



# wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 14, 2017 – 04:16 pm GMT

PDB ID : 3T6G  
Title : Structure of the complex between NSP3 (SHEP1) and p130Cas  
Authors : Mace, P.D.; Robinson, H.; Riedl, S.J.  
Deposited on : 2011-07-28  
Resolution : 2.50 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 : 1.7.2 (RC1), CSD as538be (2017)  
Xtriage (Phenix) : 1.9-1692  
EDS : trunk28620  
Percentile statistics : 20161228.v01 (using entries in the PDB archive December 28th 2016)  
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) : recalc28949

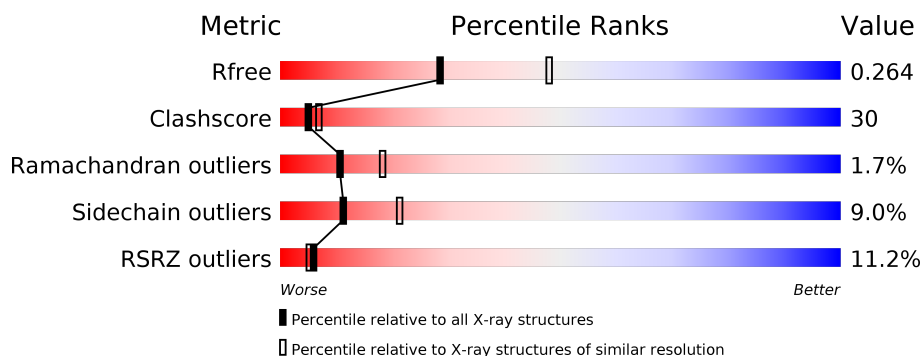
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 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))
$R_{free}$	100719	3846 (2.50-2.50)
Clashscore	112137	4554 (2.50-2.50)
Ramachandran outliers	110173	4463 (2.50-2.50)
Sidechain outliers	110143	4465 (2.50-2.50)
RSRZ outliers	101464	3876 (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 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	331	<div> <div>5%</div> <div>58% 27% 5% 10%</div> </div>
1	C	331	<div> <div>17%</div> <div>36% 41% 5% 18%</div> </div>
2	B	229	<div> <div>%</div> <div>41% 14% 41%</div> </div>
2	D	229	<div> <div>9%</div> <div>28% 26% 43%</div> </div>

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit crite-

ria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	ACT	C	1	-	-	-	X

## 2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 6598 atoms, of which 3 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 SH2 domain-containing protein 3C.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	299	Total	C	N	O	S	1	1	0
			2348	1495	418	423	12			
1	C	273	Total	C	N	O	S	1	0	0
			2139	1361	383	384	11			

There are 22 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	381	MET	-	INITIATING METHIONINE	UNP Q8N5H7
A	497	SER	CYS	ENGINEERED MUTATION	UNP Q8N5H7
A	598	SER	CYS	ENGINEERED MUTATION	UNP Q8N5H7
A	704	LEU	-	EXPRESSION TAG	UNP Q8N5H7
A	705	GLU	-	EXPRESSION TAG	UNP Q8N5H7
A	706	HIS	-	EXPRESSION TAG	UNP Q8N5H7
A	707	HIS	-	EXPRESSION TAG	UNP Q8N5H7
A	708	HIS	-	EXPRESSION TAG	UNP Q8N5H7
A	709	HIS	-	EXPRESSION TAG	UNP Q8N5H7
A	710	HIS	-	EXPRESSION TAG	UNP Q8N5H7
A	711	HIS	-	EXPRESSION TAG	UNP Q8N5H7
C	381	MET	-	INITIATING METHIONINE	UNP Q8N5H7
C	497	SER	CYS	ENGINEERED MUTATION	UNP Q8N5H7
C	598	SER	CYS	ENGINEERED MUTATION	UNP Q8N5H7
C	704	LEU	-	EXPRESSION TAG	UNP Q8N5H7
C	705	GLU	-	EXPRESSION TAG	UNP Q8N5H7
C	706	HIS	-	EXPRESSION TAG	UNP Q8N5H7
C	707	HIS	-	EXPRESSION TAG	UNP Q8N5H7
C	708	HIS	-	EXPRESSION TAG	UNP Q8N5H7
C	709	HIS	-	EXPRESSION TAG	UNP Q8N5H7
C	710	HIS	-	EXPRESSION TAG	UNP Q8N5H7
C	711	HIS	-	EXPRESSION TAG	UNP Q8N5H7

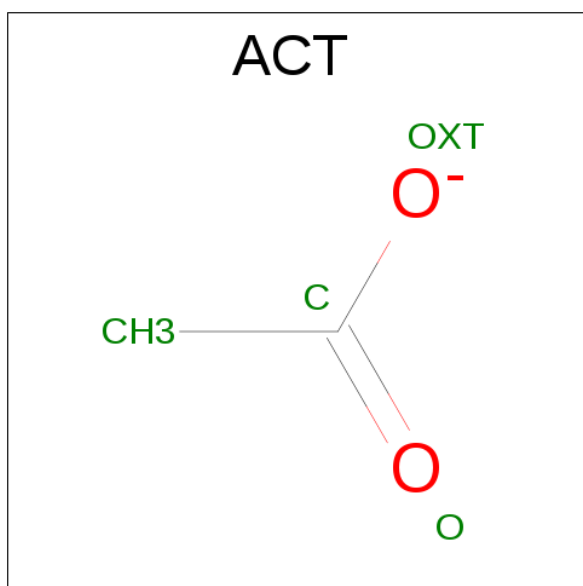
- Molecule 2 is a protein called Breast cancer anti-estrogen resistance protein 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	134	Total	C	N	O	S	0	0	0
			1035	657	183	192	3			
2	D	131	Total	C	N	O	S	0	0	0
			1010	644	177	186	3			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	644	MET	-	INITIATING METHIONINE	UNP P56945
B	871	LEU	-	EXPRESSION TAG	UNP P56945
B	872	GLU	-	EXPRESSION TAG	UNP P56945
D	644	MET	-	INITIATING METHIONINE	UNP P56945
D	871	LEU	-	EXPRESSION TAG	UNP P56945
D	872	GLU	-	EXPRESSION TAG	UNP P56945

- Molecule 3 is ACETATE ION (three-letter code: ACT) (formula:  $C_2H_3O_2$ ).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	C	1	Total	C	H	O	0	0
			7	2	3	2		

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	41	Total	O	0	0
			41	41		

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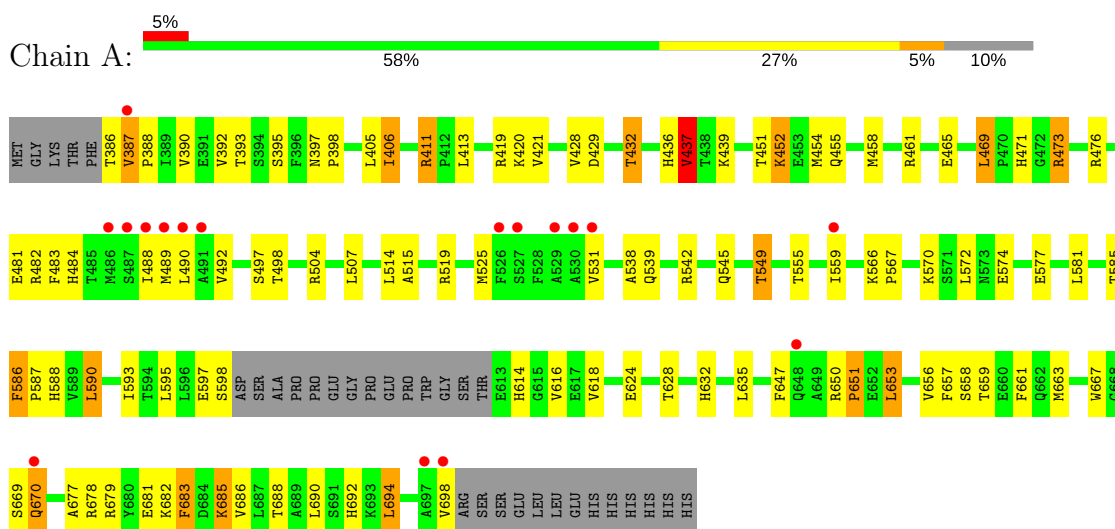
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	B	14	Total	O	0	0
			14	14		
4	C	4	Total	O	0	0
			4	4		

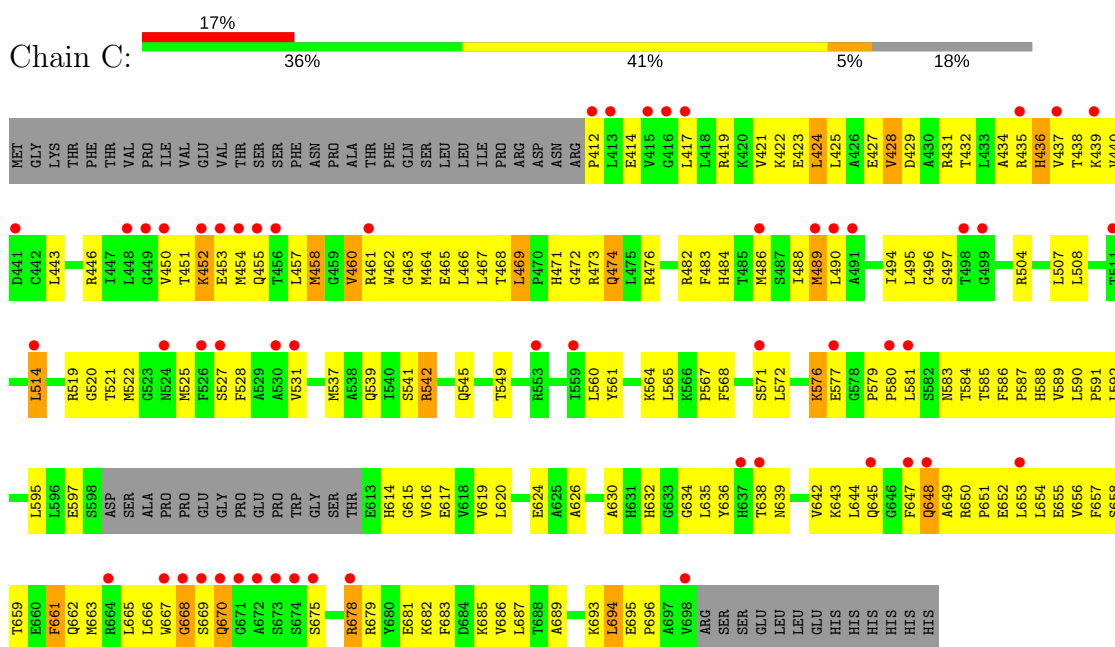
### 3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of 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.

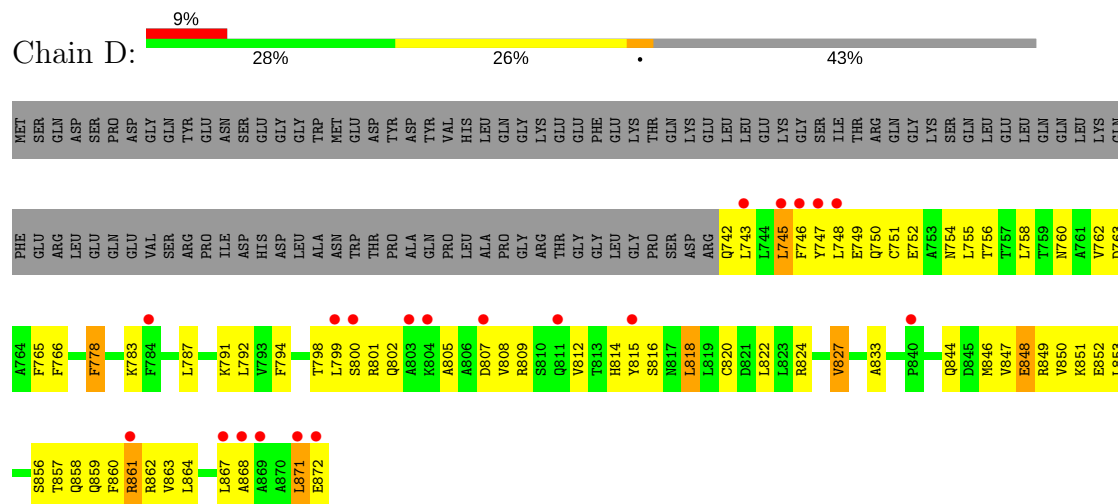
#### • Molecule 1: SH2 domain-containing protein 3C



#### • Molecule 1: SH2 domain-containing protein 3C



#### • Molecule 2: Breast cancer anti-estrogen resistance protein 1





## 4 Data and refinement statistics

Property	Value	Source
Space group	I 41	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	171.88Å 171.88Å 78.27Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.55 – 2.50 29.55 – 2.50	Depositor EDS
% Data completeness (in resolution range)	94.1 (29.55-2.50) 99.9 (29.55-2.50)	Depositor EDS
$R_{merge}$	0.07	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.38 (at 2.51Å)	Xtriage
Refinement program	PHENIX (phenix.refine: 1.6.4_486)	Depositor
R, $R_{free}$	0.197 , 0.266 0.193 , 0.264	Depositor DCC
$R_{free}$ test set	1982 reflections (5.01%)	DCC
Wilson B-factor (Å <sup>2</sup> )	63.5	Xtriage
Anisotropy	0.626	Xtriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.31 , 71.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtriage
Estimated twinning fraction	0.019 for -k,-h,-l	Xtriage
$F_o, F_c$ correlation	0.96	EDS
Total number of atoms	6598	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	100.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.12% of the height of the origin peak. No significant pseudotranslation is detected.*

<sup>1</sup>Intensities estimated from amplitudes.

<sup>2</sup>Theoretical values of  $\langle |L| \rangle$ ,  $\langle L^2 \rangle$  for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

## 5 Model quality [i](#)

### 5.1 Standard geometry [i](#)

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

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	0/2393	0.64	1/3235 (0.0%)
1	C	0.30	0/2176	0.45	0/2936
2	B	0.45	0/1052	0.62	0/1428
2	D	0.32	0/1027	0.47	0/1395
All	All	0.39	0/6648	0.56	1/8994 (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	437	VAL	CB-CA-C	-5.20	101.53	111.40

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	2348	0	2427	96	0
1	C	2139	0	2212	194	0
2	B	1035	0	1054	39	0
2	D	1010	0	1032	83	0
3	C	4	3	3	1	0
4	A	41	0	0	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	B	14	0	0	1	0
4	C	4	0	0	2	0
All	All	6595	3	6728	397	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 30.

The worst 5 of 397 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:C:454:MET:HA	1:C:457:LEU:HD12	1.21	1.17
1:A:545:GLN:O	1:A:549:THR:HG22	1.46	1.15
2:D:748:LEU:HD13	2:D:864:LEU:HD23	1.31	1.09
1:A:387:VAL:HB	1:A:388:PRO:HD3	1.09	1.09
1:C:489:MET:HE2	1:C:662:GLN:HG2	1.24	1.08

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	296/331 (89%)	274 (93%)	19 (6%)	3 (1%)	18	32
1	C	269/331 (81%)	238 (88%)	26 (10%)	5 (2%)	9	15
2	B	132/229 (58%)	124 (94%)	5 (4%)	3 (2%)	7	11
2	D	129/229 (56%)	110 (85%)	16 (12%)	3 (2%)	7	11
All	All	826/1120 (74%)	746 (90%)	66 (8%)	14 (2%)	11	18

5 of 14 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	387	VAL
2	B	803	ALA
1	C	670	GLN
2	B	868	ALA
2	D	787	LEU

### 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	255/282 (90%)	230 (90%)	25 (10%)	9	18
1	C	229/282 (81%)	213 (93%)	16 (7%)	18	33
2	B	111/193 (58%)	101 (91%)	10 (9%)	11	21
2	D	108/193 (56%)	96 (89%)	12 (11%)	7	13
All	All	703/950 (74%)	640 (91%)	63 (9%)	11	21

5 of 63 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	B	819	LEU
1	C	424	LEU
2	D	848	GLU
2	B	820	CYS
2	B	853	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 8 such sidechains are listed below:

Mol	Chain	Res	Type
1	C	455	GLN
2	D	802	GLN
1	C	631	HIS
1	C	436	HIS
1	C	622	HIS

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

## 5.4 Non-standard residues in protein, DNA, RNA chains [i](#)

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

## 5.5 Carbohydrates [i](#)

There are no carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

1 ligand is 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	$\# Z  > 2$
3	ACT	C	1	-	1,3,3	1.62	0	0,3,3	0.00	-

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
3	ACT	C	1	-	-	0/0/0/0	0/0/0/0

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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	C	1	ACT	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 [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	299/331 (90%)	0.09	17 (5%) 24 25	48, 69, 99, 148	1 (0%)
1	C	273/331 (82%)	0.90	55 (20%) 1 1	79, 129, 174, 210	1 (0%)
2	B	134/229 (58%)	-0.13	2 (1%) 74 75	52, 69, 103, 139	0
2	D	131/229 (57%)	0.71	20 (15%) 2 2	67, 123, 195, 223	0
All	All	837/1120 (74%)	0.41	94 (11%) 6 5	48, 89, 169, 223	2 (0%)

The worst 5 of 94 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	413	LEU	6.9
2	D	803	ALA	6.7
1	C	450	VAL	6.4
1	C	415	VAL	6.0
1	C	527	SER	5.4

### 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](#)

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. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. 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	LLDF	B-factors( $\text{\AA}^2$ )	Q<0.9
3	ACT	C	1	4/4	0.86	0.28	5.11	105,110,126,126	0

## 6.5 Other polymers [i](#)

There are no such residues in this entry.