



Full wwPDB X-ray Structure Validation Report ⓘ

Oct 22, 2023 – 07:22 PM EDT

PDB ID : 3EP1
Title : Structure of the PGRP-Hd from *Alvinella pompejana*
Authors : Delfosse, V.; Gagniere, N.; Perrodou, E.; Poch, O.; Lecompte, O.; Mayer, C.
Deposited on : 2008-09-29
Resolution : 2.10 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

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
Xtriage (Phenix) : 1.13
EDS : 2.36
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) : 2.36

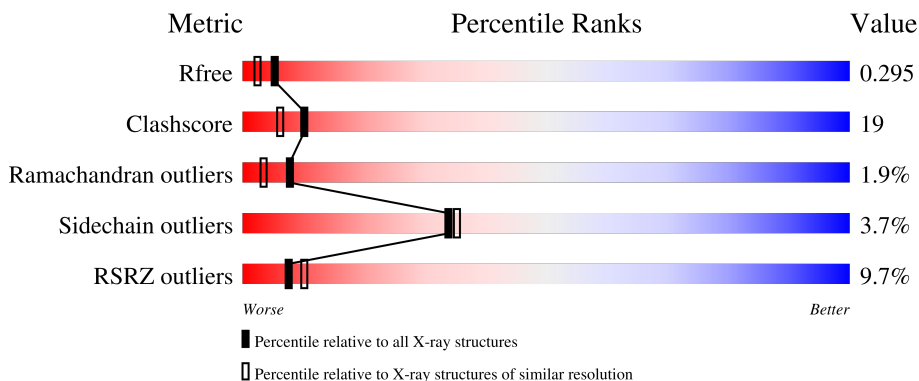
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.10 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	5197 (2.10-2.10)
Clashscore	141614	5710 (2.10-2.10)
Ramachandran outliers	138981	5647 (2.10-2.10)
Sidechain outliers	138945	5648 (2.10-2.10)
RSRZ outliers	127900	5083 (2.10-2.10)

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 ≥ 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	176	 8% 66% 27% • 5%
1	B	176	 10% 58% 31% • 7%

2 Entry composition

There are 2 unique types of molecules in this entry. The entry contains 2696 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 PGRP-Hd - Peptidoglycan recognition protein homologue.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	167	1235	763	221	242	9	0	0	0
1	B	164	1228	759	218	243	8	0	0	0

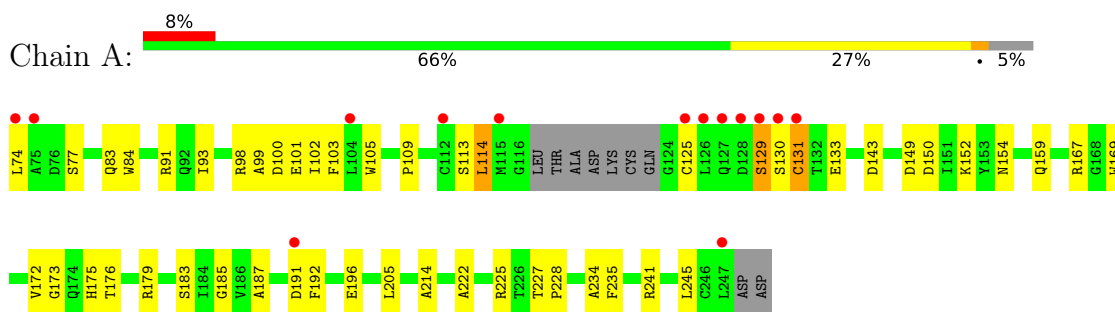
- Molecule 2 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
2	A	133	Total 133	O 133	0	0
2	B	100	Total 100	O 100	0	0

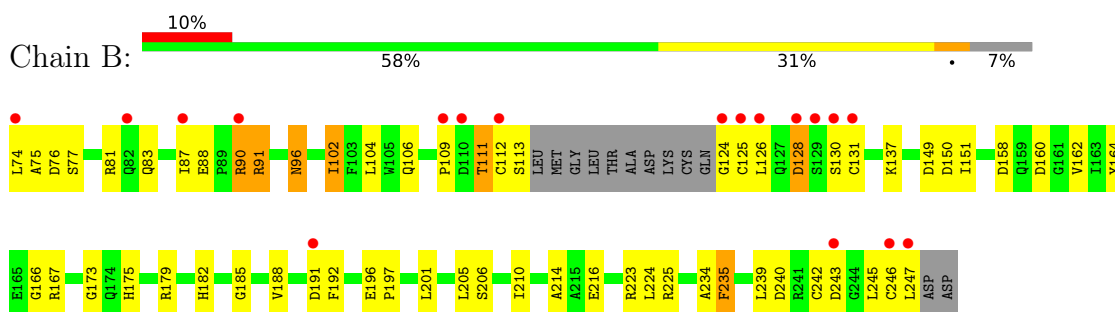
3 Residue-property plots [i](#)

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 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: PGRP-Hd - Peptidoglycan recognition protein homologue



- Molecule 1: PGRP-Hd - Peptidoglycan recognition protein homologue



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	35.36Å 71.85Å 141.88Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	28.96 – 2.10 28.96 – 2.10	Depositor EDS
% Data completeness (in resolution range)	100.0 (28.96-2.10) 99.9 (28.96-2.10)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.08	Depositor
$\langle I/\sigma(I) \rangle$ ¹	3.15 (at 2.10Å)	Xtrriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.247 , 0.302 0.248 , 0.295	Depositor DCC
R_{free} test set	7848 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å ²)	24.7	Xtrriage
Anisotropy	0.362	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.32 , 50.7	EDS
L-test for twinning ²	$\langle L \rangle = 0.47$, $\langle L^2 \rangle = 0.30$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.92	EDS
Total number of atoms	2696	wwPDB-VP
Average B, all atoms (Å ²)	28.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 20.32 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 8.9227e-03. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

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	0.34	0/1254	0.65	1/1693 (0.1%)
1	B	0.34	0/1247	0.63	0/1684
All	All	0.34	0/2501	0.64	1/3377 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	131	CYS	N-CA-C	-5.19	96.97	111.00

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	1235	0	1151	39	0
1	B	1228	0	1152	55	0
2	A	133	0	0	5	0
2	B	100	0	0	8	0
All	All	2696	0	2303	90	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 19.

All (90) 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:154:ASN:HD22	1:A:185:GLY:H	1.09	0.95
1:B:130:SER:HA	2:B:474:HOH:O	1.73	0.88
1:A:105:TRP:HE1	1:A:176:THR:HG22	1.44	0.83
1:B:102:ILE:HG23	1:B:224:LEU:HA	1.64	0.79
1:A:154:ASN:ND2	1:A:185:GLY:H	1.83	0.77
1:B:76:ASP:HA	2:B:404:HOH:O	1.86	0.76
1:B:109:PRO:N	1:B:191:ASP:HB2	2.01	0.76
1:A:228:PRO:HG2	2:A:298:HOH:O	1.88	0.72
1:B:179:ARG:HD2	2:B:448:HOH:O	1.89	0.71
1:B:235:PHE:O	1:B:239:LEU:HD22	1.91	0.71
1:A:109:PRO:CA	1:A:191:ASP:HB2	2.20	0.71
1:A:205:LEU:HG	1:A:245:LEU:HD11	1.73	0.69
1:A:109:PRO:HA	1:A:191:ASP:HB2	1.76	0.67
1:A:105:TRP:HE1	1:A:176:THR:CG2	2.09	0.65
1:B:90:ARG:HD3	1:B:149:ASP:HA	1.78	0.65
1:A:196:GLU:OE1	1:A:241:ARG:NH2	2.31	0.64
1:B:125:CYS:HA	1:B:128:ASP:CB	2.30	0.61
1:A:225:ARG:HG2	1:A:225:ARG:HH11	1.67	0.59
1:A:175:HIS:ND1	1:A:176:THR:HG23	2.17	0.59
1:B:109:PRO:CD	1:B:191:ASP:HB2	2.33	0.59
1:B:175:HIS:CD2	1:B:185:GLY:HA3	2.40	0.57
1:B:201:LEU:C	1:B:201:LEU:HD23	2.25	0.57
1:A:93:ILE:HB	1:A:172:VAL:CG2	2.35	0.57
1:B:192:PHE:O	1:B:234:ALA:HB3	2.03	0.57
1:B:235:PHE:CD1	1:B:239:LEU:HD21	2.40	0.56
1:A:77:SER:HA	1:B:214:ALA:HA	1.87	0.56
1:B:246:CYS:O	1:B:247:LEU:HB2	2.05	0.56
1:A:129:SER:O	1:A:130:SER:HB3	2.06	0.56
1:A:192:PHE:O	1:A:234:ALA:HB3	2.07	0.55
1:A:214:ALA:HA	1:B:77:SER:HA	1.88	0.55
1:B:74:LEU:O	1:B:75:ALA:HB3	2.06	0.55
1:A:74:LEU:O	1:B:210:ILE:HG23	2.07	0.55
1:B:128:ASP:CB	1:B:131:CYS:HB3	2.36	0.55
1:B:137:LYS:O	1:B:137:LYS:HD3	2.07	0.54
1:B:109:PRO:HD3	1:B:191:ASP:OD2	2.07	0.54
1:B:137:LYS:HD3	1:B:137:LYS:C	2.28	0.54
1:B:158:ASP:CG	1:B:162:VAL:HG22	2.28	0.54
1:B:235:PHE:O	1:B:239:LEU:CD2	2.56	0.54
1:A:105:TRP:NE1	1:A:176:THR:HG22	2.17	0.53
1:B:87:ILE:HG22	1:B:88:GLU:O	2.09	0.53
1:A:103:PHE:CG	1:A:176:THR:HG21	2.44	0.52
1:B:109:PRO:HA	2:B:460:HOH:O	2.09	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:91:ARG:NH2	2:B:444:HOH:O	2.42	0.52
1:A:227:THR:HB	1:A:228:PRO:HD2	1.92	0.52
1:B:158:ASP:OD2	1:B:162:VAL:HG22	2.11	0.51
1:B:235:PHE:HD1	1:B:239:LEU:HD21	1.74	0.51
1:B:81:ARG:NH1	1:B:166:GLY:O	2.44	0.51
1:B:205:LEU:HD23	1:B:245:LEU:HD21	1.93	0.51
1:A:93:ILE:HB	1:A:172:VAL:HG22	1.92	0.50
1:B:206:SER:O	1:B:210:ILE:HG13	2.12	0.50
1:A:113:SER:O	1:A:114:LEU:CB	2.59	0.50
1:A:102:ILE:HD12	1:A:102:ILE:N	2.27	0.49
1:A:169:TRP:HD1	2:A:287:HOH:O	1.95	0.49
1:A:225:ARG:HG2	1:A:225:ARG:NH1	2.26	0.49
1:B:128:ASP:CB	1:B:131:CYS:CB	2.91	0.48
1:B:109:PRO:HD3	1:B:191:ASP:HB2	1.94	0.48
1:B:124:GLY:N	2:B:465:HOH:O	2.47	0.48
1:B:150:ASP:O	1:B:151:ILE:C	2.52	0.48
1:A:100:ASP:O	1:A:222:ALA:HA	2.14	0.47
1:B:90:ARG:HD2	1:B:149:ASP:O	2.14	0.47
1:A:159:GLN:HG3	2:A:320:HOH:O	2.15	0.47
1:B:104:LEU:HD21	1:B:235:PHE:CZ	2.50	0.46
1:B:104:LEU:HD11	1:B:188:VAL:HG13	1.97	0.46
1:B:239:LEU:HD22	1:B:239:LEU:H	1.80	0.46
1:B:162:VAL:HG23	1:B:164:TYR:CE1	2.51	0.45
1:B:167:ARG:HD2	1:B:173:GLY:HA2	1.98	0.45
1:A:167:ARG:HD2	1:A:173:GLY:HA2	1.98	0.45
1:B:96:ASN:HB3	1:B:182:HIS:HE1	1.81	0.45
1:B:124:GLY:C	1:B:126:LEU:H	2.20	0.45
1:A:84:TRP:HB3	1:A:133:GLU:HG2	1.99	0.45
1:A:101:GLU:OE1	1:A:179:ARG:NH1	2.50	0.45
1:B:106:GLN:OE1	1:B:191:ASP:HA	2.16	0.45
1:B:111:THR:O	1:B:113:SER:N	2.50	0.45
1:B:196:GLU:HB2	1:B:197:PRO:HD2	1.99	0.44
1:A:149:ASP:O	1:A:150:ASP:HB2	2.17	0.44
1:A:125:CYS:O	1:A:131:CYS:SG	2.75	0.44
1:B:109:PRO:CA	1:B:191:ASP:HB2	2.47	0.44
1:B:125:CYS:SG	1:B:125:CYS:O	2.76	0.43
1:B:179:ARG:NH1	2:B:421:HOH:O	2.51	0.43
1:A:99:ALA:HB1	1:A:183:SER:HA	2.00	0.43
1:A:77:SER:HB2	1:B:216:GLU:HG2	2.00	0.43
1:A:91:ARG:HG2	1:A:149:ASP:CG	2.38	0.43
1:B:158:ASP:HB2	2:B:395:HOH:O	2.18	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:105:TRP:O	1:A:187:ALA:HA	2.20	0.42
1:A:83:GLN:NE2	2:A:364:HOH:O	2.44	0.42
1:A:143:ASP:OD1	1:A:152:LYS:HG3	2.20	0.42
1:B:242:CYS:O	1:B:243:ASP:C	2.58	0.42
1:A:74:LEU:N	2:A:351:HOH:O	2.53	0.41
1:B:90:ARG:CD	1:B:149:ASP:HA	2.47	0.41
1:B:223:ARG:HH11	1:B:225:ARG:HH22	1.69	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	163/176 (93%)	152 (93%)	9 (6%)	2 (1%)	13	8
1	B	160/176 (91%)	145 (91%)	11 (7%)	4 (2%)	5	2
All	All	323/352 (92%)	297 (92%)	20 (6%)	6 (2%)	8	3

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	114	LEU
1	A	129	SER
1	B	112	CYS
1	B	128	ASP
1	B	91	ARG
1	B	111	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	122/143 (85%)	120 (98%)	2 (2%)	62	69
1	B	124/143 (87%)	117 (94%)	7 (6%)	21	18
All	All	246/286 (86%)	237 (96%)	9 (4%)	34	35

All (9) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	98	ARG
1	A	235	PHE
1	B	83	GLN
1	B	90	ARG
1	B	96	ASN
1	B	102	ILE
1	B	160	ASP
1	B	235	PHE
1	B	240	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	82	GLN
1	A	134	GLN
1	A	154	ASN
1	A	159	GLN
1	A	213	GLN
1	B	96	ASN
1	B	159	GLN
1	B	182	HIS
1	B	202	GLN
1	B	213	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](#)

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

6.1 Protein, DNA and RNA chains

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	167/176 (94%)	0.46	14 (8%) 11 14	14, 24, 48, 52	0
1	B	164/176 (93%)	0.59	18 (10%) 5 7	16, 28, 48, 53	0
All	All	331/352 (94%)	0.53	32 (9%) 7 10	14, 26, 48, 53	0

All (32) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	74	LEU	5.8
1	A	128	ASP	5.5
1	B	125	CYS	5.4
1	B	126	LEU	5.4
1	A	125	CYS	5.3
1	B	131	CYS	3.6
1	A	247	LEU	3.6
1	B	110	ASP	3.3
1	A	75	ALA	3.2
1	B	112	CYS	3.2
1	A	112	CYS	3.1
1	B	247	LEU	3.1
1	B	87	ILE	2.9
1	A	126	LEU	2.9
1	B	82	GLN	2.9
1	B	129	SER	2.9
1	A	127	GLN	2.8
1	B	246	CYS	2.7
1	B	90	ARG	2.7
1	B	74	LEU	2.6
1	A	191	ASP	2.5
1	B	128	ASP	2.5
1	B	130	SER	2.4
1	B	243	ASP	2.4

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Mol	Chain	Res	Type	RSRZ
1	B	109	PRO	2.3
1	A	130	SER	2.2
1	B	124	GLY	2.2
1	A	115	MET	2.2
1	A	104	LEU	2.1
1	A	129	SER	2.1
1	A	131	CYS	2.1
1	B	191	ASP	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 monosaccharides 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.