



# Full wwPDB X-ray Structure Validation Report ⓘ

May 13, 2020 – 02:11 am BST

PDB ID : 2CDR  
Title : Crystal structures of caspase-3 in complex with aza-peptide epoxide inhibitors.  
Authors : Ganesan, R.; Jelakovic, S.; Campbell, A.J.; Li, Z.Z.; Asgian, J.L.; Powers, J.C.; Gruetter, M.G.  
Deposited on : 2006-01-27  
Resolution : 1.70 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 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)  
Xtriage (Phenix) : 1.13  
EDS : 2.11  
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) : 2.11

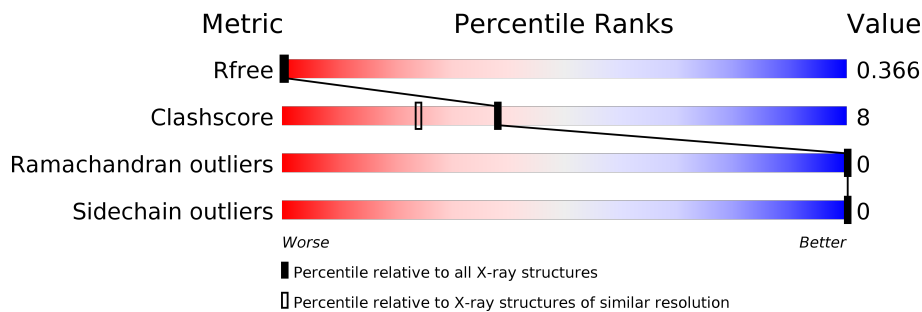
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 1.70 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	4298 (1.70-1.70)
Clashscore	141614	4695 (1.70-1.70)
Ramachandran outliers	138981	4610 (1.70-1.70)
Sidechain outliers	138945	4610 (1.70-1.70)

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 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  $\leq 5\%$

Mol	Chain	Length	Quality of chain
1	A	147	
2	B	103	
3	I	5	

## 2 Entry composition [i](#)

There are 4 unique types of molecules in this entry. The entry contains 2429 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 CASPASE-3 SUBUNIT P17.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	147	1161	716	208	228	9	0	0	0

- Molecule 2 is a protein called CASPASE-3 SUBUNIT P12.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
2	B	103	843	547	135	154	7	0	0	0

- Molecule 3 is a protein called AZA-PEPTIDE EXPOXIDE.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
3	I	5	62	42	6	14	0	0	0

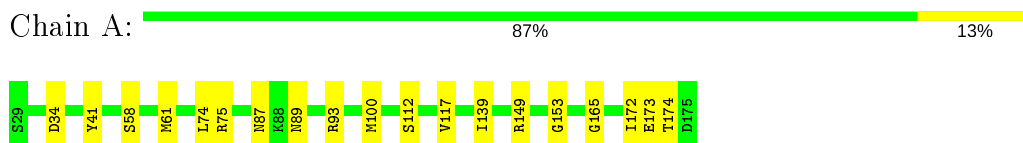
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	231	Total 231	O 231	0	0
4	B	126	Total 126	O 126	0	0
4	I	6	Total 6	O 6	0	0

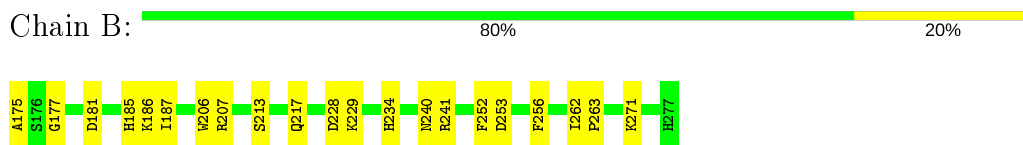
### 3 Residue-property plots [i](#)

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. 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.

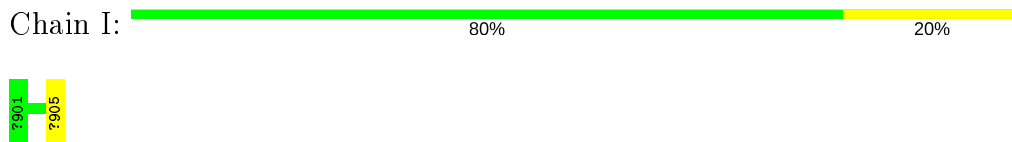
- Molecule 1: CASPASE-3 SUBUNIT P17



- Molecule 2: CASPASE-3 SUBUNIT P12



- Molecule 3: AZA-PEPTIDE EXPOXIDE



## 4 Data and refinement statistics

Property	Value	Source
Space group	I 2 2 2	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	67.47Å 83.78Å 96.25Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	19.49 – 1.70 19.80 – 1.70	Depositor EDS
% Data completeness (in resolution range)	97.9 (19.49-1.70) 95.6 (19.80-1.70)	Depositor EDS
$R_{merge}$	0.05	Depositor
$R_{sym}$	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ <sup>1</sup>	3.37 (at 1.70Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, $R_{free}$	0.177 , 0.204 0.368 , 0.366	Depositor DCC
$R_{free}$ test set	2876 reflections (9.97%)	wwPDB-VP
Wilson B-factor (Å <sup>2</sup> )	17.8	Xtrriage
Anisotropy	0.655	Xtrriage
Bulk solvent $k_{sol}$ (e/Å <sup>3</sup> ), $B_{sol}$ (Å <sup>2</sup> )	0.36 , 53.4	EDS
L-test for twinning <sup>2</sup>	$\langle  L  \rangle = 0.49$ , $\langle L^2 \rangle = 0.32$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
$F_o, F_c$ correlation	0.82	EDS
Total number of atoms	2429	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	21.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.48% 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: MY1, PHQ

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	0.29	0/1176	0.58	0/1574
2	B	0.34	0/868	0.63	0/1171
3	I	0.25	0/23	0.62	0/30
All	All	0.31	0/2067	0.60	0/2775

There are no bond length outliers.

There are no bond angle outliers.

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	1161	0	1152	19	12
2	B	843	0	807	13	15
3	I	62	0	44	3	0
4	A	231	0	0	8	6
4	B	126	0	0	6	4
4	I	6	0	0	0	0
All	All	2429	0	2003	31	21

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 8.

All (31) 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:185:HIS:O	4:B:2044:HOH:O	1.77	1.01
1:A:61:MET:HG2	3:I:905:MY1:H20	1.48	0.92
1:A:174:THR:OG1	4:A:2221:HOH:O	1.60	0.74
2:B:185:HIS:HB2	4:B:2044:HOH:O	1.88	0.74
1:A:87:ASN:HB2	4:A:2121:HOH:O	1.89	0.71
2:B:241:ARG:NH1	4:B:2096:HOH:O	2.19	0.70
2:B:252:PHE:HB2	4:B:2110:HOH:O	1.90	0.70
2:B:175:ALA:N	4:B:2028:HOH:O	2.27	0.67
2:B:228:ASP:OD1	2:B:229:LYS:HG3	1.97	0.64
1:A:100:MET:HG3	1:A:139:ILE:HG23	1.84	0.59
2:B:177:GLY:HA3	4:B:2035:HOH:O	2.04	0.58
1:A:74:LEU:HD13	1:A:117:VAL:HG11	1.87	0.57
1:A:153:GLY:HA3	4:A:2196:HOH:O	2.07	0.54
1:A:149:ARG:HH11	1:A:149:ARG:HA	1.74	0.53
1:A:165:GLY:HA2	3:I:905:MY1:H27	1.94	0.50
2:B:240:ASN:OD1	2:B:263:PRO:HB2	2.12	0.50
1:A:93:ARG:NH1	4:A:2131:HOH:O	2.45	0.50
2:B:206:TRP:HH2	2:B:256:PHE:HB3	1.76	0.50
2:B:213:SER:O	2:B:217:GLN:HG3	2.12	0.49
2:B:207:ARG:HA	2:B:213:SER:HA	1.96	0.47
1:A:34:ASP:OD1	2:B:271:LYS:HE2	2.15	0.46
1:A:89:ASN:O	4:A:2124:HOH:O	2.20	0.46
2:B:262:ILE:O	2:B:262:ILE:HG23	2.15	0.46
1:A:75:ARG:HD2	4:A:2121:HOH:O	2.16	0.45
1:A:149:ARG:NH1	1:A:149:ARG:HB3	2.32	0.45
1:A:149:ARG:HH11	1:A:149:ARG:CA	2.31	0.43
1:A:89:ASN:HB3	4:A:2038:HOH:O	2.18	0.43
1:A:153:GLY:CA	4:A:2196:HOH:O	2.65	0.43
1:A:74:LEU:CD1	1:A:117:VAL:HG11	2.48	0.42
1:A:41:TYR:HB2	1:A:112:SER:OG	2.21	0.41
1:A:61:MET:SD	3:I:905:MY1:H19	2.60	0.41

All (21) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:58:SER:OG	2:B:253:ASP:OD2[2_665]	1.16	1.04
1:A:173:GLU:OE2	2:B:186:LYS:CG[3_656]	1.49	0.71
1:A:173:GLU:OE2	2:B:186:LYS:CD[3_656]	1.53	0.67

*Continued on next page...*

Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:172:ILE:N	2:B:187:ILE:O[3_656]	1.59	0.61
2:B:234:HIS:CE1	2:B:234:HIS:CE1[3_656]	1.74	0.46
1:A:172:ILE:O	2:B:187:ILE:N[3_656]	1.75	0.45
1:A:173:GLU:CD	2:B:186:LYS:CG[3_656]	1.76	0.44
2:B:234:HIS:NE2	2:B:234:HIS:NE2[3_656]	1.78	0.42
4:A:2126:HOH:O	4:B:2043:HOH:O[6_554]	1.79	0.41
4:A:2063:HOH:O	4:B:2060:HOH:O[2_665]	1.85	0.35
1:A:58:SER:OG	2:B:253:ASP:CG[2_665]	1.86	0.34
1:A:174:THR:CG2	2:B:187:ILE:CG2[3_656]	1.87	0.33
1:A:89:ASN:N	2:B:181:ASP:OD2[6_554]	1.90	0.30
4:A:2085:HOH:O	4:A:2085:HOH:O[3_656]	1.91	0.29
1:A:173:GLU:OE1	2:B:185:HIS:O[3_656]	2.00	0.20
4:A:2156:HOH:O	4:A:2156:HOH:O[3_656]	2.06	0.14
1:A:87:ASN:ND2	2:B:181:ASP:O[6_554]	2.09	0.11
4:A:2079:HOH:O	4:B:2045:HOH:O[6_554]	2.09	0.11
2:B:234:HIS:CE1	2:B:234:HIS:NE2[3_656]	2.13	0.07
1:A:173:GLU:OE1	2:B:186:LYS:CG[3_656]	2.14	0.06
4:A:2059:HOH:O	4:B:2107:HOH:O[2_665]	2.17	0.03

## 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	145/147 (99%)	140 (97%)	5 (3%)	0	100	100
2	B	101/103 (98%)	100 (99%)	1 (1%)	0	100	100
3	I	1/5 (20%)	1 (100%)	0	0	100	100
All	All	247/255 (97%)	241 (98%)	6 (2%)	0	100	100

There are no Ramachandran outliers to report.



### 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	132/132 (100%)	132 (100%)	0	100	100
2	B	90/90 (100%)	90 (100%)	0	100	100
3	I	3/3 (100%)	3 (100%)	0	100	100
All	All	225/225 (100%)	225 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (1) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	80	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 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

### 6.1 Protein, DNA and RNA chains

Unable to reproduce the depositors R factor - this section is therefore empty.

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

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.3 Carbohydrates

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.4 Ligands

Unable to reproduce the depositors R factor - this section is therefore empty.

### 6.5 Other polymers

Unable to reproduce the depositors R factor - this section is therefore empty.