



# Full wwPDB X-ray Structure Validation Report ⓘ

Oct 19, 2024 – 01:31 PM EDT

PDB ID : 1MCH  
Title : PRINCIPLES AND PITFALLS IN DESIGNING SITE DIRECTED PEPTIDE LIGANDS  
Authors : Edmundson, A.B.; Harris, D.L.; Fan, Z.-C.; Guddat, L.W.  
Deposited on : 1993-02-25  
Resolution : 2.70 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 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 : 2022.3.0, CSD as543be (2022)  
Xtrriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : 2.39

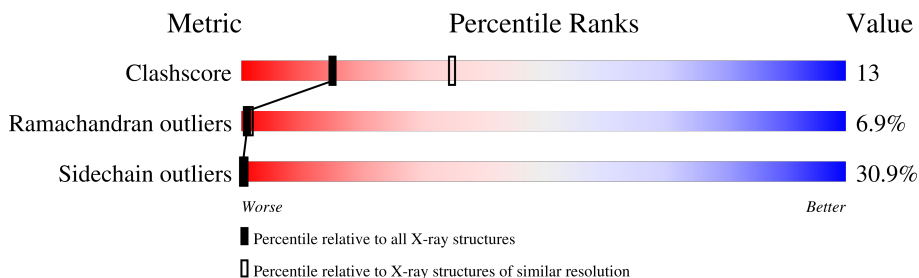
# 1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

*X-RAY DIFFRACTION*

The reported resolution of this entry is 2.70 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))
Clashscore	180529	3684 (2.70-2.70)
Ramachandran outliers	177936	3633 (2.70-2.70)
Sidechain outliers	177891	3633 (2.70-2.70)

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 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	216	49% 34% 13% .
1	B	216	52% 32% 13% .
2	P	7	14% 14% 14% 57%

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 criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	BAL	P	6	-	X	-	-

## 2 Entry composition [i](#)

There are 2 unique types of molecules in this entry. The entry contains 3261 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 IMMUNOGLOBULIN LAMBDA DIMER MCG (LIGHT CHAIN).

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	216	1605	1000	266	334	5	0	0	0
1	B	216	1605	1000	266	334	5	0	0	0

There are 44 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	20	ILE	PHE	conflict	PIR S14675
A	23	THR	SER	conflict	PIR S14675
A	29	VAL	ILE	conflict	PIR S14675
A	31	GLY	ASN	conflict	PIR S14675
A	39	GLN	ARG	conflict	PIR S14675
A	42	ALA	PRO	conflict	PIR S14675
A	48	VAL	LEU	conflict	PIR S14675
A	49	ILE	MET	conflict	PIR S14675
A	54	ASN	THR	conflict	PIR S14675
A	62	ASP	ASN	conflict	PIR S14675
A	94	GLU	ALA	conflict	PIR S14675
A	97	ASP	ASN	conflict	PIR S14675
A	98	ASN	SER	conflict	PIR S14675
A	99	PHE	LEU	conflict	PIR S14675
A	100	VAL	ILE	conflict	PIR S14675
A	103	THR	GLY	conflict	PIR S14675
A	106	LYS	ARG	conflict	PIR S14675
A	107	VAL	LEU	conflict	PIR S14675
A	116	ASN	ALA	conflict	PIR S14675
A	118	THR	SER	conflict	PIR S14675
A	156	GLY	SER	conflict	PIR S14675
A	167	LYS	THR	conflict	PIR S14675
B	20	ILE	PHE	conflict	PIR S14675
B	23	THR	SER	conflict	PIR S14675

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Chain	Residue	Modelled	Actual	Comment	Reference
B	29	VAL	ILE	conflict	PIR S14675
B	31	GLY	ASN	conflict	PIR S14675
B	39	GLN	ARG	conflict	PIR S14675
B	42	ALA	PRO	conflict	PIR S14675
B	48	VAL	LEU	conflict	PIR S14675
B	49	ILE	MET	conflict	PIR S14675
B	54	ASN	THR	conflict	PIR S14675
B	62	ASP	ASN	conflict	PIR S14675
B	94	GLU	ALA	conflict	PIR S14675
B	97	ASP	ASN	conflict	PIR S14675
B	98	ASN	SER	conflict	PIR S14675
B	99	PHE	LEU	conflict	PIR S14675
B	100	VAL	ILE	conflict	PIR S14675
B	103	THR	GLY	conflict	PIR S14675
B	106	LYS	ARG	conflict	PIR S14675
B	107	VAL	LEU	conflict	PIR S14675
B	116	ASN	ALA	conflict	PIR S14675
B	118	THR	SER	conflict	PIR S14675
B	156	GLY	SER	conflict	PIR S14675
B	167	LYS	THR	conflict	PIR S14675

- Molecule 2 is a protein called PEPTIDE N-ACETYL-L-GLN-D-PHE-L-HIS-D-PRO-B-AL A-B-ALA-OH.

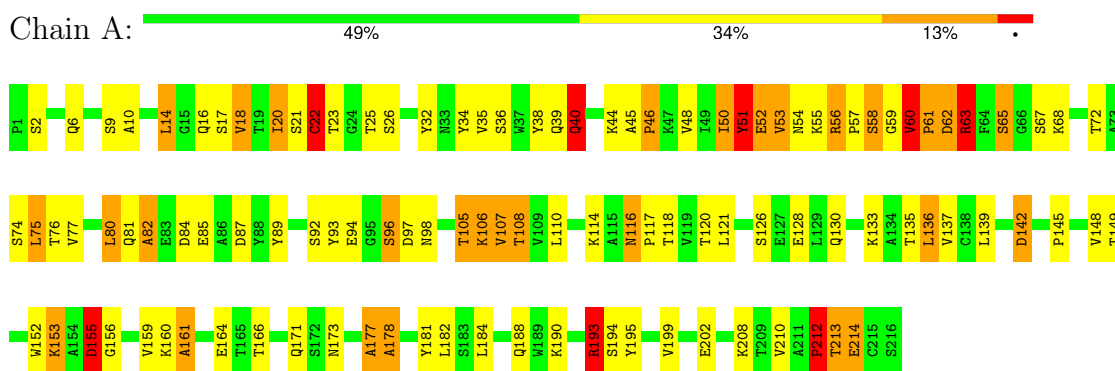
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
			Total	C	N	O			
2	P	7	51	33	9	9	0	0	0

### 3 Residue-property plots

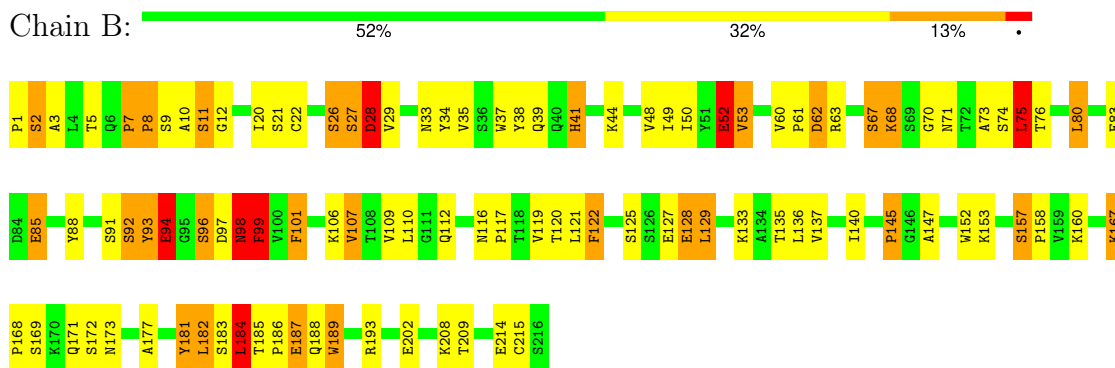
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry. Residues are color-coded 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.

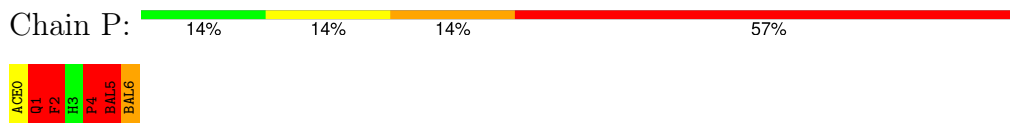
- Molecule 1: IMMUNOGLOBULIN LAMBDA DIMER MCG (LIGHT CHAIN)



- Molecule 1: IMMUNOGLOBULIN LAMBDA DIMER MCG (LIGHT CHAIN)



- Molecule 2: PEPTIDE N-ACETYL-L-GLN-D-PHE-L-HIS-D-PRO-B-ALA-B-ALA-OH



## 4 Data and refinement statistics

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

Property	Value	Source
Space group	P 31 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	72.30Å 72.30Å 185.90Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	6.00 – 2.70	Depositor
% Data completeness (in resolution range)	(Not available) (6.00-2.70)	Depositor
$R_{merge}$	(Not available)	Depositor
$R_{sym}$	(Not available)	Depositor
Refinement program	PROLSQ, X-PLOR	Depositor
R, $R_{free}$	0.252 , (Not available)	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	3261	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	0.0	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: ACE, BAL

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	0.92	1/1644 (0.1%)	1.60	24/2241 (1.1%)
1	B	0.92	0/1644	1.56	21/2241 (0.9%)
2	P	1.20	0/40	2.90	4/54 (7.4%)
All	All	0.92	1/3328 (0.0%)	1.60	49/4536 (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
1	B	0	2
2	P	2	2
All	All	2	5

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	108	THR	N-CA	5.35	1.57	1.46

All (49) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	187	GLU	CA-CB-CG	11.02	137.65	113.40
2	P	2	PHE	N-CA-C	10.74	139.99	111.00
1	A	62	ASP	CB-CG-OD1	8.21	125.69	118.30
1	A	193	ARG	CA-CB-CG	8.17	131.38	113.40
1	B	93	TYR	CA-CB-CG	8.03	128.66	113.40
1	B	181	TYR	CA-CB-CG	7.75	128.13	113.40

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	177	ALA	C-N-CA	7.74	141.04	121.70
2	P	1	GLN	C-N-CA	7.50	140.46	121.70
1	A	193	ARG	NE-CZ-NH1	7.14	123.87	120.30
1	B	145	PRO	N-CA-C	7.12	130.60	112.10
1	B	189	TRP	CA-CB-CG	7.11	127.22	113.70
1	B	83	GLU	CA-CB-CG	7.03	128.87	113.40
1	A	62	ASP	CA-CB-CG	6.98	128.76	113.40
1	B	94	GLU	CA-CB-CG	6.96	128.70	113.40
1	A	34	TYR	CB-CG-CD1	6.89	125.14	121.00
1	A	214	GLU	CA-CB-CG	6.70	128.13	113.40
1	B	88	TYR	CA-CB-CG	6.70	126.12	113.40
1	A	52	GLU	CA-CB-CG	6.60	127.92	113.40
1	A	34	TYR	CA-CB-CG	6.58	125.91	113.40
1	B	22	CYS	CA-CB-SG	6.55	125.79	114.00
1	A	22	CYS	CA-CB-SG	6.43	125.57	114.00
1	B	52	GLU	CA-CB-CG	6.03	126.65	113.40
1	B	99	PHE	CA-CB-CG	6.02	128.34	113.90
1	B	85	GLU	CA-CB-CG	6.01	126.61	113.40
1	A	108	THR	CA-CB-CG2	5.93	120.71	112.40
1	B	215	CYS	N-CA-CB	5.88	121.18	110.60
1	B	63	ARG	NE-CZ-NH1	5.87	123.23	120.30
2	P	4	PRO	CA-N-CD	-5.84	103.32	111.50
1	A	181	TYR	CA-CB-CG	5.83	124.47	113.40
1	A	107	VAL	O-C-N	5.77	131.93	122.70
1	B	96	SER	N-CA-C	-5.70	95.61	111.00
1	B	3	ALA	N-CA-C	5.61	126.14	111.00
1	B	41	HIS	N-CA-C	5.50	125.86	111.00
1	A	193	ARG	CD-NE-CZ	5.47	131.26	123.60
1	B	37	TRP	CA-CB-CG	5.46	124.06	113.70
1	A	51	TYR	N-CA-C	5.45	125.70	111.00
1	A	182	LEU	CA-CB-CG	5.34	127.59	115.30
1	B	75	LEU	CA-CB-CG	5.34	127.58	115.30
1	A	93	TYR	CA-CB-CG	5.32	123.51	113.40
1	A	68	LYS	CA-CB-CG	5.30	125.06	113.40
1	A	177	ALA	O-C-N	-5.26	114.28	122.70
1	B	2	SER	N-CA-C	5.25	125.18	111.00
1	A	177	ALA	CA-C-N	5.25	128.74	117.20
2	P	2	PHE	N-CA-CB	-5.23	101.19	110.60
1	A	178	ALA	N-CA-C	5.21	125.06	111.00
1	B	184	LEU	CA-CB-CG	5.14	127.11	115.30
1	A	40	GLN	CA-CB-CG	5.12	124.67	113.40
1	A	63	ARG	NE-CZ-NH1	5.11	122.86	120.30

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	152	TRP	CA-CB-CG	5.07	123.34	113.70

All (2) chirality outliers are listed below:

Mol	Chain	Res	Type	Atom
2	P	2	PHE	CA
2	P	4	PRO	CA

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	60	VAL	Peptide
1	B	157	SER	Peptide
1	B	33	ASN	Peptide
2	P	1	GLN	Peptide
2	P	5	BAL	Peptide

## 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	1605	0	1539	46	0
1	B	1605	0	1540	41	0
2	P	51	0	42	5	0
All	All	3261	0	3121	86	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 13.

All (86) 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:B:101:PHE:HZ	2:P:0:ACE:H2	1.39	0.87
1:A:108:THR:HG22	1:A:110:LEU:HD11	1.58	0.85
1:A:18:VAL:HG22	1:A:80:LEU:HD21	1.61	0.82
1:A:114:LYS:HG2	1:A:145:PRO:HD3	1.72	0.72

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:18:VAL:HG23	1:A:77:VAL:HG13	1.76	0.66
1:A:108:THR:HG22	1:A:110:LEU:CD1	2.29	0.61
1:A:193:ARG:HB2	1:A:193:ARG:HH11	1.66	0.61
1:A:51:TYR:HB2	1:B:99:PHE:HZ	1.67	0.60
1:B:7:PRO:HD2	1:B:21:SER:O	2.01	0.59
1:A:62:ASP:H	1:A:63:ARG:HE	1.50	0.59
1:B:128:GLU:OE2	1:B:133:LYS:HB3	2.02	0.59
1:B:49:ILE:O	1:B:50:ILE:HD12	2.03	0.58
1:A:155:ASP:OD1	1:A:193:ARG:HB3	2.05	0.56
1:A:81:GLN:O	1:A:82:ALA:CB	2.54	0.56
1:B:27:SER:O	1:B:28:ASP:HB3	2.05	0.55
1:B:34:TYR:OH	2:P:2:PHE:HE1	1.89	0.54
1:B:38:TYR:CE1	1:B:48:VAL:HG22	2.44	0.53
1:B:20:ILE:HD13	1:B:75:LEU:HD13	1.90	0.52
1:B:26:SER:O	1:B:27:SER:HB2	2.09	0.52
1:B:183:SER:O	1:B:184:LEU:HD13	2.10	0.51
1:B:12:GLY:O	1:B:109:VAL:HA	2.10	0.51
1:A:9:SER:HA	1:A:106:LYS:O	2.11	0.51
1:A:50:ILE:CG2	1:A:56:ARG:HG3	2.41	0.51
1:A:105:THR:O	1:A:106:LYS:HB2	2.11	0.51
1:A:53:VAL:HG13	1:A:54:ASN:H	1.75	0.51
1:B:171:GLN:HE21	1:B:173:ASN:HD21	1.59	0.50
1:A:53:VAL:HG13	1:A:54:ASN:N	2.25	0.50
1:B:67:SER:O	1:B:73:ALA:HA	2.12	0.50
1:B:11:SER:OG	1:B:145:PRO:HG2	2.12	0.50
1:A:137:VAL:HG11	1:B:137:VAL:HG11	1.93	0.49
2:P:5:BAL:N	2:P:6:BAL:N	2.56	0.49
1:A:136:LEU:HD23	1:A:136:LEU:N	2.27	0.49
1:B:10:ALA:O	1:B:107:VAL:HA	2.13	0.49
1:B:26:SER:O	1:B:27:SER:CB	2.61	0.49
1:A:6:GLN:HG2	1:A:22:CYS:HB2	1.95	0.49
1:B:9:SER:HB2	1:B:147:ALA:HB3	1.95	0.49
1:A:25:THR:HG22	1:A:26:SER:N	2.29	0.48
1:A:52:GLU:O	1:A:54:ASN:N	2.47	0.48
1:A:171:GLN:HG2	1:A:177:ALA:HB2	1.95	0.48
1:A:38:TYR:CD1	1:A:48:VAL:HG22	2.49	0.48
1:A:25:THR:HG22	1:A:26:SER:H	1.77	0.48
1:A:184:LEU:HD22	1:A:188:GLN:HB3	1.96	0.48
1:A:35:VAL:HG22	1:A:92:SER:HB3	1.96	0.48
1:B:171:GLN:NE2	1:B:173:ASN:HD21	2.12	0.47
1:B:101:PHE:CZ	2:P:0:ACE:H2	2.31	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:62:ASP:H	1:A:63:ARG:NE	2.13	0.47
1:A:136:LEU:HD21	1:A:184:LEU:HD12	1.95	0.47
1:A:40:GLN:HG2	1:A:89:TYR:HE2	1.80	0.47
1:B:171:GLN:OE1	1:B:177:ALA:HB2	2.15	0.47
1:B:34:TYR:O	1:B:53:VAL:HG13	2.16	0.46
1:A:20:ILE:HD12	1:A:75:LEU:O	2.15	0.46
1:A:38:TYR:HD1	1:A:48:VAL:HG22	1.80	0.46
1:B:136:LEU:HD21	1:B:189:TRP:CZ3	2.52	0.45
1:B:167:LYS:HA	1:B:168:PRO:HD3	1.77	0.45
1:A:96:SER:O	1:A:97:ASP:HB2	2.17	0.45
1:A:81:GLN:O	1:A:82:ALA:HB3	2.17	0.44
1:A:10:ALA:HB3	1:A:107:VAL:HG12	1.98	0.44
1:A:160:LYS:O	1:A:161:ALA:CB	2.66	0.44
1:B:152:TRP:CE3	1:B:182:LEU:HD12	2.53	0.44
1:B:185:THR:OG1	1:B:188:GLN:HB2	2.18	0.43
1:B:68:LYS:HE2	1:B:68:LYS:HB3	1.84	0.43
1:A:61:PRO:HB2	1:A:63:ARG:HE	1.83	0.43
1:B:94:GLU:HG3	1:B:98:ASN:HB3	2.00	0.43
1:A:16:GLN:HB3	1:A:17:SER:H	1.61	0.43
1:A:137:VAL:HG23	1:B:122:PHE:CZ	2.53	0.43
1:B:20:ILE:N	1:B:20:ILE:HD12	2.34	0.43
1:B:116:ASN:HA	1:B:117:PRO:HD3	1.74	0.42
1:B:38:TYR:HE1	1:B:48:VAL:HG22	1.84	0.42
1:B:28:ASP:OD1	1:B:28:ASP:C	2.58	0.42
1:A:65:SER:O	1:A:75:LEU:HD23	2.19	0.42
1:A:59:GLY:O	1:A:60:VAL:HG22	2.20	0.42
1:A:116:ASN:HA	1:A:117:PRO:HD3	1.83	0.42
1:B:129:LEU:HD12	1:B:186:PRO:HB3	2.02	0.42
1:A:23:THR:OG1	1:A:72:THR:HG23	2.19	0.41
1:B:60:VAL:HA	1:B:61:PRO:HD2	1.83	0.41
1:A:53:VAL:CG1	1:A:54:ASN:H	2.33	0.41
1:B:7:PRO:HA	1:B:8:PRO:HD2	1.91	0.41
2:P:4:PRO:HA	2:P:6:BAL:C	2.51	0.41
1:A:56:ARG:HA	1:A:57:PRO:HD2	1.90	0.41
1:B:119:VAL:HG22	1:B:140:ILE:HG23	2.02	0.41
1:B:157:SER:HA	1:B:158:PRO:HD3	1.95	0.41
1:A:45:ALA:HA	1:A:46:PRO:HD3	1.66	0.41
1:A:153:LYS:HA	1:A:159:VAL:HG23	2.02	0.40
1:B:122:PHE:CD1	1:B:122:PHE:N	2.89	0.40
1:B:121:LEU:HD23	1:B:208:LYS:O	2.21	0.40
1:A:212:PRO:O	1:A:214:GLU:N	2.55	0.40

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	214/216 (99%)	175 (82%)	23 (11%)	16 (8%)	1	1
1	B	214/216 (99%)	173 (81%)	29 (14%)	12 (6%)	1	2
2	P	4/7 (57%)	1 (25%)	1 (25%)	2 (50%)	0	0
All	All	432/439 (98%)	349 (81%)	53 (12%)	30 (7%)	1	1

All (30) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	61	PRO
1	A	82	ALA
1	A	161	ALA
1	A	178	ALA
1	A	213	THR
1	B	26	SER
1	B	27	SER
1	B	28	ASP
1	B	98	ASN
2	P	2	PHE
2	P	4	PRO
1	A	53	VAL
1	A	58	SER
1	A	155	ASP
1	A	212	PRO
1	B	52	GLU
1	B	202	GLU
1	A	46	PRO
1	A	85	GLU
1	A	106	LYS
1	A	142	ASP

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Mol	Chain	Res	Type
1	B	62	ASP
1	A	14	LEU
1	B	35	VAL
1	B	70	GLY
1	B	92	SER
1	A	60	VAL
1	B	8	PRO
1	B	80	LEU
1	A	156	GLY

### 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	181/181 (100%)	123 (68%)	58 (32%)	0	0
1	B	181/181 (100%)	128 (71%)	53 (29%)	0	1
2	P	4/4 (100%)	2 (50%)	2 (50%)	0	0
All	All	366/366 (100%)	253 (69%)	113 (31%)	0	0

All (113) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	2	SER
1	A	14	LEU
1	A	18	VAL
1	A	20	ILE
1	A	21	SER
1	A	22	CYS
1	A	32	TYR
1	A	36	SER
1	A	39	GLN
1	A	40	GLN
1	A	44	LYS
1	A	50	ILE
1	A	51	TYR

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	55	LYS
1	A	56	ARG
1	A	58	SER
1	A	63	ARG
1	A	65	SER
1	A	67	SER
1	A	74	SER
1	A	75	LEU
1	A	76	THR
1	A	80	LEU
1	A	84	ASP
1	A	87	ASP
1	A	94	GLU
1	A	96	SER
1	A	98	ASN
1	A	105	THR
1	A	116	ASN
1	A	118	THR
1	A	120	THR
1	A	121	LEU
1	A	126	SER
1	A	128	GLU
1	A	130	GLN
1	A	133	LYS
1	A	135	THR
1	A	136	LEU
1	A	139	LEU
1	A	142	ASP
1	A	148	VAL
1	A	149	THR
1	A	153	LYS
1	A	155	ASP
1	A	164	GLU
1	A	166	THR
1	A	173	ASN
1	A	190	LYS
1	A	193	ARG
1	A	194	SER
1	A	195	TYR
1	A	199	VAL
1	A	202	GLU
1	A	208	LYS

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<b>Mol</b>	<b>Chain</b>	<b>Res</b>	<b>Type</b>
1	A	210	VAL
1	A	212	PRO
1	A	213	THR
1	B	1	PRO
1	B	2	SER
1	B	5	THR
1	B	7	PRO
1	B	11	SER
1	B	28	ASP
1	B	29	VAL
1	B	39	GLN
1	B	41	HIS
1	B	44	LYS
1	B	52	GLU
1	B	53	VAL
1	B	62	ASP
1	B	67	SER
1	B	68	LYS
1	B	71	ASN
1	B	74	SER
1	B	75	LEU
1	B	76	THR
1	B	80	LEU
1	B	85	GLU
1	B	91	SER
1	B	92	SER
1	B	93	TYR
1	B	94	GLU
1	B	96	SER
1	B	97	ASP
1	B	98	ASN
1	B	99	PHE
1	B	101	PHE
1	B	106	LYS
1	B	107	VAL
1	B	110	LEU
1	B	112	GLN
1	B	120	THR
1	B	122	PHE
1	B	125	SER
1	B	127	GLU
1	B	128	GLU

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Mol	Chain	Res	Type
1	B	129	LEU
1	B	135	THR
1	B	153	LYS
1	B	160	LYS
1	B	167	LYS
1	B	169	SER
1	B	172	SER
1	B	181	TYR
1	B	182	LEU
1	B	184	LEU
1	B	187	GLU
1	B	193	ARG
1	B	209	THR
1	B	214	GLU
2	P	1	GLN
2	P	2	PHE

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

Mol	Chain	Res	Type
1	B	39	GLN
1	B	98	ASN
1	B	173	ASN
1	B	188	GLN

### 5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues 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
2	BAL	P	6	2	5,5,5	1.34	1 (20%)	5,5,5	3.06	3 (60%)
2	BAL	P	5	2	3,4,5	1.33	1 (33%)	3,3,5	0.87	0

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
2	BAL	P	6	2	-	3/3/3/3	-
2	BAL	P	5	2	-	0/1/2/3	-

All (2) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	P	5	BAL	CB-CA	2.20	1.60	1.51
2	P	6	BAL	O-C	2.16	1.29	1.22

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	P	6	BAL	OXT-C-O	-4.19	112.57	123.33
2	P	6	BAL	OXT-C-CA	4.13	127.06	114.00
2	P	6	BAL	CB-CA-C	2.87	119.19	112.98

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	P	6	BAL	C-CA-CB-N
2	P	6	BAL	OXT-C-CA-CB
2	P	6	BAL	O-C-CA-CB

There are no ring outliers.

2 monomers are involved in 2 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	P	6	BAL	2	0
2	P	5	BAL	1	0

## 5.5 Carbohydrates [i](#)

There are no oligosaccharides 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.