



Full wwPDB X-ray Structure Validation Report

Feb 28, 2014 – 02:26 AM GMT

PDB ID : 2F4M
Title : The Mouse PNGase-HR23 Complex Reveals a Complete Remodulation of the Protein-Protein Interface Compared to its Yeast Orthologs
Authors : Zhao, G.; Zhou, X.; Wang, L.; Kisker, C.; Lennarz, W.J.; Schindelin, H.
Deposited on : 2005-11-23
Resolution : 1.85 Å(reported)

This is a full wwPDB validation report for a publicly released PDB entry.
We welcome your comments at validation@mail.wwpdb.org
A user guide is available at <http://wwpdb.org/ValidationPDFNotes.html>

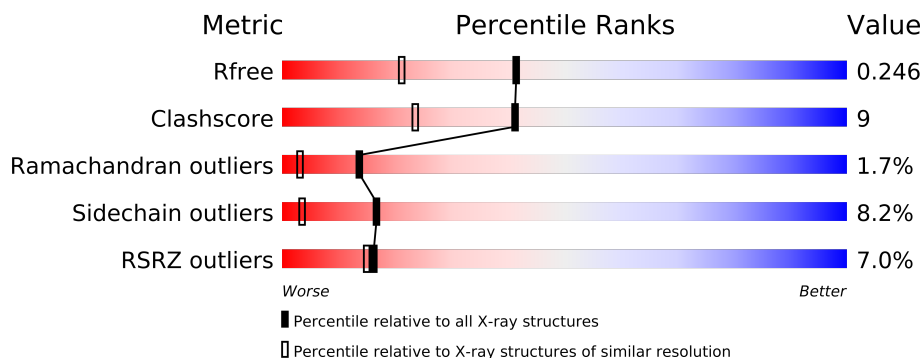
The following versions of software and data (see [references](#)) were used in the production of this report:

MolProbity : 4.02b-467
Mogul : 1.15 2013
Xtriage (Phenix) : dev-1323
EDS : stable22639
Percentile statistics : 21963
Refmac : 5.8.0049
CCP4 : 6.3.0 (Settle)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et. al. (1996)
Validation Pipeline (wwPDB-VP) : stable22683

1 Overall quality at a glance

The reported resolution of this entry is 1.85 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}	66092	1269 (1.86-1.86)
Clashscore	79885	1470 (1.86-1.86)
Ramachandran outliers	78287	1451 (1.86-1.86)
Sidechain outliers	78261	1451 (1.86-1.86)
RSRZ outliers	66119	1269 (1.86-1.86)

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. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density.

Mol	Chain	Length	Quality of chain
1	A	295	
2	B	61	

2 Entry composition

There are 5 unique types of molecules in this entry. The entry contains 3210 atoms, of which 0 are hydrogen and 0 are deuterium.

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 peptide N-glycanase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	295	Total	C	N	O	S	0	0	0
			2448	1544	441	448	15			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	451	LEU	-	CLONING ARTIFACT	UNP Q9JI78
A	452	GLU	-	CLONING ARTIFACT	UNP Q9JI78
A	453	HIS	-	EXPRESSION TAG	UNP Q9JI78
A	454	HIS	-	EXPRESSION TAG	UNP Q9JI78
A	455	HIS	-	EXPRESSION TAG	UNP Q9JI78
A	456	HIS	-	EXPRESSION TAG	UNP Q9JI78
A	457	HIS	-	EXPRESSION TAG	UNP Q9JI78
A	458	HIS	-	EXPRESSION TAG	UNP Q9JI78

- Molecule 2 is a protein called UV excision repair protein RAD23 homolog B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	61	Total	C	N	O	S	0	0	0
			505	318	95	90	2			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	333	GLY	-	CLONING ARTIFACT	UNP P54728

- Molecule 3 is ZINC ION (three-letter code: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	1	Total	Zn	0	0
			1	1		

- Molecule 4 is CHLORIDE ION (three-letter code: CL) (formula: Cl).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1	Total 1	Cl 1	0	0

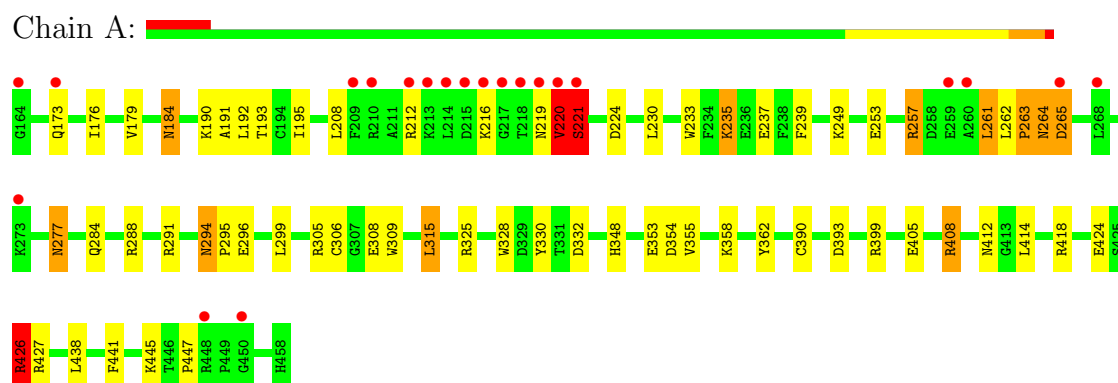
- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	217	Total 217	O 217	0	0
5	B	38	Total 38	O 38	0	0

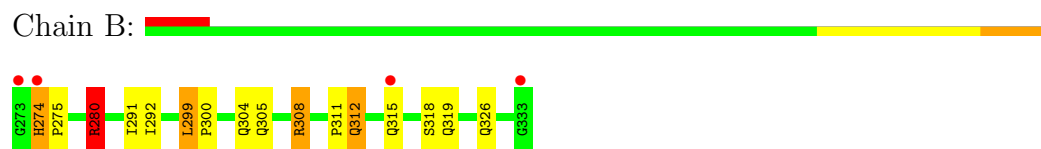
3 Residue-property plots

These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors 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: peptide N-glycanase



- Molecule 2: UV excision repair protein RAD23 homolog B



4 Data and refinement statistics

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, α , β , γ	98.22Å 52.30Å 82.55Å 90.00° 115.33° 90.00°	Depositor
Resolution (Å)	20.00 – 1.85 37.55 – 1.85	Depositor EDS
% Data completeness (in resolution range)	96.0 (20.00-1.85) 96.0 (37.55-1.85)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.05	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.47 (at 1.85Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.186 , 0.239 0.196 , 0.246	Depositor DCC
R_{free} test set	1579 reflections (5.33%)	DCC
Wilson B-factor (Å ²)	31.6	Xtriage
Anisotropy	0.508	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 77.5	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.32$	Xtriage
Outliers	0 of 31216 reflections	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	3210	wwPDB-VP
Average B, all atoms (Å ²)	48.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 6.47% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

5 Model quality ⓘ

5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: ZN, CL

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	0.80	0/2506	0.82	4/3386 (0.1%)
2	B	0.74	0/516	0.80	3/698 (0.4%)
All	All	0.79	0/3022	0.82	7/4084 (0.2%)

There are no bond length outliers.

All (7) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	399	ARG	NE-CZ-NH1	5.99	123.30	120.30
2	B	280	ARG	NE-CZ-NH1	5.75	123.18	120.30
2	B	308	ARG	NE-CZ-NH2	-5.72	117.44	120.30
1	A	441	PHE	CB-CG-CD1	5.21	124.45	120.80
1	A	325	ARG	NE-CZ-NH2	-5.20	117.70	120.30
1	A	426	ARG	NE-CZ-NH1	5.15	122.87	120.30
2	B	280	ARG	NE-CZ-NH2	-5.02	117.79	120.30

There are no chirality outliers.

There are no planarity outliers.

5.2 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 hydrogens added by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, and the number in parentheses is this value normalized per 1000 atoms of the molecule in the chain. The Symm-Clashes column gives symmetry related clashes, in the same way as for the Clashes column.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	A	2448	0	2395	41	1
2	B	505	0	501	15	0
3	A	1	0	0	0	0
4	A	1	0	0	0	0
5	A	217	0	0	12	3
5	B	38	0	0	1	0
All	All	3210	0	2896	54	3

Clashscore is defined as the number of clashes calculated for the entry per 1000 atoms (including hydrogens) of the entry. The overall clashscore for this entry is 9.

All (54) close contacts within the same asymmetric unit are listed below.

Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:408:ARG:NE	5:A:688:HOH:O	2.05	0.90
1:A:176:ILE:HD11	1:A:414:LEU:HD13	1.58	0.85
2:B:312:GLN:HA	2:B:315:GLN:HE21	1.49	0.78
2:B:315:GLN:O	2:B:319:GLN:NE2	2.16	0.76
1:A:195:ILE:O	5:A:665:HOH:O	2.03	0.74
1:A:328:TRP:CH2	1:A:330:TYR:HD1	2.04	0.74
1:A:192:LEU:O	5:A:665:HOH:O	2.07	0.72
1:A:328:TRP:HH2	1:A:330:TYR:HD1	1.38	0.69
1:A:328:TRP:CH2	1:A:330:TYR:CD1	2.87	0.63
1:A:348:HIS:HD2	1:A:358:LYS:H	1.49	0.61
1:A:291:ARG:NH1	1:A:308:GLU:OE1	2.34	0.60
1:A:332:ASP:HA	5:A:613:HOH:O	2.02	0.59
2:B:304:GLN:NE2	5:B:180:HOH:O	2.37	0.58
1:A:412:ASN:OD1	5:A:683:HOH:O	2.17	0.58
1:A:328:TRP:HH2	1:A:330:TYR:CD1	2.19	0.57
2:B:274:HIS:HB3	2:B:275:PRO:HD3	1.86	0.57
2:B:305:GLN:NE2	2:B:308:ARG:HH11	2.03	0.56
1:A:390:CYS:SG	1:A:447:PRO:HG3	2.46	0.56
1:A:393:ASP:HB3	5:A:700:HOH:O	2.06	0.54
2:B:274:HIS:HB3	2:B:275:PRO:CD	2.38	0.53
2:B:274:HIS:CB	2:B:275:PRO:CD	2.87	0.53
1:A:261:LEU:HD13	1:A:277:ASN:HB2	1.91	0.53
1:A:184:ASN:ND2	1:A:184:ASN:N	2.56	0.53
1:A:184:ASN:N	1:A:184:ASN:HD22	2.07	0.52
1:A:445:LYS:HD3	5:A:529:HOH:O	2.10	0.52
1:A:208:LEU:HD13	1:A:221:SER:O	2.09	0.51
2:B:280:ARG:HH22	2:B:326:GLN:HE22	1.59	0.51
1:A:263:PRO:O	1:A:264:ASN:C	2.50	0.50
1:A:306:CYS:HB2	5:A:669:HOH:O	2.12	0.48
1:A:233:TRP:CD1	1:A:237:GLU:HB3	2.49	0.47

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Atom-1	Atom-2	Distance(Å)	Clash(Å)
1:A:296:GLU:HA	1:A:299:LEU:HD12	1.96	0.47
1:A:438:LEU:HD11	2:B:291:ILE:HD12	1.95	0.47
2:B:318:SER:HB2	2:B:319:GLN:NE2	2.29	0.47
2:B:299:LEU:HB3	2:B:300:PRO:HD3	1.97	0.47
1:A:405:GLU:HG3	5:A:662:HOH:O	2.14	0.46
1:A:294:ASN:HD22	1:A:295:PRO:HD2	1.79	0.46
1:A:191:ALA:HB2	1:A:315:LEU:HD13	1.98	0.46
1:A:355:VAL:HG13	1:A:358:LYS:HD2	1.97	0.46
1:A:348:HIS:HE1	1:A:362:TYR:OH	1.99	0.45
1:A:220:VAL:O	1:A:221:SER:CB	2.64	0.44
2:B:311:PRO:O	2:B:315:GLN:HG3	2.17	0.44
1:A:257:ARG:HB2	1:A:277:ASN:HB3	1.99	0.44
1:A:249:LYS:NZ	5:A:695:HOH:O	2.50	0.44
1:A:191:ALA:HB2	1:A:315:LEU:CD1	2.49	0.43
2:B:280:ARG:HH22	2:B:326:GLN:NE2	2.17	0.43
1:A:426:ARG:HD3	5:A:567:HOH:O	2.19	0.43
1:A:305:ARG:O	1:A:309:TRP:HD1	2.01	0.42
1:A:262:LEU:HA	1:A:263:PRO:HD3	1.92	0.41
1:A:190:LYS:O	1:A:193:THR:HB	2.19	0.41
1:A:221:SER:HA	1:A:224:ASP:HB2	2.04	0.40
2:B:292:ILE:HD13	2:B:292:ILE:HA	1.93	0.40
1:A:418:ARG:HD3	5:A:612:HOH:O	2.21	0.40
1:A:438:LEU:HD11	2:B:291:ILE:CD1	2.51	0.40
1:A:235:LYS:HG3	1:A:354:ASP:HB2	2.02	0.40

All (3) 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	Distance(Å)	Clash(Å)
5:A:573:HOH:O	5:A:696:HOH:O[4_555]	2.01	0.19
5:A:708:HOH:O	5:A:715:HOH:O[4_546]	2.06	0.14
1:A:353:GLU:OE1	5:A:530:HOH:O[2_656]	2.12	0.08

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	293/295 (99%)	275 (94%)	13 (4%)	5 (2%)	14	3
2	B	59/61 (97%)	57 (97%)	1 (2%)	1 (2%)	14	3
All	All	352/356 (99%)	332 (94%)	14 (4%)	6 (2%)	14	3

All (6) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
2	B	274	HIS
1	A	220	VAL
1	A	265	ASP
1	A	264	ASN
1	A	221	SER
1	A	263	PRO

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	272/272 (100%)	248 (91%)	24 (9%)	14	3
2	B	57/57 (100%)	54 (95%)	3 (5%)	32	12
All	All	329/329 (100%)	302 (92%)	27 (8%)	17	3

All (27) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	173	GLN
1	A	179	VAL
1	A	184	ASN
1	A	212	ARG
1	A	216	LYS
1	A	219	ASN
1	A	220	VAL
1	A	221	SER
1	A	230	LEU
1	A	235	LYS
1	A	239	PHE

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Mol	Chain	Res	Type
1	A	253	GLU
1	A	257	ARG
1	A	261	LEU
1	A	265	ASP
1	A	277	ASN
1	A	284	GLN
1	A	288	ARG
1	A	294	ASN
1	A	315	LEU
1	A	408	ARG
1	A	424	GLU
1	A	426	ARG
1	A	427	ARG
2	B	280	ARG
2	B	299	LEU
2	B	312	GLN

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (13) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	184	ASN
1	A	219	ASN
1	A	277	ASN
1	A	294	ASN
1	A	344	GLN
1	A	348	HIS
1	A	456	HIS
2	B	295	ASN
2	B	304	GLN
2	B	305	GLN
2	B	315	GLN
2	B	323	HIS
2	B	326	GLN

5.3.3 RNA ⓘ

There are no RNA chains 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 ⓘ

Of 2 ligands modelled in this entry, 2 are monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues

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	295/295 (100%)	0.56	21 (7%)	16 14	39, 46, 58, 74	0
2	B	61/61 (100%)	0.27	4 (6%)	18 17	42, 47, 53, 58	0
All	All	356/356 (100%)	0.51	25 (7%)	16 15	39, 46, 58, 74	0

All (25) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	217	GLY	8.6
1	A	209	PHE	7.2
1	A	216	LYS	7.0
1	A	219	ASN	6.8
1	A	218	THR	6.7
1	A	220	VAL	5.6
1	A	164	GLY	5.5
2	B	273	GLY	5.4
2	B	274	HIS	5.2
1	A	215	ASP	5.1
1	A	260	ALA	4.2
1	A	213	LYS	4.1
1	A	221	SER	4.1
1	A	212	ARG	3.7
1	A	214	LEU	3.7
1	A	210	ARG	3.3
1	A	259	GLU	3.3
1	A	450	GLY	3.2
1	A	173	GLN	3.0
1	A	268	LEU	3.0
1	A	265	ASP	2.8
2	B	333	GLY	2.6
1	A	448	ARG	2.4
2	B	315	GLN	2.2

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Mol	Chain	Res	Type	RSRZ
1	A	273	LYS	2.0

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

There are no non-standard protein/DNA/RNA residues in this entry.

6.3 Carbohydrates

There are no carbohydrates in this entry.

6.4 Ligands

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. LLDF column lists the quality of electron density of the group with respect to its neighbouring residues in protein, DNA or RNA chains. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q < 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSR	LLDF	B-factors(\AA^2)	Q<0.9
4	CL	A	1	1/1	0.05	-1.68	45,45,45,45	0
3	ZN	A	501	1/1	0.05	-2.00	47,47,47,47	0

6.5 Other polymers

There are no such residues in this entry.