



Full wwPDB X-ray Structure Validation Report ⓘ

Jun 19, 2024 – 10:48 AM EDT

PDB ID : 4DTC
Title : Crystal Structure of DPP-IV with Compound C5
Authors : Xiong, B.; Zhu, L.R.; Chen, D.Q.; Zhao, Y.L.; Jiang, F.; Shen, J.K.
Deposited on : 2012-02-21
Resolution : 3.00 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
Mogul : 2022.3.0, CSD as543be (2022)
Xtriage (Phenix) : 1.20.1
EDS : 2.37.1
buster-report : 1.1.7 (2018)
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) : 2.37.1

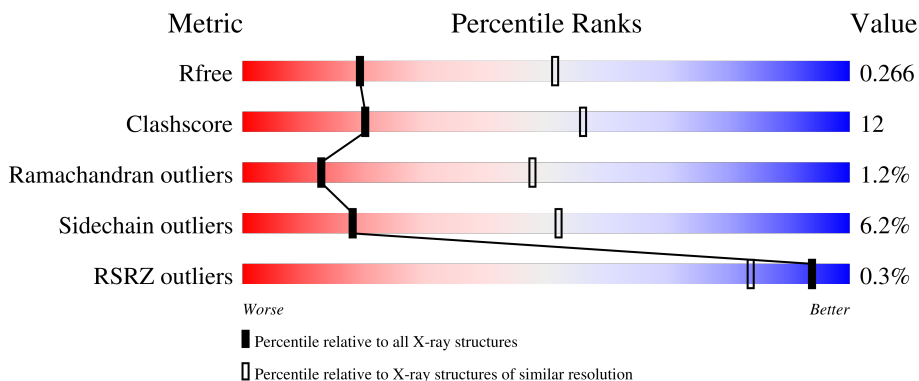
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 3.00 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	2092 (3.00-3.00)
Clashscore	141614	2416 (3.00-3.00)
Ramachandran outliers	138981	2333 (3.00-3.00)
Sidechain outliers	138945	2336 (3.00-3.00)
RSRZ outliers	127900	1990 (3.00-3.00)

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	728	
1	B	728	

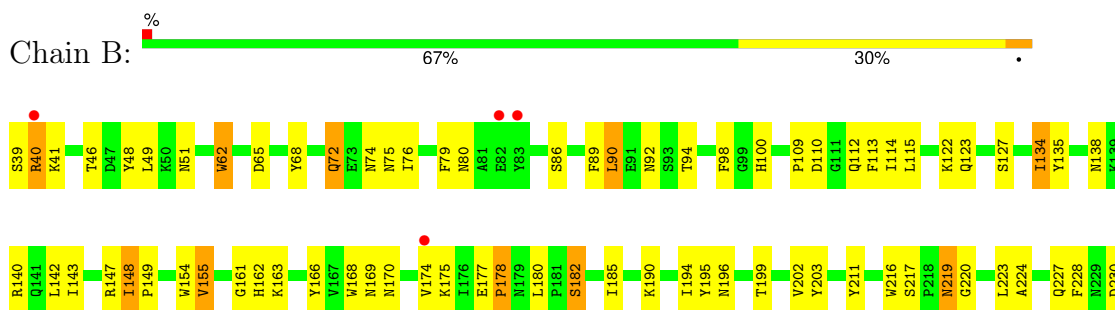
3 Residue-property plots i

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: Dipeptidyl peptidase 4



• Molecule 1: Dipeptidyl peptidase 4



T231	R343	N450	G584	E699
I236	E347	P451	Y585	I703
E237	T350	C454	Q586	H704
R253	T351	Y457	I594	H712
V254	G352	S458	N595	K721
P255	W353	V459	R596	V724
Y256	R358	K463	E602	D725
P257	E361	E464	V603	V726
K258	F364	A465	A609	G727
F268	S370	K466	F618	V728
V271	N272	L477	I624	M733
N272	T273	Y480	T481	W734
T273	F371	T481	A625	Y735
L276	E378	L482	I626	Y741
S277	R382	H483	W627	I742
V279	H383	N487	Y631	H750
T280	I384	D488	Y634	I751
N281	C385	L494	V635	K760
A282	Y386	L500	T636	S764
T288	I389	D501	S637	L765
A289	T398	N506	M638	P766
P290	T402	D515	V639	
D297	E403	Y526	L640	
D302	V404	P532	S644	
A306	Y417	L542	G645	
T307	I418	D645	V646	
Q308	S419	V546	C649	
E309	M420	Y547	G650	
R310	E421	A548	A654	
I311	Y422	G549	W659	
S312	K423	S552	E660	
L313	P426	Q553	Y661	
R318	M430	K554	Y662	
I319	L431	R669	V665	
Q320	Y432	N562	R669	
S323	K433	Y566	T675	
D326	I434	S569	D678	
D331	Q435	Y569	N679	
S334	D438	S569	L680	
W337	K441	F578	Y683	
L340	V442	B579	R684	
V341	T443	G580	M685	
A342	C444	S583	R691	
	L445			
	L449			

4 Data and refinement statistics i

Property	Value	Source
Space group	P 32	Depositor
Cell constants a, b, c, α , β , γ	80.47Å 80.47Å 290.90Å 90.00° 90.00° 120.00°	Depositor
Resolution (Å)	29.89 – 3.00 29.89 – 3.00	Depositor EDS
% Data completeness (in resolution range)	98.3 (29.89-3.00) 98.4 (29.89-3.00)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.83 (at 3.00Å)	Xtriage
Refinement program	REFMAC 5.6.0117	Depositor
R, R_{free}	0.206 , 0.268 0.202 , 0.266	Depositor DCC
R_{free} test set	2088 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å ²)	88.4	Xtriage
Anisotropy	0.176	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.30 , 52.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.001 for -h,-k,l 0.099 for h,-h-k,-l 0.028 for -k,-h,-l	Xtriage
F_o, F_c correlation	0.94	EDS
Total number of atoms	11992	wwPDB-VP
Average B, all atoms (Å ²)	107.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.39% 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 [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: D5C

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	0.66	7/6135 (0.1%)	0.74	2/8344 (0.0%)
1	B	0.64	6/6135 (0.1%)	0.73	2/8344 (0.0%)
All	All	0.65	13/12270 (0.1%)	0.74	4/16688 (0.0%)

All (13) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	B	337	TRP	CD2-CE2	5.96	1.48	1.41
1	B	659	TRP	CD2-CE2	5.41	1.47	1.41
1	A	337	TRP	CD2-CE2	5.38	1.47	1.41
1	B	154	TRP	CD2-CE2	5.18	1.47	1.41
1	B	353	TRP	CD2-CE2	5.17	1.47	1.41
1	A	187	TRP	CD2-CE2	5.16	1.47	1.41
1	B	62	TRP	CD2-CE2	5.13	1.47	1.41
1	A	124	TRP	CD2-CE2	5.10	1.47	1.41
1	A	62	TRP	CD2-CE2	5.08	1.47	1.41
1	A	525	TRP	CD2-CE2	5.08	1.47	1.41
1	B	402	TRP	CD2-CE2	5.06	1.47	1.41
1	A	315	TRP	CD2-CE2	5.06	1.47	1.41
1	A	659	TRP	CD2-CE2	5.04	1.47	1.41

All (4) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	358	ARG	NE-CZ-NH2	8.11	124.35	120.30
1	B	358	ARG	NE-CZ-NH1	-7.57	116.52	120.30
1	A	358	ARG	NE-CZ-NH1	7.45	124.02	120.30
1	A	358	ARG	NE-CZ-NH2	-7.36	116.62	120.30

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	A	5963	0	5685	149	0
1	B	5963	0	5685	149	0
2	A	33	0	20	4	0
2	B	33	0	20	2	0
All	All	11992	0	11410	292	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 12.

All (292) 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:74:ASN:HB2	1:A:92:ASN:HB2	1.55	0.87
1:B:74:ASN:HB2	1:B:92:ASN:HB2	1.56	0.87
1:B:352:GLY:HA2	1:B:595:ASN:ND2	1.95	0.81
1:B:352:GLY:HA2	1:B:595:ASN:HD22	1.45	0.80
1:A:420:ASN:HD22	1:A:426:PRO:HA	1.48	0.78
1:A:595:ASN:OD1	1:A:596:ARG:HG3	1.86	0.76
1:B:420:ASN:HD22	1:B:426:PRO:HA	1.49	0.76
1:A:352:GLY:HA2	1:A:595:ASN:HD22	1.50	0.76
1:B:114:ILE:HG22	1:B:135:TYR:HB3	1.66	0.76
1:B:595:ASN:OD1	1:B:596:ARG:HG3	1.86	0.76
1:A:237:GLU:HG2	1:A:253:ARG:HG2	1.67	0.74
1:A:352:GLY:HA2	1:A:595:ASN:ND2	2.04	0.73
1:A:596:ARG:NH2	1:A:678:ASP:OD1	2.23	0.71
1:B:596:ARG:NH2	1:B:678:ASP:OD1	2.23	0.71
1:B:237:GLU:HG2	1:B:253:ARG:HG2	1.73	0.70
1:A:358:ARG:HH21	2:A:801:D5C:CAZ	2.05	0.69
1:A:174:VAL:HG23	1:A:185:ILE:HD11	1.75	0.69
1:B:216:TRP:HZ3	1:B:273:THR:HG21	1.56	0.69
1:A:110:ASP:OD2	1:A:162:HIS:ND1	2.24	0.69
1:A:216:TRP:HZ3	1:A:273:THR:HG21	1.56	0.68

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:196:ASN:OD1	1:B:227:GLN:HG3	1.94	0.67
1:A:547:TYR:HB2	1:A:554:LYS:HE2	1.75	0.66
1:A:654:ALA:HA	1:A:704:HIS:CE1	2.30	0.66
1:A:114:ILE:HG22	1:A:135:TYR:HB3	1.77	0.66
1:B:546:VAL:HG21	1:B:626:ILE:HD11	1.79	0.65
1:B:134:ILE:HB	1:B:143:ILE:HD12	1.78	0.65
1:A:155:VAL:HG23	1:A:166:TYR:HB3	1.79	0.65
1:A:40:ARG:HH11	1:A:40:ARG:HB3	1.62	0.64
1:B:640:LEU:HD11	1:B:650:GLY:HA3	1.80	0.64
1:B:626:ILE:HG23	1:B:636:THR:HG23	1.79	0.64
1:B:276:LEU:HD21	1:B:282:ALA:HB2	1.80	0.64
1:B:547:TYR:HB2	1:B:554:LYS:HE2	1.80	0.64
1:B:123:GLN:HB3	1:B:127:SER:OG	1.99	0.63
1:B:549:GLY:O	1:B:552:SER:HB3	1.99	0.63
1:B:155:VAL:HG23	1:B:166:TYR:HB3	1.79	0.63
1:B:177:GLU:HB2	1:B:180:LEU:HD13	1.80	0.63
1:B:331:ASP:HB3	1:B:334:SER:HB3	1.79	0.63
1:A:134:ILE:HB	1:A:143:ILE:HD12	1.81	0.62
1:B:40:ARG:HH11	1:B:40:ARG:HB3	1.64	0.62
1:A:123:GLN:HB3	1:A:127:SER:OG	2.00	0.62
1:A:196:ASN:OD1	1:A:227:GLN:HG3	1.99	0.62
1:A:626:ILE:HG23	1:A:636:THR:HG23	1.82	0.62
1:B:110:ASP:OD2	1:B:162:HIS:ND1	2.25	0.62
1:A:290:PRO:HD3	1:A:326:ASP:OD2	2.00	0.61
1:B:113:PHE:CZ	1:B:178:PRO:HG2	2.35	0.61
1:B:170:ASN:O	1:B:196:ASN:HB2	2.01	0.60
2:A:801:D5C:H12	2:A:801:D5C:OAQ	2.01	0.60
1:A:79:PHE:HA	1:A:86:SER:CB	2.32	0.60
1:A:79:PHE:HA	1:A:86:SER:HB2	1.83	0.60
1:A:626:ILE:O	1:A:650:GLY:HA2	2.02	0.60
1:A:331:ASP:HB3	1:A:334:SER:HB3	1.82	0.59
1:A:163:LYS:NZ	1:A:220:GLY:O	2.29	0.59
1:A:320:GLN:OE1	1:A:669:ARG:HG3	2.02	0.58
1:B:580:GLY:O	1:B:583:SER:OG	2.18	0.58
1:B:726:VAL:O	1:B:726:VAL:HG12	2.02	0.58
1:A:340:LEU:HB2	1:A:343:ARG:HG2	1.84	0.58
1:A:420:ASN:ND2	1:A:426:PRO:HA	2.18	0.58
1:B:340:LEU:HB2	1:B:343:ARG:HG2	1.85	0.58
1:A:113:PHE:CZ	1:A:178:PRO:HG2	2.39	0.58
1:B:420:ASN:ND2	1:B:426:PRO:HA	2.18	0.58
1:B:202:VAL:HG21	1:B:665:VAL:HG23	1.86	0.57

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:169:ASN:O	1:B:170:ASN:HB2	2.05	0.57
1:B:358:ARG:HH21	2:B:801:D5C:CAZ	2.16	0.57
1:A:644:SER:O	1:A:646:VAL:N	2.37	0.57
1:A:177:GLU:HB2	1:A:180:LEU:HD13	1.87	0.56
1:A:735:TYR:CE2	1:A:751:ILE:HG13	2.40	0.56
1:B:79:PHE:HA	1:B:86:SER:CB	2.36	0.56
1:B:482:LEU:HB2	1:B:494:LEU:HD11	1.87	0.56
1:A:735:TYR:HE2	1:A:751:ILE:HG13	1.71	0.56
1:B:76:ILE:O	1:B:89:PHE:HB3	2.05	0.56
1:B:480:TYR:CD1	1:B:480:TYR:N	2.73	0.56
1:A:276:LEU:HD21	1:A:282:ALA:HB2	1.87	0.55
1:B:320:GLN:OE1	1:B:669:ARG:HG3	2.07	0.55
1:A:580:GLY:O	1:A:583:SER:OG	2.14	0.55
1:B:760:LYS:HG2	1:B:765:LEU:HB2	1.88	0.54
1:A:169:ASN:O	1:A:170:ASN:HB2	2.07	0.54
1:B:638:MET:O	1:B:691:ARG:NH1	2.40	0.54
1:A:431:LEU:HD12	1:A:432:TYR:H	1.72	0.54
1:A:358:ARG:HH21	2:A:801:D5C:CBA	2.20	0.54
1:A:418:ILE:HA	1:A:430:ASN:O	2.08	0.54
1:A:540:TYR:N	1:A:618:PHE:O	2.35	0.53
1:B:435:GLN:NE2	1:B:441:LYS:HD2	2.24	0.53
1:A:750:HIS:ND1	1:B:724:VAL:HG22	2.24	0.53
1:B:39:SER:HB3	1:B:506:ASN:O	2.08	0.53
1:B:297:ASP:HB3	1:B:318:ARG:HB2	1.91	0.53
1:B:312:SER:O	1:B:313:LEU:HD23	2.08	0.53
1:B:79:PHE:HA	1:B:86:SER:HB2	1.90	0.53
1:B:48:TYR:CE1	1:B:562:ASN:HA	2.45	0.52
1:A:654:ALA:HA	1:A:704:HIS:ND1	2.23	0.52
1:B:542:LEU:HD22	1:B:624:ILE:HG23	1.92	0.52
1:A:724:VAL:HG22	1:B:750:HIS:ND1	2.24	0.52
1:A:704:HIS:HB3	1:A:713:PHE:CD1	2.45	0.52
1:A:76:ILE:O	1:A:89:PHE:HB3	2.10	0.52
1:B:431:LEU:HD12	1:B:432:TYR:N	2.25	0.52
1:B:403:GLU:OE2	1:B:587:GLY:HA2	2.09	0.51
1:A:242:SER:O	1:B:721:LYS:NZ	2.38	0.51
1:B:532:PRO:HD3	1:B:569:SER:HA	1.93	0.51
1:A:323:SER:OG	1:A:347:GLU:HB3	2.11	0.51
1:A:403:GLU:OE2	1:A:587:GLY:HA2	2.10	0.51
1:A:62:TRP:CE3	1:A:68:TYR:HB3	2.45	0.51
1:B:548:ALA:HB3	1:B:635:VAL:HG21	1.91	0.51
1:A:40:ARG:HB3	1:A:40:ARG:NH1	2.25	0.50

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:236:ILE:HG12	1:B:712:HIS:CD2	2.46	0.50
1:B:431:LEU:HD12	1:B:432:TYR:H	1.76	0.50
1:B:98:PHE:HE2	1:B:100:HIS:HB2	1.77	0.50
1:B:654:ALA:HA	1:B:704:HIS:CE1	2.46	0.50
1:A:48:TYR:CE1	1:A:562:ASN:HA	2.47	0.50
1:A:482:LEU:HB2	1:A:494:LEU:HD11	1.94	0.50
1:A:143:ILE:HD13	1:A:178:PRO:O	2.12	0.50
1:A:155:VAL:HG23	1:A:166:TYR:CB	2.41	0.50
1:A:159:PRO:HD3	1:A:216:TRP:CG	2.48	0.49
1:A:414:TYR:CZ	1:A:433:LYS:HE2	2.47	0.49
1:A:39:SER:HB3	1:A:506:ASN:O	2.12	0.49
1:A:190:LYS:H	1:A:194:ILE:HB	1.78	0.49
1:B:62:TRP:CE3	1:B:68:TYR:HB3	2.47	0.49
1:A:297:ASP:HB3	1:A:318:ARG:HB2	1.94	0.49
1:A:480:TYR:CD1	1:A:480:TYR:N	2.81	0.49
1:A:637:SER:HG	1:A:700:TYR:HH	1.60	0.49
1:A:631:TYR:O	1:A:634:TYR:HB3	2.13	0.49
1:A:65:ASP:O	1:A:466:LYS:HB2	2.13	0.48
1:B:454:CYS:HB3	1:B:457:TYR:CZ	2.49	0.48
1:A:112:GLN:HG2	1:A:138:ASN:OD1	2.13	0.48
1:A:199:THR:HG22	1:A:203:TYR:HB3	1.95	0.48
1:A:384:ILE:HG13	1:A:404:VAL:HG21	1.94	0.48
1:B:65:ASP:O	1:B:466:LYS:HB2	2.14	0.48
1:B:279:VAL:O	1:B:279:VAL:HG13	2.12	0.48
1:A:170:ASN:O	1:A:196:ASN:HB2	2.13	0.48
1:A:548:ALA:HB3	1:A:635:VAL:HG21	1.96	0.48
1:B:40:ARG:HB3	1:B:40:ARG:NH1	2.26	0.48
1:A:542:LEU:HD22	1:A:624:ILE:HG23	1.96	0.48
1:A:115:LEU:HD21	1:A:155:VAL:CG1	2.44	0.48
1:A:431:LEU:HD12	1:A:432:TYR:N	2.29	0.48
1:A:340:LEU:CB	1:A:343:ARG:HG2	2.44	0.48
1:B:340:LEU:HB2	1:B:343:ARG:CG	2.44	0.47
1:A:340:LEU:HB2	1:A:343:ARG:CG	2.43	0.47
1:A:546:VAL:HG21	1:A:626:ILE:HD11	1.97	0.47
1:A:640:LEU:HD11	1:A:650:GLY:HA3	1.96	0.47
1:A:704:HIS:CD2	1:A:713:PHE:HA	2.49	0.47
1:B:109:PRO:HD2	1:B:161:GLY:O	2.14	0.47
1:A:477:LEU:CD1	1:A:501:ASP:HB2	2.44	0.47
1:B:384:ILE:HG13	1:B:404:VAL:HG21	1.95	0.47
1:B:435:GLN:HE22	1:B:441:LYS:HD2	1.79	0.47
1:A:463:LYS:C	1:A:465:ALA:H	2.18	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:644:SER:O	1:B:646:VAL:N	2.47	0.47
1:B:463:LYS:C	1:B:465:ALA:H	2.17	0.47
1:A:425:MET:HA	1:A:426:PRO:HD3	1.81	0.47
1:A:726:VAL:HG12	1:A:726:VAL:O	2.14	0.47
1:B:190:LYS:H	1:B:194:ILE:HB	1.79	0.47
1:B:438:ASP:OD2	1:B:441:LYS:HG3	2.15	0.47
1:A:98:PHE:HE2	1:A:100:HIS:HB2	1.80	0.46
1:A:383:HIS:ND1	1:A:398:THR:OG1	2.41	0.46
1:B:236:ILE:CG2	1:B:254:VAL:HB	2.46	0.46
1:A:68:TYR:CD1	1:A:68:TYR:C	2.89	0.46
1:A:578:PHE:CD2	1:A:609:ALA:HB2	2.51	0.46
1:A:216:TRP:CZ3	1:A:273:THR:HG21	2.45	0.46
1:A:704:HIS:HB3	1:A:713:PHE:HD1	1.81	0.46
1:A:148:ILE:HG22	1:A:149:PRO:HD2	1.98	0.46
1:A:482:LEU:C	1:A:483:HIS:CD2	2.89	0.46
1:A:532:PRO:HD3	1:A:569:SER:HA	1.97	0.46
1:B:127:SER:HB2	1:B:211:TYR:CD2	2.51	0.46
1:B:418:ILE:HA	1:B:430:ASN:O	2.16	0.46
1:A:279:VAL:O	1:A:279:VAL:HG13	2.16	0.46
1:B:364:PHE:CD1	1:B:371:PHE:HB3	2.51	0.46
1:A:662:TYR:HB3	1:A:667:THR:OG1	2.16	0.46
1:B:217:SER:O	1:B:219:ASN:N	2.49	0.46
1:B:477:LEU:HD22	1:B:500:LEU:HD12	1.98	0.46
1:B:660:GLU:HG3	1:B:683:TYR:CD2	2.51	0.46
1:B:149:PRO:HG2	1:B:168:TRP:CD1	2.52	0.45
1:B:163:LYS:NZ	1:B:220:GLY:O	2.36	0.45
1:A:251:THR:HB	1:A:253:ARG:NH2	2.31	0.45
1:B:175:LYS:HG3	1:B:182:SER:HB3	1.98	0.45
1:A:728:VAL:O	1:B:750:HIS:CE1	2.69	0.45
1:B:174:VAL:HG23	1:B:185:ILE:HD11	1.98	0.45
1:A:660:GLU:HG3	1:A:683:TYR:CD2	2.51	0.45
1:B:74:ASN:HB2	1:B:92:ASN:CB	2.37	0.45
1:A:236:ILE:HG12	1:A:712:HIS:CD2	2.51	0.45
1:A:515:ASP:HB3	1:A:526:TYR:CZ	2.51	0.45
1:A:369:ASN:HA	1:A:389:ILE:CD1	2.47	0.45
1:B:112:GLN:HG2	1:B:138:ASN:OD1	2.17	0.45
1:B:216:TRP:CZ3	1:B:273:THR:HG21	2.44	0.45
1:B:487:ASN:O	1:B:488:ASP:HB2	2.16	0.45
1:B:114:ILE:CG2	1:B:135:TYR:HB3	2.40	0.45
1:A:487:ASN:O	1:A:488:ASP:HB2	2.17	0.45
1:A:417:TYR:HE2	1:A:419:SER:HB3	1.80	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:453:ARG:HH21	1:A:479:LEU:HB2	1.82	0.44
1:B:418:ILE:HD11	1:B:459:VAL:HG12	2.00	0.44
1:B:631:TYR:O	1:B:634:TYR:HB3	2.16	0.44
1:A:225:TYR:CZ	1:A:269:PHE:HB2	2.52	0.44
1:A:358:ARG:NH2	2:A:801:D5C:CBA	2.79	0.44
1:A:728:VAL:O	1:B:750:HIS:HE1	2.01	0.44
1:B:143:ILE:HD13	1:B:178:PRO:O	2.16	0.44
1:B:306:ALA:HB3	1:B:310:ARG:HG2	1.99	0.44
1:B:340:LEU:CB	1:B:343:ARG:HG2	2.47	0.44
1:B:741:GLY:O	1:B:742:ILE:C	2.55	0.44
1:B:482:LEU:C	1:B:483:HIS:CD2	2.91	0.44
1:B:626:ILE:O	1:B:650:GLY:HA2	2.16	0.44
1:A:113:PHE:CE1	1:A:178:PRO:HG2	2.52	0.44
1:B:68:TYR:CD1	1:B:68:TYR:C	2.90	0.44
1:A:203:TYR:OH	1:A:299:TYR:HB3	2.18	0.44
1:B:199:THR:HG22	1:B:203:TYR:HB3	1.99	0.44
1:B:323:SER:OG	1:B:347:GLU:HB3	2.18	0.44
1:A:438:ASP:OD2	1:A:441:LYS:HG3	2.18	0.44
1:A:477:LEU:HD22	1:A:500:LEU:HD12	2.00	0.44
1:A:750:HIS:CE1	1:B:728:VAL:O	2.71	0.44
1:B:80:ASN:H	1:B:86:SER:HB3	1.83	0.44
1:B:155:VAL:HG23	1:B:166:TYR:CB	2.46	0.44
1:B:219:ASN:HB2	1:B:308:GLN:OE1	2.18	0.44
1:A:235:LEU:HD13	1:A:253:ARG:HB3	2.00	0.43
1:B:307:THR:OG1	1:B:310:ARG:HB3	2.18	0.43
1:B:76:ILE:HD12	1:B:90:LEU:HD22	1.99	0.43
1:B:417:TYR:HE2	1:B:419:SER:HB3	1.82	0.43
1:A:115:LEU:HD21	1:A:155:VAL:HG11	2.00	0.43
1:B:584:GLY:O	1:B:585:TYR:HB2	2.19	0.43
1:A:159:PRO:HD3	1:A:216:TRP:CB	2.48	0.43
1:A:760:LYS:HG2	1:A:765:LEU:HB2	2.00	0.43
1:B:515:ASP:HB3	1:B:526:TYR:CZ	2.53	0.43
1:B:703:ILE:HA	1:B:733:MET:O	2.18	0.43
1:B:290:PRO:HD3	1:B:326:ASP:OD2	2.19	0.43
1:B:602:GLU:HG2	1:B:603:VAL:N	2.33	0.43
1:B:675:THR:C	1:B:680:LEU:HB2	2.38	0.43
1:B:703:ILE:HG12	1:B:733:MET:HB3	2.00	0.43
1:A:49:LEU:HD23	1:A:49:LEU:HA	1.78	0.43
1:A:377:ASN:OD1	1:A:379:GLU:N	2.51	0.43
1:B:148:ILE:HG22	1:B:149:PRO:HD2	2.00	0.43
1:B:594:ILE:HD12	1:B:594:ILE:HA	1.92	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:310:ARG:NH1	1:A:368:GLY:O	2.49	0.43
1:A:630:SER:O	1:A:631:TYR:C	2.57	0.43
1:A:508:GLN:OE1	1:A:533:HIS:NE2	2.52	0.43
1:A:636:THR:HG21	1:A:651:ILE:O	2.19	0.43
1:B:237:GLU:HG2	1:B:253:ARG:CG	2.47	0.43
1:A:217:SER:O	1:A:219:ASN:N	2.52	0.42
1:B:402:TRP:CD1	1:B:421:GLU:HG3	2.54	0.42
1:B:195:TYR:HB2	1:B:228:PHE:HB2	2.00	0.42
1:B:258:LYS:HA	1:B:662:TYR:O	2.20	0.42
1:A:369:ASN:HA	1:A:389:ILE:HD12	2.01	0.42
1:A:602:GLU:HG2	1:A:603:VAL:N	2.34	0.42
1:A:718:GLN:OE1	1:A:721:LYS:HE2	2.18	0.42
1:B:98:PHE:CE2	1:B:100:HIS:HB2	2.54	0.42
1:B:382:ARG:HG2	1:B:382:ARG:HH11	1.84	0.42
1:A:109:PRO:HD2	1:A:161:GLY:O	2.19	0.42
1:A:703:ILE:HG12	1:A:733:MET:HB3	2.00	0.42
1:B:649:CYS:HB3	1:B:699:GLU:HB2	2.02	0.42
1:B:463:LYS:C	1:B:465:ALA:N	2.73	0.42
1:A:80:ASN:H	1:A:86:SER:HB3	1.84	0.42
1:A:306:ALA:HB3	1:A:310:ARG:HG2	2.01	0.42
1:B:223:LEU:HD12	1:B:223:LEU:HA	1.79	0.42
1:B:618:PHE:CD2	1:B:618:PHE:N	2.87	0.42
1:A:224:ALA:HB1	1:A:268:PHE:CZ	2.54	0.41
1:A:611:ARG:HG2	1:A:611:ARG:HH11	1.85	0.41
1:B:224:ALA:HB1	1:B:268:PHE:CZ	2.55	0.41
1:A:638:MET:O	1:A:691:ARG:NH1	2.53	0.41
1:B:127:SER:HB2	1:B:211:TYR:CG	2.56	0.41
1:B:450:ASN:O	1:B:451:PRO:C	2.59	0.41
1:A:584:GLY:O	1:A:585:TYR:HB2	2.20	0.41
1:A:718:GLN:OE1	1:A:718:GLN:HA	2.21	0.41
1:B:626:ILE:HD13	1:B:639:VAL:HG11	2.02	0.41
1:A:223:LEU:HD12	1:A:223:LEU:HA	1.77	0.41
1:B:115:LEU:HD21	1:B:155:VAL:CG1	2.51	0.41
1:B:477:LEU:CD1	1:B:501:ASP:HB2	2.50	0.41
1:A:454:CYS:HB3	1:A:457:TYR:CZ	2.56	0.41
1:B:256:TYR:CE1	1:B:712:HIS:HE1	2.37	0.41
1:B:735:TYR:CE2	1:B:751:ILE:HG13	2.56	0.41
1:A:127:SER:HB2	1:A:211:TYR:CD2	2.56	0.41
1:A:746:THR:HG21	1:B:725:ASP:HA	2.02	0.41
1:B:49:LEU:HA	1:B:49:LEU:HD23	1.82	0.41
1:B:79:PHE:HA	1:B:86:SER:HB3	2.02	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:735:TYR:HE2	1:B:751:ILE:HG13	1.85	0.41
1:A:79:PHE:HA	1:A:86:SER:HB3	2.03	0.41
1:A:364:PHE:CD1	1:A:371:PHE:HB3	2.56	0.41
1:A:644:SER:C	1:A:646:VAL:H	2.23	0.41
1:B:68:TYR:CE1	1:B:79:PHE:HB2	2.55	0.41
1:B:302:ASP:HA	1:B:358:ARG:NH1	2.35	0.41
1:A:195:TYR:HB2	1:A:228:PHE:HB2	2.02	0.41
1:A:402:TRP:CD1	1:A:421:GLU:HG3	2.55	0.41
1:A:417:TYR:CE2	1:A:419:SER:HB3	2.56	0.41
1:B:302:ASP:HA	1:B:358:ARG:HH11	1.85	0.41
1:A:594:ILE:HD12	1:A:594:ILE:HA	1.92	0.41
1:B:420:ASN:HB2	1:B:426:PRO:HA	2.02	0.41
1:A:174:VAL:CG2	1:A:185:ILE:HD11	2.48	0.40
1:A:461:PHE:CD1	1:A:468:TYR:HB3	2.56	0.40
1:B:382:ARG:HH11	1:B:382:ARG:CG	2.34	0.40
1:A:530:LEU:HA	1:A:531:PRO:HD3	1.97	0.40
1:B:384:ILE:HD12	1:B:398:THR:HG21	2.04	0.40
1:A:74:ASN:HB2	1:A:92:ASN:CB	2.39	0.40
1:B:72:GLN:O	1:B:75:ASN:HB2	2.21	0.40
1:B:370:SER:HB2	1:B:386:TYR:CE1	2.57	0.40
1:B:433:LYS:HD2	1:B:445:LEU:HD21	2.03	0.40
1:B:578:PHE:CD2	1:B:609:ALA:HB2	2.56	0.40
1:A:307:THR:CG2	1:A:368:GLY:HA3	2.51	0.40
1:A:578:PHE:HE2	1:A:605:ASP:HB3	1.86	0.40
1:B:113:PHE:CE1	1:B:178:PRO:HG2	2.56	0.40
1:B:358:ARG:NH2	2:B:801:D5C:CBA	2.84	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	A	726/728 (100%)	642 (88%)	75 (10%)	9 (1%)	13	48
1	B	726/728 (100%)	650 (90%)	68 (9%)	8 (1%)	14	50
All	All	1452/1456 (100%)	1292 (89%)	143 (10%)	17 (1%)	13	48

All (17) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	140	ARG
1	B	140	ARG
1	A	178	PRO
1	A	279	VAL
1	A	645	GLY
1	B	178	PRO
1	B	279	VAL
1	B	645	GLY
1	B	341	VAL
1	B	389	ILE
1	A	244	GLU
1	B	423	LYS
1	B	464	GLU
1	A	464	GLU
1	A	389	ILE
1	A	111	GLY
1	A	341	VAL

5.3.2 Protein sidechains [i](#)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	A	653/653 (100%)	614 (94%)	39 (6%)	19	53
1	B	653/653 (100%)	611 (94%)	42 (6%)	17	51
All	All	1306/1306 (100%)	1225 (94%)	81 (6%)	18	52

All (81) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	40	ARG
1	A	41	LYS
1	A	46	THR
1	A	51	ASN
1	A	72	GLN
1	A	90	LEU
1	A	122	LYS
1	A	134	ILE
1	A	142	LEU
1	A	147	ARG
1	A	148	ILE
1	A	155	VAL
1	A	182	SER
1	A	211	TYR
1	A	230	ASP
1	A	231	THR
1	A	242	SER
1	A	271	VAL
1	A	277	SER
1	A	280	THR
1	A	288	THR
1	A	350	THR
1	A	361	GLU
1	A	378	GLU
1	A	382	ARG
1	A	385	CYS
1	A	419	SER
1	A	443	THR
1	A	458	SER
1	A	472	CYS
1	A	480	TYR
1	A	487	ASN
1	A	522	THR
1	A	566	TYR
1	A	618	PHE
1	A	627	TRP
1	A	685	ASN
1	A	751	ILE
1	A	764	SER
1	B	40	ARG
1	B	41	LYS
1	B	46	THR
1	B	51	ASN

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Mol	Chain	Res	Type
1	B	72	GLN
1	B	90	LEU
1	B	94	THR
1	B	122	LYS
1	B	134	ILE
1	B	142	LEU
1	B	147	ARG
1	B	148	ILE
1	B	155	VAL
1	B	182	SER
1	B	219	ASN
1	B	230	ASP
1	B	231	THR
1	B	271	VAL
1	B	277	SER
1	B	280	THR
1	B	288	THR
1	B	350	THR
1	B	358	ARG
1	B	361	GLU
1	B	378	GLU
1	B	382	ARG
1	B	385	CYS
1	B	419	SER
1	B	426	PRO
1	B	433	LYS
1	B	443	THR
1	B	449	LEU
1	B	458	SER
1	B	480	TYR
1	B	487	ASN
1	B	545	ASP
1	B	566	TYR
1	B	618	PHE
1	B	627	TRP
1	B	685	ASN
1	B	751	ILE
1	B	764	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (3) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	74	ASN
1	B	74	ASN
1	B	750	HIS

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](#)

2 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
2	D5C	B	801	-	35,35,35	2.09	10 (28%)	47,50,50	1.02	2 (4%)
2	D5C	A	801	-	35,35,35	2.12	9 (25%)	47,50,50	1.29	6 (12%)

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	D5C	B	801	-	-	6/24/24/24	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	D5C	A	801	-	-	6/24/24/24	0/3/3/3

All (19) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	801	D5C	CAJ-CAD	-6.44	1.41	1.51
2	B	801	D5C	CAJ-CAD	-6.27	1.41	1.51
2	A	801	D5C	FAG-CAE	-4.99	1.22	1.35
2	B	801	D5C	CBD-CBB	-4.18	1.41	1.49
2	A	801	D5C	CAR-CAP	-3.96	1.41	1.50
2	B	801	D5C	CAU-CAX	-3.92	1.39	1.49
2	B	801	D5C	CAR-CAP	-3.66	1.42	1.50
2	B	801	D5C	FAG-CAE	-3.49	1.26	1.35
2	A	801	D5C	CAU-CAX	-3.45	1.40	1.49
2	A	801	D5C	CBD-CBB	-3.31	1.43	1.49
2	B	801	D5C	FAH-CAA	-3.24	1.26	1.35
2	B	801	D5C	FAI-CAB	-3.12	1.27	1.35
2	B	801	D5C	CAW-CAR	2.87	1.43	1.39
2	B	801	D5C	CAS-CAR	2.83	1.43	1.39
2	A	801	D5C	CAL-CAK	2.59	1.56	1.53
2	A	801	D5C	CAW-CAR	2.44	1.43	1.39
2	A	801	D5C	CAV-CAU	2.12	1.43	1.39
2	B	801	D5C	CAV-CAU	2.04	1.43	1.39
2	A	801	D5C	FBE-CBD	2.03	1.40	1.33

All (8) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	A	801	D5C	CAT-CAU-CAX	-3.11	115.88	121.25
2	B	801	D5C	CAS-CAT-CAU	-2.33	118.12	121.12
2	A	801	D5C	CAS-CAR-CAP	-2.33	113.06	120.60
2	A	801	D5C	CAW-CAR-CAP	2.32	128.14	120.60
2	B	801	D5C	CAV-CAW-CAR	-2.29	118.35	120.80
2	A	801	D5C	CAT-CAS-CAR	2.05	122.99	120.80
2	A	801	D5C	CAA-CAF-CAE	2.02	120.62	117.22
2	A	801	D5C	CAV-CAW-CAR	-2.02	118.64	120.80

There are no chirality outliers.

All (12) torsion outliers are listed below:

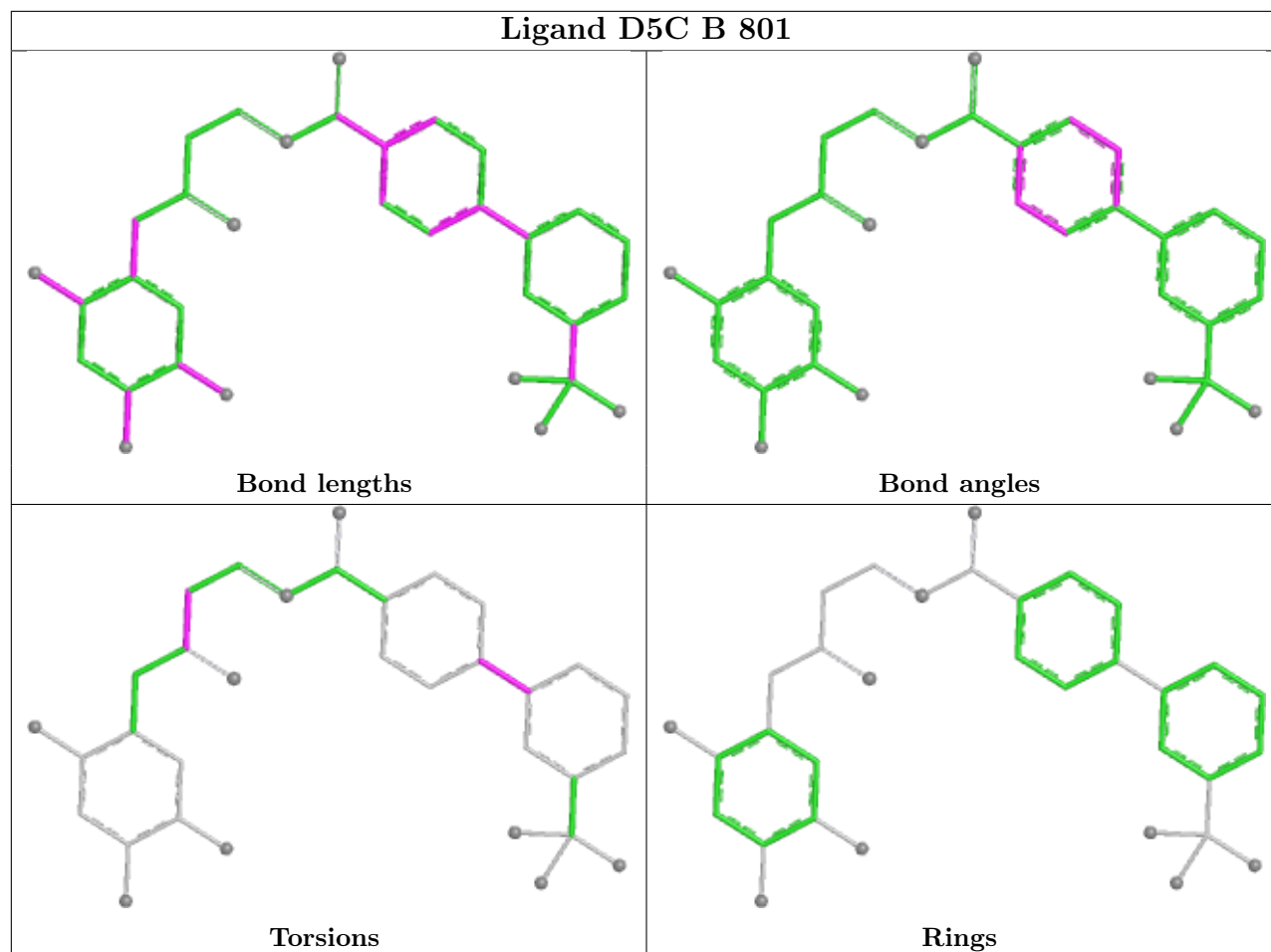
Mol	Chain	Res	Type	Atoms
2	A	801	D5C	CAL-CAN-NAO-CAP
2	B	801	D5C	CAV-CAU-CAX-CBC
2	B	801	D5C	CAT-CAU-CAX-CBC
2	B	801	D5C	CAV-CAU-CAX-CAY
2	B	801	D5C	CAT-CAU-CAX-CAY
2	A	801	D5C	CAV-CAU-CAX-CBC
2	A	801	D5C	CAT-CAU-CAX-CAY
2	A	801	D5C	CAT-CAU-CAX-CBC
2	A	801	D5C	CAV-CAU-CAX-CAY
2	B	801	D5C	NAM-CAK-CAL-CAN
2	A	801	D5C	CAJ-CAK-CAL-CAN
2	B	801	D5C	CAJ-CAK-CAL-CAN

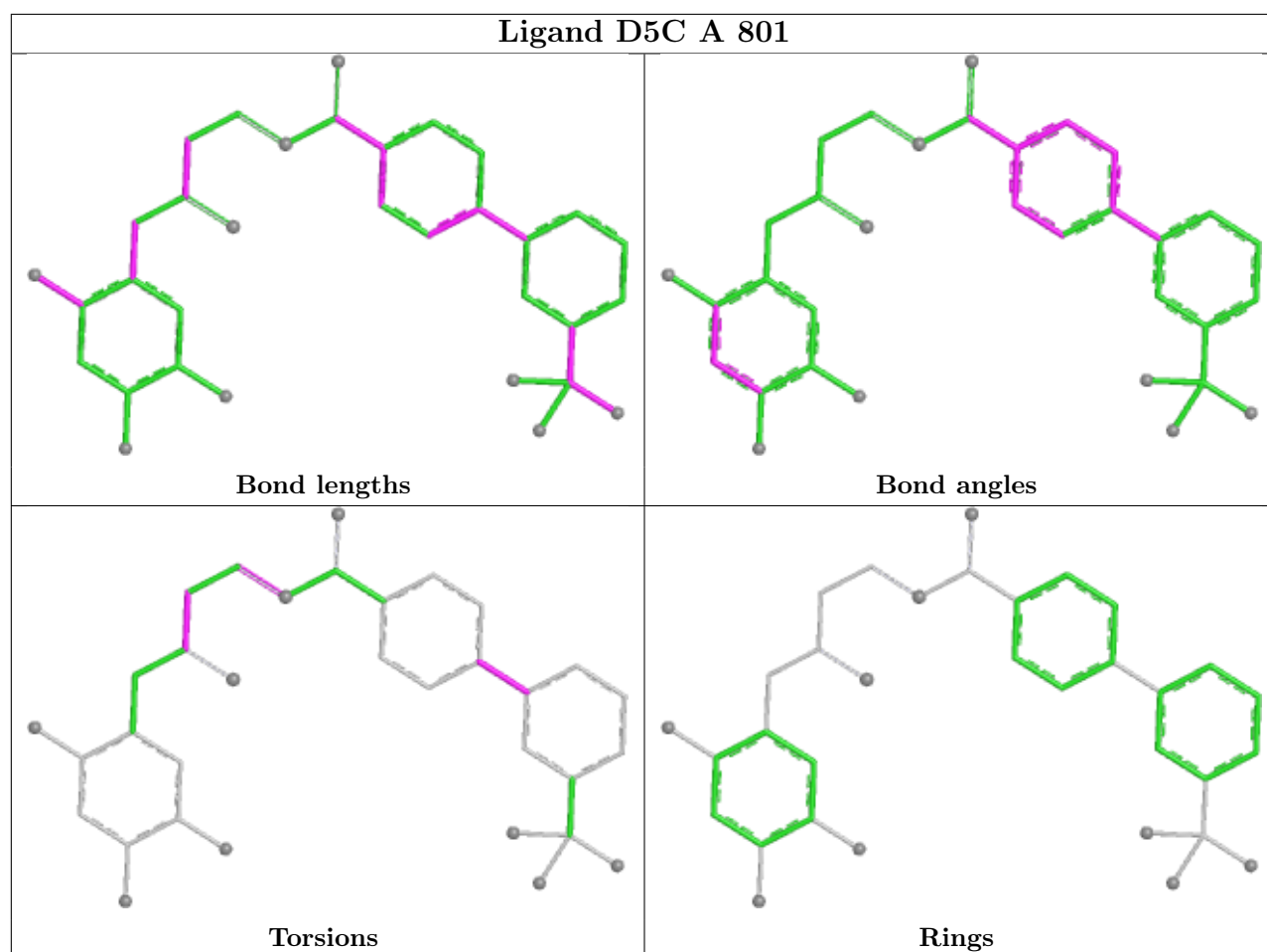
There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	B	801	D5C	2	0
2	A	801	D5C	4	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	728/728 (100%)	-0.23	1 (0%) 95 89	60, 102, 151, 200	0
1	B	728/728 (100%)	-0.24	4 (0%) 91 75	57, 106, 156, 228	0
All	All	1456/1456 (100%)	-0.23	5 (0%) 94 84	57, 104, 155, 228	0

All (5) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	83	TYR	6.2
1	B	82	GLU	2.9
1	A	39	SER	2.8
1	B	40	ARG	2.8
1	B	174	VAL	2.2

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](#)

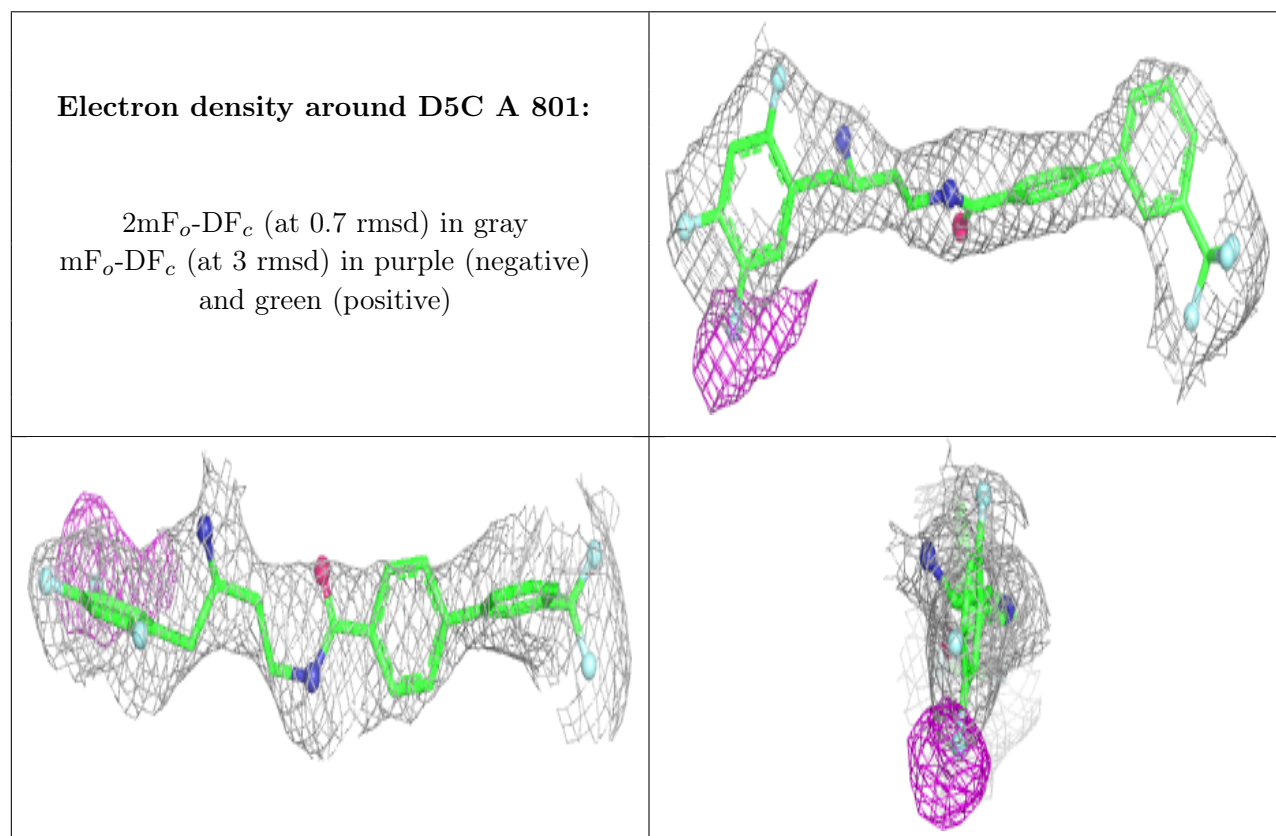
There are no monosaccharides in this entry.

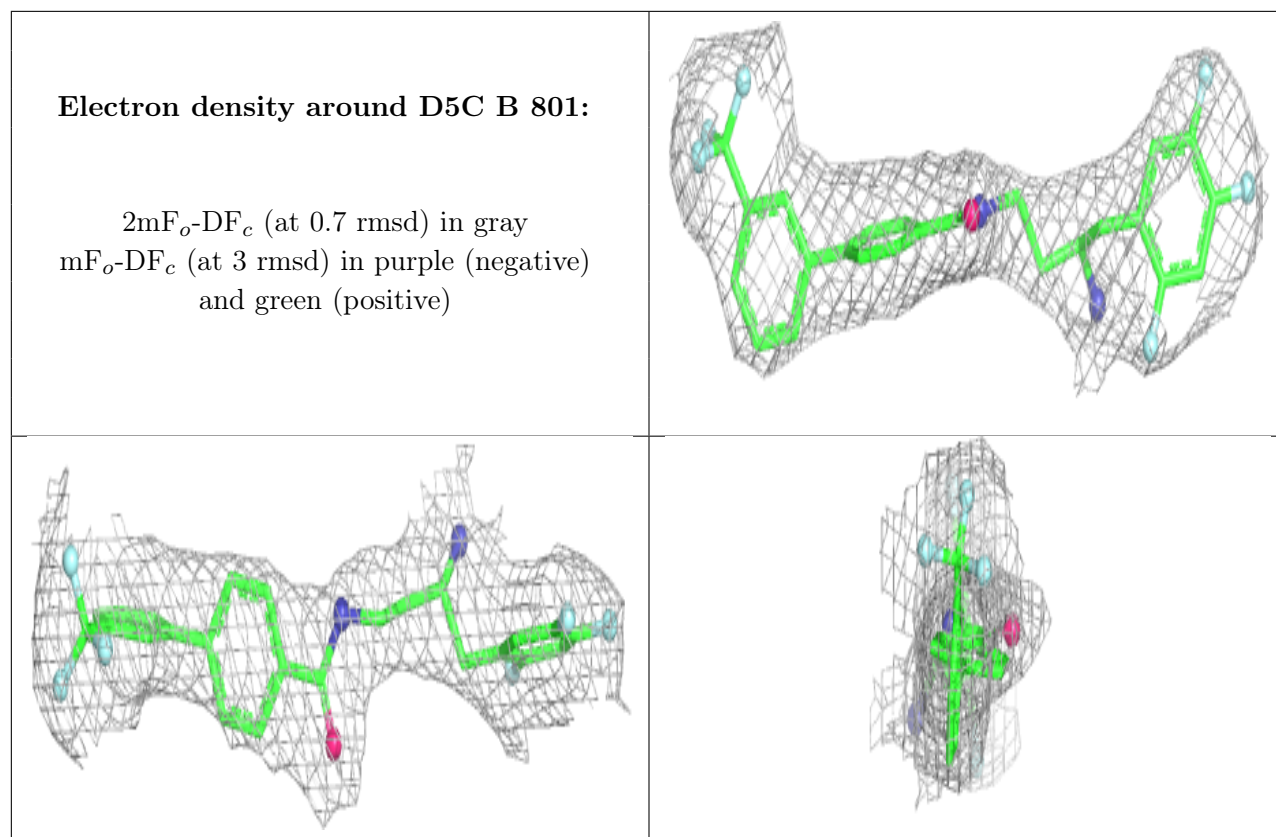
6.4 Ligands [i](#)

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(\AA^2)	Q<0.9
2	D5C	A	801	33/33	0.92	0.30	74,105,139,143	0
2	D5C	B	801	33/33	0.93	0.24	80,110,147,151	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.