Full wwPDB X-ray Structure Validation Report ⓘ

Aug 20, 2020 – 12:45 PM BST

PDB ID	:	5FHZ
Title	:	Human aldehyde dehydrogenase 1A3 complexed with NAD(+) and retinoic acid
Authors	:	Moretti, A.; Rizzi, M.; Garavaglia, S.
Deposited on	:	2015-12-22
Resolution	:	2.90 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 following versions of software and data (see references ⓘ) were used in the production of this report:

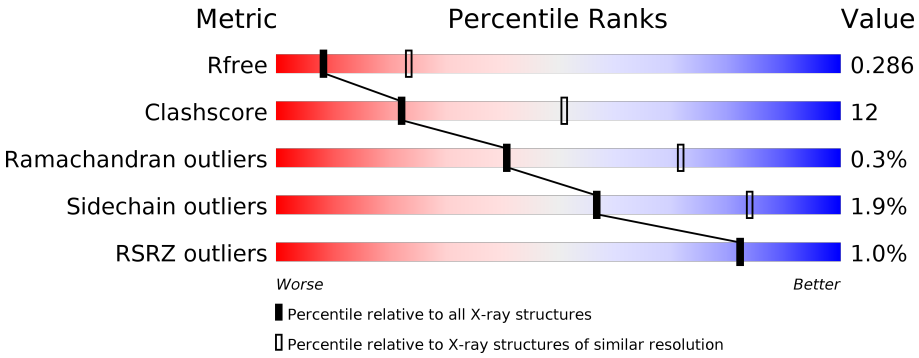
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.13.1
buster-report	:	1.1.7 (2018)
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.13.1

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 2.90 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	1957 (2.90-2.90)
Clashscore	141614	2172 (2.90-2.90)
Ramachandran outliers	138981	2115 (2.90-2.90)
Sidechain outliers	138945	2117 (2.90-2.90)
RSRZ outliers	127900	1906 (2.90-2.90)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments on the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria 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	529	68% 24% • 8%
1	B	529	66% 23% • 10%
1	C	529	68% 23% • 8%
1	D	529	71% 21% • 8%
1	E	529	2% 68% 22% • 10%
1	F	529	2% 63% 21% 15%

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Mol	Chain	Length	Quality of chain
1	G	529	2% 64% 22% 13%
1	H	529	2% 70% 22% 8%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	REA	A	602	-	-	X	-
3	REA	D	602	-	-	X	-

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 29992 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 Aldehyde dehydrogenase family 1 member A3.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	489	Total	C	N	O	S	0	0	0
			3780	2410	646	704	20			
1	B	475	Total	C	N	O	S	0	0	0
			3666	2336	628	682	20			
1	C	489	Total	C	N	O	S	0	0	0
			3779	2409	646	704	20			
1	D	488	Total	C	N	O	S	0	0	0
			3775	2407	645	703	20			
1	E	478	Total	C	N	O	S	0	0	0
			3695	2358	630	688	19			
1	F	449	Total	C	N	O	S	0	0	0
			3453	2201	586	647	19			
1	G	462	Total	C	N	O	S	0	0	0
			3570	2282	606	664	18			
1	H	488	Total	C	N	O	S	0	0	0
			3771	2403	645	703	20			

There are 136 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	-16	HIS	-	expression tag	UNP P47895
A	-15	HIS	-	expression tag	UNP P47895
A	-14	HIS	-	expression tag	UNP P47895
A	-13	HIS	-	expression tag	UNP P47895
A	-12	HIS	-	expression tag	UNP P47895
A	-11	HIS	-	expression tag	UNP P47895
A	-10	LEU	-	expression tag	UNP P47895
A	-9	GLU	-	expression tag	UNP P47895
A	-8	SER	-	expression tag	UNP P47895
A	-7	THR	-	expression tag	UNP P47895
A	-6	SER	-	expression tag	UNP P47895
A	-5	LEU	-	expression tag	UNP P47895
A	-4	TYR	-	expression tag	UNP P47895

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Chain	Residue	Modelled	Actual	Comment	Reference
A	-3	LYS	-	expression tag	UNP P47895
A	-2	LYS	-	expression tag	UNP P47895
A	-1	ALA	-	expression tag	UNP P47895
A	0	GLY	-	expression tag	UNP P47895
B	-16	HIS	-	expression tag	UNP P47895
B	-15	HIS	-	expression tag	UNP P47895
B	-14	HIS	-	expression tag	UNP P47895
B	-13	HIS	-	expression tag	UNP P47895
B	-12	HIS	-	expression tag	UNP P47895
B	-11	HIS	-	expression tag	UNP P47895
B	-10	LEU	-	expression tag	UNP P47895
B	-9	GLU	-	expression tag	UNP P47895
B	-8	SER	-	expression tag	UNP P47895
B	-7	THR	-	expression tag	UNP P47895
B	-6	SER	-	expression tag	UNP P47895
B	-5	LEU	-	expression tag	UNP P47895
B	-4	TYR	-	expression tag	UNP P47895
B	-3	LYS	-	expression tag	UNP P47895
B	-2	LYS	-	expression tag	UNP P47895
B	-1	ALA	-	expression tag	UNP P47895
B	0	GLY	-	expression tag	UNP P47895
C	-16	HIS	-	expression tag	UNP P47895
C	-15	HIS	-	expression tag	UNP P47895
C	-14	HIS	-	expression tag	UNP P47895
C	-13	HIS	-	expression tag	UNP P47895
C	-12	HIS	-	expression tag	UNP P47895
C	-11	HIS	-	expression tag	UNP P47895
C	-10	LEU	-	expression tag	UNP P47895
C	-9	GLU	-	expression tag	UNP P47895
C	-8	SER	-	expression tag	UNP P47895
C	-7	THR	-	expression tag	UNP P47895
C	-6	SER	-	expression tag	UNP P47895
C	-5	LEU	-	expression tag	UNP P47895
C	-4	TYR	-	expression tag	UNP P47895
C	-3	LYS	-	expression tag	UNP P47895
C	-2	LYS	-	expression tag	UNP P47895
C	-1	ALA	-	expression tag	UNP P47895
C	0	GLY	-	expression tag	UNP P47895
D	-16	HIS	-	expression tag	UNP P47895
D	-15	HIS	-	expression tag	UNP P47895
D	-14	HIS	-	expression tag	UNP P47895
D	-13	HIS	-	expression tag	UNP P47895

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Chain	Residue	Modelled	Actual	Comment	Reference
D	-12	HIS	-	expression tag	UNP P47895
D	-11	HIS	-	expression tag	UNP P47895
D	-10	LEU	-	expression tag	UNP P47895
D	-9	GLU	-	expression tag	UNP P47895
D	-8	SER	-	expression tag	UNP P47895
D	-7	THR	-	expression tag	UNP P47895
D	-6	SER	-	expression tag	UNP P47895
D	-5	LEU	-	expression tag	UNP P47895
D	-4	TYR	-	expression tag	UNP P47895
D	-3	LYS	-	expression tag	UNP P47895
D	-2	LYS	-	expression tag	UNP P47895
D	-1	ALA	-	expression tag	UNP P47895
D	0	GLY	-	expression tag	UNP P47895
E	-16	HIS	-	expression tag	UNP P47895
E	-15	HIS	-	expression tag	UNP P47895
E	-14	HIS	-	expression tag	UNP P47895
E	-13	HIS	-	expression tag	UNP P47895
E	-12	HIS	-	expression tag	UNP P47895
E	-11	HIS	-	expression tag	UNP P47895
E	-10	LEU	-	expression tag	UNP P47895
E	-9	GLU	-	expression tag	UNP P47895
E	-8	SER	-	expression tag	UNP P47895
E	-7	THR	-	expression tag	UNP P47895
E	-6	SER	-	expression tag	UNP P47895
E	-5	LEU	-	expression tag	UNP P47895
E	-4	TYR	-	expression tag	UNP P47895
E	-3	LYS	-	expression tag	UNP P47895
E	-2	LYS	-	expression tag	UNP P47895
E	-1	ALA	-	expression tag	UNP P47895
E	0	GLY	-	expression tag	UNP P47895
F	-16	HIS	-	expression tag	UNP P47895
F	-15	HIS	-	expression tag	UNP P47895
F	-14	HIS	-	expression tag	UNP P47895
F	-13	HIS	-	expression tag	UNP P47895
F	-12	HIS	-	expression tag	UNP P47895
F	-11	HIS	-	expression tag	UNP P47895
F	-10	LEU	-	expression tag	UNP P47895
F	-9	GLU	-	expression tag	UNP P47895
F	-8	SER	-	expression tag	UNP P47895
F	-7	THR	-	expression tag	UNP P47895
F	-6	SER	-	expression tag	UNP P47895
F	-5	LEU	-	expression tag	UNP P47895

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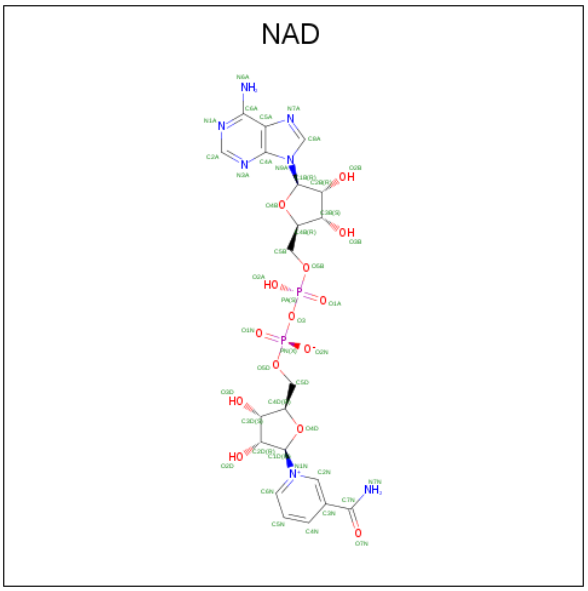
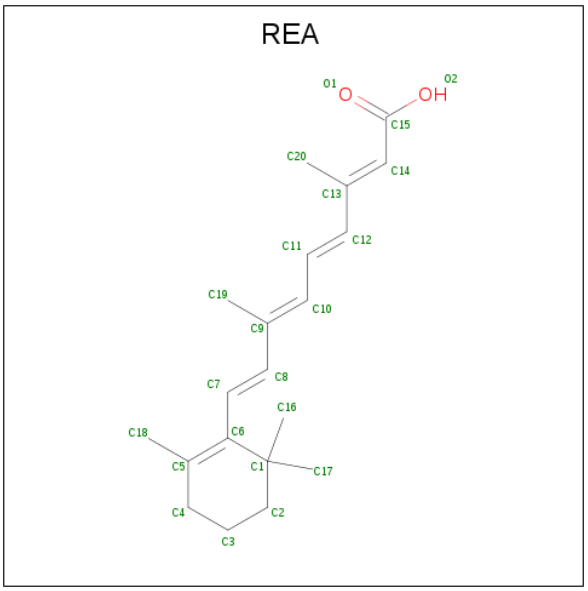
Chain	Residue	Modelled	Actual	Comment	Reference
F	-4	TYR	-	expression tag	UNP P47895
F	-3	LYS	-	expression tag	UNP P47895
F	-2	LYS	-	expression tag	UNP P47895
F	-1	ALA	-	expression tag	UNP P47895
F	0	GLY	-	expression tag	UNP P47895
G	-16	HIS	-	expression tag	UNP P47895
G	-15	HIS	-	expression tag	UNP P47895
G	-14	HIS	-	expression tag	UNP P47895
G	-13	HIS	-	expression tag	UNP P47895
G	-12	HIS	-	expression tag	UNP P47895
G	-11	HIS	-	expression tag	UNP P47895
G	-10	LEU	-	expression tag	UNP P47895
G	-9	GLU	-	expression tag	UNP P47895
G	-8	SER	-	expression tag	UNP P47895
G	-7	THR	-	expression tag	UNP P47895
G	-6	SER	-	expression tag	UNP P47895
G	-5	LEU	-	expression tag	UNP P47895
G	-4	TYR	-	expression tag	UNP P47895
G	-3	LYS	-	expression tag	UNP P47895
G	-2	LYS	-	expression tag	UNP P47895
G	-1	ALA	-	expression tag	UNP P47895
G	0	GLY	-	expression tag	UNP P47895
H	-16	HIS	-	expression tag	UNP P47895
H	-15	HIS	-	expression tag	UNP P47895
H	-14	HIS	-	expression tag	UNP P47895
H	-13	HIS	-	expression tag	UNP P47895
H	-12	HIS	-	expression tag	UNP P47895
H	-11	HIS	-	expression tag	UNP P47895
H	-10	LEU	-	expression tag	UNP P47895
H	-9	GLU	-	expression tag	UNP P47895
H	-8	SER	-	expression tag	UNP P47895
H	-7	THR	-	expression tag	UNP P47895
H	-6	SER	-	expression tag	UNP P47895
H	-5	LEU	-	expression tag	UNP P47895
H	-4	TYR	-	expression tag	UNP P47895
H	-3	LYS	-	expression tag	UNP P47895
H	-2	LYS	-	expression tag	UNP P47895
H	-1	ALA	-	expression tag	UNP P47895
H	0	GLY	-	expression tag	UNP P47895

- Molecule 2 is NICOTINAMIDE-ADENINE-DINUCLEOTIDE (three-letter code: NAD) (formula: $C_{21}H_{27}N_7O_{14}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
2	A	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	B	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	C	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	D	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	E	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	F	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	G	1	Total	C	N	O	P	0	0
			44	21	7	14	2		
2	H	1	Total	C	N	O	P	0	0
			44	21	7	14	2		

- Molecule 3 is RETINOIC ACID (three-letter code: REA) (formula: $C_{20}H_{28}O_2$).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C O 22 20 2	0	0
3	B	1	Total C O 22 20 2	0	0
3	C	1	Total C O 22 20 2	7	0
3	D	1	Total C O 22 20 2	0	0

- Molecule 4 is water.

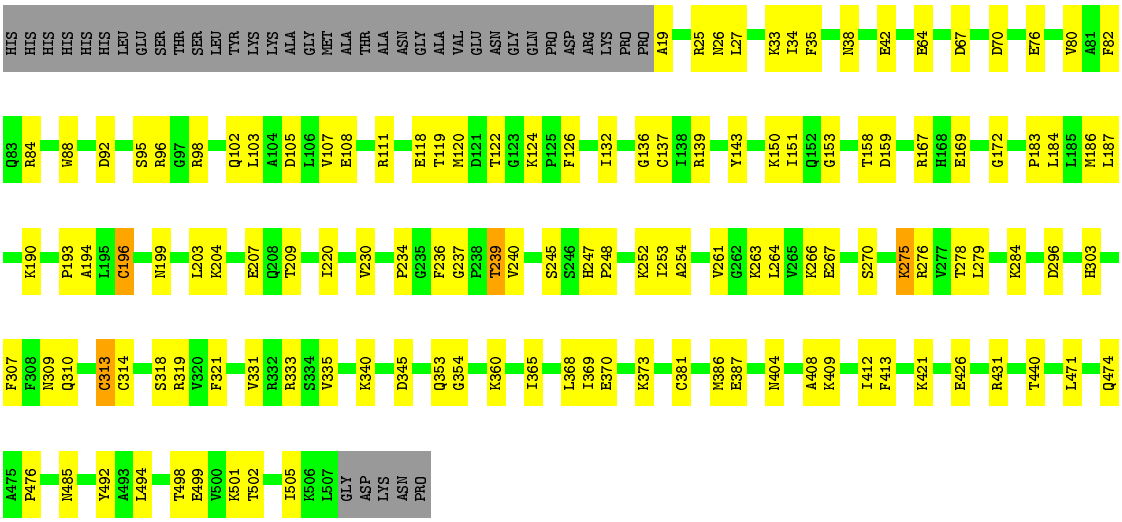
Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	19	Total O 19 19	0	0
4	B	15	Total O 15 15	0	0
4	C	9	Total O 9 9	0	0
4	D	12	Total O 12 12	0	0
4	E	2	Total O 2 2	0	0
4	F	4	Total O 4 4	0	0
4	H	2	Total O 2 2	0	0

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.

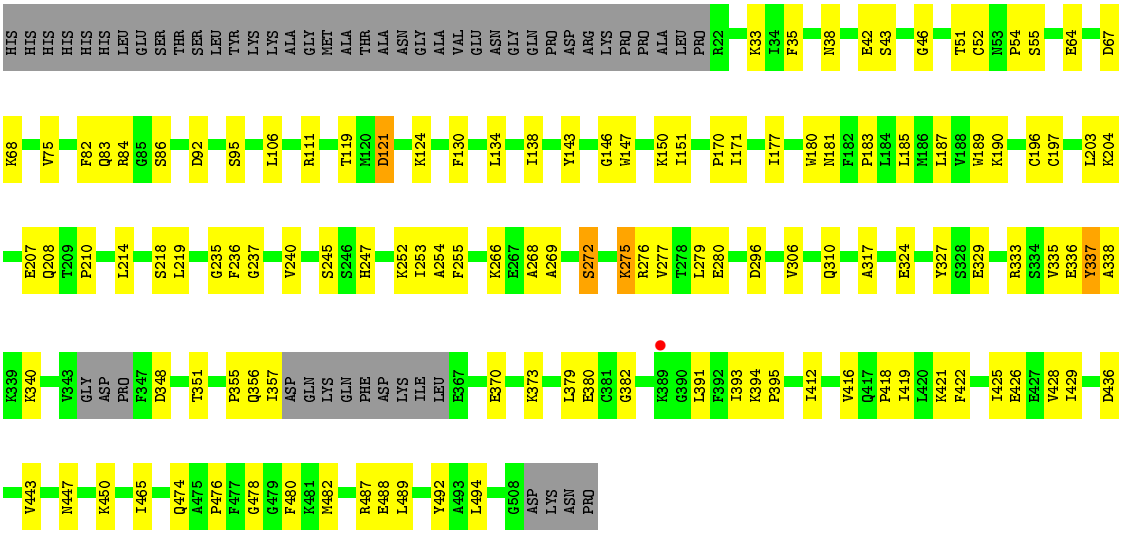
- Molecule 1: Aldehyde dehydrogenase family 1 member A3

Chain A:



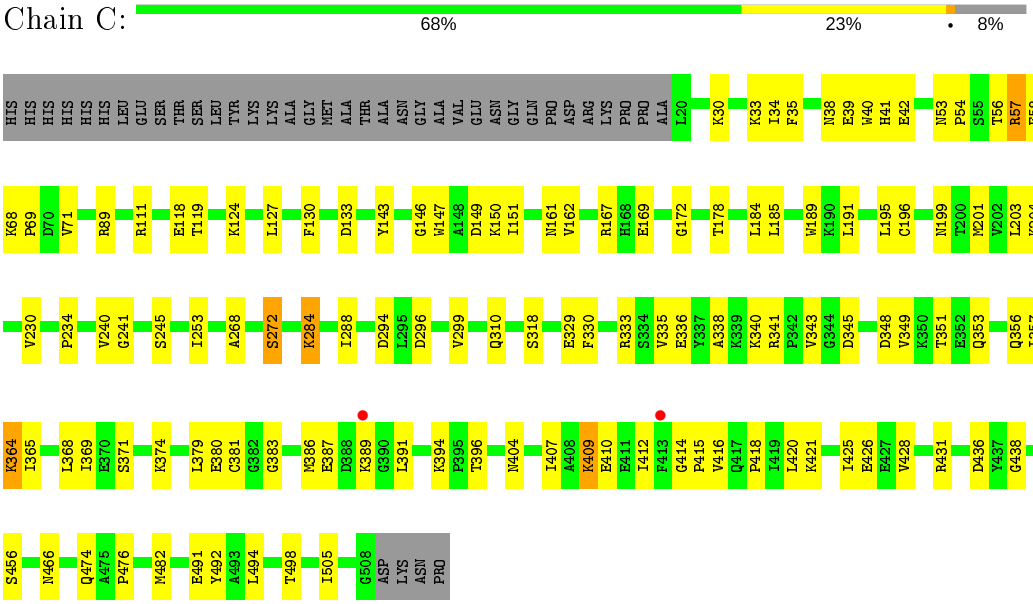
- Molecule 1: Aldehyde dehydrogenase family 1 member A3

Chain B:



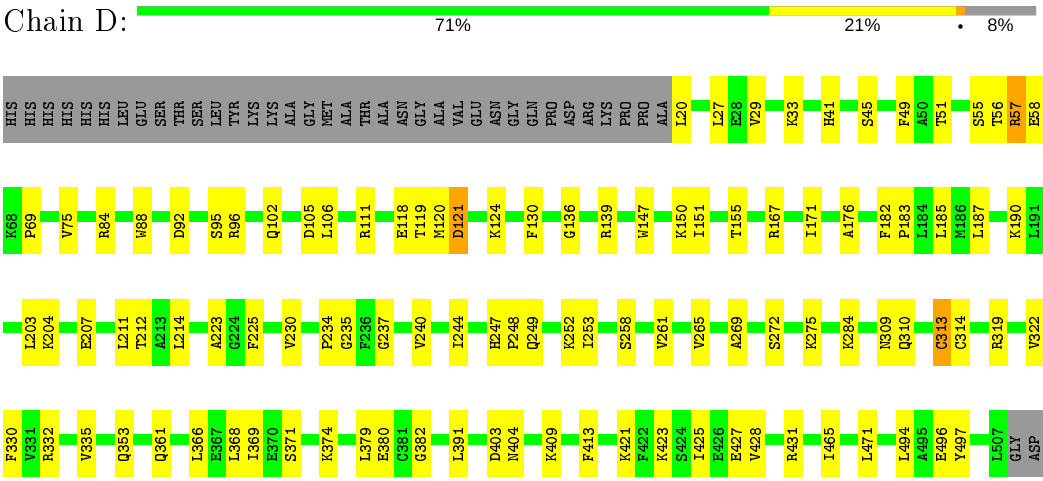
• Molecule 1: Aldehyde dehydrogenase family 1 member A3

Chain C:



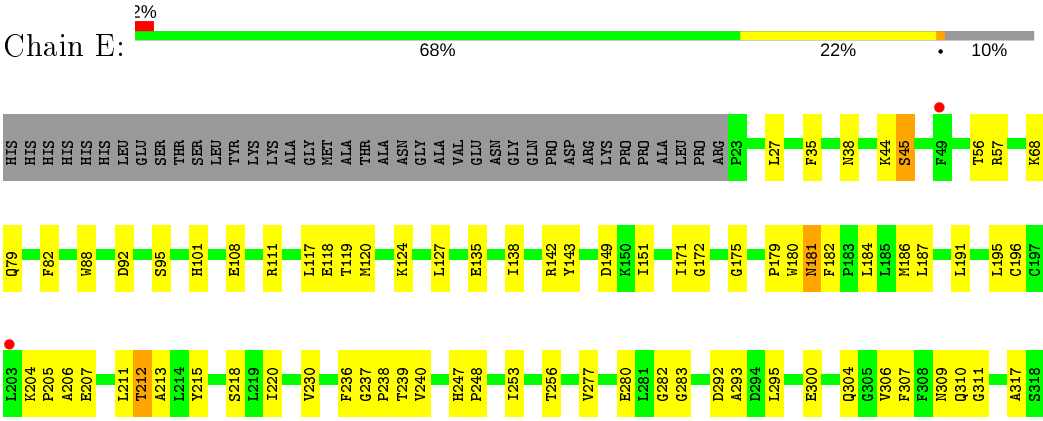
• Molecule 1: Aldehyde dehydrogenase family 1 member A3

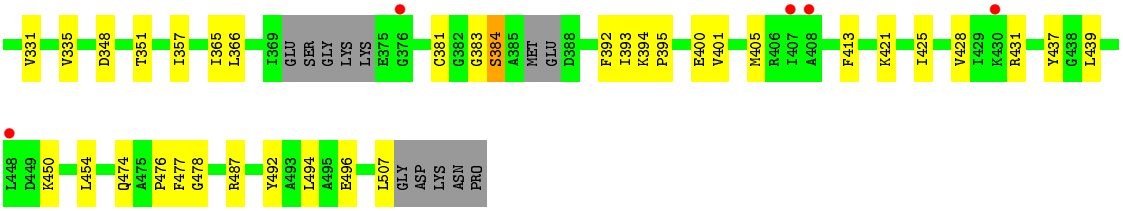
Chain D:



• Molecule 1: Aldehyde dehydrogenase family 1 member A3

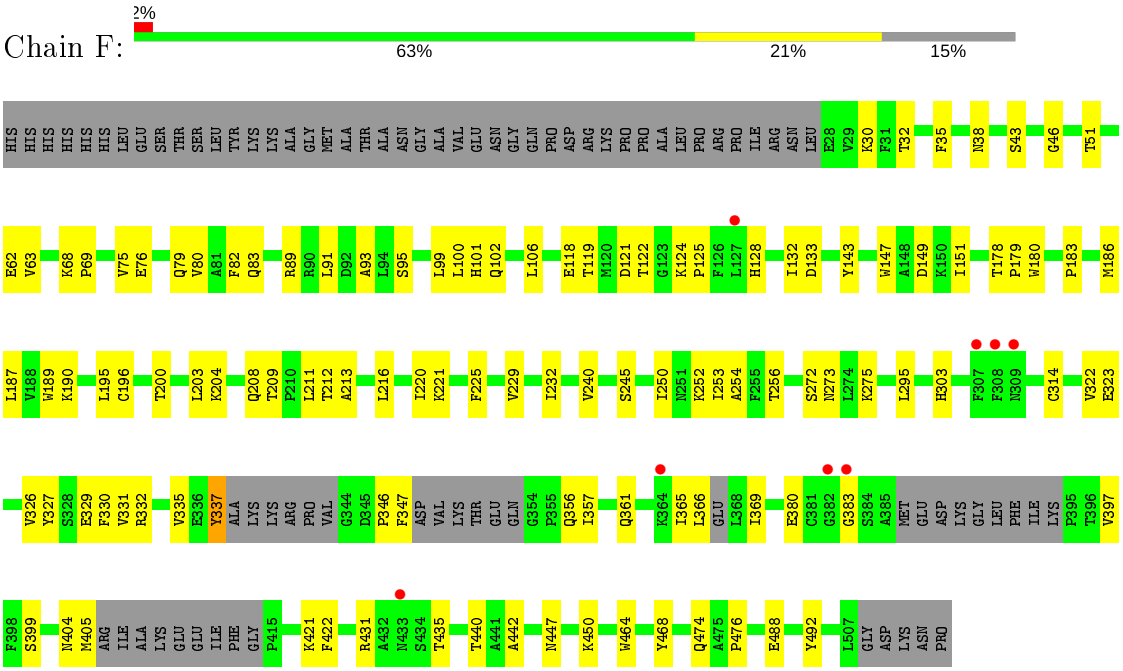
Chain E:





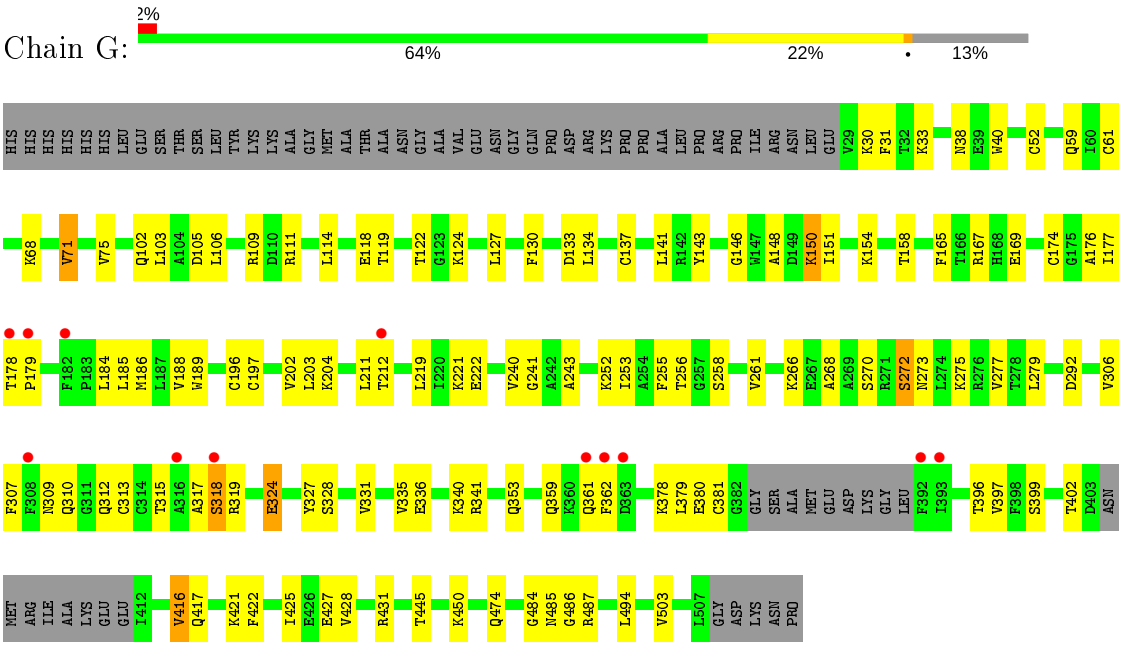
• Molecule 1: Aldehyde dehydrogenase family 1 member A3

Chain F:



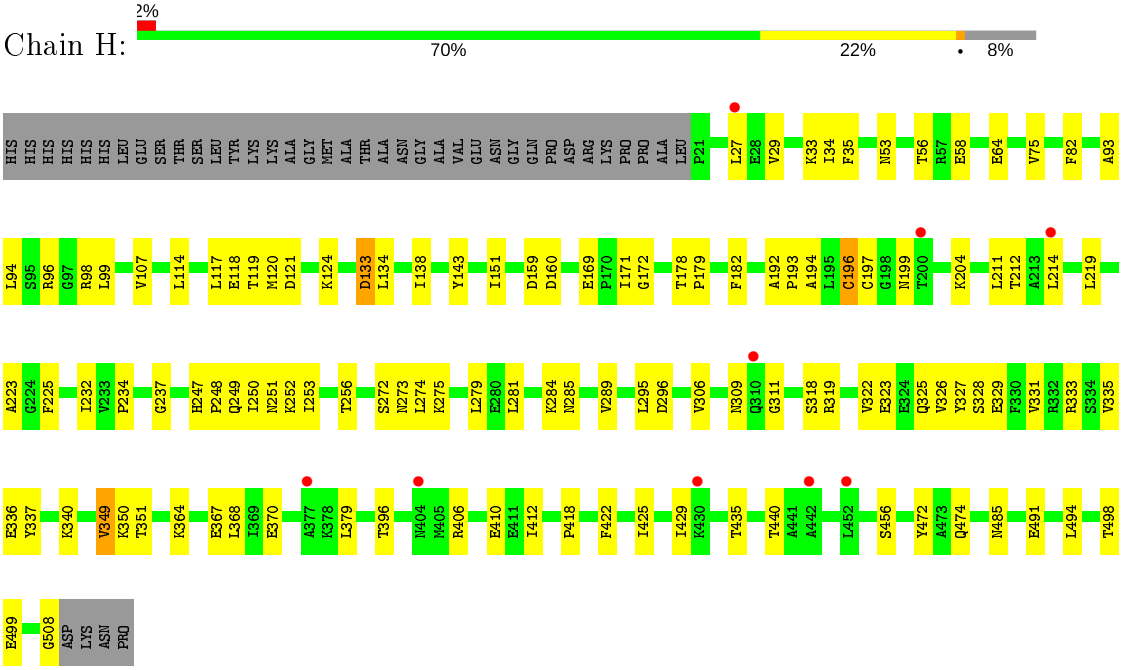
• Molecule 1: Aldehyde dehydrogenase family 1 member A3

Chain G:



• Molecule 1: Aldehyde dehydrogenase family 1 member A3

Chain H:


2%
70%
22%
8%
HIS HIS HIS HIS HIS HIS LEU GLU SER THR SER LEU TYR LYS LYS ALA GLY MET ALA THR ALA ASN GLY ALA VAL GLU ASN GLY GLN PRO ASP ARG LYS PRO PRO PRO ALA LEU P21 L27 E28 V29 K33 I34 F35 N53 T56 R57 E58 E64 V75 F82 A93
L94 S95 R96 G97 R98 L99 V107 L114 L117 E118 T119 M120 D121 K124 D133 L134 I138 Y143 I151 D159 D160 E169 P170 I171 G172 T178 P179 F182 A192 P193 A194 L195 C196 C197 G198 N199 T200 K204 L211 T212 A213 L214 L219
A223 G224 F225 I232 V233 P234 G237 H247 P248 Q249 I250 N251 K252 I253 T256 S272 N273 L274 K275 L279 E280 L281 K284 N285 V289 L295 D296 V306 N309 Q310 G311 S318 R319 V322 E323 E324 Q325 V326 Y327 S328 E329 F330 V331 R332 R333 S334 V335
E336 Y337 K340 V349 K350 T351 K364 E367 L368 I369 E370 A377 K378 L379 T396 N404 M405 R406 E410 E411 I412 P418 F422 I425 I429 K430 T435 T440 A441 A442 L452 S456 Y472 A473 Q474 N485 E491 L494 T498
E499 G508 ASP LYS ASN PRO

4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 1 21 1	Depositor
Cell constants a, b, c, α, β, γ	82.66Å 159.78Å 177.65Å 90.00° 93.69° 90.00°	Depositor
Resolution (Å)	49.57 – 2.90 47.51 – 2.90	Depositor EDS
% Data completeness (in resolution range)	98.3 (49.57-2.90) 98.3 (47.51-2.90)	Depositor EDS
R_{merge}	0.18	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	1.86 (at 2.91Å)	Xtriage
Refinement program	REFMAC 5.8.0071	Depositor
R, R_{free}	0.228 , 0.289 0.228 , 0.286	Depositor DCC
R_{free} test set	5047 reflections (5.04%)	wwPDB-VP
Wilson B-factor (Å^2)	39.5	Xtriage
Anisotropy	0.727	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.33 , 16.1	EDS
L-test for twinning[2]	$< \|L\| > = 0.48$, $< L^2 > = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	29992	wwPDB-VP
Average B, all atoms (Å^2)	44.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 36.07 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 5.2864e-04. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

[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: REA, NAD

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	0.61	0/3858	0.75	0/5221
1	B	0.61	0/3739	0.76	1/5056 (0.0%)
1	C	0.61	0/3857	0.76	0/5219
1	D	0.60	0/3853	0.75	0/5214
1	E	0.39	0/3770	0.62	0/5101
1	F	0.42	0/3521	0.61	0/4761
1	G	0.44	0/3644	0.62	0/4932
1	H	0.42	0/3849	0.62	0/5207
All	All	0.52	0/30091	0.69	1/40711 (0.0%)

There are no bond length outliers.

All (1) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	B	121	ASP	CB-CG-OD2	-5.95	112.95	118.30

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	3780	0	3813	104	0
1	B	3666	0	3696	86	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	C	3779	0	3811	97	0
1	D	3775	0	3808	82	0
1	E	3695	0	3721	84	0
1	F	3453	0	3457	74	0
1	G	3570	0	3593	88	0
1	H	3771	0	3801	87	0
2	A	44	0	26	1	0
2	B	44	0	26	3	0
2	C	44	0	26	4	0
2	D	44	0	26	4	0
2	E	44	0	26	4	0
2	F	44	0	26	3	0
2	G	44	0	26	5	0
2	H	44	0	26	2	0
3	A	22	0	27	18	0
3	B	22	0	27	7	0
3	C	22	0	27	7	0
3	D	22	0	27	10	0
4	A	19	0	0	2	0
4	B	15	0	0	1	0
4	C	9	0	0	0	0
4	D	12	0	0	0	0
4	E	2	0	0	0	0
4	F	4	0	0	0	0
4	H	2	0	0	1	0
All	All	29992	0	30016	699	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 (699) 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:310:GLN:OE1	1:A:353:GLN:HG3	1.48	1.12
1:B:180:TRP:CE3	1:B:357:ILE:HD12	1.90	1.05
1:C:34:ILE:HD13	1:C:234:PRO:HD2	1.47	0.96
1:D:56:THR:O	1:D:58:GLU:N	1.98	0.96
1:E:180:TRP:CE3	1:E:357:ILE:HD13	2.02	0.94
1:F:204:LYS:NZ	2:F:601:NAD:O2B	2.00	0.93
1:H:204:LYS:NZ	2:H:601:NAD:O2B	2.02	0.92
1:B:187:LEU:HD21	1:B:203:LEU:HD13	1.55	0.88

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:118:GLU:HG2	1:E:212:THR:HG21	1.55	0.88
1:G:167:ARG:NH1	1:G:169:GLU:OE2	2.07	0.88
1:A:284:LYS:HE2	1:A:408:ALA:O	1.74	0.86
1:G:261:VAL:HG11	2:G:601:NAD:O1A	1.76	0.86
1:E:180:TRP:CE3	1:E:357:ILE:CD1	2.59	0.85
1:B:296:ASP:OD1	1:B:333:ARG:NH1	2.11	0.84
1:D:187:LEU:HD21	1:D:203:LEU:HD23	1.60	0.83
1:E:180:TRP:CZ3	1:E:357:ILE:CD1	2.62	0.82
1:D:27:LEU:HB3	1:D:120:MET:HE1	1.65	0.78
1:B:348:ASP:HB2	1:B:351:THR:HG23	1.65	0.78
1:F:335:VAL:HG22	1:F:397:VAL:HG11	1.63	0.78
1:E:306:VAL:HG12	1:E:317:ALA:O	1.83	0.78
1:F:124:LYS:NZ	1:F:133:ASP:OD1	2.17	0.78
1:A:186:MET:HE1	3:A:602:REA:H14	1.64	0.78
1:C:56:THR:O	1:C:58:GLU:N	2.16	0.77
1:E:450:LYS:O	1:E:454:LEU:HD23	1.85	0.77
1:G:204:LYS:HE2	1:G:241:GLY:HA2	1.67	0.77
1:E:180:TRP:CZ3	1:E:357:ILE:HD12	2.20	0.77
1:B:268:ALA:O	1:B:272:SER:OG	2.02	0.77
1:C:335:VAL:HG11	1:C:380:GLU:HB3	1.66	0.76
1:A:172:GLY:O	1:A:199:ASN:HB2	1.85	0.76
1:C:386:MET:HB3	1:C:394:LYS:HG3	1.68	0.76
1:E:215:TYR:O	1:E:218:SER:OG	2.03	0.76
1:E:35:PHE:CZ	1:E:38:ASN:HA	2.21	0.75
3:B:602:REA:O1	3:B:602:REA:H201	1.86	0.75
1:H:179:PRO:HD3	1:H:256:THR:HB	1.68	0.75
1:E:119:THR:HG23	1:E:124:LYS:O	1.86	0.75
1:A:167:ARG:NH1	1:A:169:GLU:OE2	2.19	0.75
1:D:136:GLY:HA2	3:D:602:REA:H22	1.69	0.75
1:C:425:ILE:HD11	1:C:450:LYS:HD3	1.69	0.74
1:E:92:ASP:OD1	1:E:95:SER:OG	2.05	0.74
1:G:258:SER:OG	1:G:261:VAL:HG12	1.88	0.74
1:B:443:VAL:O	1:B:465:ILE:O	2.06	0.74
1:F:327:TYR:CD2	1:F:421:LYS:HE2	2.23	0.74
1:A:426:GLU:OE2	1:B:84:ARG:NH2	2.21	0.73
1:E:191:LEU:HD12	1:E:201:MET:SD	2.29	0.73
1:A:186:MET:CE	3:A:602:REA:H14	2.18	0.73
1:G:103:LEU:HD12	1:G:141:LEU:HD13	1.70	0.73
1:H:296:ASP:OD1	1:H:333:ARG:NH1	2.22	0.73
1:C:204:LYS:NZ	2:C:601:NAD:O2B	2.20	0.73
1:C:345:ASP:O	1:C:351:THR:HG21	1.89	0.73

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:322:VAL:HG21	1:F:330:PHE:CD2	2.23	0.73
1:F:356:GLN:OE1	1:F:356:GLN:N	2.21	0.73
1:B:247:HIS:O	1:B:275:LYS:NZ	2.22	0.72
1:F:180:TRP:CE3	1:F:357:ILE:HG21	2.24	0.72
1:D:361:GLN:OE1	2:D:601:NAD:O3D	2.03	0.72
1:G:33:LYS:HE3	1:G:40:TRP:HB3	1.69	0.72
1:A:252:LYS:NZ	1:A:278:THR:OG1	2.22	0.72
1:E:476:PRO:HG3	1:E:492:TYR:CD2	2.24	0.72
1:C:296:ASP:OD1	1:C:333:ARG:NH1	2.23	0.71
1:C:119:THR:HG23	1:C:124:LYS:O	1.92	0.70
1:D:27:LEU:HB3	1:D:120:MET:CE	2.20	0.70
1:B:119:THR:HG23	1:B:124:LYS:O	1.92	0.70
1:A:335:VAL:HG13	1:A:381:CYS:SG	2.32	0.70
1:B:245:SER:O	1:B:275:LYS:HE3	1.92	0.70
1:D:204:LYS:NZ	2:D:601:NAD:O2B	2.25	0.70
1:A:236:PHE:HB2	1:A:239:THR:CG2	2.22	0.69
1:D:421:LYS:O	1:D:431:ARG:NH2	2.24	0.69
1:D:92:ASP:OD1	1:D:95:SER:OG	2.06	0.69
1:B:180:TRP:CE3	1:B:357:ILE:CD1	2.71	0.69
1:H:143:TYR:CE1	1:H:474:GLN:HB3	2.27	0.69
1:H:119:THR:HG23	1:H:124:LYS:O	1.92	0.69
1:C:161:ASN:OD1	1:C:162:VAL:HG23	1.93	0.69
1:D:425:ILE:O	1:D:428:VAL:HG12	1.93	0.69
1:B:180:TRP:CZ3	1:B:357:ILE:HD12	2.29	0.68
3:A:602:REA:H181	3:A:602:REA:H8	1.76	0.68
1:H:107:VAL:HG23	1:H:138:ILE:HG12	1.76	0.68
1:H:284:LYS:NZ	1:H:435:THR:OG1	2.26	0.68
1:C:284:LYS:NZ	1:C:318:SER:OG	2.20	0.67
1:F:32:THR:OG1	1:F:62:GLU:O	2.12	0.67
1:H:99:LEU:HB3	1:H:225:PHE:CZ	2.30	0.67
1:B:134:LEU:O	1:B:138:ILE:HG13	1.95	0.66
1:C:167:ARG:NH2	1:C:169:GLU:OE2	2.28	0.66
1:E:476:PRO:HG3	1:E:492:TYR:HD2	1.61	0.66
1:G:336:GLU:O	1:G:340:LYS:HG3	1.96	0.66
1:H:53:ASN:HB3	1:H:56:THR:HG22	1.78	0.66
1:C:299:VAL:HG12	1:C:330:PHE:CD1	2.31	0.65
1:A:207:GLU:HG2	1:A:236:PHE:CD1	2.32	0.65
1:A:266:LYS:O	1:A:270:SER:OG	2.13	0.65
1:G:178:THR:CG2	1:G:186:MET:HB3	2.26	0.65
1:H:406:ARG:NE	1:H:410:GLU:OE1	2.29	0.65
1:B:43:SER:N	1:B:64:GLU:OE1	2.29	0.65

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:179:PRO:HD3	1:F:256:THR:HB	1.79	0.65
1:A:313:CYS:HB2	3:A:602:REA:H201	1.77	0.65
1:F:32:THR:OG1	1:F:63:VAL:HA	1.98	0.64
1:F:252:LYS:HG2	1:F:253:ILE:N	2.11	0.64
1:G:292:ASP:OD2	1:G:445:THR:OG1	2.10	0.64
1:G:143:TYR:CE1	1:G:474:GLN:HG3	2.32	0.64
1:G:327:TYR:CD2	1:G:421:LYS:HD3	2.33	0.64
1:E:207:GLU:HG2	1:E:236:PHE:CD1	2.33	0.63
1:D:313:CYS:HB2	3:D:602:REA:H202	1.80	0.63
1:H:279:LEU:HD12	1:H:485:ASN:OD1	1.98	0.63
1:A:98:ARG:NH1	4:A:701:HOH:O	2.29	0.63
1:C:268:ALA:O	1:C:272:SER:OG	2.12	0.63
1:H:197:CYS:SG	1:H:494:LEU:HD22	2.38	0.63
1:G:380:GLU:HB2	1:G:397:VAL:HG13	1.81	0.63
1:A:314:CYS:SG	3:A:602:REA:C15	2.87	0.62
1:F:331:VAL:O	1:F:335:VAL:HG23	2.00	0.62
1:F:329:GLU:OE1	1:F:332:ARG:NH2	2.33	0.62
1:A:284:LYS:HE3	1:A:319:ARG:CD	2.30	0.62
1:F:369:ILE:HG21	1:F:383:GLY:HA3	1.80	0.62
1:B:52:CYS:O	1:B:54:PRO:HD3	2.01	0.61
1:D:313:CYS:HB2	3:D:602:REA:C20	2.30	0.61
1:E:117:LEU:HD23	1:E:211:LEU:HB3	1.81	0.61
1:G:119:THR:HG23	1:G:124:LYS:O	2.00	0.61
1:H:124:LYS:NZ	1:H:133:ASP:OD2	2.33	0.61
1:A:19:ALA:N	4:A:702:HOH:O	2.33	0.61
1:A:314:CYS:N	3:A:602:REA:O1	2.33	0.61
1:F:250:ILE:HG22	1:F:275:LYS:HZ1	1.65	0.61
1:A:190:LYS:HD3	1:A:254:ALA:HB3	1.83	0.61
1:B:150:LYS:HE3	1:D:147:TRP:CD1	2.36	0.61
1:C:299:VAL:HG12	1:C:330:PHE:CE1	2.36	0.61
1:F:245:SER:HA	1:F:253:ILE:HD11	1.83	0.61
1:A:119:THR:HG23	1:A:124:LYS:O	2.01	0.60
1:D:324:GLU:OE1	1:D:423:LYS:NZ	2.27	0.60
1:A:151:ILE:HG12	1:A:494:LEU:HD13	1.83	0.60
1:A:139:ARG:HD2	3:A:602:REA:H21	1.82	0.60
1:D:56:THR:HG22	1:D:56:THR:O	2.00	0.60
1:D:284:LYS:O	1:D:319:ARG:NH1	2.33	0.60
1:D:214:LEU:HD21	1:D:234:PRO:HG3	1.84	0.60
1:D:314:CYS:HG	3:D:602:REA:C15	2.15	0.59
1:A:237:GLY:HA3	2:A:601:NAD:C8A	2.32	0.59
1:G:184:LEU:HB2	1:G:212:THR:HG21	1.84	0.59

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:245:SER:O	1:A:275:LYS:HE2	2.03	0.59
1:A:505:ILE:HG12	1:B:465:ILE:HG13	1.84	0.59
1:B:170:PRO:HB3	1:B:197:CYS:O	2.03	0.59
1:A:67:ASP:OD2	1:A:239:THR:OG1	2.19	0.59
1:E:44:LYS:O	1:E:45:SER:OG	2.15	0.59
1:G:331:VAL:O	1:G:335:VAL:HG23	2.02	0.59
3:A:602:REA:H181	3:A:602:REA:C8	2.33	0.59
1:G:306:VAL:HG12	1:G:317:ALA:O	2.03	0.58
1:D:187:LEU:CD2	1:D:203:LEU:HD23	2.32	0.58
1:E:253:ILE:CG2	1:E:277:VAL:HG22	2.33	0.58
1:D:371:SER:HA	1:D:374:LYS:HE2	1.85	0.58
1:E:394:LYS:HD2	1:E:395:PRO:HD2	1.85	0.58
1:H:410:GLU:O	1:H:412:ILE:HD12	2.03	0.58
3:D:602:REA:H181	3:D:602:REA:H8	1.84	0.58
1:C:204:LYS:HG3	1:C:204:LYS:O	2.02	0.58
1:C:379:LEU:HD11	1:C:383:GLY:HA3	1.85	0.58
1:F:102:GLN:O	1:F:106:LEU:HG	2.03	0.58
1:D:269:ALA:HB1	1:D:275:LYS:HG3	1.86	0.58
1:C:329:GLU:OE2	1:C:333:ARG:NH2	2.37	0.58
1:G:378:LYS:HG2	1:G:399:SER:HB3	1.84	0.58
1:C:178:THR:O	2:C:601:NAD:O3B	2.15	0.57
1:E:207:GLU:HG2	1:E:236:PHE:HA	1.87	0.57
1:E:184:LEU:O	1:E:187:LEU:HB3	2.05	0.57
1:A:26:ASN:O	1:A:26:ASN:OD1	2.23	0.57
1:C:426:GLU:OE1	1:D:84:ARG:NH2	2.38	0.57
1:A:27:LEU:HB3	1:A:120:MET:CE	2.34	0.57
1:G:179:PRO:HG3	1:G:256:THR:HG22	1.87	0.57
1:C:185:LEU:HD11	3:C:602:REA:H173	1.86	0.57
1:D:427:GLU:O	1:D:431:ARG:HG3	2.05	0.57
1:F:476:PRO:HG3	1:F:492:TYR:HD2	1.70	0.57
1:H:279:LEU:HD22	1:H:281:LEU:HD21	1.87	0.57
1:E:236:PHE:HB2	1:E:239:THR:HG22	1.85	0.56
1:H:107:VAL:CG2	1:H:138:ILE:HG12	2.34	0.56
1:C:203:LEU:HD13	1:C:230:VAL:HG13	1.87	0.56
1:F:404:ASN:OD1	1:F:405:MET:N	2.38	0.56
1:B:190:LYS:HG2	1:B:254:ALA:HB3	1.86	0.56
1:D:471:LEU:HD12	3:D:602:REA:H10	1.86	0.56
1:H:124:LYS:HG2	1:H:309:ASN:OD1	2.05	0.56
1:B:207:GLU:HG3	1:B:235:GLY:O	2.05	0.56
1:E:27:LEU:HB3	1:E:120:MET:HE1	1.88	0.56
1:G:266:LYS:HG2	1:G:277:VAL:HG11	1.88	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:207:GLU:CG	1:E:236:PHE:HA	2.36	0.56
1:F:421:LYS:O	1:F:431:ARG:NH2	2.38	0.56
1:A:247:HIS:O	1:A:275:LYS:NZ	2.38	0.56
1:A:279:LEU:HD12	1:A:485:ASN:OD1	2.05	0.56
1:F:295:LEU:HD13	1:F:326:VAL:HG11	1.88	0.56
1:D:118:GLU:OE2	1:D:212:THR:HG21	2.06	0.55
1:G:38:ASN:HB3	1:G:221:LYS:HD3	1.87	0.55
1:H:323:GLU:HG2	1:H:422:PHE:CE2	2.41	0.55
1:F:245:SER:HA	1:F:253:ILE:CD1	2.37	0.55
1:G:111:ARG:HG2	1:G:130:PHE:CE1	2.41	0.55
1:H:29:VAL:HG21	1:H:211:LEU:HD13	1.89	0.55
1:H:336:GLU:O	1:H:340:LYS:HG2	2.06	0.55
1:B:42:GLU:HA	1:B:64:GLU:OE1	2.07	0.55
1:C:310:GLN:HB3	1:C:356:GLN:HE22	1.70	0.55
1:B:177:ILE:HD12	1:B:253:ILE:HD11	1.89	0.55
1:E:365:ILE:HD11	1:E:393:ILE:HD13	1.88	0.55
1:G:109:ARG:NH2	1:G:222:GLU:OE1	2.39	0.55
1:A:139:ARG:HD2	3:A:602:REA:C2	2.36	0.55
1:B:43:SER:HB2	1:B:46:GLY:H	1.71	0.55
1:E:306:VAL:O	1:E:311:GLY:HA2	2.07	0.55
1:A:245:SER:HA	1:A:253:ILE:HD11	1.88	0.55
1:C:33:LYS:HA	1:C:64:GLU:HG3	1.88	0.55
1:C:348:ASP:O	1:C:351:THR:HG22	2.07	0.55
1:F:35:PHE:CZ	1:F:38:ASN:HA	2.42	0.55
1:B:151:ILE:HG12	1:B:494:LEU:HD23	1.88	0.54
1:A:310:GLN:HE22	1:A:353:GLN:HA	1.71	0.54
1:E:101:HIS:CE1	1:E:142:ARG:HG3	2.43	0.54
1:E:366:LEU:CD2	1:E:384:SER:HB2	2.38	0.54
1:G:319:ARG:NH1	1:G:431:ARG:O	2.36	0.54
1:H:273:ASN:OD1	1:H:275:LYS:HG3	2.08	0.54
1:C:33:LYS:HB3	1:C:41:HIS:O	2.07	0.54
1:D:404:ASN:HA	1:D:409:LYS:NZ	2.21	0.54
1:F:365:ILE:O	1:F:369:ILE:HG13	2.07	0.54
1:F:80:VAL:O	1:F:83:GLN:HB2	2.07	0.54
1:E:283:GLY:HA2	1:E:437:TYR:CD2	2.42	0.54
1:G:261:VAL:CG1	2:G:601:NAD:O1A	2.54	0.54
1:A:27:LEU:HB3	1:A:120:MET:HE1	1.89	0.54
1:A:499:GLU:HB3	1:B:480:PHE:CE1	2.43	0.54
3:D:602:REA:C18	3:D:602:REA:H8	2.36	0.54
1:G:179:PRO:HD3	1:G:256:THR:HB	1.90	0.54
1:A:124:LYS:HE2	1:A:309:ASN:OD1	2.07	0.54

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:476:PRO:HG3	1:F:492:TYR:CD2	2.42	0.54
1:C:189:TRP:HE1	3:C:602:REA:H172	1.73	0.53
1:C:284:LYS:HE2	1:C:409:LYS:C	2.29	0.53
1:H:53:ASN:HB3	1:H:56:THR:CG2	2.38	0.53
1:C:151:ILE:HG12	1:C:494:LEU:HD13	1.89	0.53
1:C:371:SER:HA	1:C:374:LYS:HD2	1.89	0.53
1:E:365:ILE:HD11	1:E:393:ILE:HG21	1.89	0.53
1:A:313:CYS:SG	3:A:602:REA:C20	2.96	0.53
1:F:327:TYR:CE2	1:F:421:LYS:HE2	2.44	0.53
1:G:255:PHE:HB3	1:G:279:LEU:HD23	1.89	0.53
1:C:149:ASP:OD1	1:C:150:LYS:NZ	2.40	0.53
1:G:306:VAL:HG21	1:G:417:GLN:HB2	1.91	0.53
1:B:269:ALA:HB1	1:B:275:LYS:HG2	1.91	0.53
1:C:341:ARG:HH22	1:C:353:GLN:NE2	2.07	0.53
1:B:147:TRP:HB3	1:B:494:LEU:HD21	1.90	0.53
1:B:338:ALA:HB1	1:B:395:PRO:HB2	1.91	0.53
1:B:51:THR:HG1	1:B:121:ASP:CG	2.12	0.53
1:E:348:ASP:HB2	1:E:351:THR:OG1	2.09	0.53
1:E:56:THR:O	1:E:56:THR:HG23	2.09	0.53
1:A:421:LYS:O	1:A:431:ARG:NH1	2.36	0.53
1:H:75:VAL:HG11	1:H:249:GLN:HB2	1.91	0.53
1:D:111:ARG:HG2	1:D:130:PHE:CE1	2.43	0.53
1:E:182:PHE:HB2	1:E:186:MET:HG2	1.91	0.53
1:H:27:LEU:HB3	1:H:120:MET:HE1	1.91	0.53
1:B:83:GLN:O	1:B:86:SER:HB3	2.10	0.52
1:C:383:GLY:N	1:C:396:THR:HG22	2.23	0.52
1:C:35:PHE:CZ	1:C:38:ASN:HA	2.44	0.52
1:D:252:LYS:HE3	1:D:496:GLU:O	2.09	0.52
1:B:111:ARG:HG2	1:B:130:PHE:CE1	2.45	0.52
1:D:27:LEU:CB	1:D:120:MET:HE1	2.37	0.52
1:H:250:ILE:C	1:H:275:LYS:HD3	2.29	0.52
1:F:119:THR:HG23	1:F:346:PRO:HB2	1.91	0.52
1:A:236:PHE:HB2	1:A:239:THR:HG22	1.91	0.52
1:B:327:TYR:CE2	1:B:419:ILE:HG22	2.45	0.52
1:F:143:TYR:CZ	1:F:474:GLN:HA	2.45	0.52
1:G:307:PHE:HB3	1:G:341:ARG:NH1	2.25	0.52
1:B:280:GLU:OE2	1:B:478:GLY:HA2	2.10	0.52
1:D:253:ILE:HG12	1:D:275:LYS:HD3	1.92	0.51
1:G:268:ALA:O	1:G:272:SER:OG	2.16	0.51
1:D:329:GLU:OE1	1:D:332:ARG:NH2	2.40	0.51
1:H:117:LEU:HD11	1:H:212:THR:HA	1.93	0.51

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:154:LYS:HE2	1:H:491:GLU:OE1	2.10	0.51
1:A:296:ASP:OD1	1:A:333:ARG:NH1	2.43	0.51
1:B:337:TYR:HA	1:B:340:LYS:HE2	1.92	0.51
1:D:139:ARG:HD2	3:D:602:REA:H21	1.92	0.51
1:H:322:VAL:HG22	1:H:327:TYR:HD1	1.75	0.51
1:A:82:PHE:CZ	1:A:172:GLY:HA2	2.46	0.51
1:E:191:LEU:HD11	1:E:195:LEU:HD11	1.93	0.51
1:G:313:CYS:HG	1:G:315:THR:HG1	1.58	0.51
1:B:306:VAL:HG22	1:B:317:ALA:O	2.10	0.51
1:B:310:GLN:HG3	1:B:356:GLN:NE2	2.25	0.51
1:D:171:ILE:HD12	1:D:252:LYS:HD2	1.93	0.51
1:G:114:LEU:HD22	1:G:212:THR:HG23	1.93	0.51
1:C:214:LEU:HD21	1:C:234:PRO:HG3	1.93	0.51
1:C:456:SER:HA	1:D:167:ARG:NH1	2.26	0.51
1:D:471:LEU:HD12	3:D:602:REA:C10	2.41	0.51
1:D:33:LYS:HB3	1:D:41:HIS:O	2.11	0.50
1:F:204:LYS:HD3	1:F:204:LYS:O	2.11	0.50
1:H:75:VAL:HG11	1:H:247:HIS:CE1	2.46	0.50
1:E:306:VAL:HG23	1:E:307:PHE:CD2	2.47	0.50
1:A:220:ILE:HD13	1:A:230:VAL:HG11	1.92	0.50
1:A:35:PHE:CZ	1:A:38:ASN:HA	2.47	0.50
1:C:172:GLY:O	1:C:199:ASN:HB3	2.12	0.50
1:C:245:SER:HA	1:C:253:ILE:HD11	1.93	0.50
1:A:266:LYS:HD2	1:A:279:LEU:HD11	1.93	0.50
1:C:288:ILE:HG23	1:C:428:VAL:HG21	1.94	0.50
1:E:300:GLU:O	1:E:304:GLN:HG2	2.12	0.50
1:F:178:THR:HG23	1:F:179:PRO:HD2	1.93	0.50
1:A:187:LEU:HD21	1:A:203:LEU:HD13	1.93	0.50
1:A:313:CYS:CB	3:A:602:REA:H201	2.42	0.50
1:A:42:GLU:HB2	1:A:64:GLU:OE1	2.11	0.50
1:A:368:LEU:CD2	1:A:412:ILE:HG12	2.41	0.50
1:E:180:TRP:CD2	1:E:357:ILE:HD13	2.44	0.50
1:A:368:LEU:HD23	1:A:412:ILE:HG12	1.94	0.50
1:G:266:LYS:HD3	1:H:274:LEU:CD2	2.42	0.50
1:A:137:CYS:SG	1:A:184:LEU:HG	2.52	0.49
1:E:44:LYS:O	1:E:45:SER:CB	2.60	0.49
1:C:379:LEU:HD11	1:C:383:GLY:CA	2.42	0.49
1:C:444:PHE:CD2	1:C:466:ASN:HA	2.47	0.49
1:F:250:ILE:O	1:F:275:LYS:NZ	2.46	0.49
1:H:53:ASN:CB	1:H:56:THR:HG22	2.42	0.49
1:A:245:SER:O	1:A:275:LYS:CE	2.60	0.49

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:284:LYS:HE3	1:A:319:ARG:HD3	1.93	0.49
1:C:56:THR:C	1:C:58:GLU:H	2.16	0.49
1:A:365:ILE:O	1:A:369:ILE:HG13	2.13	0.49
1:H:364:LYS:O	1:H:367:GLU:HG2	2.10	0.49
1:G:359:GLN:O	1:G:362:PHE:HB3	2.12	0.49
1:C:56:THR:OG1	1:C:56:THR:O	2.27	0.49
1:E:149:ASP:HB2	1:G:474:GLN:HG2	1.93	0.49
1:C:284:LYS:NZ	1:C:410:GLU:O	2.46	0.49
1:H:425:ILE:O	1:H:429:ILE:HG13	2.12	0.49
1:A:471:LEU:O	3:A:602:REA:H173	2.12	0.49
1:B:143:TYR:CE1	1:B:474:GLN:HB3	2.48	0.49
1:C:365:ILE:HD13	1:C:415:PRO:HD2	1.95	0.49
1:A:313:CYS:SG	3:A:602:REA:H201	2.53	0.49
1:G:184:LEU:HB2	1:G:212:THR:CG2	2.43	0.49
1:E:421:LYS:O	1:E:431:ARG:NH1	2.46	0.48
1:E:27:LEU:HB3	1:E:120:MET:CE	2.43	0.48
1:G:273:ASN:OD1	1:G:275:LYS:HG2	2.13	0.48
1:C:241:GLY:C	2:C:601:NAD:H2A	2.34	0.48
1:C:436:ASP:O	1:C:482:MET:HB2	2.13	0.48
1:G:266:LYS:CG	1:G:277:VAL:HG11	2.43	0.48
1:C:365:ILE:HD11	1:C:416:VAL:HG23	1.96	0.48
1:C:420:LEU:N	1:C:420:LEU:HD12	2.28	0.48
1:H:114:LEU:HB2	1:H:134:LEU:HD21	1.94	0.48
1:B:185:LEU:HD21	3:B:602:REA:C17	2.44	0.48
1:E:280:GLU:OE1	1:E:477:PHE:O	2.31	0.48
1:G:253:ILE:HD11	1:G:275:LYS:HE2	1.96	0.48
2:E:601:NAD:H6N	2:E:601:NAD:O5D	2.14	0.48
1:G:174:CYS:SG	1:G:252:LYS:HB3	2.54	0.48
1:G:204:LYS:NZ	2:G:601:NAD:H1B	2.29	0.48
1:A:169:GLU:OE2	1:A:501:LYS:NZ	2.32	0.48
1:B:207:GLU:CG	1:B:236:PHE:HA	2.44	0.48
1:H:328:SER:O	1:H:331:VAL:HG12	2.14	0.48
1:C:184:LEU:HD11	1:C:216:LEU:HD22	1.96	0.48
1:C:245:SER:HA	1:C:253:ILE:CD1	2.44	0.48
1:A:33:LYS:HA	1:A:64:GLU:CG	2.44	0.47
1:C:336:GLU:O	1:C:340:LYS:HB3	2.13	0.47
1:G:134:LEU:O	1:G:137:CYS:HB2	2.14	0.47
1:G:184:LEU:HD13	1:G:212:THR:HG22	1.95	0.47
1:G:197:CYS:SG	1:G:494:LEU:HD22	2.54	0.47
1:A:122:THR:HG22	1:A:209:THR:HG21	1.96	0.47
1:B:412:ILE:HD13	1:B:416:VAL:HB	1.96	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:407:ILE:O	1:C:412:ILE:HD11	2.13	0.47
1:D:207:GLU:HB3	1:D:235:GLY:O	2.14	0.47
1:H:171:ILE:HG22	1:H:251:ASN:HB3	1.95	0.47
1:A:245:SER:HA	1:A:253:ILE:CD1	2.44	0.47
2:G:601:NAD:H4D	2:G:601:NAD:O2A	2.15	0.47
1:A:194:ALA:O	1:A:199:ASN:OD1	2.33	0.47
1:D:194:ALA:HB2	1:D:497:TYR:CE1	2.49	0.47
1:E:179:PRO:HD3	1:E:256:THR:HB	1.96	0.47
1:G:484:GLY:C	1:G:485:ASN:HD22	2.17	0.47
1:E:220:ILE:HD13	1:E:230:VAL:HG11	1.94	0.47
1:E:92:ASP:OD1	1:E:95:SER:CB	2.62	0.47
1:F:327:TYR:CD1	1:F:421:LYS:HG2	2.49	0.47
1:G:71:VAL:HG11	1:G:243:ALA:HB1	1.96	0.47
1:B:92:ASP:OD1	1:B:95:SER:OG	2.24	0.47
1:D:67:ASP:HB3	1:D:69:PRO:HD2	1.96	0.47
1:F:204:LYS:HG3	1:F:240:VAL:HG12	1.97	0.47
1:F:190:LYS:HD2	1:F:254:ALA:HB3	1.97	0.47
1:G:176:ALA:HB3	1:G:203:LEU:HD23	1.97	0.47
1:G:312:GLN:HE21	1:G:361:GLN:NE2	2.13	0.47
1:A:153:GLY:HA3	1:D:155:THR:OG1	2.15	0.47
1:C:456:SER:HA	1:D:167:ARG:HH11	1.80	0.47
1:G:186:MET:HE2	1:G:256:THR:HG21	1.96	0.47
1:B:210:PRO:O	1:B:214:LEU:HG	2.14	0.47
1:D:404:ASN:HA	1:D:409:LYS:HZ2	1.79	0.47
1:E:181:ASN:HD21	2:E:601:NAD:C4N	2.27	0.47
1:E:400:GLU:OE2	1:E:421:LYS:HE2	2.15	0.47
1:A:335:VAL:HG13	1:A:381:CYS:HG	1.79	0.47
1:B:422:PHE:CD2	1:B:428:VAL:HB	2.50	0.47
1:H:349:VAL:HG23	1:H:350:LYS:H	1.80	0.47
1:H:379:LEU:HD11	1:H:396:THR:HG23	1.97	0.47
3:A:602:REA:H8	3:A:602:REA:C18	2.44	0.47
1:C:383:GLY:H	1:C:396:THR:HG22	1.79	0.47
1:C:421:LYS:O	1:C:431:ARG:NH2	2.37	0.47
1:F:186:MET:O	1:F:190:LYS:HG2	2.15	0.47
1:F:208:GLN:N	1:F:208:GLN:OE1	2.46	0.47
1:G:165:PHE:CE1	1:G:503:VAL:HB	2.50	0.47
1:D:102:GLN:O	1:D:105:ASP:HB2	2.15	0.46
1:G:124:LYS:NZ	1:G:133:ASP:OD2	2.38	0.46
1:A:92:ASP:HB2	1:A:95:SER:OG	2.15	0.46
1:D:118:GLU:OE1	1:D:183:PRO:HD2	2.16	0.46
1:E:143:TYR:CZ	1:E:474:GLN:HA	2.50	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:G:177:ILE:O	1:G:255:PHE:HA	2.15	0.46
1:C:67:ASP:O	1:C:68:LYS:C	2.54	0.46
1:D:203:LEU:HD13	1:D:230:VAL:HG13	1.97	0.46
1:E:204:LYS:HD2	1:E:240:VAL:HG23	1.97	0.46
1:F:93:ALA:HB1	1:F:149:ASP:HA	1.97	0.46
1:A:102:GLN:O	1:A:105:ASP:HB2	2.15	0.46
1:A:331:VAL:O	1:A:335:VAL:HG23	2.16	0.46
1:B:146:GLY:O	1:B:150:LYS:HD2	2.15	0.46
1:C:185:LEU:HD11	3:C:602:REA:C17	2.45	0.46
1:B:68:LYS:HE2	4:B:702:HOH:O	2.15	0.46
1:H:284:LYS:O	1:H:284:LYS:HE2	2.15	0.46
1:H:322:VAL:CG2	1:H:327:TYR:HA	2.46	0.46
1:A:360:LYS:HE2	1:A:360:LYS:HB3	1.75	0.46
1:A:476:PRO:HG3	1:A:492:TYR:CD2	2.50	0.46
1:B:181:ASN:C	1:B:183:PRO:HD3	2.35	0.46
1:C:284:LYS:HE2	1:C:410:GLU:N	2.31	0.46
1:D:237:GLY:HA3	2:D:601:NAD:C8A	2.46	0.46
1:A:25:ARG:NH1	1:A:345:ASP:OD2	2.49	0.46
1:C:365:ILE:HD12	1:C:414:GLY:HA3	1.97	0.46
1:D:171:ILE:CD1	1:D:252:LYS:HD2	2.45	0.46
1:D:335:VAL:HG11	1:D:380:GLU:HB3	1.98	0.46
1:F:447:ASN:HB3	1:F:450:LYS:HB2	1.97	0.46
1:A:370:GLU:HA	1:A:373:LYS:HE3	1.97	0.46
3:A:602:REA:O1	3:A:602:REA:H201	2.16	0.45
1:A:76:GLU:O	1:A:80:VAL:HG23	2.16	0.45
1:C:185:LEU:HD21	3:C:602:REA:C17	2.46	0.45
1:A:136:GLY:HA2	3:A:602:REA:H42	1.99	0.45
1:A:313:CYS:HB2	3:A:602:REA:C20	2.43	0.45
1:F:272:SER:O	1:F:273:ASN:HB3	2.16	0.45
1:H:237:GLY:HA3	2:H:601:NAD:C8A	2.46	0.45
1:H:82:PHE:CZ	1:H:172:GLY:HA2	2.51	0.45
1:A:143:TYR:CZ	1:A:474:GLN:HA	2.51	0.45
1:C:476:PRO:HG3	1:C:492:TYR:CD2	2.51	0.45
1:E:118:GLU:OE2	1:E:212:THR:OG1	2.29	0.45
1:F:295:LEU:HD21	1:F:329:GLU:HG3	1.97	0.45
1:G:75:VAL:HG22	1:G:202:VAL:HG21	1.97	0.45
1:H:306:VAL:O	1:H:311:GLY:HA2	2.16	0.45
1:A:263:LYS:O	1:A:267:GLU:HB2	2.16	0.45
1:A:284:LYS:HE3	1:A:319:ARG:CG	2.47	0.45
1:C:369:ILE:HG21	1:C:383:GLY:O	2.16	0.45
1:B:147:TRP:CD1	1:D:150:LYS:HE3	2.51	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:B:235:GLY:HA3	1:B:240:VAL:HG21	1.99	0.45
1:B:266:LYS:HG3	1:B:279:LEU:HD11	1.98	0.45
1:B:425:ILE:O	1:B:429:ILE:HG13	2.16	0.45
1:C:416:VAL:O	1:C:418:PRO:HD3	2.15	0.45
1:F:82:PHE:O	1:F:89:ARG:NH1	2.50	0.45
1:H:151:ILE:HD11	1:H:196:CYS:SG	2.57	0.45
1:H:285:ASN:ND2	1:H:440:THR:HB	2.31	0.45
1:H:326:VAL:O	1:H:326:VAL:HG12	2.17	0.45
1:B:67:ASP:O	1:B:68:LYS:C	2.55	0.45
1:E:75:VAL:HG12	1:E:79:GLN:NE2	2.32	0.45
1:F:118:GLU:OE2	1:F:212:THR:HG21	2.16	0.45
1:G:106:LEU:HB3	1:G:219:LEU:HD22	1.98	0.45
1:H:318:SER:O	1:H:418:PRO:HG2	2.16	0.45
1:H:367:GLU:HG3	1:H:368:LEU:N	2.32	0.45
1:C:146:GLY:O	1:C:150:LYS:HD2	2.17	0.45
1:D:88:TRP:CH2	1:D:96:ARG:HD2	2.52	0.45
1:H:160:ASP:OD1	1:H:160:ASP:N	2.45	0.45
1:H:508:GLY:O	4:H:701:HOH:O	2.21	0.45
1:B:329:GLU:OE1	1:H:333:ARG:NH2	2.38	0.45
1:G:102:GLN:O	1:G:105:ASP:HB2	2.17	0.45
1:G:335:VAL:HG22	1:G:397:VAL:HG11	1.98	0.45
1:B:324:GLU:HG2	1:B:421:LYS:HD3	1.98	0.45
1:F:200:THR:HG22	1:F:229:VAL:HA	1.99	0.45
1:A:310:GLN:CD	1:A:354:GLY:H	2.20	0.44
1:A:386:MET:O	1:A:387:GLU:HG2	2.17	0.44
1:D:368:LEU:O	1:D:371:SER:OG	2.28	0.44
1:E:124:LYS:HG2	1:E:309:ASN:OD1	2.17	0.44
1:E:439:LEU:HD11	1:E:477:PHE:CZ	2.52	0.44
1:H:192:ALA:HB3	1:H:193:PRO:CD	2.46	0.44
3:C:602:REA:H8	3:C:602:REA:C18	2.47	0.44
1:E:68:LYS:HB3	1:E:69:PRO:HD3	2.00	0.44
1:F:361:GLN:NE2	2:F:601:NAD:O2D	2.50	0.44
1:F:189:TRP:HE3	1:F:488:GLU:OE1	2.00	0.44
1:G:318:SER:O	1:G:319:ARG:HB2	2.17	0.44
1:G:31:PHE:CD1	1:G:40:TRP:CZ2	3.06	0.44
1:H:295:LEU:HD13	1:H:326:VAL:HG11	1.99	0.44
1:H:289:VAL:O	1:H:322:VAL:HA	2.16	0.44
1:C:360:LYS:O	1:C:364:LYS:HD2	2.17	0.44
1:C:40:TRP:HH2	1:C:214:LEU:O	2.00	0.44
1:F:327:TYR:CE1	1:F:421:LYS:HG3	2.53	0.44
1:B:171:ILE:HD12	1:B:252:LYS:HG3	2.00	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:204:LYS:HE3	1:D:240:VAL:HG23	1.98	0.44
1:G:381:CYS:SG	1:G:397:VAL:HG12	2.57	0.44
1:C:341:ARG:NH1	1:C:353:GLN:HB2	2.33	0.44
1:D:379:LEU:HD21	1:D:382:GLY:O	2.18	0.44
1:E:204:LYS:NZ	2:E:601:NAD:O2B	2.25	0.44
1:F:119:THR:HG21	1:F:347:PHE:CD1	2.52	0.44
1:G:158:THR:HB	1:H:472:TYR:CE2	2.53	0.44
1:H:295:LEU:HD21	1:H:329:GLU:HG2	1.99	0.44
1:H:325:GLN:N	1:H:325:GLN:OE1	2.40	0.44
1:A:158:THR:OG1	1:A:159:ASP:N	2.45	0.44
3:C:602:REA:H171	3:C:602:REA:H7	1.86	0.44
1:D:258:SER:HB2	2:D:601:NAD:C2N	2.47	0.44
1:G:258:SER:OG	1:G:261:VAL:CG1	2.63	0.44
1:G:396:THR:HB	1:G:416:VAL:HG12	1.99	0.44
1:B:335:VAL:HG21	1:B:380:GLU:HB3	2.00	0.44
1:B:436:ASP:O	1:B:482:MET:HB2	2.18	0.44
1:B:204:LYS:NZ	2:B:601:NAD:O2B	2.30	0.44
1:C:191:LEU:HD21	1:C:195:LEU:HD12	1.99	0.44
1:D:261:VAL:O	1:D:265:VAL:HG23	2.18	0.44
1:G:397:VAL:HG23	1:G:417:GLN:HB3	1.99	0.44
1:G:167:ARG:NH1	1:H:456:SER:HA	2.32	0.44
1:C:338:ALA:HB3	1:C:381:CYS:SG	2.57	0.44
1:C:39:GLU:OE1	1:C:39:GLU:HA	2.18	0.44
1:D:203:LEU:N	1:D:203:LEU:HD12	2.33	0.44
1:E:88:TRP:NE1	1:E:198:GLY:O	2.50	0.44
1:G:312:GLN:HG2	1:G:361:GLN:HE22	1.82	0.44
1:H:35:PHE:CD2	1:H:232:ILE:HD12	2.53	0.44
1:G:61:CYS:SG	1:G:211:LEU:HD21	2.58	0.44
1:H:27:LEU:HB3	1:H:120:MET:CE	2.48	0.43
1:A:193:PRO:HA	1:A:196:CYS:HB3	2.00	0.43
1:F:125:PRO:HG2	1:F:128:HIS:CD2	2.54	0.43
1:F:326:VAL:O	1:F:326:VAL:HG12	2.17	0.43
1:F:442:ALA:HB2	1:F:468:TYR:CD1	2.53	0.43
1:H:193:PRO:HA	1:H:196:CYS:HB3	2.00	0.43
1:A:82:PHE:CE2	1:A:172:GLY:HA2	2.53	0.43
1:D:195:LEU:HD13	1:D:225:PHE:CE1	2.53	0.43
1:E:293:ALA:O	1:E:295:LEU:HD22	2.19	0.43
1:E:383:GLY:O	1:E:384:SER:CB	2.65	0.43
1:G:335:VAL:HG22	1:G:380:GLU:HB3	1.99	0.43
1:H:219:LEU:O	1:H:223:ALA:N	2.46	0.43
3:B:602:REA:H8	3:B:602:REA:C18	2.48	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:111:ARG:NH2	1:E:135:GLU:OE2	2.46	0.43
1:G:146:GLY:O	1:G:150:LYS:HD2	2.18	0.43
1:F:380:GLU:N	1:F:380:GLU:OE1	2.51	0.43
1:E:247:HIS:CD2	1:E:248:PRO:HD2	2.53	0.43
1:F:216:LEU:O	1:F:220:ILE:HG12	2.18	0.43
1:H:250:ILE:HG22	1:H:275:LYS:HD3	1.99	0.43
1:A:187:LEU:HD11	1:A:203:LEU:HB3	2.00	0.43
1:B:393:ILE:HG22	1:B:394:LYS:O	2.18	0.43
1:C:203:LEU:CD1	1:C:230:VAL:HG13	2.48	0.43
1:H:117:LEU:C	1:H:117:LEU:HD12	2.38	0.43
1:H:214:LEU:HD21	1:H:234:PRO:HG3	2.00	0.43
1:A:132:ILE:CG2	3:A:602:REA:H192	2.49	0.43
1:A:303:HIS:CE1	1:A:307:PHE:CD2	3.07	0.43
1:E:295:LEU:HD21	1:E:326:VAL:HG11	2.00	0.43
1:E:401:VAL:HG13	1:E:405:MET:HE2	2.01	0.43
1:F:122:THR:HG22	1:F:209:THR:HG21	2.01	0.43
1:G:241:GLY:HA3	2:G:601:NAD:C2A	2.48	0.43
1:A:34:ILE:HG12	1:A:234:PRO:HD2	2.00	0.43
1:C:57:ARG:NH1	1:C:389:LYS:O	2.52	0.43
1:C:42:GLU:HB2	1:C:64:GLU:OE1	2.18	0.43
1:D:27:LEU:CB	1:D:120:MET:CE	2.95	0.43
1:F:100:LEU:HD21	1:F:195:LEU:HB2	2.00	0.43
1:G:425:ILE:HD11	1:G:450:LYS:HD3	2.01	0.43
1:G:68:LYS:O	1:G:71:VAL:HG12	2.19	0.43
1:H:252:LYS:HG2	1:H:253:ILE:N	2.34	0.43
1:A:340:LYS:HD3	1:A:340:LYS:N	2.33	0.43
1:B:269:ALA:HB1	1:B:275:LYS:CG	2.49	0.43
1:B:253:ILE:CG2	1:B:277:VAL:HG22	2.49	0.43
1:B:33:LYS:HA	1:B:64:GLU:HG3	2.00	0.43
1:C:343:VAL:HG12	1:C:353:GLN:HB3	1.99	0.43
1:E:366:LEU:HD21	1:E:384:SER:HB2	2.01	0.43
1:F:128:HIS:O	1:F:132:ILE:HB	2.19	0.43
1:H:247:HIS:HA	1:H:248:PRO:HD3	1.88	0.43
1:C:310:GLN:HB3	1:C:356:GLN:NE2	2.34	0.42
1:C:505:ILE:HG12	1:D:465:ILE:HD12	2.01	0.42
1:F:183:PRO:O	1:F:187:LEU:HD13	2.18	0.42
1:G:324:GLU:HA	1:G:421:LYS:HD2	2.00	0.42
1:H:33:LYS:HA	1:H:64:GLU:HG3	2.01	0.42
1:A:119:THR:OG1	1:A:126:PHE:HA	2.20	0.42
1:A:88:TRP:CZ2	1:A:96:ARG:HD2	2.54	0.42
1:B:55:SER:HA	1:B:355:PRO:HG3	2.01	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:191:LEU:HA	1:C:201:MET:SD	2.59	0.42
1:F:147:TRP:O	1:F:151:ILE:HG13	2.19	0.42
1:A:150:LYS:HE3	1:C:147:TRP:CD1	2.55	0.42
1:A:33:LYS:HA	1:A:64:GLU:HG3	2.00	0.42
3:C:602:REA:C8	3:C:602:REA:H181	2.49	0.42
1:D:151:ILE:HG12	1:D:494:LEU:HD13	2.00	0.42
1:D:57:ARG:NH2	1:D:391:LEU:HD21	2.34	0.42
1:D:314:CYS:SG	3:D:602:REA:C15	3.07	0.42
1:H:284:LYS:CE	1:H:319:ARG:CZ	2.96	0.42
1:A:284:LYS:HG2	1:A:318:SER:OG	2.20	0.42
1:B:207:GLU:HG2	1:B:236:PHE:HA	2.01	0.42
1:B:488:GLU:O	1:B:489:LEU:HB2	2.18	0.42
1:C:169:GLU:O	1:C:498:THR:HA	2.20	0.42
1:G:151:ILE:HD11	1:G:196:CYS:SG	2.60	0.42
1:G:379:LEU:HD11	1:G:396:THR:HG23	2.00	0.42
1:H:194:ALA:O	1:H:199:ASN:HB2	2.20	0.42
1:F:143:TYR:CE1	1:F:474:GLN:HB3	2.54	0.42
1:F:91:LEU:HD22	1:F:95:SER:HB3	2.01	0.42
1:H:273:ASN:OD1	1:H:275:LYS:HE3	2.20	0.42
1:A:84:ARG:HH12	1:B:426:GLU:CD	2.22	0.42
1:B:237:GLY:HA3	2:B:601:NAD:C8A	2.50	0.42
1:B:476:PRO:HG3	1:B:492:TYR:CD2	2.54	0.42
1:C:71:VAL:CG2	1:C:240:VAL:HG13	2.50	0.42
1:D:118:GLU:OE2	1:D:212:THR:CG2	2.68	0.42
1:D:403:ASP:OD2	1:D:431:ARG:HD2	2.20	0.42
1:B:218:SER:OG	1:B:219:LEU:N	2.52	0.42
1:G:309:ASN:C	1:G:310:GLN:OE1	2.57	0.42
1:H:151:ILE:HG12	1:H:494:LEU:HD13	2.01	0.42
1:C:68:LYS:HB3	1:C:69:PRO:HD3	2.00	0.42
1:E:365:ILE:HD12	1:E:365:ILE:C	2.40	0.42
1:F:43:SER:HB2	1:F:46:GLY:H	1.85	0.42
1:G:118:GLU:O	1:G:122:THR:OG1	2.28	0.42
1:H:34:ILE:HD13	1:H:234:PRO:HD2	2.01	0.42
1:H:94:LEU:O	1:H:98:ARG:HG2	2.19	0.42
1:B:121:ASP:OD1	1:B:208:GLN:O	2.38	0.42
1:B:370:GLU:O	1:B:373:LYS:N	2.53	0.42
1:D:182:PHE:HB3	1:D:185:LEU:HB3	2.02	0.42
1:D:310:GLN:HG3	1:D:353:GLN:HG3	2.02	0.42
1:E:151:ILE:HG12	1:E:494:LEU:HD13	2.01	0.42
1:H:322:VAL:CG2	1:H:327:TYR:HD1	2.32	0.42
1:A:247:HIS:HA	1:A:248:PRO:HD3	1.86	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:404:ASN:HA	1:A:409:LYS:HD2	2.02	0.42
1:B:356:GLN:HG2	1:B:391:LEU:O	2.20	0.42
1:D:244:ILE:HG22	1:D:253:ILE:CD1	2.50	0.42
1:D:309:ASN:C	1:D:310:GLN:OE1	2.58	0.42
1:E:309:ASN:C	1:E:310:GLN:OE1	2.58	0.42
1:F:51:THR:HG21	1:F:211:LEU:HD21	2.02	0.42
1:B:189:TRP:HE1	3:B:602:REA:H172	1.85	0.41
2:C:601:NAD:O1N	2:C:601:NAD:H52A	2.20	0.41
1:D:49:PHE:HD1	1:D:65:GLU:HB2	1.85	0.41
1:H:117:LEU:HD12	1:H:118:GLU:N	2.35	0.41
1:B:416:VAL:O	1:B:418:PRO:HD3	2.20	0.41
1:D:203:LEU:CD1	1:D:230:VAL:HG13	2.50	0.41
1:D:75:VAL:HG21	1:D:247:HIS:CD2	2.55	0.41
1:E:237:GLY:N	1:E:238:PRO:HD2	2.36	0.41
1:G:148:ALA:O	1:G:151:ILE:HD12	2.20	0.41
1:C:143:TYR:CE1	1:C:474:GLN:HG3	2.55	0.41
1:C:359:GLN:HA	1:C:391:LEU:CD2	2.49	0.41
1:E:425:ILE:O	1:E:428:VAL:HG12	2.20	0.41
1:F:99:LEU:HB3	1:F:225:PHE:CZ	2.54	0.41
1:H:284:LYS:HE3	1:H:319:ARG:CZ	2.49	0.41
1:B:150:LYS:HE3	1:D:147:TRP:NE1	2.36	0.41
1:B:185:LEU:HD21	3:B:602:REA:H171	2.01	0.41
1:C:147:TRP:CZ2	1:C:491:GLU:HG3	2.55	0.41
1:C:386:MET:O	1:C:386:MET:HG3	2.20	0.41
1:D:176:ALA:HB1	1:D:190:LYS:HD2	2.02	0.41
1:E:205:PRO:HG3	1:E:213:ALA:HB3	2.02	0.41
1:E:366:LEU:HD22	1:E:384:SER:HB2	2.01	0.41
1:G:327:TYR:O	1:G:331:VAL:HG23	2.19	0.41
1:G:341:ARG:HD3	1:G:353:GLN:HE21	1.85	0.41
1:H:169:GLU:O	1:H:498:THR:HA	2.21	0.41
1:A:169:GLU:O	1:A:498:THR:HA	2.20	0.41
1:A:276:ARG:NH1	1:A:499:GLU:OE2	2.53	0.41
1:B:35:PHE:CZ	1:B:38:ASN:HA	2.55	0.41
1:C:30:LYS:HB3	1:C:30:LYS:HE2	1.85	0.41
2:F:601:NAD:H6N	2:F:601:NAD:H52N	2.03	0.41
1:G:204:LYS:HD3	1:G:240:VAL:HG12	2.01	0.41
1:H:284:LYS:HE3	1:H:319:ARG:NE	2.35	0.41
1:A:204:LYS:HD2	1:A:240:VAL:HB	2.02	0.41
1:B:106:LEU:HB3	1:B:219:LEU:HD22	2.03	0.41
1:B:379:LEU:HD21	1:B:382:GLY:O	2.20	0.41
1:E:282:GLY:HA2	2:E:601:NAD:H72N	1.85	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:F:203:LEU:HD12	1:F:232:ILE:HG12	2.02	0.41
1:F:68:LYS:HB3	1:F:69:PRO:HD3	2.03	0.41
1:F:75:VAL:O	1:F:79:GLN:HG2	2.21	0.41
1:H:124:LYS:HZ1	1:H:182:PHE:HA	1.86	0.41
1:H:474:GLN:N	1:H:474:GLN:OE1	2.53	0.41
1:A:103:LEU:O	1:A:107:VAL:HG23	2.21	0.41
1:C:368:LEU:O	1:C:371:SER:HB2	2.21	0.41
1:D:51:THR:HG21	1:D:121:ASP:OD1	2.20	0.41
1:D:248:PRO:HG2	1:D:249:GLN:OE1	2.21	0.41
1:D:192:ALA:HB3	1:D:193:PRO:CD	2.50	0.41
1:E:204:LYS:CE	1:E:240:VAL:HG23	2.50	0.41
1:F:365:ILE:HG13	1:F:366:LEU:N	2.35	0.41
1:F:76:GLU:O	1:F:80:VAL:HG23	2.20	0.41
1:G:427:GLU:OE1	1:G:431:ARG:NH2	2.53	0.41
1:H:82:PHE:CE2	1:H:172:GLY:HA2	2.56	0.41
3:B:602:REA:H8	3:B:602:REA:H181	2.03	0.41
1:D:253:ILE:CG1	1:D:275:LYS:HD3	2.51	0.41
1:G:137:CYS:HA	1:G:188:VAL:HG21	2.03	0.41
1:H:93:ALA:HA	1:H:96:ARG:CZ	2.51	0.41
1:A:502:THR:OG1	1:B:476:PRO:HG2	2.20	0.41
1:C:296:ASP:O	1:C:299:VAL:HG22	2.21	0.41
1:D:119:THR:HG23	1:D:124:LYS:O	2.21	0.41
1:E:108:GLU:OE1	1:E:138:ILE:HD13	2.21	0.41
1:D:322:VAL:HG21	1:D:330:PHE:CD2	2.56	0.41
1:G:422:PHE:CD2	1:G:428:VAL:HB	2.56	0.41
1:B:276:ARG:HB3	1:B:276:ARG:HE	1.72	0.40
3:B:602:REA:C8	3:B:602:REA:H181	2.51	0.40
1:C:54:PRO:HG3	1:C:357:ILE:O	2.21	0.40
1:E:175:GLY:HA2	1:E:202:VAL:O	2.21	0.40
1:E:239:THR:HG23	1:E:240:VAL:H	1.85	0.40
1:H:192:ALA:HB3	1:H:193:PRO:HD3	2.03	0.40
1:H:56:THR:HG23	1:H:58:GLU:N	2.35	0.40
1:A:118:GLU:OE1	1:A:183:PRO:HD2	2.21	0.40
1:A:27:LEU:HB3	1:A:120:MET:HE2	2.01	0.40
1:A:67:ASP:O	1:A:70:ASP:N	2.53	0.40
1:B:255:PHE:CE2	2:B:601:NAD:H52A	2.56	0.40
1:B:356:GLN:HB2	1:B:391:LEU:HB2	2.03	0.40
1:B:447:ASN:HB3	1:B:450:LYS:HB2	2.02	0.40
1:B:478:GLY:HA3	1:B:487:ARG:HD3	2.03	0.40
1:B:82:PHE:O	1:B:82:PHE:CG	2.75	0.40
1:C:294:ASP:C	1:C:294:ASP:OD1	2.60	0.40

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:335:VAL:HG11	1:C:380:GLU:CB	2.46	0.40
1:D:121:ASP:OD2	1:D:211:LEU:HB2	2.21	0.40
1:E:82:PHE:CZ	1:E:172:GLY:HA2	2.56	0.40
1:A:108:GLU:O	1:A:111:ARG:HB2	2.21	0.40
1:C:42:GLU:CB	1:C:64:GLU:OE1	2.69	0.40
1:C:53:ASN:O	1:C:57:ARG:HA	2.21	0.40
1:D:366:LEU:HD23	1:D:369:ILE:HD12	2.03	0.40
1:E:181:ASN:HB2	1:E:182:PHE:HD1	1.86	0.40
1:E:204:LYS:CD	1:E:240:VAL:HG23	2.52	0.40
1:E:478:GLY:HA3	1:E:487:ARG:HD3	2.02	0.40
1:F:38:ASN:O	1:F:221:LYS:NZ	2.38	0.40
1:F:440:THR:HG21	1:F:464:TRP:CZ3	2.56	0.40
1:F:474:GLN:CD	1:F:474:GLN:H	2.25	0.40
1:G:103:LEU:HD13	1:G:103:LEU:O	2.22	0.40
1:G:324:GLU:HA	1:G:421:LYS:CD	2.51	0.40
1:H:178:THR:CG2	1:H:179:PRO:HD2	2.51	0.40
1:H:331:VAL:O	1:H:335:VAL:HG23	2.21	0.40
1:A:261:VAL:HA	1:A:264:LEU:HD12	2.03	0.40
1:C:111:ARG:HG2	1:C:130:PHE:CE1	2.57	0.40
1:C:404:ASN:O	1:C:409:LYS:NZ	2.44	0.40
1:E:171:ILE:HD11	1:E:496:GLU:O	2.20	0.40
1:E:207:GLU:HG2	1:E:236:PHE:HD1	1.83	0.40
1:E:327:TYR:CD2	1:E:421:LYS:HB3	2.56	0.40
1:E:327:TYR:CE2	1:E:421:LYS:HB3	2.57	0.40
1:G:486:GLY:O	1:G:487:ARG:NH1	2.52	0.40
1:A:319:ARG:HB3	1:A:321:PHE:CE1	2.56	0.40
1:B:75:VAL:HG11	1:B:247:HIS:CE1	2.56	0.40
1:C:127:LEU:HD11	1:C:349:VAL:HA	2.03	0.40
1:D:106:LEU:HD12	1:D:223:ALA:HB2	2.03	0.40
1:E:331:VAL:O	1:E:335:VAL:HG23	2.22	0.40
1:F:187:LEU:HD21	1:F:213:ALA:HB1	2.03	0.40
1:F:303:HIS:CG	1:F:337:TYR:HD2	2.39	0.40
1:F:323:GLU:HA	1:F:422:PHE:O	2.21	0.40
1:G:185:LEU:HD11	1:G:189:TRP:HE1	1.87	0.40
1:G:52:CYS:SG	1:G:59:GLN:HA	2.62	0.40

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	487/529 (92%)	464 (95%)	23 (5%)	0	100	100
1	B	469/529 (89%)	434 (92%)	35 (8%)	0	100	100
1	C	487/529 (92%)	459 (94%)	24 (5%)	4 (1%)	19	51
1	D	486/529 (92%)	462 (95%)	23 (5%)	1 (0%)	47	78
1	E	472/529 (89%)	443 (94%)	25 (5%)	4 (1%)	19	51
1	F	437/529 (83%)	419 (96%)	18 (4%)	0	100	100
1	G	456/529 (86%)	432 (95%)	22 (5%)	2 (0%)	34	66
1	H	486/529 (92%)	454 (93%)	30 (6%)	2 (0%)	34	66
All	All	3780/4232 (89%)	3567 (94%)	200 (5%)	13 (0%)	41	71

All (13) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	C	57	ARG
1	D	57	ARG
1	E	384	SER
1	H	349	VAL
1	C	387	GLU
1	E	45	SER
1	E	57	ARG
1	E	206	ALA
1	G	324	GLU
1	G	272	SER
1	C	409	LYS
1	H	272	SER
1	C	438	GLY

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	405/437 (93%)	399 (98%)	6 (2%)	65	87
1	B	392/437 (90%)	387 (99%)	5 (1%)	69	90
1	C	405/437 (93%)	398 (98%)	7 (2%)	60	86
1	D	405/437 (93%)	397 (98%)	8 (2%)	55	82
1	E	396/437 (91%)	387 (98%)	9 (2%)	50	80
1	F	370/437 (85%)	362 (98%)	8 (2%)	52	81
1	G	383/437 (88%)	374 (98%)	9 (2%)	50	80
1	H	404/437 (92%)	396 (98%)	8 (2%)	55	82
All	All	3160/3496 (90%)	3100 (98%)	60 (2%)	57	84

All (60) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	196	CYS
1	A	239	THR
1	A	275	LYS
1	A	313	CYS
1	A	413	PHE
1	A	440	THR
1	B	196	CYS
1	B	272	SER
1	B	275	LYS
1	B	336	GLU
1	B	337	TYR
1	C	89	ARG
1	C	118	GLU
1	C	133	ASP
1	C	196	CYS
1	C	272	SER
1	C	284	LYS
1	C	364	LYS
1	D	20	LEU

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Mol	Chain	Res	Type
1	D	29	VAL
1	D	45	SER
1	D	55	SER
1	D	121	ASP
1	D	272	SER
1	D	313	CYS
1	D	413	PHE
1	E	127	LEU
1	E	181	ASN
1	E	196	CYS
1	E	212	THR
1	E	292	ASP
1	E	381	CYS
1	E	392	PHE
1	E	413	PHE
1	E	507	LEU
1	F	30	LYS
1	F	101	HIS
1	F	121	ASP
1	F	196	CYS
1	F	314	CYS
1	F	337	TYR
1	F	399	SER
1	F	435	THR
1	G	30	LYS
1	G	71	VAL
1	G	127	LEU
1	G	150	LYS
1	G	270	SER
1	G	318	SER
1	G	328	SER
1	G	402	THR
1	G	416	VAL
1	H	121	ASP
1	H	133	ASP
1	H	159	ASP
1	H	196	CYS
1	H	337	TYR
1	H	351	THR
1	H	370	GLU
1	H	499	GLU

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (17) such

sidechains are listed below:

Mol	Chain	Res	Type
1	A	247	HIS
1	B	312	GLN
1	B	325	GLN
1	C	310	GLN
1	C	353	GLN
1	C	356	GLN
1	D	79	GLN
1	E	41	HIS
1	E	79	GLN
1	E	485	ASN
1	F	79	GLN
1	F	128	HIS
1	F	361	GLN
1	G	312	GLN
1	G	353	GLN
1	G	361	GLN
1	H	303	HIS

5.3.3 RNA

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains

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

5.5 Carbohydrates

There are no monosaccharides in this entry.

5.6 Ligand geometry

12 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	$\#\|Z\| > 2$
3	REA	D	602	-	19,22,22	1.25	3 (15%)	26,30,30	2.81	12 (46%)
3	REA	B	602	-	19,22,22	0.88	0	26,30,30	2.44	10 (38%)
3	REA	A	602	-	19,22,22	0.97	1 (5%)	26,30,30	2.21	6 (23%)
2	NAD	B	601	-	42,48,48	0.84	2 (4%)	50,73,73	1.44	8 (16%)
2	NAD	D	601	-	42,48,48	0.97	2 (4%)	50,73,73	1.50	11 (22%)
2	NAD	F	601	-	42,48,48	0.89	2 (4%)	50,73,73	1.18	6 (12%)
2	NAD	H	601	-	42,48,48	0.92	2 (4%)	50,73,73	1.32	6 (12%)
2	NAD	A	601	-	42,48,48	1.08	2 (4%)	50,73,73	1.55	8 (16%)
2	NAD	C	601	-	42,48,48	0.88	1 (2%)	50,73,73	1.24	5 (10%)
2	NAD	E	601	-	42,48,48	0.94	3 (7%)	50,73,73	1.49	7 (14%)
2	NAD	G	601	-	42,48,48	0.92	3 (7%)	50,73,73	1.27	6 (12%)
3	REA	C	602	-	19,22,22	0.96	0	26,30,30	2.16	8 (30%)

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
3	REA	D	602	-	-	2/13/32/32	0/1/1/1
3	REA	B	602	-	-	2/13/32/32	0/1/1/1
3	REA	A	602	-	-	2/13/32/32	0/1/1/1
2	NAD	B	601	-	-	12/26/62/62	0/5/5/5
2	NAD	D	601	-	-	11/26/62/62	0/5/5/5
2	NAD	F	601	-	-	7/26/62/62	0/5/5/5
2	NAD	H	601	-	-	7/26/62/62	0/5/5/5
2	NAD	A	601	-	-	8/26/62/62	0/5/5/5
2	NAD	C	601	-	-	13/26/62/62	0/5/5/5
2	NAD	E	601	-	-	10/26/62/62	0/5/5/5
2	NAD	G	601	-	-	15/26/62/62	0/5/5/5
3	REA	C	602	-	-	2/13/32/32	0/1/1/1

All (21) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	A	601	NAD	O4D-C1D	3.59	1.46	1.41
2	D	601	NAD	O4D-C1D	3.23	1.45	1.41
2	A	601	NAD	C2B-C1B	-3.16	1.49	1.53
2	C	601	NAD	O4D-C1D	3.11	1.45	1.41
2	E	601	NAD	O4D-C1D	2.83	1.45	1.41
3	D	602	REA	C5-C6	2.71	1.39	1.34
2	F	601	NAD	O4D-C1D	2.70	1.44	1.41
3	A	602	REA	C5-C6	2.67	1.39	1.34
2	E	601	NAD	C2A-N3A	2.34	1.35	1.32
2	H	601	NAD	O4D-C1D	2.34	1.44	1.41
2	D	601	NAD	O4B-C1B	2.31	1.44	1.41
2	F	601	NAD	C2A-N3A	2.31	1.35	1.32
2	G	601	NAD	C5A-C4A	2.31	1.47	1.40
2	G	601	NAD	O4D-C1D	2.27	1.44	1.41
3	D	602	REA	C8-C9	2.25	1.50	1.45
2	E	601	NAD	C5A-C4A	2.20	1.46	1.40
2	B	601	NAD	O4D-C1D	2.10	1.44	1.41
2	G	601	NAD	C2A-N3A	2.07	1.35	1.32
3	D	602	REA	C7-C6	2.05	1.52	1.45
2	B	601	NAD	C5A-C4A	2.05	1.46	1.40
2	H	601	NAD	C2B-C1B	-2.00	1.50	1.53

All (93) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	D	602	REA	C8-C9-C10	-7.24	107.83	118.94
3	A	602	REA	C8-C9-C10	-6.81	108.49	118.94
3	D	602	REA	C11-C10-C9	6.62	136.76	127.31
3	B	602	REA	C3-C4-C5	-5.70	103.89	114.08
3	B	602	REA	C2-C1-C6	5.42	118.83	110.48
3	A	602	REA	C19-C9-C8	5.21	126.28	118.08
2	D	601	NAD	N3A-C2A-N1A	-4.92	121.00	128.68
3	B	602	REA	C4-C5-C6	-4.82	115.74	122.73
3	C	602	REA	C2-C1-C6	4.79	117.85	110.48
2	A	601	NAD	N3A-C2A-N1A	-4.60	121.49	128.68
3	C	602	REA	C1-C6-C5	-4.33	116.52	122.61
3	D	602	REA	C19-C9-C8	4.22	124.73	118.08
3	C	602	REA	C4-C5-C6	-4.17	116.68	122.73
2	E	601	NAD	PN-O3-PA	-4.15	118.58	132.83
2	B	601	NAD	N3A-C2A-N1A	-3.99	122.44	128.68
2	G	601	NAD	C3D-C2D-C1D	3.98	106.97	100.98
2	E	601	NAD	N3A-C2A-N1A	-3.93	122.54	128.68
2	H	601	NAD	N3A-C2A-N1A	-3.85	122.66	128.68

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
3	B	602	REA	C7-C8-C9	-3.77	120.55	126.23
2	C	601	NAD	N3A-C2A-N1A	-3.72	122.86	128.68
2	F	601	NAD	N3A-C2A-N1A	-3.71	122.88	128.68
2	E	601	NAD	C3D-C2D-C1D	3.61	106.42	100.98
3	A	602	REA	C3-C4-C5	-3.61	107.64	114.08
2	A	601	NAD	PN-O3-PA	-3.50	120.81	132.83
2	H	601	NAD	C3D-C2D-C1D	3.50	106.25	100.98
3	D	602	REA	C10-C11-C12	-3.47	112.38	123.22
3	B	602	REA	C1-C6-C5	-3.40	117.82	122.61
3	D	602	REA	C7-C8-C9	3.37	131.33	126.23
3	B	602	REA	C18-C5-C4	3.35	120.04	113.62
2	G	601	NAD	C4A-C5A-N7A	-3.30	105.96	109.40
2	A	601	NAD	C3N-C7N-N7N	3.30	121.71	117.75
3	D	602	REA	C19-C9-C10	3.21	127.43	122.92
3	D	602	REA	C1-C6-C5	-3.20	118.11	122.61
2	D	601	NAD	N6A-C6A-N1A	3.18	125.17	118.57
2	H	601	NAD	C1B-N9A-C4A	-3.16	121.10	126.64
3	A	602	REA	C10-C11-C12	-3.13	113.45	123.22
2	E	601	NAD	C4A-C5A-N7A	-3.09	106.18	109.40
2	H	601	NAD	C4A-C5A-N7A	-3.05	106.22	109.40
2	G	601	NAD	N3A-C2A-N1A	-2.98	124.02	128.68
2	D	601	NAD	C3N-C7N-N7N	2.96	121.30	117.75
3	D	602	REA	C17-C1-C6	2.95	115.09	110.30
3	C	602	REA	C11-C12-C13	-2.92	118.21	126.42
2	C	601	NAD	C3D-C2D-C1D	2.91	105.36	100.98
2	A	601	NAD	N6A-C6A-N1A	2.91	124.60	118.57
3	D	602	REA	C3-C4-C5	-2.89	108.92	114.08
2	D	601	NAD	C5A-C6A-N6A	-2.85	116.02	120.35
2	D	601	NAD	C2D-C3D-C4D	2.84	108.16	102.64
3	C	602	REA	C8-C9-C10	-2.83	114.60	118.94
2	D	601	NAD	C3B-C2B-C1B	-2.79	96.78	100.98
2	F	601	NAD	C3D-C2D-C1D	2.78	105.17	100.98
2	A	601	NAD	C2D-C3D-C4D	2.78	108.04	102.64
2	E	601	NAD	O4B-C1B-C2B	-2.73	102.93	106.93
2	B	601	NAD	C3B-C2B-C1B	2.68	105.02	100.98
3	D	602	REA	C18-C5-C6	2.68	127.53	124.53
3	A	602	REA	C16-C1-C6	2.64	114.59	110.30
2	B	601	NAD	C3N-C7N-N7N	2.61	120.88	117.75
2	B	601	NAD	C3D-C2D-C1D	2.59	104.88	100.98
2	G	601	NAD	C6N-N1N-C2N	-2.58	119.62	121.97
2	C	601	NAD	C4A-C5A-N7A	-2.55	106.74	109.40
2	D	601	NAD	PN-O3-PA	-2.54	124.09	132.83

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Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
2	B	601	NAD	PN-O3-PA	-2.51	124.20	132.83
3	B	602	REA	C16-C1-C6	-2.51	106.23	110.30
3	C	602	REA	C8-C7-C6	-2.51	120.16	127.20
3	D	602	REA	C2-C1-C6	-2.50	106.63	110.48
3	C	602	REA	C18-C5-C4	2.48	118.38	113.62
2	C	601	NAD	C2D-C3D-C4D	2.47	107.45	102.64
2	E	601	NAD	C6N-N1N-C2N	-2.47	119.72	121.97
2	D	601	NAD	C3D-C2D-C1D	2.46	104.68	100.98
2	F	601	NAD	N6A-C6A-N1A	2.43	123.62	118.57
2	E	601	NAD	C2D-C3D-C4D	2.43	107.36	102.64
2	A	601	NAD	C5A-C6A-N6A	-2.42	116.68	120.35
2	D	601	NAD	O7N-C7N-N7N	-2.42	119.14	122.58
3	A	602	REA	C18-C5-C4	-2.37	109.05	113.62
2	B	601	NAD	PA-O5B-C5B	-2.34	107.93	121.68
2	C	601	NAD	C3N-C7N-N7N	2.32	120.53	117.75
2	H	601	NAD	C6N-N1N-C2N	-2.28	119.90	121.97
2	B	601	NAD	N6A-C6A-N1A	2.27	123.28	118.57
2	A	601	NAD	C3D-C2D-C1D	2.22	104.31	100.98
2	B	601	NAD	C2A-N1A-C6A	2.17	122.47	118.75
2	G	601	NAD	O5B-C5B-C4B	2.17	116.45	108.99
2	H	601	NAD	C3N-C7N-N7N	2.17	120.35	117.75
3	B	602	REA	C11-C12-C13	-2.16	120.36	126.42
3	B	602	REA	C11-C10-C9	-2.16	124.23	127.31
2	G	601	NAD	C1B-N9A-C4A	-2.15	122.87	126.64
2	F	601	NAD	C2N-C3N-C4N	2.14	120.68	118.26
3	D	602	REA	C8-C7-C6	-2.12	121.23	127.20
3	B	602	REA	C8-C9-C10	-2.08	115.76	118.94
3	C	602	REA	C11-C10-C9	-2.06	124.37	127.31
2	A	601	NAD	O3B-C3B-C2B	-2.05	105.18	111.82
2	F	601	NAD	C4A-C5A-N7A	-2.05	107.26	109.40
2	D	601	NAD	C6N-N1N-C2N	-2.04	120.11	121.97
2	D	601	NAD	C2A-N1A-C6A	2.01	122.19	118.75
2	F	601	NAD	C6N-N1N-C2N	-2.01	120.15	121.97

There are no chirality outliers.

All (91) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
3	D	602	REA	C1-C6-C7-C8
3	D	602	REA	C5-C6-C7-C8
3	B	602	REA	C1-C6-C7-C8
3	B	602	REA	C5-C6-C7-C8

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Mol	Chain	Res	Type	Atoms
2	B	601	NAD	C5B-O5B-PA-O2A
2	B	601	NAD	C5B-O5B-PA-O3
2	B	601	NAD	C5D-O5D-PN-O3
2	B	601	NAD	C2N-C3N-C7N-O7N
2	B	601	NAD	C2N-C3N-C7N-N7N
2	D	601	NAD	C5B-O5B-PA-O3
2	D	601	NAD	C5D-O5D-PN-O3
2	D	601	NAD	O4D-C1D-N1N-C6N
2	F	601	NAD	C3D-C4D-C5D-O5D
2	H	601	NAD	PN-O3-PA-O5B
2	H	601	NAD	O4D-C1D-N1N-C2N
2	H	601	NAD	O4D-C1D-N1N-C6N
2	H	601	NAD	C2D-C1D-N1N-C2N
2	H	601	NAD	C2D-C1D-N1N-C6N
2	A	601	NAD	C5D-O5D-PN-O3
2	A	601	NAD	C2N-C3N-C7N-N7N
2	C	601	NAD	C5B-O5B-PA-O1A
2	C	601	NAD	C5B-O5B-PA-O2A
2	C	601	NAD	C5B-O5B-PA-O3
2	C	601	NAD	O4B-C4B-C5B-O5B
2	C	601	NAD	C3B-C4B-C5B-O5B
2	C	601	NAD	C5D-O5D-PN-O3
2	C	601	NAD	C2N-C3N-C7N-O7N
2	C	601	NAD	C2N-C3N-C7N-N7N
2	E	601	NAD	C5B-O5B-PA-O1A
2	G	601	NAD	C5B-O5B-PA-O1A
2	G	601	NAD	C5B-O5B-PA-O2A
2	G	601	NAD	PN-O3-PA-O5B
2	G	601	NAD	O4B-C4B-C5B-O5B
2	G	601	NAD	C5D-O5D-PN-O3
2	B	601	NAD	C4N-C3N-C7N-O7N
2	B	601	NAD	C4N-C3N-C7N-N7N
2	C	601	NAD	C4N-C3N-C7N-O7N
2	C	601	NAD	C4N-C3N-C7N-N7N
2	A	601	NAD	C4N-C3N-C7N-N7N
2	A	601	NAD	C4N-C3N-C7N-O7N
2	A	601	NAD	C2N-C3N-C7N-O7N
2	B	601	NAD	O4B-C4B-C5B-O5B
2	D	601	NAD	O4B-C4B-C5B-O5B
2	A	601	NAD	O4D-C4D-C5D-O5D
2	A	601	NAD	C3D-C4D-C5D-O5D
2	G	601	NAD	O4D-C4D-C5D-O5D

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Mol	Chain	Res	Type	Atoms
2	G	601	NAD	C3D-C4D-C5D-O5D
2	G	601	NAD	C4N-C3N-C7N-N7N
2	G	601	NAD	C2N-C3N-C7N-O7N
2	G	601	NAD	C2N-C3N-C7N-N7N
2	G	601	NAD	C4N-C3N-C7N-O7N
2	D	601	NAD	O4D-C4D-C5D-O5D
2	F	601	NAD	O4D-C4D-C5D-O5D
2	G	601	NAD	C3B-C4B-C5B-O5B
2	D	601	NAD	C3D-C4D-C5D-O5D
2	F	601	NAD	C4N-C3N-C7N-N7N
2	E	601	NAD	C4N-C3N-C7N-N7N
2	F	601	NAD	C4N-C3N-C7N-O7N
2	D	601	NAD	C3B-C4B-C5B-O5B
3	A	602	REA	C1-C6-C7-C8
3	A	602	REA	C5-C6-C7-C8
3	C	602	REA	C1-C6-C7-C8
3	C	602	REA	C5-C6-C7-C8
2	F	601	NAD	C2N-C3N-C7N-N7N
2	F	601	NAD	C2N-C3N-C7N-O7N
2	E	601	NAD	C4N-C3N-C7N-O7N
2	E	601	NAD	C2N-C3N-C7N-N7N
2	E	601	NAD	PN-O3-PA-O1A
2	B	601	NAD	PN-O3-PA-O5B
2	D	601	NAD	PA-O3-PN-O5D
2	F	601	NAD	PN-O3-PA-O5B
2	H	601	NAD	C5D-O5D-PN-O3
2	E	601	NAD	C5B-O5B-PA-O3
2	G	601	NAD	C4D-C5D-O5D-PN
2	B	601	NAD	C5D-O5D-PN-O1N
2	B	601	NAD	C5D-O5D-PN-O2N
2	D	601	NAD	C5B-O5B-PA-O1A
2	D	601	NAD	C5B-O5B-PA-O2A
2	D	601	NAD	C5D-O5D-PN-O1N
2	A	601	NAD	C5D-O5D-PN-O1N
2	C	601	NAD	C5D-O5D-PN-O1N
2	C	601	NAD	C5D-O5D-PN-O2N
2	E	601	NAD	C5B-O5B-PA-O2A
2	E	601	NAD	C2N-C3N-C7N-O7N
2	H	601	NAD	C3D-C4D-C5D-O5D
2	B	601	NAD	O4D-C4D-C5D-O5D
2	E	601	NAD	PN-O3-PA-O5B
2	G	601	NAD	C5B-O5B-PA-O3

Continued on next page...

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Mol	Chain	Res	Type	Atoms
2	E	601	NAD	C5D-O5D-PN-O1N
2	G	601	NAD	C5D-O5D-PN-O1N
2	C	601	NAD	O4D-C4D-C5D-O5D

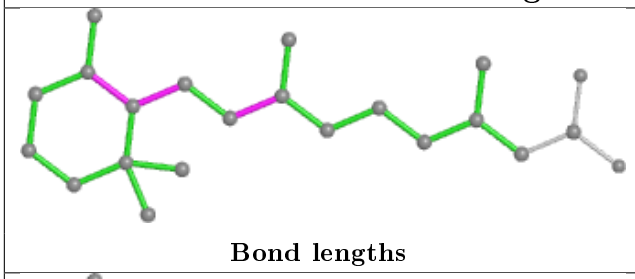
There are no ring outliers.

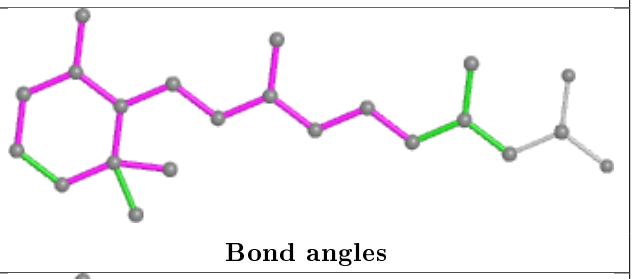
12 monomers are involved in 68 short contacts:

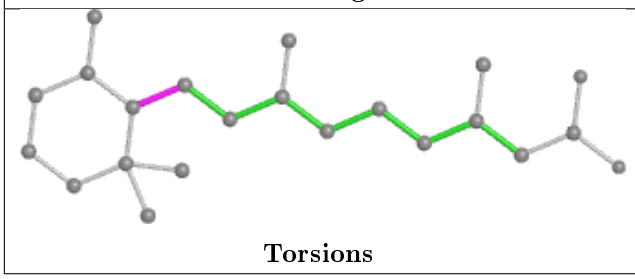
Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	D	602	REA	10	0
3	B	602	REA	7	0
3	A	602	REA	18	0
2	B	601	NAD	3	0
2	D	601	NAD	4	0
2	F	601	NAD	3	0
2	H	601	NAD	2	0
2	A	601	NAD	1	0
2	C	601	NAD	4	0
2	E	601	NAD	4	0
2	G	601	NAD	5	0
3	C	602	REA	7	0

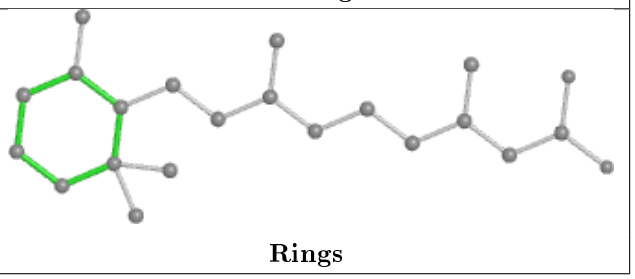
The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. 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 REA D 602

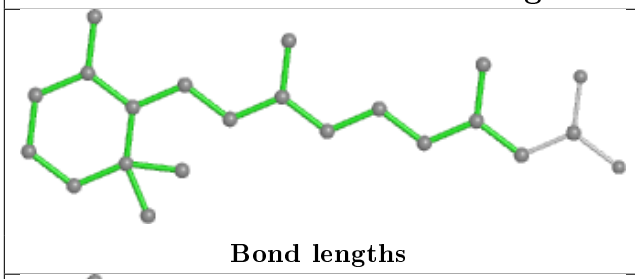

Bond lengths

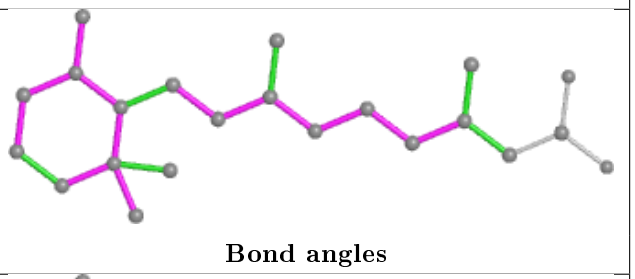

Bond angles

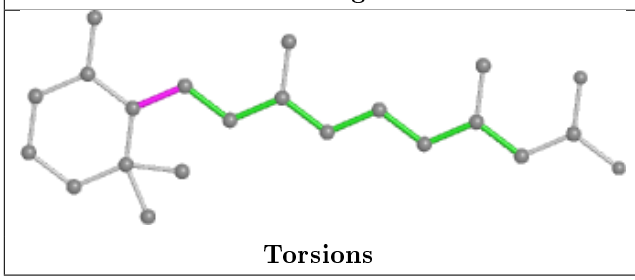

Torsions

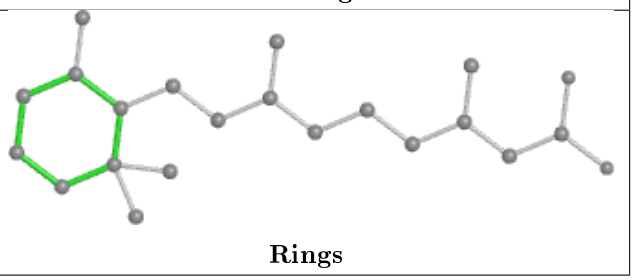

Rings

Ligand REA B 602

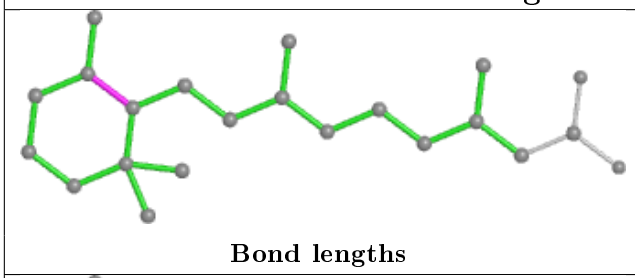

Bond lengths

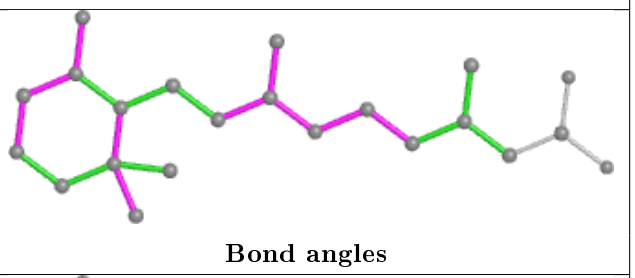

Bond angles

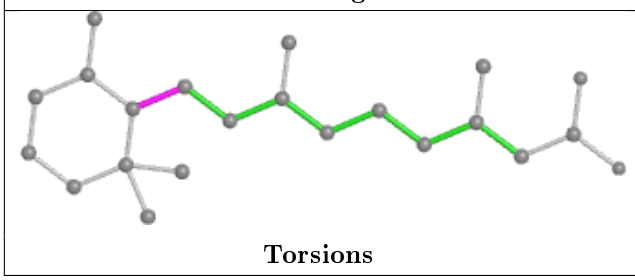

Torsions

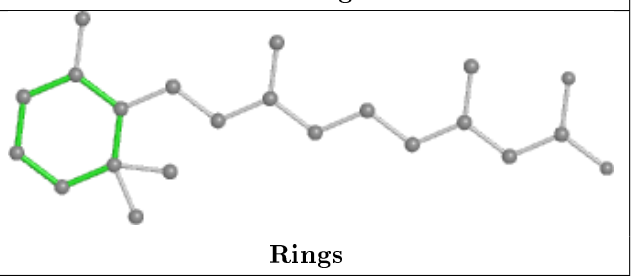

Rings

Ligand REA A 602

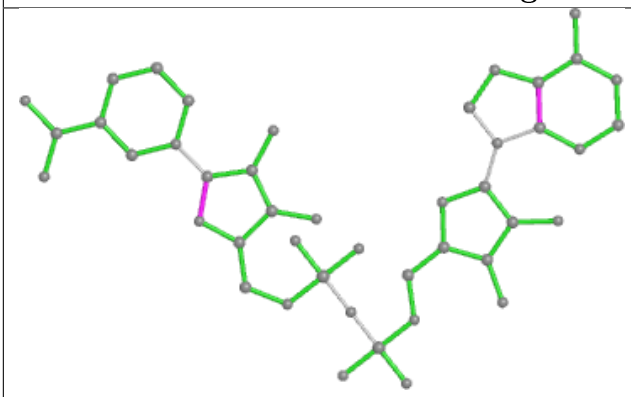

Bond lengths


Bond angles

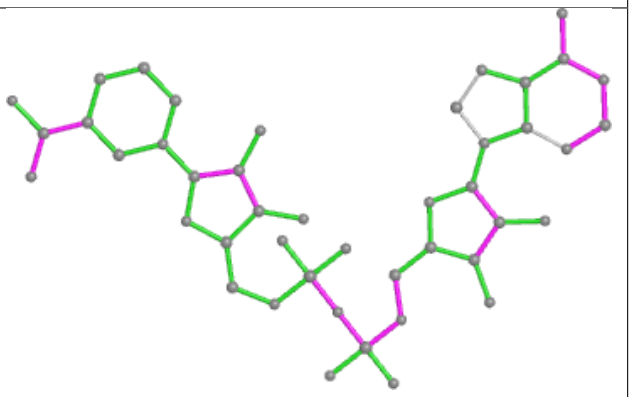

Torsions


Rings

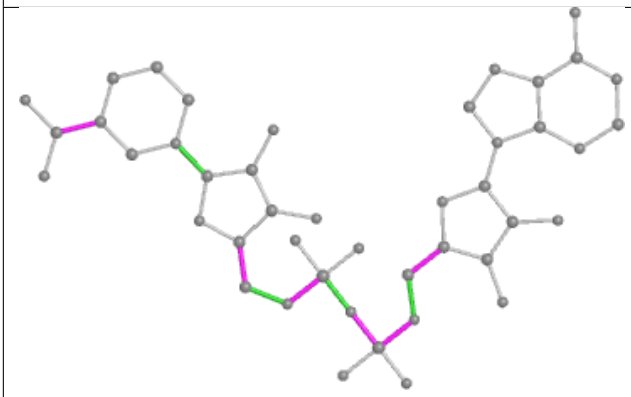
Ligand NAD B 601



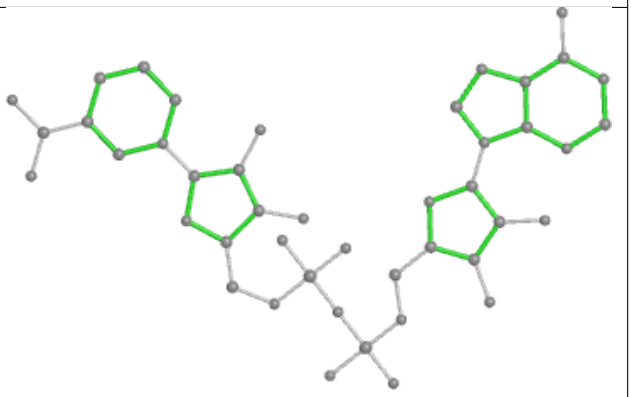
Bond lengths



Bond angles

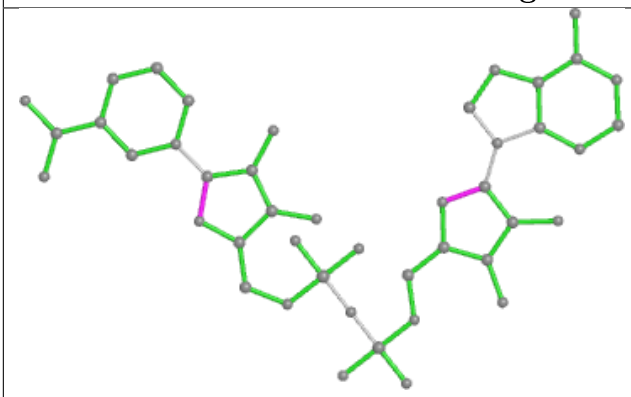


Torsions

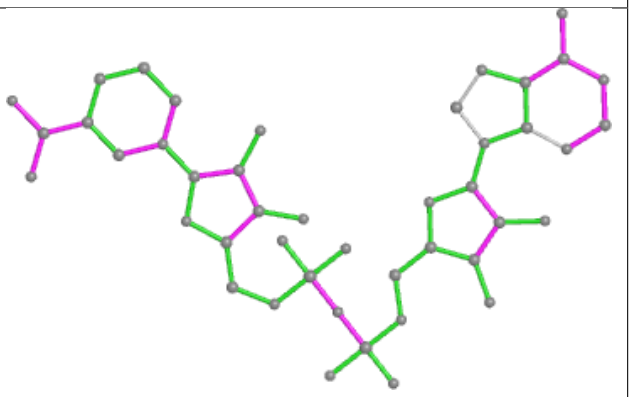


Rings

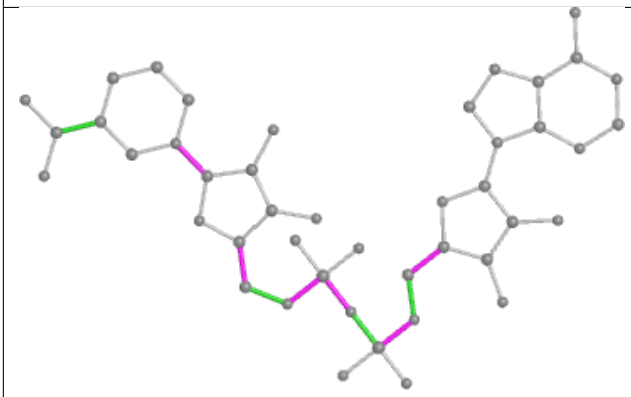
Ligand NAD D 601



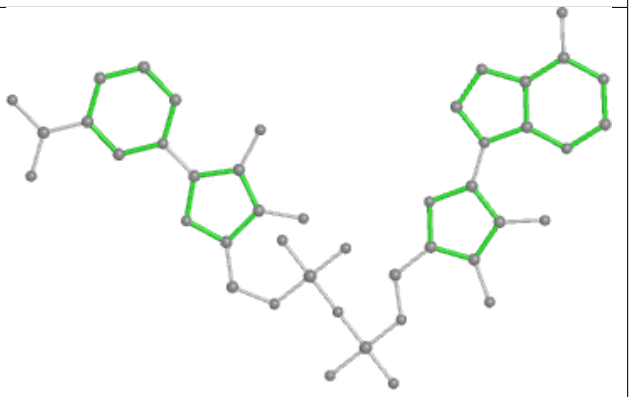
Bond lengths



Bond angles

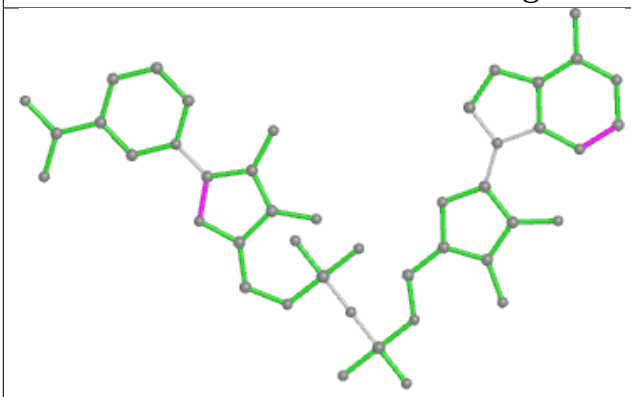


Torsions

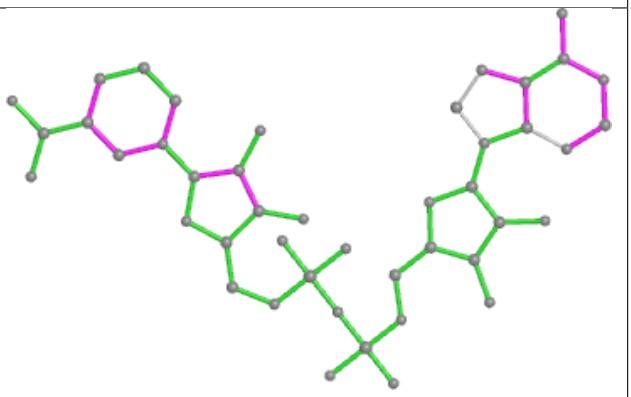


Rings

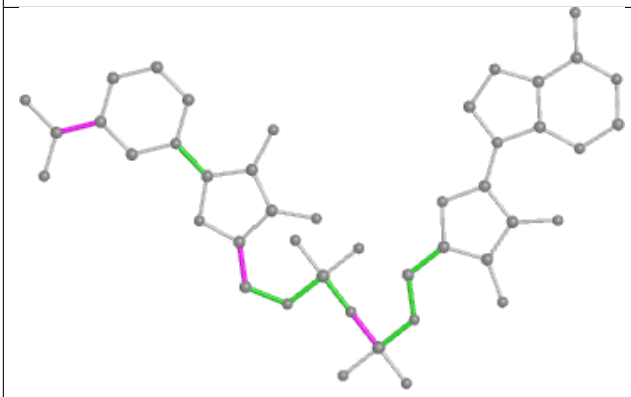
Ligand NAD F 601



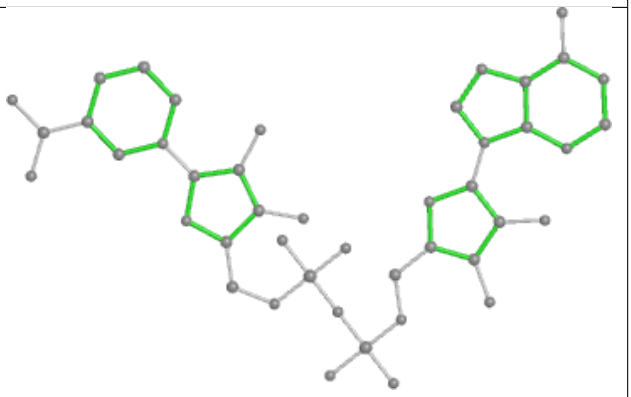
Bond lengths



Bond angles

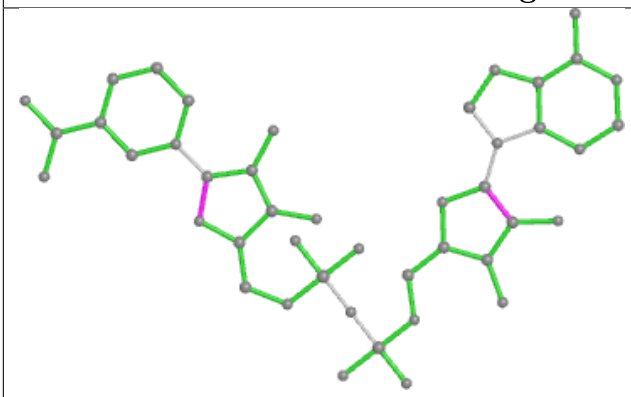


Torsions



Rings

Ligand NAD H 601



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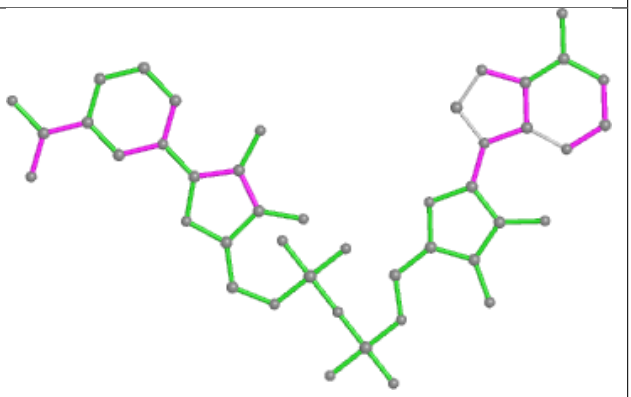
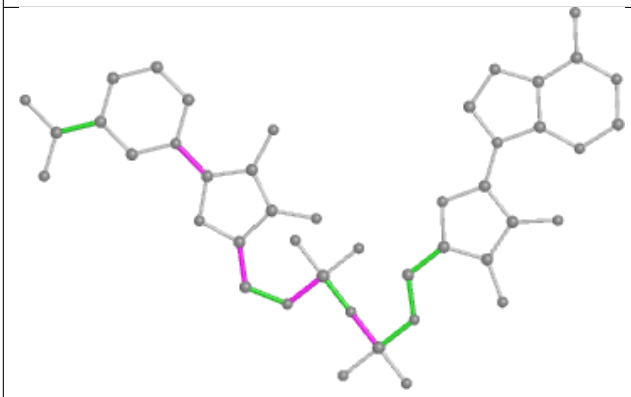
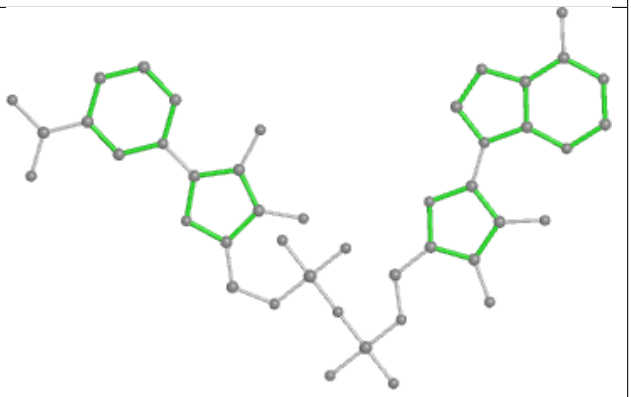


Bond angles

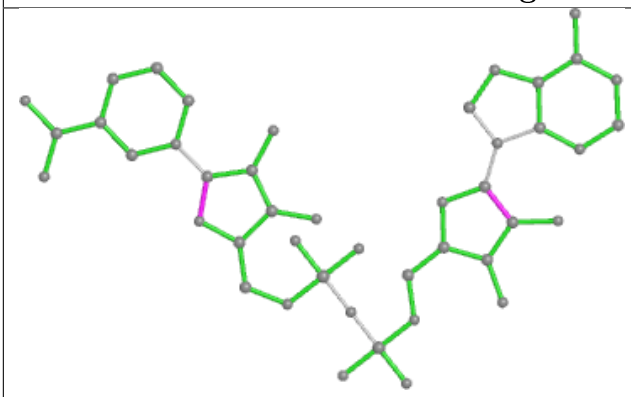


Torsions



Rings

Ligand NAD A 601



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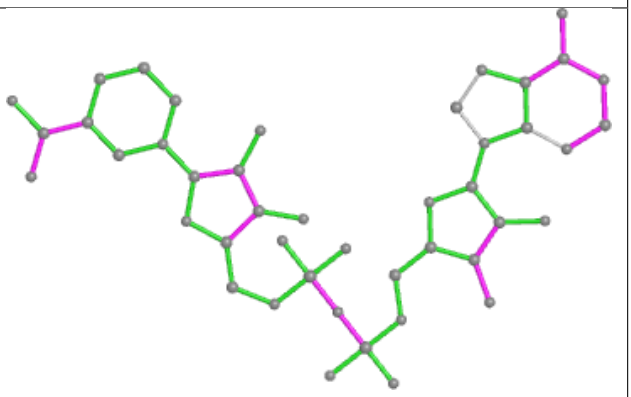
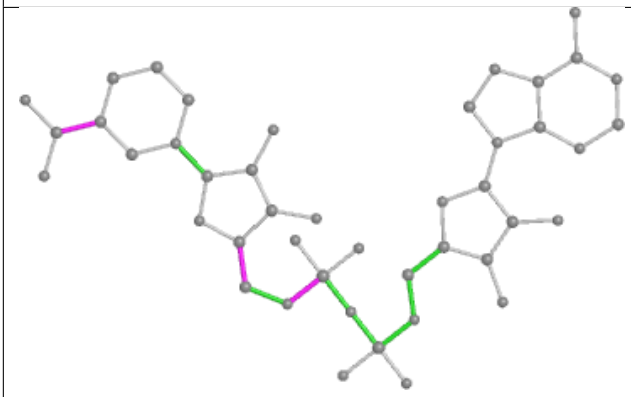


Bond angles



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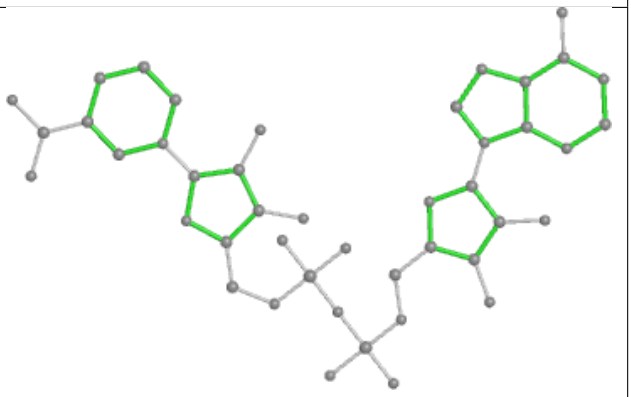
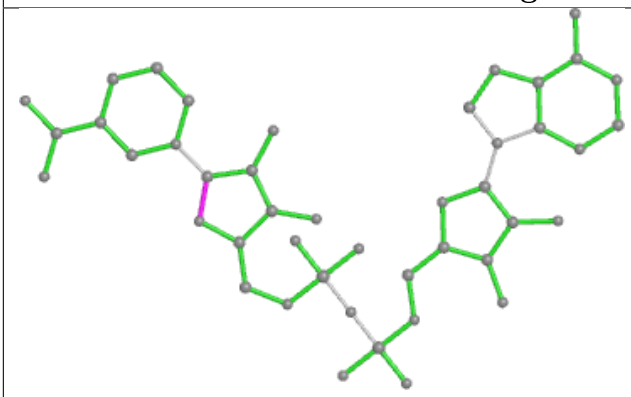
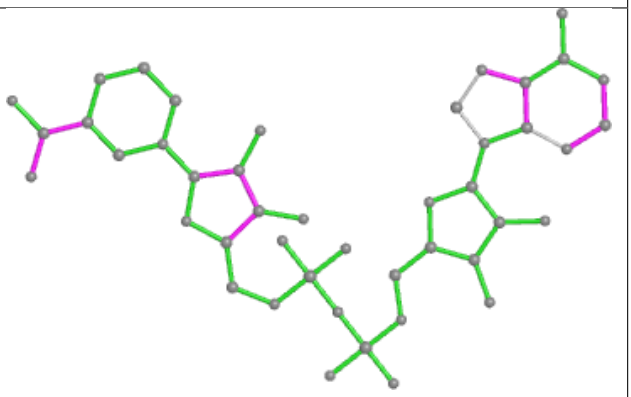


Rings

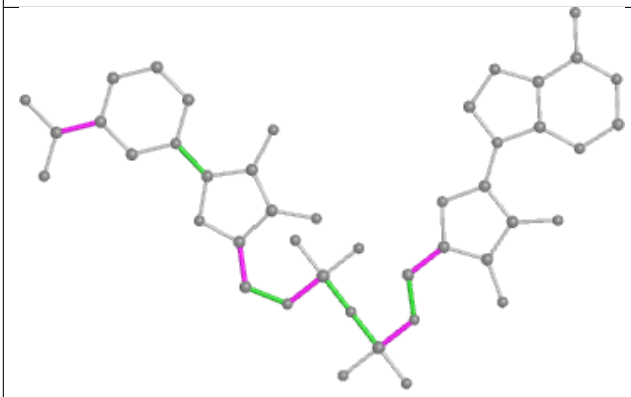
Ligand NAD C 601



Bond lengths



Bond angles



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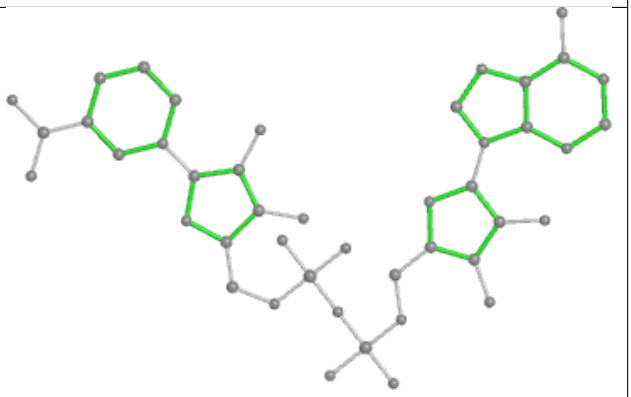
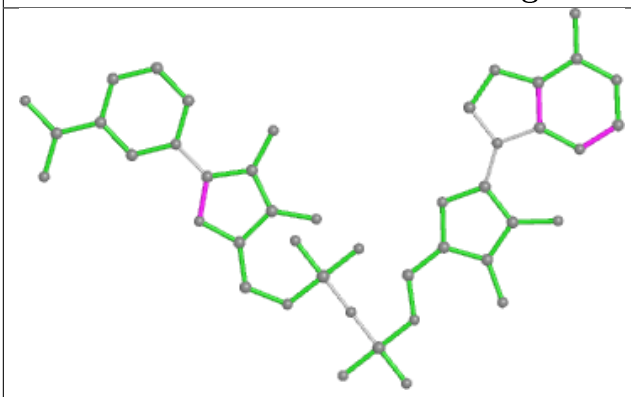


Rings

Ligand NAD E 601



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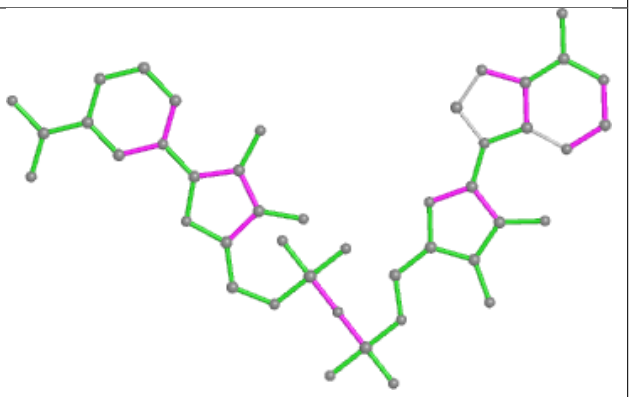
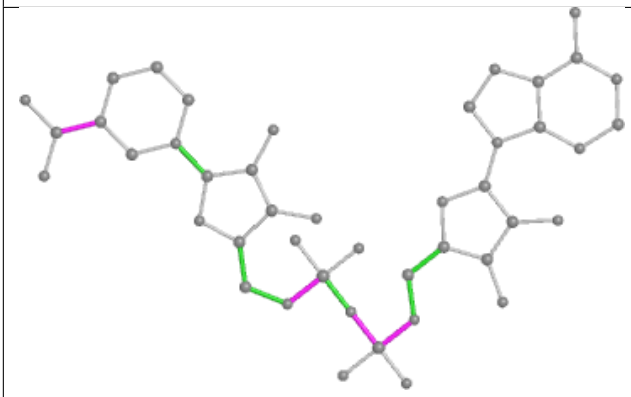


Bond angles



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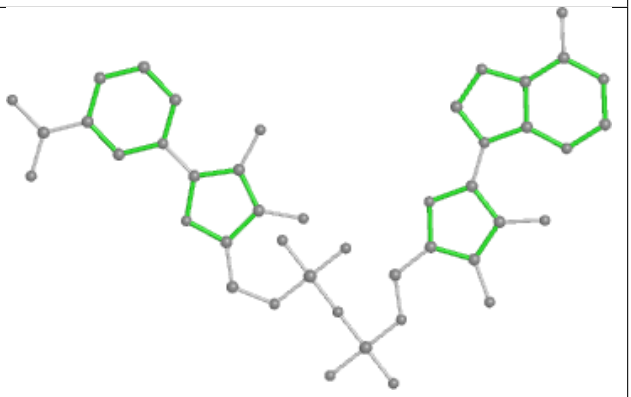
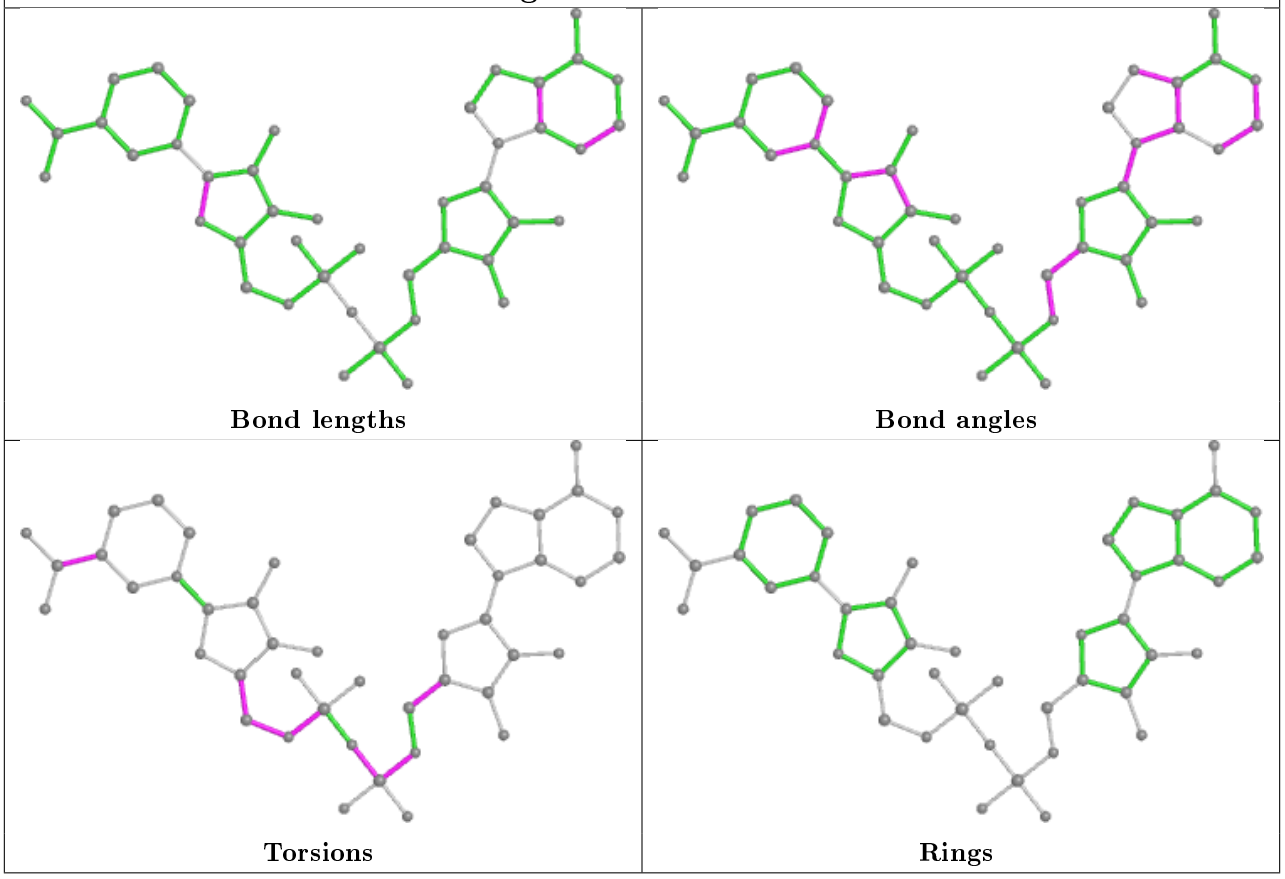
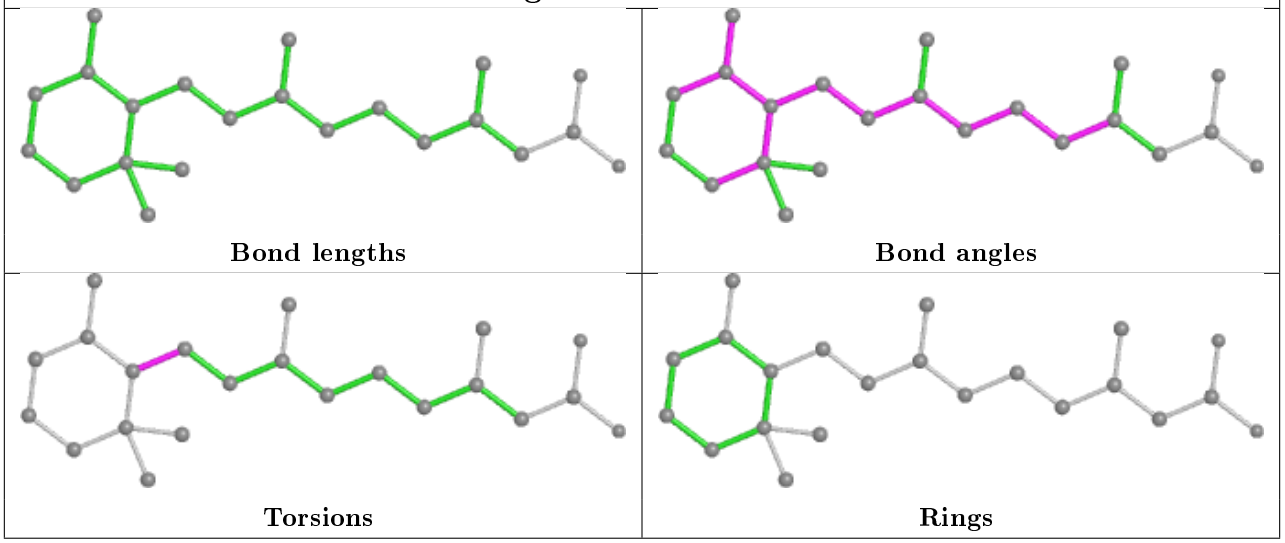


Rings

Ligand NAD G 601



Ligand REA C 602



5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å^2)	Q<0.9
1	A	489/529 (92%)	-0.53	0 100 100	8, 21, 53, 82	0
1	B	475/529 (89%)	-0.48	1 (0%) 95 95	8, 19, 65, 104	0
1	C	489/529 (92%)	-0.41	2 (0%) 92 93	8, 20, 73, 108	0
1	D	488/529 (92%)	-0.56	0 100 100	8, 21, 48, 85	0
1	E	478/529 (90%)	0.01	8 (1%) 70 69	37, 61, 86, 105	0
1	F	449/529 (84%)	-0.10	8 (1%) 68 67	36, 55, 89, 111	0
1	G	462/529 (87%)	0.04	12 (2%) 56 52	39, 57, 87, 107	0
1	H	488/529 (92%)	0.00	9 (1%) 68 67	37, 59, 83, 109	0
All	All	3818/4232 (90%)	-0.26	40 (1%) 82 82	8, 47, 82, 111	0

All (40) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	F	308	PHE	4.2
1	G	392	PHE	3.8
1	G	178	THR	3.7
1	G	362	PHE	3.5
1	C	389	LYS	3.4
1	G	361	GLN	3.1
1	F	382	GLY	3.1
1	E	376	GLY	3.0
1	H	442	ALA	2.9
1	G	182	PHE	2.7
1	H	214	LEU	2.7
1	F	364	LYS	2.7
1	F	127	LEU	2.6
1	B	389	LYS	2.6
1	E	408	ALA	2.5
1	F	309	ASN	2.5

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Mol	Chain	Res	Type	RSRZ
1	F	383	GLY	2.5
1	G	212	THR	2.5
1	H	404	ASN	2.4
1	H	200	THR	2.4
1	G	308	PHE	2.4
1	F	307	PHE	2.4
1	F	433	ASN	2.3
1	G	363	ASP	2.3
1	G	316	ALA	2.3
1	E	319	ARG	2.3
1	G	179	PRO	2.3
1	H	452	LEU	2.2
1	E	430	LYS	2.2
1	E	407	ILE	2.2
1	H	310	GLN	2.2
1	G	393	ILE	2.1
1	E	49	PHE	2.1
1	H	430	LYS	2.1
1	G	318	SER	2.0
1	E	448	LEU	2.0
1	C	413	PHE	2.0
1	H	377	ALA	2.0
1	E	203	LEU	2.0
1	H	27	LEU	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 monosaccharides in this entry.

6.4 Ligands (i)

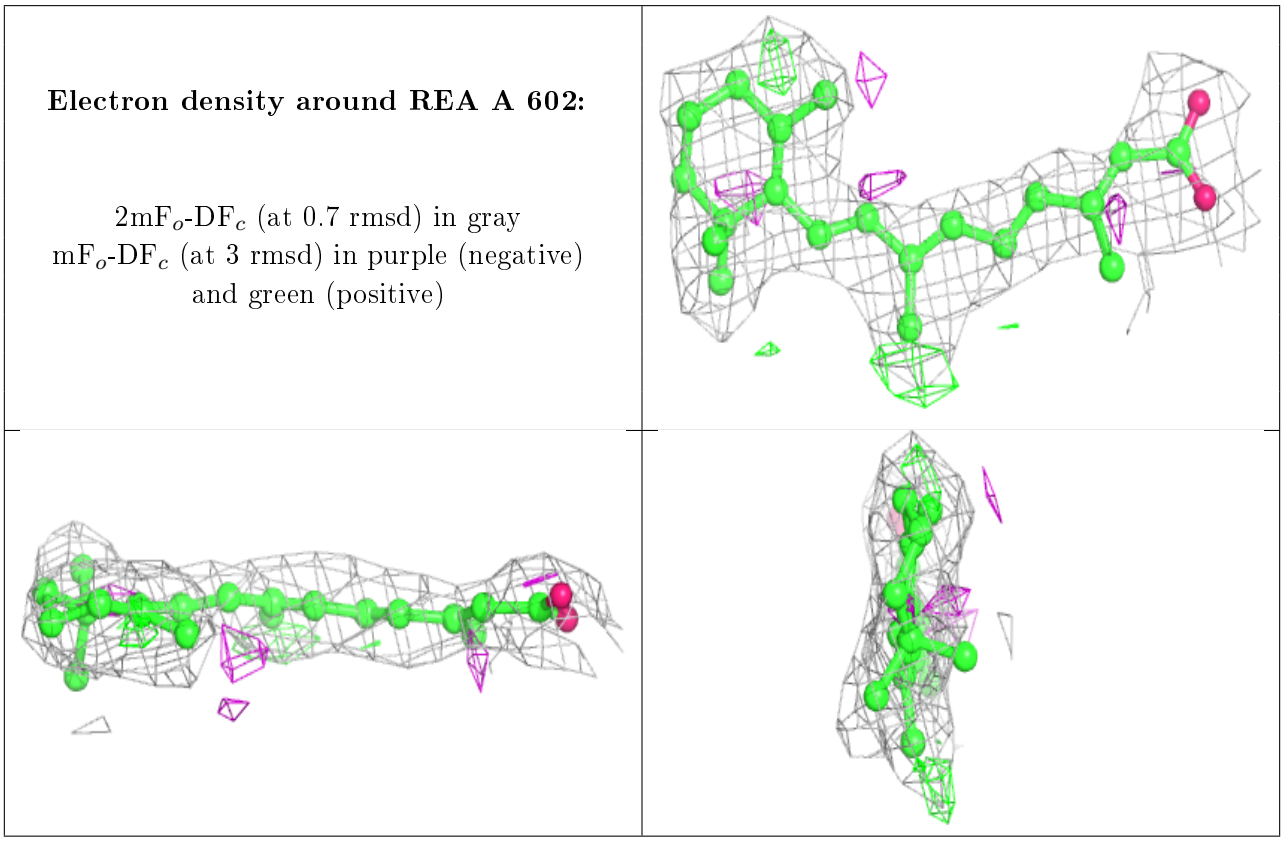
In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95^{th} percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	REA	A	602	22/22	0.86	0.27	17,28,40,43	0
3	REA	D	602	22/22	0.88	0.32	19,27,37,39	0
3	REA	B	602	22/22	0.90	0.31	16,35,57,64	0
3	REA	C	602	22/22	0.90	0.24	12,28,75,85	7
2	NAD	E	601	44/44	0.92	0.23	56,73,103,104	0
2	NAD	G	601	44/44	0.94	0.17	44,53,81,82	0
2	NAD	H	601	44/44	0.94	0.21	43,60,92,95	0
2	NAD	F	601	44/44	0.95	0.17	41,52,101,103	0
2	NAD	B	601	44/44	0.96	0.19	11,25,84,84	0
2	NAD	D	601	44/44	0.96	0.19	18,29,89,92	0
2	NAD	A	601	44/44	0.96	0.19	17,27,76,78	0
2	NAD	C	601	44/44	0.97	0.17	14,20,64,70	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.

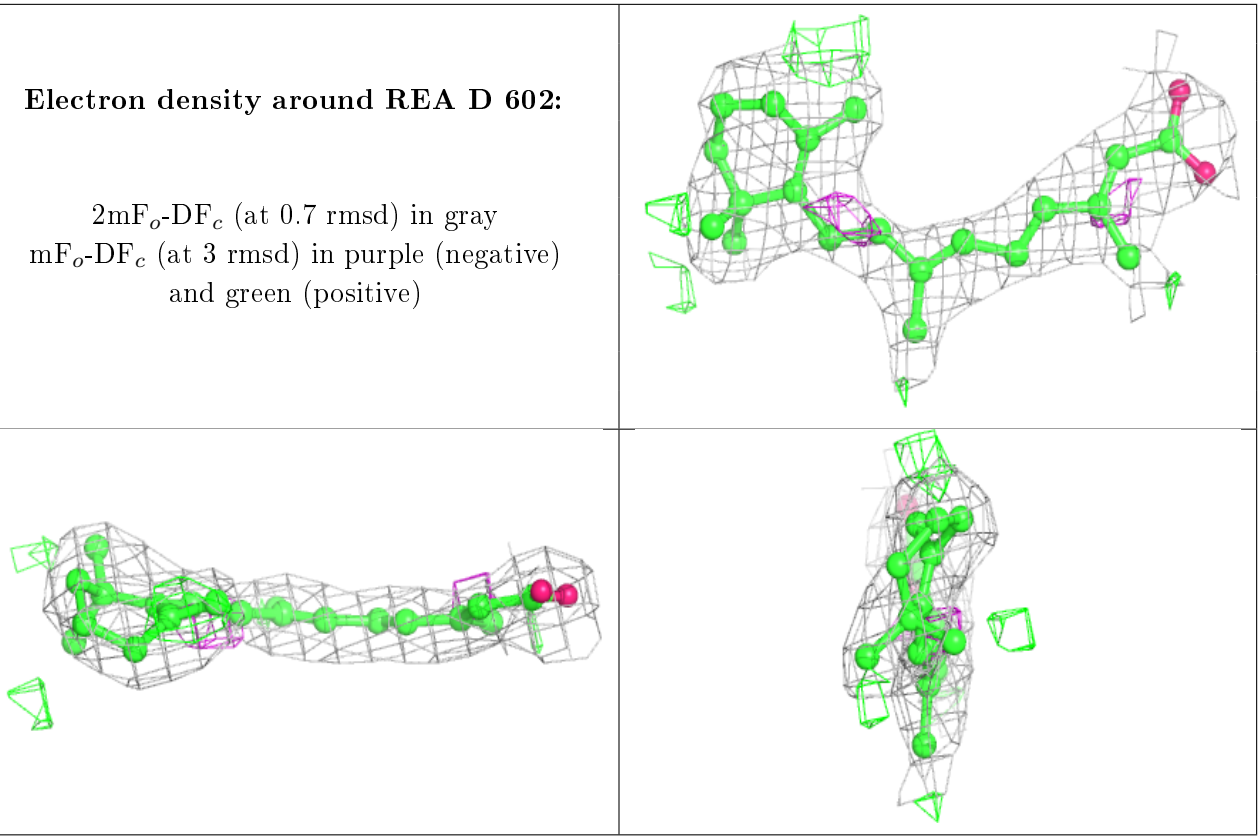
Electron density around REA A 602:

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



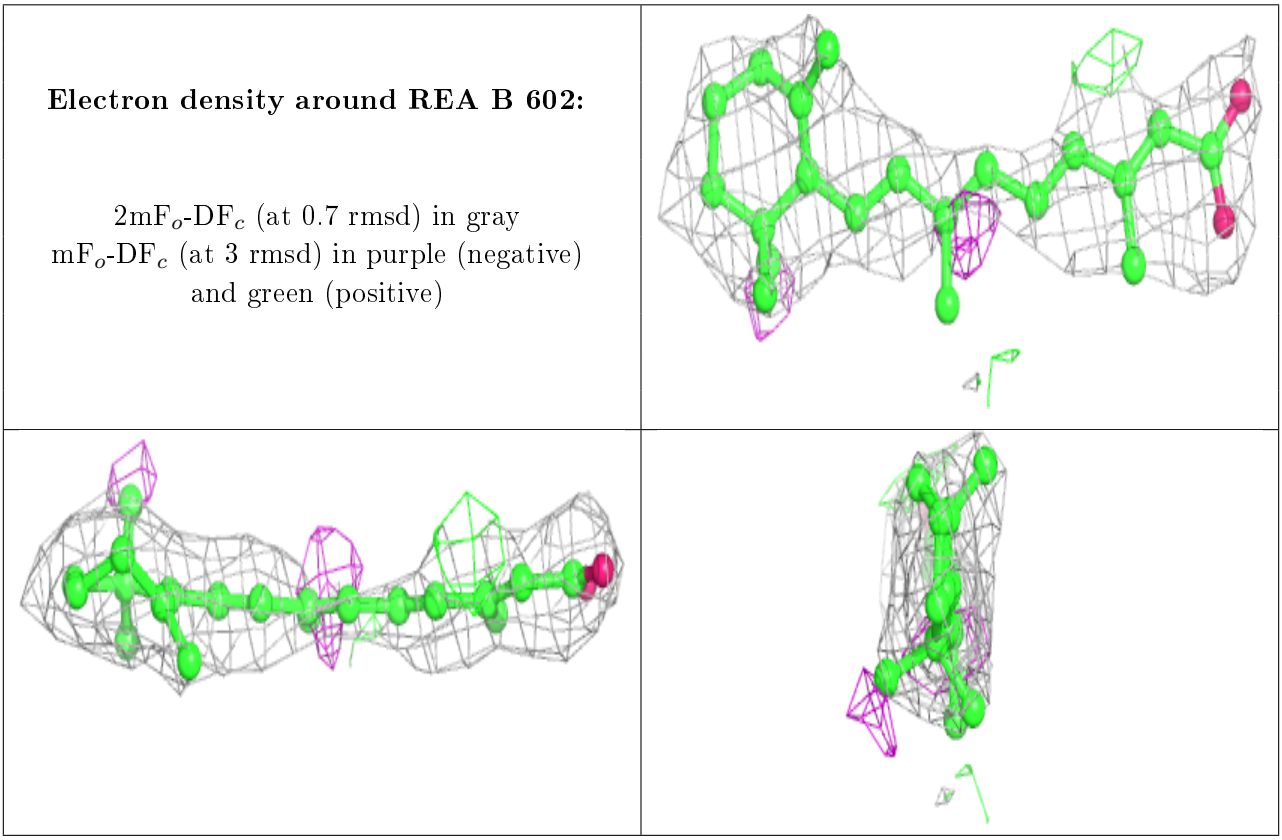
Electron density around REA D 602:

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



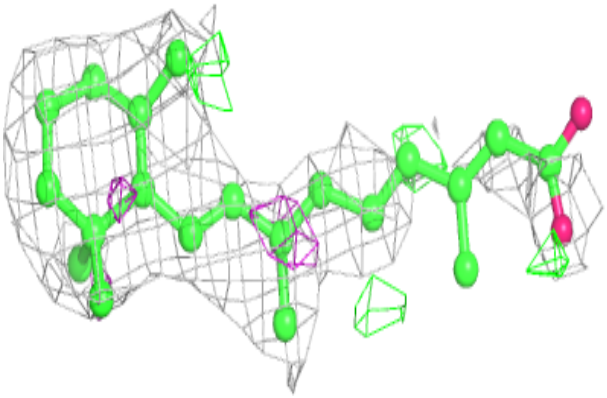
Electron density around REA B 602:

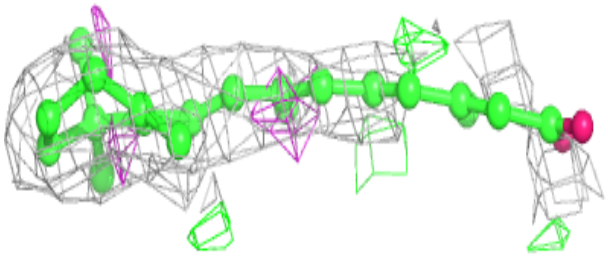
$2mF_o$-DF_c (at 0.7 rmsd) in gray
mF_o-DF_c (at 3 rmsd) in purple (negative) and green (positive)

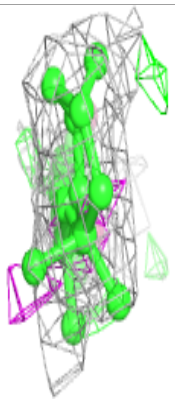


Electron density around REA C 602:

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

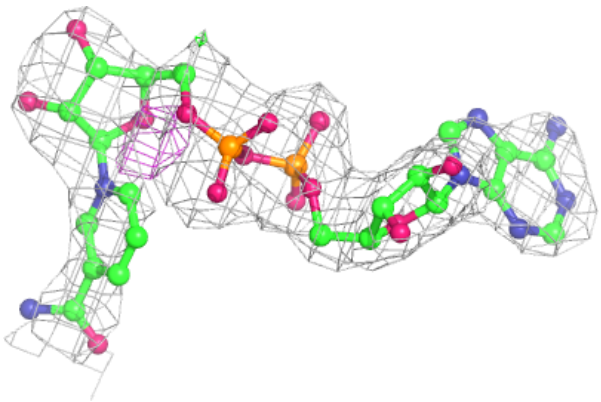


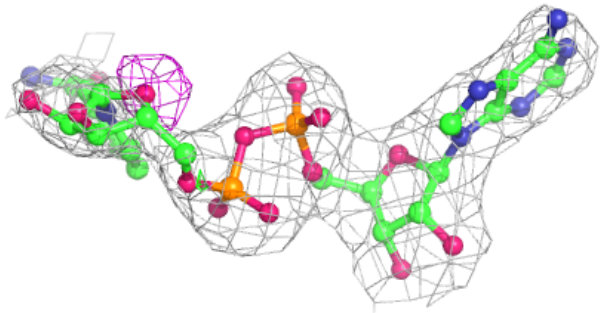


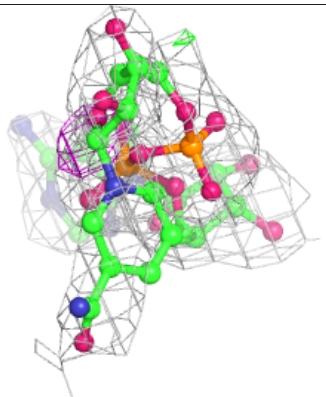


Electron density around NAD E 601:

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

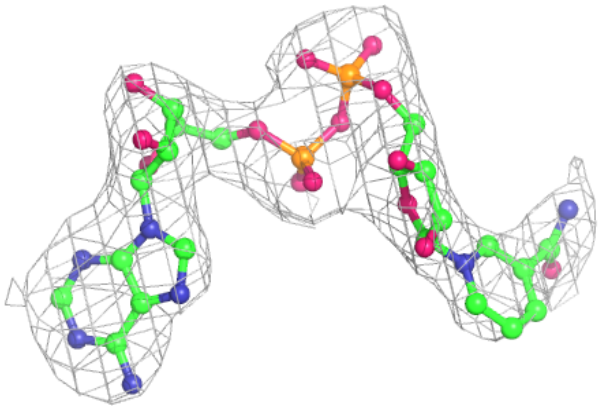


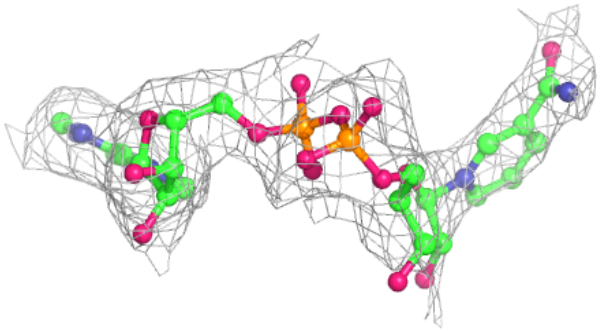


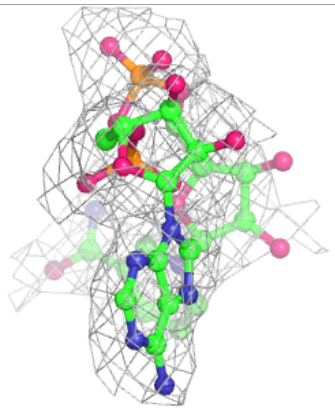


Electron density around NAD G 601:

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

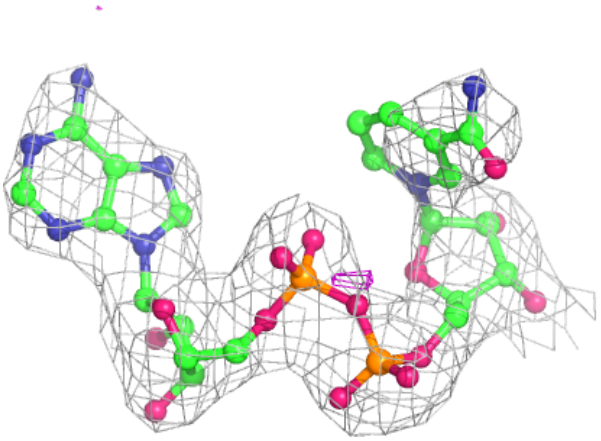


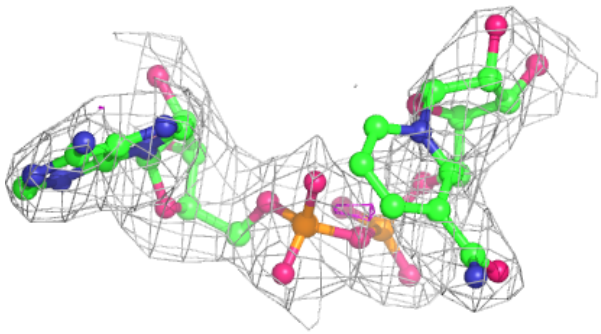


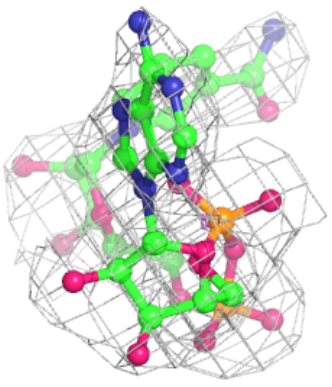


Electron density around NAD H 601:

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

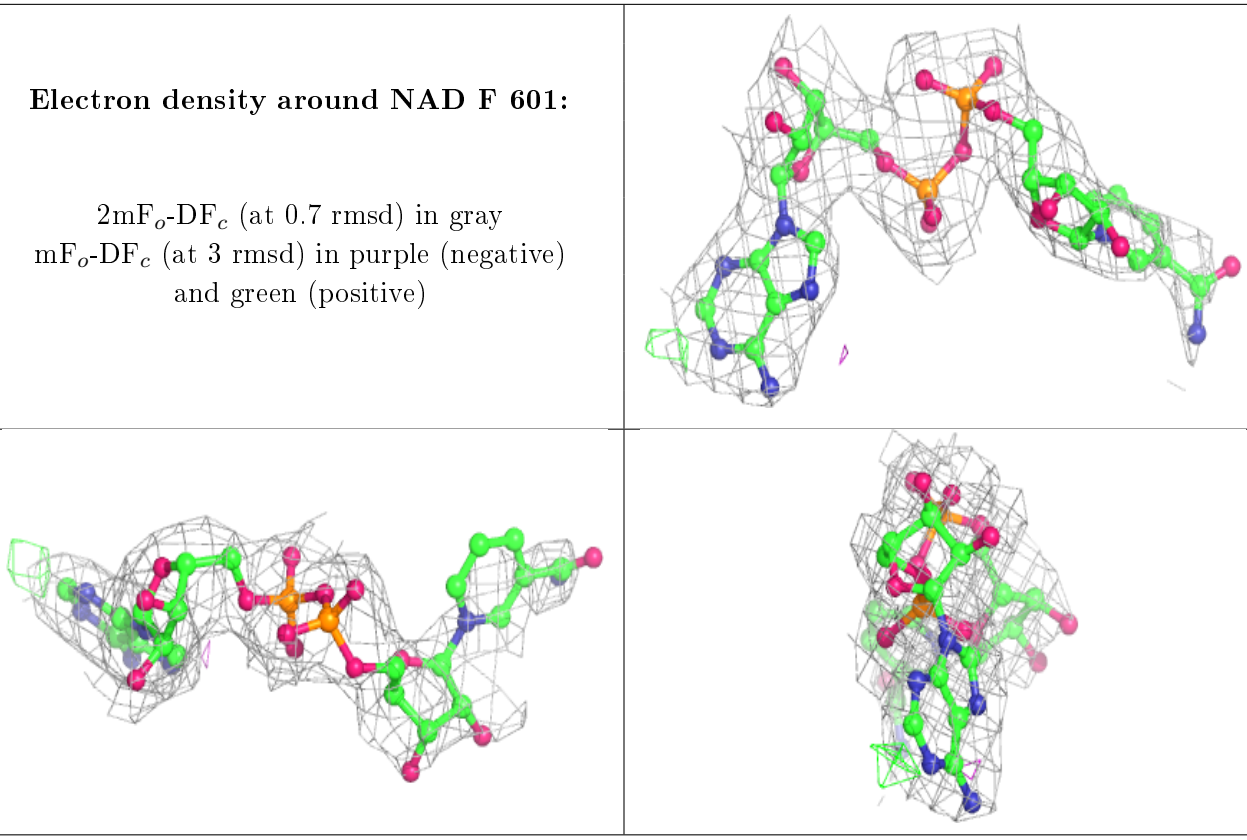






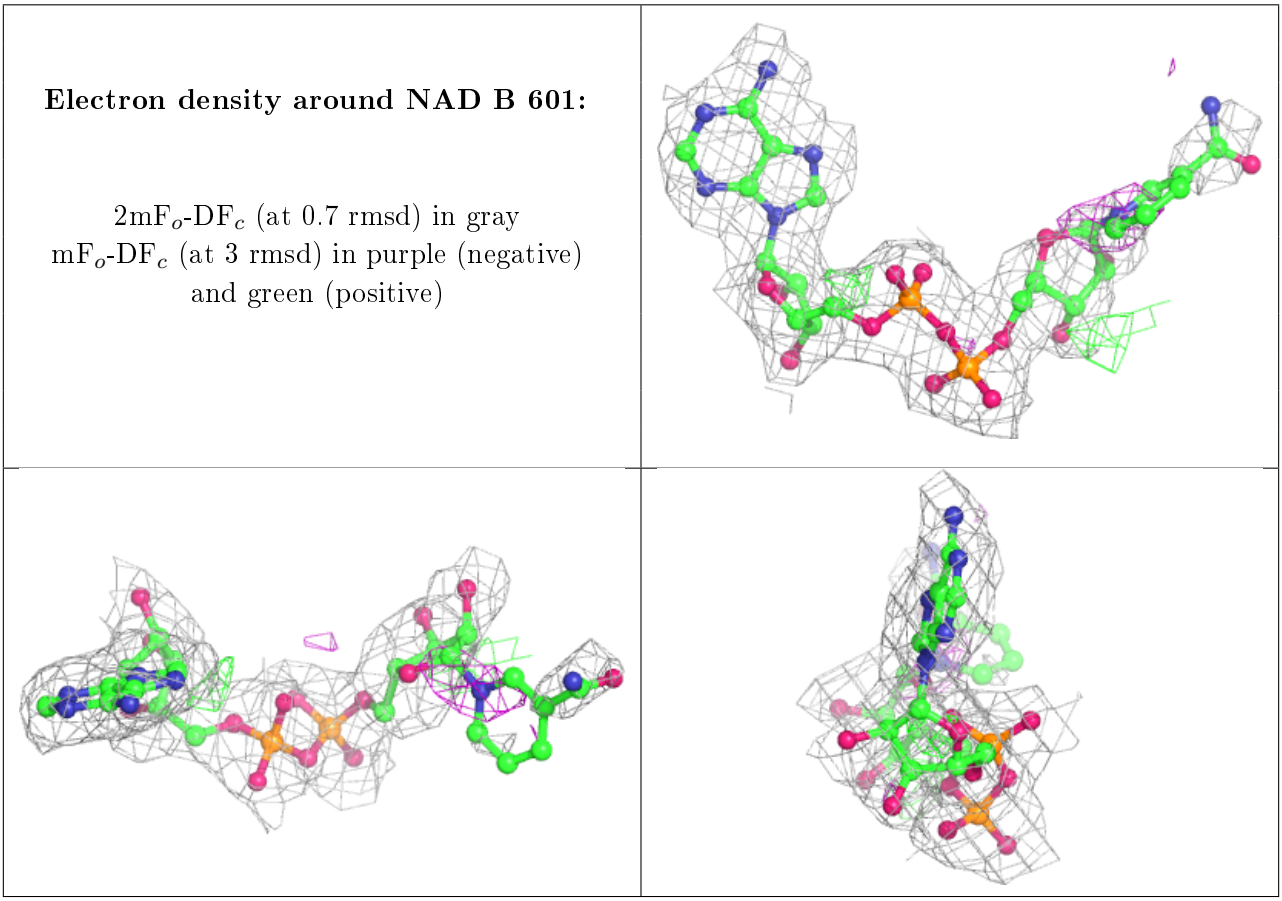
Electron density around NAD F 601:

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



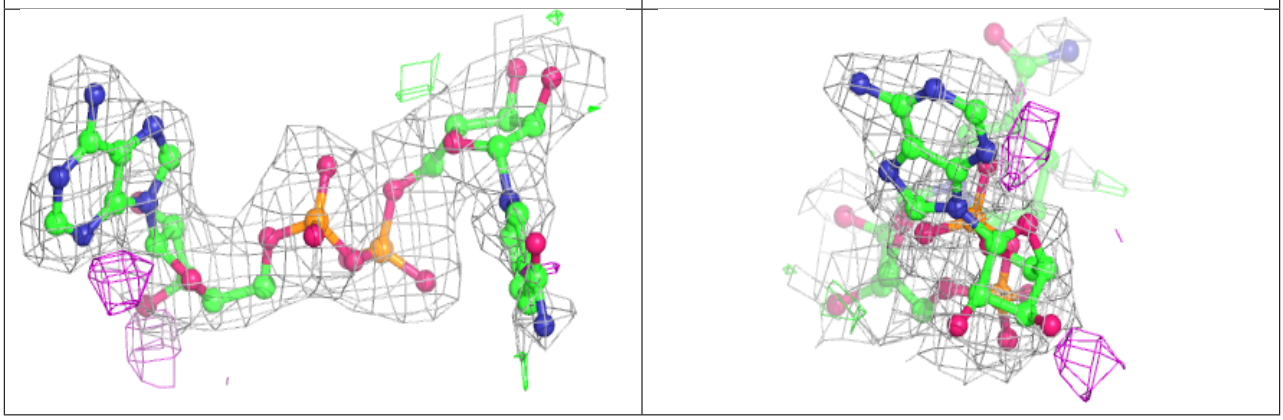
Electron density around NAD B 601:

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



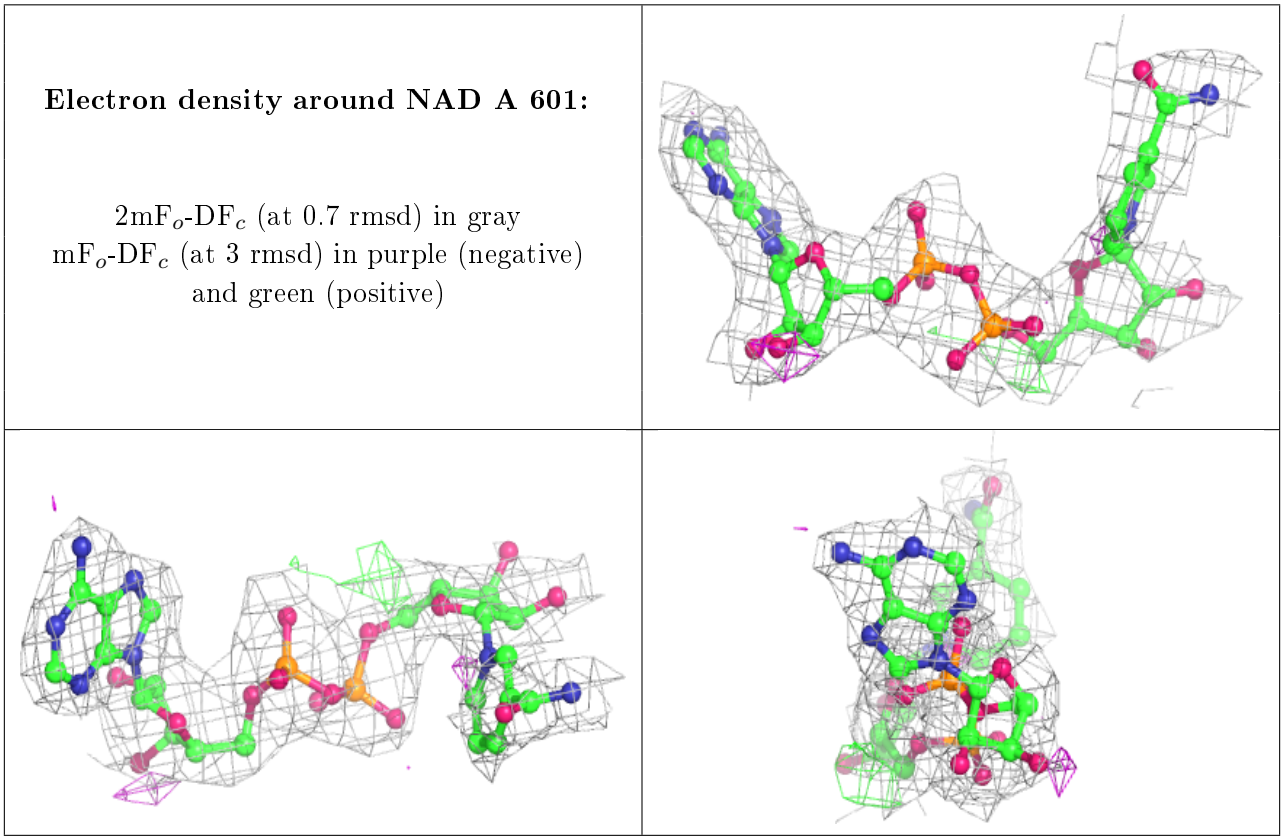
Electron density around NAD D 601:

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



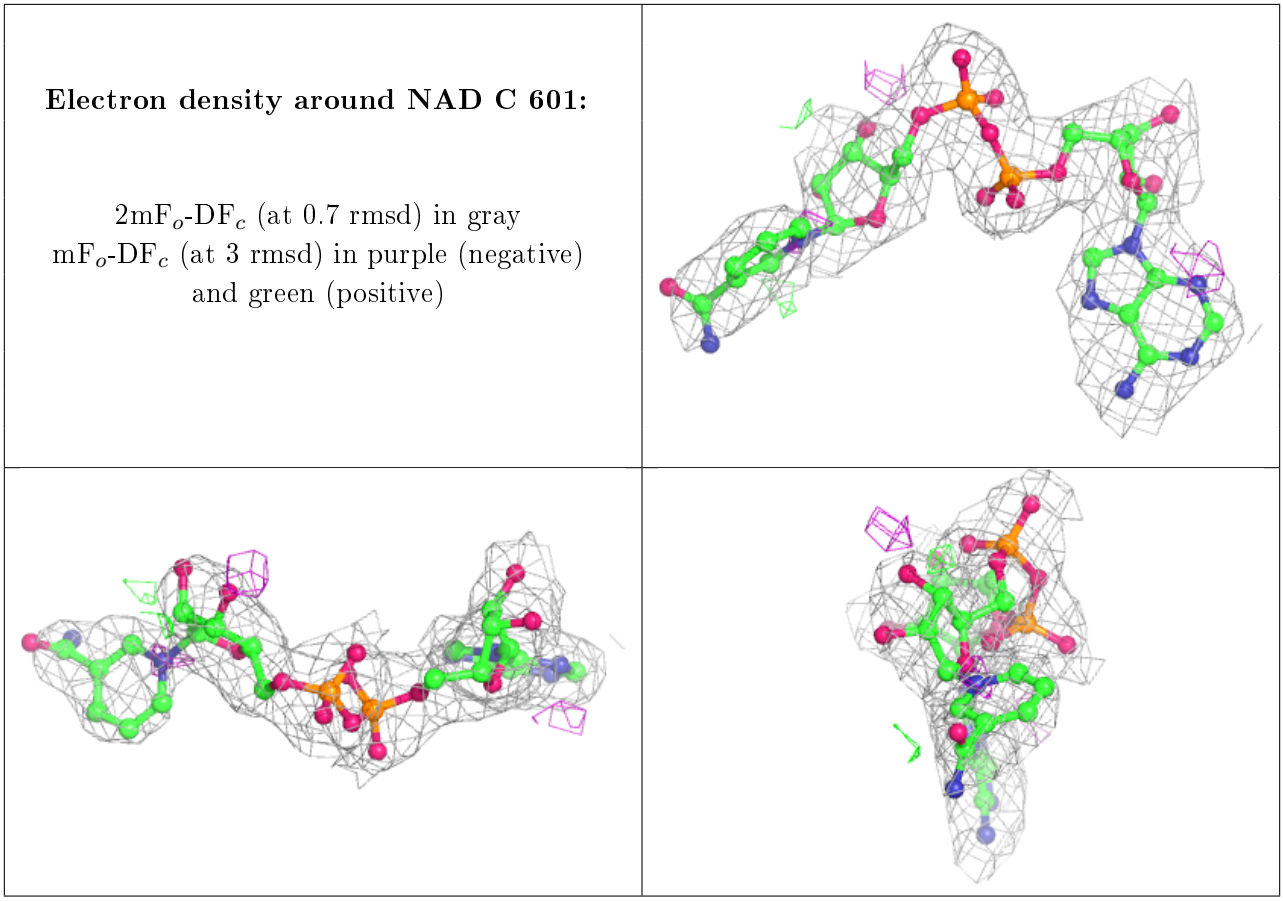
Electron density around NAD A 601:

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



Electron density around NAD 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.