



wwPDB X-ray Structure Validation Summary Report ⓘ

May 25, 2020 – 04:21 am BST

PDB ID : 6PPM
Title : Ancestral Caspase 6
Authors : Clark, A.C.
Deposited on : 2019-07-08
Resolution : 2.61 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

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
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

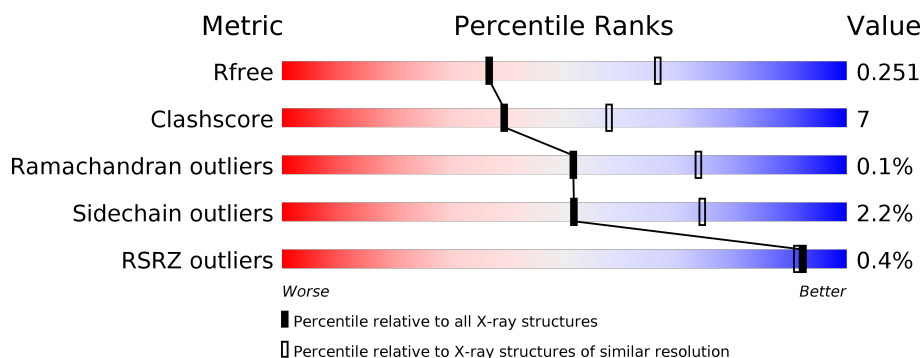
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.61 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	3797 (2.64-2.60)
Clashscore	141614	4168 (2.64-2.60)
Ramachandran outliers	138981	4093 (2.64-2.60)
Sidechain outliers	138945	4093 (2.64-2.60)
RSRZ outliers	127900	3731 (2.64-2.60)

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 ≥ 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	151	<div> <div>77%</div> <div>23%</div> <div>.</div> </div>
1	C	151	<div> <div>79%</div> <div>17%</div> <div>.</div> </div>
1	G	151	<div> <div>89%</div> <div>11%</div> </div>
1	J	151	<div> <div>%</div> <div>73%</div> <div>23%</div> <div>5%</div> </div>
2	B	95	<div> <div>%</div> <div>86%</div> <div>13%</div> <div>.</div> </div>
2	D	95	<div> <div>%</div> <div>77%</div> <div>21%</div> <div>..</div> </div>

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Mol	Chain	Length	Quality of chain
2	H	95	<div><div></div><div>87%11%..</div></div>
2	K	95	<div>%<div><div></div><div>75%18%7%</div></div></div>
3	E	4	<div><div></div><div>75%25%</div></div>
3	F	4	<div><div></div><div>25%75%</div></div>
3	I	4	<div><div></div><div>75%25%</div></div>
3	L	4	<div><div></div><div>25%75%</div></div>

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 7697 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 Ancestral Caspase-6 Large Subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	151	Total	C	N	O	S	0	0	0
			1185	746	206	226	7			
1	G	151	Total	C	N	O	S	0	1	0
			1183	749	205	223	6			
1	C	145	Total	C	N	O	S	0	0	0
			1107	695	190	216	6			
1	J	144	Total	C	N	O	S	5	1	0
			1089	687	193	203	6			

- Molecule 2 is a protein called Ancestral Caspase-6 small subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	94	Total	C	N	O	S	5	2	0
			751	488	118	136	9			
2	H	94	Total	C	N	O	S	0	0	0
			749	487	118	136	8			
2	D	94	Total	C	N	O	S	0	0	0
			739	483	114	134	8			
2	K	88	Total	C	N	O	S	0	0	0
			691	451	110	123	7			

- Molecule 3 is a protein called VAL-GLU-ILE-ASP Inhibitor.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	E	4	Total	C	N	O	0	0	0
			32	20	4	8			
3	I	4	Total	C	N	O	0	0	0
			32	20	4	8			
3	L	4	Total	C	N	O	0	0	0
			32	20	4	8			
3	F	1	Total	C	N	O	0	0	0
			7	5	1	1			

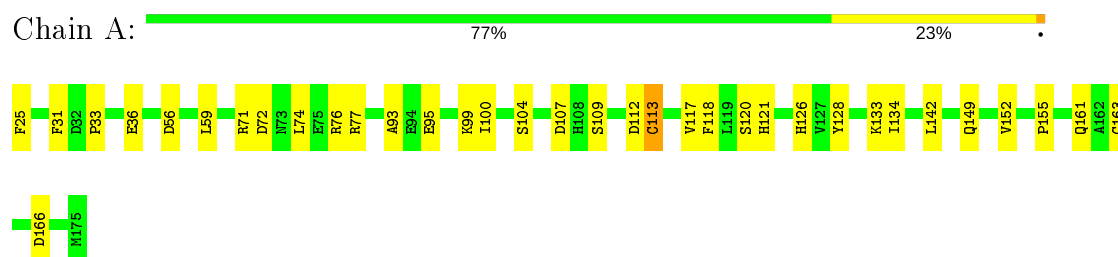
- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	19	Total 19	O 19	0	0
4	B	13	Total 13	O 13	0	0
4	E	1	Total 1	O 1	0	0
4	G	13	Total 13	O 13	0	0
4	H	16	Total 16	O 16	0	0
4	C	9	Total 9	O 9	0	0
4	D	9	Total 9	O 9	0	0
4	J	13	Total 13	O 13	0	0
4	K	7	Total 7	O 7	0	0

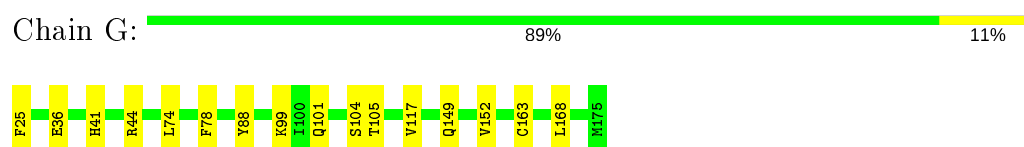
3 Residue-property plots [i](#)

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 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.

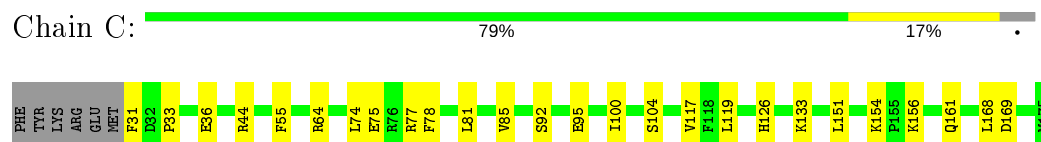
- Molecule 1: Ancestral Caspase-6 Large Subunit



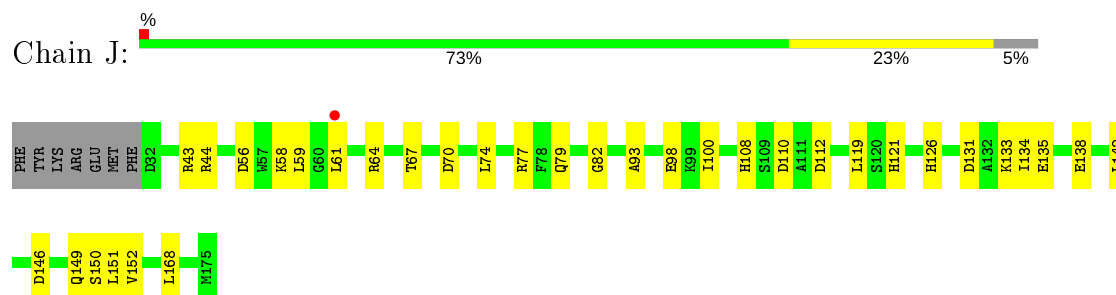
- Molecule 1: Ancestral Caspase-6 Large Subunit



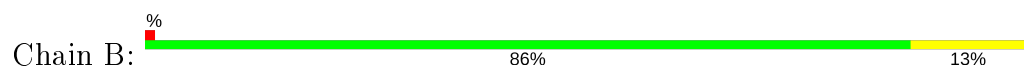
- Molecule 1: Ancestral Caspase-6 Large Subunit

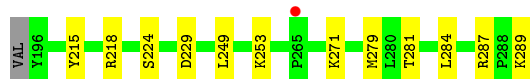


- Molecule 1: Ancestral Caspase-6 Large Subunit



- Molecule 2: Ancestral Caspase-6 small subunit

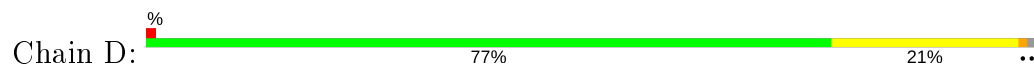




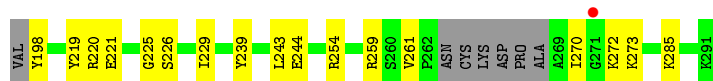
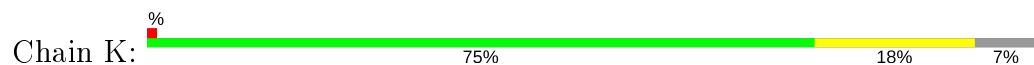
- Molecule 2: Ancestral Caspase-6 small subunit



- Molecule 2: Ancestral Caspase-6 small subunit



- Molecule 2: Ancestral Caspase-6 small subunit



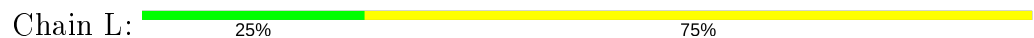
- Molecule 3: VAL-GLU-ILE-ASP Inhibitor



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- Molecule 3: VAL-GLU-ILE-ASP Inhibitor



Y301
GLU
ILE
ASP

4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	84.31Å 88.54Å 141.03Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	42.24 – 2.61 42.24 – 2.61	Depositor EDS
% Data completeness (in resolution range)	99.7 (42.24-2.61) 99.7 (42.24-2.61)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.11 (at 2.61Å)	Xtriage
Refinement program	PHENIX 1.15.2_3472	Depositor
R, R_{free}	0.177 , 0.251 0.177 , 0.251	Depositor DCC
R_{free} test set	1999 reflections (6.11%)	wwPDB-VP
Wilson B-factor (Å ²)	51.8	Xtriage
Anisotropy	0.639	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.31 , 46.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.023 for k,h,-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	7697	wwPDB-VP
Average B, all atoms (Å ²)	54.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 4.69% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical 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](#)

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	0.45	1/1207 (0.1%)	0.57	0/1626
1	C	0.40	0/1127	0.60	0/1525
1	G	0.41	0/1208	0.56	0/1628
1	J	0.40	0/1111	0.56	0/1503
2	B	0.43	0/775	0.62	0/1048
2	D	0.48	0/756	0.61	0/1020
2	H	0.48	0/767	0.60	0/1034
2	K	0.40	0/707	0.53	0/955
3	E	0.34	0/31	0.62	0/41
3	F	0.22	0/6	0.30	0/7
3	I	0.62	0/31	0.82	0/41
3	L	0.39	0/31	0.46	0/41
All	All	0.43	1/7757 (0.0%)	0.58	0/10469

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	113	CYS	CB-SG	5.06	1.90	1.82

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	1185	0	1111	26	0
1	C	1107	0	1013	18	0
1	G	1183	0	1113	12	0
1	J	1089	0	1017	24	0
2	B	751	0	745	12	0
2	D	739	0	732	14	0
2	H	749	0	751	11	0
2	K	691	0	678	12	0
3	E	32	0	29	4	0
3	F	7	0	8	0	0
3	I	32	0	29	3	0
3	L	32	0	29	4	0
4	A	19	0	0	1	0
4	B	13	0	0	0	0
4	C	9	0	0	0	0
4	D	9	0	0	0	0
4	E	1	0	0	0	0
4	G	13	0	0	0	0
4	H	16	0	0	0	0
4	J	13	0	0	1	0
4	K	7	0	0	0	0
All	All	7697	0	7255	110	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 7.

The worst 5 of 110 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:K:261:VAL:HG12	2:K:272:LYS:H	1.39	0.87
2:H:220:ARG:HH21	3:I:304:ASP:HB3	1.43	0.82
1:A:107:ASP:OD1	1:A:109:SER:OG	2.06	0.73
2:B:218:ARG:HH21	3:E:304:ASP:HB3	1.58	0.68
1:A:36:GLU:OE1	2:B:287:ARG:NH2	2.26	0.68

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	149/151 (99%)	144 (97%)	5 (3%)	0	100	100
1	C	143/151 (95%)	136 (95%)	7 (5%)	0	100	100
1	G	150/151 (99%)	143 (95%)	7 (5%)	0	100	100
1	J	143/151 (95%)	132 (92%)	11 (8%)	0	100	100
2	B	94/95 (99%)	89 (95%)	5 (5%)	0	100	100
2	D	90/95 (95%)	87 (97%)	2 (2%)	1 (1%)	14	27
2	H	92/95 (97%)	89 (97%)	3 (3%)	0	100	100
2	K	84/95 (88%)	82 (98%)	2 (2%)	0	100	100
3	E	2/4 (50%)	2 (100%)	0	0	100	100
3	I	2/4 (50%)	2 (100%)	0	0	100	100
3	L	2/4 (50%)	2 (100%)	0	0	100	100
All	All	951/996 (96%)	908 (96%)	42 (4%)	1 (0%)	51	74

All (1) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	D	222	THR

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	120/131 (92%)	117 (98%)	3 (2%)	47	71

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	C	110/131 (84%)	108 (98%)	2 (2%)	59	79
1	G	118/131 (90%)	116 (98%)	2 (2%)	60	80
1	J	106/131 (81%)	102 (96%)	4 (4%)	33	57
2	B	81/84 (96%)	79 (98%)	2 (2%)	47	71
2	D	78/84 (93%)	77 (99%)	1 (1%)	69	85
2	H	81/84 (96%)	80 (99%)	1 (1%)	71	86
2	K	72/84 (86%)	70 (97%)	2 (3%)	43	68
3	E	4/4 (100%)	3 (75%)	1 (25%)	0	1
3	F	1/4 (25%)	1 (100%)	0	100	100
3	I	4/4 (100%)	3 (75%)	1 (25%)	0	1
3	L	4/4 (100%)	4 (100%)	0	100	100
All	All	779/876 (89%)	760 (98%)	19 (2%)	52	72

5 of 19 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	H	255	LYS
1	C	31	PHE
1	J	119[B]	LEU
1	G	104	SER
1	J	146	ASP

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

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 ⓘ

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, 95th 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 ²)	Q<0.9
1	A	151/151 (100%)	-0.48	0 100 100	36, 51, 64, 80	0
1	C	145/151 (96%)	-0.36	0 100 100	40, 55, 67, 86	0
1	G	151/151 (100%)	-0.39	0 100 100	38, 52, 69, 75	0
1	J	144/151 (95%)	-0.11	1 (0%) 87 85	44, 65, 77, 86	0
2	B	94/95 (98%)	-0.15	1 (1%) 80 78	34, 47, 66, 74	0
2	D	94/95 (98%)	-0.20	1 (1%) 80 78	34, 48, 75, 82	0
2	H	94/95 (98%)	-0.24	0 100 100	35, 49, 61, 77	0
2	K	88/95 (92%)	-0.14	1 (1%) 80 78	41, 56, 84, 93	0
3	E	4/4 (100%)	-0.09	0 100 100	49, 49, 53, 59	0
3	F	1/4 (25%)	-0.36	0 100 100	67, 67, 67, 67	0
3	I	4/4 (100%)	-0.39	0 100 100	44, 48, 53, 56	0
3	L	4/4 (100%)	0.87	0 100 100	74, 76, 84, 88	0
All	All	974/1000 (97%)	-0.27	4 (0%) 92 91	34, 54, 73, 93	0

All (4) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	D	197	VAL	4.8
1	J	61	LEU	2.1
2	K	271	GLY	2.0
2	B	265	PRO	2.0

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.