.38	0.58
1:A:18:LYS:HA	1:A:80:GLU:O	2.03	0.58
2:B:6:PRO:HB3	2:B:195:TRP:CZ2	2.39	0.58
2:B:23:ASN:N	2:B:23:ASN:ND2	2.51	0.58
2:B:94:TYR:N	2:B:94:TYR:CD1	2.64	0.58
2:B:171:LEU:O	2:B:177:SER:OG	2.19	0.57
1:A:37:GLN:HB3	1:A:43:LEU:HD23	1.85	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:207:ASP:OD2	2:B:210:LYS:HB2	2.04	0.57
2:B:27:LEU:HB2	2:B:28:TYR:CE1	2.40	0.56
2:B:209:SER:O	2:B:211:TYR:N	2.39	0.56
2:B:197:ASP:OD1	2:B:198:MET:N	2.39	0.55
2:B:234:THR:HG22	2:B:235:LYS:N	2.21	0.55
2:B:84:VAL:HG22	2:B:113:ILE:HG22	1.88	0.55
2:B:41:VAL:HG21	2:B:52:ASN:ND2	2.19	0.55
2:B:85:TYR:HD2	2:B:156:GLU:HA	1.70	0.55
2:B:45:LEU:C	2:B:47:HIS:H	2.09	0.55
2:B:7:MET:HB2	2:B:10:ASP:CG	2.27	0.55
2:B:3:GLN:HE22	2:B:195:TRP:H	1.52	0.55
2:B:112:GLY:O	2:B:113:ILE:HG23	2.06	0.55
1:A:84:PRO:CA	1:A:116:VAL:HB	2.33	0.54
2:B:45:LEU:O	2:B:47:HIS:N	2.36	0.54
2:B:80:GLU:CB	2:B:115:LYS:CE	2.79	0.54
2:B:128:ASN:OD1	2:B:146:GLN:HG2	2.08	0.54
2:B:141:ILE:HD12	2:B:142:SER:H	1.72	0.54
1:A:23:CYS:O	1:A:74:GLN:NE2	2.41	0.54
2:B:7:MET:HB2	2:B:10:ASP:CB	2.38	0.54
2:B:136:ASN:O	2:B:137:LYS:HB2	2.08	0.54
1:A:38:ASP:HB2	1:A:41:HIS:CB	2.34	0.53
2:B:12:HIS:CE1	2:B:201:ALA:HA	2.44	0.53
2:B:42:ASP:CG	2:B:43:LYS:N	2.60	0.53
2:B:45:LEU:O	2:B:48:ASP:OD1	2.27	0.53
2:B:17:PHE:CE1	2:B:19:GLY:HA3	2.43	0.53
2:B:28:TYR:CE2	2:B:162:ARG:HD2	2.44	0.53
2:B:209:SER:O	2:B:212:LEU:N	2.42	0.53
1:A:53:GLY:HA3	2:B:26:TYR:CZ	2.44	0.53
2:B:155:GLN:NE2	2:B:215:TYR:HB3	2.22	0.53
1:A:93:ALA:HA	1:A:101:TYR:O	2.09	0.52
1:A:114:LEU:HD12	1:A:115:SER:H	1.75	0.52
2:B:134:TYR:N	2:B:134:TYR:CD1	2.77	0.52
1:A:83:THR:N	1:A:116:VAL:HG11	2.25	0.52
2:B:41:VAL:O	2:B:42:ASP:HB2	2.10	0.52
2:B:175:ASN:O	2:B:176:SER:HB2	2.09	0.52
2:B:182:GLY:HA2	2:B:231:HIS:O	2.10	0.52
2:B:129:VAL:HB	2:B:145:VAL:HG22	1.91	0.52
1:A:101:TYR:C	1:A:108:PHE:HA	2.27	0.52
2:B:152:VAL:CG2	2:B:153:THR:H	2.20	0.51
1:A:37:GLN:O	1:A:37:GLN:OE1	2.27	0.51
2:B:166:ILE:CD1	2:B:171:LEU:HD23	2.40	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:223:SER:OG	2:B:224:LYS:N	2.43	0.51
1:A:3:ALA:HB1	1:A:101:TYR:CD1	2.46	0.51
1:A:38:ASP:HB2	1:A:41:HIS:CG	2.46	0.51
2:B:129:VAL:HB	2:B:145:VAL:HG23	1.91	0.51
2:B:129:VAL:O	2:B:144:GLU:HA	2.11	0.51
2:B:32:TYR:CD1	2:B:32:TYR:O	2.64	0.50
1:A:32:MET:SD	1:A:69:ARG:NE	2.85	0.50
2:B:20:THR:O	2:B:22:GLY:N	2.43	0.50
1:A:69:ARG:NH1	1:A:72:GLN:O	2.41	0.50
1:A:25:GLN:HG3	1:A:73:GLU:HA	1.94	0.50
2:B:71:GLU:O	2:B:74:ALA:HB3	2.12	0.50
2:B:116:HIS:ND1	2:B:116:HIS:O	2.44	0.49
1:A:30:ASN:CA	1:A:72:GLN:HE22	2.19	0.49
2:B:134:TYR:HA	2:B:138:ARG:O	2.12	0.49
1:A:9:ARG:NH2	1:A:113:ARG:HG3	2.28	0.49
2:B:167:ASN:O	2:B:168:LYS:NZ	2.43	0.49
2:B:69:LEU:HD12	2:B:69:LEU:O	2.13	0.49
2:B:95:PHE:HB2	2:B:103:TRP:CH2	2.48	0.49
1:A:16:GLY:O	1:A:81:SER:HA	2.13	0.48
1:A:83:THR:CA	1:A:116:VAL:HG11	2.43	0.48
1:A:84:PRO:HA	1:A:116:VAL:O	2.12	0.48
1:A:95:GLY:HA2	1:A:99:THR:O	2.13	0.48
2:B:40:SER:HB3	2:B:78:LYS:O	2.14	0.48
2:B:12:HIS:ND1	2:B:200:PRO:O	2.46	0.48
2:B:85:TYR:CD2	2:B:156:GLU:HA	2.48	0.48
2:B:103:TRP:O	2:B:104:HIS:CB	2.61	0.48
2:B:160:LYS:NZ	4:B:502:HOH:O	2.39	0.48
2:B:32:TYR:C	2:B:32:TYR:HD1	2.17	0.48
2:B:75:LYS:HA	2:B:78:LYS:HB2	1.95	0.48
2:B:141:ILE:HD12	2:B:142:SER:N	2.29	0.47
2:B:143:PHE:N	2:B:143:PHE:CD2	2.82	0.47
2:B:12:HIS:HA	4:B:523:HOH:O	2.15	0.47
2:B:63:LYS:N	2:B:105:GLY:O	2.43	0.47
1:A:66:LYS:HB3	1:A:78:ILE:HB	1.97	0.47
2:B:158:ASP:O	2:B:161:ALA:HB3	2.15	0.47
2:B:119:ASN:O	2:B:150:LYS:HB2	2.15	0.46
2:B:180:GLU:OE2	2:B:180:GLU:HA	2.15	0.46
2:B:89:TYR:CZ	2:B:108:CYS:HB2	2.51	0.46
2:B:103:TRP:HB2	2:B:104:HIS:H	1.57	0.46
1:A:85:SER:C	1:A:87:THR:H	2.18	0.46
1:A:15:THR:HG23	1:A:84:PRO:HD3	1.98	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:90:TYR:O	2:B:91:VAL:C	2.53	0.45
2:B:7:MET:HB2	2:B:10:ASP:OD1	2.16	0.45
2:B:129:VAL:HG12	2:B:228:ILE:HD12	1.98	0.45
2:B:85:TYR:CE2	2:B:156:GLU:HG3	2.50	0.45
2:B:17:PHE:CZ	2:B:19:GLY:HA3	2.52	0.45
1:A:84:PRO:HG3	1:A:116:VAL:O	2.16	0.45
2:B:45:LEU:N	2:B:48:ASP:OD1	2.49	0.45
1:A:93:ALA:HB1	1:A:100:LEU:HD12	1.98	0.44
2:B:103:TRP:CD1	2:B:103:TRP:N	2.84	0.44
2:B:56:LYS:HA	2:B:56:LYS:HD3	1.73	0.44
1:A:96:GLY:O	1:A:97:GLY:C	2.55	0.44
2:B:138:ARG:HB3	3:B:500:SO4:O4	2.17	0.44
1:A:78:ILE:C	1:A:79:LEU:HD12	2.37	0.43
2:B:6:PRO:HB3	2:B:195:TRP:CE2	2.53	0.43
2:B:45:LEU:HD23	2:B:45:LEU:HA	1.87	0.43
2:B:158:ASP:OD2	2:B:215:TYR:OH	2.35	0.43
1:A:25:GLN:HE22	1:A:28:ASN:HA	1.83	0.43
1:A:101:TYR:HD2	1:A:101:TYR:HA	1.63	0.43
2:B:176:SER:OG	2:B:177:SER:N	2.48	0.43
1:A:15:THR:CG2	1:A:84:PRO:HD3	2.48	0.43
1:A:25:GLN:HE21	1:A:73:GLU:CB	2.32	0.43
1:A:96:GLY:O	1:A:99:THR:HB	2.19	0.43
2:B:208:GLN:O	2:B:209:SER:C	2.57	0.43
2:B:28:TYR:OH	2:B:162:ARG:NH1	2.52	0.42
2:B:183:TYR:CZ	2:B:231:HIS:HB2	2.53	0.42
2:B:211:TYR:O	2:B:214:MET:HG2	2.19	0.42
2:B:75:LYS:C	2:B:77:TYR:N	2.72	0.42
2:B:27:LEU:C	2:B:28:TYR:CD1	2.93	0.42
2:B:95:PHE:CE1	2:B:106:LYS:HD3	2.54	0.42
2:B:93:CYS:SG	2:B:108:CYS:N	2.93	0.42
1:A:15:THR:OG1	1:A:117:LEU:O	2.27	0.42
2:B:66:THR:O	2:B:66:THR:HG23	2.20	0.42
2:B:101:VAL:CG1	2:B:102:TRP:N	2.81	0.42
2:B:135:GLU:OE2	2:B:140:THR:HG21	2.20	0.42
2:B:149:LYS:HB2	2:B:152:VAL:HB	2.02	0.42
1:A:30:ASN:O	1:A:69:ARG:NH1	2.53	0.42
2:B:28:TYR:CE2	2:B:159:ILE:HD12	2.54	0.42
1:A:29:HIS:HB2	1:A:94:SER:HB2	2.01	0.41
2:B:99:ASP:OD1	2:B:99:ASP:N	2.53	0.41
2:B:202:PRO:HG2	2:B:202:PRO:O	2.20	0.41
2:B:41:VAL:HG21	2:B:52:ASN:HD21	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:199:MET:HA	2:B:200:PRO:HD3	1.85	0.41
2:B:212:LEU:C	2:B:214:MET:N	2.73	0.41
1:A:8:PRO:HD2	1:A:21:LEU:CD2	2.51	0.41
1:A:25:GLN:HG3	1:A:73:GLU:CA	2.50	0.41
1:A:52:ALA:HA	1:A:69:ARG:CG	2.51	0.41
2:B:13:LYS:HD2	2:B:16:GLU:CD	2.41	0.41
2:B:20:THR:HG22	2:B:22:GLY:H	1.85	0.41
2:B:21:MET:HG3	2:B:21:MET:O	2.19	0.41
2:B:155:GLN:O	2:B:156:GLU:C	2.58	0.41
1:A:7:SER:O	1:A:22:SER:OG	2.38	0.41
2:B:27:LEU:HB2	2:B:28:TYR:CD1	2.55	0.41
2:B:36:THR:O	2:B:37:LYS:HB3	2.21	0.41
2:B:85:TYR:CG	2:B:156:GLU:HG3	2.53	0.41
2:B:201:ALA:O	2:B:203:GLY:N	2.54	0.41
2:B:90:TYR:N	2:B:90:TYR:CD1	2.88	0.41
2:B:190:ASN:OD1	2:B:191:GLY:N	2.54	0.41
1:A:60:ILE:O	1:A:60:ILE:HG13	2.21	0.41
2:B:7:MET:CB	2:B:10:ASP:HB2	2.46	0.40
2:B:69:LEU:HB2	2:B:216:ASN:O	2.22	0.40
1:A:77:LEU:HA	1:A:77:LEU:HD12	1.88	0.40
2:B:117:GLU:CD	2:B:117:GLU:N	2.72	0.40
2:B:167:ASN:C	2:B:168:LYS:HG2	2.41	0.40
2:B:217:ASP:O	2:B:218:ASN:C	2.60	0.40
2:B:7:MET:O	2:B:10:ASP:N	2.52	0.40
2:B:58:LEU:HB2	2:B:59:LYS:H	1.57	0.40

There are no symmetry-related clashes.

## 5.3 Torsion angles

### 5.3.1 Protein backbone

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	107/109 (98%)	88 (82%)	14 (13%)	5 (5%)	<b>2</b> <b>1</b>

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
2	B	232/237 (98%)	180 (78%)	31 (13%)	21 (9%)	1	0
All	All	339/346 (98%)	268 (79%)	45 (13%)	26 (8%)	1	0

All (26) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3	ALA
1	A	72	GLN
2	B	46	ALA
2	B	104	HIS
2	B	209	SER
2	B	210	LYS
2	B	223	SER
2	B	224	LYS
1	A	39	THR
2	B	21	MET
2	B	76	LYS
2	B	122	ASP
2	B	218	ASN
2	B	226	VAL
2	B	15	SER
2	B	189	ASN
2	B	200	PRO
2	B	42	ASP
2	B	59	LYS
2	B	167	ASN
2	B	176	SER
1	A	60	ILE
1	A	86	GLN
2	B	8	PRO
2	B	19	GLY
2	B	91	VAL

### 5.3.2 Protein sidechains ⓘ

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	88/88 (100%)	77 (88%)	11 (12%)	4	5
2	B	217/219 (99%)	194 (89%)	23 (11%)	6	7
All	All	305/307 (99%)	271 (89%)	34 (11%)	6	7

All (34) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	9	ARG
1	A	12	VAL
1	A	17	GLU
1	A	25	GLN
1	A	34	TRP
1	A	37	GLN
1	A	46	ILE
1	A	48	TYR
1	A	72	GLN
1	A	75	PHE
1	A	115	SER
2	B	10	ASP
2	B	18	THR
2	B	23	ASN
2	B	28	TYR
2	B	49	LEU
2	B	79	ASP
2	B	87	SER
2	B	90	TYR
2	B	92	ASN
2	B	94	TYR
2	B	99	ASP
2	B	100	ASN
2	B	141	ILE
2	B	143	PHE
2	B	159	ILE
2	B	165	LEU
2	B	166	ILE
2	B	175	ASN
2	B	189	ASN
2	B	205	LYS
2	B	216	ASN
2	B	220	THR
2	B	232	LEU



Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	25	GLN
1	A	72	GLN
1	A	74	GLN
2	B	3	GLN
2	B	23	ASN
2	B	60	ASN
2	B	100	ASN
2	B	139	ASN
2	B	155	GLN
2	B	170	ASN
2	B	189	ASN
2	B	208	GLN
2	B	216	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](#)

2 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	$\# Z  > 2$
3	SO4	B	501	-	4,4,4	0.36	0	6,6,6	0.77	0
3	SO4	B	500	-	4,4,4	0.36	0	6,6,6	0.15	0

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	500	SO4	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

The following chains have linkage breaks:

Mol	Chain	Number of breaks
1	A	1

All chain breaks are listed below:

Model	Chain	Residue-1	Atom-1	Residue-2	Atom-2	Distance (Å)
1	A	101:TYR	C	108:PHE	N	1.74

## 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	109/109 (100%)	-0.45	0 <b>100</b> <b>100</b>	6, 24, 39, 43	0
2	B	234/237 (98%)	-0.60	1 (0%) <b>92</b> <b>95</b>	4, 13, 36, 50	0
All	All	343/346 (99%)	-0.55	1 (0%) <b>94</b> <b>96</b>	4, 16, 39, 50	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	4	PRO	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, 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	SO4	B	500	5/5	0.82	0.17	99,99,99,99	0
3	SO4	B	501	5/5	0.97	0.10	31,35,37,38	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.