



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 7, 2023 – 07:53 AM EDT

PDB ID : 4GOV  
Title : The crystal structure of human fascin 1 S39D mutant  
Authors : Yang, S.Y.; Huang, F.K.; Huang, J.; Chen, S.; Jakoncic, J.; Leo-Macias, A.;  
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Deposited on : 2012-08-20  
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](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 : 1.8.5 (274361), CSD as541be (2020)  
Xtriage (Phenix) : 1.13  
EDS : 2.35  
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) : 2.35

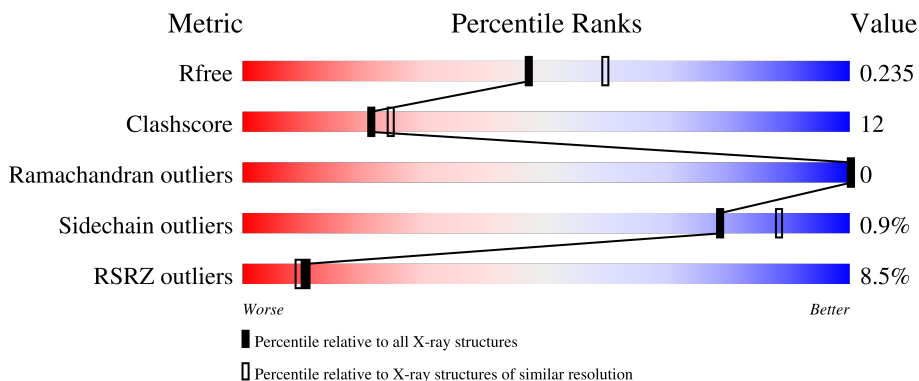
# 1 Overall quality at a glance i

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  $\geq 3$ , 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	493	<div style="display: flex; align-items: center;"> <div style="width: 9%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 73%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 22%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="margin-left: 10px;">9%      73%      22%      • 5%</p>
1	B	493	<div style="display: flex; align-items: center;"> <div style="width: 8%; height: 10px; background-color: red; margin-right: 5px;"></div> <div style="width: 74%; height: 10px; background-color: green; margin-right: 5px;"></div> <div style="width: 24%; height: 10px; background-color: yellow; margin-right: 5px;"></div> <div style="width: 5%; height: 10px; background-color: grey; margin-right: 5px;"></div> </div> <p style="margin-left: 10px;">8%      74%      24%      •</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	BR	A	502	-	-	X	-
4	GOL	B	518	-	-	X	-

## 2 Entry composition [i](#)

There are 6 unique types of molecules in this entry. The entry contains 8114 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 Fascin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	470	3675	2301	651	708	15	0	1	0
1	B	483	3791	2371	676	727	17	0	4	0

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	39	ASP	SER	engineered mutation	UNP Q16658
B	39	ASP	SER	engineered mutation	UNP Q16658

- Molecule 2 is BROMIDE ION (three-letter code: BR) (formula: Br).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	2	Total	Br	0	0
			2	2		
2	B	4	Total	Br	0	0
			4	4		

- Molecule 3 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

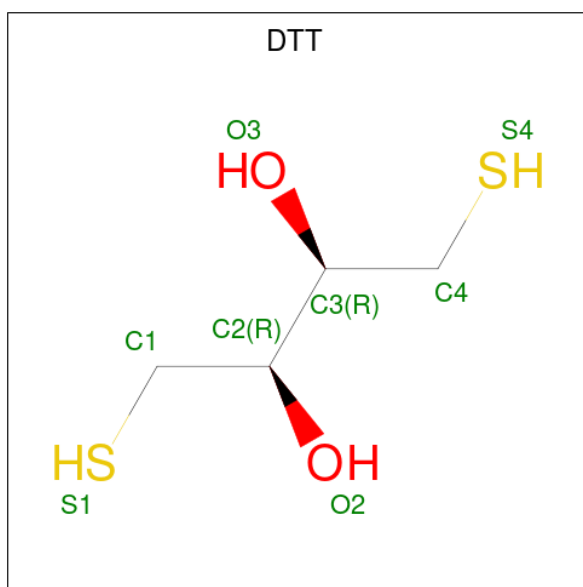
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	5	Total	Cl	0	0
			5	5		
3	B	8	Total	Cl	0	0
			8	8		

- Molecule 4 is GLYCEROL (three-letter code: GOL) (formula: C<sub>3</sub>H<sub>8</sub>O<sub>3</sub>).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total C O 6 3 3	0	0
4	A	1	Total C O 6 3 3	0	0
4	A	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0
4	B	1	Total C O 6 3 3	0	0

- Molecule 5 is 2,3-DIHYDROXY-1,4-DITHIOBUTANE (three-letter code: DTT) (formula:  $C_4H_{10}O_2S_2$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
5	A	1	Total	C	O	S	0	0
			8	4	2	2		

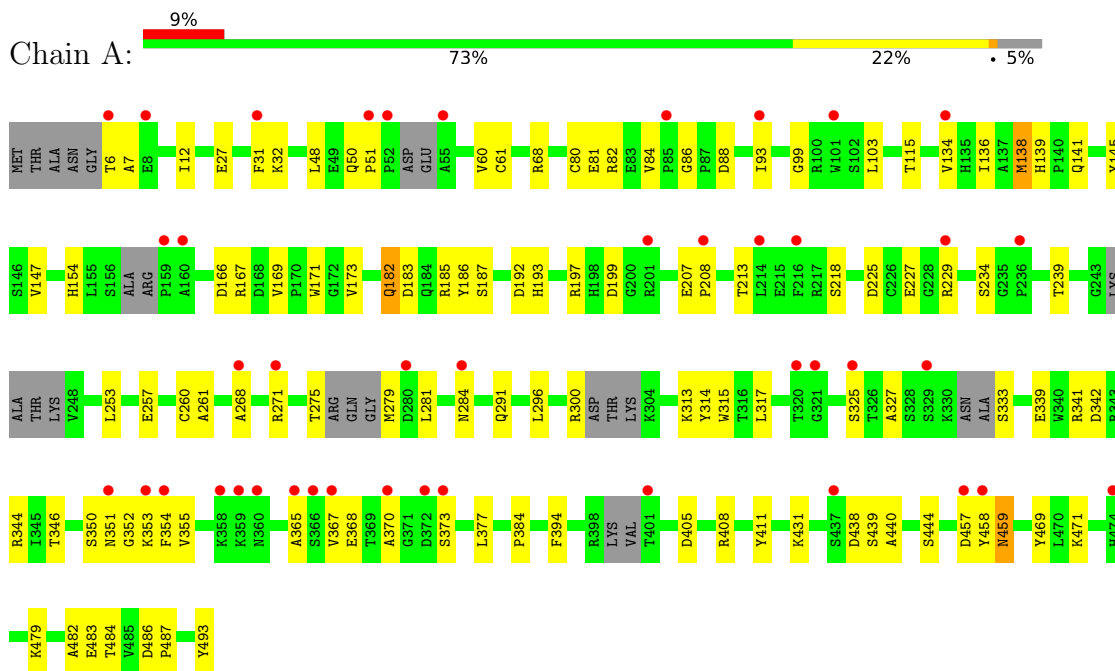
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	288	Total	O	0	0
			288	288		
6	B	273	Total	O	0	0
			273	273		

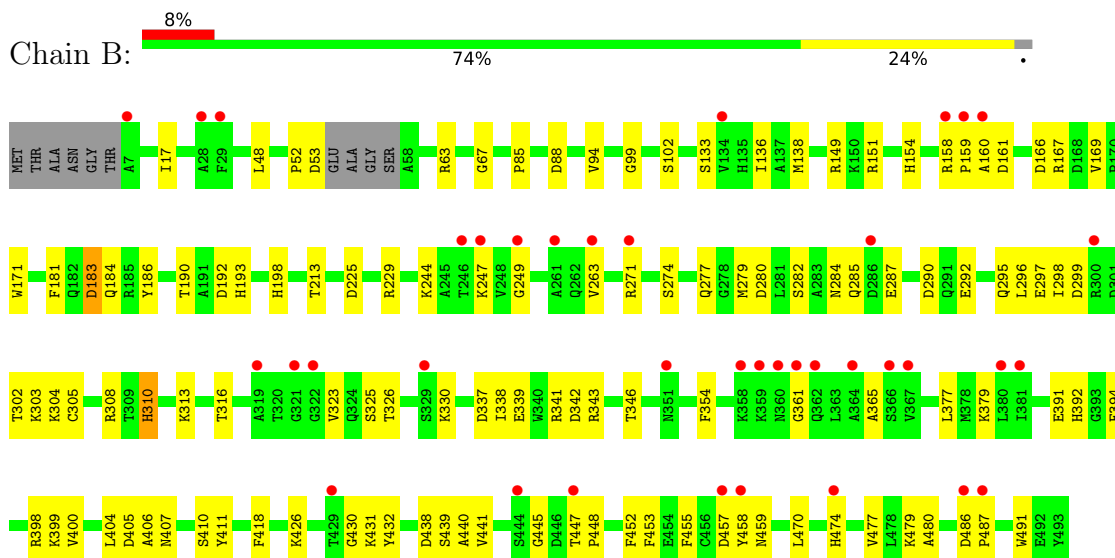
### 3 Residue-property plots i

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: Fascin



#### • Molecule 1: Fascin



## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	161.25Å 70.72Å 111.06Å 90.00° 130.68° 90.00°	Depositor
Resolution (Å)	30.00 – 2.20 29.24 – 2.19	Depositor EDS
% Data completeness (in resolution range)	99.0 (30.00-2.20) 99.1 (29.24-2.19)	Depositor EDS
$R_{merge}$	0.06	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.81 (at 2.20Å)	Xtrriage
Refinement program	REFMAC 5.6.0117	Depositor
R, $R_{free}$	0.196 , 0.234 0.200 , 0.235	Depositor DCC
$R_{free}$ test set	2438 reflections (5.05%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	36.1	Xtrriage
Anisotropy	0.197	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.40 , 64.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.48$ , $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	0.026 for -h-2*1,-k,l	Xtrriage
$F_o, F_c$ correlation	0.95	EDS
Total number of atoms	8114	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	50.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.76% 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: BR, CL, DTT, GOL

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	0.46	0/3752	0.53	0/5066
1	B	0.45	0/3883	0.55	0/5249
All	All	0.45	0/7635	0.54	0/10315

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

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	182	GLN	Peptide

### 5.2 Too-close contacts [i](#)

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	3675	0	3540	89	0
1	B	3791	0	3676	92	0
2	A	2	0	0	2	0
2	B	4	0	0	1	0
3	A	5	0	0	1	0
3	B	8	0	0	0	0
4	A	18	0	24	2	0
4	B	42	0	56	10	0
5	A	8	0	10	2	0
6	A	288	0	0	6	0
6	B	273	0	0	2	0
All	All	8114	0	7306	180	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 12.

All (180) 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:B:160:ALA:HB1	1:B:161:ASP:CG	1.73	1.06
1:A:353:LYS:HE3	1:A:368:GLU:HG3	1.45	0.97
1:B:284:ASN:OD1	1:B:285:GLN:HG2	1.66	0.96
1:B:398:ARG:HG2	4:B:518:GOL:H11	1.52	0.89
1:A:260[B]:CYS:SG	1:A:458:TYR:OH	2.38	0.79
1:A:457:ASP:OD1	1:A:458:TYR:HB2	1.86	0.75
1:A:440:ALA:HA	1:A:479:LYS:HG2	1.71	0.73
1:A:458:TYR:CG	1:A:459:ASN:N	2.57	0.70
1:A:218:SER:HB2	5:A:511:DTT:S1	2.31	0.70
1:B:398:ARG:HG2	4:B:518:GOL:C1	2.23	0.69
1:A:145:TYR:HE2	4:A:510:GOL:H31	1.57	0.69
1:B:52:PRO:O	1:B:53:ASP:HB2	1.92	0.69
1:A:353:LYS:CE	1:A:368:GLU:HG3	2.22	0.69
1:B:313:LYS:HB3	1:B:325:SER:O	1.93	0.67
1:A:486:ASP:HB2	1:A:487:PRO:CD	2.24	0.66
1:A:253:LEU:HD11	5:A:511:DTT:H41	1.78	0.65
1:B:99:GLY:HA2	1:B:213:THR:OG1	1.96	0.65
1:A:333:SER:HA	6:A:861:HOH:O	1.97	0.65
1:B:160:ALA:HB1	1:B:161:ASP:OD1	1.97	0.64
1:A:68:ARG:HD2	1:A:81:GLU:O	1.98	0.64
1:B:304:LYS:HE2	1:B:337:ASP:OD1	1.97	0.63
1:A:353:LYS:HD2	6:A:829:HOH:O	1.98	0.63
1:B:159:PRO:C	1:B:160:ALA:O	2.34	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:147:VAL:HA	4:A:510:GOL:H32	1.81	0.62
1:A:300:ARG:HG3	1:A:457:ASP:OD2	2.00	0.62
1:A:487:PRO:HD3	4:B:518:GOL:H12	1.82	0.62
1:A:86:GLY:HA3	2:A:502:BR:BR	2.54	0.61
1:A:183:ASP:N	1:A:183:ASP:OD1	2.32	0.61
1:B:399:LYS:N	4:B:518:GOL:H32	2.16	0.61
1:B:486:ASP:HB2	1:B:487:PRO:HD2	1.83	0.61
1:B:159:PRO:O	1:B:159:PRO:HG2	2.00	0.61
1:B:271:ARG:HD2	1:B:284:ASN:HA	1.83	0.60
1:A:48:LEU:HD11	1:A:60:VAL:HB	1.83	0.59
1:B:377:LEU:HD21	1:B:418:PHE:CZ	2.37	0.59
1:A:167:ARG:HD3	1:A:169:VAL:O	2.02	0.58
1:B:405:ASP:HB3	1:B:407:ASN:OD1	2.03	0.58
1:B:290:ASP:HB3	1:B:310:HIS:ND1	2.19	0.58
4:B:513:GOL:H31	6:B:863:HOH:O	2.03	0.58
1:A:197:ARG:NH2	1:A:199:ASP:OD2	2.37	0.58
1:B:160:ALA:HB1	1:B:161:ASP:CB	2.34	0.58
1:B:160:ALA:CB	1:B:161:ASP:OD1	2.53	0.56
1:B:404:LEU:HD12	1:B:441:VAL:HG12	1.88	0.56
1:B:406:ALA:HB1	1:B:491:TRP:HH2	1.70	0.56
1:A:458:TYR:CD1	1:A:459:ASN:N	2.74	0.55
1:B:63:ARG:HH11	1:B:67:GLY:HA2	1.72	0.55
1:B:316:THR:O	1:B:323:VAL:HA	2.07	0.55
1:A:12:ILE:HB	1:A:48:LEU:HB3	1.89	0.54
1:B:277:GLN:O	1:B:280:ASP:HB2	2.07	0.54
1:B:391:GLU:HG3	1:B:392:HIS:CD2	2.42	0.54
1:A:182:GLN:O	1:A:185:ARG:N	2.41	0.54
1:B:339:GLU:OE1	1:B:341:ARG:NH1	2.41	0.54
1:A:484:THR:HG21	1:B:477:VAL:CG2	2.38	0.54
1:B:400:VAL:H	4:B:518:GOL:H32	1.73	0.54
1:A:341:ARG:O	1:A:342:ASP:HB2	2.07	0.53
1:B:354:PHE:O	1:B:365:ALA:HA	2.08	0.53
1:B:486:ASP:HB2	1:B:487:PRO:CD	2.38	0.53
1:A:31:PHE:HB3	1:A:80:CYS:O	2.08	0.53
1:A:353:LYS:HG3	1:A:367:VAL:O	2.08	0.53
1:A:82:ARG:HD3	3:A:504:CL:CL	2.46	0.52
1:B:457:ASP:CG	1:B:458:TYR:H	2.12	0.52
1:A:350:SER:HB2	6:A:861:HOH:O	2.09	0.52
1:B:431:LYS:HD2	1:B:445:GLY:O	2.09	0.52
1:A:136:ILE:HG12	1:A:186:TYR:CZ	2.44	0.52
1:A:207:GLU:HB2	1:A:208:PRO:HD2	1.91	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:260[B]:CYS:SG	1:A:296:LEU:O	2.68	0.52
1:A:377:LEU:C	1:A:377:LEU:HD23	2.30	0.52
1:B:305[A]:CYS:SG	1:B:338:ILE:HD11	2.49	0.52
1:A:48:LEU:HD11	1:A:60:VAL:CB	2.40	0.51
1:B:17:ILE:HB	1:B:133:SER:HB2	1.91	0.51
1:B:94:VAL:HB	1:B:102[B]:SER:OG	2.10	0.51
1:B:406:ALA:HB1	1:B:491:TRP:CH2	2.44	0.51
1:B:279:MET:SD	1:B:326:THR:HG22	2.50	0.51
1:B:430:GLY:CA	4:B:515:GOL:H11	2.41	0.51
1:A:317:LEU:HD21	1:A:351:ASN:ND2	2.26	0.50
1:A:82:ARG:HD2	1:A:84:VAL:O	2.12	0.50
1:B:447:THR:HG23	1:B:448:PRO:HD2	1.92	0.50
1:A:6:THR:HG23	1:A:7:ALA:N	2.27	0.50
1:A:182:GLN:OE1	1:A:187:SER:HB3	2.12	0.50
1:B:343:ARG:HG2	1:B:452:PHE:HE1	1.77	0.49
1:B:470:LEU:CD2	1:B:480:ALA:HB2	2.43	0.49
1:B:426:LYS:HB2	1:B:431:LYS:O	2.12	0.49
1:A:394:PHE:CD1	1:A:411:TYR:HB3	2.48	0.49
1:A:115:THR:HB	6:A:617:HOH:O	2.12	0.49
1:A:457:ASP:HA	1:A:458:TYR:HB2	1.95	0.49
1:A:271:ARG:CZ	1:A:284:ASN:O	2.61	0.49
1:B:181:PHE:CE2	1:B:410:SER:HB3	2.48	0.48
1:B:159:PRO:O	1:B:159:PRO:CG	2.59	0.48
1:A:192:ASP:O	1:A:193:HIS:HB2	2.14	0.48
1:A:99:GLY:HA2	1:A:213:THR:OG1	2.14	0.48
1:B:52:PRO:HD3	1:B:85:PRO:HB2	1.96	0.48
1:B:440:ALA:HA	1:B:479:LYS:HG2	1.96	0.48
1:A:354:PHE:CE1	1:A:370:ALA:HB2	2.48	0.47
1:B:136:ILE:HG23	1:B:186:TYR:CZ	2.48	0.47
1:B:341:ARG:O	1:B:342:ASP:HB2	2.14	0.47
1:A:469:TYR:HB2	1:A:482:ALA:HB3	1.97	0.47
1:A:139:HIS:CE1	1:A:141:GLN:HG3	2.49	0.47
1:A:93:ILE:HD13	1:A:103:LEU:HD23	1.97	0.47
1:A:268:ALA:CB	1:A:373:SER:HA	2.45	0.47
1:A:457:ASP:HA	1:A:458:TYR:CB	2.45	0.47
1:B:298:ILE:HD13	1:B:455:PHE:O	2.16	0.46
1:A:27:GLU:OE1	1:A:32:LYS:HB2	2.16	0.46
1:B:149:ARG:O	1:B:151:ARG:HG2	2.14	0.46
1:B:287:GLU:O	1:B:292:GLU:HG2	2.15	0.46
1:B:432:TYR:CD1	1:B:448:PRO:HB3	2.50	0.46
1:B:192:ASP:O	1:B:193:HIS:HB2	2.14	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:350:SER:CB	6:A:861:HOH:O	2.64	0.46
1:B:398:ARG:HE	1:B:405:ASP:CG	2.19	0.46
1:A:93:ILE:HD13	1:A:103:LEU:CD2	2.46	0.46
1:B:154:HIS:NE2	1:B:166:ASP:OD1	2.42	0.46
1:B:183:ASP:HB3	1:B:184:GLN:H	1.52	0.46
1:A:281:LEU:HD21	1:A:315:TRP:CE2	2.52	0.45
1:A:486:ASP:HB2	1:A:487:PRO:HD2	1.99	0.45
1:A:486:ASP:HB2	1:A:487:PRO:HD3	1.96	0.45
1:A:313:LYS:HA	1:A:327:ALA:O	2.17	0.45
1:B:296:LEU:HD12	1:B:305[B]:CYS:SG	2.56	0.45
1:B:198:HIS:CE1	1:B:229:ARG:HH22	2.35	0.45
1:A:355:VAL:HA	1:A:365:ALA:HA	1.99	0.45
1:B:377:LEU:HD21	1:B:418:PHE:HZ	1.81	0.45
1:B:377:LEU:HD21	1:B:418:PHE:CE2	2.51	0.45
1:A:281:LEU:HD21	1:A:315:TRP:CD2	2.52	0.45
1:B:343:ARG:HD2	4:B:519:GOL:H32	1.99	0.45
1:A:341:ARG:HB2	1:A:344:ARG:O	2.17	0.44
1:B:438:ASP:O	1:B:439:SER:HB2	2.17	0.44
1:A:7:ALA:HB3	1:A:257:GLU:OE1	2.17	0.44
1:B:88:ASP:HB2	2:B:501:BR:BR	2.71	0.44
1:A:136:ILE:HG23	1:A:138:MET:SD	2.57	0.44
1:B:296:LEU:CD1	1:B:305[B]:CYS:SG	3.06	0.44
1:A:234:SER:N	1:A:239:THR:O	2.49	0.44
1:B:302:THR:O	1:B:303:LYS:HB2	2.17	0.44
1:B:470:LEU:HD23	1:B:480:ALA:HB2	1.99	0.44
1:A:483:GLU:OE1	1:B:474:HIS:CD2	2.71	0.44
1:A:339:GLU:HB2	1:A:346:THR:OG1	2.18	0.43
1:A:351:ASN:OD1	1:A:352:GLY:N	2.51	0.43
1:B:263:VAL:HA	1:B:379:LYS:O	2.18	0.43
1:A:261:ALA:HB2	1:A:493:TYR:OH	2.18	0.43
1:B:158:ARG:HA	1:B:160:ALA:H	1.82	0.43
1:A:471:LYS:HD2	1:A:482:ALA:HB2	2.00	0.43
1:A:438:ASP:O	1:A:439:SER:HB2	2.18	0.43
1:B:274:SER:HB2	1:B:285:GLN:HG3	1.99	0.43
1:A:6:THR:HG23	1:A:7:ALA:H	1.83	0.43
1:B:295:GLN:HB3	1:B:308:ARG:HB3	2.01	0.43
1:B:394:PHE:CD1	1:B:411:TYR:HB3	2.53	0.43
1:A:50:GLN:HG2	1:A:51:PRO:O	2.18	0.43
1:A:88:ASP:HB2	2:A:502:BR:BR	2.74	0.43
1:A:405:ASP:HB2	1:A:408:ARG:HD3	2.00	0.43
1:B:453:PHE:HB2	4:B:513:GOL:H32	2.01	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:158:ARG:HA	1:B:160:ALA:N	2.34	0.42
1:B:271:ARG:HH11	1:B:284:ASN:HA	1.84	0.42
1:B:159:PRO:O	1:B:160:ALA:C	2.58	0.42
1:B:299:ASP:O	1:B:303:LYS:N	2.49	0.42
1:A:173:VAL:HG23	1:A:384:PRO:HD3	2.02	0.42
1:B:459:ASN:OD1	1:B:459:ASN:N	2.49	0.42
1:B:339:GLU:CD	1:B:341:ARG:HH11	2.22	0.42
1:B:160:ALA:HA	1:B:161:ASP:HA	1.50	0.42
1:B:48:LEU:HD12	1:B:48:LEU:HA	1.84	0.42
1:A:353:LYS:HG3	1:A:367:VAL:C	2.39	0.42
1:A:154:HIS:NE2	1:A:166:ASP:OD1	2.42	0.42
1:B:247:LYS:HB3	6:B:688:HOH:O	2.20	0.41
1:A:51:PRO:HB3	1:A:61:CYS:SG	2.61	0.41
1:A:353:LYS:HE3	1:A:368:GLU:HA	2.03	0.41
1:A:431:LYS:HD2	1:A:444:SER:O	2.21	0.41
1:B:225:ASP:OD2	1:B:229:ARG:NH2	2.52	0.41
1:A:279:MET:HE1	1:A:325:SER:O	2.20	0.41
1:B:190:THR:OG1	1:B:192:ASP:OD1	2.32	0.41
1:B:302:THR:C	1:B:304:LYS:H	2.24	0.41
1:A:354:PHE:HD2	1:A:367:VAL:O	2.04	0.41
1:B:244:LYS:NZ	1:B:249:GLY:O	2.54	0.41
1:A:192:ASP:O	1:A:193:HIS:CB	2.69	0.41
1:A:275:THR:HG22	1:A:291:GLN:O	2.20	0.41
1:A:314:TYR:O	1:A:325:SER:HA	2.21	0.41
1:B:342:ASP:O	4:B:513:GOL:H12	2.20	0.41
1:A:134:VAL:O	1:A:134:VAL:HG13	2.20	0.41
1:B:282:SER:HA	1:B:361:GLY:O	2.21	0.41
1:B:167:ARG:HD3	1:B:169:VAL:O	2.21	0.40
1:B:339:GLU:HB3	1:B:346:THR:OG1	2.21	0.40
1:A:50:GLN:NE2	6:A:821:HOH:O	2.54	0.40
1:A:225:ASP:C	1:A:225:ASP:OD1	2.60	0.40
1:A:227:GLU:HG3	1:A:229:ARG:NH2	2.37	0.40
1:B:297:GLU:OE1	1:B:330:LYS:HE3	2.21	0.40
1:B:457:ASP:CG	1:B:458:TYR:N	2.75	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	455/493 (92%)	441 (97%)	14 (3%)	0	100	100
1	B	483/493 (98%)	467 (97%)	16 (3%)	0	100	100
All	All	938/986 (95%)	908 (97%)	30 (3%)	0	100	100

There are no Ramachandran outliers to report.

### 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	388/404 (96%)	385 (99%)	3 (1%)	81	90
1	B	401/404 (99%)	397 (99%)	4 (1%)	76	86
All	All	789/808 (98%)	782 (99%)	7 (1%)	78	88

All (7) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	138	MET
1	A	171	TRP
1	A	459	ASN
1	B	138	MET
1	B	171	TRP
1	B	183	ASP
1	B	310	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	193	HIS
1	B	193	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](#)

Of 30 ligands modelled in this entry, 19 are monoatomic - leaving 11 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	$\# Z  > 2$
4	GOL	B	513	-	5,5,5	0.25	0	5,5,5	0.52	0
4	GOL	A	510	-	5,5,5	0.22	0	5,5,5	0.33	0
4	GOL	A	508	-	5,5,5	0.12	0	5,5,5	0.53	0
4	GOL	A	509	-	5,5,5	0.30	0	5,5,5	0.12	0
5	DTT	A	511	-	7,7,7	0.36	0	4,8,8	1.88	1 (25%)
4	GOL	B	519	-	5,5,5	0.24	0	5,5,5	0.38	0
4	GOL	B	517	-	5,5,5	0.27	0	5,5,5	0.39	0
4	GOL	B	515	-	5,5,5	0.26	0	5,5,5	0.35	0
4	GOL	B	516	-	5,5,5	0.29	0	5,5,5	0.35	0
4	GOL	B	518	-	5,5,5	0.36	0	5,5,5	0.62	0



Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
4	GOL	B	514	-	5,5,5	0.27	0	5,5,5	0.20	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
4	GOL	B	513	-	-	1/4/4/4	-
4	GOL	A	510	-	-	4/4/4/4	-
4	GOL	A	508	-	-	2/4/4/4	-
4	GOL	A	509	-	-	1/4/4/4	-
5	DTT	A	511	-	-	3/8/8/8	-
4	GOL	B	519	-	-	2/4/4/4	-
4	GOL	B	517	-	-	2/4/4/4	-
4	GOL	B	515	-	-	4/4/4/4	-
4	GOL	B	516	-	-	2/4/4/4	-
4	GOL	B	518	-	-	2/4/4/4	-
4	GOL	B	514	-	-	0/4/4/4	-

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	511	DTT	C3-C4-S4	-3.56	104.12	114.47

There are no chirality outliers.

All (23) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	508	GOL	O1-C1-C2-C3
4	B	515	GOL	O1-C1-C2-C3
4	B	516	GOL	C1-C2-C3-O3
4	B	516	GOL	O2-C2-C3-O3
4	B	517	GOL	O1-C1-C2-C3
4	B	519	GOL	O1-C1-C2-C3
5	A	511	DTT	C2-C3-C4-S4
5	A	511	DTT	O3-C3-C4-S4
4	A	508	GOL	O1-C1-C2-O2

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Mol	Chain	Res	Type	Atoms
4	B	517	GOL	O1-C1-C2-O2
4	A	509	GOL	O1-C1-C2-C3
4	A	510	GOL	C1-C2-C3-O3
4	B	518	GOL	C1-C2-C3-O3
4	B	519	GOL	O1-C1-C2-O2
4	B	515	GOL	O1-C1-C2-O2
4	B	515	GOL	C1-C2-C3-O3
4	A	510	GOL	O1-C1-C2-C3
5	A	511	DTT	S1-C1-C2-O2
4	A	510	GOL	O1-C1-C2-O2
4	B	518	GOL	O2-C2-C3-O3
4	A	510	GOL	O2-C2-C3-O3
4	B	515	GOL	O2-C2-C3-O3
4	B	513	GOL	C1-C2-C3-O3

There are no ring outliers.

6 monomers are involved in 14 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	B	513	GOL	3	0
4	A	510	GOL	2	0
5	A	511	DTT	2	0
4	B	519	GOL	1	0
4	B	515	GOL	1	0
4	B	518	GOL	5	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

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

There are no chain breaks in this entry.

## 6 Fit of model and data

### 6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95<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	470/493 (95%)	0.49	43 (9%) <b>9</b> <b>8</b>	31, 48, 78, 98	1 (0%)
1	B	483/493 (97%)	0.42	38 (7%) <b>12</b> <b>11</b>	30, 47, 74, 88	0
All	All	953/986 (96%)	0.46	81 (8%) <b>10</b> <b>9</b>	30, 48, 76, 98	1 (0%)

All (81) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	359	LYS	5.7
1	A	6	THR	5.6
1	B	359	LYS	5.2
1	A	373	SER	5.0
1	B	159	PRO	4.6
1	B	319	ALA	4.6
1	B	458	TYR	4.5
1	B	321	GLY	4.4
1	A	268	ALA	4.1
1	B	160	ALA	4.1
1	B	329	SER	4.1
1	A	401	THR	4.0
1	B	366	SER	3.8
1	B	263	VAL	3.8
1	A	367	VAL	3.8
1	B	447	THR	3.7
1	A	329	SER	3.6
1	A	457	ASP	3.5
1	B	247	LYS	3.4
1	A	360	ASN	3.4
1	A	372	ASP	3.3
1	B	300	ARG	3.3
1	A	216	PHE	3.2
1	A	55	ALA	3.2

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>	<b>RSRZ</b>
1	A	366	SER	3.2
1	A	214	LEU	3.2
1	A	370	ALA	3.2
1	A	474	HIS	3.1
1	B	7	ALA	3.1
1	B	358	LYS	3.0
1	A	280	ASP	2.9
1	A	351	ASN	2.9
1	B	380	LEU	2.8
1	B	360	ASN	2.8
1	A	101	TRP	2.8
1	A	458	TYR	2.8
1	A	134	VAL	2.7
1	B	487	PRO	2.6
1	A	353	LYS	2.6
1	A	365	ALA	2.6
1	B	362	GLN	2.6
1	B	134	VAL	2.6
1	A	52	PRO	2.6
1	A	160	ALA	2.6
1	A	321	GLY	2.6
1	A	201	ARG	2.6
1	A	31	PHE	2.6
1	B	367	VAL	2.5
1	B	444	SER	2.5
1	A	358	LYS	2.5
1	B	361	GLY	2.5
1	A	159	PRO	2.4
1	A	354	PHE	2.4
1	B	271	ARG	2.4
1	B	381	ILE	2.4
1	A	229	ARG	2.4
1	B	486	ASP	2.3
1	A	51	PRO	2.3
1	A	208	PRO	2.3
1	B	28	ALA	2.3
1	B	246	THR	2.3
1	B	429	THR	2.3
1	B	351	ASN	2.3
1	B	322	GLY	2.3
1	A	85	PRO	2.3
1	B	364	ALA	2.2

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Mol	Chain	Res	Type	RSRZ
1	B	286	ASP	2.2
1	B	158	ARG	2.2
1	A	325	SER	2.2
1	B	29	PHE	2.2
1	A	8	GLU	2.2
1	A	320	THR	2.2
1	B	261	ALA	2.1
1	A	271	ARG	2.1
1	B	249	GLY	2.1
1	B	474	HIS	2.1
1	A	236	PRO	2.1
1	A	284	ASN	2.0
1	B	457	ASP	2.0
1	A	93	ILE	2.0
1	A	437	SER	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, 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
4	GOL	B	517	6/6	0.74	0.23	59,62,64,66	0
4	GOL	A	510	6/6	0.75	0.29	56,57,59,61	0
5	DTT	A	511	8/8	0.75	0.28	79,84,85,87	0
4	GOL	B	519	6/6	0.77	0.17	77,78,79,79	0
4	GOL	B	518	6/6	0.78	0.20	44,47,48,51	0
4	GOL	B	516	6/6	0.82	0.19	66,67,68,68	0
4	GOL	B	515	6/6	0.87	0.26	64,65,66,69	0
2	BR	B	504	1/1	0.89	0.06	86,86,86,86	0

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors( $\text{\AA}^2$ )	Q<0.9
4	GOL	A	508	6/6	0.90	0.14	42,47,51,53	0
3	CL	A	504	1/1	0.90	0.13	67,67,67,67	0
4	GOL	B	513	6/6	0.90	0.17	43,46,48,49	0
3	CL	B	508	1/1	0.91	0.27	62,62,62,62	0
3	CL	B	512	1/1	0.92	0.10	70,70,70,70	0
3	CL	B	509	1/1	0.92	0.18	56,56,56,56	0
3	CL	A	505	1/1	0.93	0.08	66,66,66,66	0
3	CL	A	507	1/1	0.93	0.07	54,54,54,54	0
3	CL	B	506	1/1	0.93	0.07	65,65,65,65	0
3	CL	B	505	1/1	0.94	0.12	57,57,57,57	0
3	CL	A	503	1/1	0.94	0.06	57,57,57,57	0
2	BR	B	503	1/1	0.96	0.06	75,75,75,75	0
4	GOL	A	509	6/6	0.96	0.11	41,45,46,49	0
4	GOL	B	514	6/6	0.97	0.23	39,41,42,43	0
3	CL	A	506	1/1	0.98	0.21	36,36,36,36	0
2	BR	B	502	1/1	0.98	0.04	75,75,75,75	0
3	CL	B	510	1/1	0.98	0.16	34,34,34,34	0
2	BR	A	501	1/1	0.98	0.05	75,75,75,75	0
2	BR	A	502	1/1	0.98	0.05	57,57,57,57	0
3	CL	B	507	1/1	0.99	0.20	37,37,37,37	0
2	BR	B	501	1/1	0.99	0.04	50,50,50,50	0
3	CL	B	511	1/1	0.99	0.13	44,44,44,44	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.