



# Full wwPDB X-ray Structure Validation Report ⓘ

Apr 2, 2025 – 12:12 am BST

PDB ID : 6I5N / pdb\_00006i5n  
Title : Crystal structure of SOCS2:Elongin C:Elongin B in complex with growth hormone receptor peptide  
Authors : Kung, W.W.; Ramachandran, S.; Makukhin, N.; Bruno, E.; Ciulli, A.  
Deposited on : 2018-11-14  
Resolution : 1.98 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	:	1.8.4, CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	3.0
Percentile statistics	:	20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4	:	9.0.003 (Gargrove)
Density-Fitness	:	1.0.11
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.42

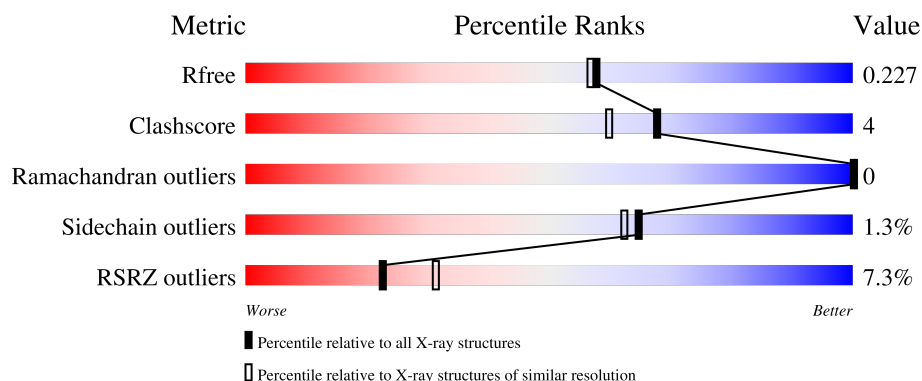
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.98 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))
$R_{free}$	164625	1356 (1.98-1.98)
Clashscore	180529	1437 (1.98-1.98)
Ramachandran outliers	177936	1426 (1.98-1.98)
Sidechain outliers	177891	1426 (1.98-1.98)
RSRZ outliers	164620	1356 (1.98-1.98)

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	169	<div> <div>3%</div> <div>86%</div> <div>9%</div> <div>5%</div> </div>
1	D	169	<div> <div>7%</div> <div>76%</div> <div>13%</div> <div>11%</div> </div>
2	B	104	<div> <div>12%</div> <div>94%</div> <div>5%</div> </div>
2	E	104	<div> <div>6%</div> <div>93%</div> <div>•</div> <div>•</div> </div>
3	C	97	<div> <div>5%</div> <div>93%</div> <div>7%</div> </div>

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Mol	Chain	Length	Quality of chain
3	F	97	<div><div></div><div>2%</div><div>95%</div><div></div><div></div></div>
4	I	11	<div><div></div><div>9%</div><div>64%</div><div>18%</div><div>18%</div></div>
4	J	11	<div><div></div><div>27%</div><div>73%</div><div>18%</div><div>9%</div></div>
4	K	11	<div><div></div><div>9%</div><div>64%</div><div>27%</div><div>9%</div></div>
4	L	11	<div><div></div><div>64%</div><div>55%</div><div>18%</div><div>9%</div><div>18%</div></div>

## 2 Entry composition [i](#)

There are 7 unique types of molecules in this entry. The entry contains 6433 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
1	A	160	Total	As	C	N	O	S	0	0	0
			1263	3	813	210	230	7			
1	D	151	Total	As	C	N	O	S	0	0	0
			1206	2	774	201	223	6			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	31	MET	PRO	conflict	UNP O14508
A	115	ALA	LYS	conflict	UNP O14508
A	117	ALA	LYS	conflict	UNP O14508
A	118	ALA	GLN	conflict	UNP O14508
D	31	MET	PRO	conflict	UNP O14508
D	115	ALA	LYS	conflict	UNP O14508
D	117	ALA	LYS	conflict	UNP O14508
D	118	ALA	GLN	conflict	UNP O14508

- Molecule 2 is a protein called Elongin-B.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
2	B	103	Total	As	C	N	O	S	0	0	0
			795	1	508	133	149	4			
2	E	101	Total	As	C	N	O	S	0	0	0
			795	1	504	133	153	4			

- Molecule 3 is a protein called Elongin-C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	97	Total	C	N	O	S	0	0	0
			762	489	122	145	6			
3	F	97	Total	C	N	O	S	0	0	0
			756	487	119	143	7			

There are 2 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
C	16	MET	-	initiating methionine	UNP Q15369
F	16	MET	-	initiating methionine	UNP Q15369

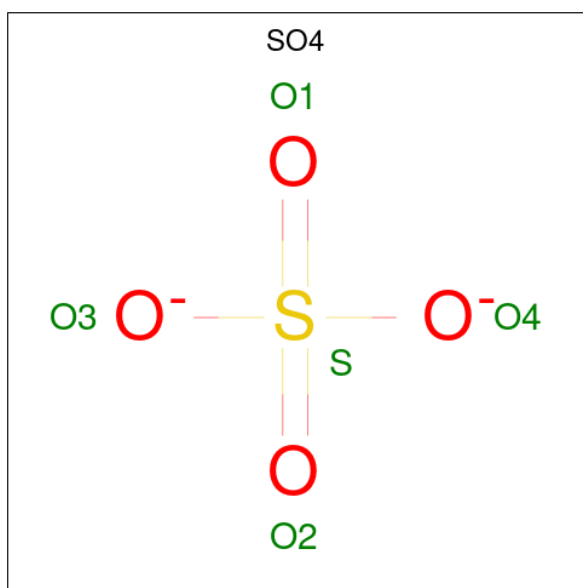
- Molecule 4 is a protein called Growth hormone receptor peptide.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
4	J	10	Total 84	C 53	N 12	O 18	P 1	0	0	0
4	K	10	Total 83	C 51	N 13	O 18	P 1	0	0	0
4	I	11	Total 96	C 61	N 14	O 20	P 1	0	1	0
4	L	9	Total 74	C 47	N 12	O 14	P 1	0	0	0

- Molecule 5 is COBALT (II) ION (CCD ID: CO) (formula: Co).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	1	Total	Co	0	0
			1	1		
5	D	1	Total	Co	0	0
			1	1		

- Molecule 6 is SULFATE ION (CCD ID: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
6	D	1	Total	O	S	0	0
			5	4	1		

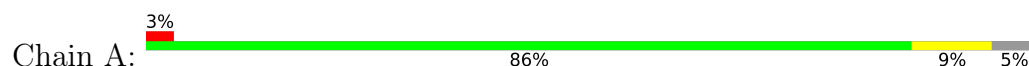
- Molecule 7 is water.

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
7	A	102	Total	O		0	0
			102	102			
7	B	74	Total	O		0	0
			74	74			
7	C	69	Total	O		0	0
			69	69			
7	D	72	Total	O		0	0
			72	72			
7	E	109	Total	O		0	0
			109	109			
7	F	61	Total	O		0	0
			61	61			
7	J	1	Total	O		0	0
			1	1			
7	K	13	Total	O		0	0
			13	13			
7	I	9	Total	O		0	0
			9	9			
7	L	2	Total	O		0	0
			2	2			

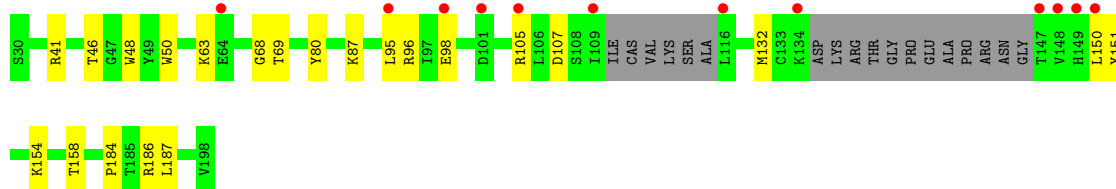
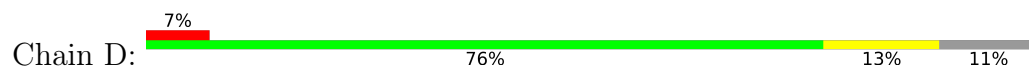
### 3 Residue-property plots [i](#)

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.

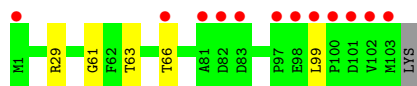
- Molecule 1: Suppressor of cytokine signaling 2



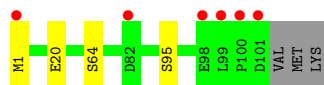
- Molecule 1: Suppressor of cytokine signaling 2



- Molecule 2: Elongin-B

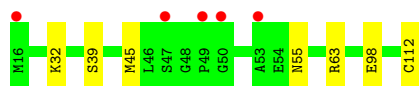


- Molecule 2: Elongin-B

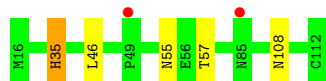


- Molecule 3: Elongin-C

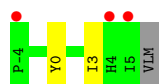
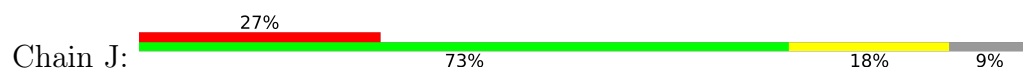




• Molecule 3: Elongin-C



• Molecule 4: Growth hormone receptor peptide



• Molecule 4: Growth hormone receptor peptide



• Molecule 4: Growth hormone receptor peptide



• Molecule 4: Growth hormone receptor peptide





## 4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	113.18Å 156.76Å 57.57Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	54.04 – 1.98 54.04 – 1.98	Depositor EDS
% Data completeness (in resolution range)	100.0 (54.04-1.98) 100.0 (54.04-1.98)	Depositor EDS
$R_{merge}$	0.09	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	1.47 (at 1.97Å)	Xtriage
Refinement program	PHENIX (dev_2420: ???)	Depositor
R, $R_{free}$	0.190 , 0.226 0.190 , 0.227	Depositor DCC
$R_{free}$ test set	70229 reflections (2.73%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	24.3	Xtriage
Anisotropy	0.027	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.34 , 42.9	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.50$ , $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
$F_o, F_c$ correlation	0.94	EDS
Total number of atoms	6433	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	32.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.47% 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

### 5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: PTR, SO4, CO, CAS, VLM

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	0.47	0/1260	0.61	0/1702
1	D	0.47	0/1212	0.59	0/1637
2	B	0.46	0/801	0.62	0/1084
2	E	0.51	0/801	0.65	0/1082
3	C	0.54	0/779	0.63	0/1053
3	F	0.58	0/773	0.63	0/1045
4	I	0.40	0/76	0.65	0/103
4	J	0.31	0/69	0.48	0/93
4	K	0.38	0/59	0.51	0/79
4	L	0.27	0/50	0.49	0/66
All	All	0.49	0/5880	0.62	0/7944

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
4	K	0	1
4	L	0	1
All	All	0	2

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (2) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
4	K	5	ILE	Mainchain

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Mol	Chain	Res	Type	Group
4	L	5	ILE	Mainchain

## 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	1263	0	1246	8	0
1	D	1206	0	1185	18	0
2	B	795	0	778	5	0
2	E	795	0	785	2	0
3	C	762	0	747	4	0
3	F	756	0	741	5	0
4	I	96	0	93	4	0
4	J	84	0	77	2	0
4	K	83	0	72	1	0
4	L	74	0	65	4	0
5	A	1	0	0	0	0
5	D	1	0	0	0	0
6	D	5	0	0	0	0
7	A	102	0	0	2	0
7	B	74	0	0	0	0
7	C	69	0	0	1	0
7	D	72	0	0	2	0
7	E	109	0	0	1	0
7	F	61	0	0	1	0
7	I	9	0	0	1	0
7	J	1	0	0	0	0
7	K	13	0	0	0	0
7	L	2	0	0	0	0
All	All	6433	0	5789	41	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 4.

All (41) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:63:THR:H	2:B:66:THR:HG22	1.45	0.82
1:D:80:TYR:HE2	1:D:98:GLU:HG2	1.51	0.75
3:C:55:ASN:HD21	3:F:55:ASN:ND2	1.89	0.71
1:A:59:LYS:O	1:A:63:LYS:HG3	1.90	0.70
1:A:105:ARG:NH1	7:A:301:HOH:O	2.27	0.67
1:A:73:ARG:HH21	1:A:94:ASN:ND2	1.94	0.66
2:E:1:MET:HG3	2:E:20:GLU:HB3	1.79	0.65
1:D:95:LEU:HD11	4:J:3:ILE:HG23	1.80	0.62
1:A:59:LYS:NZ	7:A:302:HOH:O	2.33	0.61
1:D:150:LEU:HB2	4:L:5:ILE:HD13	1.81	0.60
1:D:150:LEU:HB2	4:L:5:ILE:CD1	2.34	0.58
2:B:99:LEU:HG	3:C:98:GLU:HG3	1.87	0.57
2:B:63:THR:H	2:B:66:THR:CG2	2.18	0.56
1:A:116:LEU:HD11	4:I:3:ILE:HD11	1.88	0.55
1:D:184:PRO:HD2	1:D:187:LEU:HD12	1.89	0.55
3:F:35:HIS:HD2	7:F:208:HOH:O	1.90	0.53
2:B:61:GLY:O	2:B:66:THR:HG21	2.08	0.53
1:D:63:LYS:O	1:D:87:LYS:NZ	2.34	0.52
1:D:186:ARG:HH12	3:F:108:ASN:HD21	1.56	0.52
4:J:3:ILE:HG22	4:L:5:ILE:HD11	1.92	0.52
3:C:32:LYS:HD2	7:C:254:HOH:O	2.10	0.51
1:D:68:GLY:HA2	1:D:151:TYR:O	2.11	0.51
1:D:132:MET:HB2	4:L:-2:PRO:HB2	1.94	0.50
1:D:41:ARG:NH2	7:D:305:HOH:O	2.45	0.49
1:D:98:GLU:OE1	1:D:105:ARG:NH1	2.46	0.48
2:E:64:SER:HA	7:E:201:HOH:O	2.13	0.47
1:D:186:ARG:HH12	3:F:108:ASN:ND2	2.13	0.47
1:D:96:ARG:O	1:D:107:ASP:HB2	2.18	0.43
1:A:55:VAL:HG21	4:I:0:PTR:HE1	2.00	0.43
1:A:173:LYS:HG2	1:A:197:GLN:HE21	1.83	0.43
1:D:50:TRP:CE2	1:D:158:THR:HB	2.54	0.43
1:D:105:ARG:HD2	7:D:363:HOH:O	2.18	0.43
4:K:3:ILE:HG23	4:I:5:ILE:HD13	2.01	0.42
1:D:98:GLU:HB2	1:D:105:ARG:NH2	2.36	0.41
2:B:29:ARG:HG2	2:B:29:ARG:HH11	1.86	0.41
1:D:69:THR:HA	1:D:154:LYS:O	2.21	0.41
3:C:39:SER:HA	3:C:112:CYS:HB3	2.02	0.41
1:D:46:THR:HB	1:D:48:TRP:CE2	2.57	0.40
4:I:4:HIS:HD2	7:I:107:HOH:O	2.04	0.40
1:A:46:THR:HB	1:A:48:TRP:CE2	2.56	0.40
3:F:46:LEU:HD22	3:F:57:THR:O	2.22	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	153/169 (90%)	151 (99%)	2 (1%)	0	100	100
1	D	143/169 (85%)	142 (99%)	1 (1%)	0	100	100
2	B	100/104 (96%)	94 (94%)	6 (6%)	0	100	100
2	E	98/104 (94%)	95 (97%)	3 (3%)	0	100	100
3	C	95/97 (98%)	92 (97%)	3 (3%)	0	100	100
3	F	95/97 (98%)	95 (100%)	0	0	100	100
4	I	9/11 (82%)	9 (100%)	0	0	100	100
4	J	7/11 (64%)	7 (100%)	0	0	100	100
4	K	7/11 (64%)	7 (100%)	0	0	100	100
4	L	6/11 (54%)	6 (100%)	0	0	100	100
All	All	713/784 (91%)	698 (98%)	15 (2%)	0	100	100

There are no Ramachandran outliers to report.

### 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	129/143 (90%)	126 (98%)	3 (2%)	45	38
1	D	126/143 (88%)	126 (100%)	0	100	100
2	B	82/91 (90%)	82 (100%)	0	100	100
2	E	86/91 (94%)	85 (99%)	1 (1%)	67	65

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	C	84/86 (98%)	82 (98%)	2 (2%)	44	36
3	F	83/86 (96%)	82 (99%)	1 (1%)	67	65
4	I	10/9 (111%)	9 (90%)	1 (10%)	6	1
4	J	9/9 (100%)	9 (100%)	0	100	100
4	K	7/9 (78%)	7 (100%)	0	100	100
4	L	5/9 (56%)	5 (100%)	0	100	100
All	All	621/676 (92%)	613 (99%)	8 (1%)	65	62

All (8) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	41	ARG
1	A	95	LEU
1	A	124	HIS
3	C	45	MET
3	C	63	ARG
2	E	95	SER
3	F	35	HIS
4	I	4	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	94	ASN
1	A	197	GLN
3	C	51	GLN
3	C	58	ASN
1	D	100	GLN
3	F	35	HIS
3	F	55	ASN
3	F	58	ASN
3	F	108	ASN

### 5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

14 non-standard protein/DNA/RNA residues 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	CAS	E	89	2	5,8,9	1.02	0	1,9,11	0.87	0
1	CAS	A	111	1	5,8,9	1.32	0	1,9,11	0.56	0
1	CAS	A	133	1	5,8,9	0.76	0	1,9,11	2.33	1 (100%)
2	CAS	B	89	2	5,8,9	1.16	0	1,9,11	0.23	0
1	CAS	D	174	1	5,8,9	1.02	0	1,9,11	0.90	0
4	VLM	L	6	4	6,7,7	0.17	0	7,9,9	0.25	0
4	VLM	K	6	4	6,7,7	0.08	0	7,9,9	0.38	0
4	VLM	I	6	4	6,7,7	0.29	0	7,9,9	0.28	0
1	CAS	D	133	1	5,8,9	1.09	0	1,9,11	0.79	0
4	PTR	K	0	4	15,16,17	1.35	1 (6%)	19,22,24	0.78	2 (10%)
4	PTR	I	0	4	15,16,17	1.33	1 (6%)	19,22,24	0.66	0
4	PTR	L	0	4	15,16,17	1.21	1 (6%)	19,22,24	0.57	0
4	PTR	J	0	4	15,16,17	1.32	1 (6%)	19,22,24	0.49	0
1	CAS	A	174	1	5,8,9	1.03	0	1,9,11	0.64	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
2	CAS	E	89	2	-	0/0/7/9	-
1	CAS	A	111	1	-	0/0/7/9	-
1	CAS	A	133	1	-	0/0/7/9	-
2	CAS	B	89	2	-	0/0/7/9	-
1	CAS	D	174	1	-	0/0/7/9	-
4	VLM	L	6	4	-	3/7/8/8	-
4	VLM	K	6	4	-	0/7/8/8	-
4	VLM	I	6	4	-	3/7/8/8	-
1	CAS	D	133	1	-	0/0/7/9	-

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
4	PTR	K	0	4	-	0/10/11/13	0/1/1/1
4	PTR	I	0	4	-	2/10/11/13	0/1/1/1
4	PTR	L	0	4	-	0/10/11/13	0/1/1/1
4	PTR	J	0	4	-	2/10/11/13	0/1/1/1
1	CAS	A	174	1	-	0/0/7/9	-

All (4) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	J	0	PTR	OH-CZ	-4.57	1.30	1.40
4	I	0	PTR	OH-CZ	-4.48	1.30	1.40
4	K	0	PTR	OH-CZ	-4.32	1.30	1.40
4	L	0	PTR	OH-CZ	-4.30	1.30	1.40

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	133	CAS	CA-CB-SG	-2.33	104.62	114.43
4	K	0	PTR	CB-CA-C	-2.20	107.34	111.47
4	K	0	PTR	O3P-P-OH	2.20	112.11	105.24

There are no chirality outliers.

All (10) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	I	0	PTR	N-CA-CB-CG
4	I	0	PTR	C-CA-CB-CG
4	L	6	VLM	C-CA-CB-CG1
4	J	0	PTR	N-CA-CB-CG
4	I	6	VLM	O-C-CA-CB
4	I	6	VLM	NT-C-CA-CB
4	I	6	VLM	O-C-CA-N
4	J	0	PTR	C-CA-CB-CG
4	L	6	VLM	N-CA-CB-CG1
4	L	6	VLM	C-CA-CB-CG2

There are no ring outliers.

1 monomer is involved in 1 short contact:



Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	I	0	PTR	1	0

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

## 5.6 Ligand geometry [i](#)

Of 3 ligands modelled in this entry, 2 are monoatomic - leaving 1 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	$\# Z  > 2$
6	SO4	D	202	-	4,4,4	0.15	0	6,6,6	0.33	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.

No monomer is involved in short contacts.

## 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	157/169 (92%)	-0.10	5 (3%) 50 61	15, 27, 43, 77	0
1	D	149/169 (88%)	0.22	12 (8%) 19 28	15, 32, 62, 85	0
2	B	102/104 (98%)	0.29	12 (11%) 10 15	17, 29, 72, 116	0
2	E	100/104 (96%)	-0.03	6 (6%) 29 39	16, 24, 59, 85	0
3	C	97/97 (100%)	-0.11	5 (5%) 34 45	14, 23, 49, 71	0
3	F	97/97 (100%)	-0.08	2 (2%) 63 72	16, 25, 45, 51	0
4	I	9/11 (81%)	0.08	1 (11%) 12 17	16, 30, 40, 53	1 (11%)
4	J	9/11 (81%)	1.65	3 (33%) 1 1	50, 62, 68, 73	0
4	K	8/11 (72%)	0.85	1 (12%) 9 14	30, 40, 47, 60	0
4	L	7/11 (63%)	3.43	7 (100%) 0 0	71, 77, 90, 92	0
All	All	735/784 (93%)	0.10	54 (7%) 22 31	14, 27, 62, 116	1 (0%)

All (54) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	B	102	VAL	8.9
2	E	99	LEU	5.6
3	C	49	PRO	5.5
2	B	100	PRO	5.2
2	B	101	ASP	5.1
2	B	103	MET	5.1
1	D	116	LEU	5.0
2	E	101	ASP	5.0
1	A	135	ASP	4.8
2	E	1	MET	4.8
1	D	109	ILE	4.8
2	B	98	GLU	4.4
4	L	1	THR	4.2

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Mol	Chain	Res	Type	RSRZ
4	K	-3	VAL	4.2
2	B	99	LEU	4.1
4	L	-2	PRO	4.1
1	A	136	LYS	4.1
4	L	5	ILE	4.0
1	D	147	THR	3.9
3	C	16	MET	3.7
4	L	2	SER	3.6
2	B	82	ASP	3.5
2	E	100	PRO	3.4
1	A	116	LEU	3.3
4	J	5	ILE	3.3
2	B	1	MET	3.2
4	L	-1	ASP	3.2
2	B	81	ALA	3.2
1	D	148	VAL	3.1
2	B	83	ASP	3.1
2	B	97	PRO	3.0
1	D	149	HIS	3.0
1	D	134	LYS	2.8
1	D	150	LEU	2.7
4	L	3	ILE	2.7
3	C	50	GLY	2.6
1	D	101	ASP	2.6
4	J	-4	PRO	2.5
1	D	64	GLU	2.5
3	C	47	SER	2.5
1	D	95	LEU	2.5
3	F	85	ASN	2.4
2	E	82	ASP	2.4
1	A	186	ARG	2.4
4	L	4	HIS	2.3
1	A	52	SER	2.3
2	E	98	GLU	2.3
2	B	66	THR	2.3
1	D	98	GLU	2.2
1	D	105	ARG	2.2
4	I	-4	PRO	2.1
3	F	49	PRO	2.1
4	J	4	HIS	2.0
3	C	53	ALA	2.0

## 6.2 Non-standard residues in protein, DNA, RNA chains [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	PTR	L	0	16/17	0.76	0.16	81,84,89,90	0
4	VLM	L	6	8/8	0.78	0.20	54,62,66,68	0
4	VLM	I	6	8/8	0.87	0.13	24,33,41,44	0
1	CAS	A	174	9/10	0.90	0.18	22,29,69,69	9
2	CAS	B	89	9/10	0.91	0.15	32,35,77,79	0
1	CAS	D	174	9/10	0.92	0.15	18,23,55,56	9
1	CAS	A	111	9/10	0.93	0.14	21,22,63,66	9
4	PTR	K	0	16/17	0.94	0.08	38,42,48,48	0
1	CAS	D	133	9/10	0.95	0.13	46,54,64,66	0
4	VLM	K	6	8/8	0.95	0.09	18,26,32,34	0
4	PTR	J	0	16/17	0.96	0.09	38,44,54,55	0
4	PTR	I	0	16/17	0.97	0.07	21,27,30,31	0
2	CAS	E	89	9/10	0.98	0.09	17,19,31,38	0
1	CAS	A	133	9/10	0.98	0.09	27,32,35,36	0

## 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
5	CO	D	201	1/1	0.71	0.15	115,115,115,115	0
6	SO4	D	202	5/5	0.91	0.11	59,59,62,66	0
5	CO	A	201	1/1	0.99	0.03	36,36,36,36	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.