



# Full wwPDB X-ray Structure Validation Report ⓘ

Jun 12, 2024 – 07:26 PM EDT

PDB ID : 1BY7  
Title : HUMAN PLASMINOGEN ACTIVATOR INHIBITOR-2. LOOP (66-98)  
DELETION MUTANT  
Authors : Harrop, S.J.; King, G.C.; Mabbutt, B.C.; Curmi, P.M.G.  
Deposited on : 1998-10-27  
Resolution : 2.00 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 types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

---

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4.02b-467  
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) : 2.36.2

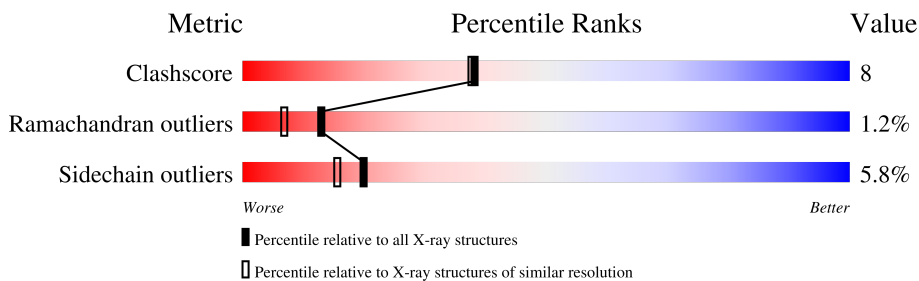
# 1 Overall quality at a glance i

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.00 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))
Clashscore	141614	9178 (2.00-2.00)
Ramachandran outliers	138981	9054 (2.00-2.00)
Sidechain outliers	138945	9053 (2.00-2.00)

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 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	A	382	 69% 19% • • 7%

## 2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 3045 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 PROTEIN (PLASMINOGEN ACTIVATOR INHIBITOR-2).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	354	2836	1816	467	535	18	0	0	0

- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	209	Total 209	O 209	3	0

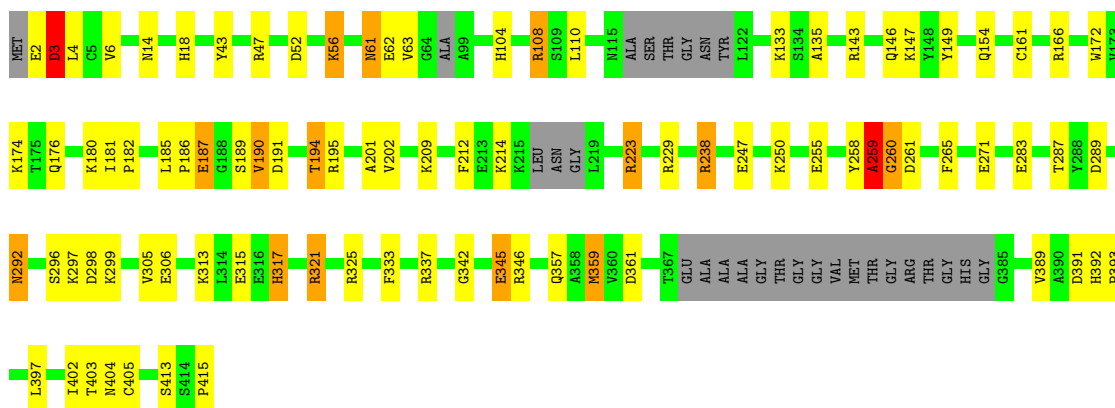
### 3 Residue-property plots [i](#)

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: PROTEIN (PLASMINOGEN ACTIVATOR INHIBITOR-2)

Chain A:  69% 19% 7%



## 4 Data and refinement statistics

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

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	138.82Å 41.73Å 77.40Å 90.00° 114.88° 90.00°	Depositor
Resolution (Å)	30.00 – 2.00	Depositor
% Data completeness (in resolution range)	99.0 (30.00-2.00)	Depositor
$R_{merge}$	0.06	Depositor
$R_{sym}$	0.06	Depositor
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.202 , 0.268	Depositor
Estimated twinning fraction	No twinning to report.	Xtrriage
Total number of atoms	3045	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	38.0	wwPDB-VP

## 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	0.87	2/2894 (0.1%)	1.76	44/3894 (1.1%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	1

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	415	PRO	N-CD	6.41	1.56	1.47
1	A	321	ARG	CD-NE	-5.23	1.37	1.46

All (44) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	321	ARG	CD-NE-CZ	29.09	164.33	123.60
1	A	47	ARG	NE-CZ-NH1	11.32	125.96	120.30
1	A	166	ARG	NE-CZ-NH1	11.18	125.89	120.30
1	A	229	ARG	NE-CZ-NH2	-10.85	114.87	120.30
1	A	191	ASP	CB-CG-OD1	9.64	126.98	118.30
1	A	321	ARG	NE-CZ-NH1	9.15	124.88	120.30
1	A	166	ARG	CD-NE-CZ	9.05	136.28	123.60
1	A	321	ARG	NE-CZ-NH2	-8.93	115.83	120.30
1	A	52	ASP	CB-CG-OD1	8.62	126.05	118.30
1	A	345	GLU	OE1-CD-OE2	8.14	133.06	123.30
1	A	166	ARG	NE-CZ-NH2	-8.04	116.28	120.30
1	A	195	ARG	NE-CZ-NH1	7.93	124.27	120.30
1	A	194	THR	CA-CB-OG1	-7.42	93.42	109.00
1	A	283	GLU	OE1-CD-OE2	-7.39	114.43	123.30

*Continued on next page...*

Continued from previous page...

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	43	TYR	CB-CG-CD1	7.35	125.41	121.00
1	A	202	VAL	CG1-CB-CG2	-7.02	99.67	110.90
1	A	108	ARG	NE-CZ-NH1	6.87	123.73	120.30
1	A	191	ASP	CB-CG-OD2	-6.83	112.15	118.30
1	A	43	TYR	CB-CG-CD2	-6.82	116.91	121.00
1	A	223	ARG	NE-CZ-NH2	-6.74	116.93	120.30
1	A	190	VAL	N-CA-CB	-6.70	96.75	111.50
1	A	47	ARG	NE-CZ-NH2	-6.67	116.97	120.30
1	A	3	ASP	CB-CG-OD2	6.65	124.29	118.30
1	A	143	ARG	CD-NE-CZ	6.47	132.66	123.60
1	A	342	GLY	O-C-N	-6.33	112.58	122.70
1	A	289	ASP	CB-CG-OD1	6.29	123.96	118.30
1	A	391	ASP	CB-CG-OD1	6.26	123.94	118.30
1	A	255	GLU	OE1-CD-OE2	6.12	130.64	123.30
1	A	201	ALA	CB-CA-C	-6.06	101.02	110.10
1	A	317	HIS	CA-CB-CG	6.00	123.80	113.60
1	A	258	TYR	CB-CG-CD2	5.88	124.53	121.00
1	A	154	GLN	CB-CG-CD	5.82	126.74	111.60
1	A	265	PHE	CB-CG-CD2	-5.61	116.87	120.80
1	A	292	ASN	CA-CB-CG	-5.61	101.06	113.40
1	A	195	ARG	NE-CZ-NH2	-5.53	117.54	120.30
1	A	391	ASP	CB-CG-OD2	-5.52	113.33	118.30
1	A	258	TYR	CA-CB-CG	5.50	123.85	113.40
1	A	305	VAL	CB-CA-C	-5.41	101.13	111.40
1	A	259	ALA	O-C-N	-5.36	114.09	123.20
1	A	287	THR	N-CA-CB	5.26	120.30	110.30
1	A	47	ARG	CD-NE-CZ	5.22	130.91	123.60
1	A	298	ASP	CB-CA-C	-5.17	100.06	110.40
1	A	321	ARG	CG-CD-NE	5.16	122.64	111.80
1	A	52	ASP	CB-CG-OD2	-5.03	113.77	118.30

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	212	PHE	Mainchain

## 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	2836	0	2803	43	0
2	A	209	0	0	9	0
All	All	3045	0	2803	43	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 8.

All (43) 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:A:181:ILE:HD12	1:A:357:GLN:NE2	2.06	0.70
1:A:161:CYS:SG	2:A:583:HOH:O	2.51	0.68
1:A:186:PRO:HD2	1:A:189:SER:OG	1.94	0.67
1:A:104:HIS:HD2	1:A:149:TYR:OH	1.77	0.67
1:A:110:LEU:HD11	2:A:567:HOH:O	1.98	0.62
1:A:315:GLU:OE2	1:A:357:GLN:NE2	2.33	0.62
1:A:104:HIS:HE1	2:A:429:HOH:O	1.82	0.61
1:A:321:ARG:HG3	1:A:333:PHE:CD1	2.37	0.59
1:A:56:LYS:HD2	1:A:61:ASN:OD1	2.03	0.59
1:A:313:LYS:HG2	1:A:361:ASP:OD1	2.03	0.58
1:A:2:GLU:O	1:A:3:ASP:HB2	2.01	0.58
1:A:321:ARG:HD3	1:A:325:ARG:NH1	2.18	0.58
1:A:4:LEU:HD12	1:A:110:LEU:HD12	1.86	0.57
1:A:402:ILE:HG12	2:A:447:HOH:O	2.06	0.55
1:A:238:ARG:HG3	1:A:306:GLU:HG2	1.88	0.54
1:A:321:ARG:HD3	1:A:325:ARG:CZ	2.39	0.52
1:A:186:PRO:HD2	1:A:189:SER:CB	2.40	0.51
1:A:337:ARG:NH1	2:A:608:HOH:O	2.43	0.51
1:A:135:ALA:HA	1:A:346:ARG:HD2	1.93	0.51
1:A:413:SER:HB2	2:A:549:HOH:O	2.10	0.51
1:A:180:LYS:HD2	1:A:359:MET:CE	2.41	0.50
1:A:14:ASN:HD21	1:A:18:HIS:CE1	2.29	0.50
1:A:247:GLU:HG2	2:A:616:HOH:O	2.10	0.49
1:A:108:ARG:HD2	1:A:147:LYS:O	2.11	0.49
1:A:260:GLY:O	1:A:261:ASP:HB2	2.12	0.49
1:A:223:ARG:O	1:A:393:PRO:HD3	2.12	0.48
1:A:190:VAL:HG22	1:A:194:THR:HG21	1.96	0.48
1:A:296:SER:OG	1:A:299:LYS:HG2	2.13	0.48
1:A:4:LEU:HB2	1:A:110:LEU:CD1	2.44	0.47

*Continued on next page...*



Continued from previous page...

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:397:LEU:C	1:A:397:LEU:HD12	2.35	0.47
1:A:181:ILE:HD12	1:A:357:GLN:HE22	1.79	0.46
1:A:259:ALA:O	1:A:261:ASP:N	2.47	0.45
1:A:174:LYS:CG	1:A:182:PRO:HA	2.48	0.44
1:A:135:ALA:CA	1:A:346:ARG:HD2	2.48	0.43
1:A:3:ASP:OD2	1:A:6:VAL:HG23	2.20	0.42
1:A:345:GLU:HG2	2:A:443:HOH:O	2.20	0.42
1:A:392:HIS:HD2	2:A:418:HOH:O	2.02	0.42
1:A:172:TRP:CZ2	1:A:176:GLN:HG3	2.55	0.41
1:A:174:LYS:HG3	1:A:182:PRO:HA	2.03	0.41
1:A:133:LYS:HB2	1:A:133:LYS:HE3	1.82	0.41
1:A:135:ALA:CB	1:A:346:ARG:HD2	2.51	0.41
1:A:403:THR:O	1:A:404:ASN:CB	2.69	0.41
1:A:135:ALA:HB2	1:A:346:ARG:HD2	2.02	0.41

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	344/382 (90%)	326 (95%)	14 (4%)	4 (1%)	<b>13</b> <b>7</b>

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	187	GLU
1	A	259	ALA
1	A	3	ASP
1	A	260	GLY

### 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	313/329 (95%)	295 (94%)	18 (6%)	20 15

All (18) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	56	LYS
1	A	61	ASN
1	A	62	GLU
1	A	63	VAL
1	A	146	GLN
1	A	185	LEU
1	A	187	GLU
1	A	209	LYS
1	A	214	LYS
1	A	238	ARG
1	A	250	LYS
1	A	271	GLU
1	A	292	ASN
1	A	297	LYS
1	A	317	HIS
1	A	359	MET
1	A	389	VAL
1	A	405	CYS

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (4) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	14	ASN
1	A	104	HIS
1	A	200	ASN
1	A	242	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](#)

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](#)

EDS was not executed - this section is therefore empty.

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

EDS was not executed - this section is therefore empty.

### 6.3 Carbohydrates [i](#)

EDS was not executed - this section is therefore empty.

### 6.4 Ligands [i](#)

EDS was not executed - this section is therefore empty.

### 6.5 Other polymers [i](#)

EDS was not executed - this section is therefore empty.