



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 6, 2026 – 12:49 PM UTC

PDB ID : 2DCU / pdb_00002dcu
Title : Crystal structure of translation initiation factor aIF2betagamma heterodimer with GDP
Authors : Sokabe, M.; Yao, M.; Sakai, N.; Toya, S.; Tanaka, I.
Deposited on : 2006-01-16
Resolution : 3.40 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 : 4-5-2 with Phenix2.0
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 2.0
EDS : 3.0
Buster-report : wwPDB partial adaption of 1.1.7 (2018)
Percentile statistics : 20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4 : 9.0.010 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.49

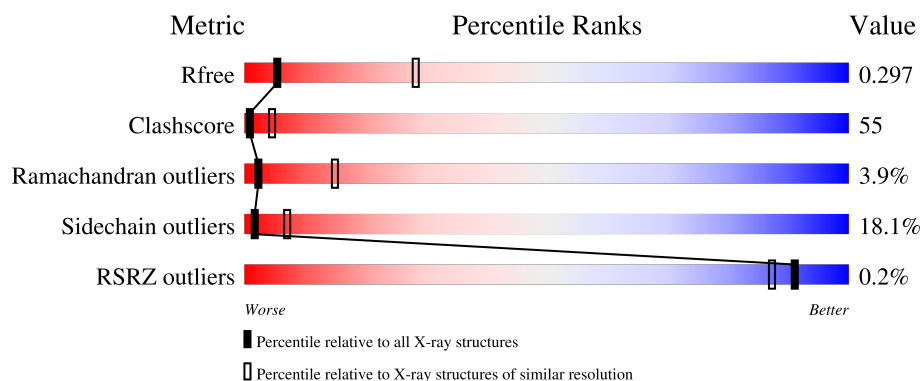
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.40 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}	180053	1001 (3.44-3.36)
Clashscore	190562	1022 (3.44-3.36)
Ramachandran outliers	187476	1012 (3.44-3.36)
Sidechain outliers	187428	1012 (3.44-3.36)
RSRZ outliers	180081	1001 (3.44-3.36)

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	419	
2	B	148	

2 Entry composition

There are 6 unique types of molecules in this entry. The entry contains 4389 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 Translation initiation factor 2 gamma subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	407	Total	C	N	O	S	0	0	0
			3132	1987	550	581	14			

There are 9 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	236	ASP	GLY	engineered mutation	UNP Q8U082
A	412	LEU	-	expression tag	UNP Q8U082
A	413	GLU	-	expression tag	UNP Q8U082
A	414	HIS	-	expression tag	UNP Q8U082
A	415	HIS	-	expression tag	UNP Q8U082
A	416	HIS	-	expression tag	UNP Q8U082
A	417	HIS	-	expression tag	UNP Q8U082
A	418	HIS	-	expression tag	UNP Q8U082
A	419	HIS	-	expression tag	UNP Q8U082

- Molecule 2 is a protein called Translation initiation factor 2 beta subunit.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	137	Total	C	N	O	S	0	0	0
			1118	720	194	200	4			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
B	141	LEU	-	expression tag	UNP Q8U3I5
B	142	GLU	-	expression tag	UNP Q8U3I5
B	143	HIS	-	expression tag	UNP Q8U3I5
B	144	HIS	-	expression tag	UNP Q8U3I5
B	145	HIS	-	expression tag	UNP Q8U3I5
B	146	HIS	-	expression tag	UNP Q8U3I5
B	147	HIS	-	expression tag	UNP Q8U3I5

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Chain	Residue	Modelled	Actual	Comment	Reference
B	148	HIS	-	expression tag	UNP Q8U3I5

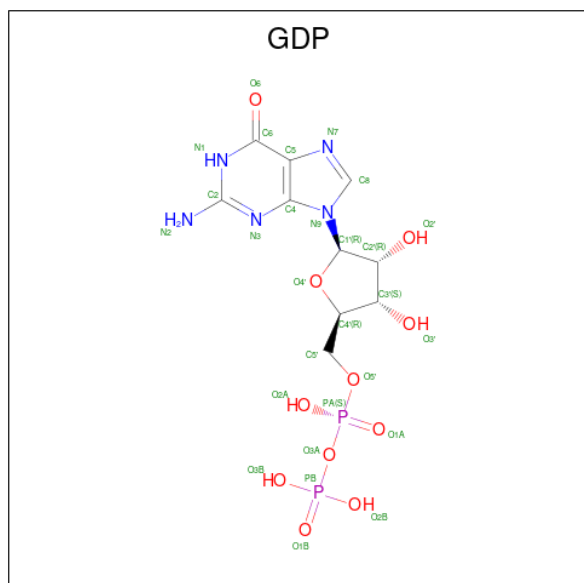
- Molecule 3 is MAGNESIUM ION (CCD ID: MG) (formula: Mg).

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

- Molecule 4 is ZINC ION (CCD ID: ZN) (formula: Zn).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Zn 1 1	0	0
4	B	1	Total Zn 1 1	0	0

- Molecule 5 is GUANOSINE-5'-DIPHOSPHATE (CCD ID: GDP) (formula: C₁₀H₁₅N₅O₁₁P₂).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	1	Total C N O P 28 10 5 11 2	0	0

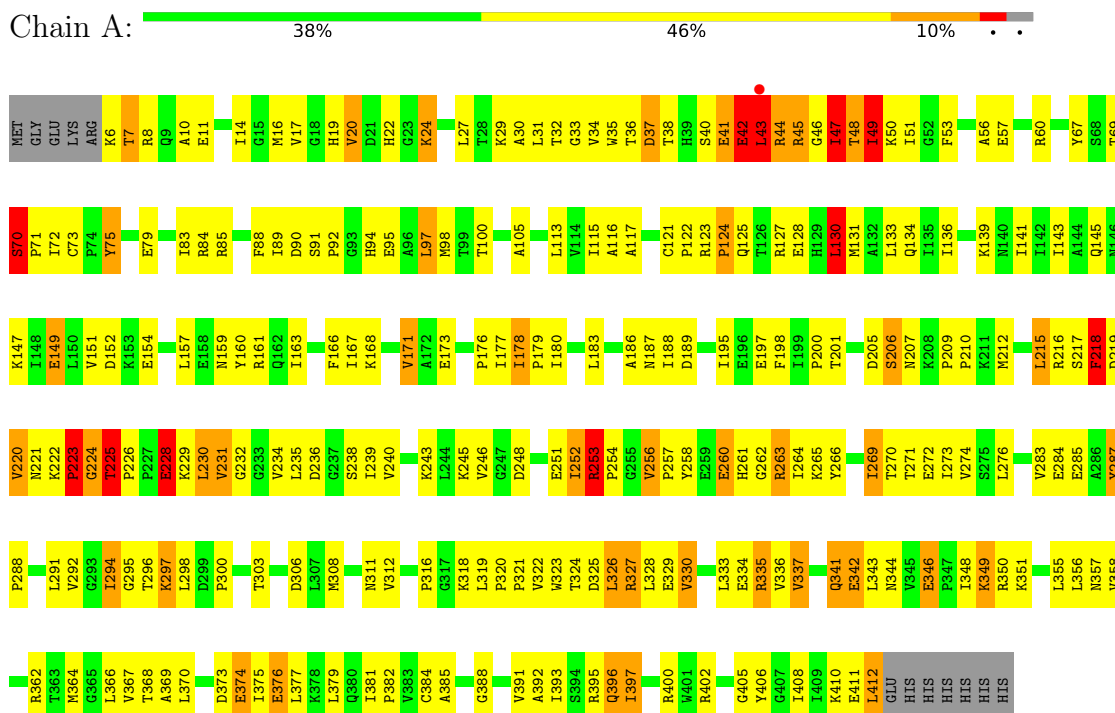
- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	85	Total 85	O 85	0	0
6	B	23	Total 23	O 23	0	0

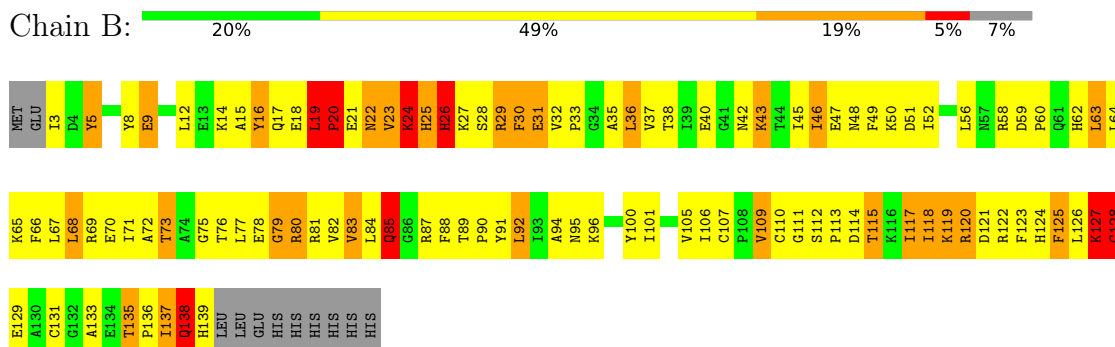
3 Residue-property plots

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 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: Translation initiation factor 2 gamma subunit



- Molecule 2: Translation initiation factor 2 beta subunit



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	69.20Å 76.56Å 97.86Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	20.00 – 3.40 20.00 – 3.40	Depositor EDS
% Data completeness (in resolution range)	98.8 (20.00-3.40) 98.1 (20.00-3.40)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	0.12	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.45 (at 3.32Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.249 , 0.298 0.239 , 0.297	Depositor DCC
R_{free} test set	601 reflections (7.51%)	wwPDB-VP
Wilson B-factor (Å ²)	76.6	Xtriage
Anisotropy	0.087	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 37.1	EDS
L-test for twinning ²	$\langle L \rangle = 0.42$, $\langle L^2 \rangle = 0.25$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.90	EDS
Total number of atoms	4389	wwPDB-VP
Average B, all atoms (Å ²)	53.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.10% of the height of the origin peak. No significant pseudotranslation is detected.*

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

5.1 Standard geometry

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

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	0.43	1/3187 (0.0%)	1.14	29/4315 (0.7%)
2	B	0.41	0/1142	1.29	16/1540 (1.0%)
All	All	0.42	1/4329 (0.0%)	1.18	45/5855 (0.8%)

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
2	B	0	1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	A	47	ILE	CA-CB	5.36	1.61	1.54

All (45) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	46	GLY	N-CA-C	19.74	140.97	112.55
1	A	261	HIS	N-CA-C	-14.37	91.70	111.96
2	B	29	ARG	N-CA-C	-14.16	87.24	109.76
1	A	41	GLU	N-CA-C	-12.80	92.45	110.50
1	A	42	GLU	N-CA-C	10.91	134.05	110.80
2	B	138	GLN	N-CA-C	-10.18	96.70	113.50
2	B	127	LYS	N-CA-C	8.41	128.72	110.80
2	B	125	PHE	N-CA-C	-8.29	95.78	108.96
2	B	19	LEU	CA-C-N	8.19	130.08	119.84
2	B	19	LEU	C-N-CA	8.19	130.08	119.84

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	137	ILE	N-CA-C	8.19	119.71	107.51
1	A	49	ILE	N-CA-C	-7.99	92.72	109.34
1	A	178	ILE	N-CA-C	7.51	114.40	107.56
1	A	262	GLY	N-CA-C	-7.34	95.79	113.18
2	B	18	GLU	N-CA-C	-7.25	103.41	111.82
2	B	25	HIS	N-CA-C	7.10	120.17	109.95
1	A	225	THR	CA-C-N	-6.64	113.54	120.38
1	A	225	THR	C-N-CA	-6.64	113.54	120.38
2	B	85	GLN	N-CA-C	6.57	120.89	113.01
1	A	224	GLY	N-CA-C	-6.51	97.75	113.18
2	B	128	CYS	N-CA-C	6.45	124.55	110.80
1	A	225	THR	N-CA-C	6.40	123.95	109.81
2	B	28	SER	N-CA-C	6.40	119.21	108.02
1	A	70	SER	CA-C-N	6.34	126.09	119.05
1	A	70	SER	C-N-CA	6.34	126.09	119.05
1	A	37	ASP	N-CA-C	6.31	121.07	112.68
1	A	253	ARG	N-CA-C	6.28	123.69	109.81
1	A	38	THR	N-CA-C	6.17	119.19	108.76
1	A	346	GLU	N-CA-C	-6.10	102.37	109.93
2	B	17	GLN	N-CA-C	-5.98	105.07	112.90
1	A	330	VAL	N-CA-C	5.96	116.76	109.30
2	B	92	LEU	N-CA-C	-5.91	104.53	110.97
1	A	388	GLY	N-CA-C	-5.87	106.97	114.37
1	A	8	ARG	N-CA-C	-5.85	106.38	112.93
1	A	324	THR	N-CA-C	-5.70	106.95	114.31
1	A	256	VAL	CA-C-N	5.49	125.46	120.03
1	A	256	VAL	C-N-CA	5.49	125.46	120.03
1	A	43	LEU	N-CA-C	5.41	117.31	108.55
1	A	130	LEU	N-CA-C	-5.39	105.51	111.71
1	A	252	ILE	N-CA-C	-5.39	104.17	110.05
2	B	14	LYS	N-CA-C	-5.23	105.76	111.82
1	A	297	LYS	N-CA-C	-5.19	106.79	113.02
1	A	239	ILE	N-CA-C	-5.19	102.16	109.63
1	A	218	PHE	N-CA-C	5.09	116.03	108.86
2	B	24	LYS	N-CA-C	5.08	116.51	110.97

There are no chirality outliers.

All (1) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	B	16	TYR	Sidechain

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	3132	0	3245	298	0
2	B	1118	0	1138	202	0
3	A	1	0	0	0	0
4	A	1	0	0	0	0
4	B	1	0	0	0	0
5	A	28	0	12	3	0
6	A	85	0	0	9	0
6	B	23	0	0	9	0
All	All	4389	0	4395	476	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 55.

All (476) 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:48:THR:HG21	1:A:362:ARG:CD	1.56	1.32
1:A:44:ARG:HD2	1:A:44:ARG:O	1.37	1.19
1:A:42:GLU:O	1:A:43:LEU:HD23	1.41	1.19
2:B:15:ALA:O	2:B:19:LEU:HD23	1.49	1.13
1:A:45:ARG:HG3	1:A:45:ARG:HH11	1.05	1.12
1:A:29:LYS:HG2	1:A:43:LEU:HG	1.19	1.11
1:A:253:ARG:HG3	1:A:384:CYS:HB2	1.23	1.10
1:A:44:ARG:HD2	1:A:44:ARG:C	1.77	1.08
1:A:48:THR:HG21	1:A:362:ARG:HD2	1.09	1.08
2:B:22:ASN:HB2	2:B:29:ARG:O	1.55	1.06
1:A:350:ARG:HG3	1:A:370:LEU:HD13	1.40	1.03
1:A:263:ARG:HG2	1:A:263:ARG:HH11	1.29	0.98
1:A:48:THR:CG2	1:A:362:ARG:HD2	1.93	0.98
1:A:357:ASN:HB2	1:A:392:ALA:HB3	1.49	0.94
1:A:42:GLU:O	1:A:43:LEU:CD2	2.14	0.94
1:A:303:THR:HG22	1:A:308:MET:HG3	1.47	0.93
2:B:110:CYS:SG	2:B:131:CYS:HB3	2.08	0.93
1:A:226:PRO:O	1:A:230:LEU:HG	1.70	0.92
1:A:121:CYS:HB3	1:A:122:PRO:HD3	1.50	0.92

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:253:ARG:HB3	1:A:254:PRO:HD3	1.52	0.92
2:B:15:ALA:O	2:B:19:LEU:CD2	2.17	0.92
1:A:257:PRO:HG3	1:A:266:TYR:CE1	2.07	0.89
1:A:48:THR:HG21	1:A:362:ARG:HD3	1.52	0.89
1:A:139:LYS:HG2	1:A:171:VAL:HG12	1.53	0.88
1:A:45:ARG:HG3	1:A:45:ARG:NH1	1.83	0.88
1:A:369:ALA:HB3	1:A:376:GLU:HB2	1.56	0.87
2:B:20:PRO:O	2:B:24:LYS:HB2	1.74	0.87
1:A:333:LEU:HG	1:A:405:GLY:HA2	1.56	0.87
1:A:253:ARG:CG	1:A:384:CYS:HB2	2.05	0.86
2:B:22:ASN:HB3	2:B:29:ARG:NH1	1.90	0.86
2:B:50:LYS:HG3	2:B:51:ASP:N	1.89	0.85
2:B:22:ASN:ND2	2:B:23:VAL:HG12	1.92	0.85
2:B:20:PRO:HB2	2:B:23:VAL:HG13	1.56	0.84
2:B:50:LYS:HD2	2:B:80:ARG:NE	1.93	0.84
1:A:37:ASP:HA	2:B:87:ARG:HH22	1.41	0.83
2:B:118:ILE:HG22	2:B:126:LEU:HA	1.59	0.83
2:B:95:ASN:ND2	2:B:96:LYS:HE3	1.94	0.82
2:B:118:ILE:HG12	2:B:119:LYS:H	1.43	0.82
1:A:187:ASN:ND2	2:B:15:ALA:HB2	1.93	0.82
1:A:37:ASP:HA	2:B:87:ARG:NH2	1.94	0.82
2:B:118:ILE:HG23	2:B:125:PHE:O	1.80	0.82
2:B:29:ARG:NH1	2:B:29:ARG:HB3	1.96	0.81
1:A:219:ASP:OD1	1:A:221:ASN:HB2	1.81	0.81
1:A:45:ARG:HB3	1:A:92:PRO:HD2	1.63	0.81
1:A:222:LYS:O	1:A:224:GLY:N	2.14	0.79
1:A:253:ARG:HH21	1:A:322:VAL:N	1.80	0.79
1:A:400:ARG:NH1	1:A:400:ARG:HA	1.99	0.78
2:B:126:LEU:HD22	2:B:137:ILE:HD11	1.65	0.78
2:B:36:LEU:HD22	2:B:47:GLU:HG3	1.66	0.78
1:A:29:LYS:CG	1:A:43:LEU:HG	2.10	0.77
1:A:84:ARG:HH12	1:A:200:PRO:HA	1.49	0.77
1:A:355:LEU:HD13	1:A:364:MET:HE2	1.64	0.77
1:A:327:ARG:HG2	1:A:410:LYS:HB2	1.65	0.77
1:A:49:ILE:C	1:A:51:ILE:H	1.90	0.76
2:B:118:ILE:HG12	2:B:119:LYS:N	1.98	0.75
1:A:253:ARG:HG2	1:A:384:CYS:SG	2.26	0.75
1:A:253:ARG:HB3	1:A:254:PRO:CD	2.17	0.75
1:A:31:LEU:HA	1:A:69:THR:HG21	1.68	0.75
1:A:294:ILE:HD11	1:A:296:THR:HG22	1.68	0.75
1:A:45:ARG:HG2	1:A:92:PRO:HG2	1.69	0.75

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:273:ILE:HG12	1:A:294:ILE:HD13	1.69	0.75
2:B:29:ARG:HH21	2:B:105:VAL:HG12	1.51	0.75
2:B:46:ILE:HD11	2:B:49:PHE:CD1	2.22	0.74
2:B:117:ILE:HA	2:B:126:LEU:HB3	1.69	0.74
1:A:253:ARG:HG3	1:A:384:CYS:CB	2.11	0.74
1:A:37:ASP:CA	2:B:87:ARG:HH22	1.99	0.74
1:A:272:GLU:HB3	1:A:297:LYS:HD2	1.70	0.74
1:A:95:GLU:OE2	1:A:402:ARG:HA	1.87	0.73
2:B:46:ILE:HG12	2:B:46:ILE:O	1.88	0.73
1:A:16:MET:HE1	1:A:27:LEU:HD23	1.70	0.73
2:B:95:ASN:HD22	2:B:96:LYS:HE3	1.51	0.73
1:A:36:THR:CG2	1:A:40:SER:O	2.36	0.73
2:B:20:PRO:O	2:B:24:LYS:CB	2.36	0.73
1:A:350:ARG:O	1:A:351:LYS:HB2	1.90	0.72
1:A:329:GLU:HB3	1:A:408:ILE:HB	1.71	0.72
1:A:60:ARG:HB2	1:A:83:ILE:HD11	1.72	0.72
1:A:34:VAL:HG23	2:B:87:ARG:HB3	1.72	0.71
1:A:49:ILE:HD11	1:A:100:THR:HA	1.71	0.71
1:A:149:GLU:HB3	2:B:19:LEU:CD1	2.20	0.71
1:A:186:ALA:O	1:A:187:ASN:HB2	1.89	0.71
1:A:44:ARG:NH2	6:A:3044:HOH:O	2.22	0.71
1:A:224:GLY:O	1:A:226:PRO:HD3	1.90	0.71
1:A:44:ARG:C	1:A:44:ARG:CD	2.60	0.70
2:B:12:LEU:HG	2:B:16:TYR:CE2	2.26	0.70
1:A:49:ILE:HG23	1:A:51:ILE:HB	1.74	0.69
1:A:139:LYS:HG2	1:A:171:VAL:CG1	2.21	0.69
1:A:269:ILE:HD11	1:A:298:LEU:HD21	1.74	0.69
1:A:226:PRO:HB2	1:A:230:LEU:HD21	1.75	0.69
1:A:263:ARG:HG2	1:A:263:ARG:NH1	2.04	0.69
1:A:36:THR:H	2:B:87:ARG:HH12	1.40	0.69
1:A:349:LYS:HB2	1:A:349:LYS:NZ	2.06	0.68
1:A:326:LEU:HD22	1:A:379:LEU:HD11	1.75	0.68
2:B:58:ARG:NH2	2:B:115:THR:OG1	2.26	0.68
1:A:35:TRP:CD1	1:A:56:ALA:HA	2.29	0.68
1:A:128:GLU:OE1	1:A:335:ARG:NH1	2.26	0.68
1:A:44:ARG:NE	6:A:3044:HOH:O	2.09	0.68
1:A:122:PRO:HB2	1:A:127:ARG:NH1	2.09	0.68
1:A:41:GLU:HG2	2:B:40:GLU:OE2	1.94	0.68
1:A:342:GLU:HG3	1:A:397:ILE:HG21	1.77	0.67
1:A:276:LEU:HD23	1:A:294:ILE:HA	1.76	0.67
1:A:36:THR:HG22	1:A:40:SER:O	1.93	0.67

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:253:ARG:HH21	1:A:322:VAL:H	1.40	0.67
2:B:126:LEU:O	2:B:127:LYS:CB	2.43	0.67
1:A:128:GLU:CD	1:A:337:VAL:HG12	2.20	0.67
1:A:272:GLU:HB3	1:A:297:LYS:CD	2.25	0.66
2:B:91:TYR:HA	2:B:94:ALA:HB3	1.77	0.66
1:A:257:PRO:HG3	1:A:266:TYR:HE1	1.59	0.66
1:A:400:ARG:HA	1:A:400:ARG:HH11	1.61	0.66
2:B:12:LEU:HG	2:B:16:TYR:HE2	1.61	0.66
1:A:24:LYS:HG3	5:A:2001:GDP:O2B	1.96	0.66
1:A:49:ILE:O	1:A:51:ILE:N	2.28	0.66
1:A:51:ILE:HG13	1:A:89:ILE:HG23	1.77	0.66
1:A:266:TYR:CE2	1:A:382:PRO:HD2	2.31	0.66
2:B:22:ASN:HB3	2:B:29:ARG:HH12	1.58	0.65
1:A:149:GLU:HB3	2:B:19:LEU:HD11	1.79	0.65
2:B:29:ARG:HB2	2:B:113:PRO:CG	2.26	0.65
1:A:253:ARG:HD2	1:A:253:ARG:C	2.19	0.65
2:B:117:ILE:HB	2:B:126:LEU:HD23	1.78	0.65
2:B:107:CYS:SG	2:B:109:VAL:HG23	2.37	0.65
1:A:253:ARG:O	1:A:254:PRO:C	2.37	0.65
2:B:38:THR:O	2:B:45:ILE:HG22	1.97	0.65
1:A:253:ARG:NH2	1:A:322:VAL:H	1.95	0.65
2:B:46:ILE:HD11	2:B:49:PHE:HD1	1.62	0.65
2:B:79:GLY:C	2:B:80:ARG:HG2	2.22	0.65
2:B:127:LYS:NZ	2:B:137:ILE:HD13	2.11	0.64
1:A:44:ARG:O	1:A:44:ARG:CD	2.31	0.64
1:A:49:ILE:HG12	1:A:100:THR:HG23	1.79	0.64
2:B:16:TYR:O	2:B:24:LYS:HG3	1.96	0.64
2:B:117:ILE:HG13	2:B:126:LEU:HG	1.78	0.64
2:B:22:ASN:HD21	2:B:23:VAL:HG12	1.62	0.64
2:B:38:THR:HB	2:B:45:ILE:HG23	1.80	0.64
1:A:206:SER:HB2	1:A:243:LYS:HE2	1.79	0.63
1:A:20:VAL:HB	1:A:125:GLN:OE1	1.98	0.63
1:A:36:THR:C	2:B:87:ARG:HH22	2.05	0.63
1:A:45:ARG:CB	1:A:92:PRO:HD2	2.28	0.63
1:A:217:SER:OG	1:A:306:ASP:HA	1.98	0.63
2:B:126:LEU:O	2:B:127:LYS:HB2	1.99	0.63
1:A:47:ILE:HG13	1:A:48:THR:N	2.13	0.63
2:B:119:LYS:HD3	2:B:124:HIS:CD2	2.33	0.63
1:A:49:ILE:CG2	1:A:51:ILE:CG2	2.76	0.62
1:A:60:ARG:CB	1:A:83:ILE:HD11	2.29	0.62
1:A:121:CYS:CB	1:A:122:PRO:HD3	2.25	0.62

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:50:LYS:CG	2:B:80:ARG:HB3	2.28	0.62
2:B:110:CYS:SG	2:B:131:CYS:CB	2.81	0.62
1:A:218:PHE:N	1:A:218:PHE:CD1	2.67	0.62
2:B:29:ARG:HB3	2:B:29:ARG:HH11	1.64	0.62
1:A:20:VAL:O	1:A:20:VAL:HG13	1.99	0.62
1:A:294:ILE:HD12	1:A:295:GLY:N	2.15	0.61
1:A:217:SER:HB3	1:A:308:MET:HB2	1.82	0.61
1:A:397:ILE:HD12	1:A:402:ARG:HD3	1.81	0.61
2:B:112:SER:O	2:B:115:THR:HG22	1.99	0.61
2:B:20:PRO:HB2	2:B:23:VAL:CG1	2.29	0.61
1:A:294:ILE:HD11	1:A:296:THR:CG2	2.31	0.61
2:B:9:GLU:HA	2:B:9:GLU:OE1	2.01	0.60
2:B:37:VAL:HB	2:B:90:PRO:HG3	1.83	0.60
2:B:115:THR:HB	2:B:127:LYS:HD2	1.83	0.60
2:B:50:LYS:HG3	2:B:51:ASP:H	1.64	0.60
1:A:19:HIS:CD2	1:A:125:GLN:HB2	2.36	0.60
2:B:127:LYS:HE2	2:B:137:ILE:HG21	1.82	0.60
1:A:224:GLY:C	1:A:226:PRO:HD3	2.27	0.60
1:A:369:ALA:O	1:A:370:LEU:HD12	2.02	0.60
1:A:45:ARG:CG	1:A:92:PRO:HD2	2.31	0.60
1:A:49:ILE:HG22	1:A:51:ILE:HG22	1.84	0.60
2:B:50:LYS:HG2	2:B:80:ARG:HB3	1.83	0.59
2:B:36:LEU:C	2:B:36:LEU:HD23	2.26	0.59
1:A:327:ARG:HG3	1:A:328:LEU:N	2.17	0.59
1:A:45:ARG:NH1	1:A:45:ARG:CG	2.58	0.59
2:B:37:VAL:HG21	2:B:90:PRO:HA	1.85	0.59
2:B:118:ILE:CG2	2:B:125:PHE:O	2.49	0.59
1:A:253:ARG:CG	1:A:384:CYS:CB	2.78	0.59
2:B:25:HIS:HB2	2:B:26:HIS:ND1	2.18	0.59
2:B:137:ILE:HG13	2:B:137:ILE:O	2.02	0.59
2:B:32:VAL:HG23	2:B:32:VAL:O	2.03	0.59
2:B:70:GLU:HB3	2:B:96:LYS:HD2	1.84	0.59
2:B:105:VAL:HG12	2:B:105:VAL:O	2.02	0.58
1:A:45:ARG:HG2	1:A:92:PRO:CG	2.31	0.58
1:A:223:PRO:HA	6:A:3041:HOH:O	2.01	0.58
1:A:197:GLU:HB3	1:A:198:PHE:CD1	2.39	0.58
1:A:149:GLU:CD	1:A:149:GLU:H	2.11	0.58
1:A:49:ILE:C	1:A:51:ILE:N	2.61	0.58
2:B:106:ILE:HD13	6:B:3022:HOH:O	2.03	0.58
1:A:234:VAL:HG13	1:A:294:ILE:O	2.03	0.57
2:B:80:ARG:HG3	2:B:80:ARG:NH1	2.17	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:90:ASP:OD1	1:A:91:SER:N	2.37	0.57
1:A:256:VAL:HG23	1:A:269:ILE:HG21	1.86	0.57
2:B:46:ILE:O	2:B:46:ILE:CG1	2.52	0.57
1:A:37:ASP:CA	2:B:87:ARG:NH2	2.64	0.57
1:A:287:TYR:HB3	1:A:288:PRO:HD2	1.85	0.57
2:B:38:THR:HB	2:B:45:ILE:CG2	2.34	0.57
1:A:45:ARG:HG2	1:A:92:PRO:CD	2.34	0.57
2:B:50:LYS:HE3	2:B:80:ARG:HH21	1.68	0.57
1:A:22:HIS:CG	1:A:116:ALA:H	2.22	0.57
2:B:26:HIS:ND1	2:B:26:HIS:N	2.52	0.56
1:A:49:ILE:CG2	1:A:51:ILE:HG22	2.34	0.56
2:B:126:LEU:O	2:B:127:LYS:CG	2.53	0.56
1:A:187:ASN:HD21	2:B:15:ALA:HB2	1.65	0.56
2:B:126:LEU:HD22	2:B:137:ILE:CD1	2.35	0.56
2:B:110:CYS:SG	2:B:110:CYS:O	2.63	0.56
1:A:143:ILE:HD11	1:A:167:ILE:HG21	1.86	0.56
1:A:51:ILE:CG1	1:A:89:ILE:HG23	2.36	0.56
1:A:269:ILE:HD11	1:A:298:LEU:CD2	2.35	0.56
2:B:22:ASN:HB3	2:B:29:ARG:HH11	1.71	0.56
1:A:24:LYS:HB2	1:A:24:LYS:NZ	2.21	0.56
2:B:117:ILE:HA	2:B:126:LEU:CB	2.36	0.55
1:A:45:ARG:NH1	1:A:45:ARG:H	2.04	0.55
1:A:243:LYS:HD2	1:A:285:GLU:OE2	2.07	0.55
2:B:31:GLU:O	2:B:33:PRO:HD3	2.07	0.55
2:B:45:ILE:HD11	2:B:81:ARG:HE	1.71	0.55
2:B:88:PHE:HD1	2:B:92:LEU:HD13	1.72	0.54
2:B:119:LYS:HA	6:B:3017:HOH:O	2.07	0.54
1:A:49:ILE:HG23	1:A:51:ILE:CB	2.37	0.54
2:B:36:LEU:HB3	2:B:48:ASN:HB2	1.89	0.54
1:A:121:CYS:SG	1:A:163:ILE:HA	2.47	0.54
1:A:348:ILE:HA	1:A:395:ARG:HH21	1.71	0.54
1:A:236:ASP:HA	1:A:292:VAL:O	2.08	0.54
1:A:238:SER:O	1:A:240:VAL:HG13	2.07	0.54
1:A:253:ARG:CZ	1:A:322:VAL:HB	2.38	0.54
2:B:50:LYS:HE3	2:B:80:ARG:NH2	2.23	0.54
1:A:318:LYS:C	1:A:319:LEU:HD12	2.33	0.54
1:A:70:SER:HB2	2:B:89:THR:CG2	2.38	0.53
1:A:269:ILE:HG13	1:A:270:THR:N	2.16	0.53
2:B:45:ILE:HD11	2:B:81:ARG:NE	2.22	0.53
2:B:67:LEU:C	2:B:69:ARG:N	2.65	0.53
2:B:80:ARG:HG3	2:B:80:ARG:HH11	1.74	0.53

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:34:VAL:HG22	1:A:34:VAL:O	2.07	0.53
1:A:160:TYR:CE1	1:A:177:ILE:HD12	2.43	0.53
1:A:321:PRO:HD2	1:A:385:ALA:O	2.08	0.53
2:B:58:ARG:HH22	2:B:115:THR:C	2.17	0.53
1:A:44:ARG:HH11	1:A:44:ARG:H	1.57	0.53
1:A:49:ILE:O	1:A:49:ILE:CG2	2.56	0.53
1:A:396:GLN:O	1:A:397:ILE:HB	2.09	0.53
1:A:49:ILE:O	1:A:49:ILE:HG22	2.08	0.52
1:A:263:ARG:HH11	1:A:263:ARG:CG	2.11	0.52
2:B:71:ILE:HG22	2:B:72:ALA:N	2.25	0.52
2:B:66:PHE:CE2	2:B:100:TYR:HB2	2.44	0.52
2:B:105:VAL:O	2:B:115:THR:HG23	2.09	0.52
1:A:49:ILE:O	1:A:51:ILE:HG22	2.10	0.52
2:B:126:LEU:HB2	2:B:137:ILE:HG12	1.91	0.52
2:B:127:LYS:HZ3	2:B:137:ILE:HD13	1.74	0.52
1:A:134:GLN:HA	1:A:171:VAL:HG21	1.90	0.52
2:B:58:ARG:NH1	2:B:115:THR:O	2.39	0.52
2:B:121:ASP:C	2:B:123:PHE:H	2.18	0.52
1:A:358:VAL:HB	1:A:391:VAL:HG22	1.92	0.52
1:A:48:THR:CG2	1:A:362:ARG:CD	2.53	0.52
1:A:183:LEU:HB2	5:A:2001:GDP:C6	2.44	0.52
2:B:35:ALA:HB3	6:B:3020:HOH:O	2.09	0.52
2:B:117:ILE:HA	2:B:126:LEU:CG	2.40	0.51
1:A:396:GLN:HG3	1:A:400:ARG:O	2.10	0.51
2:B:48:ASN:O	2:B:51:ASP:HB2	2.10	0.51
2:B:78:GLU:O	2:B:79:GLY:C	2.53	0.51
2:B:115:THR:CB	2:B:127:LYS:HD2	2.40	0.51
2:B:118:ILE:H	2:B:126:LEU:HA	1.74	0.51
1:A:178:ILE:HG22	1:A:180:ILE:CG2	2.39	0.51
1:A:320:PRO:HB2	1:A:384:CYS:SG	2.50	0.51
2:B:67:LEU:C	2:B:69:ARG:H	2.19	0.51
2:B:68:LEU:O	2:B:71:ILE:O	2.29	0.51
1:A:253:ARG:NH2	1:A:322:VAL:N	2.51	0.51
2:B:58:ARG:NH2	2:B:115:THR:HG1	2.08	0.51
1:A:350:ARG:HD3	1:A:370:LEU:HD22	1.93	0.51
1:A:287:TYR:CD1	1:A:287:TYR:N	2.79	0.50
2:B:105:VAL:O	2:B:105:VAL:CG1	2.59	0.50
1:A:37:ASP:N	2:B:87:ARG:HH22	2.09	0.50
2:B:8:TYR:HE1	2:B:12:LEU:HD22	1.77	0.50
2:B:119:LYS:CA	6:B:3017:HOH:O	2.58	0.50
1:A:36:THR:HG21	1:A:42:GLU:HA	1.92	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:49:ILE:HG23	1:A:51:ILE:CG2	2.40	0.50
2:B:29:ARG:HB2	2:B:113:PRO:CB	2.41	0.50
1:A:217:SER:CB	1:A:308:MET:HB2	2.41	0.50
2:B:126:LEU:C	2:B:127:LYS:HD3	2.36	0.50
1:A:195:ILE:O	1:A:198:PHE:O	2.30	0.50
2:B:36:LEU:HD22	2:B:47:GLU:CG	2.41	0.50
2:B:139:HIS:ND1	2:B:139:HIS:C	2.69	0.50
2:B:27:LYS:HG2	2:B:111:GLY:O	2.12	0.49
2:B:68:LEU:HD22	2:B:73:THR:O	2.11	0.49
1:A:246:VAL:CG2	1:A:284:GLU:HA	2.42	0.49
1:A:329:GLU:CD	1:A:408:ILE:HD12	2.37	0.49
1:A:19:HIS:HD2	1:A:125:GLN:HB2	1.78	0.49
1:A:179:PRO:HG3	2:B:8:TYR:CE2	2.47	0.49
2:B:121:ASP:C	2:B:123:PHE:N	2.68	0.49
2:B:125:PHE:C	2:B:126:LEU:HD12	2.38	0.49
2:B:80:ARG:HH11	2:B:80:ARG:CG	2.24	0.49
2:B:67:LEU:O	2:B:69:ARG:N	2.46	0.49
1:A:245:LYS:HB3	1:A:248:ASP:OD1	2.12	0.49
2:B:121:ASP:O	6:B:3017:HOH:O	2.20	0.49
1:A:186:ALA:HB2	2:B:19:LEU:CD2	2.43	0.48
1:A:327:ARG:CG	1:A:410:LYS:HB2	2.39	0.48
1:A:232:GLY:HA2	1:A:300:PRO:HG3	1.94	0.48
1:A:412:LEU:HB2	6:A:3084:HOH:O	2.12	0.48
2:B:21:GLU:O	2:B:23:VAL:N	2.46	0.48
2:B:50:LYS:CG	2:B:51:ASP:N	2.70	0.48
2:B:94:ALA:HB2	6:B:3020:HOH:O	2.13	0.48
1:A:366:LEU:O	1:A:368:THR:HG23	2.13	0.48
1:A:20:VAL:O	5:A:2001:GDP:O1B	2.32	0.48
1:A:128:GLU:O	1:A:131:MET:HB3	2.14	0.48
1:A:53:PHE:CG	1:A:291:LEU:HD13	2.49	0.48
1:A:133:LEU:HD13	1:A:141:ILE:CD1	2.44	0.48
1:A:198:PHE:CD1	1:A:198:PHE:N	2.80	0.48
1:A:115:ILE:HA	6:A:3068:HOH:O	2.13	0.48
2:B:120:ARG:N	6:B:3017:HOH:O	2.45	0.48
1:A:266:TYR:CD2	1:A:382:PRO:HD2	2.49	0.48
2:B:29:ARG:NH2	2:B:105:VAL:HG12	2.25	0.48
1:A:212:MET:HE2	1:A:292:VAL:HB	1.95	0.47
1:A:36:THR:O	2:B:87:ARG:NH2	2.47	0.47
1:A:57:GLU:HG3	1:A:85:ARG:HD2	1.95	0.47
1:A:183:LEU:HD23	6:A:3060:HOH:O	2.14	0.47
1:A:147:LYS:HA	1:A:149:GLU:OE2	2.14	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:22:ASN:CB	2:B:29:ARG:O	2.46	0.47
1:A:212:MET:CE	1:A:292:VAL:HB	2.45	0.47
1:A:94:HIS:NE2	1:A:337:VAL:HG11	2.30	0.47
1:A:257:PRO:HG3	1:A:266:TYR:CD1	2.50	0.47
1:A:341:GLN:C	1:A:341:GLN:CD	2.82	0.47
1:A:10:ALA:HA	1:A:85:ARG:O	2.15	0.47
1:A:45:ARG:HH11	1:A:45:ARG:H	1.61	0.47
1:A:51:ILE:HG13	1:A:89:ILE:CG2	2.44	0.47
1:A:51:ILE:HD12	1:A:100:THR:HG21	1.96	0.47
1:A:67:TYR:CE2	1:A:83:ILE:HD12	2.49	0.47
2:B:21:GLU:OE1	2:B:21:GLU:HA	2.15	0.47
2:B:29:ARG:HB2	2:B:113:PRO:HB3	1.95	0.47
1:A:36:THR:H	2:B:87:ARG:NH1	2.11	0.47
1:A:70:SER:HB2	2:B:89:THR:HG23	1.97	0.47
1:A:117:ALA:HA	1:A:159:ASN:ND2	2.30	0.47
1:A:349:LYS:HB2	1:A:349:LYS:HZ2	1.78	0.47
2:B:119:LYS:HD3	2:B:124:HIS:HD2	1.80	0.47
1:A:367:VAL:HA	1:A:376:GLU:O	2.15	0.47
2:B:52:ILE:N	2:B:52:ILE:HD12	2.30	0.47
2:B:56:LEU:CD2	2:B:101:ILE:HG12	2.45	0.47
1:A:36:THR:N	2:B:87:ARG:HH12	2.11	0.46
1:A:253:ARG:NH2	1:A:322:VAL:HB	2.31	0.46
1:A:205:ASP:OD1	1:A:207:ASN:HB2	2.15	0.46
1:A:245:LYS:HD2	1:A:285:GLU:OE2	2.15	0.46
2:B:50:LYS:HG3	2:B:51:ASP:OD1	2.15	0.46
2:B:66:PHE:HE2	2:B:96:LYS:O	1.98	0.46
1:A:45:ARG:HD2	1:A:92:PRO:HB2	1.95	0.46
1:A:75:TYR:CD1	1:A:75:TYR:N	2.84	0.46
2:B:126:LEU:HD22	2:B:137:ILE:CG1	2.45	0.46
1:A:168:LYS:HA	1:A:173:GLU:HG3	1.97	0.46
1:A:253:ARG:CB	1:A:254:PRO:CD	2.90	0.46
2:B:21:GLU:OE1	2:B:24:LYS:NZ	2.49	0.46
2:B:127:LYS:HD3	2:B:127:LYS:N	2.28	0.46
1:A:17:VAL:O	1:A:113:LEU:HD12	2.15	0.46
1:A:128:GLU:CD	1:A:337:VAL:CG1	2.87	0.46
2:B:29:ARG:HD2	2:B:32:VAL:HG13	1.98	0.46
1:A:256:VAL:HA	1:A:257:PRO:HD3	1.79	0.46
2:B:45:ILE:HG23	2:B:45:ILE:O	2.16	0.46
2:B:75:GLY:HA2	2:B:83:VAL:O	2.15	0.46
2:B:49:PHE:HE1	2:B:63:LEU:HD22	1.81	0.46
2:B:19:LEU:O	2:B:24:LYS:HE3	2.16	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:373:ASP:OD1	1:A:373:ASP:N	2.50	0.45
2:B:22:ASN:ND2	2:B:32:VAL:CG2	2.80	0.45
1:A:17:VAL:HG23	1:A:113:LEU:HD13	1.99	0.45
1:A:51:ILE:CG2	1:A:215:LEU:HD11	2.47	0.45
1:A:75:TYR:OH	1:A:189:ASP:HB3	2.16	0.45
1:A:251:GLU:O	1:A:319:LEU:HD21	2.17	0.45
2:B:50:LYS:HD2	2:B:80:ARG:CZ	2.44	0.45
2:B:124:HIS:HB3	2:B:126:LEU:HD11	1.97	0.45
1:A:121:CYS:CB	1:A:122:PRO:CD	2.94	0.45
2:B:8:TYR:CE1	2:B:12:LEU:HD22	2.51	0.45
2:B:29:ARG:HB3	2:B:29:ARG:CZ	2.46	0.45
2:B:30:PHE:CD1	2:B:30:PHE:N	2.84	0.45
2:B:22:ASN:ND2	2:B:32:VAL:HG22	2.31	0.45
2:B:117:ILE:HB	2:B:126:LEU:CD2	2.47	0.45
1:A:157:LEU:O	1:A:161:ARG:HD3	2.17	0.45
1:A:397:ILE:O	1:A:397:ILE:HG22	2.15	0.45
2:B:49:PHE:O	2:B:50:LYS:C	2.59	0.45
2:B:126:LEU:CD2	2:B:137:ILE:HD11	2.41	0.45
1:A:130:LEU:HD12	1:A:166:PHE:CZ	2.51	0.45
1:A:133:LEU:HD13	1:A:141:ILE:HD13	1.99	0.45
1:A:329:GLU:OE2	1:A:408:ILE:HD12	2.17	0.45
2:B:56:LEU:HD21	2:B:101:ILE:HG12	1.99	0.45
1:A:49:ILE:HG12	1:A:100:THR:CG2	2.46	0.44
1:A:326:LEU:O	1:A:377:LEU:N	2.49	0.44
1:A:326:LEU:HD12	6:A:3059:HOH:O	2.18	0.44
1:A:356:LEU:CD2	1:A:393:ILE:HG12	2.47	0.44
1:A:51:ILE:HG21	1:A:215:LEU:HD11	1.98	0.44
1:A:197:GLU:HG2	2:B:5:TYR:CE1	2.52	0.44
1:A:253:ARG:CG	1:A:384:CYS:SG	3.01	0.44
2:B:135:THR:HG22	2:B:136:PRO:HD2	1.99	0.44
1:A:45:ARG:CD	1:A:92:PRO:HB2	2.47	0.44
1:A:374:GLU:HG2	1:A:375:ILE:N	2.33	0.44
2:B:16:TYR:HA	2:B:19:LEU:HB2	1.99	0.44
2:B:107:CYS:HB3	2:B:110:CYS:O	2.17	0.44
1:A:246:VAL:HG23	1:A:284:GLU:HA	1.98	0.44
1:A:32:THR:O	1:A:33:GLY:C	2.61	0.44
1:A:35:TRP:NE1	1:A:57:GLU:H	2.16	0.44
1:A:134:GLN:HA	1:A:171:VAL:CG2	2.48	0.44
1:A:176:PRO:HG2	1:A:198:PHE:CZ	2.52	0.44
1:A:149:GLU:CD	1:A:149:GLU:N	2.74	0.44
1:A:346:GLU:O	1:A:395:ARG:NH1	2.50	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:209:PRO:HA	1:A:210:PRO:HD3	1.83	0.44
1:A:271:THR:CB	1:A:298:LEU:HG	2.48	0.44
2:B:75:GLY:CA	2:B:83:VAL:O	2.66	0.44
1:A:32:THR:HG22	1:A:56:ALA:HB2	1.98	0.44
2:B:45:ILE:HG13	2:B:82:VAL:O	2.17	0.44
1:A:167:ILE:O	1:A:168:LYS:C	2.61	0.43
2:B:21:GLU:O	2:B:22:ASN:C	2.61	0.43
2:B:36:LEU:C	2:B:36:LEU:CD2	2.91	0.43
1:A:396:GLN:O	1:A:400:ARG:O	2.35	0.43
2:B:29:ARG:CZ	2:B:29:ARG:CB	2.95	0.43
2:B:125:PHE:HA	2:B:136:PRO:HA	1.99	0.43
1:A:321:PRO:O	1:A:323:TRP:CD1	2.71	0.43
1:A:49:ILE:HG12	1:A:100:THR:OG1	2.19	0.43
1:A:45:ARG:HG2	1:A:92:PRO:HD2	1.97	0.43
1:A:123:ARG:O	1:A:124:PRO:C	2.60	0.43
1:A:152:ASP:OD2	1:A:154:GLU:HB3	2.19	0.43
1:A:312:VAL:HG21	1:A:384:CYS:SG	2.58	0.43
2:B:136:PRO:O	2:B:136:PRO:HG2	2.19	0.43
1:A:333:LEU:HD21	1:A:406:TYR:HD1	1.84	0.43
1:A:348:ILE:HA	1:A:395:ARG:NH2	2.32	0.43
2:B:29:ARG:HH21	2:B:105:VAL:CG1	2.24	0.43
2:B:43:LYS:NZ	2:B:43:LYS:HB3	2.33	0.43
1:A:45:ARG:CG	1:A:92:PRO:HG2	2.45	0.43
1:A:225:THR:O	1:A:225:THR:CG2	2.67	0.43
1:A:330:VAL:CG2	1:A:375:ILE:HG12	2.49	0.43
2:B:138:GLN:HB2	6:B:3025:HOH:O	2.18	0.43
1:A:220:VAL:HG23	1:A:220:VAL:O	2.19	0.43
1:A:245:LYS:O	1:A:248:ASP:OD1	2.37	0.43
2:B:85:GLN:HE21	2:B:85:GLN:HB3	1.62	0.43
1:A:235:LEU:O	1:A:294:ILE:HG23	2.18	0.43
2:B:101:ILE:HA	2:B:105:VAL:HB	2.00	0.43
1:A:30:ALA:HB1	2:B:91:TYR:CZ	2.54	0.43
1:A:14:ILE:O	1:A:88:PHE:HA	2.18	0.42
1:A:263:ARG:NH1	1:A:263:ARG:CG	2.73	0.42
1:A:45:ARG:HG3	1:A:45:ARG:H	1.61	0.42
1:A:326:LEU:N	1:A:377:LEU:O	2.50	0.42
2:B:112:SER:C	2:B:114:ASP:H	2.27	0.42
1:A:325:ASP:O	1:A:326:LEU:HD13	2.18	0.42
1:A:228:GLU:HB2	1:A:229:LYS:H	1.50	0.42
1:A:349:LYS:HB2	1:A:349:LYS:HZ3	1.84	0.42
2:B:82:VAL:HG12	2:B:84:LEU:HD13	2.00	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:151:VAL:HG23	1:A:151:VAL:O	2.19	0.42
2:B:12:LEU:HD12	2:B:12:LEU:HA	1.93	0.42
1:A:230:LEU:N	1:A:230:LEU:CD2	2.83	0.42
1:A:251:GLU:OE1	1:A:316:PRO:HA	2.20	0.42
1:A:180:ILE:HA	1:A:186:ALA:O	2.19	0.42
1:A:219:ASP:C	1:A:221:ASN:H	2.28	0.42
1:A:219:ASP:C	1:A:221:ASN:N	2.77	0.41
2:B:21:GLU:C	2:B:23:VAL:N	2.77	0.41
1:A:48:THR:CG2	1:A:362:ARG:HD3	2.37	0.41
1:A:186:ALA:CB	2:B:19:LEU:HD21	2.50	0.41
1:A:188:ILE:HG13	2:B:91:TYR:CE2	2.54	0.41
1:A:49:ILE:CD1	1:A:100:THR:HA	2.45	0.41
1:A:215:LEU:O	1:A:216:ARG:HG2	2.21	0.41
1:A:323:TRP:CE3	1:A:326:LEU:CD1	3.03	0.41
1:A:346:GLU:O	1:A:395:ARG:NH2	2.50	0.41
2:B:66:PHE:CD2	2:B:100:TYR:HB2	2.54	0.41
2:B:107:CYS:O	2:B:111:GLY:HA2	2.20	0.41
1:A:35:TRP:CZ2	1:A:57:GLU:HB2	2.56	0.41
1:A:44:ARG:CZ	6:A:3044:HOH:O	2.49	0.41
1:A:70:SER:HA	1:A:71:PRO:HD3	1.81	0.41
2:B:59:ASP:HB2	2:B:62:HIS:HB2	2.01	0.41
2:B:3:ILE:HG22	6:B:3018:HOH:O	2.20	0.41
2:B:124:HIS:HB3	2:B:126:LEU:CD1	2.50	0.41
1:A:45:ARG:CG	1:A:92:PRO:CD	2.97	0.41
1:A:311:ASN:N	1:A:311:ASN:HD22	2.18	0.41
2:B:29:ARG:HB2	2:B:113:PRO:HG2	2.03	0.41
2:B:127:LYS:HB3	2:B:133:ALA:O	2.20	0.41
1:A:72:ILE:O	1:A:73:CYS:C	2.62	0.41
1:A:95:GLU:O	1:A:98:MET:HB2	2.20	0.41
1:A:97:LEU:HD23	1:A:97:LEU:HA	1.79	0.41
1:A:253:ARG:CB	1:A:254:PRO:HD3	2.35	0.41
1:A:366:LEU:O	1:A:377:LEU:HA	2.21	0.41
1:A:225:THR:O	1:A:225:THR:HG22	2.19	0.41
2:B:112:SER:C	2:B:114:ASP:N	2.77	0.41
2:B:122:ARG:NH1	2:B:122:ARG:HG2	2.36	0.41
1:A:11:GLU:HB3	1:A:201:THR:OG1	2.21	0.40
1:A:117:ALA:HB2	1:A:145:GLN:CG	2.51	0.40
2:B:36:LEU:CD2	2:B:47:GLU:HG3	2.43	0.40
1:A:105:ALA:HB1	1:A:136:ILE:HB	2.03	0.40
1:A:197:GLU:HB3	1:A:198:PHE:CE1	2.55	0.40
2:B:42:ASN:HD22	2:B:42:ASN:HA	1.72	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:B:50:LYS:HB3	2:B:80:ARG:HB3	2.03	0.40
1:A:7:THR:HG21	1:A:283:VAL:HG11	2.03	0.40
1:A:127:ARG:HD2	6:A:3023:HOH:O	2.20	0.40
1:A:395:ARG:HG2	1:A:396:GLN:N	2.37	0.40
2:B:71:ILE:CG2	2:B:72:ALA:N	2.85	0.40
2:B:120:ARG:NE	2:B:125:PHE:CE2	2.90	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	405/419 (97%)	352 (87%)	40 (10%)	13 (3%)	3	17
2	B	135/148 (91%)	109 (81%)	18 (13%)	8 (6%)	1	8
All	All	540/567 (95%)	461 (85%)	58 (11%)	21 (4%)	2	15

All (21) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	42	GLU
1	A	47	ILE
1	A	50	LYS
1	A	225	THR
1	A	228	GLU
1	A	253	ARG
2	B	20	PRO
2	B	128	CYS
1	A	231	VAL
1	A	260	GLU
1	A	343	LEU
2	B	22	ASN

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Mol	Chain	Res	Type
2	B	79	GLY
2	B	127	LYS
1	A	223	PRO
1	A	344	ASN
2	B	26	HIS
2	B	68	LEU
1	A	396	GLN
1	A	397	ILE
2	B	60	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	342/353 (97%)	290 (85%)	52 (15%)	3	10
2	B	121/132 (92%)	89 (74%)	32 (26%)	0	1
All	All	463/485 (96%)	379 (82%)	84 (18%)	2	7

All (84) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	6	LYS
1	A	7	THR
1	A	20	VAL
1	A	24	LYS
1	A	42	GLU
1	A	43	LEU
1	A	44	ARG
1	A	45	ARG
1	A	47	ILE
1	A	48	THR
1	A	49	ILE
1	A	70	SER
1	A	75	TYR
1	A	79	GLU

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Mol	Chain	Res	Type
1	A	97	LEU
1	A	124	PRO
1	A	130	LEU
1	A	149	GLU
1	A	171	VAL
1	A	206	SER
1	A	215	LEU
1	A	218	PHE
1	A	220	VAL
1	A	223	PRO
1	A	228	GLU
1	A	230	LEU
1	A	231	VAL
1	A	252	ILE
1	A	253	ARG
1	A	258	TYR
1	A	260	GLU
1	A	263	ARG
1	A	264	ILE
1	A	265	LYS
1	A	269	ILE
1	A	274	VAL
1	A	287	TYR
1	A	294	ILE
1	A	326	LEU
1	A	327	ARG
1	A	334	GLU
1	A	335	ARG
1	A	336	VAL
1	A	337	VAL
1	A	341	GLN
1	A	342	GLU
1	A	349	LYS
1	A	374	GLU
1	A	376	GLU
1	A	381	ILE
1	A	411	GLU
1	A	412	LEU
2	B	5	TYR
2	B	9	GLU
2	B	19	LEU
2	B	20	PRO

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Mol	Chain	Res	Type
2	B	23	VAL
2	B	24	LYS
2	B	26	HIS
2	B	30	PHE
2	B	31	GLU
2	B	36	LEU
2	B	43	LYS
2	B	46	ILE
2	B	63	LEU
2	B	64	LEU
2	B	65	LYS
2	B	73	THR
2	B	76	THR
2	B	77	LEU
2	B	80	ARG
2	B	83	VAL
2	B	85	GLN
2	B	109	VAL
2	B	115	THR
2	B	117	ILE
2	B	118	ILE
2	B	119	LYS
2	B	120	ARG
2	B	127	LYS
2	B	128	CYS
2	B	129	GLU
2	B	135	THR
2	B	138	GLN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (9) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	129	HIS
1	A	145	GLN
1	A	311	ASN
1	A	396	GLN
2	B	22	ASN
2	B	42	ASN
2	B	85	GLN
2	B	95	ASN
2	B	124	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 ⓘ

There are no oligosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 4 ligands modelled in this entry, 3 are monoatomic - leaving 1 for Mogul analysis.

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	$\# Z > 2$
5	GDP	A	2001	3	29,30,30	1.72	6 (20%)	45,47,47	2.30	14 (31%)

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
5	GDP	A	2001	3	-	5/16/32/32	0/3/3/3

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	2001	GDP	PA-O3A	-5.47	1.53	1.59
5	A	2001	GDP	C3'-C4'	-3.37	1.44	1.53
5	A	2001	GDP	PB-O2B	3.17	1.66	1.54

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	2001	GDP	C5'-C4'	-2.38	1.44	1.51
5	A	2001	GDP	PB-O1B	-2.36	1.43	1.50
5	A	2001	GDP	O5'-C5'	-2.04	1.36	1.44

All (14) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	2001	GDP	O3A-PA-O1A	6.36	129.85	110.70
5	A	2001	GDP	C5'-C4'-C3'	-5.57	95.16	115.21
5	A	2001	GDP	C2-N3-C4	4.73	120.45	112.30
5	A	2001	GDP	PA-O5'-C5'	-4.70	94.44	121.35
5	A	2001	GDP	C5-C4-N3	-4.66	120.98	128.39
5	A	2001	GDP	O3B-PB-O3A	3.45	116.21	104.64
5	A	2001	GDP	O4'-C4'-C3'	3.28	111.67	105.15
5	A	2001	GDP	N9-C4-N3	2.82	131.59	125.95
5	A	2001	GDP	O2'-C2'-C1'	2.56	118.92	110.10
5	A	2001	GDP	C4'-O4'-C1'	-2.43	104.11	109.47
5	A	2001	GDP	O3B-PB-O2B	2.32	116.51	107.80
5	A	2001	GDP	O5'-C5'-C4'	2.16	116.34	108.99
5	A	2001	GDP	O3B-PB-O1B	-2.07	102.78	110.83
5	A	2001	GDP	O3A-PB-O1B	-2.03	100.34	111.04

There are no chirality outliers.

All (5) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	2001	GDP	PA-O3A-PB-O3B
5	A	2001	GDP	C5'-O5'-PA-O3A
5	A	2001	GDP	C5'-O5'-PA-O1A
5	A	2001	GDP	C3'-C4'-C5'-O5'
5	A	2001	GDP	O4'-C4'-C5'-O5'

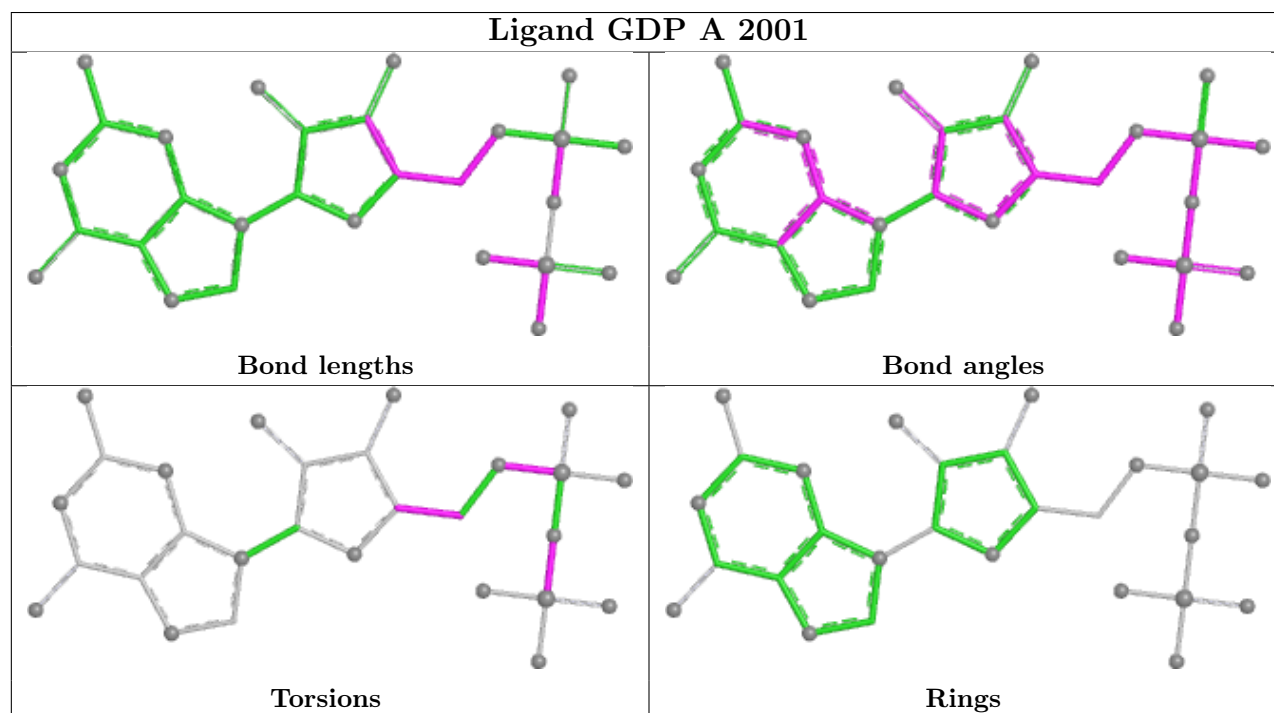
There are no ring outliers.

1 monomer is involved in 3 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
5	A	2001	GDP	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will

also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.



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](#)

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	407/419 (97%)	-0.45	1 (0%) 91 87	20, 47, 94, 95	0
2	B	137/148 (92%)	-0.20	0 100 100	20, 63, 93, 95	0
All	All	544/567 (95%)	-0.38	1 (0%) 91 87	20, 51, 94, 95	0

All (1) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	43	LEU	2.8

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](#)

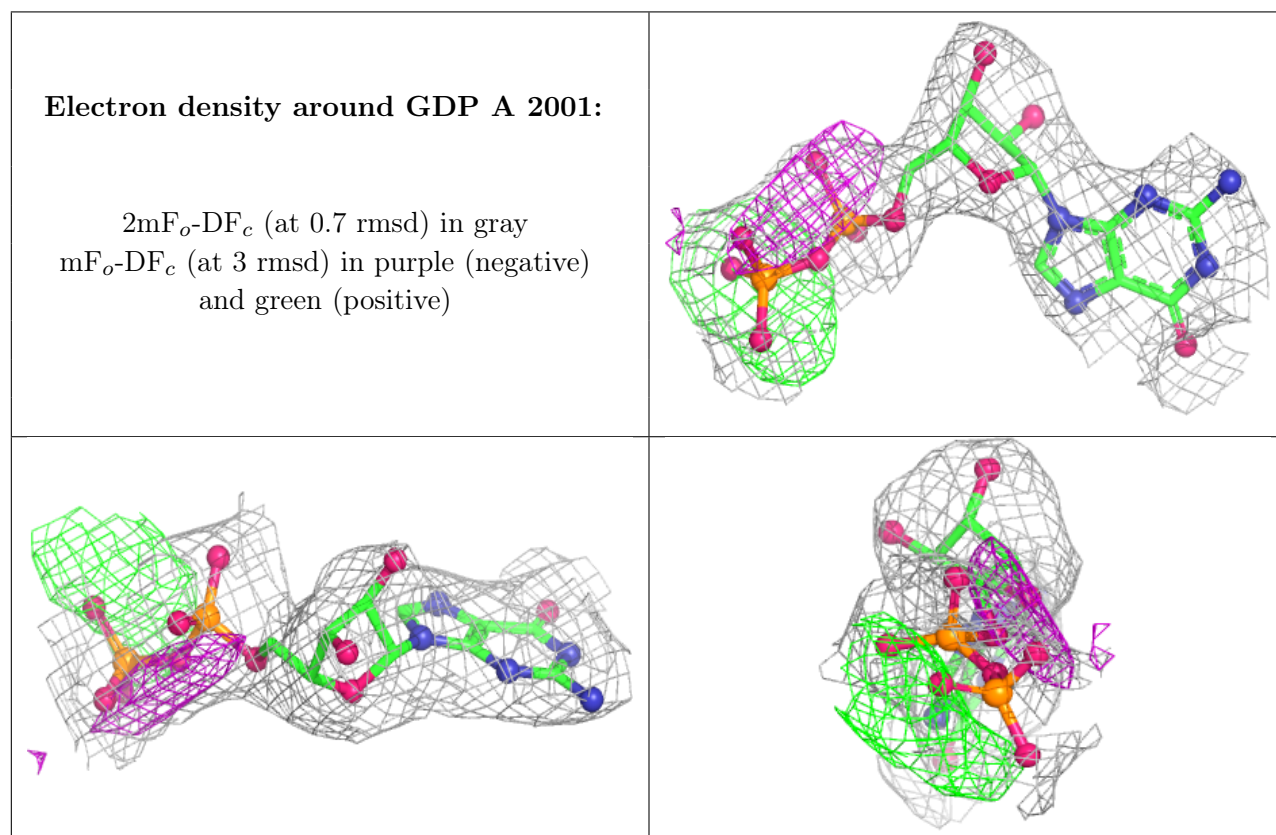
There are no oligosaccharides in this entry.

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. 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	RSCC	RSR	B-factors(Å ²)	Q<0.9
3	MG	A	1001	1/1	0.84	0.12	23,23,23,23	0
5	GDP	A	2001	28/28	0.87	0.10	21,30,34,35	0
4	ZN	B	3002	1/1	0.99	0.07	61,61,61,61	0
4	ZN	A	3001	1/1	1.00	0.04	26,26,26,26	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.



6.5 Other polymers [i](#)

There are no such residues in this entry.