



# wwPDB X-ray Structure Validation Summary Report ⓘ

Aug 16, 2023 – 09:50 PM EDT

PDB ID : 2F55  
Title : Two hepatitis c virus ns3 helicase domains complexed with the same strand of dna  
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Deposited on : 2005-11-25  
Resolution : 3.30 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

<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 : 1.8.5 (274361), CSD as541be (2020)  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.35

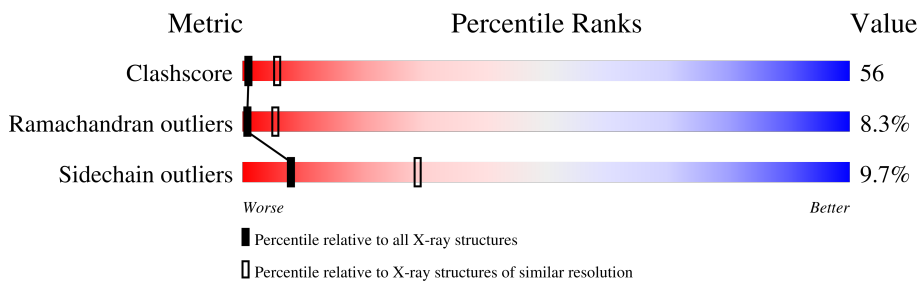
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 3.30 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))
Clashscore	141614	1205 (3.34-3.26)
Ramachandran outliers	138981	1183 (3.34-3.26)
Sidechain outliers	138945	1182 (3.34-3.26)

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  $\leq 5\%$

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	D	13	23% 69% 8%
2	E	3	100%
3	A	435	38% 52% 9% ..
3	B	435	28% 57% 14% .
3	C	435	37% 51% 10% ..





Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total	O	S	0	0
			5	4	1		
4	C	1	Total	O	S	0	0
			5	4	1		

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	D	3	Total	O	0	0
			3	3		
5	A	20	Total	O	0	0
			20	20		
5	B	14	Total	O	0	0
			14	14		
5	C	25	Total	O	0	0
			25	25		

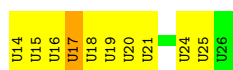
### 3 Residue-property plots

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. 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. 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.

Note EDS was not executed.

- Molecule 1: 5'-D(P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)P\*(DU)-3'

Chain D: 



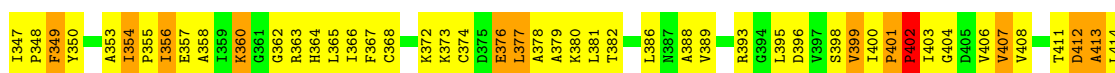
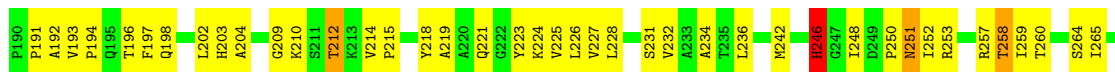
- Molecule 2: 5'-D(P\*(DU)P\*(DU)P\*(DU))-3'

Chain E: 



- Molecule 3: polyprotein

Chain A: 





Q564  
A566  
T566  
V567  
C568  
A569  
R570  
A571  
Q572  
A573  
P574  
P575  
P576  
S577  
W578  
D579  
Q580  
M581  
W582  
K583  
C584  
L585  
I586  
R587  
L588  
K589  
L592  
P595  
T596  
P597  
L598  
L599  
Y600  
R601  
L602  
G603  
A604  
M607  
E608  
V609  
I610  
L611  
T612  
H613  
P614  
I615  
T616  
K617  
Y618  
I619  
M620  
A621  
C622  
M623  
S624

## 4 Data and refinement statistics

Xtrriage (Phenix) and EDS were not executed - this section is therefore incomplete.

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	108.20Å 109.80Å 183.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	50.00 – 3.30	Depositor
% Data completeness (in resolution range)	83.2 (50.00-3.30)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.247 , 0.273	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	10129	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	36.0	wwPDB-VP



## 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: SO4

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	D	0.70	0/272	0.98	1/412 (0.2%)
2	E	0.70	0/62	0.99	0/92
3	A	0.54	3/3331 (0.1%)	0.73	2/4548 (0.0%)
3	B	0.59	4/3331 (0.1%)	0.74	1/4548 (0.0%)
3	C	0.53	5/3331 (0.2%)	0.72	1/4548 (0.0%)
All	All	0.56	12/10327 (0.1%)	0.74	5/14148 (0.0%)

The worst 5 of 12 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
3	C	469	ARG	NE-CZ	7.51	1.42	1.33
3	B	469	ARG	NE-CZ	7.47	1.42	1.33
3	A	469	ARG	NE-CZ	7.45	1.42	1.33
3	B	469	ARG	CZ-NH2	7.42	1.42	1.33
3	C	469	ARG	CZ-NH2	7.38	1.42	1.33

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
3	C	402	PRO	CA-N-CD	-12.76	93.64	111.50
3	B	402	PRO	CA-N-CD	-12.74	93.67	111.50
3	A	402	PRO	CA-N-CD	-11.23	95.78	111.50
3	A	401	PRO	C-N-CD	7.38	143.90	128.40
1	D	17	DU	O4'-C1'-C2'	5.03	109.92	105.90

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	D	247	0	131	18	0
2	E	57	0	31	6	0
3	A	3251	0	3216	332	0
3	B	3251	0	3215	434	0
3	C	3251	0	3215	354	0
4	A	5	0	0	0	0
4	C	5	0	0	1	0
5	A	20	0	0	2	0
5	B	14	0	0	0	0
5	C	25	0	0	3	0
5	D	3	0	0	0	0
All	All	10129	0	9808	1118	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 56.

The worst 5 of 1118 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)
3:A:469:ARG:HB2	3:A:469:ARG:NH1	1.31	1.43
3:C:513:LEU:O	3:C:517:LEU:CD2	1.65	1.42
3:A:360:LYS:NZ	3:A:386:LEU:HD21	1.06	1.36
3:A:360:LYS:NZ	3:A:386:LEU:CD2	1.88	1.35
3:A:339:ILE:CG2	3:A:474:ARG:HG2	1.54	1.35

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	
3	A	428/435 (98%)	318 (74%)	86 (20%)	24 (6%)	2	11
3	B	428/435 (98%)	282 (66%)	104 (24%)	42 (10%)	0	3
3	C	428/435 (98%)	296 (69%)	92 (22%)	40 (9%)	0	4
All	All	1284/1305 (98%)	896 (70%)	282 (22%)	106 (8%)	1	5

5 of 106 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	A	246	HIS
3	A	349	PHE
3	A	413	ALA
3	A	583	LYS
3	B	245	ALA

### 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	
3	A	352/354 (99%)	323 (92%)	29 (8%)	11	36
3	B	352/354 (99%)	311 (88%)	41 (12%)	5	22
3	C	352/354 (99%)	320 (91%)	32 (9%)	9	31
All	All	1056/1062 (99%)	954 (90%)	102 (10%)	8	29

5 of 102 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
3	B	524	VAL
3	C	206	THR
3	C	588	LEU
3	B	542	ILE
3	B	593	HIS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 31 such sidechains are listed below:

Mol	Chain	Res	Type
3	B	564	GLN
3	C	549	GLN
3	C	198	GLN
3	C	572	GLN
3	C	387	ASN

### 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](#)

2 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	$\# Z  > 2$
4	SO4	A	101	-	4,4,4	0.24	0	6,6,6	0.19	0
4	SO4	C	102	-	4,4,4	0.20	0	6,6,6	0.25	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
4	C	102	SO4	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

EDS was not executed - this section is therefore empty.

### 6.2 Non-standard residues in protein, DNA, RNA chains

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates

EDS was not executed - this section is therefore empty.

### 6.4 Ligands

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers

EDS was not executed - this section is therefore empty.