



# Full wwPDB X-ray Structure Validation Report ⓘ

Sep 11, 2023 – 04:18 AM EDT

PDB ID : 4JGH  
Title : Structure of the SOCS2-Elongin BC complex bound to an N-terminal fragment of Cullin5  
Authors : Kim, Y.K.; Kwak, M.J.; Ku, B.; Suh, H.Y.; Joo, K.; Lee, J.; Jung, J.U.; Oh, B.H.  
Deposited on : 2013-03-01  
Resolution : 3.00 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  
Xtriage (Phenix) : 1.13  
EDS : 2.35.1  
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) : 2.35.1

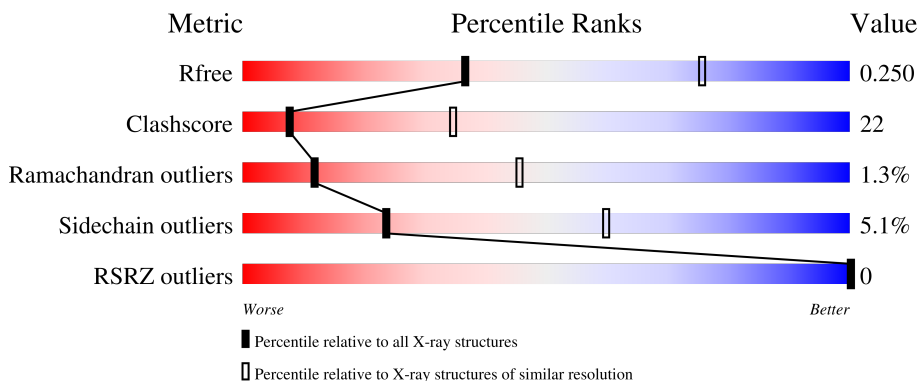
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.00 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	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

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	173	
2	B	118	
3	C	96	
4	D	378	

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 5902 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 Suppressor of cytokine signaling 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	163	1310	842	220	242	6	0	0	0

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	26	HIS	-	expression tag	UNP O14508
A	27	MET	-	expression tag	UNP O14508
A	28	ASP	-	expression tag	UNP O14508
A	29	PRO	-	expression tag	UNP O14508
A	30	GLU	-	expression tag	UNP O14508
A	31	PHE	-	expression tag	UNP O14508

- Molecule 2 is a protein called Transcription elongation factor B polypeptide 2.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	104	828	524	141	159	4	0	0	0

- Molecule 3 is a protein called Transcription elongation factor B polypeptide 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
3	C	96	762	489	122	145	6	0	0	0

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	100	PRO	ALA	SEE REMARK 999	UNP P83940

- Molecule 4 is a protein called Cullin-5.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
4	D	368	3002	1907	509	568	18	0	0	0

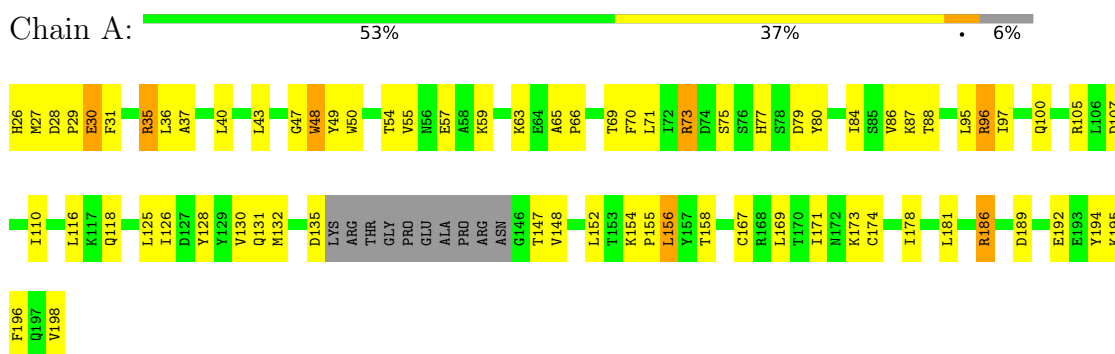
There are 3 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
D	341	ARG	VAL	engineered mutation	UNP Q93034
D	345	ASP	LEU	engineered mutation	UNP Q93034
D	387	VAL	-	expression tag	UNP Q93034

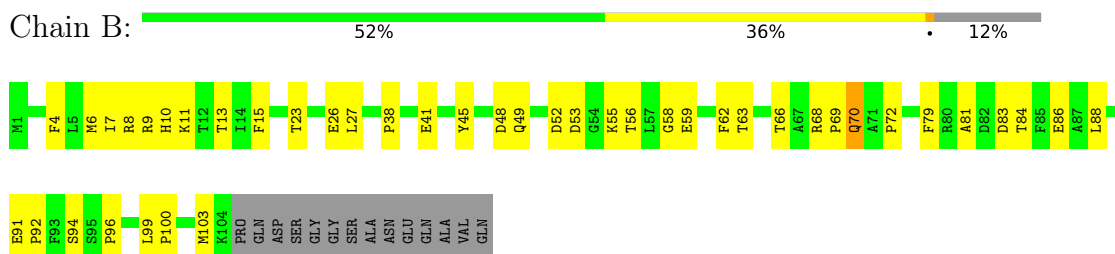
### 3 Residue-property plots [i](#)

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.

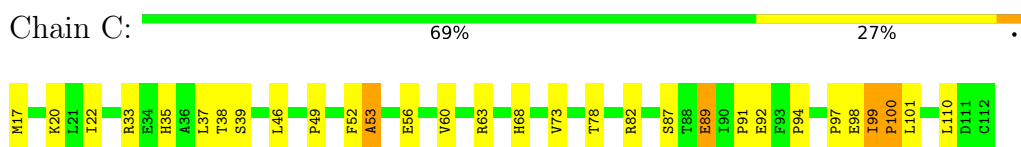
- Molecule 1: Suppressor of cytokine signaling 2



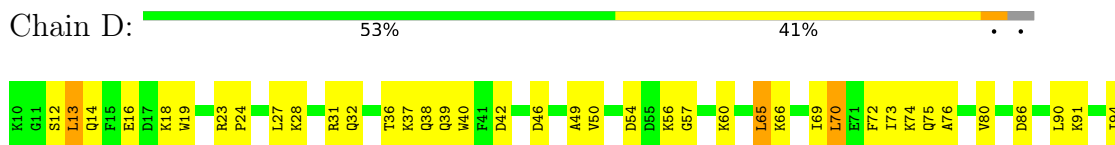
- Molecule 2: Transcription elongation factor B polypeptide 2



- Molecule 3: Transcription elongation factor B polypeptide 1



- Molecule 4: Cullin-5



V95	E96	W97	R98	Q103	L107	P108	K109	P110	Q113	L114	E115	I116	T117	L118	MET	GLY	LYS	GLN	GLY	ASN	ASN	LYS	LYS	LYS	LYS	LYS	LYS	N129	V130	E131	D132	S133	R136	K137	L138	T142	I147	F148	S149	N150	I151	K152	N153	R154	L155	S158	R167	D173	S174	Q175	L176	G179
V180	R181	V185	V185	M190	P191	E192	D193	K194	L195	Q196	I197	N201	I116	Y206	L207	D208	S209	T210	Y214	R215	T216	Q217	A218	P219	L222	Q223	V227	Q228	N229	Y230	M231	K237	R244	A245	Y248	L249	E250	T251	R252	R253	E254	C255	L261	M262	E263	C264	F273	K274	E275			
T276	I277	L278	A279	E280	C281	Q282	G283	M284	I285	K286	R287	K288	E289	T290	E291	K292	L293	H294	L295	M296	M300	P304	N305	G306	I307	E308	P309	M310	L311	K312	D313	L314	E315	E316	L323	A324	D325	M326	I333	T334	E338	K339	Y340	E341	E342	Q343	L344	L347	F348	K349	R350	K353
L354	V355	Q360	R364	F365	L366	T367	A368	A372	Y373	K374	A375	V376	D379	I382	L385	E386	V387																																			

## 4 Data and refinement statistics i

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	138.85Å 141.46Å 182.00Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 3.00 49.54 – 3.01	Depositor EDS
% Data completeness (in resolution range)	(Not available) (30.00-3.00) 96.8 (49.54-3.01)	Depositor EDS
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.82 (at 3.01Å)	Xtrriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.225 , 0.248 0.226 , 0.250	Depositor DCC
$R_{free}$ test set	3438 reflections (9.96%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	58.1	Xtrriage
Anisotropy	0.134	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 11.2	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtrriage
Estimated twinning fraction	0.045 for -k,-h,-l	Xtrriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	5902	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	74.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.31% 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](#)

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	0.30	0/1340	0.60	1/1812 (0.1%)
2	B	0.30	0/844	0.59	0/1139
3	C	0.31	0/780	0.53	0/1055
4	D	0.29	0/3055	0.52	0/4116
All	All	0.29	0/6019	0.55	1/8122 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	186	ARG	NE-CZ-NH1	5.24	122.92	120.30

There are no chirality outliers.

There are no planarity outliers.

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

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

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	1310	0	1310	66	0
2	B	828	0	834	31	0
3	C	762	0	751	34	0
4	D	3002	0	2987	137	0
All	All	5902	0	5882	257	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 22.



All (257) 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)
4:D:167:ARG:HH12	4:D:210:THR:HA	1.20	1.06
4:D:253:ARG:HB2	4:D:253:ARG:HH11	1.31	0.96
1:A:107:ASP:HB3	1:A:110:ILE:HD13	1.48	0.96
4:D:333:ILE:HG23	4:D:340:TYR:HA	1.56	0.87
4:D:109:LYS:HB2	4:D:110:PRO:HD3	1.54	0.87
2:B:9:ARG:HG2	2:B:10:HIS:H	1.40	0.86
3:C:101:LEU:HD12	3:C:101:LEU:H	1.42	0.84
4:D:181:ARG:HD3	4:D:248:TYR:O	1.79	0.81
4:D:315:GLU:HB2	4:D:372:ALA:HB2	1.63	0.81
4:D:285:ILE:HD11	4:D:314:LEU:HD12	1.64	0.79
3:C:35:HIS:O	3:C:38:THR:HG23	1.83	0.77
1:A:54:THR:HG22	1:A:57:GLU:CG	2.15	0.77
4:D:307:ILE:HD11	4:D:364:ARG:CZ	2.17	0.75
4:D:218:ALA:HB3	4:D:219:PRO:HD3	1.66	0.74
2:B:56:THR:OG1	2:B:59:GLU:HG3	1.89	0.72
1:A:54:THR:HG22	1:A:57:GLU:HG3	1.72	0.72
4:D:308:GLU:N	4:D:309:PRO:HD2	2.05	0.71
4:D:73:ILE:HD12	4:D:142:THR:HG22	1.73	0.70
4:D:185:VAL:HG21	4:D:250:GLU:HG2	1.74	0.69
1:A:40:LEU:HD23	1:A:40:LEU:O	1.92	0.68
4:D:73:ILE:HD12	4:D:142:THR:CG2	2.25	0.67
4:D:280:GLU:O	4:D:284:MET:HG3	1.94	0.67
4:D:32:GLN:HE21	4:D:103:GLN:NE2	1.92	0.67
4:D:173:ASP:OD1	4:D:175:GLN:HB2	1.95	0.66
4:D:190:ASN:HB3	4:D:193:ASP:O	1.94	0.66
4:D:69:ILE:HD12	4:D:138:LEU:HD22	1.77	0.66
4:D:13:LEU:HD13	4:D:18:LYS:HE3	1.77	0.66
4:D:307:ILE:HG22	4:D:310:MET:HE2	1.77	0.66
1:A:80:TYR:CE2	1:A:96:ARG:HG2	2.31	0.66
3:C:99:ILE:N	3:C:100:PRO:CD	2.57	0.66
4:D:32:GLN:HE21	4:D:103:GLN:HE21	1.45	0.65
3:C:100:PRO:HG2	3:C:101:LEU:HD12	1.78	0.65
4:D:54:ASP:HB3	4:D:57:GLY:HA3	1.76	0.65
4:D:253:ARG:HB2	4:D:253:ARG:NH1	2.08	0.64
4:D:152:LYS:HG3	4:D:153:ASN:H	1.64	0.63
4:D:214:TYR:HA	4:D:217:GLN:HB3	1.82	0.61
1:A:28:ASP:HB3	1:A:31:PHE:HB3	1.83	0.61
4:D:348:PHE:HB2	4:D:373:TYR:CE2	2.36	0.61
1:A:167:CYS:O	1:A:171:ILE:HG13	2.01	0.61
4:D:355:VAL:HG11	4:D:366:LEU:HD23	1.83	0.60

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:105:ARG:HG2	1:A:118:GLN:HG2	1.83	0.60
2:B:9:ARG:CG	2:B:10:HIS:H	2.14	0.60
4:D:13:LEU:HD11	4:D:49:ALA:HB1	1.84	0.60
1:A:47:GLY:O	1:A:158:THR:HG22	2.02	0.59
2:B:6:MET:HE3	2:B:15:PHE:CE1	2.37	0.59
3:C:53:ALA:HB3	3:C:56:GLU:HB2	1.85	0.59
1:A:130:VAL:HA	1:A:152:LEU:O	2.02	0.59
1:A:70:PHE:CZ	1:A:155:PRO:HB3	2.37	0.59
4:D:138:LEU:HD23	4:D:138:LEU:O	2.03	0.59
4:D:76:ALA:HB1	4:D:96:GLU:HG2	1.85	0.59
2:B:52:ASP:HB3	2:B:55:LYS:HG2	1.85	0.58
2:B:68:ARG:HB3	2:B:70:GLN:OE1	2.03	0.58
2:B:70:GLN:H	2:B:70:GLN:NE2	2.02	0.57
1:A:147:THR:HG22	1:A:148:VAL:N	2.19	0.57
1:A:155:PRO:HG3	1:A:198:VAL:HG22	1.86	0.57
4:D:374:LYS:O	4:D:374:LYS:HD3	2.04	0.57
3:C:99:ILE:N	3:C:100:PRO:HD3	2.18	0.57
3:C:53:ALA:HB3	3:C:56:GLU:CB	2.35	0.57
4:D:152:LYS:HG3	4:D:153:ASN:N	2.19	0.57
4:D:197:ILE:O	4:D:201:ASN:HB2	2.04	0.57
4:D:253:ARG:HG3	4:D:254:GLU:N	2.20	0.57
4:D:56:LYS:HB2	4:D:60:LYS:HE3	1.86	0.56
1:A:71:LEU:HD12	1:A:71:LEU:C	2.26	0.56
2:B:11:LYS:HG3	2:B:91:GLU:HG3	1.87	0.56
1:A:174:CYS:SG	3:C:97:PRO:HB3	2.45	0.56
4:D:277:ILE:O	4:D:296:MET:HE1	2.06	0.56
1:A:54:THR:CG2	1:A:57:GLU:HG3	2.35	0.56
4:D:308:GLU:N	4:D:309:PRO:CD	2.68	0.56
2:B:103:MET:HE1	3:C:101:LEU:HD11	1.87	0.56
1:A:147:THR:HG22	1:A:148:VAL:H	1.71	0.56
4:D:325:ASP:OD2	4:D:347:LEU:HD21	2.06	0.56
1:A:155:PRO:HG3	1:A:198:VAL:CG2	2.36	0.56
4:D:278:LEU:HD13	4:D:309:PRO:HG3	1.88	0.56
1:A:48:TRP:O	1:A:50:TRP:HD1	1.89	0.55
1:A:178:ILE:O	1:A:181:LEU:HG	2.06	0.55
1:A:28:ASP:OD2	1:A:30:GLU:HG3	2.06	0.55
4:D:284:MET:HE1	4:D:292:LYS:HB3	1.87	0.55
1:A:147:THR:HG22	1:A:148:VAL:HG23	1.89	0.55
1:A:194:TYR:CE1	1:A:196:PHE:HB2	2.40	0.55
4:D:91:LYS:O	4:D:95:VAL:HG23	2.07	0.55
1:A:178:ILE:HD11	1:A:195:LYS:NZ	2.21	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:278:LEU:HD21	4:D:300:MET:HG3	1.89	0.55
4:D:386:GLU:OE1	4:D:386:GLU:N	2.40	0.55
1:A:195:LYS:HA	1:A:195:LYS:HE2	1.88	0.54
1:A:28:ASP:CG	1:A:29:PRO:HD2	2.28	0.54
1:A:80:TYR:CZ	1:A:96:ARG:HG2	2.42	0.54
4:D:334:THR:HG23	4:D:382:ILE:HG21	1.90	0.54
2:B:6:MET:HB2	2:B:72:PRO:HB2	1.89	0.54
4:D:31:ARG:HH11	4:D:31:ARG:HG3	1.72	0.54
4:D:98:ARG:HD2	4:D:175:GLN:OE1	2.07	0.54
1:A:186:ARG:O	1:A:189:ASP:HB2	2.08	0.54
2:B:103:MET:CE	3:C:101:LEU:HD11	2.38	0.54
3:C:17:MET:CE	3:C:33:ARG:HD3	2.37	0.54
2:B:45:TYR:CE2	2:B:88:LEU:HB2	2.43	0.54
4:D:90:LEU:HD12	4:D:155:LEU:HD22	1.89	0.54
4:D:372:ALA:O	4:D:375:ALA:HB3	2.07	0.53
4:D:338:GLU:O	4:D:342:GLU:HG3	2.08	0.53
4:D:129:ASN:HD22	4:D:132:ASP:H	1.55	0.53
1:A:69:THR:HG23	1:A:156:LEU:HD13	1.90	0.53
3:C:97:PRO:C	3:C:100:PRO:HD3	2.29	0.53
2:B:7:ILE:HD11	2:B:27:LEU:HD11	1.91	0.53
4:D:117:THR:HG22	4:D:117:THR:O	2.09	0.53
1:A:194:TYR:HE1	1:A:196:PHE:HB2	1.74	0.52
3:C:63:ARG:HD3	4:D:42:ASP:OD1	2.09	0.52
4:D:323:LEU:HD23	4:D:376:VAL:HG13	1.91	0.52
4:D:133:SER:HB3	4:D:136:ARG:HB3	1.90	0.52
2:B:4:PHE:CE2	2:B:69:PRO:HG3	2.45	0.52
4:D:294:HIS:NE2	4:D:360:GLN:OE1	2.42	0.52
1:A:54:THR:HG23	1:A:57:GLU:H	1.74	0.52
1:A:59:LYS:O	1:A:63:LYS:HB2	2.10	0.52
1:A:125:LEU:C	1:A:125:LEU:HD23	2.29	0.52
3:C:22:ILE:N	3:C:22:ILE:HD12	2.25	0.52
3:C:99:ILE:H	3:C:100:PRO:HD3	1.75	0.52
4:D:136:ARG:HH11	4:D:136:ARG:HG3	1.75	0.51
4:D:287:ARG:HB2	4:D:289:GLU:HG3	1.92	0.51
1:A:55:VAL:HA	1:A:73:ARG:NH2	2.25	0.51
4:D:36:THR:OG1	4:D:39:GLN:HG3	2.11	0.51
4:D:385:LEU:C	4:D:385:LEU:HD12	2.31	0.51
1:A:126:ILE:O	1:A:130:VAL:HG23	2.11	0.51
1:A:54:THR:HG22	1:A:57:GLU:CD	2.32	0.50
1:A:110:ILE:HD12	1:A:110:ILE:N	2.26	0.50
2:B:23:THR:OG1	2:B:26:GLU:HG3	2.11	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:31:ARG:HG2	4:D:72:PHE:CD2	2.47	0.50
4:D:284:MET:HE2	4:D:292:LYS:HD3	1.92	0.50
2:B:8:ARG:HG2	2:B:13:THR:HG23	1.94	0.50
4:D:148:PHE:O	4:D:150:ASN:N	2.45	0.50
4:D:27:LEU:HD12	4:D:31:ARG:HH12	1.77	0.50
4:D:46:ASP:O	4:D:50:VAL:HG23	2.12	0.50
1:A:43:LEU:HD13	1:A:49:TYR:HB2	1.94	0.50
1:A:69:THR:CG2	1:A:156:LEU:HD13	2.42	0.50
4:D:227:VAL:O	4:D:231:MET:HG3	2.12	0.50
4:D:307:ILE:HD11	4:D:364:ARG:NH1	2.26	0.50
4:D:147:ILE:O	4:D:151:ILE:HG12	2.12	0.50
4:D:12:SER:HB3	4:D:14:GLN:NE2	2.27	0.50
4:D:261:LEU:O	4:D:264:CYS:HB3	2.12	0.49
4:D:311:LEU:HD23	4:D:365:PHE:CE1	2.47	0.49
4:D:167:ARG:NH1	4:D:210:THR:HA	2.05	0.49
1:A:178:ILE:HD11	1:A:195:LYS:HE3	1.94	0.49
3:C:49:PRO:HG2	4:D:40:TRP:CD2	2.46	0.49
2:B:94:SER:O	3:C:68:HIS:HB3	2.12	0.49
1:A:84:ILE:CG1	1:A:97:ILE:HD11	2.43	0.49
1:A:95:LEU:HD22	1:A:110:ILE:HD11	1.95	0.49
1:A:178:ILE:HD12	1:A:192:GLU:OE2	2.12	0.49
4:D:76:ALA:O	4:D:80:VAL:HG23	2.13	0.49
1:A:54:THR:CG2	1:A:57:GLU:H	2.26	0.49
2:B:8:ARG:NH2	2:B:91:GLU:O	2.45	0.49
3:C:82:ARG:NH1	3:C:82:ARG:HB3	2.28	0.49
4:D:116:ILE:HG22	4:D:116:ILE:O	2.13	0.49
1:A:77:HIS:HE1	1:A:79:ASP:OD2	1.95	0.48
4:D:24:PRO:O	4:D:28:LYS:HG3	2.13	0.48
2:B:103:MET:HE2	3:C:101:LEU:HD21	1.96	0.48
1:A:198:VAL:HG22	1:A:198:VAL:OXT	2.14	0.48
3:C:17:MET:HE3	3:C:33:ARG:HD3	1.95	0.48
3:C:73:VAL:HG11	3:C:110:LEU:CD1	2.43	0.48
4:D:312:LYS:O	4:D:316:GLU:HB2	2.13	0.48
4:D:343:GLN:HA	4:D:343:GLN:OE1	2.14	0.48
4:D:16:GLU:CD	4:D:16:GLU:H	2.16	0.48
4:D:23:ARG:N	4:D:24:PRO:HD2	2.28	0.48
4:D:278:LEU:HD13	4:D:309:PRO:CG	2.43	0.48
4:D:253:ARG:HG3	4:D:254:GLU:H	1.79	0.48
4:D:195:LEU:CD1	4:D:255:CYS:HB3	2.44	0.48
1:A:69:THR:HA	1:A:154:LYS:O	2.14	0.48
4:D:23:ARG:HG3	4:D:27:LEU:HD21	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:D:27:LEU:HD12	4:D:31:ARG:NH1	2.29	0.47
1:A:95:LEU:O	1:A:95:LEU:HD12	2.14	0.47
4:D:307:ILE:HG22	4:D:310:MET:CE	2.41	0.47
2:B:58:GLY:HA2	2:B:62:PHE:O	2.14	0.47
4:D:31:ARG:HG3	4:D:31:ARG:NH1	2.30	0.47
4:D:117:THR:O	4:D:118:LEU:HD23	2.14	0.47
4:D:284:MET:CE	4:D:292:LYS:HD3	2.44	0.47
1:A:36:LEU:HD23	1:A:36:LEU:C	2.35	0.47
4:D:176:LEU:O	4:D:180:VAL:HG23	2.15	0.47
4:D:350:ARG:O	4:D:353:LYS:HB3	2.15	0.47
4:D:129:ASN:ND2	4:D:132:ASP:H	2.12	0.47
1:A:87:LYS:HD3	1:A:88:THR:N	2.30	0.47
1:A:169:LEU:O	1:A:173:LYS:HG3	2.14	0.47
4:D:113:GLN:HA	4:D:113:GLN:NE2	2.30	0.47
2:B:48:ASP:O	2:B:49:GLN:HG2	2.15	0.47
4:D:284:MET:CE	4:D:292:LYS:HB3	2.45	0.46
1:A:178:ILE:HD11	1:A:195:LYS:CE	2.45	0.46
2:B:4:PHE:CD2	2:B:69:PRO:HG3	2.50	0.46
3:C:92:GLU:HG2	3:C:94:PRO:HD3	1.98	0.45
2:B:70:GLN:H	2:B:70:GLN:CD	2.19	0.45
2:B:79:PHE:O	2:B:86:GLU:HG2	2.17	0.45
4:D:151:ILE:O	4:D:155:LEU:HG	2.17	0.45
4:D:14:GLN:HB3	4:D:54:ASP:OD2	2.17	0.45
4:D:273:PHE:O	4:D:277:ILE:HG12	2.16	0.45
4:D:72:PHE:O	4:D:75:GLN:HB2	2.17	0.45
3:C:49:PRO:HG2	4:D:40:TRP:CG	2.52	0.45
3:C:52:PHE:CE1	4:D:37:LYS:HE3	2.52	0.45
4:D:244:ARG:HG3	4:D:245:ALA:N	2.32	0.45
1:A:77:HIS:HB3	1:A:80:TYR:CE1	2.52	0.44
4:D:23:ARG:HG3	4:D:27:LEU:CD2	2.46	0.44
1:A:54:THR:C	1:A:73:ARG:HH21	2.20	0.44
3:C:20:LYS:HG2	3:C:22:ILE:CD1	2.48	0.44
4:D:133:SER:HB3	4:D:136:ARG:CB	2.47	0.44
4:D:290:THR:HG22	4:D:354:LEU:HD12	2.00	0.44
3:C:82:ARG:HB3	3:C:82:ARG:HH11	1.82	0.44
4:D:27:LEU:CD1	4:D:31:ARG:HH12	2.31	0.44
1:A:147:THR:CG2	1:A:148:VAL:H	2.29	0.44
2:B:96:PRO:HB3	3:C:99:ILE:HG22	1.98	0.44
1:A:84:ILE:HG13	1:A:97:ILE:HD11	1.99	0.44
1:A:131:GLN:HE21	1:A:131:GLN:HB3	1.58	0.44
1:A:35:ARG:HH11	1:A:35:ARG:HB2	1.82	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:100:GLN:HB2	1:A:105:ARG:HH12	1.83	0.43
4:D:38:GLN:NE2	4:D:42:ASP:OD2	2.51	0.43
1:A:65:ALA:HB1	1:A:66:PRO:HD2	2.00	0.43
2:B:99:LEU:HD12	2:B:100:PRO:HD2	2.00	0.43
3:C:20:LYS:HG2	3:C:22:ILE:HD11	1.99	0.43
2:B:63:THR:OG1	2:B:66:THR:HG23	2.19	0.43
2:B:91:GLU:OE2	2:B:92:PRO:HD2	2.18	0.43
4:D:385:LEU:C	4:D:386:GLU:HG3	2.39	0.43
4:D:66:LYS:HB2	4:D:66:LYS:HE3	1.85	0.43
3:C:100:PRO:HG2	3:C:101:LEU:CD1	2.49	0.42
4:D:130:VAL:HG12	4:D:130:VAL:O	2.19	0.42
3:C:37:LEU:C	3:C:39:SER:H	2.21	0.42
4:D:282:GLN:C	4:D:285:ILE:HG22	2.40	0.42
4:D:206:TYR:CD2	4:D:249:LEU:HD21	2.54	0.42
3:C:37:LEU:C	3:C:39:SER:N	2.72	0.42
4:D:54:ASP:HB3	4:D:57:GLY:CA	2.46	0.42
4:D:192:GLU:O	4:D:193:ASP:HB2	2.19	0.42
4:D:323:LEU:CD2	4:D:376:VAL:HG13	2.50	0.42
1:A:128:TYR:O	1:A:132:MET:HG2	2.19	0.42
3:C:101:LEU:H	3:C:101:LEU:CD1	2.21	0.42
2:B:83:ASP:OD2	2:B:84:THR:N	2.50	0.42
4:D:300:MET:O	4:D:306:GLY:HA3	2.20	0.42
4:D:282:GLN:O	4:D:285:ILE:HG22	2.19	0.42
4:D:374:LYS:HD3	4:D:374:LYS:C	2.40	0.41
2:B:38:PRO:HG2	2:B:41:GLU:HG3	2.02	0.41
4:D:38:GLN:O	4:D:42:ASP:OD2	2.38	0.41
1:A:26:HIS:CE1	1:A:27:MET:HG3	2.56	0.41
4:D:94:ILE:HD12	4:D:179:GLY:HA3	2.03	0.41
4:D:113:GLN:HA	4:D:113:GLN:HE21	1.84	0.41
3:C:46:LEU:HD21	3:C:60:VAL:HG23	2.03	0.41
4:D:107:LEU:N	4:D:108:PRO:CD	2.84	0.41
4:D:109:LYS:HB2	4:D:110:PRO:CD	2.37	0.41
4:D:154:ARG:O	4:D:158:SER:HB2	2.19	0.41
4:D:222:LEU:HD11	4:D:227:VAL:HG22	2.02	0.41
1:A:186:ARG:NH1	4:D:113:GLN:OE1	2.54	0.41
4:D:278:LEU:CD1	4:D:309:PRO:HG3	2.50	0.41
4:D:343:GLN:O	4:D:347:LEU:HG	2.21	0.41
1:A:36:LEU:HD23	1:A:37:ALA:N	2.36	0.41
4:D:65:LEU:O	4:D:69:ILE:HG13	2.21	0.40
4:D:284:MET:HA	4:D:289:GLU:OE1	2.21	0.40
4:D:326:MET:HE2	4:D:344:LEU:HD21	2.02	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:86:VAL:HG22	1:A:87:LYS:N	2.35	0.40
4:D:70:LEU:CD2	4:D:74:LYS:HE3	2.51	0.40
4:D:237:LYS:HD2	4:D:237:LYS:HA	1.79	0.40
2:B:100:PRO:HD2	2:B:103:MET:CE	2.51	0.40
3:C:87:SER:C	3:C:89:GLU:H	2.24	0.40
4:D:273:PHE:CD2	4:D:273:PHE:N	2.90	0.40
4:D:304:PRO:O	4:D:305:ASN:HB3	2.21	0.40
1:A:75:SER:C	1:A:77:HIS:H	2.25	0.40
4:D:138:LEU:HD23	4:D:138:LEU:C	2.41	0.40
4:D:231:MET:HG2	4:D:277:ILE:HD12	2.03	0.40
4:D:261:LEU:HD23	4:D:262:MET:N	2.37	0.40
4:D:365:PHE:O	4:D:368:ALA:HB3	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	159/173 (92%)	142 (89%)	16 (10%)	1 (1%)	25	64
2	B	102/118 (86%)	93 (91%)	8 (8%)	1 (1%)	15	53
3	C	94/96 (98%)	87 (93%)	3 (3%)	4 (4%)	2	15
4	D	364/378 (96%)	322 (88%)	39 (11%)	3 (1%)	19	57
All	All	719/765 (94%)	644 (90%)	66 (9%)	9 (1%)	12	45

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	D	149	SER
4	D	193	ASP
4	D	19	TRP

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Mol	Chain	Res	Type
1	A	96	ARG
2	B	81	ALA
3	C	53	ALA
3	C	91	PRO
3	C	99	ILE
3	C	100	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	143/153 (94%)	136 (95%)	7 (5%)	25	61
2	B	92/102 (90%)	90 (98%)	2 (2%)	52	81
3	C	86/86 (100%)	83 (96%)	3 (4%)	36	71
4	D	329/340 (97%)	308 (94%)	21 (6%)	17	51
All	All	650/681 (95%)	617 (95%)	33 (5%)	24	60

All (33) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	30	GLU
1	A	35	ARG
1	A	48	TRP
1	A	73	ARG
1	A	116	LEU
1	A	135	ASP
1	A	156	LEU
2	B	53	ASP
2	B	70	GLN
3	C	78	THR
3	C	89	GLU
3	C	98	GLU
4	D	13	LEU
4	D	65	LEU
4	D	70	LEU

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
4	D	86	ASP
4	D	114	LEU
4	D	136	ARG
4	D	208	ASP
4	D	215	ARG
4	D	223	GLN
4	D	229	ASN
4	D	250	GLU
4	D	252	ARG
4	D	253	ARG
4	D	254	GLU
4	D	261	LEU
4	D	275	GLU
4	D	308	GLU
4	D	313	ASP
4	D	325	ASP
4	D	379	ASP
4	D	386	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	32	GLN
1	A	124	HIS
1	A	131	GLN
1	A	164	GLN
2	B	70	GLN
3	C	35	HIS
3	C	51	GLN
3	C	108	ASN
4	D	48	HIS
4	D	103	GLN
4	D	129	ASN
4	D	153	ASN
4	D	223	GLN
4	D	229	ASN
4	D	288	ASN
4	D	360	GLN

### 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](#)

There are no ligands in this entry.

### 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	163/173 (94%)	-0.20	0 100 100	49, 72, 101, 131	0
2	B	104/118 (88%)	-0.20	0 100 100	44, 62, 89, 98	0
3	C	96/96 (100%)	-0.22	0 100 100	45, 60, 89, 94	0
4	D	368/378 (97%)	-0.24	0 100 100	51, 78, 103, 124	0
All	All	731/765 (95%)	-0.22	0 100 100	44, 73, 100, 131	0

There are no RSRZ outliers to report.

### 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](#)

There are no ligands in this entry.

### 6.5 Other polymers [i](#)

There are no such residues in this entry.