Full wwPDB X-ray Structure Validation Report ⓘ

Sep 28, 2023 – 10:49 AM EDT

PDB ID	:	2IAA
Title	:	Crystal Structure of an Electron Transfer Complex Between Aromatic Amine Dephydrogenase and Azurin from Alcaligenes Faecalis (Form 2)
Authors	:	Sukumar, N.; Chen, Z.; Leys, D.; Scrutton, N.S.; Ferrati, D.; Merli, A.; Rossi, G.L.; Bellamy, H.D.; Chistoserdov, A.; Davidson, V.L.; Mathews, F.S.
Deposited on	:	2006-09-07
Resolution	:	1.95 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at *validation@mail.wwpdb.org*
A user guide is available at
https://www.wwpdb.org/validation/2017/XrayValidationReportHelp
with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at
http://www.wwpdb.org/validation/2017/FAQs#types.

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

|		
MolProbity	:	4.02b-467
Mogul	:	1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix)	:	1.13
EDS	:	2.35.1
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)	:	2.35.1
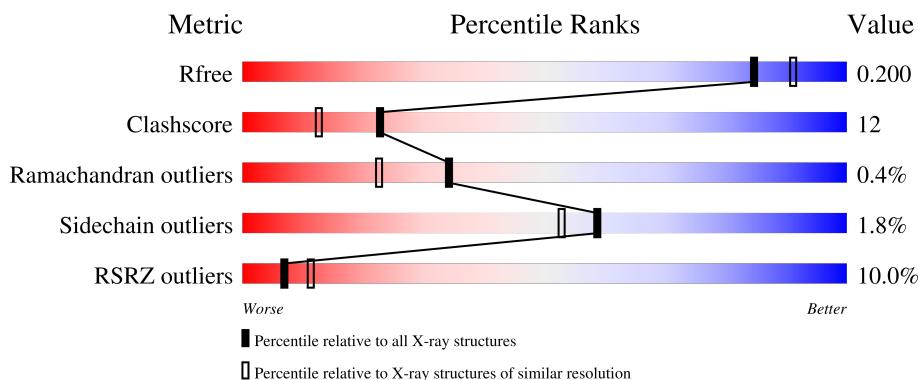
1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION
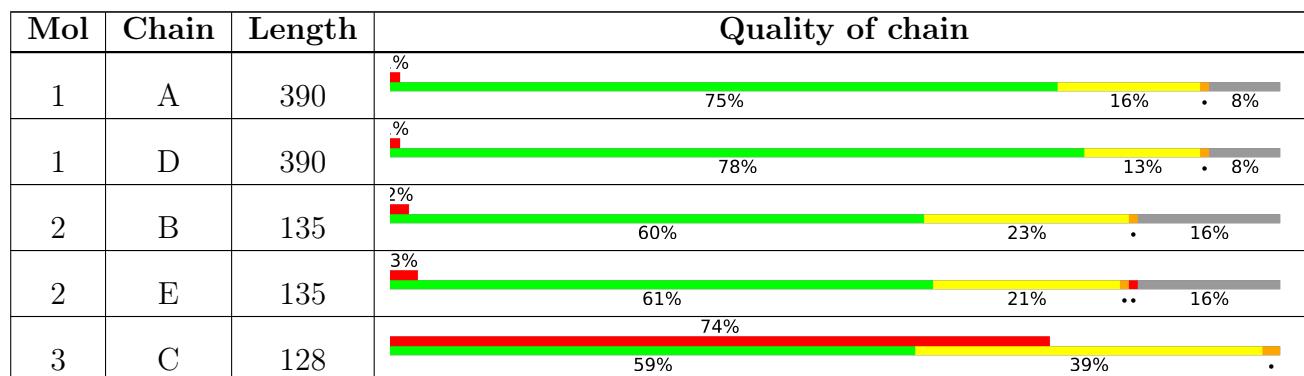
The reported resolution of this entry is 1.95 Å.

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	2580 (1.96-1.96)
Clashscore	141614	2705 (1.96-1.96)
Ramachandran outliers	138981	2678 (1.96-1.96)
Sidechain outliers	138945	2678 (1.96-1.96)
RSRZ outliers	127900	2539 (1.96-1.96)

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	390	
1	D	390	
2	B	135	
2	E	135	
3	C	128	

2 Entry composition ⓘ

There are 5 unique types of molecules in this entry. The entry contains 9307 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 Aromatic Amine Dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	359	Total 2813	C 1775	N 490	O 534	S 14	0	1	0
1	D	359	Total 2813	C 1775	N 490	O 534	S 14	0	1	0

- Molecule 2 is a protein called Aromatic Amine Dehydrogenase.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	113	Total 867	C 528	N 152	O 172	S 15	0	0	0
2	E	113	Total 867	C 528	N 152	O 172	S 15	0	0	0

- Molecule 3 is a protein called Azurin.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	C	128	Total 957	C 596	N 160	O 194	S 7	0	0	0

- Molecule 4 is COPPER (II) ION (three-letter code: CU) (formula: Cu).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	C	1	Total 1	Cu 1	0	0

- Molecule 5 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	A	374	Total 374	O 374	0	0
5	B	97	Total 97	O 97	0	0

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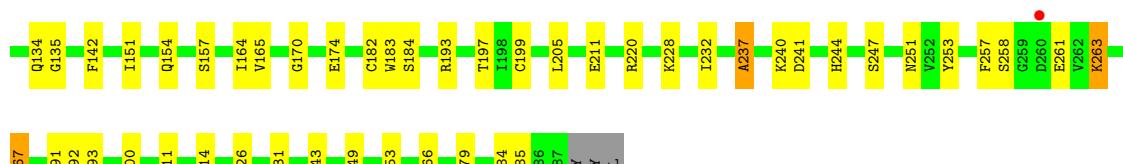
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Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
5	C	25	Total 25	O 25	0	0
5	D	393	Total 393	O 393	0	0
5	E	100	Total 100	O 100	0	0
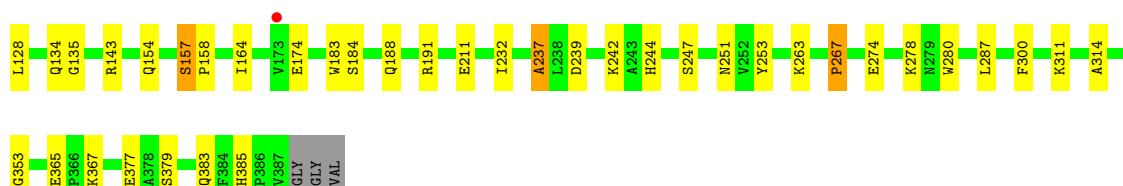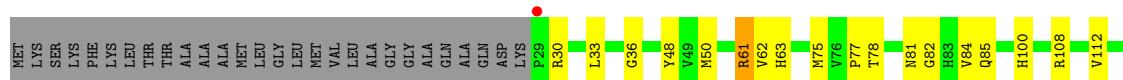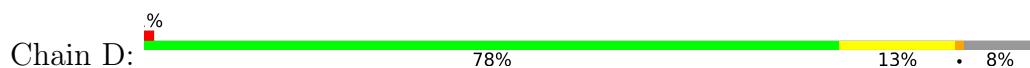
3 Residue-property plots ⓘ

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: Aromatic Amine Dehydrogenase


- Molecule 1: Aromatic Amine Dehydrogenase
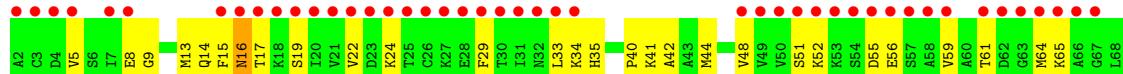
- Molecule 2: Aromatic Amine Dehydrogenase

• Molecule 2: Aromatic Amine Dehydrogenase

Chain E:

• Molecule 3: Azurin

Chain C:

4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α, β, γ	67.22Å 131.72Å 133.20Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.04 – 1.95 47.04 – 1.95	Depositor EDS
% Data completeness (in resolution range)	89.5 (47.04-1.95) 89.6 (47.04-1.95)	Depositor EDS
R_{merge}	0.06	Depositor
R_{sym}	(Not available)	Depositor
$<I/\sigma(I)>$ [1]	3.67 (at 1.95Å)	Xtriage
Refinement program	CNS 1.1	Depositor
R, R_{free}	0.174 , 0.205 0.171 , 0.200	Depositor DCC
R_{free} test set	4031 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å^2)	19.8	Xtriage
Anisotropy	0.487	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 55.6	EDS
L-test for twinning[2]	$<|L|> = 0.49, <L^2> = 0.32$	Xtriage
Estimated twinning fraction	0.014 for -h,l,k	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	9307	wwPDB-VP
Average B, all atoms (Å^2)	27.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.64% 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 (i)

5.1   Standard geometry (i)

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

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	0.31	0/2878	0.67	1/3900 (0.0%)
1	D	0.32	0/2878	0.67	1/3900 (0.0%)
2	B	0.32	0/873	0.67	0/1187
2	E	0.31	0/873	0.67	0/1187
3	C	0.28	0/972	0.49	0/1307
All	All	0.31	0/8474	0.65	2/11481 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	237	ALA	N-CA-C	-6.06	94.65	111.00
1	D	237	ALA	N-CA-C	-5.60	95.88	111.00

There are no chirality outliers.

There are no planarity outliers.

5.2   Too-close contacts (i)

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	2813	0	2757	50	0
1	D	2813	0	2757	45	0
2	B	867	0	760	30	0
2	E	867	0	760	27	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	C	957	0	932	58	0
4	C	1	0	0	0	0
5	A	374	0	0	7	0
5	B	97	0	0	2	0
5	C	25	0	0	1	0
5	D	393	0	0	3	0
5	E	100	0	0	2	0
All	All	9307	0	7966	188	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 (188) 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:B:85:LYS:HD3	1:D:75[B]:MET:HE2	1.43	0.98
2:B:62:TRQ:HB2	2:B:113:TRP:NE1	1.81	0.94
1:A:75[B]:MET:HE2	2:E:85:LYS:HD3	1.48	0.94
2:E:62:TRQ:HB2	2:E:113:TRP:NE1	1.86	0.90
2:E:133:ALA:O	2:E:134:LYS:HG2	1.77	0.85
1:D:278:LYS:HE2	1:D:280:TRP:HE1	1.45	0.82
2:E:62:TRQ:HB2	2:E:113:TRP:HE1	1.44	0.81
2:B:62:TRQ:HB2	2:B:113:TRP:HE1	1.41	0.81
2:B:133:ALA:O	2:B:134:LYS:HG3	1.82	0.79
3:C:102:LEU:HD12	3:C:127:LEU:HD22	1.65	0.76
2:B:58:SER:HA	2:B:117:ASN:HD21	1.51	0.76
2:E:23:ASP:HA	2:E:26:ASN:HB2	1.69	0.75
3:C:109:ALA:HB1	3:C:122:LYS:HE2	1.69	0.74
3:C:22:VAL:HG22	3:C:127:LEU:HA	1.73	0.69
2:B:22:GLU:O	2:B:25:VAL:HG22	1.94	0.67
1:D:48:TYR:OH	1:D:385:HIS:HD2	1.78	0.67
2:E:58:SER:HA	2:E:117:ASN:HD21	1.59	0.67
3:C:51:SER:HA	3:C:81:ILE:HD13	1.76	0.67
1:D:61:ARG:HH11	1:D:63:HIS:HE1	1.43	0.66
3:C:56:GLU:OE1	3:C:122:LYS:HG3	1.96	0.66
3:C:24:LYS:HG3	3:C:128:GLY:HA2	1.78	0.66
2:B:130:VAL:O	1:D:30:ARG:HB2	1.97	0.65
3:C:52:LYS:HD2	3:C:106:GLU:OE1	1.97	0.64
1:D:81:ASN:HD21	1:D:135:GLY:H	1.46	0.63
1:D:134:GLN:HE22	2:E:120:SER:HB2	1.63	0.63
2:B:108:HIS:NE2	2:B:110:ASP:HB2	2.14	0.63

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:251:ASN:HB3	1:D:267:PRO:HB2	1.81	0.62
1:D:278:LYS:CE	1:D:280:TRP:HE1	2.11	0.62
1:A:251:ASN:HB3	1:A:267:PRO:HB2	1.81	0.61
1:A:134:GLN:HE22	2:B:120:SER:HB2	1.65	0.61
3:C:101:LYS:O	3:C:101:LYS:HG3	2.02	0.60
1:A:61:ARG:HH11	1:A:63:HIS:HE1	1.48	0.60
1:A:75[B]:MET:CE	1:A:77:PRO:HD3	2.31	0.60
1:A:29:PRO:HB3	5:A:609:HOH:O	2.01	0.60
1:A:48:TYR:OH	1:A:385:HIS:HD2	1.85	0.60
1:D:75[B]:MET:CE	1:D:77:PRO:HD3	2.32	0.59
3:C:33:LEU:HD22	3:C:48:VAL:HG23	1.83	0.59
1:A:326:GLN:HG2	5:A:605:HOH:O	2.01	0.59
2:B:131:GLY:HA2	1:D:30:ARG:HH11	1.67	0.59
3:C:102:LEU:HD13	3:C:127:LEU:HB2	1.84	0.59
3:C:52:LYS:HE3	3:C:55:ASP:OD2	2.03	0.59
3:C:61:THR:HG22	3:C:65:LYS:NZ	2.17	0.59
1:A:134:GLN:NE2	2:B:112:ASN:HD22	2.01	0.58
3:C:22:VAL:HG12	3:C:29:PHE:CE1	2.38	0.58
2:E:133:ALA:O	2:E:134:LYS:CG	2.50	0.58
1:A:300:PHE:HB3	1:A:314:ALA:HB2	1.85	0.57
1:D:100:HIS:CE1	1:D:108:ARG:HB2	2.40	0.57
1:D:278:LYS:HE2	1:D:280:TRP:NE1	2.19	0.56
2:B:85:LYS:HD3	1:D:75[B]:MET:CE	2.27	0.56
1:D:164:ILE:HB	1:D:174:GLU:HB3	1.87	0.56
1:A:81:ASN:HD21	1:A:135:GLY:H	1.54	0.56
1:A:253:TYR:CZ	1:A:267:PRO:HB3	2.41	0.56
1:D:253:TYR:CZ	1:D:267:PRO:HB3	2.41	0.56
3:C:22:VAL:HG23	3:C:127:LEU:HD12	1.88	0.55
3:C:34:LYS:HA	3:C:92:THR:HG22	1.89	0.55
3:C:122:LYS:HD3	3:C:123:GLY:N	2.21	0.55
3:C:55:ASP:O	3:C:59:VAL:HG23	2.06	0.55
2:E:90:ARG:HH11	2:E:90:ARG:HG3	1.73	0.54
1:A:228:LYS:HG2	5:A:730:HOH:O	2.08	0.54
1:D:134:GLN:NE2	2:E:112:ASN:HD22	2.06	0.54
3:C:17:THR:HG22	3:C:19:SER:H	1.73	0.53
3:C:81:ILE:HD12	3:C:81:ILE:N	2.24	0.53
3:C:110:PHE:CE1	3:C:123:GLY:HA3	2.44	0.53
1:A:261:GLU:HB2	1:A:263:LYS:HE3	1.92	0.52
2:B:106:PHE:CZ	3:C:13:MET:HE1	2.43	0.52
3:C:16:ASN:N	3:C:16:ASN:HD22	2.05	0.52
1:A:107:LYS:HE2	5:A:585:HOH:O	2.08	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:D:75[B]:MET:HE3	1:D:77:PRO:HD3	1.92	0.52
2:B:61:SER:HB2	2:B:79:TYR:O	2.10	0.52
1:A:75[B]:MET:HE3	1:A:77:PRO:HD3	1.90	0.51
1:D:61:ARG:HH11	1:D:63:HIS:CE1	2.27	0.51
2:B:63:ILE:HD13	3:C:120:ILE:HD11	1.93	0.51
2:B:35:ALA:HB3	2:B:79:TYR:CE1	2.46	0.51
3:C:8:GLU:H	3:C:16:ASN:ND2	2.07	0.50
1:D:143:ARG:HH22	1:D:383:GLN:NE2	2.07	0.50
1:A:232:ILE:HA	1:A:247:SER:HA	1.93	0.50
3:C:61:THR:HG22	3:C:65:LYS:HZ2	1.76	0.50
1:D:242:LYS:HD2	5:D:491:HOH:O	2.11	0.50
1:A:56:HIS:NE2	1:D:377:GLU:OE2	2.40	0.50
3:C:109:ALA:CB	3:C:122:LYS:HE2	2.40	0.50
1:D:300:PHE:HB3	1:D:314:ALA:HB2	1.92	0.50
1:A:220:ARG:NH2	3:C:64:MET:HE1	2.26	0.50
3:C:84:THR:HG22	3:C:95:VAL:CG2	2.41	0.50
3:C:16:ASN:ND2	3:C:16:ASN:H	2.10	0.49
3:C:103:LYS:HD3	3:C:106:GLU:OE1	2.12	0.49
1:D:154:GLN:NE2	1:D:184:SER:H	2.11	0.49
2:E:108:HIS:NE2	2:E:110:ASP:HB2	2.27	0.49
1:D:311:LYS:HZ3	2:E:110:ASP:CG	2.16	0.49
2:E:108:HIS:CE1	2:E:110:ASP:HB2	2.48	0.48
3:C:99:VAL:HG12	3:C:99:VAL:O	2.14	0.48
1:A:183:TRP:CD1	2:B:102:GLY:HA3	2.49	0.48
1:A:311:LYS:HD2	2:B:96:GLN:CD	2.35	0.47
1:D:36:GLY:HA2	5:D:624:HOH:O	2.13	0.47
2:E:34:CYS:O	2:E:95:THR:HG22	2.13	0.47
2:B:62:TRQ:CB	2:B:113:TRP:NE1	2.68	0.47
1:D:183:TRP:CD1	2:E:102:GLY:HA3	2.50	0.47
3:C:40:PRO:HB2	5:C:826:HOH:O	2.15	0.47
3:C:16:ASN:N	3:C:16:ASN:ND2	2.63	0.47
2:B:99:GLU:OE2	2:B:108:HIS:HD2	1.97	0.46
3:C:99:VAL:CG1	3:C:102:LEU:HD11	2.46	0.46
2:B:22:GLU:C	2:B:24:GLU:H	2.19	0.46
3:C:8:GLU:O	3:C:15:PHE:HA	2.15	0.46
1:A:164:ILE:HB	1:A:174:GLU:HB3	1.98	0.46
1:A:291:HIS:CE1	1:A:293:ALA:HB3	2.51	0.46
1:A:75[B]:MET:CE	2:E:85:LYS:HD3	2.35	0.46
5:A:513:HOH:O	2:B:108:HIS:HE1	1.99	0.46
1:A:193:ARG:NH2	1:A:211:GLU:HG3	2.30	0.46
3:C:84:THR:HG22	3:C:95:VAL:HG23	1.97	0.46

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
3:C:122:LYS:HD3	3:C:122:LYS:C	2.36	0.46
1:D:84:VAL:HG22	1:D:85:GLN:N	2.31	0.46
1:A:220:ARG:HH21	3:C:64:MET:HE1	1.81	0.46
3:C:34:LYS:HG2	3:C:92:THR:CG2	2.45	0.46
2:E:51:CYS:HB3	2:E:55:SER:OG	2.16	0.46
1:D:154:GLN:HE21	1:D:184:SER:H	1.62	0.46
1:A:154:GLN:NE2	1:A:184:SER:H	2.14	0.46
1:A:311:LYS:HZ3	2:B:110:ASP:CG	2.20	0.45
2:E:25:VAL:HG13	5:E:204:HOH:O	2.16	0.45
1:A:75[B]:MET:HE1	1:A:77:PRO:HD3	1.99	0.45
1:D:278:LYS:NZ	5:D:740:HOH:O	2.49	0.45
1:A:237:ALA:HB3	1:A:244:HIS:HB2	1.99	0.45
1:A:182:CYS:HA	1:A:199:CYS:HA	1.99	0.45
1:A:100:HIS:CE1	1:A:108:ARG:HB2	2.51	0.45
3:C:52:LYS:HB2	3:C:55:ASP:OD2	2.17	0.45
1:A:85:GLN:HG2	1:A:142:PHE:CE2	2.52	0.45
1:A:100:HIS:HD2	5:A:536:HOH:O	2.00	0.45
3:C:5:VAL:CG2	3:C:29:PHE:HZ	2.29	0.44
1:A:151:ILE:HB	1:A:165:VAL:HB	1.99	0.44
1:A:84:VAL:HG22	1:A:85:GLN:N	2.32	0.44
2:B:80:HIS:HB2	1:D:33:LEU:HD22	1.99	0.44
3:C:44:MET:O	3:C:44:MET:HG3	2.17	0.44
1:A:349:LEU:HG	1:A:384:PHE:CZ	2.53	0.44
3:C:24:LYS:HE3	3:C:128:GLY:CA	2.48	0.44
3:C:81:ILE:HG23	3:C:101:LYS:HD2	1.99	0.44
1:D:75[B]:MET:HE1	1:D:77:PRO:HD3	2.00	0.44
1:D:112:VAL:HG23	1:D:128:LEU:HD11	1.99	0.44
2:E:24:GLU:HB3	5:E:204:HOH:O	2.18	0.44
1:D:263:LYS:HA	1:D:263:LYS:HE2	2.00	0.44
1:D:232:ILE:HA	1:D:247:SER:HA	2.00	0.44
3:C:48:VAL:O	3:C:83:HIS:HA	2.18	0.44
2:B:56:THR:HA	2:B:57:PRO:HD3	1.87	0.43
2:B:108:HIS:CE1	2:B:110:ASP:HB2	2.52	0.43
3:C:52:LYS:HG2	3:C:108:TYR:CE1	2.53	0.43
1:A:197:THR:HG22	1:A:205:LEU:HB3	2.01	0.43
1:A:30:ARG:HH21	1:A:30:ARG:HG2	1.82	0.43
1:D:81:ASN:HD21	1:D:135:GLY:N	2.11	0.43
2:E:134:LYS:HD2	2:E:134:LYS:HA	1.81	0.43
1:D:78:THR:HB	1:D:82:GLY:HA3	2.00	0.43
2:E:90:ARG:HG3	2:E:90:ARG:NH1	2.32	0.43
1:D:237:ALA:HB3	1:D:244:HIS:HB2	2.00	0.43

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:241:ASP:HA	1:A:257:PHE:CE1	2.54	0.43
1:A:112:VAL:HG23	1:A:128:LEU:HD11	2.01	0.43
3:C:102:LEU:CD1	3:C:127:LEU:HD22	2.45	0.43
3:C:9:GLY:HA2	3:C:14:GLN:O	2.19	0.42
1:D:50:MET:SD	1:D:62:VAL:HG22	2.59	0.42
2:E:22:GLU:C	2:E:24:GLU:H	2.23	0.42
1:A:100:HIS:HA	1:A:107:LYS:O	2.20	0.42
3:C:35:HIS:ND1	3:C:89:GLY:HA2	2.34	0.42
2:E:30:TYR:HB3	2:E:33:HIS:CD2	2.54	0.42
2:B:64:GLY:HA2	5:B:181:HOH:O	2.20	0.42
3:C:51:SER:HA	3:C:81:ILE:CD1	2.49	0.42
1:A:292:ARG:H	1:A:343:GLN:HE22	1.67	0.42
2:E:61:SER:HB2	2:E:79:TYR:O	2.19	0.42
3:C:41:LYS:HG3	3:C:42:ALA:N	2.35	0.41
1:D:239:ASP:HB3	1:D:242:LYS:HG2	2.02	0.41
1:A:124:LYS:HE2	1:A:170:GLY:HA3	2.02	0.41
3:C:24:LYS:HE3	3:C:128:GLY:HA3	2.02	0.41
2:E:39:PHE:CE2	2:E:89:GLY:HA2	2.55	0.41
2:E:62:TRQ:CB	2:E:113:TRP:NE1	2.71	0.41
1:D:157:SER:N	1:D:158:PRO:CA	2.83	0.41
2:E:56:THR:HA	2:E:57:PRO:HD3	1.89	0.41
2:B:39:PHE:HB3	2:B:90:ARG:O	2.20	0.41
1:A:124:LYS:CE	1:A:170:GLY:HA3	2.49	0.41
3:C:74:LYS:O	3:C:77:ASP:HB2	2.20	0.41
1:D:157:SER:N	1:D:158:PRO:HA	2.36	0.41
1:A:240:LYS:HD3	5:A:533:HOH:O	2.19	0.41
1:A:353:GLY:HA2	1:A:379:SER:O	2.20	0.41
3:C:87:ILE:HB	3:C:91:GLU:HB2	2.02	0.41
1:D:353:GLY:HA2	1:D:379:SER:O	2.21	0.41
2:B:73:LYS:NZ	5:B:146:HOH:O	2.53	0.41
1:A:311:LYS:NZ	2:B:96:GLN:NE2	2.69	0.41
1:A:331:ILE:HD13	1:A:366:PRO:HB2	2.03	0.41
3:C:84:THR:HA	3:C:95:VAL:CG2	2.51	0.41
3:C:102:LEU:CD1	3:C:127:LEU:HB2	2.51	0.41
3:C:22:VAL:HG12	3:C:29:PHE:CD1	2.56	0.41
1:D:367:LYS:HD3	1:D:367:LYS:C	2.40	0.41
1:A:241:ASP:OD2	1:A:258:SER:HB3	2.20	0.40
3:C:87:ILE:HD12	3:C:91:GLU:O	2.21	0.40
1:D:188:GLN:NE2	1:D:191:ARG:HH11	2.19	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

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

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

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	A	358/390 (92%)	340 (95%)	17 (5%)	1 (0%)	41	30
1	D	358/390 (92%)	343 (96%)	14 (4%)	1 (0%)	41	30
2	B	110/135 (82%)	101 (92%)	9 (8%)	0	100	100
2	E	110/135 (82%)	101 (92%)	8 (7%)	1 (1%)	17	8
3	C	126/128 (98%)	116 (92%)	9 (7%)	1 (1%)	19	9
All	All	1062/1178 (90%)	1001 (94%)	57 (5%)	4 (0%)	34	22

All (4) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
3	C	115	PRO
1	A	157	SER
2	E	23	ASP
1	D	157	SER

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	306/325 (94%)	302 (99%)	4 (1%)	69	65
1	D	306/325 (94%)	300 (98%)	6 (2%)	55	48
2	B	98/112 (88%)	97 (99%)	1 (1%)	76	74
2	E	98/112 (88%)	97 (99%)	1 (1%)	76	74

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
3	C	106/106 (100%)	102 (96%)	4 (4%)	33	21
All	All	914/980 (93%)	898 (98%)	16 (2%)	59	53

All (16) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	32	VAL
1	A	61	ARG
1	A	263	LYS
1	A	267	PRO
2	B	98	ARG
3	C	16	ASN
3	C	106	GLU
3	C	115	PRO
3	C	126	GLU
1	D	61	ARG
1	D	211	GLU
1	D	267	PRO
1	D	274	GLU
1	D	287	LEU
1	D	365	GLU
2	E	23	ASP

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (42) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	43	GLN
1	A	63	HIS
1	A	81	ASN
1	A	85	GLN
1	A	100	HIS
1	A	134	GLN
1	A	137	ASN
1	A	144	GLN
1	A	154	GLN
1	A	188	GLN
1	A	223	GLN
1	A	343	GLN
1	A	344	GLN
1	A	381	GLN
1	A	383	GLN

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Mol	Chain	Res	Type
1	A	385	HIS
2	B	92	GLN
2	B	96	GLN
2	B	108	HIS
2	B	117	ASN
3	C	16	ASN
1	D	43	GLN
1	D	63	HIS
1	D	81	ASN
1	D	85	GLN
1	D	100	HIS
1	D	134	GLN
1	D	137	ASN
1	D	144	GLN
1	D	154	GLN
1	D	188	GLN
1	D	223	GLN
1	D	326	GLN
1	D	343	GLN
1	D	363	GLN
1	D	381	GLN
1	D	383	GLN
1	D	385	HIS
2	E	92	GLN
2	E	96	GLN
2	E	108	HIS
2	E	117	ASN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

2 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the

expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#\|Z\| > 2$	Counts	RMSZ	$\#\|Z\| > 2$
2	TRQ	E	62	2	13,17,18	4.69	3 (23%)	14,24,26	2.68	6 (42%)
2	TRQ	B	62	2	13,17,18	4.71	3 (23%)	14,24,26	2.27	4 (28%)

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	TRQ	E	62	2	-	0/4/19/21	0/2/2/2
2	TRQ	B	62	2	-	0/4/19/21	0/2/2/2

All (6) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	62	TRQ	CH2-CZ2	-14.71	1.37	1.54
2	E	62	TRQ	CH2-CZ2	-14.65	1.37	1.54
2	B	62	TRQ	CE2-CZ2	-7.38	1.40	1.50
2	E	62	TRQ	CE2-CZ2	-7.35	1.40	1.50
2	E	62	TRQ	CZ3-CE3	3.16	1.40	1.34
2	B	62	TRQ	CZ3-CE3	3.02	1.39	1.34

All (10) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	62	TRQ	CZ2-CE2-NE1	5.61	128.91	119.94
2	E	62	TRQ	CZ2-CE2-NE1	5.49	128.71	119.94
2	E	62	TRQ	O7-CZ2-CH2	4.52	124.33	119.00
2	B	62	TRQ	O6-CH2-CZ2	-4.42	115.50	118.51
2	E	62	TRQ	O7-CZ2-CE2	-3.73	117.89	121.84
2	E	62	TRQ	O6-CH2-CZ2	-3.61	116.05	118.51
2	E	62	TRQ	CG-CB-CA	2.40	118.23	114.53
2	B	62	TRQ	CG-CB-CA	2.09	117.76	114.53
2	E	62	TRQ	CB-CG-CD1	-2.07	125.40	127.97
2	B	62	TRQ	CZ3-CH2-CZ2	2.05	121.52	118.72

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

2 monomers are involved in 6 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	E	62	TRQ	3	0
2	B	62	TRQ	3	0

5.5 Carbohydrates ⓘ

There are no monosaccharides in this entry.

5.6 Ligand geometry ⓘ

Of 1 ligands modelled in this entry, 1 is monoatomic - leaving 0 for Mogul analysis.

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

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	359/390 (92%)	-0.15	3 (0%)	86	90	13, 21, 35, 60	0
1	D	359/390 (92%)	-0.23	2 (0%)	89	93	13, 20, 32, 53	0
2	B	112/135 (82%)	-0.00	3 (2%)	54	63	16, 20, 33, 73	0
2	E	112/135 (82%)	-0.15	4 (3%)	42	52	13, 19, 29, 75	0
3	C	128/128 (100%)	4.08	95 (74%)	0	0	38, 63, 82, 87	0
All	All	1070/1178 (90%)	0.35	107 (10%)	7	11	13, 21, 68, 87	0

All (107) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
3	C	127	LEU	14.9
3	C	3	CYS	10.0
3	C	102	LEU	9.9
3	C	97	PHE	9.0
3	C	103	LYS	8.9
3	C	22	VAL	8.8
3	C	81	ILE	8.8
3	C	128	GLY	8.3
3	C	106	GLU	8.3
3	C	31	ILE	8.2
3	C	20	ILE	8.0
3	C	29	PHE	7.8
1	A	29	PRO	7.7
3	C	101	LYS	7.7
3	C	76	GLY	7.6
3	C	21	VAL	7.6
3	C	95	VAL	7.6
3	C	129	SER	7.6
3	C	27	LYS	7.4
3	C	26	CYS	7.4

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Mol	Chain	Res	Type	RSRZ
3	C	108	TYR	7.3
2	E	23	ASP	7.2
3	C	23	ASP	7.1
3	C	98	ASP	6.9
3	C	104	GLU	6.8
3	C	25	THR	6.8
3	C	24	LYS	6.7
3	C	7	ILE	6.6
3	C	75	ALA	6.5
2	E	22	GLU	6.4
3	C	2	ALA	6.4
3	C	5	VAL	6.4
3	C	100	SER	6.3
3	C	99	VAL	6.3
3	C	118	TRP	6.2
3	C	82	ALA	6.2
3	C	124	THR	6.2
3	C	48	VAL	5.8
3	C	80	VAL	5.8
3	C	126	GLU	5.6
3	C	54	SER	5.4
2	B	22	GLU	5.3
3	C	109	ALA	5.2
3	C	4	ASP	5.1
3	C	73	VAL	5.1
3	C	34	LYS	5.1
3	C	59	VAL	5.0
3	C	110	PHE	5.0
3	C	107	ASP	5.0
3	C	94	SER	4.9
2	B	134	LYS	4.9
3	C	78	GLU	4.9
3	C	111	PHE	4.8
3	C	55	ASP	4.6
3	C	86	VAL	4.6
3	C	28	GLU	4.5
3	C	51	SER	4.3
3	C	96	THR	4.3
3	C	74	LYS	4.1
3	C	122	LYS	4.1
3	C	87	ILE	4.1
3	C	125	ILE	4.0

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Mol	Chain	Res	Type	RSRZ
3	C	50	VAL	4.0
3	C	105	GLY	3.9
3	C	17	THR	3.7
3	C	32	ASN	3.7
3	C	123	GLY	3.7
3	C	18	LYS	3.6
3	C	30	THR	3.5
3	C	69	ASN	3.5
3	C	53	LYS	3.5
3	C	70	ASN	3.4
3	C	19	SER	3.4
3	C	92	THR	3.4
3	C	79	ARG	3.3
3	C	49	VAL	3.2
3	C	56	GLU	3.2
1	D	29	PRO	3.2
3	C	93	ASP	3.1
3	C	84	THR	3.1
3	C	120	ILE	2.9
3	C	52	LYS	2.9
3	C	119	SER	2.9
2	B	23	ASP	2.8
3	C	83	HIS	2.8
3	C	77	ASP	2.7
3	C	64	MET	2.7
3	C	67	GLY	2.7
3	C	65	LYS	2.6
3	C	62	ASP	2.6
3	C	63	GLY	2.6
3	C	85	SER	2.5
3	C	33	LEU	2.5
2	E	24	GLU	2.5
3	C	58	ALA	2.4
3	C	57	SER	2.4
2	E	134	LYS	2.4
3	C	16	ASN	2.3
3	C	8	GLU	2.3
1	A	30	ARG	2.3
3	C	61	THR	2.2
1	A	260	ASP	2.2
3	C	121	MET	2.2
3	C	66	ALA	2.1

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Mol	Chain	Res	Type	RSRZ
3	C	15	PHE	2.1
3	C	72	TYR	2.1
1	D	173	VAL	2.1

6.2 Non-standard residues in protein, DNA, RNA chains ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
2	TRQ	B	62	16/17	0.96	0.11	15,18,23,27	0
2	TRQ	E	62	16/17	0.97	0.10	12,15,20,20	0

6.3 Carbohydrates ⓘ

There are no monosaccharides in this entry.

6.4 Ligands ⓘ

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
4	CU	C	130	1/1	0.99	0.07	53,53,53,53	0

6.5 Other polymers ⓘ

There are no such residues in this entry.