



Full wwPDB X-ray Structure Validation Report ⓘ

Mar 9, 2026 – 08:37 PM UTC

PDB ID : 8VZQ / pdb_00008vzq
Title : Crystal Structure of the ER-alpha Ligand-binding Domain (L372S, L536S) in complex with k-406
Authors : Min, C.K.; Nwachukwu, J.C.; Hou, Y.; Russo, R.J.; Papa, A.; Min, J.; Peng, R.; Kim, S.H.; Ziegler, Y.; Rangarajan, E.S.; Izard, T.; Katzenellenbogen, B.S.; Katzenellenbogen, J.A.; Nettles, K.W.
Deposited on : 2024-02-12
Resolution : 1.75 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](#) ①) 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

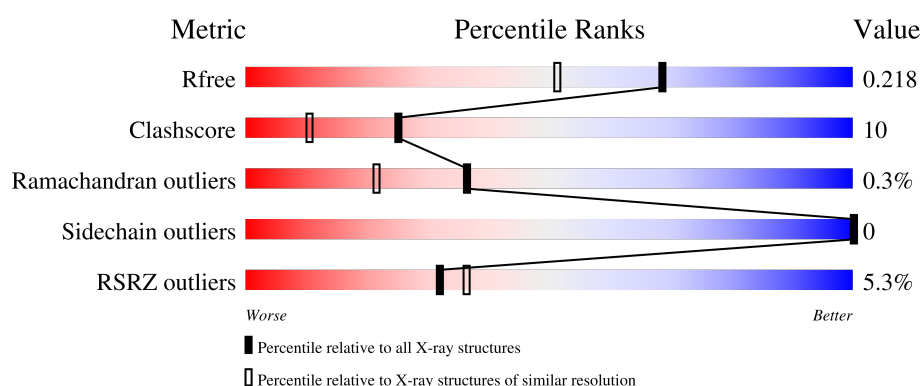
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.75 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	3183 (1.76-1.76)
Clashscore	190562	3299 (1.76-1.76)
Ramachandran outliers	187476	3274 (1.76-1.76)
Sidechain outliers	187428	3274 (1.76-1.76)
RSRZ outliers	180081	3183 (1.76-1.76)

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	242	6% 76% 21% .
1	B	242	5% 71% 14% . 10%
1	C	242	3% 85% 9% . 5%
1	D	242	6% 80% 16% .

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 14808 atoms, of which 7117 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.

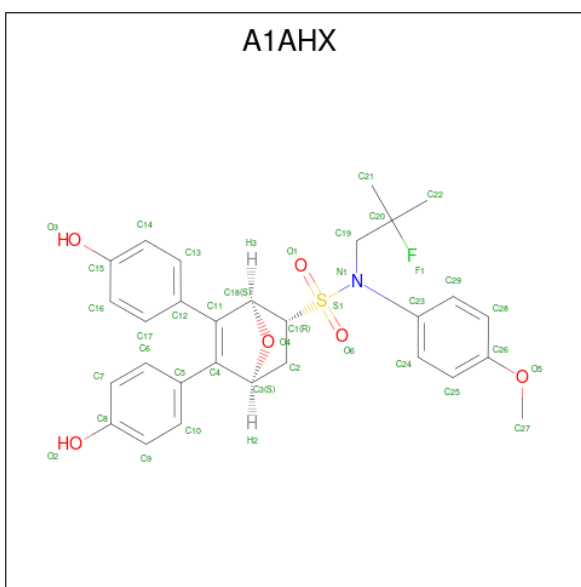
- Molecule 1 is a protein called Estrogen receptor.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	A	236	Total	C	H	N	O	S	0	0	0
			3661	1174	1826	316	328	17			
1	B	217	Total	C	H	N	O	S	0	0	0
			3393	1089	1691	288	310	15			
1	C	231	Total	C	H	N	O	S	0	0	0
			3551	1145	1765	306	319	16			
1	D	234	Total	C	H	N	O	S	0	0	0
			3529	1145	1733	311	324	16			

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	372	SER	LEU	engineered mutation	UNP P03372
A	536	SER	LEU	engineered mutation	UNP P03372
B	372	SER	LEU	engineered mutation	UNP P03372
B	536	SER	LEU	engineered mutation	UNP P03372
C	372	SER	LEU	engineered mutation	UNP P03372
C	536	SER	LEU	engineered mutation	UNP P03372
D	372	SER	LEU	engineered mutation	UNP P03372
D	536	SER	LEU	engineered mutation	UNP P03372

- Molecule 2 is (1S,2R,4S)-N-(2-fluoro-2-methylpropyl)-5,6-bis(4-hydroxyphenyl)-N-(4-methoxyphenyl)-7-oxabicyclo[2.2.1]hept-5-ene-2-sulfonamide (CCD ID: A1AHX) (formula: C₂₉H₃₀FO₆S) (labeled as "Ligand of Interest" by depositor).



Mol	Chain	Residues	Atoms							ZeroOcc	AltConf
2	A	1	Total	C	H	N	O	S	0	0	
			59	27	24	1	6	1			
2	B	1	Total	C	H	N	O	S	0	0	
			59	27	24	1	6	1			
2	C	1	Total	C	F	H	N	O	0	0	
			68	29	1	30	1	6			
2	D	1	Total	C	H	N	O	S	0	0	
			59	27	24	1	6	1			

- Molecule 3 is NICKEL (II) ION (CCD ID: NI) (formula: Ni).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total Ni 1 1	0	0
3	C	1	Total Ni 1 1	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	116	Total O 116 116	0	0
4	B	109	Total O 109 109	0	0
4	C	105	Total O 105 105	0	0

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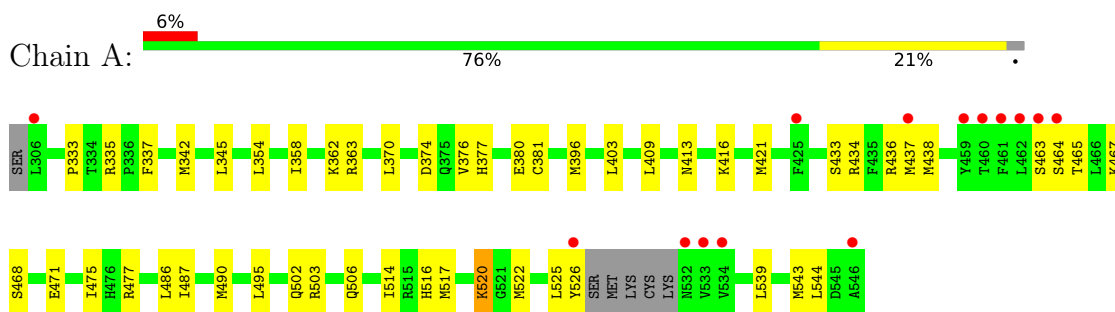
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	D	97	Total	O	0	0
			97	97		

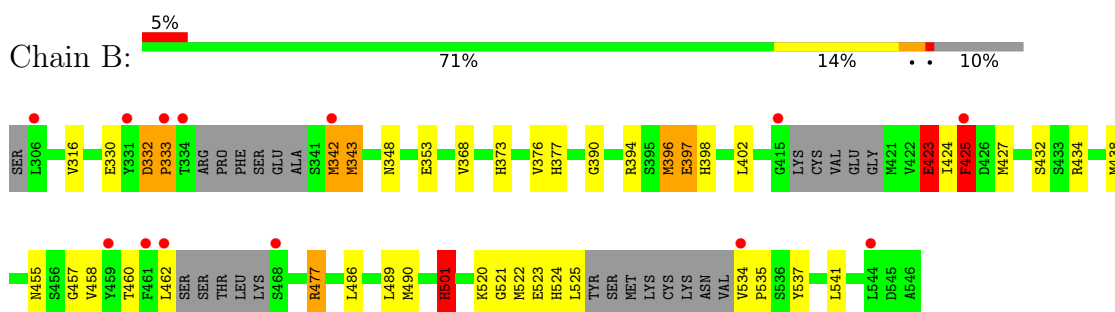
3 Residue-property plots [i](#)

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.

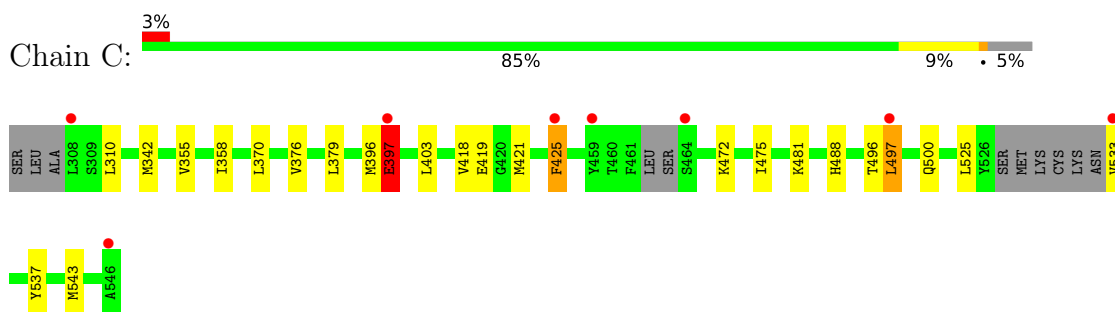
- Molecule 1: Estrogen receptor



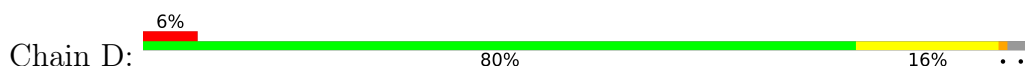
- Molecule 1: Estrogen receptor

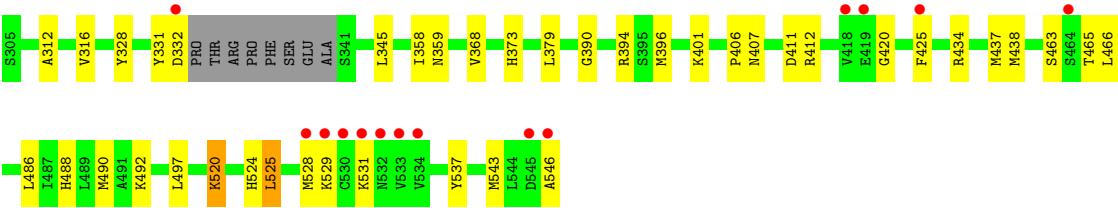


- Molecule 1: Estrogen receptor



- Molecule 1: Estrogen receptor





4 Data and refinement statistics

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α , β , γ	53.17Å 58.69Å 93.53Å 86.80° 75.08° 63.25°	Depositor
Resolution (Å)	33.02 – 1.75 33.02 – 1.75	Depositor EDS
% Data completeness (in resolution range)	63.0 (33.02-1.75) 62.9 (33.02-1.75)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.47 (at 1.75Å)	Xtriage
Refinement program	PHENIX 1.18.2_3874	Depositor
R, R_{free}	0.183 , 0.220 0.184 , 0.218	Depositor DCC
R_{free} test set	3099 reflections (3.16%)	wwPDB-VP
Wilson B-factor (Å ²)	27.3	Xtriage
Anisotropy	0.017	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.43 , 50.9	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	0.117 for h,h-k,h-l	Xtriage
F_o, F_c correlation	0.95	EDS
Total number of atoms	14808	wwPDB-VP
Average B, all atoms (Å ²)	37.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 8.63% 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: NI, A1AHX

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	0.41	0/1869	0.63	2/2529 (0.1%)
1	B	0.50	1/1729 (0.1%)	0.94	20/2339 (0.9%)
1	C	0.47	2/1819 (0.1%)	0.95	10/2464 (0.4%)
1	D	0.69	6/1827 (0.3%)	0.84	11/2473 (0.4%)
All	All	0.53	9/7244 (0.1%)	0.85	43/9805 (0.4%)

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
1	B	0	4
1	C	0	1
All	All	0	5

All (9) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	529	LYS	N-CA	13.35	1.65	1.46
1	D	529	LYS	CA-CB	-8.55	1.40	1.53
1	D	529	LYS	CD-CE	7.31	1.74	1.52
1	C	397	GLU	CD-OE1	6.89	1.38	1.25
1	D	528	MET	CA-C	-6.25	1.44	1.52
1	C	397	GLU	CB-CG	6.20	1.71	1.52
1	B	423	GLU	CB-CG	5.72	1.69	1.52
1	D	525	LEU	C-N	-5.10	1.26	1.33
1	D	525	LEU	CB-CG	-5.03	1.43	1.53

All (43) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	C	397	GLU	OE1-CD-OE2	-23.83	65.71	122.90
1	D	525	LEU	CD1-CG-CD2	-19.23	68.49	110.80
1	C	397	GLU	CG-CD-OE2	-17.99	77.02	118.40
1	D	525	LEU	CB-CG-CD1	13.32	150.65	110.70
1	B	423	GLU	OE1-CD-OE2	-12.79	92.20	122.90
1	C	397	GLU	CB-CG-CD	10.93	131.18	112.60
1	B	425	PHE	CB-CG-CD2	-9.28	104.92	120.70
1	B	477	ARG	CA-CB-CG	-9.14	95.83	114.10
1	D	525	LEU	CB-CG-CD2	-9.11	83.36	110.70
1	C	497	LEU	CB-CG-CD1	8.70	136.79	110.70
1	C	497	LEU	CB-CG-CD2	-8.44	85.37	110.70
1	C	397	GLU	N-CA-C	8.31	128.51	110.80
1	A	520	LYS	CG-CD-CE	8.02	129.75	111.30
1	B	501	HIS	N-CA-CB	7.79	122.35	110.28
1	C	397	GLU	CG-CD-OE1	7.63	135.95	118.40
1	A	520	LYS	CB-CG-CD	-7.55	93.93	111.30
1	B	501	HIS	CA-CB-CG	7.33	121.13	113.80
1	B	423	GLU	N-CA-CB	-7.03	98.61	110.49
1	B	342	MET	CA-C-O	-6.93	113.48	120.90
1	B	333	PRO	CA-C-N	6.79	133.92	121.70
1	B	333	PRO	C-N-CA	6.79	133.92	121.70
1	B	342	MET	CB-CA-C	-6.74	100.03	110.81
1	B	477	ARG	CD-NE-CZ	-6.50	115.29	124.40
1	C	497	LEU	CD1-CG-CD2	-6.39	96.74	110.80
1	D	525	LEU	CA-C-O	-6.34	111.44	120.51
1	B	423	GLU	CG-CD-OE1	6.30	132.90	118.40
1	D	529	LYS	CB-CG-CD	6.21	125.58	111.30
1	C	425	PHE	N-CA-CB	6.18	118.97	110.01
1	B	425	PHE	CB-CG-CD1	6.08	131.03	120.70
1	D	396	MET	CB-CG-SD	-6.04	94.58	112.70
1	D	529	LYS	CB-CA-C	5.97	121.30	110.72
1	B	425	PHE	CB-CA-C	5.94	122.72	110.31
1	B	343	MET	CG-SD-CE	-5.93	87.86	100.90
1	D	525	LEU	N-CA-C	5.71	122.96	110.80
1	D	529	LYS	N-CA-C	-5.67	106.68	113.21
1	B	477	ARG	NE-CZ-NH2	5.50	124.15	119.20
1	D	525	LEU	N-CA-CB	-5.43	101.31	110.49
1	B	396	MET	CB-CG-SD	-5.33	96.72	112.70
1	B	501	HIS	CB-CG-CD2	-5.20	124.44	131.20
1	B	342	MET	N-CA-C	5.17	117.31	111.11
1	C	397	GLU	CA-CB-CG	-5.14	103.81	114.10
1	B	423	GLU	CB-CA-C	5.10	120.56	110.42
1	D	520	LYS	N-CA-CB	-5.09	102.39	110.28

There are no chirality outliers.

All (5) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	B	397	GLU	Sidechain
1	B	423	GLU	Sidechain
1	B	425	PHE	Sidechain
1	B	501	HIS	Sidechain
1	C	397	GLU	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	1835	1826	1843	42	0
1	B	1702	1691	1714	50	0
1	C	1786	1765	1777	24	0
1	D	1796	1733	1779	27	0
2	A	35	24	0	1	0
2	B	35	24	0	3	0
2	C	38	30	0	1	0
2	D	35	24	0	0	0
3	A	1	0	0	0	0
3	C	1	0	0	0	0
4	A	116	0	0	5	5
4	B	109	0	0	9	3
4	C	105	0	0	5	3
4	D	97	0	0	3	0
All	All	7691	7117	7113	139	6

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 10.

All (139) 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:C:419:GLU:O	4:C:701:HOH:O	1.77	1.02
1:B:397:GLU:OE1	4:B:701:HOH:O	1.82	0.97

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:342:MET:HE3	1:B:343:MET:CE	1.95	0.95
1:C:397:GLU:N	1:C:397:GLU:OE2	2.03	0.92
1:D:359:ASN:ND2	4:D:701:HOH:O	2.02	0.92
1:B:522:MET:O	4:B:702:HOH:O	1.96	0.84
1:B:342:MET:HE3	1:B:343:MET:HE3	1.63	0.79
1:C:418:VAL:O	4:C:702:HOH:O	2.03	0.74
1:A:381:CYS:SG	4:B:791:HOH:O	2.47	0.73
1:D:525:LEU:HD12	1:D:531:LYS:O	1.90	0.72
1:B:332:ASP:N	1:B:333:PRO:HD3	2.04	0.72
1:A:354:LEU:O	1:A:358:ILE:HD12	1.90	0.70
1:A:463:SER:HA	1:A:468:SER:OG	1.92	0.69
1:A:525:LEU:HD12	2:A:601:A1AHX:C26	2.24	0.67
1:A:342:MET:HE3	1:A:421:MET:CE	2.25	0.67
1:A:354:LEU:HD23	1:A:543:MET:HE1	1.77	0.66
1:D:373:HIS:ND1	1:D:537:TYR:OH	2.26	0.66
1:B:460:THR:HG22	1:B:460:THR:O	1.96	0.66
1:C:370:LEU:HD11	1:C:475:ILE:HD11	1.78	0.66
1:A:464:SER:HB2	4:A:780:HOH:O	1.96	0.66
1:A:370:LEU:HD11	1:A:475:ILE:HD11	1.78	0.65
1:A:413:ASN:HD22	1:A:416:LYS:HE2	1.62	0.64
1:C:358:ILE:HD12	1:C:379:LEU:HD13	1.80	0.63
1:D:525:LEU:CD1	1:D:531:LYS:O	2.47	0.62
1:D:331:TYR:CB	1:D:345:LEU:HD21	2.30	0.61
1:D:486:LEU:O	1:D:490:MET:HG3	2.00	0.61
1:B:402:LEU:CD1	1:B:425:PHE:CD1	2.84	0.61
1:C:472:LYS:NZ	4:C:705:HOH:O	2.32	0.61
1:A:490:MET:HB3	1:A:495:LEU:HD12	1.82	0.61
1:B:377:HIS:ND1	1:B:462:LEU:CB	2.64	0.61
1:C:370:LEU:HD21	1:C:475:ILE:HD11	1.84	0.60
1:C:421:MET:HG2	1:C:425:PHE:CE1	2.37	0.59
1:B:402:LEU:HD11	1:B:425:PHE:CD1	2.38	0.58
1:A:362:LYS:NZ	4:A:703:HOH:O	2.36	0.58
1:B:394:ARG:C	4:B:701:HOH:O	2.45	0.58
1:A:539:LEU:HG	1:A:543:MET:HE2	1.86	0.58
1:B:377:HIS:HE2	1:B:460:THR:CG2	2.18	0.57
1:C:497:LEU:HD21	1:D:497:LEU:HD23	1.87	0.57
1:A:464:SER:CB	4:A:780:HOH:O	2.52	0.57
1:D:520:LYS:HE3	1:D:524:HIS:NE2	2.20	0.56
1:C:497:LEU:HD21	1:D:497:LEU:CD2	2.35	0.56
1:B:427:MET:CE	1:B:520:LYS:HD3	2.35	0.56
1:A:333:PRO:HG3	1:A:345:LEU:HD11	1.89	0.55

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:477:ARG:N	1:B:477:ARG:HD2	2.22	0.55
1:B:525:LEU:HB3	4:B:702:HOH:O	2.06	0.54
1:B:332:ASP:H	1:B:333:PRO:HD3	1.73	0.54
1:A:433:SER:O	1:A:437:MET:HG2	2.08	0.54
1:B:332:ASP:N	1:B:333:PRO:CD	2.70	0.54
1:B:534:VAL:N	1:B:535:PRO:HD3	2.23	0.53
1:D:373:HIS:CE1	1:D:537:TYR:HH	2.26	0.53
1:D:463:SER:OG	1:D:465:THR:HG23	2.07	0.53
1:B:377:HIS:HE1	1:B:457:GLY:O	1.91	0.53
1:B:330:GLU:HG2	1:B:348:ASN:OD1	2.08	0.53
1:D:434:ARG:O	1:D:438:MET:HG3	2.09	0.52
1:B:376:VAL:HG21	1:B:541:LEU:HB2	1.90	0.52
1:A:342:MET:HE3	1:A:421:MET:HE1	1.92	0.51
1:B:523:GLU:C	4:B:702:HOH:O	2.53	0.51
1:A:377:HIS:CD2	1:A:380:GLU:OE2	2.63	0.51
1:B:424:ILE:HD11	1:B:520:LYS:HG2	1.92	0.51
1:D:358:ILE:HG13	1:D:543:MET:HE2	1.93	0.51
1:B:373:HIS:ND1	1:B:537:TYR:OH	2.42	0.51
1:D:546:ALA:HB3	4:D:735:HOH:O	2.09	0.51
1:B:377:HIS:HE2	1:B:460:THR:HG22	1.75	0.50
1:D:420:GLY:O	1:D:524:HIS:ND1	2.43	0.50
1:D:488:HIS:CE1	1:D:492:LYS:HD3	2.47	0.50
1:D:412:ARG:HA	1:D:425:PHE:CE2	2.47	0.50
1:A:377:HIS:HD2	1:A:380:GLU:OE2	1.95	0.50
1:B:525:LEU:HD12	2:B:600:A1AHX:C26	2.41	0.50
1:B:368:VAL:HG22	4:B:730:HOH:O	2.12	0.50
1:B:394:ARG:O	4:B:701:HOH:O	2.18	0.49
1:C:310:LEU:O	1:C:481:LYS:HE3	2.12	0.49
1:C:376:VAL:HG11	1:C:537:TYR:CD2	2.47	0.49
1:B:427:MET:HE2	1:B:520:LYS:HD3	1.93	0.49
1:B:353:GLU:OE2	2:B:600:A1AHX:O2	2.31	0.48
1:A:464:SER:OG	1:A:465:THR:HG23	2.13	0.48
1:B:390:GLY:O	1:B:394:ARG:HG3	2.14	0.48
1:A:539:LEU:CG	1:A:543:MET:HE2	2.44	0.47
1:D:373:HIS:CG	1:D:537:TYR:HH	2.29	0.47
1:A:487:ILE:HG13	1:B:501:HIS:CG	2.49	0.47
1:A:376:VAL:CG2	1:A:544:LEU:HD12	2.45	0.46
1:B:524:HIS:O	1:B:525:LEU:C	2.58	0.46
1:A:354:LEU:CD2	1:A:543:MET:HE1	2.45	0.46
1:D:332:ASP:CB	1:D:407:ASN:O	2.64	0.46
1:A:413:ASN:ND2	1:A:416:LYS:HE2	2.30	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:342:MET:HE3	1:C:421:MET:SD	2.56	0.46
1:A:335:ARG:HD3	1:A:337:PHE:CZ	2.51	0.46
1:B:342:MET:HE3	1:B:343:MET:HE1	1.91	0.46
1:C:533:VAL:N	4:C:711:HOH:O	2.48	0.46
1:D:368:VAL:HG22	4:D:731:HOH:O	2.16	0.45
1:B:525:LEU:N	4:B:702:HOH:O	2.49	0.45
1:D:434:ARG:O	1:D:437:MET:HB3	2.16	0.45
1:B:397:GLU:HG2	1:B:398:HIS:CD2	2.51	0.45
1:A:403:LEU:HD13	1:A:409:LEU:HD13	1.99	0.45
1:A:363:ARG:NH2	4:A:707:HOH:O	2.50	0.45
1:A:477:ARG:NH2	4:A:706:HOH:O	2.49	0.45
1:A:514:ILE:HA	1:A:517:MET:HE3	1.98	0.45
1:B:460:THR:O	1:B:460:THR:CG2	2.65	0.45
1:A:516:HIS:O	1:A:520:LYS:HG2	2.16	0.45
1:C:397:GLU:OE2	1:C:397:GLU:CA	2.65	0.45
1:D:390:GLY:O	1:D:394:ARG:HG3	2.17	0.45
1:B:396:MET:HA	1:B:432:SER:OG	2.17	0.44
1:A:467:LYS:HE2	1:A:471:GLU:HG2	1.99	0.44
1:C:525:LEU:HD22	2:C:601:A1AHX:O5	2.17	0.44
1:B:377:HIS:CE1	1:B:457:GLY:O	2.71	0.44
1:D:358:ILE:HD13	1:D:379:LEU:HD13	2.00	0.44
1:B:377:HIS:NE2	1:B:460:THR:HG22	2.33	0.44
1:A:486:LEU:O	1:A:490:MET:HG3	2.17	0.44
1:B:427:MET:HE1	1:B:520:LYS:HD3	1.98	0.44
1:B:455:ASN:O	1:B:458:VAL:HG12	2.17	0.44
1:B:342:MET:CE	1:B:343:MET:HE3	2.42	0.44
1:C:403:LEU:C	1:C:403:LEU:HD23	2.43	0.44
1:B:486:LEU:O	1:B:490:MET:HG3	2.19	0.43
1:C:355:VAL:HG22	1:C:543:MET:CE	2.49	0.43
1:A:342:MET:CE	1:A:421:MET:CE	2.96	0.43
1:A:502:GLN:O	1:A:506:GLN:HG3	2.18	0.43
1:A:358:ILE:HG23	1:A:544:LEU:HD23	2.00	0.43
1:C:488:HIS:CD2	4:C:718:HOH:O	2.72	0.43
1:C:370:LEU:HD21	1:C:475:ILE:CD1	2.50	0.42
1:B:534:VAL:N	1:B:535:PRO:CD	2.82	0.42
1:C:358:ILE:HD12	1:C:379:LEU:CD1	2.49	0.42
1:A:396:MET:O	1:A:436:ARG:HD3	2.19	0.42
1:B:402:LEU:HG	1:B:425:PHE:CE1	2.54	0.42
1:B:423:GLU:O	1:B:427:MET:HG3	2.20	0.42
1:D:401:LYS:HE2	1:D:411:ASP:HB3	2.01	0.42
1:A:520:LYS:HD3	1:A:520:LYS:HA	1.42	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:397:GLU:H	1:B:397:GLU:CD	2.29	0.41
1:C:370:LEU:CD1	1:C:475:ILE:HD11	2.49	0.41
1:A:463:SER:CA	1:A:468:SER:OG	2.66	0.41
1:A:503:ARG:CZ	1:D:466:LEU:HD22	2.50	0.41
1:A:522:MET:O	1:A:526:TYR:N	2.44	0.41
1:D:328:TYR:CE2	1:D:406:PRO:HB2	2.56	0.41
1:C:355:VAL:HG22	1:C:543:MET:HE2	2.01	0.41
1:A:434:ARG:O	1:A:438:MET:HG3	2.22	0.40
1:A:374:ASP:OD2	1:A:471:GLU:OE2	2.39	0.40
1:D:312:ALA:O	1:D:316:VAL:HG23	2.20	0.40
1:B:316:VAL:HG21	1:B:489:LEU:HD21	2.03	0.40
1:B:521:GLY:HA3	2:B:600:A1AHX:O1	2.22	0.40
1:B:434:ARG:O	1:B:438:MET:HG3	2.21	0.40
1:C:496:THR:O	1:C:500:GLN:HG3	2.22	0.40

All (6) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
4:B:786:HOH:O	4:B:794:HOH:O[1_655]	2.00	0.20
4:A:811:HOH:O	4:C:781:HOH:O[1_554]	2.01	0.19
4:A:800:HOH:O	4:B:748:HOH:O[1_465]	2.14	0.06
4:A:803:HOH:O	4:C:802:HOH:O[1_554]	2.16	0.04
4:A:810:HOH:O	4:C:805:HOH:O[1_554]	2.18	0.02
4:A:713:HOH:O	4:B:752:HOH:O[1_655]	2.19	0.01

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	232/242 (96%)	231 (100%)	1 (0%)	0	100 100

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	B	207/242 (86%)	203 (98%)	3 (1%)	1 (0%)	24	11
1	C	225/242 (93%)	220 (98%)	3 (1%)	2 (1%)	14	4
1	D	230/242 (95%)	224 (97%)	6 (3%)	0	100	100
All	All	894/968 (92%)	878 (98%)	13 (2%)	3 (0%)	36	21

All (3) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	397	GLU
1	C	396	MET
1	B	332	ASP

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	199/218 (91%)	199 (100%)	0	100	100
1	B	188/218 (86%)	188 (100%)	0	100	100
1	C	192/218 (88%)	192 (100%)	0	100	100
1	D	191/218 (88%)	191 (100%)	0	100	100
All	All	770/872 (88%)	770 (100%)	0	100	100

There are no protein residues with a non-rotameric sidechain to report.

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (18) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	413	ASN
1	A	414	GLN
1	A	501	HIS
1	A	513	HIS
1	A	516	HIS
1	B	398	HIS

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Mol	Chain	Res	Type
1	B	413	ASN
1	B	474	HIS
1	B	488	HIS
1	C	455	ASN
1	C	474	HIS
1	C	488	HIS
1	C	519	ASN
1	D	359	ASN
1	D	455	ASN
1	D	474	HIS
1	D	513	HIS
1	D	519	ASN

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 oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 6 ligands modelled in this entry, 2 are monoatomic - leaving 4 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$
2	A1AHX	A	601	-	38,39,42	1.99	6 (15%)	47,58,64	1.40	6 (12%)

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	A1AHX	C	601	-	38,42,42	2.01	6 (15%)	48,64,64	1.30	5 (10%)
2	A1AHX	D	600	-	38,39,42	2.05	5 (13%)	47,58,64	1.46	3 (6%)
2	A1AHX	B	600	-	38,39,42	1.87	5 (13%)	47,58,64	1.37	7 (14%)

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	A1AHX	A	601	-	-	6/26/52/55	0/6/5/5
2	A1AHX	C	601	-	-	6/28/55/55	0/6/5/5
2	A1AHX	D	600	-	-	9/26/52/55	0/6/5/5
2	A1AHX	B	600	-	-	11/26/52/55	0/6/5/5

All (22) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	A1AHX	O6-S1	6.75	1.49	1.43
2	D	600	A1AHX	O6-S1	6.32	1.48	1.43
2	D	600	A1AHX	S1-N1	6.23	1.80	1.67
2	B	600	A1AHX	S1-N1	6.16	1.80	1.67
2	C	601	A1AHX	S1-N1	6.01	1.80	1.67
2	A	601	A1AHX	C1-S1	5.86	1.90	1.77
2	B	600	A1AHX	C1-S1	5.81	1.89	1.77
2	D	600	A1AHX	O1-S1	5.67	1.48	1.43
2	D	600	A1AHX	C1-S1	5.61	1.89	1.77
2	C	601	A1AHX	O1-S1	5.45	1.48	1.43
2	C	601	A1AHX	C1-S1	5.37	1.89	1.77
2	C	601	A1AHX	O6-S1	5.37	1.48	1.43
2	A	601	A1AHX	S1-N1	5.04	1.78	1.67
2	B	600	A1AHX	O1-S1	4.71	1.47	1.43
2	A	601	A1AHX	O1-S1	4.59	1.47	1.43
2	B	600	A1AHX	O6-S1	4.52	1.47	1.43
2	C	601	A1AHX	F1-C20	-2.51	1.33	1.39
2	B	600	A1AHX	C23-N1	-2.44	1.41	1.44
2	A	601	A1AHX	O4-C18	-2.32	1.40	1.43
2	C	601	A1AHX	C23-N1	-2.22	1.41	1.44
2	A	601	A1AHX	C23-N1	-2.15	1.41	1.44
2	D	600	A1AHX	C23-N1	-2.07	1.41	1.44

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	600	A1AHX	O4-C3-C2	-5.91	93.19	104.73
2	C	601	A1AHX	O4-C3-C2	-4.71	95.54	104.73
2	A	601	A1AHX	O4-C3-C2	-4.70	95.55	104.73
2	D	600	A1AHX	C3-C2-C1	-4.40	96.72	100.61
2	B	600	A1AHX	O4-C3-C2	-4.05	96.82	104.73
2	B	600	A1AHX	C20-C19-N1	3.37	121.10	111.71
2	A	601	A1AHX	O6-S1-O1	3.34	121.69	119.17
2	B	600	A1AHX	O6-S1-O1	3.04	121.46	119.17
2	A	601	A1AHX	C17-C12-C11	-2.99	117.03	120.91
2	C	601	A1AHX	O6-S1-O1	2.89	121.35	119.17
2	C	601	A1AHX	C22-C20-C21	-2.82	109.54	112.39
2	B	600	A1AHX	C29-C23-N1	-2.82	116.05	120.15
2	D	600	A1AHX	C20-C19-N1	2.80	119.52	111.71
2	A	601	A1AHX	O1-S1-N1	2.79	110.72	107.39
2	A	601	A1AHX	C3-C2-C1	-2.77	98.17	100.61
2	B	600	A1AHX	C24-C23-N1	2.67	124.04	120.15
2	A	601	A1AHX	C20-C19-N1	2.38	118.35	111.71
2	B	600	A1AHX	C12-C11-C4	2.25	134.62	128.81
2	B	600	A1AHX	O1-S1-N1	2.21	110.03	107.39
2	C	601	A1AHX	C17-C12-C11	-2.20	118.05	120.91
2	C	601	A1AHX	C3-C2-C1	-2.18	98.69	100.61

There are no chirality outliers.

All (32) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	A	601	A1AHX	C19-N1-S1-O1
2	A	601	A1AHX	C19-N1-S1-O6
2	A	601	A1AHX	C23-N1-S1-O1
2	B	600	A1AHX	C20-C19-N1-S1
2	B	600	A1AHX	C19-N1-S1-O1
2	B	600	A1AHX	C19-N1-S1-O6
2	B	600	A1AHX	C23-N1-S1-O1
2	C	601	A1AHX	C19-N1-S1-O1
2	C	601	A1AHX	C19-N1-S1-O6
2	D	600	A1AHX	C19-N1-S1-O1
2	D	600	A1AHX	C19-N1-S1-O6
2	B	600	A1AHX	C20-C19-N1-C23
2	D	600	A1AHX	C2-C1-S1-O1
2	A	601	A1AHX	C24-C23-N1-S1
2	B	600	A1AHX	C24-C23-N1-S1

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Mol	Chain	Res	Type	Atoms
2	C	601	A1AHX	C24-C23-N1-S1
2	D	600	A1AHX	C24-C23-N1-S1
2	A	601	A1AHX	C19-N1-S1-C1
2	B	600	A1AHX	C19-N1-S1-C1
2	C	601	A1AHX	C19-N1-S1-C1
2	D	600	A1AHX	C18-C1-S1-O1
2	B	600	A1AHX	C2-C1-S1-O1
2	C	601	A1AHX	C2-C1-S1-O1
2	D	600	A1AHX	C19-N1-S1-C1
2	B	600	A1AHX	C18-C11-C12-C13
2	D	600	A1AHX	C18-C11-C12-C13
2	D	600	A1AHX	C18-C11-C12-C17
2	A	601	A1AHX	C29-C23-N1-S1
2	B	600	A1AHX	C29-C23-N1-S1
2	D	600	A1AHX	C29-C23-N1-S1
2	B	600	A1AHX	C18-C1-S1-O1
2	C	601	A1AHX	C29-C23-N1-S1

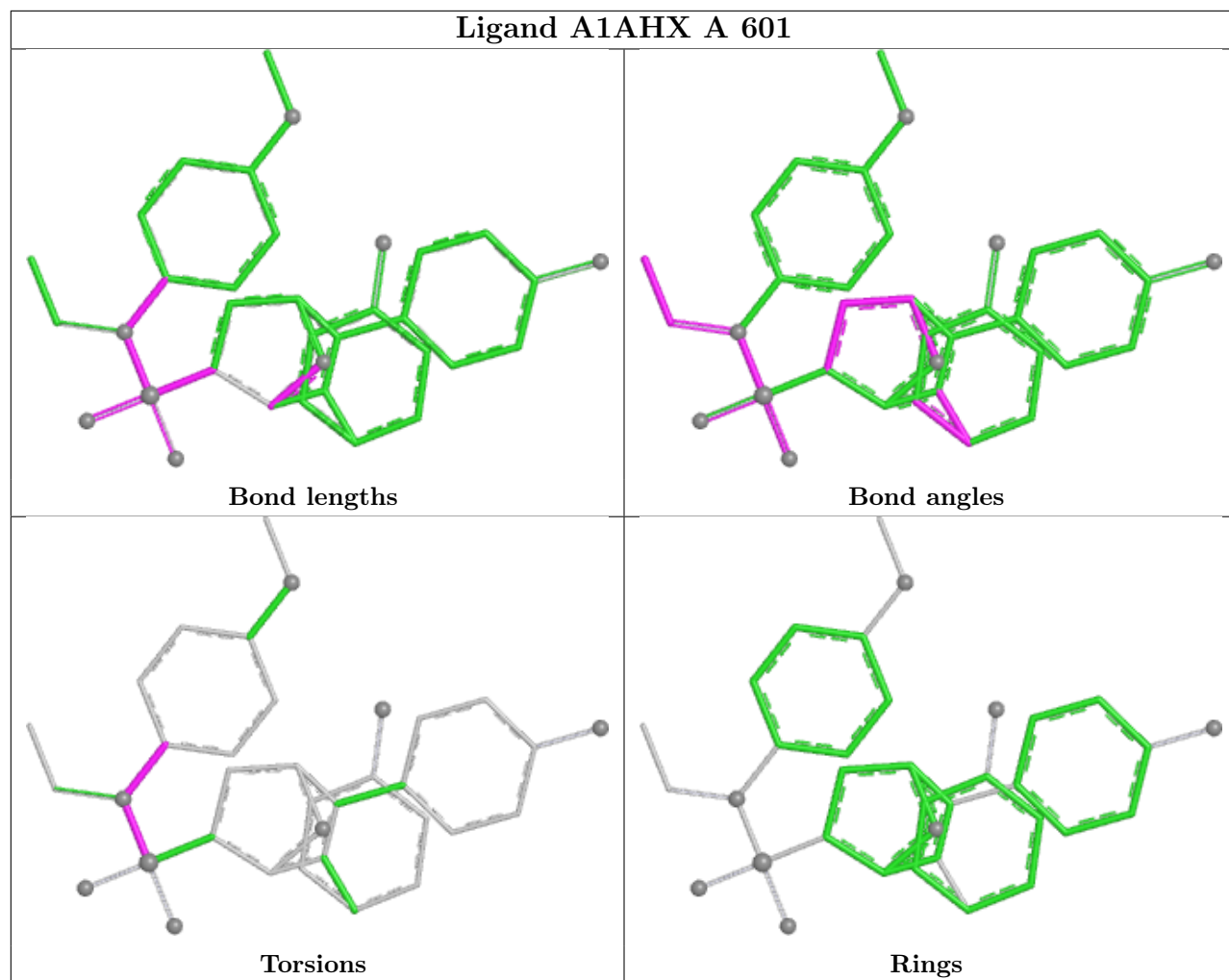
There are no ring outliers.

3 monomers are involved in 5 short contacts:

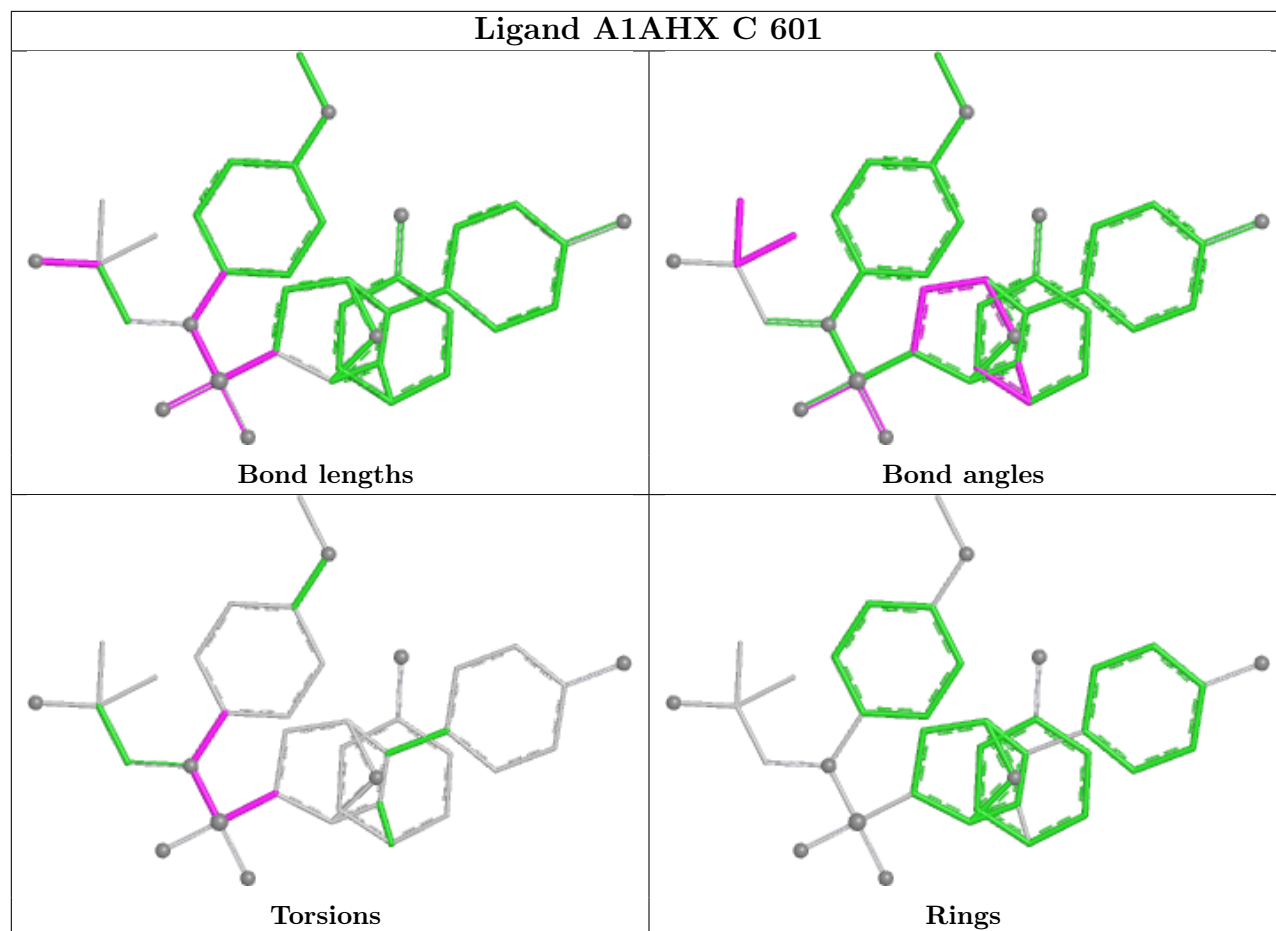
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	601	A1AHX	1	0
2	C	601	A1AHX	1	0
2	B	600	A1AHX	3	0

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.

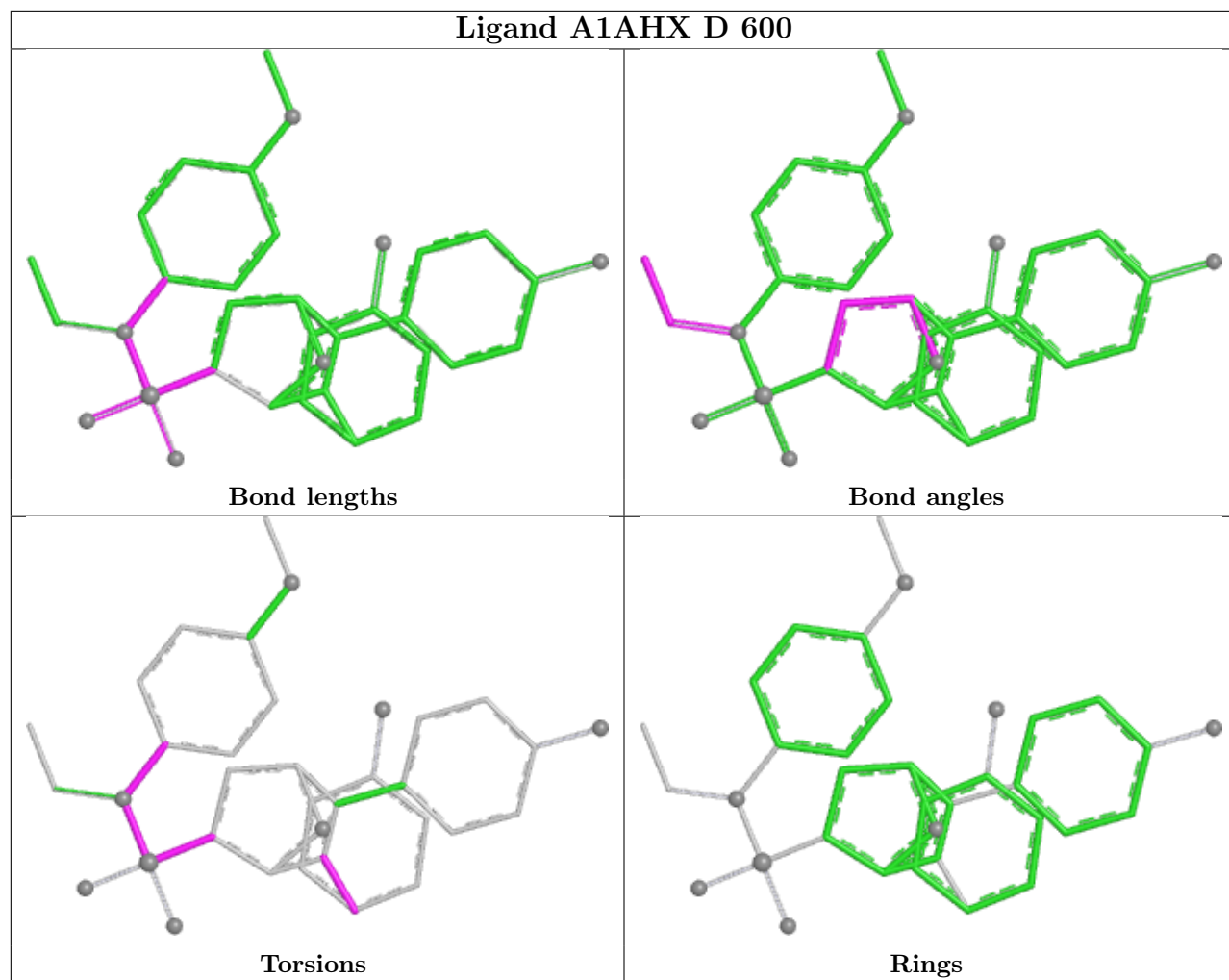
Ligand A1AHX A 601

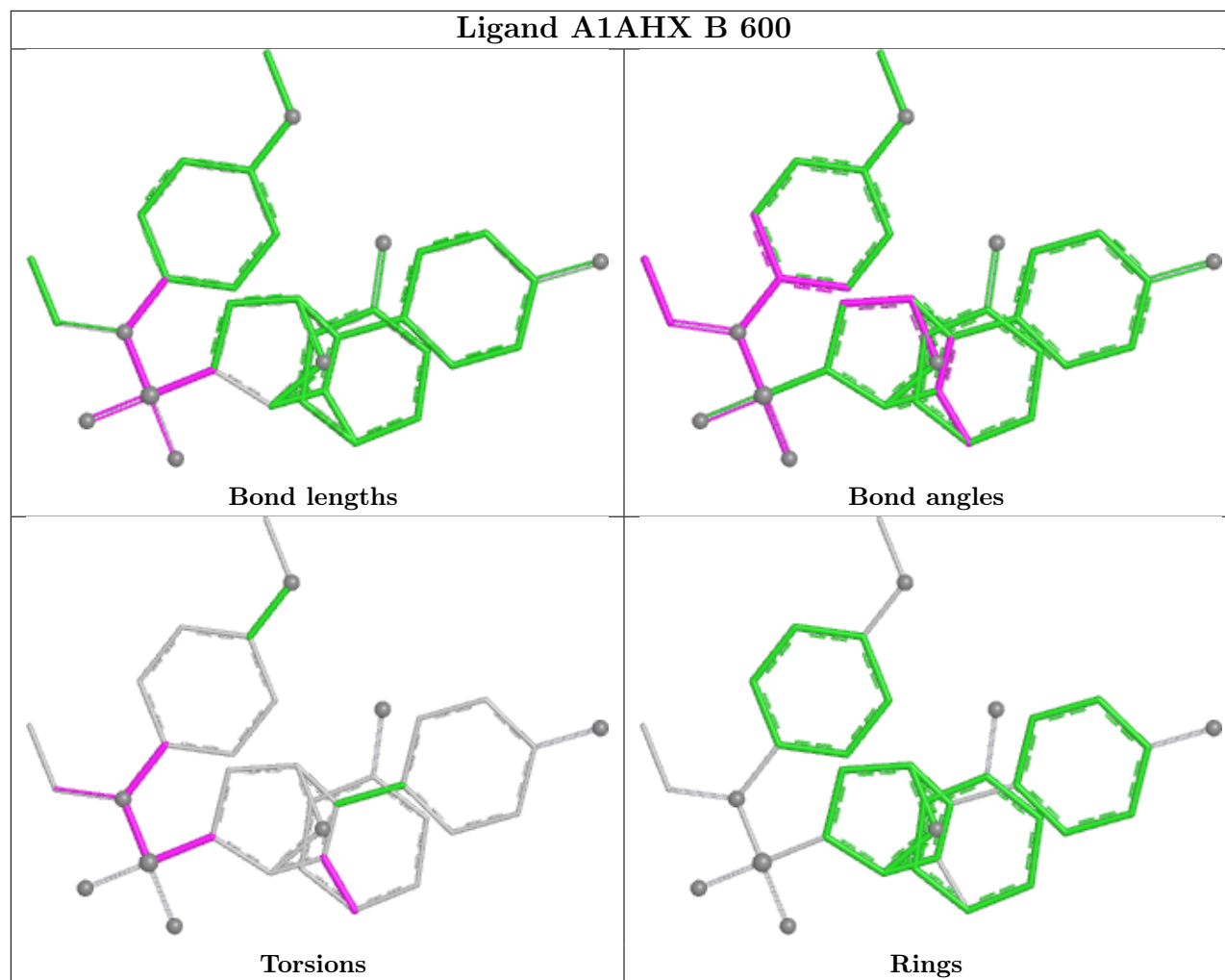


Ligand A1AHX C 601



Ligand A1AHX D 600





5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ> 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q< 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	A	236/242 (97%)	0.07	14 (5%) 28 32	20, 34, 65, 80	0
1	B	217/242 (89%)	0.16	13 (5%) 27 31	20, 34, 70, 80	0
1	C	231/242 (95%)	0.08	8 (3%) 47 53	20, 36, 62, 80	0
1	D	234/242 (96%)	0.13	14 (5%) 27 31	18, 34, 73, 103	0
All	All	918/968 (94%)	0.11	49 (5%) 32 36	18, 35, 68, 103	0

All (49) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	B	333	PRO	6.5
1	B	331	TYR	5.1
1	B	425	PHE	4.9
1	B	461	PHE	4.5
1	A	533	VAL	4.2
1	A	526	TYR	4.2
1	A	460	THR	4.1
1	B	334	THR	4.0
1	D	332	ASP	4.0
1	D	531	LYS	3.9
1	D	534	VAL	3.8
1	B	462	LEU	3.8
1	A	306	LEU	3.7
1	B	534	VAL	3.4
1	D	530	CYS	3.4
1	D	528	MET	3.4
1	C	425	PHE	3.3
1	D	532	ASN	3.3
1	C	459	TYR	3.3
1	A	459	TYR	3.2
1	B	459	TYR	3.1

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Mol	Chain	Res	Type	RSRZ
1	A	461	PHE	3.1
1	D	464	SER	3.1
1	A	546	ALA	3.0
1	A	532	ASN	3.0
1	D	419	GLU	3.0
1	D	546	ALA	2.9
1	A	534	VAL	2.9
1	C	308	LEU	2.9
1	B	342	MET	2.8
1	D	418	VAL	2.8
1	B	306	LEU	2.7
1	C	497	LEU	2.7
1	C	533	VAL	2.7
1	A	425	PHE	2.7
1	A	462	LEU	2.6
1	A	463	SER	2.4
1	B	468	SER	2.4
1	B	544	LEU	2.4
1	C	464	SER	2.3
1	B	415	GLY	2.2
1	D	529	LYS	2.2
1	D	425	PHE	2.2
1	D	545	ASP	2.1
1	D	533	VAL	2.1
1	A	464	SER	2.1
1	C	397	GLU	2.0
1	A	437	MET	2.0
1	C	546	ALA	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

6.3 Carbohydrates [i](#)

There are no 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,

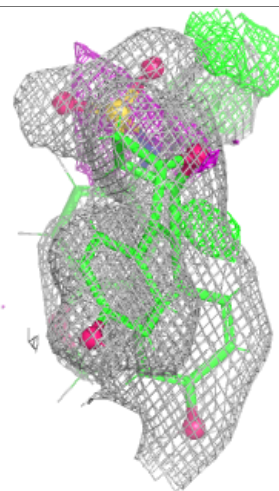
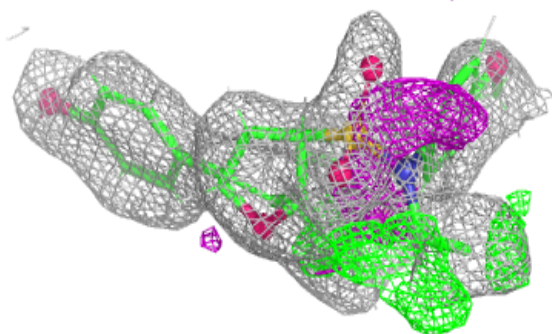
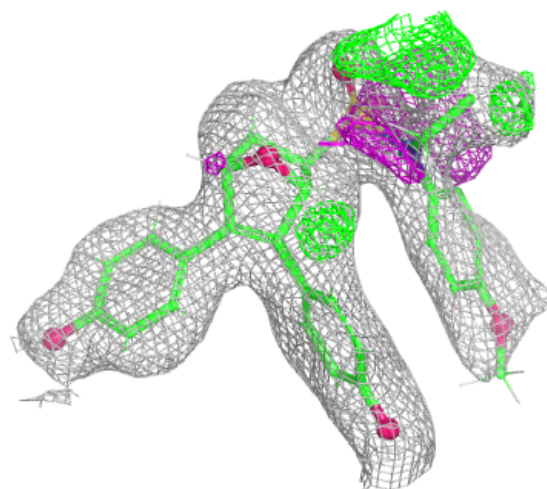
median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q<0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	A1AHX	D	600	35/38	0.89	0.11	23,37,58,60	0
2	A1AHX	B	600	35/38	0.90	0.11	21,44,64,66	0
2	A1AHX	A	601	35/38	0.92	0.11	19,37,56,67	0
2	A1AHX	C	601	38/38	0.93	0.10	17,38,64,74	0
3	NI	A	602	1/1	0.98	0.03	49,49,49,49	0
3	NI	C	602	1/1	0.98	0.03	55,55,55,55	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.

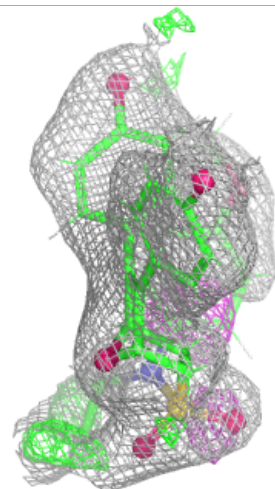
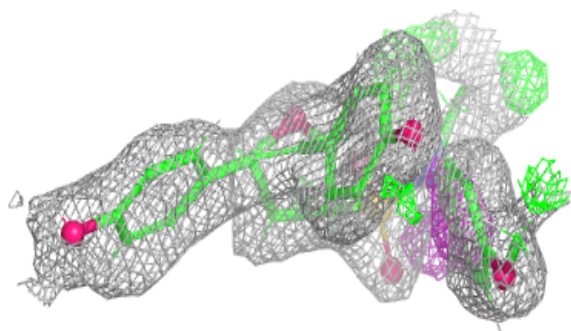
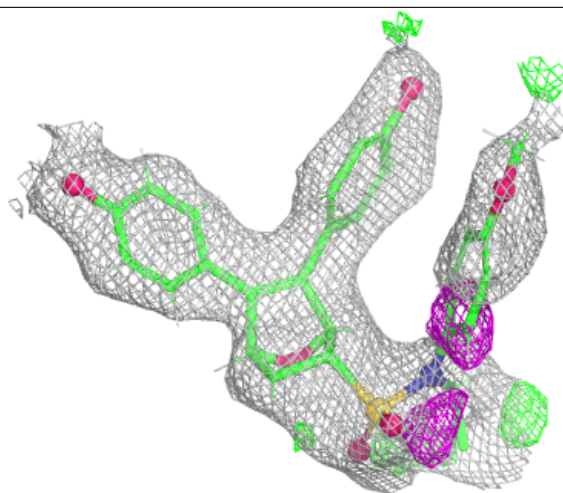
Electron density around A1AHX D 600:

2mF_o-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



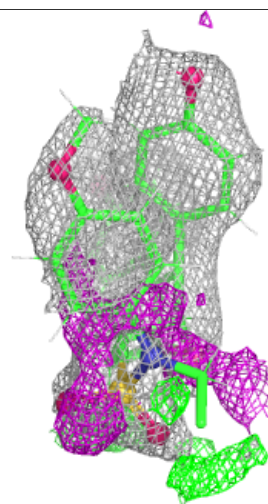
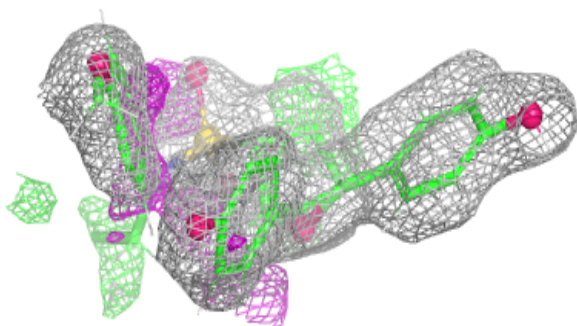
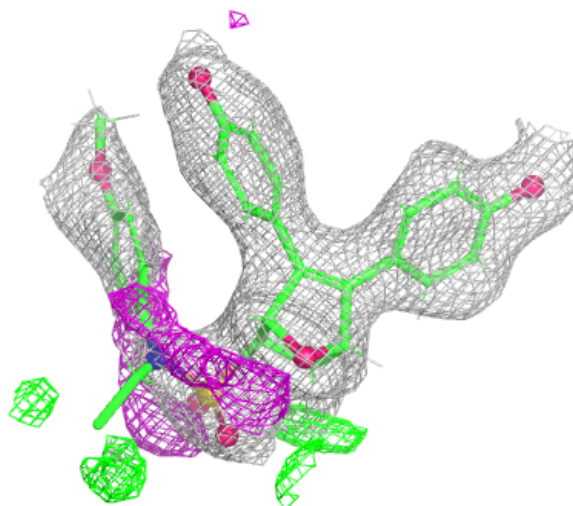
Electron density around A1AHX B 600:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



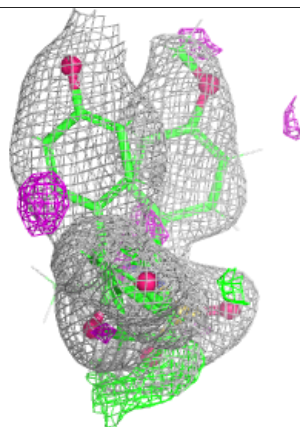
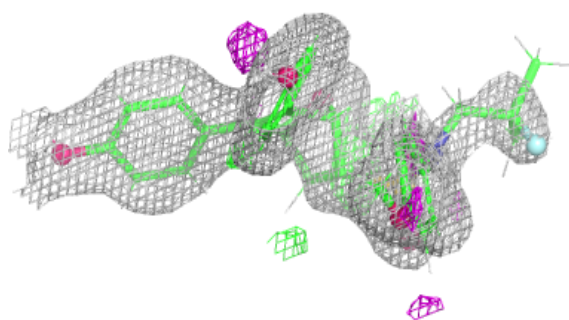
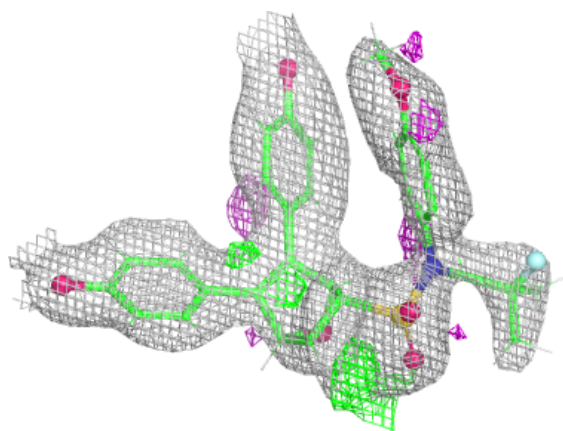
Electron density around A1AHX A 601:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



Electron density around A1AHX C 601:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)



6.5 Other polymers ⓘ

There are no such residues in this entry.