



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 1, 2016 – 05:46 PM GMT

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 wwPDB X-ray Structure Validation Summary 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  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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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 : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : 1.9-1692  
EDS : rb-20026688  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Refmac : 5.8.0135  
CCP4 : 6.5.0  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

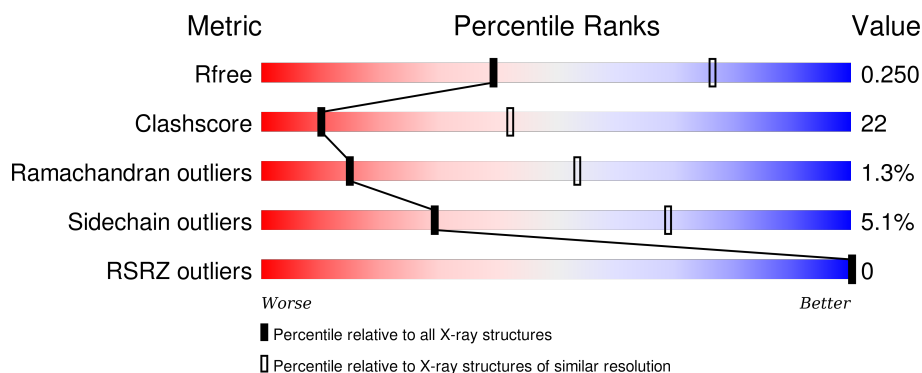
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*




The reported resolution of this entry is 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))
$R_{free}$	91344	1578 (3.00-3.00)
Clashscore	102246	1912 (3.00-3.00)
Ramachandran outliers	100387	1853 (3.00-3.00)
Sidechain outliers	100360	1856 (3.00-3.00)
RSRZ outliers	91569	1592 (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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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
1	A	163	Total	C	N	O	S	0	0	0
			1310	842	220	242	6			

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
2	B	104	Total	C	N	O	S	0	0	0
			828	524	141	159	4			

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

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

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
4	D	368	Total	C	N	O	S	0	0	0
			3002	1907	509	568	18			

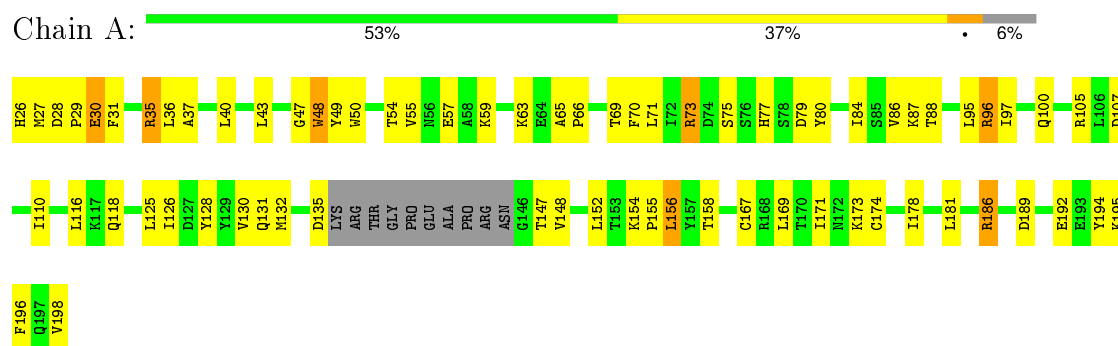
There are 3 discrepancies between the modelled and reference sequences:

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

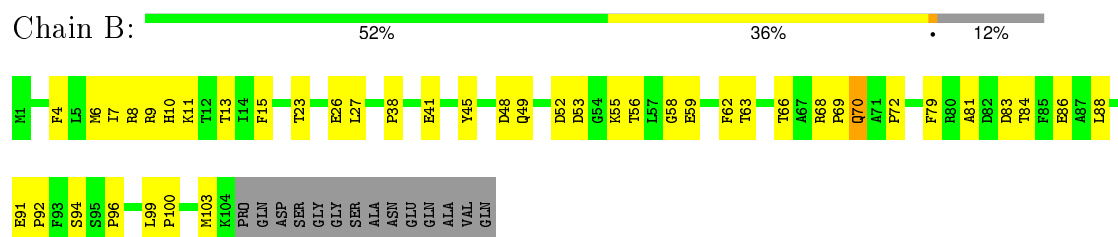
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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 ( $\text{RSRZ} > 2$ ). 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.

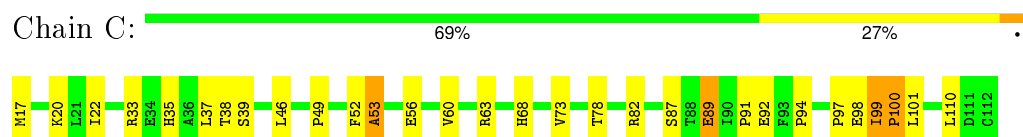
#### • Molecule 1: Suppressor of cytokine signaling 2



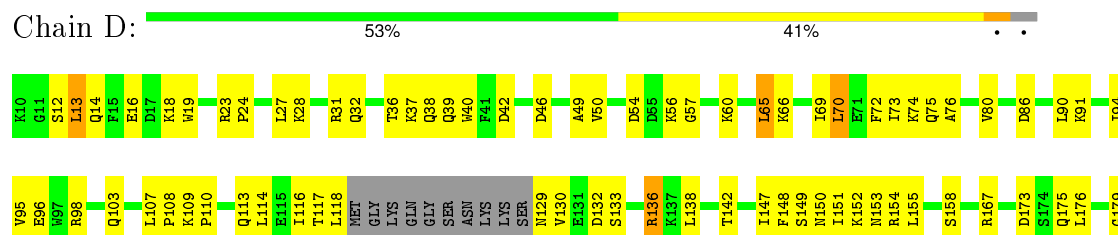
#### • Molecule 2: Transcription elongation factor B polypeptide 2



#### • Molecule 3: Transcription elongation factor B polypeptide 1



#### • Molecule 4: Cullin-5





## 4 Data and refinement statistics

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)	Xtriage
Refinement program	CNS	Depositor
R, $R_{free}$	0.225 , 0.248 0.226 , 0.250	Depositor DCC
$R_{free}$ test set	3434 reflections (9.96%)	DCC
Wilson B-factor (Å <sup>2</sup> )	58.1	Xtriage
Anisotropy	0.134	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.29 , 11.2	EDS
Estimated twinning fraction	0.045 for -k,-h,-l	Xtriage
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.45$ , $\langle L^2 \rangle = 0.28$	Xtriage
Outliers	0 of 34527 reflections	Xtriage
$F_o, F_c$ correlation	0.92	EDS
Total number of atoms	5902	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	74.0	wwPDB-VP

Xtriage'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, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

## 5 Model quality

### 5.1 Standard geometry

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

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.



The worst 5 of 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:HH11	4:D:253:ARG:HB2	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

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%)	30	72
2	B	102/118 (86%)	93 (91%)	8 (8%)	1 (1%)	19	61
3	C	94/96 (98%)	87 (93%)	3 (3%)	4 (4%)	3	19
4	D	364/378 (96%)	322 (88%)	39 (11%)	3 (1%)	24	66
All	All	719/765 (94%)	644 (90%)	66 (9%)	9 (1%)	15	53

5 of 9 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
4	D	149	SER
4	D	193	ASP
4	D	19	TRP
1	A	96	ARG
2	B	81	ALA

### 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	143/153 (94%)	136 (95%)	7 (5%)	31	71
2	B	92/102 (90%)	90 (98%)	2 (2%)	60	88
3	C	86/86 (100%)	83 (96%)	3 (4%)	43	80
4	D	329/340 (97%)	308 (94%)	21 (6%)	22	59
All	All	650/681 (95%)	617 (95%)	33 (5%)	29	69

5 of 33 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
4	D	70	LEU
4	D	208	ASP
4	D	325	ASP
4	D	86	ASP
4	D	114	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 16 such sidechains are listed below:

Mol	Chain	Res	Type
3	C	108	ASN
4	D	48	HIS
4	D	223	GLN
3	C	51	GLN
4	D	229	ASN

### 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 [i](#)

There are no carbohydrates 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%)	-0.18	0 100 100	49, 72, 101, 131	0
2	B	104/118 (88%)	-0.18	0 100 100	44, 62, 89, 98	0
3	C	96/96 (100%)	-0.21	0 100 100	45, 60, 89, 94	0
4	D	368/378 (97%)	-0.22	0 100 100	51, 78, 103, 124	0
All	All	731/765 (95%)	-0.20	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 carbohydrates 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.