Full wwPDB X-ray Structure Validation Report (i)

Feb 1, 2016 – 04:58 AM GMT

PDB ID	:	2OYU
Title	:	Indomethacin-(S)-alpha-ethyl-ethanolamide bound to Cyclooxygenase-1
Authors	:	Harman, C.A.; Garavito, R.M.
Deposited on	:	2007-02-23
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
A user guide is available at
http://wwpdb.org/validation/2016/XrayValidationReportHelp
with specific help available everywhere you see the (i) symbol.

The following versions of software and data (see references (1)) were used in the production of this report:

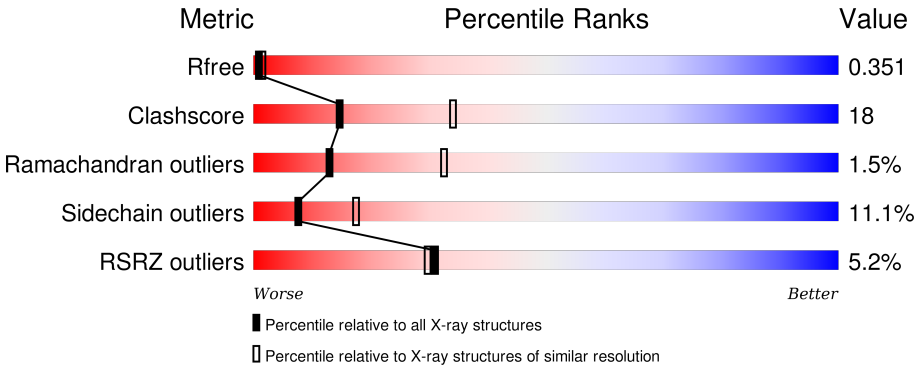
MolProbity	:	4.02b-467
Mogul	:	1.7 (RC4), CSD as536be (2015)
Xtriage (Phenix)	:	1.9-1692
EDS	:	rb-20026688
Percentile statistics	:	20151230.v01 (using entries in the PDB archive December 30th 2015)
Refmac	:	5.8.0135
CCP4	:	6.5.0
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	trunk26865

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 2.70 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))
R_{free}	91344	2103 (2.70-2.70)
Clashscore	102246	2422 (2.70-2.70)
Ramachandran outliers	100387	2382 (2.70-2.70)
Sidechain outliers	100360	2382 (2.70-2.70)
RSRZ outliers	91569	2107 (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 on the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria. 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 <=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	P	600	5% 61% 27% 5% 8%

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	NAG	P	661	-	-	-	X

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Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
5	IMS	P	700	-	-	X	X

2 Entry composition

There are 7 unique types of molecules in this entry. The entry contains 4652 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 Prostaglandin G/H synthase 1.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	P	553	Total	C	N	O	S	0	0	0
			4408	2864	741	775	28			

There is a discrepancy between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
P	92	LEU	MET	SEE REMARK 999	UNP P05979

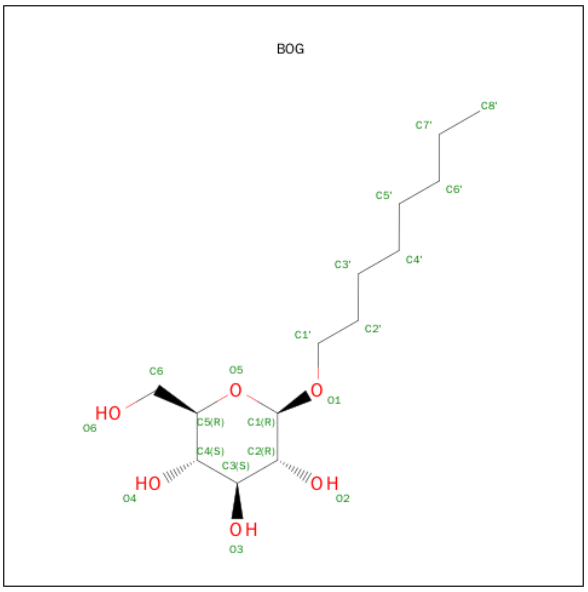
- Molecule 2 is a polymer of unknown type called SUGAR (2-MER).

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	P	2	Total	C	N	O	0	0
			28	16	2	10		
2	P	2	Total	C	N	O	0	0
			28	16	2	10		

- Molecule 3 is a polymer of unknown type called SUGAR (3-MER).

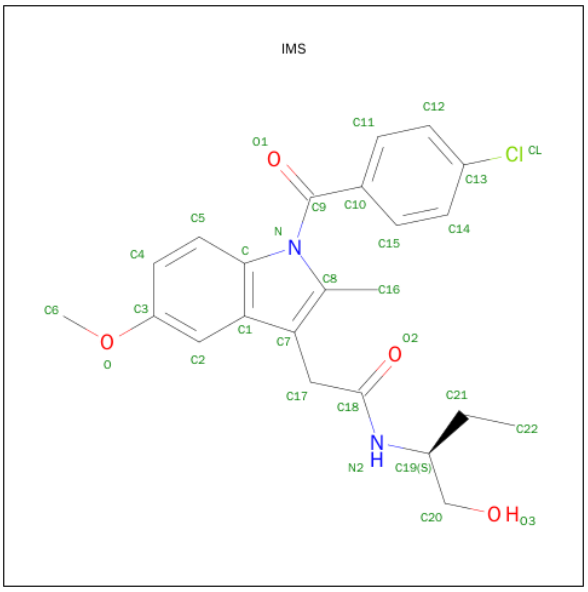
Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
3	P	3	Total	C	N	O	0	0
			39	22	2	15		

- Molecule 4 is SUGAR (B-OCTYLGLUCOSIDE) (three-letter code: BOG) (formula: $C_{14}H_{28}O_6$).



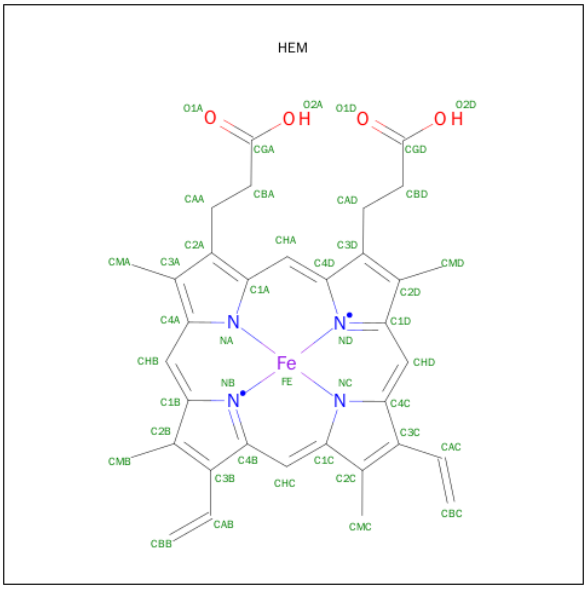
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	P	1	Total	C	O	0	0
			12	6	6		
4	P	1	Total	C	O	0	0
			12	6	6		

- Molecule 5 is 2-[1-(4-CHLOROBENZOYL)-5-METHOXY-2-METHYL-1H-INDOL-3-YL]-N-[(1S)-1-(HYDROXYMETHYL)PROPYL]ACETAMIDE (three-letter code: IMS) (formula: $C_{23}H_{25}ClN_2O_4$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	P	1	Total	C	Cl	N	O	0	0
			30	23	1	2	4		

- Molecule 6 is PROTOPORPHYRIN IX CONTAINING FE (three-letter code: HEM) (formula: $C_{34}H_{32}FeN_4O_4$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
6	P	1	Total	C	Fe	N	O	0	0
			43	34	1	4	4		

- Molecule 7 is water.

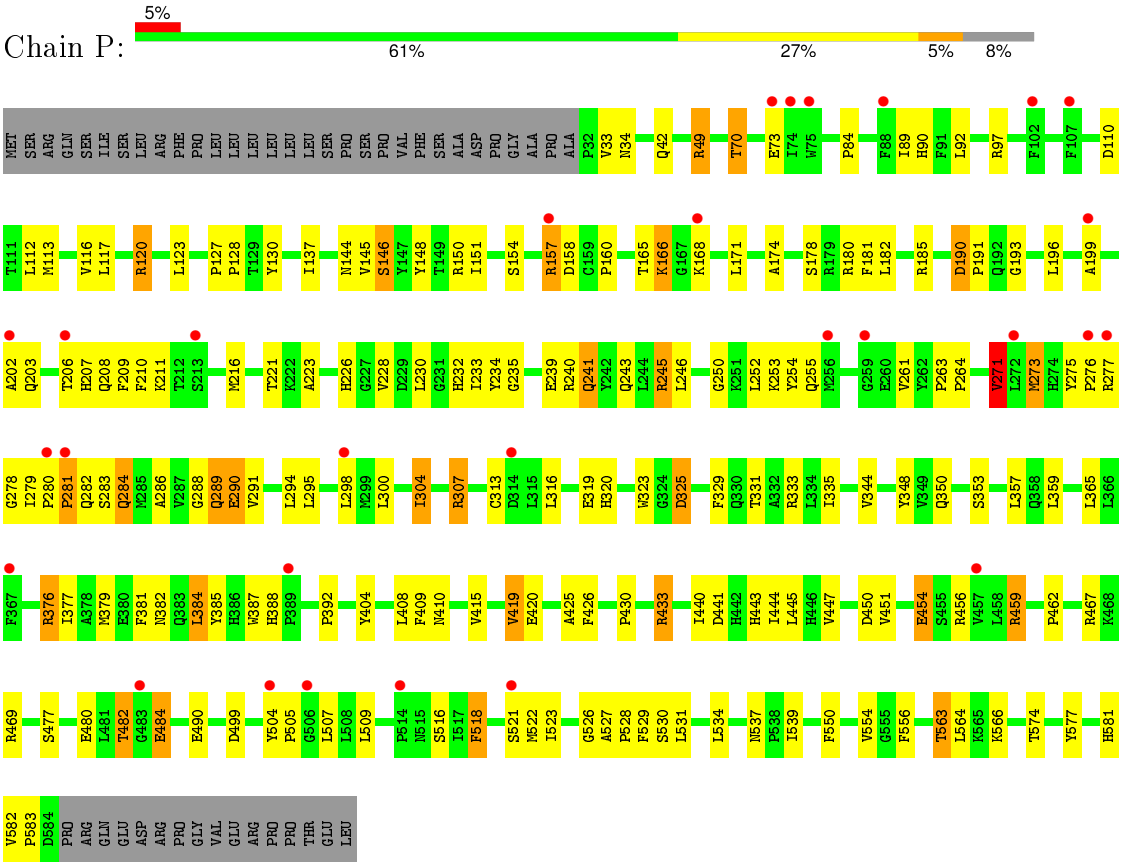
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
7	P	52	Total	O	0	0
			52	52		

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 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: Prostaglandin G/H synthase 1

Chain P:



4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 65 2 2	Depositor
Cell constants a, b, c, α, β, γ	181.41Å 181.41Å 103.40Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	30.00 – 2.70 29.69 – 2.70	Depositor EDS
% Data completeness (in resolution range)	99.5 (30.00-2.70) 99.6 (29.69-2.70)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	9.74 (at 2.68Å)	Xtriage
Refinement program	REFMAC 5.2.0005	Depositor
R, R_{free}	0.241 , 0.292 0.320 , 0.351	Depositor DCC
R_{free} test set	1400 reflections (5.29%)	DCC
Wilson B-factor (Å^2)	62.7	Xtriage
Anisotropy	0.084	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 28.4	EDS
Estimated twinning fraction	No twinning to report.	Xtriage
L-test for twinning[2]	$< \|L\| > = 0.43$, $< L^2 > = 0.26$	Xtriage
Outliers	0 of 27880 reflections	Xtriage
F_o,F_c correlation	0.87	EDS
Total number of atoms	4652	wwPDB-VP
Average B, all atoms (Å^2)	51.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.27% of the height of the origin peak. No significant pseudotranslation is detected.*

[1] Intensities estimated from amplitudes.

[2] Theoretical values of $< |L| >$, $< L^2 >$ for acentric reflections are 0.5, 0.375 respectively for untwinned datasets, and 0.333, 0.2 for perfectly twinned datasets.

5 Model quality

5.1 Standard geometry

Bond lengths and bond angles in the following residue types are not validated in this section: HEM, IMS, BMA, NAG, BOG

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	P	0.53	0/4547	0.67	0/6189

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no planarity outliers.

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	P	4408	0	4243	156	0
2	P	56	0	50	0	0
3	P	39	0	34	4	0
4	P	24	0	22	0	0
5	P	30	0	25	26	0
6	P	43	0	30	4	0
7	P	52	0	0	6	0
All	All	4652	0	4404	160	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 18.

All (160) 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:P:151:ILE:HG22	1:P:469:ARG:NH1	1.56	1.19
1:P:280:PRO:HA	1:P:284:GLN:HG3	1.23	1.13
1:P:459:ARG:HH21	1:P:459:ARG:HG2	1.17	1.04
1:P:151:ILE:HG22	1:P:469:ARG:HH12	1.05	1.04
1:P:84:PRO:HG2	1:P:89:ILE:HD11	1.43	0.98
1:P:208:GLN:HE22	1:P:228:VAL:HA	1.29	0.96
1:P:527:ALA:HB3	1:P:528:PRO:HD3	1.48	0.94
1:P:90:HIS:HE1	5:P:700:IMS:H202	1.33	0.93
1:P:151:ILE:CG2	1:P:469:ARG:HH12	1.84	0.90
1:P:563:THR:HG22	1:P:566:LYS:H	1.36	0.90
1:P:527:ALA:HA	5:P:700:IMS:H5	1.52	0.89
1:P:433:ARG:HH11	1:P:433:ARG:HG2	1.39	0.88
1:P:49:ARG:HH11	1:P:49:ARG:HG2	1.39	0.86
1:P:157:ARG:HA	1:P:459:ARG:HH11	1.42	0.85
1:P:388:HIS:HB3	1:P:444:ILE:HD12	1.58	0.84
1:P:353:SER:CB	5:P:700:IMS:H163	2.08	0.82
1:P:527:ALA:HA	5:P:700:IMS:C5	2.09	0.81
1:P:208:GLN:NE2	1:P:228:VAL:HA	1.97	0.78
1:P:516:SER:HB3	5:P:700:IMS:H212	1.63	0.78
1:P:90:HIS:CE1	5:P:700:IMS:H202	2.16	0.78
1:P:344:VAL:O	1:P:348:TYR:HB3	1.84	0.77
1:P:459:ARG:CG	1:P:459:ARG:HH21	1.96	0.74
1:P:280:PRO:CA	1:P:284:GLN:HG3	2.12	0.74
1:P:353:SER:HB2	5:P:700:IMS:H163	1.69	0.74
1:P:387:TRP:HB2	6:P:601:HEM:HAC	1.70	0.73
1:P:353:SER:HB3	5:P:700:IMS:H163	1.71	0.73
1:P:157:ARG:HA	1:P:459:ARG:NH1	2.05	0.71
3:P:672:NAG:H4	3:P:673:BMA:O2	1.90	0.70
1:P:49:ARG:HH11	1:P:49:ARG:CG	2.04	0.70
1:P:459:ARG:HG2	1:P:459:ARG:NH2	1.99	0.69
1:P:90:HIS:HE1	5:P:700:IMS:C20	2.05	0.69
1:P:171:LEU:HB3	1:P:456:ARG:HH21	1.56	0.69
1:P:359:LEU:HD22	5:P:700:IMS:CL	2.31	0.68
1:P:563:THR:HG22	1:P:566:LYS:N	2.08	0.68
1:P:450:ASP:O	1:P:454:GLU:HG2	1.93	0.67
1:P:531:LEU:HD11	5:P:700:IMS:H11	1.76	0.67
1:P:462:PRO:HB3	1:P:499:ASP:O	1.95	0.67
1:P:226:HIS:CE1	1:P:376:ARG:HD2	2.30	0.66
3:P:672:NAG:H3	7:P:789:HOH:O	1.97	0.64
1:P:335:ILE:HD13	1:P:550:PHE:HB3	1.77	0.64
1:P:151:ILE:CG2	1:P:469:ARG:NH1	2.46	0.64
1:P:359:LEU:CD1	5:P:700:IMS:H14	2.28	0.64

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:433:ARG:HH11	1:P:433:ARG:CG	2.09	0.64
1:P:151:ILE:HG13	1:P:529:PHE:HZ	1.63	0.63
1:P:577:TYR:CE2	1:P:583:PRO:HD3	2.33	0.63
1:P:116:VAL:O	1:P:120:ARG:HB2	1.97	0.62
1:P:353:SER:HA	5:P:700:IMS:N2	2.14	0.62
1:P:34:ASN:HB2	1:P:158:ASP:OD2	2.00	0.61
1:P:320:HIS:HB3	1:P:323:TRP:CD1	2.36	0.60
1:P:150:ARG:NH1	1:P:154:SER:HB3	2.16	0.60
1:P:171:LEU:HB3	1:P:456:ARG:NH2	2.16	0.60
1:P:273:MET:SD	1:P:286:ALA:HA	2.42	0.59
1:P:388:HIS:HB3	1:P:444:ILE:CD1	2.31	0.59
1:P:211:LYS:HB2	1:P:223:ALA:HB2	1.84	0.59
1:P:300:LEU:HD22	1:P:426:PHE:HE2	1.67	0.58
1:P:359:LEU:CD2	5:P:700:IMS:H14	2.34	0.58
1:P:295:LEU:HB2	1:P:298:LEU:HD23	1.86	0.58
1:P:230:LEU:HG	1:P:233:ILE:HD12	1.85	0.57
1:P:281:PRO:O	1:P:284:GLN:HB2	2.05	0.56
1:P:353:SER:O	5:P:700:IMS:H201	2.05	0.56
1:P:433:ARG:NH1	1:P:433:ARG:HG2	2.12	0.56
1:P:477:SER:OG	1:P:480:GLU:HB2	2.05	0.56
1:P:276:PRO:HA	7:P:773:HOH:O	2.04	0.56
1:P:154:SER:HB2	1:P:459:ARG:HB2	1.87	0.56
1:P:261:VAL:HB	1:P:307:ARG:HD2	1.86	0.56
1:P:359:LEU:HD13	5:P:700:IMS:H14	1.85	0.56
1:P:240:ARG:HG3	1:P:271:VAL:HG21	1.88	0.56
1:P:130:TYR:HB2	1:P:150:ARG:HG2	1.87	0.56
1:P:209:PHE:HB2	1:P:377:ILE:HG13	1.87	0.56
1:P:235:GLY:HA2	1:P:288:GLY:O	2.05	0.56
1:P:447:VAL:O	1:P:451:VAL:HG23	2.07	0.55
1:P:181:PHE:HZ	1:P:490:GLU:HG3	1.71	0.55
1:P:157:ARG:H	1:P:157:ARG:NE	2.04	0.55
1:P:290:GLU:CB	7:P:783:HOH:O	2.55	0.55
1:P:526:GLY:HA3	5:P:700:IMS:H62	1.88	0.55
1:P:250:GLY:HA2	1:P:325:ASP:OD1	2.07	0.55
1:P:113:MET:O	1:P:117:LEU:HG	2.08	0.54
1:P:261:VAL:HB	1:P:307:ARG:HH11	1.71	0.54
1:P:42:GLN:HG3	1:P:70:THR:HG23	1.90	0.54
1:P:350:GLN:OE1	1:P:359:LEU:HG	2.08	0.54
1:P:178:SER:HB3	1:P:445:LEU:HD11	1.89	0.54
1:P:300:LEU:HD22	1:P:426:PHE:CE2	2.44	0.53
1:P:379:MET:O	1:P:382:ASN:HB3	2.08	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:34:ASN:CB	1:P:158:ASP:OD2	2.57	0.53
1:P:523:ILE:HG12	5:P:700:IMS:H223	1.91	0.52
1:P:241:GLN:O	1:P:245:ARG:HG2	2.09	0.52
1:P:295:LEU:HD21	1:P:408:LEU:HD23	1.92	0.52
1:P:359:LEU:HD22	5:P:700:IMS:H14	1.90	0.51
1:P:447:VAL:HG13	6:P:601:HEM:HBA2	1.91	0.51
1:P:527:ALA:HB3	1:P:528:PRO:CD	2.31	0.51
1:P:203:GLN:HA	6:P:601:HEM:HBC2	1.92	0.51
1:P:254:TYR:HA	1:P:264:PRO:HD3	1.93	0.51
1:P:255:GLN:HG2	1:P:263:PRO:O	2.09	0.51
1:P:150:ARG:HH12	1:P:154:SER:HB3	1.74	0.51
1:P:425:ALA:HA	7:P:760:HOH:O	2.11	0.50
1:P:459:ARG:CG	1:P:459:ARG:NH2	2.65	0.50
1:P:404:TYR:CG	1:P:443:HIS:CD2	3.00	0.50
1:P:216:MET:HG2	3:P:672:NAG:H82	1.94	0.49
1:P:286:ALA:O	7:P:786:HOH:O	2.20	0.49
1:P:280:PRO:HA	1:P:284:GLN:CG	2.17	0.49
1:P:307:ARG:HH21	1:P:419:VAL:HG11	1.77	0.49
1:P:207:HIS:HB3	1:P:289:GLN:HE21	1.76	0.49
1:P:307:ARG:NH2	1:P:419:VAL:HG11	2.27	0.49
1:P:90:HIS:CE1	5:P:700:IMS:C20	2.89	0.49
1:P:166:LYS:HG3	1:P:499:ASP:HB2	1.95	0.48
1:P:420:GLU:HG2	1:P:574:THR:HB	1.95	0.48
1:P:381:PHE:HD1	1:P:384:LEU:HD22	1.78	0.48
1:P:335:ILE:CD1	1:P:550:PHE:HB3	2.43	0.48
1:P:353:SER:HA	5:P:700:IMS:C18	2.43	0.47
1:P:49:ARG:HG2	1:P:49:ARG:NH1	2.19	0.47
1:P:278:GLY:C	1:P:280:PRO:HD3	2.35	0.47
1:P:280:PRO:N	1:P:281:PRO:HD3	2.30	0.47
1:P:359:LEU:HB3	5:P:700:IMS:CL	2.52	0.47
5:P:700:IMS:C16	5:P:700:IMS:H15	2.45	0.47
1:P:359:LEU:HD22	5:P:700:IMS:C14	2.45	0.46
1:P:234:TYR:CE2	1:P:333:ARG:HG3	2.50	0.46
1:P:441:ASP:OD2	1:P:443:HIS:CD2	2.68	0.46
1:P:253:LYS:O	1:P:264:PRO:HD3	2.14	0.46
1:P:199:ALA:O	1:P:202:ALA:HB3	2.15	0.46
1:P:84:PRO:CG	1:P:89:ILE:HD11	2.29	0.46
1:P:116:VAL:HG11	5:P:700:IMS:C12	2.46	0.46
1:P:144:ASN:OD1	1:P:146:SER:HB2	2.16	0.46
1:P:49:ARG:CG	1:P:49:ARG:NH1	2.73	0.45
1:P:240:ARG:HD2	7:P:755:HOH:O	2.15	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:P:313:CYS:HA	1:P:316:LEU:HD12	1.98	0.45
1:P:210:PHE:CE1	1:P:382:ASN:HA	2.51	0.45
1:P:518:PHE:CD1	1:P:522:MET:HG2	2.50	0.45
1:P:359:LEU:HD13	5:P:700:IMS:C14	2.47	0.44
1:P:137:ILE:HD12	1:P:137:ILE:H	1.81	0.44
1:P:42:GLN:HG3	1:P:70:THR:CG2	2.47	0.44
1:P:171:LEU:HD13	1:P:456:ARG:HE	1.83	0.43
1:P:482:THR:O	1:P:484:GLU:N	2.51	0.43
1:P:190:ASP:HA	1:P:191:PRO:HD3	1.84	0.43
1:P:127:PRO:HB2	1:P:128:PRO:HD2	2.00	0.43
1:P:182:LEU:HB3	1:P:440:ILE:HD13	2.00	0.42
1:P:331:THR:O	1:P:335:ILE:HG12	2.19	0.42
1:P:384:LEU:HB2	1:P:507:LEU:CD1	2.49	0.42
1:P:582:VAL:HG23	1:P:583:PRO:HD2	2.01	0.42
1:P:504:TYR:HB3	1:P:505:PRO:HD3	2.00	0.42
1:P:467:ARG:NH1	1:P:521:SER:OG	2.47	0.42
1:P:207:HIS:HE1	6:P:601:HEM:C1D	2.38	0.42
1:P:206:THR:HB	1:P:210:PHE:CD2	2.55	0.42
1:P:245:ARG:HD2	1:P:329:PHE:CE1	2.55	0.42
1:P:239:GLU:O	1:P:243:GLN:HG2	2.20	0.42
1:P:193:GLY:O	1:P:581:HIS:HA	2.19	0.42
1:P:148:TYR:CZ	1:P:221:THR:HB	2.55	0.42
1:P:182:LEU:HB3	1:P:440:ILE:CD1	2.50	0.41
1:P:157:ARG:HE	1:P:157:ARG:H	1.67	0.41
1:P:196:LEU:HD11	1:P:392:PRO:HG3	2.02	0.41
1:P:300:LEU:O	1:P:304:ILE:HD12	2.20	0.41
1:P:112:LEU:HD12	1:P:357:LEU:HD13	2.02	0.41
1:P:537:ASN:OD1	1:P:539:ILE:HG12	2.19	0.41
1:P:509:LEU:HD23	1:P:509:LEU:HA	1.80	0.41
1:P:282:GLN:O	1:P:283:SER:CB	2.68	0.41
1:P:151:ILE:HG13	1:P:529:PHE:CZ	2.50	0.41
1:P:240:ARG:HG3	1:P:271:VAL:CG2	2.49	0.41
1:P:226:HIS:ND1	1:P:376:ARG:HD2	2.36	0.41
1:P:320:HIS:HB3	1:P:323:TRP:CG	2.55	0.41
1:P:110:ASP:HB3	1:P:365:LEU:HD21	2.02	0.41
3:P:672:NAG:C4	3:P:673:BMA:O2	2.63	0.40

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	P	551/600 (92%)	497 (90%)	46 (8%)	8 (2%)	13 32

All (8) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	P	281	PRO
1	P	430	PRO
1	P	174	ALA
1	P	294	LEU
1	P	160	PRO
1	P	290	GLU
1	P	410	ASN
1	P	271	VAL

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	P	468/530 (88%)	416 (89%)	52 (11%)	8 17

All (52) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	P	33	VAL
1	P	49	ARG
1	P	70	THR

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Mol	Chain	Res	Type
1	P	73	GLU
1	P	92	LEU
1	P	97	ARG
1	P	120	ARG
1	P	123	LEU
1	P	145	VAL
1	P	146	SER
1	P	157	ARG
1	P	165	THR
1	P	166	LYS
1	P	168	LYS
1	P	180	ARG
1	P	185	ARG
1	P	190	ASP
1	P	232	HIS
1	P	241	GLN
1	P	245	ARG
1	P	246	LEU
1	P	252	LEU
1	P	271	VAL
1	P	273	MET
1	P	275	TYR
1	P	277	ARG
1	P	279	ILE
1	P	284	GLN
1	P	289	GLN
1	P	291	VAL
1	P	304	ILE
1	P	307	ARG
1	P	319	GLU
1	P	325	ASP
1	P	376	ARG
1	P	384	LEU
1	P	385	TYR
1	P	409	PHE
1	P	415	VAL
1	P	419	VAL
1	P	433	ARG
1	P	454	GLU
1	P	459	ARG
1	P	482	THR
1	P	484	GLU

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Mol	Chain	Res	Type
1	P	518	PHE
1	P	530	SER
1	P	534	LEU
1	P	554	VAL
1	P	556	PHE
1	P	563	THR
1	P	564	LEU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (16) such sidechains are listed below:

Mol	Chain	Res	Type
1	P	90	HIS
1	P	134	HIS
1	P	203	GLN
1	P	204	HIS
1	P	207	HIS
1	P	208	GLN
1	P	237	ASN
1	P	241	GLN
1	P	243	GLN
1	P	282	GLN
1	P	358	GLN
1	P	386	HIS
1	P	442	HIS
1	P	443	HIS
1	P	461	GLN
1	P	581	HIS

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

7 carbohydrates 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	NAG	P	661	1,2	14,14,15	0.54	0	15,19,21	1.01	1 (6%)
2	NAG	P	662	2	14,14,15	0.67	0	15,19,21	1.90	4 (26%)
3	NAG	P	671	1,3	14,14,15	0.46	0	15,19,21	1.27	2 (13%)
3	NAG	P	672	3	14,14,15	0.72	0	15,19,21	1.00	1 (6%)
3	BMA	P	673	3	11,11,12	0.75	0	14,15,17	2.90	4 (28%)
2	NAG	P	681	1,2	14,14,15	0.68	0	15,19,21	1.40	3 (20%)
2	NAG	P	682	2	14,14,15	0.66	0	15,19,21	1.24	1 (6%)

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	NAG	P	661	1,2	-	0/6/23/26	0/1/1/1
2	NAG	P	662	2	-	0/6/23/26	0/1/1/1
3	NAG	P	671	1,3	-	0/6/23/26	0/1/1/1
3	NAG	P	672	3	-	0/6/23/26	0/1/1/1
3	BMA	P	673	3	-	0/2/19/22	0/1/1/1
2	NAG	P	681	1,2	-	0/6/23/26	0/1/1/1
2	NAG	P	682	2	-	0/6/23/26	0/1/1/1

There are no bond length outliers.

All (16) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	P	681	NAG	C3-C4-C5	-3.38	104.31	110.20
3	P	673	BMA	C3-C4-C5	-3.31	104.42	110.20
2	P	662	NAG	C1-O5-C5	-3.21	108.18	112.25
3	P	671	NAG	O4-C4-C3	-2.33	105.10	110.34
2	P	681	NAG	O5-C5-C6	2.16	112.01	107.35
2	P	681	NAG	O4-C4-C5	2.37	115.51	109.24
2	P	662	NAG	O5-C5-C6	2.41	112.56	107.35

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	P	661	NAG	O5-C5-C6	2.43	112.60	107.35
3	P	672	NAG	C4-C3-C2	2.53	115.17	111.23
3	P	671	NAG	C1-O5-C5	2.60	115.54	112.25
3	P	673	BMA	O5-C1-C2	2.92	115.59	110.86
2	P	662	NAG	C3-C4-C5	3.22	115.80	110.20
2	P	682	NAG	C1-O5-C5	3.43	116.60	112.25
2	P	662	NAG	C4-C3-C2	4.53	118.26	111.23
3	P	673	BMA	C1-O5-C5	6.53	120.54	112.25
3	P	673	BMA	C1-C2-C3	6.57	117.32	109.54

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 4 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	P	672	NAG	4	0
3	P	673	BMA	2	0

5.6 Ligand geometry (i)

4 ligands 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	$\#\|Z\| > 2$
6	HEM	P	601	1	30,50,50	2.23	9 (30%)	24,82,82	2.34	7 (29%)
5	IMS	P	700	-	29,32,32	2.19	2 (6%)	34,45,45	2.55	11 (32%)
4	BOG	P	750	-	12,12,20	0.51	0	17,17,25	0.70	1 (5%)
4	BOG	P	751	-	12,12,20	0.47	0	17,17,25	1.01	1 (5%)

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
6	HEM	P	601	1	-	0/10/54/54	0/0/8/8
5	IMS	P	700	-	-	0/18/22/22	0/3/3/3
4	BOG	P	750	-	-	0/2/22/31	0/1/1/1
4	BOG	P	751	-	-	0/2/22/31	0/1/1/1

All (11) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	P	700	IMS	C13-CL	-10.43	1.50	1.74
6	P	601	HEM	C3B-C4B	-7.27	1.45	1.51
6	P	601	HEM	C3D-C4D	-5.27	1.44	1.51
5	P	700	IMS	C-N	-4.21	1.33	1.39
6	P	601	HEM	C2C-C1C	-3.86	1.45	1.52
6	P	601	HEM	C2B-C1B	-2.22	1.44	1.51
6	P	601	HEM	C2D-C1D	-2.00	1.45	1.51
6	P	601	HEM	C3B-CAB	2.11	1.55	1.51
6	P	601	HEM	C3C-CAC	2.23	1.55	1.51
6	P	601	HEM	C1C-NC	2.24	1.38	1.36
6	P	601	HEM	FE-ND	3.21	2.14	1.97

All (20) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
5	P	700	IMS	C17-C18-N2	-4.50	108.74	115.96
5	P	700	IMS	C21-C19-N2	-4.22	105.28	110.43
5	P	700	IMS	O1-C9-C10	-3.51	113.50	120.17
5	P	700	IMS	C12-C11-C10	-2.16	118.26	120.76
6	P	601	HEM	CMA-C3A-C4A	-2.02	125.03	128.36
4	P	751	BOG	C1-O5-C5	2.23	117.59	113.47
4	P	750	BOG	O5-C5-C6	2.28	112.11	106.36
6	P	601	HEM	C2C-C1C-CHC	2.56	127.57	123.68
5	P	700	IMS	C20-C19-N2	2.58	114.02	109.43
5	P	700	IMS	C11-C10-C15	2.61	122.47	118.60
5	P	700	IMS	C6-O-C3	2.72	123.88	117.51
5	P	700	IMS	O2-C18-N2	3.05	128.18	123.01
6	P	601	HEM	CMD-C2D-C3D	3.06	127.90	114.35
5	P	700	IMS	C16-C8-N	3.58	127.02	122.44
6	P	601	HEM	CAD-C3D-C4D	4.16	127.14	112.47
6	P	601	HEM	CMC-C2C-C3C	4.25	127.14	116.53
5	P	700	IMS	C10-C9-N	4.27	123.51	118.02

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
6	P	601	HEM	CMB-C2B-C3B	4.32	127.32	116.53
6	P	601	HEM	CAD-C3D-C2D	5.34	128.58	113.22
5	P	700	IMS	C19-N2-C18	8.89	135.89	122.79

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 30 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
6	P	601	HEM	4	0
5	P	700	IMS	26	0

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, 95^{th} 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	P	553/600 (92%)	0.54	29 (5%) 31 30	41, 50, 58, 65	0

All (29) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	P	281	PRO	5.6
1	P	280	PRO	5.6
1	P	256	MET	4.6
1	P	102	PHE	2.9
1	P	277	ARG	2.8
1	P	457	VAL	2.7
1	P	367	PHE	2.7
1	P	74	ILE	2.7
1	P	88	PHE	2.7
1	P	168	LYS	2.6
1	P	514	PRO	2.5
1	P	276	PRO	2.5
1	P	213	SER	2.5
1	P	259	GLY	2.5
1	P	75	TRP	2.4
1	P	107	PHE	2.3
1	P	483	GLY	2.3
1	P	73	GLU	2.3
1	P	202	ALA	2.2
1	P	157	ARG	2.2
1	P	506	GLY	2.2
1	P	206	THR	2.1
1	P	272	LEU	2.1
1	P	504	TYR	2.1
1	P	199	ALA	2.1
1	P	389	PRO	2.1
1	P	314	ASP	2.1

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Mol	Chain	Res	Type	RSRZ
1	P	298	LEU	2.0
1	P	521	SER	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)

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, 95^{th} 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	RSCC	RSR	LLDF	B-factors(Å^2)	Q<0.9
2	NAG	P	661	14/15	0.90	0.41	4.38	70,76,77,80	0
2	NAG	P	681	14/15	0.82	0.18	-0.68	61,63,66,68	0
3	NAG	P	671	14/15	0.88	0.15	-1.71	47,53,56,60	0
2	NAG	P	662	14/15	0.70	0.46	-	82,84,86,86	0
2	NAG	P	682	14/15	0.77	0.34	-	69,72,75,75	0
3	BMA	P	673	11/12	0.70	0.30	-	68,69,69,70	0
3	NAG	P	672	14/15	0.84	0.31	-	59,62,64,66	0

6.4 Ligands (i)

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, 95^{th} 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	RSCC	RSR	LLDF	B-factors(Å^2)	Q<0.9
5	IMS	P	700	30/30	0.65	0.35	3.14	57,59,60,60	0
4	BOG	P	751	12/20	0.84	0.24	0.90	71,73,75,76	0
6	HEM	P	601	43/43	0.91	0.19	-0.72	38,50,53,57	0
4	BOG	P	750	12/20	0.83	0.47	-	80,81,82,82	0

6.5 Other polymers (i)

There are no such residues in this entry.