WORLDWIDE wwPDB PROTEIN DATA BANK

wwPDB X-ray Structure Validation Summary Report ⓘ

Feb 5, 2024 – 06:01 AM EST

PDB ID	:	1XLS
Title	:	Crystal structure of the mouse CAR/RXR LBD heterodimer bound to TCPOBOP and 9cRA and a TIF2 peptide containg the third LXXLL motifs
Authors	:	Suino, K.; peng, L.; Reynolds, R.; Li, Y.; Cha, J.-Y.; Repa, J.J.; Kliewer, S.A.; Xu, H.E.
Deposited on	:	2004-09-30
Resolution	:	2.96 Å(reported)

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

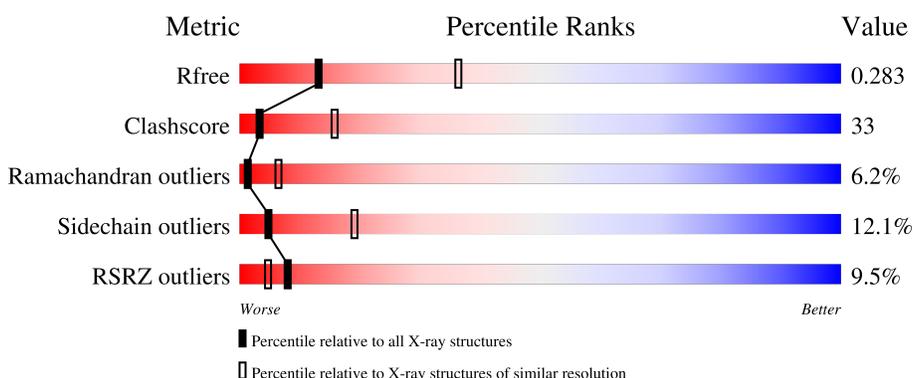|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.36
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36

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 2.96 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	Percentile Ranks	Value
Rfree		0.283
Clashscore		33
Ramachandran outliers		6.2%
Sidechain outliers		12.1%
RSRZ outliers		9.5%

Worse — *Better*

▮ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3104 (3.00-2.92)
Clashscore	141614	3462 (3.00-2.92)
Ramachandran outliers	138981	3340 (3.00-2.92)
Sidechain outliers	138945	3343 (3.00-2.92)
RSRZ outliers	127900	2986 (3.00-2.92)

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 <=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	232	10% 56% 35% 8%
1	B	232	11% 55% 37% 8%
1	C	232	11% 57% 34% 9%
1	D	232	9% 56% 34% 9%
2	E	242	5% 44% 43% 10% •

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Mol	Chain	Length	Quality of chain
2	F	242	5% 47% 42% 9%
2	G	242	8% 45% 44% 8%
2	H	242	6% 45% 43% 8%
3	I	18	22% 50% 22% 17% 11%
3	J	18	33% 44% 28% 17% 11%
3	K	18	39% 50% 22% 17% 11%
3	L	18	28% 44% 28% 17% 11%
3	M	18	6% 22% 39% 22% 17%
3	N	18	39% 28% 33% 11% 28%
3	O	18	28% 22% 44% 17% 17%
3	P	18	22% 28% 39% 17% 17%

2   Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 16288 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 Retinoic acid receptor RXR-alpha.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	232	Total	C	N	O	S	0	0	0
			1755	1117	306	322	10			
1	B	232	Total	C	N	O	S	0	0	0
			1755	1117	306	322	10			
1	C	232	Total	C	N	O	S	0	0	0
			1755	1117	306	322	10			
1	D	232	Total	C	N	O	S	0	0	0
			1755	1117	306	322	10			

- Molecule 2 is a protein called Orphan nuclear receptor NR1I3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	E	242	Total	C	N	O	S	0	0	0
			1969	1269	334	353	13			
2	F	242	Total	C	N	O	S	0	0	0
			1969	1269	334	353	13			
2	G	242	Total	C	N	O	S	0	0	0
			1969	1269	334	353	13			
2	H	242	Total	C	N	O	S	0	0	0
			1969	1269	334	353	13			

There are 4 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
E	146	ARG	LYS	conflict	UNP O35627
F	146	ARG	LYS	conflict	UNP O35627
G	146	ARG	LYS	conflict	UNP O35627
H	146	ARG	LYS	conflict	UNP O35627

- Molecule 3 is a protein called Nuclear receptor coactivator 2.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
3	I	16	Total 131	C 82	N 22	O 27	0	0	0
3	J	16	Total 131	C 82	N 22	O 27	0	0	0
3	K	16	Total 131	C 82	N 22	O 27	0	0	0
3	L	16	Total 131	C 82	N 22	O 27	0	0	0
3	M	18	Total 149	C 92	N 25	O 32	0	0	0
3	N	18	Total 149	C 92	N 25	O 32	0	0	0
3	O	18	Total 149	C 92	N 25	O 32	0	0	0
3	P	18	Total 149	C 92	N 25	O 32	0	0	0

There are 8 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
I	739	ALA	LYS	conflict	UNP Q9WUI9
J	739	ALA	LYS	conflict	UNP Q9WUI9
K	739	ALA	LYS	conflict	UNP Q9WUI9
L	739	ALA	LYS	conflict	UNP Q9WUI9
M	739	ALA	LYS	conflict	UNP Q9WUI9
N	739	ALA	LYS	conflict	UNP Q9WUI9
O	739	ALA	LYS	conflict	UNP Q9WUI9
P	739	ALA	LYS	conflict	UNP Q9WUI9

- Molecule 4 is (9cis)-retinoic acid (three-letter code: 9CR) (formula: $C_{20}H_{28}O_2$).

9CR
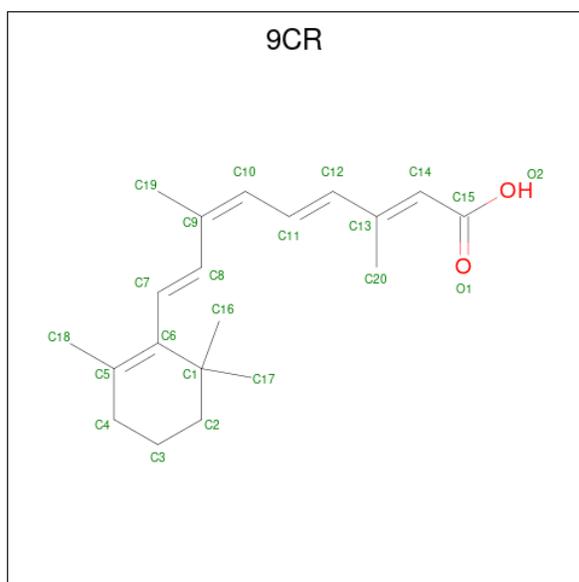
Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
4	A	1	Total 22	C 20	O 2	0	0
4	B	1	Total 22	C 20	O 2	0	0
4	C	1	Total 22	C 20	O 2	0	0
4	D	1	Total 22	C 20	O 2	0	0

- Molecule 5 is 3,5-DICHLORO-2-{4-[(3,5-DICHLOROPYRIDIN-2-YL)OXY]PHENOXY}P YRIDINE (three-letter code: TCD) (formula: $C_{16}H_8Cl_4N_2O_2$).

TCD
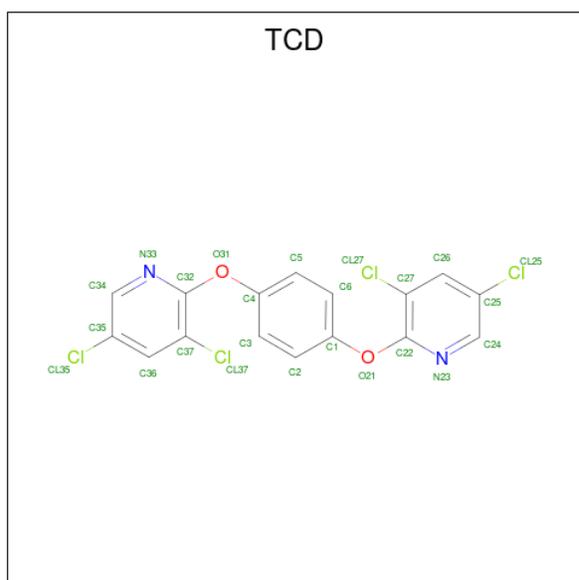
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	E	1	Total 24	C 16	Cl 4	N 2	O 2	0	0
5	F	1	Total 24	C 16	Cl 4	N 2	O 2	0	0
5	G	1	Total 24	C 16	Cl 4	N 2	O 2	0	0
5	H	1	Total 24	C 16	Cl 4	N 2	O 2	0	0

- Molecule 6 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	7	Total 7	O 7	0	0
6	B	8	Total 8	O 8	0	0
6	C	10	Total 10	O 10	0	0
6	D	20	Total 20	O 20	0	0
6	E	4	Total 4	O 4	0	0
6	F	17	Total 17	O 17	0	0
6	G	10	Total 10	O 10	0	0
6	H	4	Total 4	O 4	0	0
6	I	1	Total 1	O 1	0	0
6	J	1	Total 1	O 1	0	0
6	K	1	Total 1	O 1	0	0
6	L	1	Total 1	O 1	0	0
6	M	1	Total 1	O 1	0	0
6	O	1	Total 1	O 1	0	0
6	P	2	Total 2	O 2	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: Retinoic acid receptor RXR-alpha
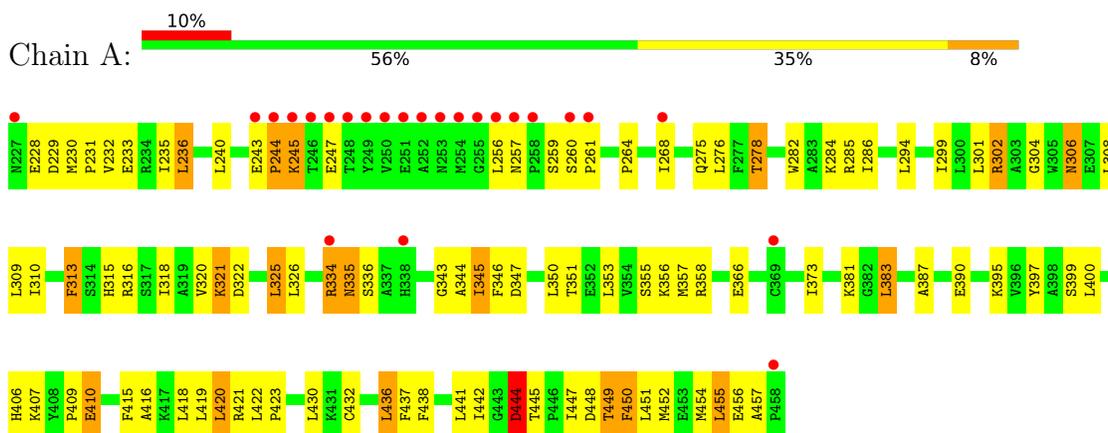
Chain A:
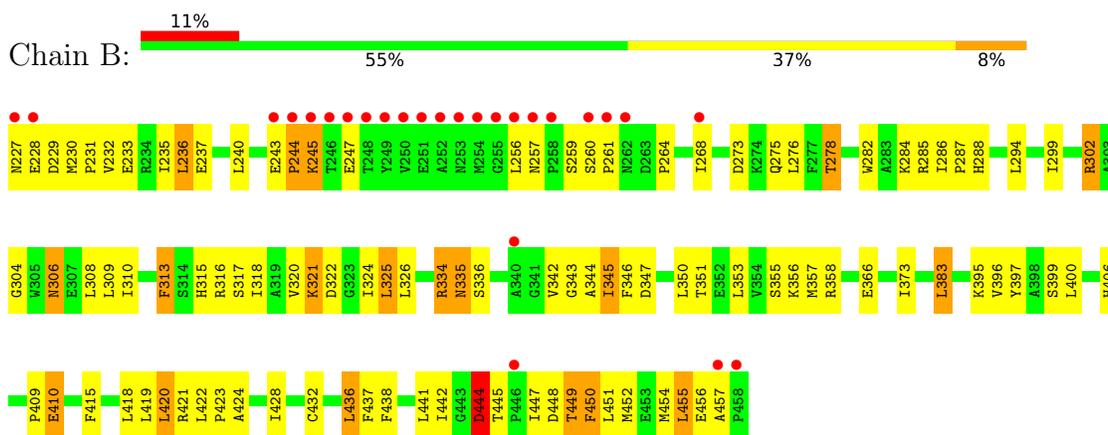
• Molecule 1: Retinoic acid receptor RXR-alpha

Chain B:

• Molecule 1: Retinoic acid receptor RXR-alpha

Chain C:

• Molecule 1: Retinoic acid receptor RXR-alpha

• Molecule 2: Orphan nuclear receptor NR1I3
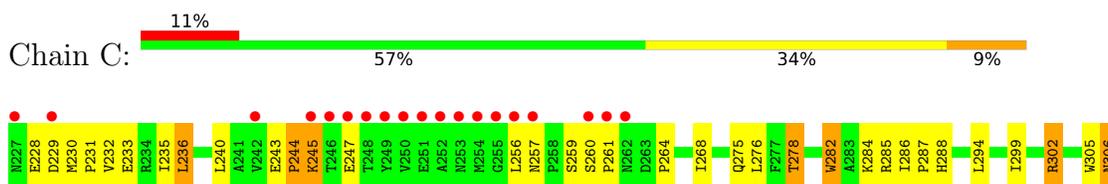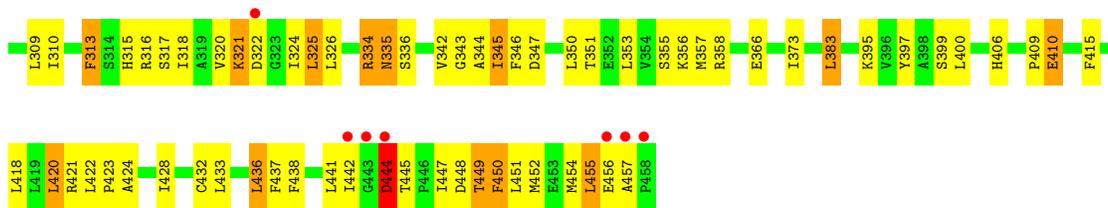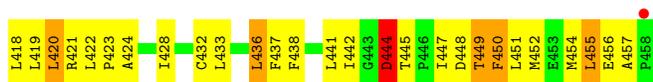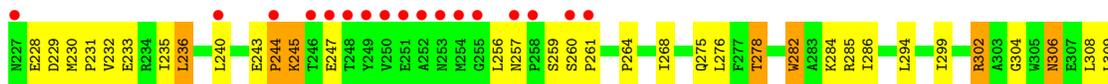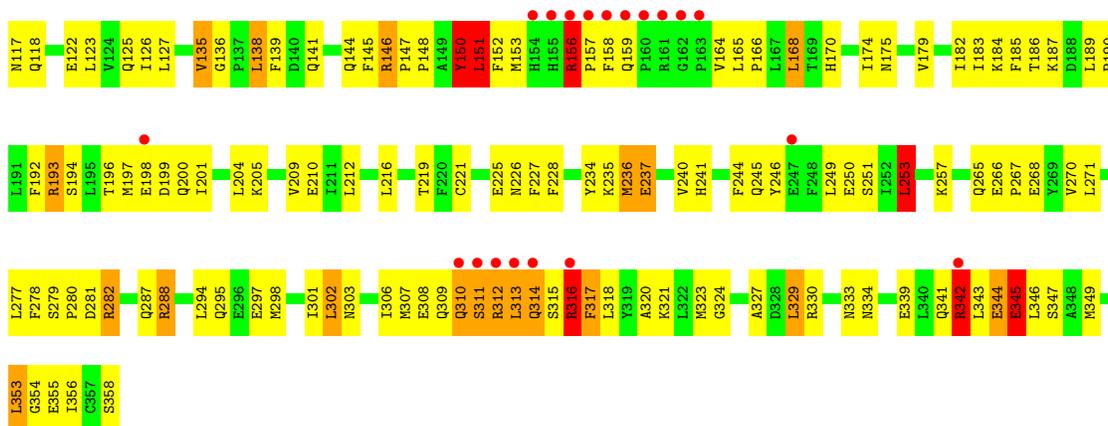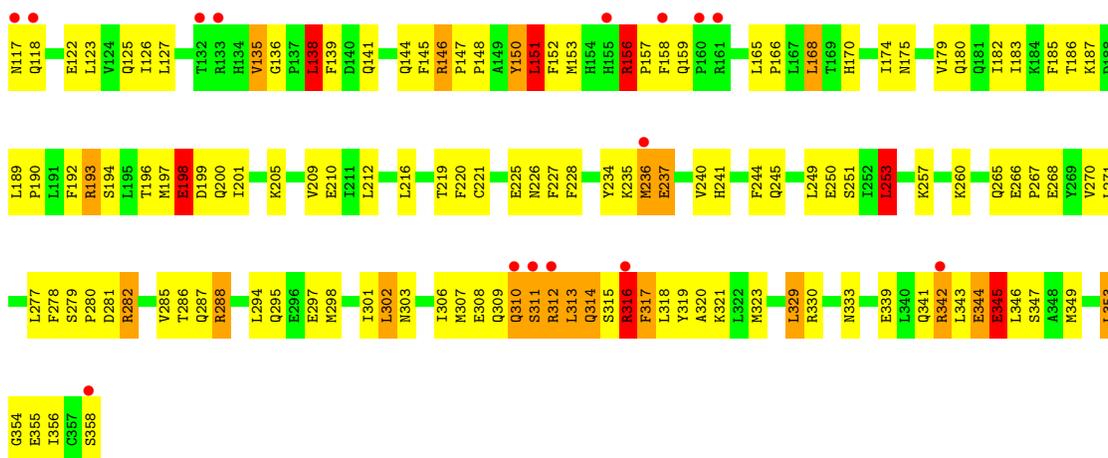

• Molecule 2: Orphan nuclear receptor NR1I3

P280 D281 R282 V285 T286 Q287 R288 L294 Q295 E296 E297 M298 I301 L302 N303 I306 M307 E308 Q309 Q310 S311 R312 L313 Q314 S315 R316 F317 L318 Y319 A320 K321 L322 M323 G324 A327 D328 L329 R330 N333 E339 L340 Q341 R342 L343 E344 L345 L346 S347 A348 M349 L353 G354

E355 I356 C357 S358

• Molecule 2: Orphan nuclear receptor NR1I3

Chain G:

8%

45% 44% 8%

N117 Q118 E122 L123 V124 Q125 I126 L127 V135 G136 P137 L138 F139 D140 Q141 Q144 F145 R146 P147 P148 A149 Y150 L151 F152 M153 H154 H155 R156 P157 F158 Q159 P160 R161 G162 P163 V164 L165 P166 L167 L168 T169 H170 I174 N175 V179 I182 I183 K184 F185 T186 K187 D188 L189 P190

L191 F192 R193 S194 L195 T196 M197 E198 D199 Q200 I201 L204 K205 V209 E210 I211 L212 L216 T219 F220 C221 E225 N226 F227 F228 Y234 K235 M236 E237 V240 H241 F244 Q245 Y246 E247 F248 L249 E250 S251 I252 L253 K257 Q265 E266 P267 E268 Y269 V270 L271

L277 F278 S279 P280 D281 R282 Q287 R288 L294 Q295 E296 E297 M298 I301 L302 N303 I306 M307 E308 Q309 Q310 S311 R312 L313 Q314 S315 R316 F317 L318 Y319 A320 K321 L322 M323 G324 A327 D328 L329 R330 N333 N334 E339 L340 Q341 R342 L343 E344 L345 L346 S347 A348 M349

L353 G354 E355 I356 C357 S358

• Molecule 2: Orphan nuclear receptor NR1I3

Chain H:

6%

45% 43% 8%

N117 Q118 E122 L123 V124 Q125 I126 L127 T132 R133 H134 V135 G136 P137 L138 F139 D140 Q141 Q144 F145 R146 P147 P148 A149 Y150 L151 F152 M153 H154 H155 R156 P157 F158 Q159 P160 R161 L165 P166 L167 L168 T169 H170 I174 N175 V179 Q180 Q181 I182 I183 K184 F185 T186 K187 D188

L189 P190 L191 F192 R193 S194 L195 T196 M197 E198 D199 Q200 I201 K205 V209 E210 I211 L212 L216 T219 F220 C221 E225 N226 F227 F228 Y234 K235 M236 E237 V240 H241 F244 Q245 L249 E250 S251 I252 L253 K257 K260 Q265 E266 P267 E268 Y269 V270 L271

L277 F278 S279 P280 D281 R282 V285 T286 Q287 R288 L294 Q295 E296 E297 M298 I301 L302 N303 I306 M307 E308 Q309 Q310 S311 R312 L313 Q314 S315 R316 F317 L318 Y319 A320 K321 L322 M323 L329 R330 N333 E339 L340 Q341 R342 L343 E344 L345 L346 S347 A348 M349 L353

G354 E355 I356 C357 S358

• Molecule 3: Nuclear receptor coactivator 2

Chain I:

22%

50% 22% 17% 11%

A739 K740 E741 N742 A743 L744 L745 D750 K751 D752 D753 T754 LYS ASP

• Molecule 3: Nuclear receptor coactivator 2

Chain J:

• Molecule 3: Nuclear receptor coactivator 2

Chain K:

• Molecule 3: Nuclear receptor coactivator 2

Chain L:

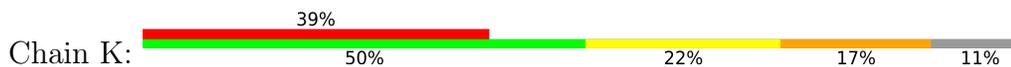• Molecule 3: Nuclear receptor coactivator 2
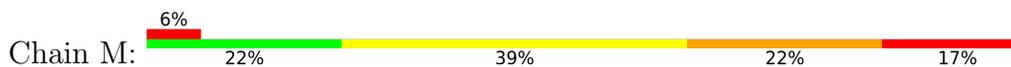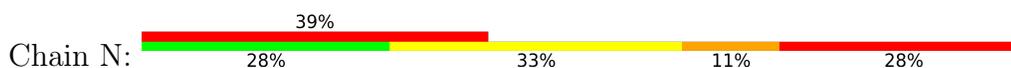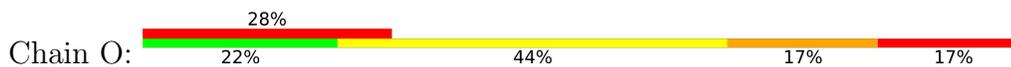
Chain M:

• Molecule 3: Nuclear receptor coactivator 2

Chain N:

• Molecule 3: Nuclear receptor coactivator 2

Chain O:

• Molecule 3: Nuclear receptor coactivator 2

Chain P:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 1	Depositor
Cell constants a, b, c, α, β, γ	68.27Å 88.38Å 105.49Å 79.02° 85.81° 67.22°	Depositor
Resolution (Å)	19.99 – 2.96 19.99 – 2.97	Depositor EDS
% Data completeness (in resolution range)	92.5 (19.99-2.96) 92.6 (19.99-2.97)	Depositor EDS
R_{merge}	0.17	Depositor
R_{sym}	0.12	Depositor
$< I/\sigma(I) >$ [1]	2.12 (at 2.98Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.255 , 0.303 0.239 , 0.283	Depositor DCC
R_{free} test set	3463 reflections (8.12%)	wwPDB-VP
Wilson B-factor (Å^2)	56.2	Xtriage
Anisotropy	0.008	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.31 , 59.0	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.89	EDS
Total number of atoms	16288	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 4.53% of the height of the origin peak. No significant pseudotranslation is detected.*

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[1]Intensities estimated from amplitudes.
[2]Theoretical values of $< |L| >$, $< L^2 >$ 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: TCD, 9CR

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	0.40	0/1790	0.60	0/2414
1	B	0.41	0/1790	0.61	0/2414
1	C	0.40	0/1790	0.60	0/2414
1	D	0.40	0/1790	0.61	0/2414
2	E	0.48	0/2016	0.94	16/2727 (0.6%)
2	F	0.48	1/2016 (0.0%)	0.85	8/2727 (0.3%)
2	G	0.48	2/2016 (0.1%)	0.83	6/2727 (0.2%)
2	H	0.54	1/2016 (0.0%)	1.28	14/2727 (0.5%)
3	I	0.39	0/131	0.60	0/175
3	J	0.40	0/131	0.62	0/175
3	K	0.34	0/131	0.61	0/175
3	L	0.39	0/131	0.60	0/175
3	M	1.01	1/149 (0.7%)	3.00	7/197 (3.6%)
3	N	0.84	1/149 (0.7%)	1.92	7/197 (3.6%)
3	O	0.84	1/149 (0.7%)	3.56	10/197 (5.1%)
3	P	0.99	1/149 (0.7%)	2.16	8/197 (4.1%)
All	All	0.48	8/16344 (0.0%)	0.96	76/22052 (0.3%)

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	G	0	1
3	M	0	1
3	N	0	1
3	P	0	1
All	All	0	4

The worst 5 of 8 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	H	193	ARG	CZ-NH1	-12.28	1.17	1.33
3	M	750	ASP	CB-CG	-7.52	1.35	1.51
3	P	750	ASP	CB-CG	-7.52	1.35	1.51
2	G	342	ARG	CB-CG	-6.12	1.36	1.52
3	N	750	ASP	CB-CG	-5.28	1.40	1.51

The worst 5 of 76 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	H	193	ARG	NE-CZ-NH2	33.36	136.98	120.30
3	O	746	ARG	NE-CZ-NH1	-30.74	104.93	120.30
3	O	746	ARG	NE-CZ-NH2	27.55	134.08	120.30
3	M	746	ARG	NE-CZ-NH1	-26.46	107.07	120.30
2	H	342	ARG	NE-CZ-NH1	-24.98	107.81	120.30

There are no chirality outliers.

All (4) planarity outliers are listed below:

Mol	Chain	Res	Type	Group
2	G	150	TYR	Sidechain
3	M	746	ARG	Sidechain
3	N	746	ARG	Sidechain
3	P	746	ARG	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	1755	0	1733	116	0
1	B	1755	0	1733	112	1
1	C	1755	0	1733	89	0
1	D	1755	0	1733	90	0
2	E	1969	0	1964	164	1
2	F	1969	0	1964	140	2
2	G	1969	0	1964	165	0
2	H	1969	0	1964	156	2
3	I	131	0	132	9	0
3	J	131	0	132	11	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	K	131	0	132	9	0
3	L	131	0	132	10	0
3	M	149	0	149	29	0
3	N	149	0	149	27	0
3	O	149	0	149	28	0
3	P	149	0	149	34	0
4	A	22	0	27	3	0
4	B	22	0	27	3	0
4	C	22	0	27	4	0
4	D	22	0	27	4	0
5	E	24	0	8	1	0
5	F	24	0	8	1	0
5	G	24	0	8	1	0
5	H	24	0	8	1	0
6	A	7	0	0	1	0
6	B	8	0	0	1	0
6	C	10	0	0	1	0
6	D	20	0	0	1	0
6	E	4	0	0	2	0
6	F	17	0	0	2	0
6	G	10	0	0	1	0
6	H	4	0	0	0	0
6	I	1	0	0	0	0
6	J	1	0	0	3	0
6	K	1	0	0	0	0
6	L	1	0	0	1	0
6	M	1	0	0	0	0
6	O	1	0	0	0	0
6	P	2	0	0	1	0
All	All	16288	0	16052	1058	3

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 33.

The worst 5 of 1058 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)
2:E:157:PRO:CD	2:G:342:ARG:HH12	1.16	1.54
2:E:157:PRO:CD	2:G:342:ARG:NH1	1.74	1.39
2:E:157:PRO:HD3	2:G:342:ARG:NH1	1.09	1.37
1:A:406:HIS:CD2	1:B:233:GLU:HA	1.64	1.32

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:406:HIS:CE1	1:B:236:LEU:HB3	1.72	1.25

All (3) symmetry-related close contacts are listed below. The label for Atom-2 includes the symmetry operator and encoded unit-cell translations to be applied.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:F:342:ARG:NH1	2:H:156:ARG:O[1_655]	1.81	0.39
2:F:342:ARG:NH1	2:H:157:PRO:CD[1_655]	1.88	0.32
1:B:442:ILE:O	2:E:161:ARG:NH1[1_554]	2.17	0.03

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	230/232 (99%)	191 (83%)	26 (11%)	13 (6%)	1	8
1	B	230/232 (99%)	190 (83%)	27 (12%)	13 (6%)	1	8
1	C	230/232 (99%)	191 (83%)	25 (11%)	14 (6%)	1	7
1	D	230/232 (99%)	189 (82%)	27 (12%)	14 (6%)	1	7
2	E	240/242 (99%)	206 (86%)	22 (9%)	12 (5%)	2	10
2	F	240/242 (99%)	207 (86%)	20 (8%)	13 (5%)	2	9
2	G	240/242 (99%)	206 (86%)	21 (9%)	13 (5%)	2	9
2	H	240/242 (99%)	209 (87%)	18 (8%)	13 (5%)	2	9
3	I	14/18 (78%)	10 (71%)	3 (21%)	1 (7%)	1	4
3	J	14/18 (78%)	10 (71%)	3 (21%)	1 (7%)	1	4
3	K	14/18 (78%)	10 (71%)	3 (21%)	1 (7%)	1	4
3	L	14/18 (78%)	10 (71%)	3 (21%)	1 (7%)	1	4
3	M	16/18 (89%)	9 (56%)	3 (19%)	4 (25%)	0	0

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Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
3	N	16/18 (89%)	10 (62%)	1 (6%)	5 (31%)	0	0
3	O	16/18 (89%)	10 (62%)	3 (19%)	3 (19%)	0	0
3	P	16/18 (89%)	9 (56%)	4 (25%)	3 (19%)	0	0
All	All	2000/2040 (98%)	1667 (83%)	209 (10%)	124 (6%)	1	6

5 of 124 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	244	PRO
1	A	245	LYS
1	A	256	LEU
1	A	260	SER
1	A	261	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	182/200 (91%)	163 (90%)	19 (10%)	7	24
1	B	182/200 (91%)	163 (90%)	19 (10%)	7	24
1	C	182/200 (91%)	163 (90%)	19 (10%)	7	24
1	D	182/200 (91%)	163 (90%)	19 (10%)	7	24
2	E	217/217 (100%)	191 (88%)	26 (12%)	5	19
2	F	217/217 (100%)	194 (89%)	23 (11%)	6	24
2	G	217/217 (100%)	193 (89%)	24 (11%)	6	22
2	H	217/217 (100%)	193 (89%)	24 (11%)	6	22
3	I	14/16 (88%)	10 (71%)	4 (29%)	0	1
3	J	14/16 (88%)	10 (71%)	4 (29%)	0	1
3	K	14/16 (88%)	10 (71%)	4 (29%)	0	1
3	L	14/16 (88%)	10 (71%)	4 (29%)	0	1
3	M	16/16 (100%)	11 (69%)	5 (31%)	0	1

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	N	16/16 (100%)	11 (69%)	5 (31%)	0	1
3	O	16/16 (100%)	11 (69%)	5 (31%)	0	1
3	P	16/16 (100%)	12 (75%)	4 (25%)	0	2
All	All	1716/1796 (96%)	1508 (88%)	208 (12%)	5	19

5 of 208 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
2	F	277	LEU
2	G	329	LEU
3	O	740	LYS
2	F	316	ARG
2	G	151	LEU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 73 such sidechains are listed below:

Mol	Chain	Res	Type
2	G	341	GLN
2	H	333	ASN
2	H	125	GLN
2	H	181	GLN
2	E	245	GLN

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 monosaccharides in this entry.

5.6 Ligand geometry ⓘ

8 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	#$|Z| > 2$
4	9CR	C	803	-	22,22,22	3.99	13 (59%)	30,30,30	2.74	14 (46%)
4	9CR	D	804	-	22,22,22	3.96	14 (63%)	30,30,30	2.72	12 (40%)
5	TCD	G	807	-	24,26,26	2.46	5 (20%)	28,36,36	1.92	8 (28%)
4	9CR	A	801	-	22,22,22	3.88	13 (59%)	30,30,30	2.72	12 (40%)
5	TCD	H	808	-	24,26,26	2.14	4 (16%)	28,36,36	1.98	7 (25%)
5	TCD	F	806	-	24,26,26	2.21	3 (12%)	28,36,36	1.88	6 (21%)
5	TCD	E	805	-	24,26,26	2.41	4 (16%)	28,36,36	1.96	8 (28%)
4	9CR	B	802	-	22,22,22	3.91	13 (59%)	30,30,30	2.73	13 (43%)

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
4	9CR	C	803	-	-	4/15/32/32	0/1/1/1
4	9CR	D	804	-	-	4/15/32/32	0/1/1/1
5	TCD	G	807	-	-	0/8/8/8	0/3/3/3
4	9CR	A	801	-	-	4/15/32/32	0/1/1/1
5	TCD	H	808	-	-	0/8/8/8	0/3/3/3
5	TCD	F	806	-	-	0/8/8/8	0/3/3/3
5	TCD	E	805	-	-	0/8/8/8	0/3/3/3
4	9CR	B	802	-	-	4/15/32/32	0/1/1/1

The worst 5 of 69 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	C	803	9CR	C1-C6	10.36	1.68	1.53

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Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
4	D	804	9CR	C1-C6	10.31	1.67	1.53
4	B	802	9CR	C1-C6	10.06	1.67	1.53
5	G	807	TCD	C26-C27	9.98	1.54	1.38
4	A	801	9CR	C1-C6	9.86	1.67	1.53

The worst 5 of 80 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
4	A	801	9CR	C19-C9-C10	-6.00	114.52	122.92
4	D	804	9CR	C19-C9-C10	-6.00	114.52	122.92
4	C	803	9CR	C19-C9-C10	-5.97	114.56	122.92
4	B	802	9CR	C19-C9-C10	-5.97	114.56	122.92
4	B	802	9CR	C1-C6-C5	-5.36	115.06	122.61

There are no chirality outliers.

5 of 16 torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
4	A	801	9CR	C13-C14-C15-O1
4	A	801	9CR	C13-C14-C15-O2
4	B	802	9CR	C13-C14-C15-O1
4	B	802	9CR	C13-C14-C15-O2
4	C	803	9CR	C13-C14-C15-O1

There are no ring outliers.

8 monomers are involved in 18 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
4	C	803	9CR	4	0
4	D	804	9CR	4	0
5	G	807	TCD	1	0
4	A	801	9CR	3	0
5	H	808	TCD	1	0
5	F	806	TCD	1	0
5	E	805	TCD	1	0
4	B	802	9CR	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 then 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 9CR C 803

Bond lengths

Bond angles

Torsions

Rings

Ligand 9CR D 804

Bond lengths

Bond angles

Torsions

Rings

Ligand TCD G 807

Bond lengths

Bond angles

Torsions

Rings

Ligand 9CR A 801

Bond lengths

Bond angles

Torsions

Rings

Ligand TCD H 808

Bond lengths

Bond angles

Torsions

Rings

Ligand TCD F 806

Bond lengths

Bond angles

Torsions

Rings

Ligand TCD E 805

Bond lengths

Bond angles

Torsions

Rings

Ligand 9CR B 802

Bond lengths

Bond angles

Torsions

Rings

5.7 Other polymers ⓘ

There are no such residues in this entry.

5.8 Polymer linkage issues ⓘ

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å²)	Q<0.9
1	A	232/232 (100%)	0.42	24 (10%)	6	4	22, 47, 126, 134	0
1	B	232/232 (100%)	0.54	26 (11%)	5	3	22, 50, 128, 137	0
1	C	232/232 (100%)	0.56	26 (11%)	5	3	21, 53, 127, 136	0
1	D	232/232 (100%)	0.42	21 (9%)	9	5	21, 50, 125, 135	0
2	E	242/242 (100%)	-0.05	11 (4%)	33	21	21, 44, 89, 122	0
2	F	242/242 (100%)	0.09	13 (5%)	25	16	16, 42, 89, 127	0
2	G	242/242 (100%)	0.14	19 (7%)	12	7	17, 44, 88, 126	0
2	H	242/242 (100%)	-0.01	15 (6%)	20	12	18, 44, 89, 121	0
3	I	16/18 (88%)	1.40	4 (25%)	0	0	43, 79, 130, 135	0
3	J	16/18 (88%)	2.42	6 (37%)	0	0	51, 82, 132, 134	0
3	K	16/18 (88%)	2.32	7 (43%)	0	0	53, 85, 134, 136	0
3	L	16/18 (88%)	1.24	5 (31%)	0	0	43, 77, 131, 137	0
3	M	18/18 (100%)	0.95	1 (5%)	24	15	37, 77, 121, 125	0
3	N	18/18 (100%)	1.68	7 (38%)	0	0	39, 76, 121, 129	0
3	O	18/18 (100%)	1.38	5 (27%)	0	0	39, 75, 120, 129	0
3	P	18/18 (100%)	0.91	4 (22%)	0	0	37, 80, 120, 124	0
All	All	2032/2040 (99%)	0.34	194 (9%)	8	5	16, 48, 120, 137	0

The worst 5 of 194 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	249	TYR	13.7
1	B	248	THR	13.6
1	C	255	GLY	12.4
3	K	754	THR	11.2
1	D	252	ALA	10.4

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($\text{\AA}^2$)	Q<0.9
5	TCD	E	805	24/24	0.82	0.30	27,42,54,54	0
5	TCD	H	808	24/24	0.83	0.26	27,37,54,54	0
4	9CR	C	803	22/22	0.87	0.26	32,41,48,48	0
5	TCD	G	807	24/24	0.88	0.23	12,38,54,54	0
4	9CR	B	802	22/22	0.90	0.28	26,36,41,47	0
4	9CR	A	801	22/22	0.92	0.38	31,43,48,53	0
5	TCD	F	806	24/24	0.92	0.19	14,35,54,54	0
4	9CR	D	804	22/22	0.93	0.33	31,39,44,49	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.

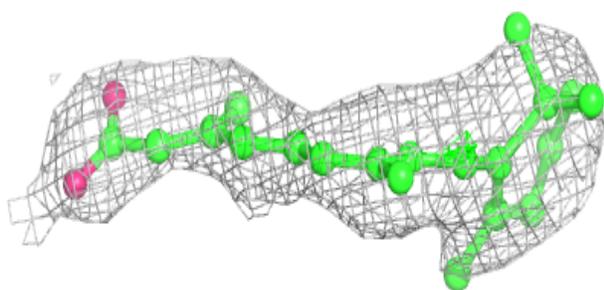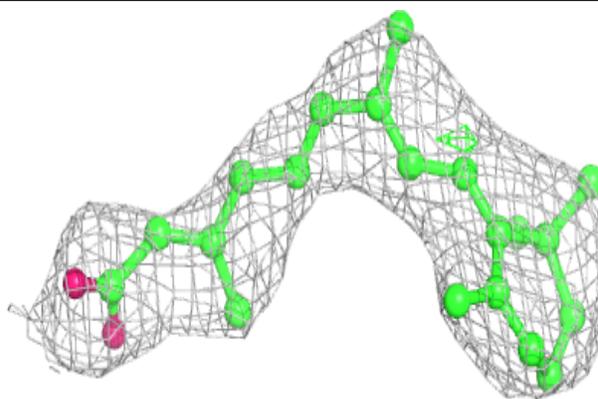WORLDWIDE
wwPDB
PROTEIN DATA BANK

Electron density around TCD E 805:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
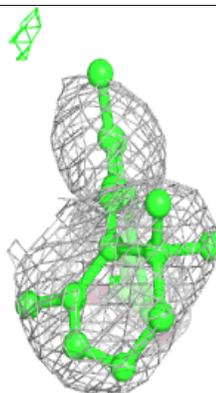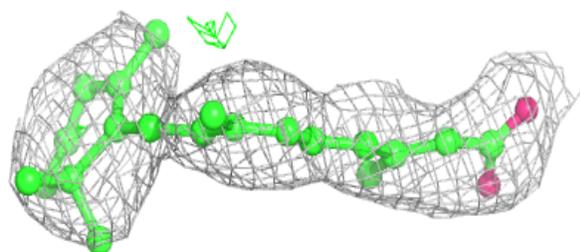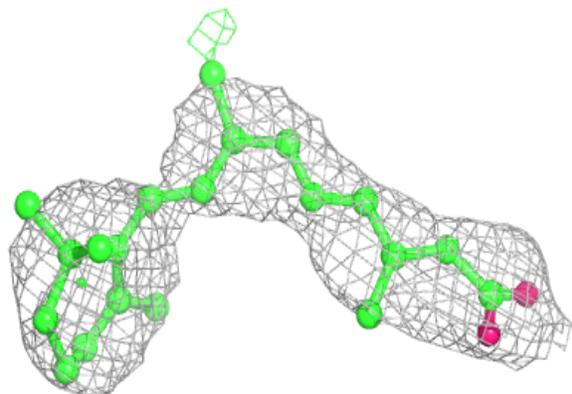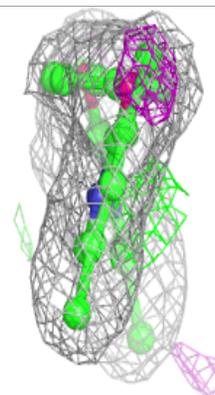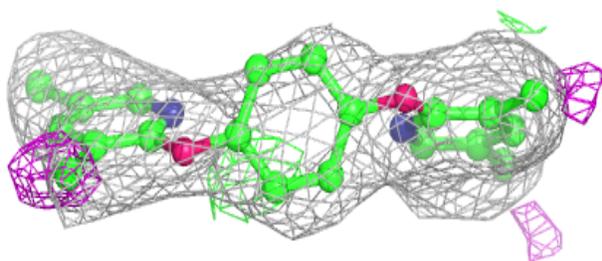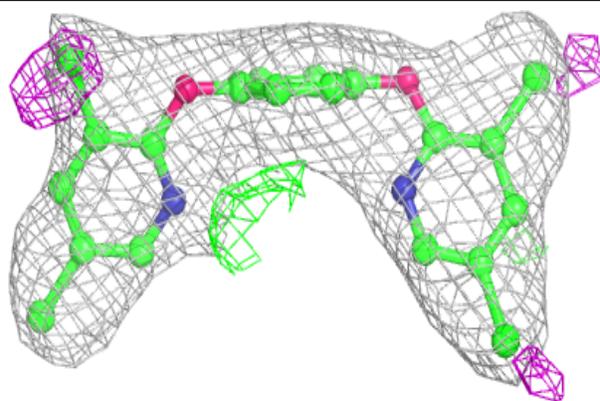mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
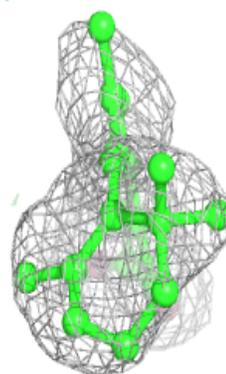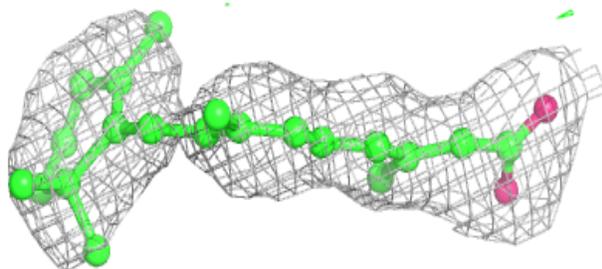and green (positive)

Electron density around TCD H 808:

2mF$_o$-DF$_c$ (at 0.7 rmsd) in gray
mF$_o$-DF$_c$ (at 3 rmsd) in purple (negative)
and green (positive)
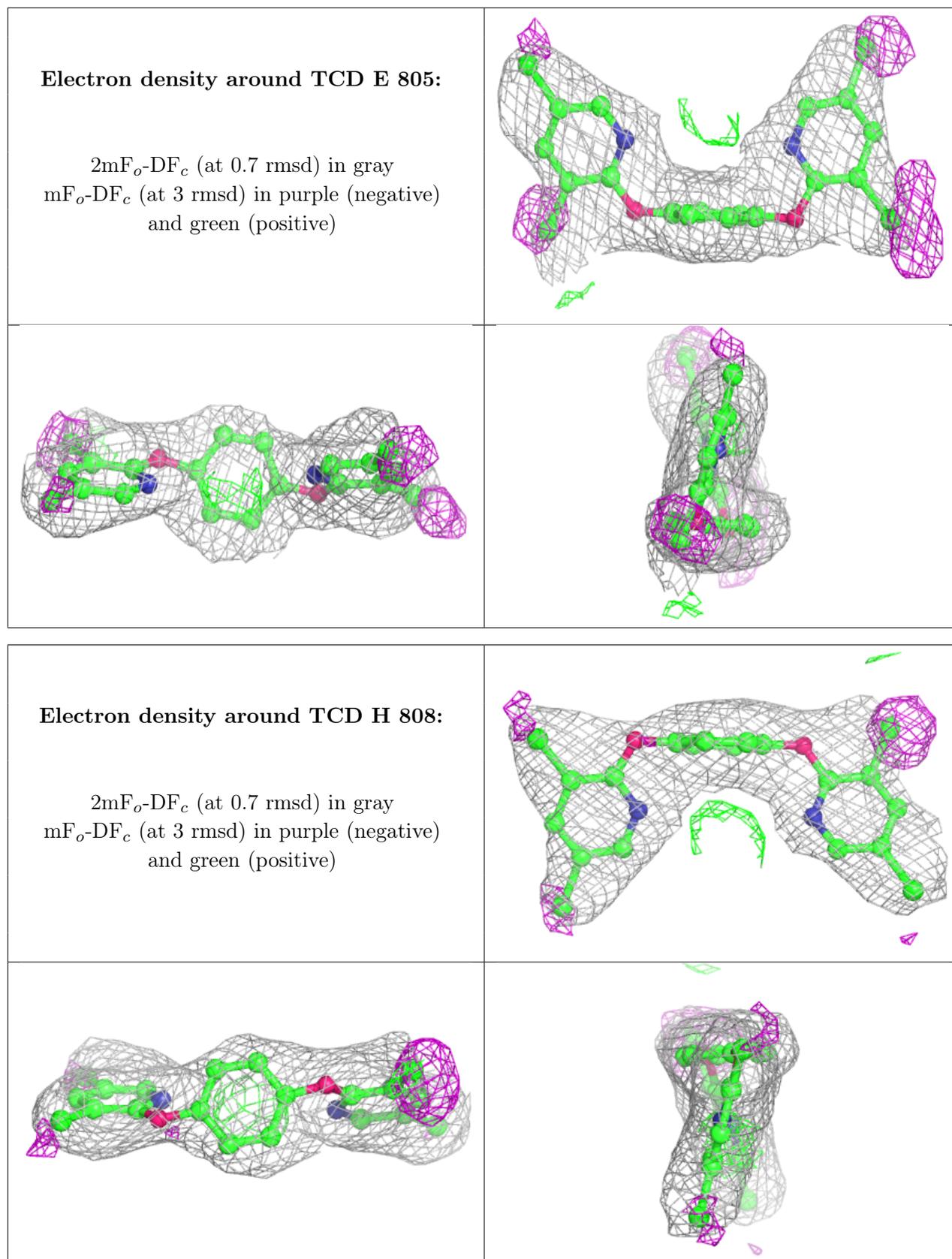
Electron density around 9CR C 803:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray

$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative) and green (positive)
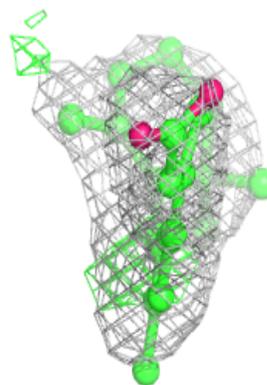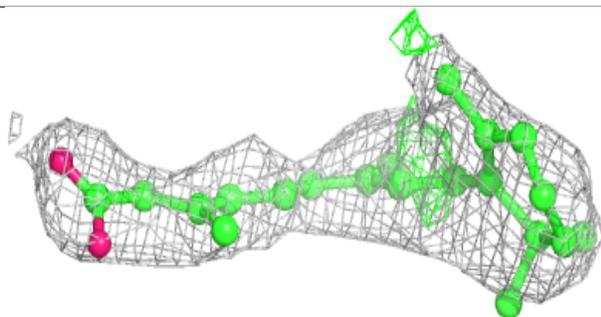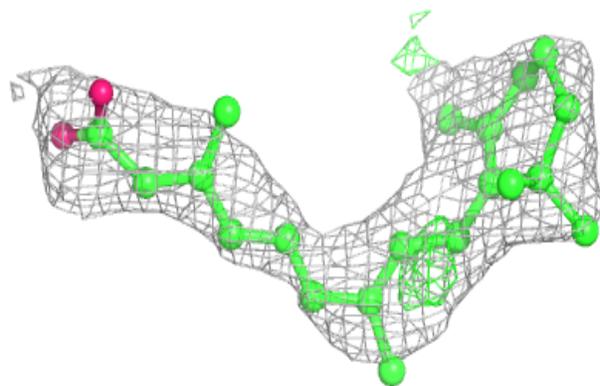
Electron density around TCD G 807:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray

$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative) and green (positive)
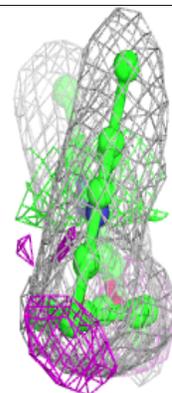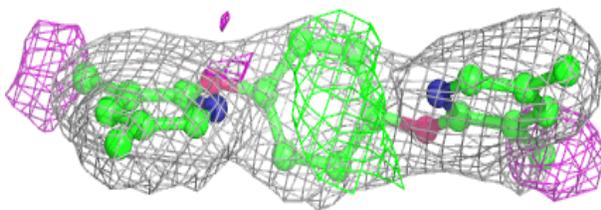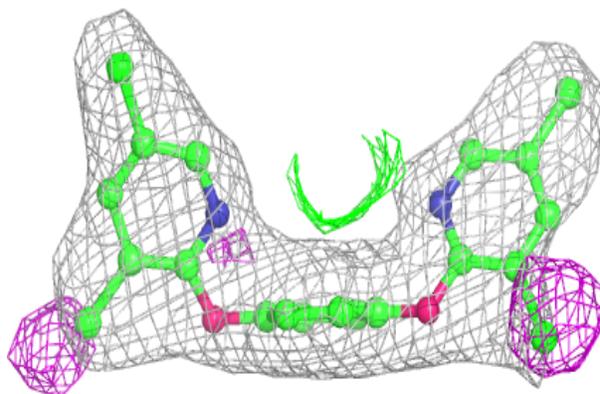
Electron density around 9CR B 802:

$2mF_o\text{-}DF_c$ (at 0.7 rmsd) in gray
$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)
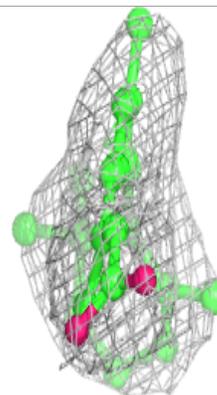
Electron density around 9CR A 801:

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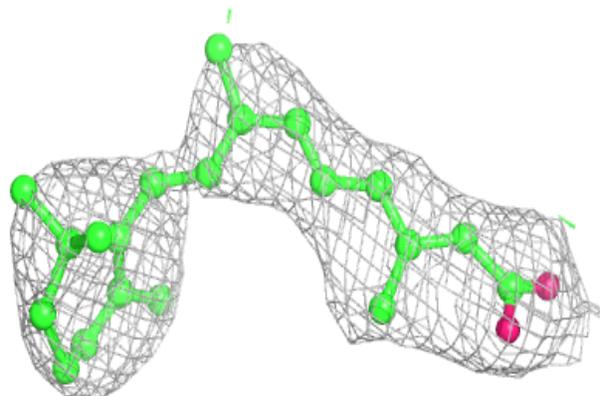$mF_o\text{-}DF_c$ (at 3 rmsd) in purple (negative)
and green (positive)

Electron density around TCD F 806:

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

Electron density around 9CR D 804:

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

6.5 Other polymers ⓘ

There are no such residues in this entry.