Full wwPDB X-ray Structure Validation Report (i)

Feb 20, 2023 – 04:00 pm GMT

PDB ID	:	7YZ8
Title	:	Triclinic crystal structure of YTHDF1 YTH domain (544AVV546 mutant)
Authors	:	Dalle Vedove, A.; Cazzanelli, G.; Lolli, G.
Deposited on	:	2022-02-19
Resolution	:	2.50 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 (1)) were used in the production of this report:

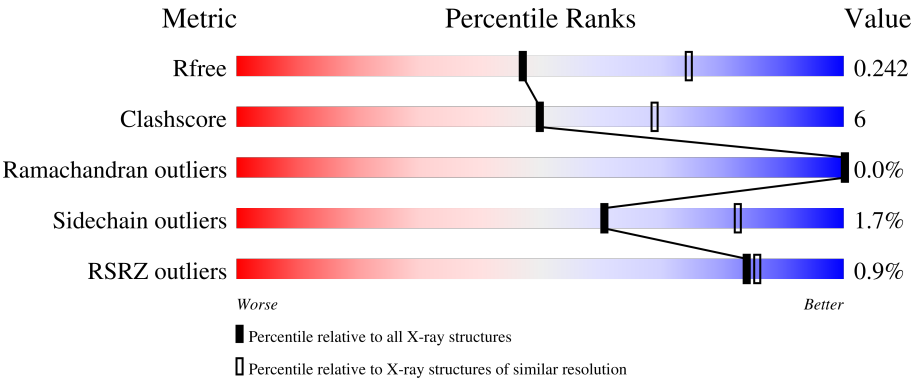
MolProbity	:	4.02b-467
Mogul	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.32.1
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.32.1

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 2.50 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	4661 (2.50-2.50)
Clashscore	141614	5346 (2.50-2.50)
Ramachandran outliers	138981	5231 (2.50-2.50)
Sidechain outliers	138945	5233 (2.50-2.50)
RSRZ outliers	127900	4559 (2.50-2.50)

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	200	82% 12% 6%
1	B	200	86% 12% .
1	C	200	% 84% 7% 8%
1	D	200	83% 9% 8%
1	E	200	% 80% 13% 7%

Continued on next page...

Continued from previous page...

Mol	Chain	Length	Quality of chain
1	F	200	74% 17% • 8%
1	G	200	77% 14% • 8%
1	H	200	78% 14% 7%
1	I	200	78% 14% 7%
1	J	200	76% 15% 8%
1	K	200	82% 10% • 8%
1	L	200	79% 11% • 9%

2 Entry composition (i)

There are 3 unique types of molecules in this entry. The entry contains 18773 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 YTH domain-containing family protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	189	Total	C	N	O	S	0	1	0
			1564	991	281	287	5			
1	B	195	Total	C	N	O	S	0	1	0
			1609	1020	289	295	5			
1	C	183	Total	C	N	O	S	0	1	0
			1512	959	272	276	5			
1	D	184	Total	C	N	O	S	0	1	0
			1526	970	274	277	5			
1	E	186	Total	C	N	O	S	0	1	0
			1541	979	277	280	5			
1	F	185	Total	C	N	O	S	0	1	0
			1535	976	276	278	5			
1	G	184	Total	C	N	O	S	0	0	0
			1515	961	274	275	5			
1	H	186	Total	C	N	O	S	0	0	0
			1534	972	278	279	5			
1	I	186	Total	C	N	O	S	0	1	0
			1539	978	277	279	5			
1	J	184	Total	C	N	O	S	0	1	0
			1530	972	275	278	5			
1	K	185	Total	C	N	O	S	0	0	0
			1528	969	276	278	5			
1	L	182	Total	C	N	O	S	0	0	0
			1501	953	270	273	5			

There are 48 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	360	GLY	-	expression tag	UNP Q9BYJ9
A	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
A	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
A	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
B	360	GLY	-	expression tag	UNP Q9BYJ9

Continued on next page...

Continued from previous page...

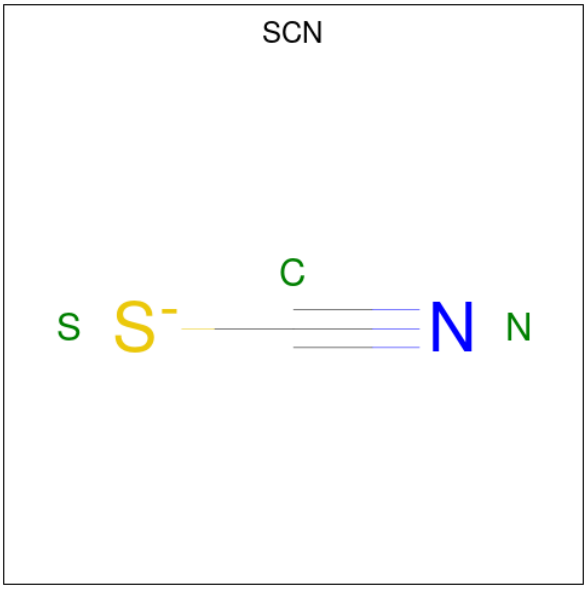
Chain	Residue	Modelled	Actual	Comment	Reference
B	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
B	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
B	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
C	360	GLY	-	expression tag	UNP Q9BYJ9
C	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
C	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
C	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
D	360	GLY	-	expression tag	UNP Q9BYJ9
D	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
D	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
D	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
E	360	GLY	-	expression tag	UNP Q9BYJ9
E	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
E	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
E	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
F	360	GLY	-	expression tag	UNP Q9BYJ9
F	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
F	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
F	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
G	360	GLY	-	expression tag	UNP Q9BYJ9
G	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
G	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
G	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
H	360	GLY	-	expression tag	UNP Q9BYJ9
H	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
H	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
H	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
I	360	GLY	-	expression tag	UNP Q9BYJ9
I	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
I	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
I	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
J	360	GLY	-	expression tag	UNP Q9BYJ9
J	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
J	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
J	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
K	360	GLY	-	expression tag	UNP Q9BYJ9
K	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
K	545	VAL	GLU	engineered mutation	UNP Q9BYJ9
K	546	VAL	GLU	engineered mutation	UNP Q9BYJ9
L	360	GLY	-	expression tag	UNP Q9BYJ9
L	544	ALA	GLU	engineered mutation	UNP Q9BYJ9
L	545	VAL	GLU	engineered mutation	UNP Q9BYJ9

Continued on next page...

Continued from previous page...

Chain	Residue	Modelled	Actual	Comment	Reference
L	546	VAL	GLU	engineered mutation	UNP Q9BYJ9

- Molecule 2 is THIOCYANATE ION (three-letter code: SCN) (formula: CNS).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	A	1	Total	C	N	S	0	0
			3	1	1	1		
2	B	1	Total	C	N	S	0	0
			3	1	1	1		
2	C	1	Total	C	N	S	0	0
			3	1	1	1		
2	D	1	Total	C	N	S	0	0
			3	1	1	1		
2	E	1	Total	C	N	S	0	0
			3	1	1	1		
2	F	1	Total	C	N	S	0	0
			3	1	1	1		
2	G	1	Total	C	N	S	0	0
			3	1	1	1		
2	H	1	Total	C	N	S	0	0
			3	1	1	1		
2	I	1	Total	C	N	S	0	0
			3	1	1	1		
2	J	1	Total	C	N	S	0	0
			3	1	1	1		
2	K	1	Total	C	N	S	0	0
			3	1	1	1		

Continued on next page...

Continued from previous page...

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
2	L	1	Total C N S 3 1 1 1	0	0

- Molecule 3 is water.

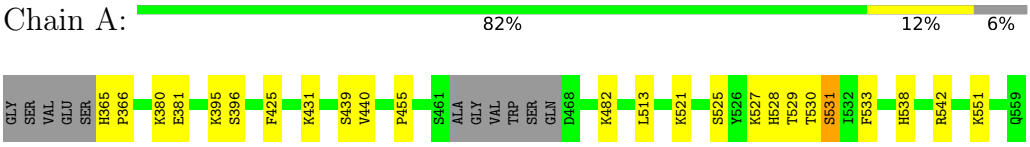
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	37	Total O 37 37	0	0
3	B	37	Total O 37 37	0	0
3	C	30	Total O 30 30	0	0
3	D	35	Total O 35 35	0	0
3	E	22	Total O 22 22	0	0
3	F	28	Total O 28 28	0	0
3	G	20	Total O 20 20	0	0
3	H	19	Total O 19 19	0	0
3	I	24	Total O 24 24	0	0
3	J	28	Total O 28 28	0	0
3	K	16	Total O 16 16	0	0
3	L	7	Total O 7 7	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.

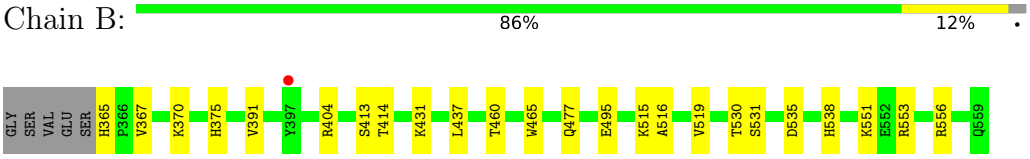
• Molecule 1: YTH domain-containing family protein 1

Chain A:



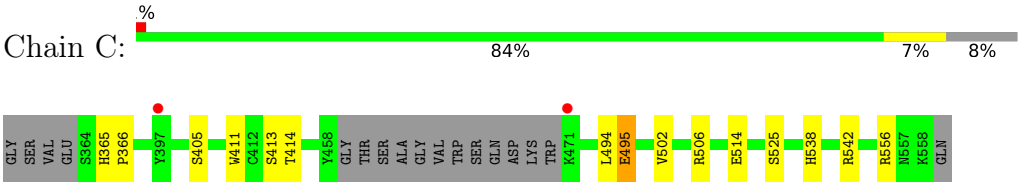
• Molecule 1: YTH domain-containing family protein 1

Chain B:



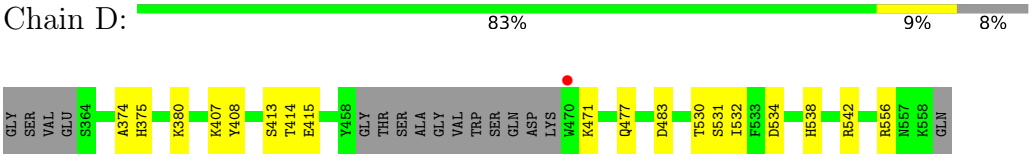
• Molecule 1: YTH domain-containing family protein 1

Chain C:



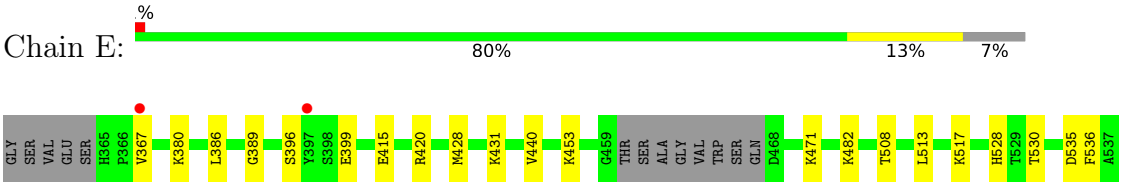
• Molecule 1: YTH domain-containing family protein 1

Chain D:



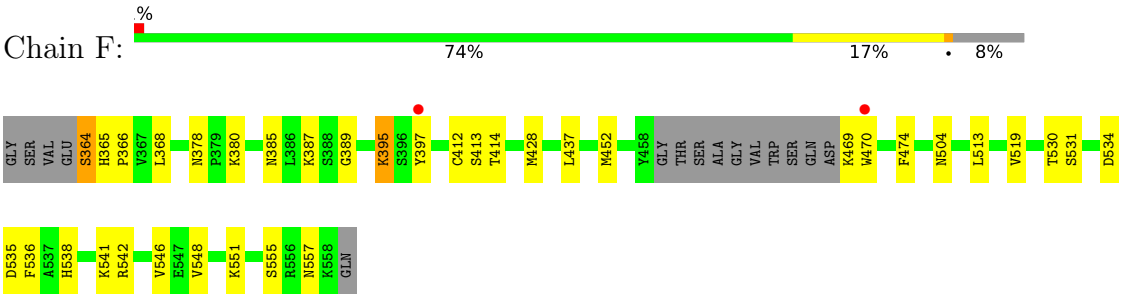
• Molecule 1: YTH domain-containing family protein 1

Chain E:



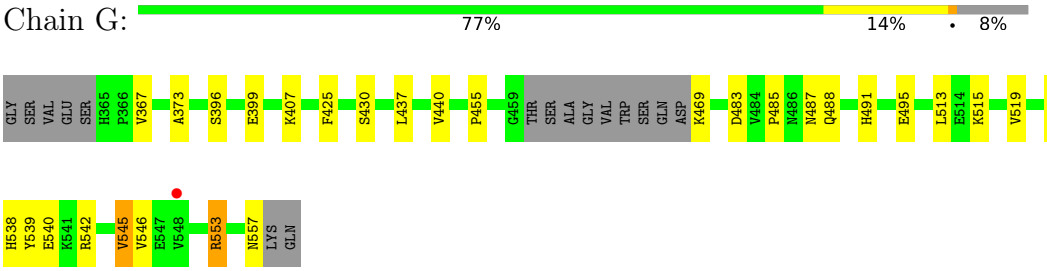
• Molecule 1: YTH domain-containing family protein 1

Chain F:



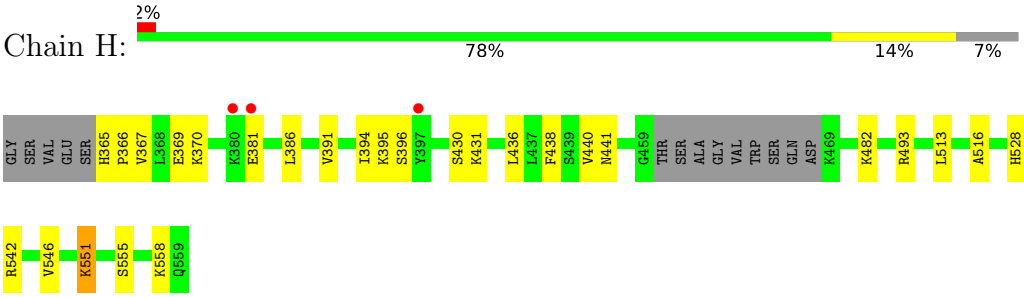
• Molecule 1: YTH domain-containing family protein 1

Chain G:



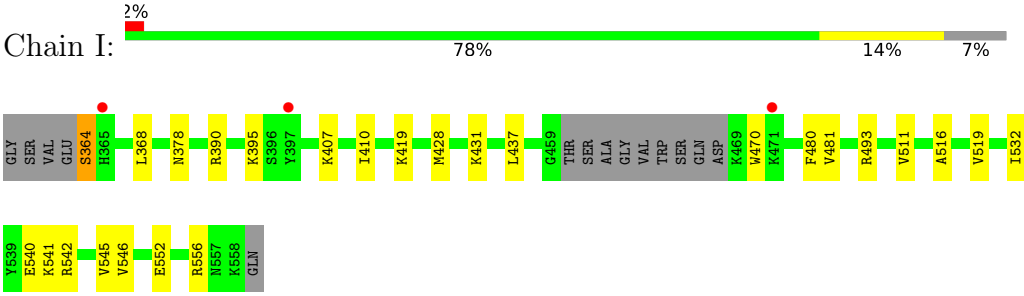
• Molecule 1: YTH domain-containing family protein 1

Chain H:



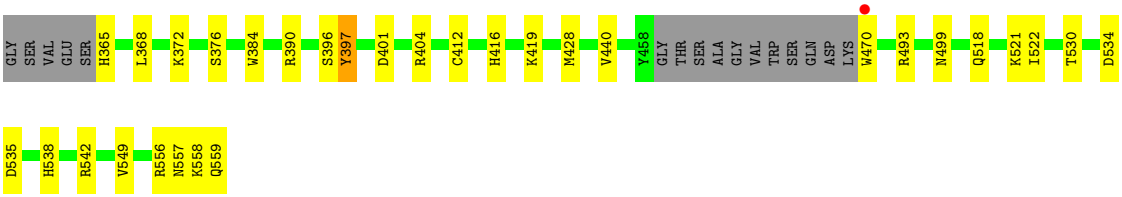
• Molecule 1: YTH domain-containing family protein 1

Chain I:

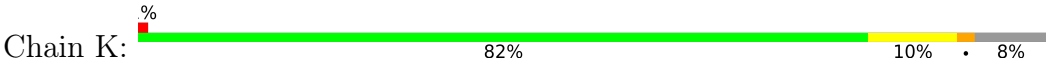


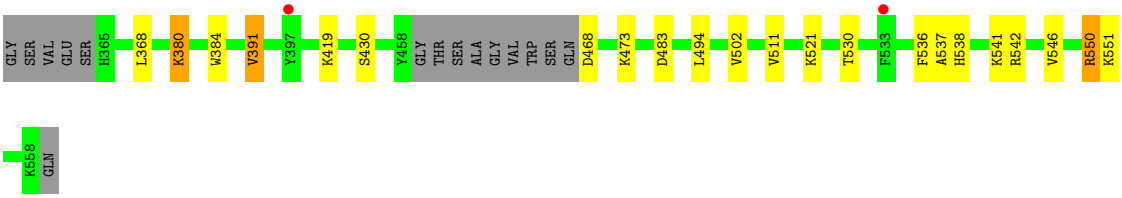
• Molecule 1: YTH domain-containing family protein 1

Chain J:

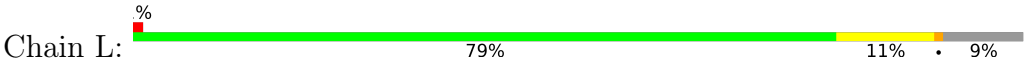


• Molecule 1: YTH domain-containing family protein 1





• Molecule 1: YTH domain-containing family protein 1



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	71.22Å 92.57Å 113.94Å 72.87° 79.05° 67.87°	Depositor
Resolution (Å)	48.09 – 2.50 49.06 – 2.50	Depositor EDS
% Data completeness (in resolution range)	98.2 (48.09-2.50) 98.3 (49.06-2.50)	Depositor EDS
R_{merge}	0.05	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.91 (at 2.51Å)	Xtriage
Refinement program	PHENIX 1.11.1	Depositor
R, R_{free}	0.184 , 0.243 0.184 , 0.242	Depositor DCC
R_{free} test set	4294 reflections (4.92%)	wwPDB-VP
Wilson B-factor (Å^2)	52.2	Xtriage
Anisotropy	0.305	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 41.0	EDS
L-test for twinning[2]	$< \|L\| > = 0.50$, $< L^2 > = 0.34$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.95	EDS
Total number of atoms	18773	wwPDB-VP
Average B, all atoms (Å^2)	62.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.27% of the height of the origin peak. No significant pseudotranslation is detected.*

[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

5.1 Standard geometry

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

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	0.55	0/1605	0.73	0/2158
1	B	0.54	0/1653	0.71	0/2226
1	C	0.52	0/1551	0.71	0/2086
1	D	0.50	0/1567	0.68	0/2109
1	E	0.52	0/1582	0.65	0/2128
1	F	0.52	0/1576	0.66	0/2120
1	G	0.50	0/1552	0.65	0/2088
1	H	0.49	0/1571	0.67	0/2111
1	I	0.49	0/1580	0.67	0/2125
1	J	0.52	0/1571	0.69	0/2113
1	K	0.49	0/1565	0.67	0/2105
1	L	0.48	0/1537	0.66	0/2067
All	All	0.51	0/18910	0.68	0/25436

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

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	1564	0	1543	19	0

Continued on next page...

Continued from previous page...

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	B	1609	0	1584	22	0
1	C	1512	0	1498	12	0
1	D	1526	0	1508	17	0
1	E	1541	0	1523	19	0
1	F	1535	0	1521	23	0
1	G	1515	0	1497	25	0
1	H	1534	0	1518	19	0
1	I	1539	0	1524	23	0
1	J	1530	0	1511	20	0
1	K	1528	0	1511	19	0
1	L	1501	0	1488	18	0
2	A	3	0	0	0	0
2	B	3	0	0	0	0
2	C	3	0	0	0	0
2	D	3	0	0	1	0
2	E	3	0	0	0	0
2	F	3	0	0	0	0
2	G	3	0	0	0	0
2	H	3	0	0	0	0
2	I	3	0	0	1	0
2	J	3	0	0	0	0
2	K	3	0	0	0	0
2	L	3	0	0	1	0
3	A	37	0	0	1	0
3	B	37	0	0	2	0
3	C	30	0	0	0	0
3	D	35	0	0	0	0
3	E	22	0	0	0	0
3	F	28	0	0	1	0
3	G	20	0	0	1	0
3	H	19	0	0	1	0
3	I	24	0	0	1	0
3	J	28	0	0	1	0
3	K	16	0	0	1	0
3	L	7	0	0	0	0
All	All	18773	0	18226	212	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 6.

All (212) 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:G:553:ARG:HH21	1:G:553:ARG:HG3	1.26	0.97
1:K:550:ARG:HH11	1:K:550:ARG:HG2	1.34	0.92
1:I:378:ASN:HD21	1:I:481:VAL:H	1.18	0.91
1:A:380:LYS:HD2	1:H:381:GLU:HG2	1.60	0.83
1:G:485:PRO:HB2	1:G:487:ASN:OD1	1.77	0.83
1:A:521:LYS:NZ	1:G:373:ALA:HB1	1.98	0.79
1:L:367:VAL:HG23	1:L:536:PHE:HE1	1.47	0.79
1:I:390:ARG:HE	1:I:428:MET:HE2	1.51	0.76
1:L:380:LYS:HE2	1:L:381:GLU:OE2	1.85	0.75
1:I:552:GLU:HB3	1:I:556:ARG:NH1	2.04	0.73
1:A:551:LYS:O	1:A:551:LYS:HD3	1.88	0.72
1:E:389:GLY:HA2	1:E:428:MET:HE1	1.70	0.71
1:I:552:GLU:HB3	1:I:556:ARG:HH12	1.57	0.70
1:A:521:LYS:HZ2	1:G:373:ALA:HB1	1.57	0.69
1:G:407:LYS:HE3	1:G:540:GLU:OE2	1.92	0.69
1:G:553:ARG:HG3	1:G:553:ARG:NH2	1.97	0.67
1:E:380:LYS:HA	1:E:380:LYS:HE2	1.77	0.67
1:G:367:VAL:HG11	1:G:407:LYS:NZ	2.10	0.66
1:K:384:TRP:CE2	1:K:521:LYS:HD3	2.31	0.66
1:A:396:SER:HB3	1:A:440:VAL:HG22	1.78	0.65
1:K:550:ARG:HG2	1:K:550:ARG:NH1	2.09	0.65
1:K:483:ASP:OD2	1:K:530:THR:HG23	1.97	0.64
1:K:468:ASP:N	3:K:701:HOH:O	2.30	0.63
1:L:552:GLU:HB3	1:L:556:ARG:NH2	2.14	0.63
1:B:404:ARG:HH11	1:B:404:ARG:HG3	1.64	0.62
1:L:552:GLU:HB3	1:L:556:ARG:HH22	1.64	0.62
1:F:542:ARG:O	1:F:546:VAL:HG23	1.99	0.62
1:B:530:THR:CG2	1:D:556:ARG:HH11	2.13	0.61
1:A:551:LYS:HD3	1:A:551:LYS:C	2.19	0.61
1:D:415:GLU:HG2	1:D:471:LYS:HE2	1.83	0.61
1:F:364:SER:HB2	1:F:365:HIS:CD2	2.36	0.61
1:I:541:LYS:HE3	1:I:545:VAL:HG21	1.83	0.60
1:H:370:LYS:HE3	1:J:549:VAL:HG22	1.84	0.59
1:G:485:PRO:CB	1:G:487:ASN:OD1	2.51	0.59
1:D:375:HIS:HD2	1:D:477:GLN:HE22	1.51	0.59
1:H:542:ARG:O	1:H:546:VAL:HG23	2.04	0.58
1:I:364:SER:N	3:I:703:HOH:O	2.35	0.58
1:J:384:TRP:CZ2	1:J:521:LYS:HD2	2.39	0.58
1:I:511:VAL:HG23	1:I:516:ALA:HB2	1.85	0.58
1:A:431:LYS:HE3	1:E:513:LEU:HB3	1.86	0.57
1:E:541:LYS:HE3	1:E:545:VAL:HG21	1.87	0.57
1:G:367:VAL:HG11	1:G:407:LYS:HZ1	1.71	0.56

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:J:493:ARG:NH1	1:J:499:ASN:O	2.35	0.56
1:K:380:LYS:H	1:K:380:LYS:HD2	1.70	0.56
1:A:531:SER:HB3	1:A:533:PHE:H	1.71	0.56
1:E:530:THR:CG2	1:I:556:ARG:HE	2.19	0.55
1:I:437:LEU:HD13	1:I:519:VAL:HG11	1.88	0.55
1:I:542:ARG:O	1:I:546:VAL:HG23	2.07	0.55
1:B:370:LYS:NZ	3:B:702:HOH:O	2.39	0.55
1:I:407:LYS:NZ	1:I:540:GLU:OE1	2.40	0.55
1:D:538:HIS:CE1	1:D:542:ARG:HD2	2.42	0.55
1:J:518:GLN:O	1:J:522:ILE:HD12	2.06	0.54
1:B:551:LYS:NZ	3:B:704:HOH:O	2.39	0.54
1:E:530:THR:HG22	1:I:556:ARG:HE	1.71	0.54
1:E:396:SER:HB3	1:E:440:VAL:HG22	1.88	0.54
1:I:378:ASN:ND2	1:I:480:PHE:HA	2.23	0.54
1:K:550:ARG:HH11	1:K:550:ARG:CG	2.12	0.54
1:G:469:LYS:N	3:G:701:HOH:O	2.41	0.53
1:F:530:THR:HG23	1:F:534:ASP:OD2	2.08	0.53
1:G:396:SER:HB3	1:G:440:VAL:HG22	1.90	0.53
1:F:530:THR:CG2	1:J:556:ARG:HE	2.22	0.53
1:F:385:ASN:HD21	1:F:387:LYS:HE2	1.74	0.53
1:L:380:LYS:HG3	1:L:381:GLU:OE1	2.08	0.53
1:F:530:THR:HG21	1:J:556:ARG:HE	1.73	0.52
1:C:514:GLU:OE1	1:I:431:LYS:NZ	2.42	0.52
1:A:551:LYS:NZ	3:A:702:HOH:O	2.42	0.52
1:B:551:LYS:O	1:B:551:LYS:HD3	2.10	0.52
1:B:535:ASP:O	1:B:538:HIS:HB3	2.10	0.52
1:F:551:LYS:O	1:F:555:SER:N	2.40	0.51
1:G:367:VAL:HB	1:G:536:PHE:HE1	1.75	0.51
1:D:415:GLU:OE1	1:D:471:LYS:HE2	2.10	0.51
1:H:396:SER:HB3	1:H:440:VAL:HG22	1.91	0.51
1:B:530:THR:HG21	1:D:556:ARG:HH11	1.75	0.50
1:G:542:ARG:O	1:G:546:VAL:HG23	2.11	0.50
1:A:521:LYS:HZ1	1:G:373:ALA:HB1	1.72	0.50
1:D:415:GLU:CG	1:D:471:LYS:HE2	2.42	0.50
1:K:550:ARG:NH1	1:K:550:ARG:CG	2.73	0.50
1:A:538:HIS:CE1	1:A:542:ARG:HD2	2.47	0.50
1:E:420:ARG:NH2	1:E:508:THR:O	2.37	0.50
1:C:365:HIS:N	1:C:366:PRO:HD3	2.26	0.49
1:F:389:GLY:HA2	1:F:428:MET:HE2	1.94	0.49
1:H:395:LYS:HB3	1:H:441:ASN:HD21	1.77	0.49
1:J:538:HIS:CE1	1:J:542:ARG:HD2	2.48	0.49

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:378:ASN:O	1:F:380:LYS:HE2	2.13	0.49
1:B:556:ARG:HE	1:D:530:THR:HG21	1.78	0.49
1:B:391:VAL:HG21	1:B:516:ALA:HB1	1.94	0.48
1:A:530:THR:HG22	1:A:531:SER:N	2.28	0.48
1:D:532:ILE:HD12	2:D:601:SCN:S	2.53	0.48
1:D:530:THR:HG23	1:D:534:ASP:OD2	2.13	0.48
1:H:535:ASP:O	1:H:538:HIS:HB3	2.14	0.48
1:K:368:LEU:HB2	1:K:536:PHE:CD1	2.49	0.48
1:E:399:GLU:H	1:E:399:GLU:CD	2.17	0.48
1:B:404:ARG:HG3	1:B:404:ARG:NH1	2.27	0.48
1:H:430:SER:HB2	1:H:431:LYS:NZ	2.29	0.48
1:J:530:THR:HG23	1:J:534:ASP:OD2	2.13	0.48
1:F:557:ASN:ND2	3:F:704:HOH:O	2.45	0.48
1:H:365:HIS:CD2	1:H:366:PRO:HD2	2.49	0.48
1:I:378:ASN:HD22	1:I:480:PHE:HA	1.79	0.48
1:F:397[A]:TYR:OH	1:J:401:ASP:OD2	2.24	0.47
1:H:513:LEU:HB2	3:H:707:HOH:O	2.14	0.47
1:K:538:HIS:CE1	1:K:542:ARG:HD2	2.49	0.47
1:F:541:LYS:NZ	1:H:369:GLU:OE1	2.42	0.47
1:C:494:LEU:HD21	1:C:502:VAL:HG23	1.96	0.47
1:F:413:SER:OG	1:F:414:THR:N	2.47	0.47
1:J:390:ARG:HE	1:J:428:MET:CE	2.27	0.47
1:L:458:TYR:CE1	1:L:471:LYS:NZ	2.83	0.47
1:G:538:HIS:CE1	1:G:542:ARG:HD2	2.50	0.47
1:G:553:ARG:HH21	1:G:553:ARG:CG	2.07	0.47
1:I:532:ILE:HD12	2:I:601:SCN:S	2.54	0.46
1:H:394:ILE:HG21	1:H:438:PHE:CE2	2.51	0.46
1:B:413:SER:OG	1:B:414:THR:N	2.49	0.46
1:G:399:GLU:HG2	1:G:539:TYR:OH	2.16	0.46
1:G:425:PHE:CE2	1:G:455:PRO:HD3	2.51	0.46
1:G:367:VAL:HB	1:G:536:PHE:CE1	2.50	0.46
1:A:525:SER:O	1:A:527:LYS:HD2	2.16	0.46
1:K:551:LYS:HA	1:K:551:LYS:HD2	1.56	0.46
1:L:532:ILE:HD12	2:L:601:SCN:S	2.55	0.46
1:H:551:LYS:NZ	1:H:555:SER:OG	2.49	0.45
1:A:365:HIS:HA	1:A:366:PRO:HD3	1.73	0.45
1:C:514:GLU:HG2	1:K:430:SER:CB	2.46	0.45
1:H:395:LYS:HE2	1:H:441:ASN:HD22	1.80	0.45
1:J:384:TRP:CH2	1:J:521:LYS:HD2	2.52	0.45
1:J:416:HIS:CE1	1:J:419:LYS:HZ3	2.35	0.45
1:J:416:HIS:CE1	1:J:419:LYS:NZ	2.85	0.45

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:495:GLU:OE1	1:B:515:LYS:NZ	2.49	0.45
1:L:395:LYS:HA	1:L:395:LYS:HD2	1.72	0.45
1:D:415:GLU:HG2	1:D:471:LYS:CE	2.46	0.45
1:J:535:ASP:O	1:J:538:HIS:HB3	2.16	0.45
1:E:367:VAL:HG23	1:E:536:PHE:HE1	1.80	0.45
1:I:395:LYS:HA	1:I:395:LYS:HD2	1.74	0.45
1:B:556:ARG:HE	1:D:530:THR:CG2	2.30	0.44
1:C:506:ARG:HH12	1:I:419:LYS:HZ3	1.66	0.44
1:D:407:LYS:HE3	1:D:408:TYR:CZ	2.52	0.44
1:J:396:SER:HB3	1:J:440:VAL:HG22	1.99	0.44
1:B:437:LEU:HD13	1:B:519:VAL:HG11	1.99	0.44
1:D:530:THR:HG22	1:D:531:SER:N	2.32	0.44
1:K:538:HIS:O	1:K:541:LYS:HB3	2.16	0.44
1:B:375:HIS:CD2	1:B:477:GLN:HE22	2.36	0.44
1:F:535:ASP:O	1:F:538:HIS:HB3	2.18	0.44
1:L:410:ILE:HG13	1:L:470:TRP:HZ3	1.82	0.44
1:L:388:SER:O	1:L:433:PRO:HD2	2.18	0.43
1:L:543:GLN:O	1:L:546:VAL:HG22	2.18	0.43
1:C:538:HIS:CE1	1:C:542:ARG:HD2	2.53	0.43
1:G:483:ASP:OD2	1:G:530:THR:HG23	2.19	0.43
1:K:368:LEU:HB2	1:K:536:PHE:CE1	2.54	0.43
1:C:405:SER:HB2	1:C:411:TRP:HE3	1.84	0.43
1:C:413:SER:OG	1:C:414:THR:N	2.52	0.43
1:L:390:ARG:O	1:L:434:VAL:HA	2.18	0.43
1:E:428:MET:HE3	1:E:428:MET:HB3	1.89	0.43
1:G:495:GLU:OE2	1:G:515:LYS:NZ	2.44	0.43
1:B:530:THR:HG22	1:B:531:SER:N	2.34	0.43
1:B:553:ARG:HH21	1:D:483:ASP:CG	2.23	0.43
1:G:542:ARG:O	1:G:545:VAL:HG12	2.19	0.43
1:F:513:LEU:HD12	1:F:513:LEU:HA	1.81	0.42
1:H:482:LYS:HE3	1:H:528:HIS:ND1	2.34	0.42
1:L:425:PHE:HE2	1:L:455:PRO:HD3	1.84	0.42
1:J:412:CYS:HB3	1:J:470:TRP:CD2	2.54	0.42
1:A:513:LEU:HD23	1:E:431:LYS:HE3	2.01	0.42
1:F:395:LYS:HZ3	1:F:395:LYS:HB3	1.84	0.42
1:A:530:THR:CG2	1:C:556:ARG:HH11	2.32	0.42
1:H:394:ILE:HG13	1:H:436:LEU:HB3	2.01	0.42
1:G:513:LEU:HD12	1:G:513:LEU:HA	1.87	0.42
1:L:471:LYS:HB3	1:L:471:LYS:HE3	1.68	0.42
1:B:551:LYS:HD3	1:B:551:LYS:C	2.40	0.42
1:E:386:LEU:O	1:E:517:LYS:HE2	2.20	0.42

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:I:535:ASP:O	1:I:538:HIS:HB3	2.19	0.42
1:L:499:ASN:HD22	1:L:499:ASN:HA	1.66	0.42
1:C:506:ARG:NH1	1:I:419:LYS:NZ	2.68	0.42
1:F:412:CYS:HB3	1:F:470:TRP:CD2	2.55	0.42
1:I:378:ASN:ND2	1:I:481:VAL:H	2.01	0.42
1:A:395:LYS:HA	1:A:439:SER:O	2.20	0.42
1:I:368:LEU:HB2	1:I:536:PHE:CD1	2.54	0.42
1:A:425:PHE:CE2	1:A:455:PRO:HD3	2.55	0.41
1:F:530:THR:HG22	1:F:531:SER:N	2.35	0.41
1:B:375:HIS:HD2	1:B:477:GLN:HE22	1.67	0.41
1:F:437:LEU:HD13	1:F:519:VAL:HG11	2.02	0.41
1:H:365:HIS:HD2	1:H:367:VAL:H	1.68	0.41
1:E:542:ARG:O	1:E:546:VAL:HG23	2.20	0.41
1:H:431:LYS:N	1:H:431:LYS:HD2	2.35	0.41
1:L:383:GLU:HG3	1:L:383:GLU:O	2.21	0.41
1:K:494:LEU:HD21	1:K:502:VAL:HG23	2.02	0.41
1:B:431:LYS:HD2	1:B:431:LYS:H	1.84	0.41
1:D:374:ALA:O	1:F:548:VAL:HG21	2.21	0.41
1:F:368:LEU:HB2	1:F:536:PHE:CD1	2.56	0.41
1:C:405:SER:HB2	1:C:411:TRP:CE3	2.55	0.41
1:C:495:GLU:CD	1:C:495:GLU:H	2.22	0.41
1:E:415:GLU:OE2	1:E:471:LYS:HE2	2.20	0.41
1:J:365:HIS:N	3:J:705:HOH:O	2.54	0.41
1:F:452:MET:HG3	1:F:474:PHE:CD1	2.55	0.41
1:H:391:VAL:HG21	1:H:516:ALA:HB1	2.03	0.41
1:A:482:LYS:HE3	1:A:528:HIS:ND1	2.36	0.41
1:B:365:HIS:HD2	1:B:367:VAL:H	1.67	0.41
1:G:437:LEU:HD13	1:G:519:VAL:HG11	2.02	0.41
1:I:410:ILE:HG13	1:I:470:TRP:HZ3	1.86	0.41
1:K:391:VAL:HG22	1:K:511:VAL:HB	2.02	0.41
1:K:538:HIS:NE2	1:K:542:ARG:HD2	2.36	0.41
1:D:413:SER:OG	1:D:414:THR:N	2.54	0.41
1:B:404:ARG:NH1	1:B:465:TRP:O	2.54	0.40
1:F:378:ASN:O	1:F:380:LYS:CE	2.69	0.40
1:H:431:LYS:HD2	1:H:431:LYS:H	1.86	0.40
1:J:368:LEU:HD11	1:J:372:LYS:HE3	2.03	0.40
1:E:453:LYS:HA	1:E:453:LYS:HD2	1.83	0.40
1:K:542:ARG:O	1:K:546:VAL:HG23	2.22	0.40
1:L:368:LEU:HB2	1:L:536:PHE:CE1	2.57	0.40
1:G:488:GLN:O	1:G:491:HIS:HE1	2.05	0.40
1:E:482:LYS:HB2	1:E:528:HIS:CG	2.57	0.40

Continued on next page...

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:535:ASP:O	1:E:538:HIS:HB3	2.22	0.40
1:K:537:ALA:O	1:K:541:LYS:N	2.49	0.40
1:E:367:VAL:HG23	1:E:536:PHE:CE1	2.56	0.40
1:L:552:GLU:O	1:L:556:ARG:HG3	2.21	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	186/200 (93%)	178 (96%)	8 (4%)	0	100	100
1	B	194/200 (97%)	188 (97%)	6 (3%)	0	100	100
1	C	180/200 (90%)	175 (97%)	5 (3%)	0	100	100
1	D	181/200 (90%)	175 (97%)	6 (3%)	0	100	100
1	E	183/200 (92%)	177 (97%)	6 (3%)	0	100	100
1	F	182/200 (91%)	176 (97%)	5 (3%)	1 (0%)	29	48
1	G	180/200 (90%)	175 (97%)	5 (3%)	0	100	100
1	H	182/200 (91%)	179 (98%)	3 (2%)	0	100	100
1	I	183/200 (92%)	176 (96%)	7 (4%)	0	100	100
1	J	181/200 (90%)	176 (97%)	5 (3%)	0	100	100
1	K	181/200 (90%)	176 (97%)	5 (3%)	0	100	100
1	L	178/200 (89%)	174 (98%)	4 (2%)	0	100	100
All	All	2191/2400 (91%)	2125 (97%)	65 (3%)	1 (0%)	100	100

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	F	366	PRO

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	175/182 (96%)	172 (98%)	3 (2%)	60	82
1	B	179/182 (98%)	178 (99%)	1 (1%)	86	95
1	C	170/182 (93%)	168 (99%)	2 (1%)	71	88
1	D	171/182 (94%)	170 (99%)	1 (1%)	86	95
1	E	172/182 (94%)	172 (100%)	0	100	100
1	F	172/182 (94%)	168 (98%)	4 (2%)	50	76
1	G	169/182 (93%)	165 (98%)	4 (2%)	49	74
1	H	171/182 (94%)	167 (98%)	4 (2%)	50	76
1	I	172/182 (94%)	170 (99%)	2 (1%)	71	88
1	J	171/182 (94%)	164 (96%)	7 (4%)	30	55
1	K	171/182 (94%)	166 (97%)	5 (3%)	42	69
1	L	168/182 (92%)	165 (98%)	3 (2%)	59	81
All	All	2061/2184 (94%)	2025 (98%)	36 (2%)	60	82

All (36) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	381	GLU
1	A	529	THR
1	A	531	SER
1	B	460	THR
1	C	495	GLU
1	C	525	SER
1	D	380	LYS
1	F	364	SER
1	F	395	LYS
1	F	469	LYS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	F	504	ASN
1	G	430	SER
1	G	545	VAL
1	G	553	ARG
1	G	557	ASN
1	H	386	LEU
1	H	493	ARG
1	H	551	LYS
1	H	558	LYS
1	I	364	SER
1	I	493	ARG
1	J	376	SER
1	J	397[A]	TYR
1	J	397[B]	TYR
1	J	404	ARG
1	J	557	ASN
1	J	558	LYS
1	J	559	GLN
1	K	380	LYS
1	K	391	VAL
1	K	419	LYS
1	K	473	LYS
1	K	550	ARG
1	L	499	ASN
1	L	552	GLU
1	L	554	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (31) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	365	HIS
1	A	375	HIS
1	A	554	GLN
1	A	559	GLN
1	B	365	HIS
1	B	375	HIS
1	B	538	HIS
1	D	477	GLN
1	E	375	HIS
1	E	441	ASN
1	E	477	GLN
1	E	538	HIS

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type
1	F	365	HIS
1	F	385	ASN
1	F	403	HIS
1	F	499	ASN
1	G	365	HIS
1	H	365	HIS
1	H	375	HIS
1	H	441	ASN
1	I	378	ASN
1	J	365	HIS
1	J	416	HIS
1	J	487	ASN
1	J	538	HIS
1	J	557	ASN
1	K	365	HIS
1	K	375	HIS
1	L	488	GLN
1	L	499	ASN
1	L	509	GLN

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

12 ligands are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	SCN	D	601	-	1,2,2	0.89	0	0,1,1	-	-
2	SCN	H	601	-	1,2,2	1.03	0	0,1,1	-	-
2	SCN	F	601	-	1,2,2	0.88	0	0,1,1	-	-
2	SCN	G	601	-	1,2,2	0.96	0	0,1,1	-	-
2	SCN	I	601	-	1,2,2	0.77	0	0,1,1	-	-
2	SCN	K	601	-	1,2,2	0.93	0	0,1,1	-	-
2	SCN	J	601	-	1,2,2	0.79	0	0,1,1	-	-
2	SCN	L	601	-	1,2,2	0.72	0	0,1,1	-	-
2	SCN	B	601	-	1,2,2	0.88	0	0,1,1	-	-
2	SCN	C	601	-	1,2,2	0.85	0	0,1,1	-	-
2	SCN	A	601	-	1,2,2	0.88	0	0,1,1	-	-
2	SCN	E	601	-	1,2,2	0.75	0	0,1,1	-	-

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.

3 monomers are involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	D	601	SCN	1	0
2	I	601	SCN	1	0
2	L	601	SCN	1	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^{th} 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	189/200 (94%)	-0.23	0 100 100	29, 46, 80, 111	0
1	B	195/200 (97%)	-0.20	1 (0%) 91 91	30, 52, 83, 95	0
1	C	183/200 (91%)	-0.09	2 (1%) 80 82	35, 49, 86, 107	0
1	D	184/200 (92%)	-0.29	1 (0%) 91 91	35, 55, 91, 102	0
1	E	186/200 (93%)	-0.14	2 (1%) 80 82	36, 59, 95, 119	0
1	F	185/200 (92%)	-0.26	2 (1%) 80 82	42, 56, 92, 110	0
1	G	184/200 (92%)	-0.13	1 (0%) 91 91	40, 60, 96, 119	0
1	H	186/200 (93%)	-0.06	3 (1%) 72 74	41, 71, 98, 122	0
1	I	186/200 (93%)	-0.04	3 (1%) 72 74	40, 64, 96, 107	0
1	J	184/200 (92%)	-0.18	1 (0%) 91 91	45, 59, 90, 105	0
1	K	185/200 (92%)	-0.00	2 (1%) 80 82	44, 68, 94, 103	0
1	L	182/200 (91%)	0.08	2 (1%) 80 82	50, 73, 114, 128	0
All	All	2229/2400 (92%)	-0.13	20 (0%) 84 86	29, 59, 95, 128	0

All (20) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	L	471	LYS	4.3
1	D	470	TRP	3.6
1	K	397	TYR	3.6
1	F	470	TRP	3.3
1	C	471	LYS	3.2
1	J	470	TRP	3.2
1	E	367	VAL	2.8
1	I	397[A]	TYR	2.8
1	B	397[A]	TYR	2.8
1	H	397	TYR	2.8
1	L	470	TRP	2.6

Continued on next page...

Continued from previous page...

Mol	Chain	Res	Type	RSRZ
1	E	397[A]	TYR	2.5
1	I	471	LYS	2.4
1	K	533	PHE	2.4
1	H	381	GLU	2.4
1	H	380	LYS	2.3
1	G	548	VAL	2.3
1	C	397[A]	TYR	2.1
1	I	365	HIS	2.0
1	F	397[A]	TYR	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^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	SCN	H	601	3/3	0.87	0.30	95,95,97,98	0
2	SCN	K	601	3/3	0.91	0.24	110,110,120,135	0
2	SCN	E	601	3/3	0.92	0.36	126,126,132,144	0
2	SCN	J	601	3/3	0.95	0.23	97,97,101,104	0
2	SCN	L	601	3/3	0.95	0.31	77,77,82,96	0
2	SCN	F	601	3/3	0.96	0.14	55,55,69,84	0
2	SCN	G	601	3/3	0.97	0.23	63,63,78,84	0
2	SCN	A	601	3/3	0.97	0.17	67,67,77,82	0
2	SCN	I	601	3/3	0.97	0.25	71,71,77,86	0
2	SCN	B	601	3/3	0.98	0.25	72,72,83,92	0
2	SCN	D	601	3/3	0.98	0.16	47,47,57,67	0
2	SCN	C	601	3/3	0.99	0.18	64,64,70,75	0

6.5 Other polymers (i)

There are no such residues in this entry.