Full wwPDB X-ray Structure Validation Report (i)

Jun 12, 2024 – 07:23 PM EDT

PDB ID	:	2Y8N
Title	:	Crystal structure of glycyl radical enzyme
Authors	:	Martins, B.M.; Blaser, M.; Feliks, M.; Ullmann, G.M.; Selmer, T.
Deposited on	:	2011-02-08
Resolution	:	1.75 Å(reported)

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

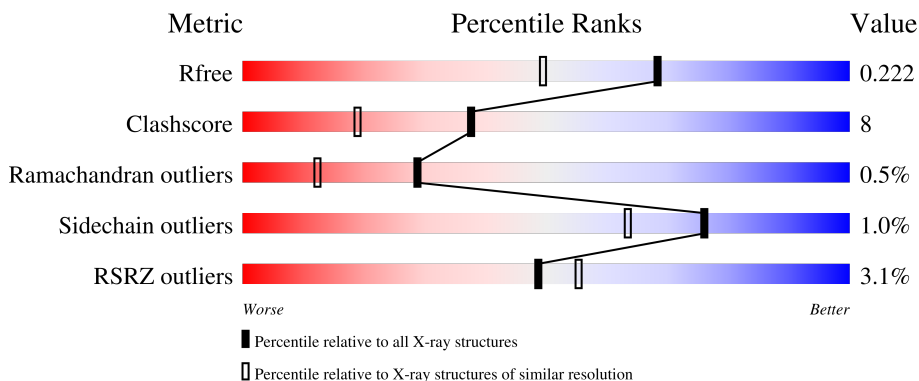|		
MolProbity	:	4.02b-467
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	1.20.1
EDS	:	2.36.2
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac	:	5.8.0158
CCP4	:	7.0.044 (Gargrove)
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.36.2

1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:
X-RAY DIFFRACTION

The reported resolution of this entry is 1.75 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.

Metric	Percentile Ranks	Value
Rfree		0.222
Clashscore		8
Ramachandran outliers		0.5%
Sidechain outliers		1.0%
RSRZ outliers		3.1%

Worse *Better*

▌ Percentile relative to all X-ray structures

▯ Percentile relative to X-ray structures of similar resolution

Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R$_{free}$	130704	2340 (1.76-1.76)
Clashscore	141614	2466 (1.76-1.76)
Ramachandran outliers	138981	2437 (1.76-1.76)
Sidechain outliers	138945	2437 (1.76-1.76)
RSRZ outliers	127900	2298 (1.76-1.76)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for >=3, 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions <=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	897	82% 14% •
1	C	897	82% 14% • •
2	B	86	73% 24% •
2	D	86	80% 17% •

2 Entry composition ⓘ

There are 4 unique types of molecules in this entry. The entry contains 17094 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.
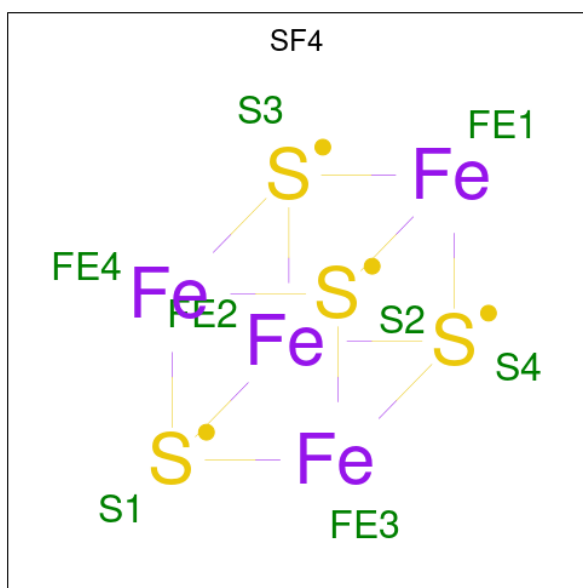
- Molecule 1 is a protein called 4-HYDROXYPHENYLACETATE DECARBOXYLASE LARGE SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	869	Total	C	N	O	S	0	0	0
			6823	4335	1123	1308	57			
1	C	869	Total	C	N	O	S	0	0	0
			6835	4343	1125	1310	57			

- Molecule 2 is a protein called 4-HYDROXYPHENYLACETATE DECARBOXYLASE SMALL SUBUNIT.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	B	86	Total	C	N	O	S	0	0	0
			645	398	108	127	12			
2	D	86	Total	C	N	O	S	0	0	0
			645	398	108	127	12			

- Molecule 3 is IRON/SULFUR CLUSTER (three-letter code: SF4) (formula: Fe_4S_4).

SF4

Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
3	B	1	Total 8	Fe 4	S 4	0	0
3	B	1	Total 8	Fe 4	S 4	0	0
3	D	1	Total 8	Fe 4	S 4	0	0
3	D	1	Total 8	Fe 4	S 4	0	0

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	A	1024	Total 1024	O 1024	0	0
4	B	70	Total 70	O 70	0	0
4	C	957	Total 957	O 957	0	0
4	D	63	Total 63	O 63	0	0

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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 anno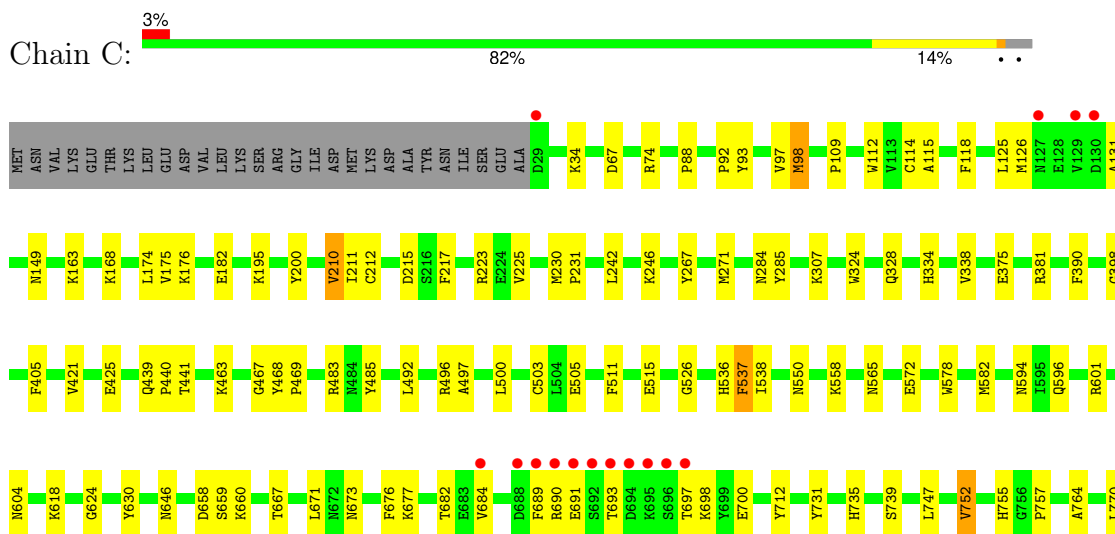tated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density (RSRZ > 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: 4-HYDROXYPHENYLACETATE DECARBOXYLASE LARGE SUBUNIT
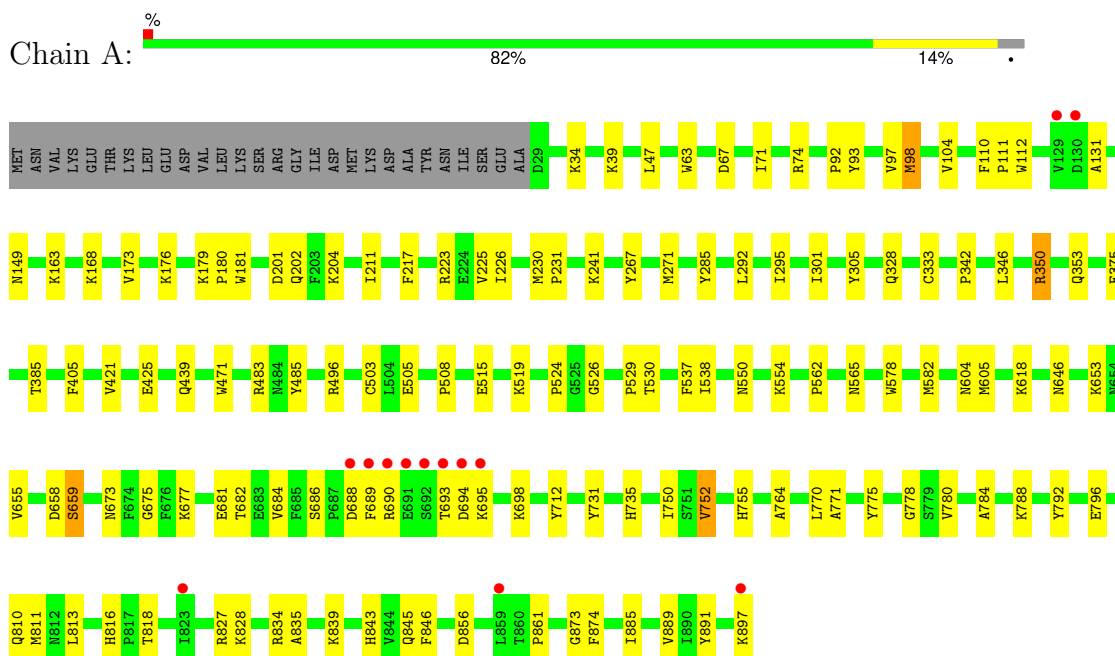
• Molecule 1: 4-HYDROXYPHENYLACETATE DECARBOXYLASE LARGE SUBUNIT

A771 Y775 A784 Y792 H806 K821 G822 I823 N824 G825 T826 R827 K828 R834 Q845 D850 S851 K852 L859 E862 K863 R870 G873 F874 Y891 D896 K897

• Molecule 2: 4-HYDROXYPHENYLACETATE DECARBOXYLASE SMALL SUBUNIT

Chain B:

9%

73% 24%

M1 R2 H3 Y9 I10 N11 L12 G17 L18 T22 K23 E31 E34 A35 C36 P37 N38 E43 K49 N50 F51 C52 N53 P54 L59 K67 E68 N69 W70 S78 Y83 K84 A85 E86

• Molecule 2: 4-HYDROXYPHENYLACETATE DECARBOXYLASE SMALL SUBUNIT

Chain D:

17%

80% 17%

M1 R2 I10 N11 L12 L18 T22 K23 G24 M25 D29 G30 E31 E34 A35 C36 P37 N38 F39 E43 K49 L65 E66 K67 E68 N69 W70 S78 S82 Y83 K84 A85 E86
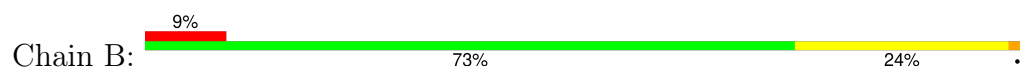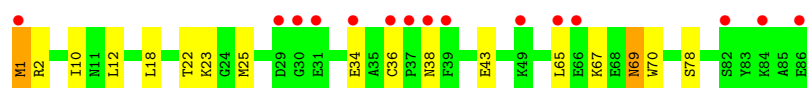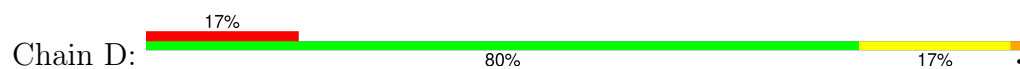
4 Data and refinement statistics ⓘ

Property	Value	Source
Space group	C 2 2 21	Depositor
Cell constants a, b, c, α, β, γ	132.28Å 227.76Å 148.01Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	29.18 – 1.75 29.18 – 1.75	Depositor EDS
% Data completeness (in resolution range)	97.7 (29.18-1.75) 97.7 (29.18-1.75)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.81 (at 1.75Å)	Xtriage
Refinement program	PHENIX	Depositor
R, R_{free}	0.184 , 0.228 0.180 , 0.222	Depositor DCC
R_{free} test set	10963 reflections (5.03%)	wwPDB-VP
Wilson B-factor (Å^2)	17.1	Xtriage
Anisotropy	0.037	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.35 , 51.4	EDS
L-test for twinning[2]	$< |L| > = 0.42, < L^2 > = 0.24$	Xtriage
Estimated twinning fraction	0.024 for 1/2*h-1/2*k,-3/2*h-1/2*k,-l 0.036 for 1/2*h+1/2*k,3/2*h-1/2*k,-l	Xtriage
F_o,F_c correlation	0.96	EDS
Total number of atoms	17094	wwPDB-VP
Average B, all atoms (Å^2)	25.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 2.90% 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: SF4

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	0.38	0/6981	0.55	1/9443 (0.0%)
1	C	0.38	0/6992	0.53	0/9454
2	B	0.32	0/659	0.51	0/887
2	D	0.30	0/659	0.49	0/887
All	All	0.37	0/15291	0.54	1/20671 (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	A	350	ARG	NE-CZ-NH2	-5.04	117.78	120.30

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	6823	0	6635	95	0
1	C	6835	0	6658	106	0
2	B	645	0	604	20	0
2	D	645	0	604	13	0
3	B	16	0	0	1	0
3	D	16	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	1024	0	0	23	0
4	B	70	0	0	1	0
4	C	957	0	0	19	0
4	D	63	0	0	1	0
All	All	17094	0	14501	228	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 8.

All (228) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:483:ARG:HD2	4:C:2892:HOH:O	1.62	0.99
1:A:618:LYS:HD2	4:A:2787:HOH:O	1.60	0.98
1:A:646:ASN:HD21	1:A:712:TYR:H	1.12	0.96
1:A:97:VAL:H	1:A:328:GLN:HE22	1.18	0.92
1:C:845:GLN:HE22	1:C:873:GLY:H	0.90	0.90
1:C:97:VAL:H	1:C:328:GLN:HE22	1.21	0.88
1:C:646:ASN:HD21	1:C:712:TYR:H	1.20	0.88
1:A:845:GLN:HE22	1:A:873:GLY:H	1.19	0.84
1:A:483:ARG:HD2	4:A:2950:HOH:O	1.80	0.82
1:C:845:GLN:NE2	1:C:873:GLY:H	1.75	0.82
1:A:653:LYS:HE2	1:A:658:ASP:OD2	1.79	0.81
1:C:784:ALA:HB1	1:C:891:TYR:HD2	1.47	0.79
1:C:673:ASN:HD22	1:C:764:ALA:HB2	1.48	0.78
1:C:684:VAL:HG11	1:C:689:PHE:HB3	1.64	0.78
1:A:673:ASN:HD21	1:A:771:ALA:H	1.32	0.77
2:B:69:ASN:HD22	2:B:70:TRP:H	1.33	0.76
1:C:845:GLN:HE22	1:C:873:GLY:N	1.76	0.76
1:C:618:LYS:HD2	4:C:2736:HOH:O	1.86	0.75
1:A:673:ASN:ND2	1:A:771:ALA:H	1.84	0.74
1:C:114:CYS:HB2	4:C:2272:HOH:O	1.85	0.74
1:A:515:GLU:HB2	4:A:2693:HOH:O	1.88	0.73
1:C:673:ASN:HD21	1:C:771:ALA:H	1.38	0.72
1:A:673:ASN:HD22	1:A:764:ALA:HB2	1.53	0.72
1:A:784:ALA:HB1	1:A:891:TYR:HD2	1.54	0.72
1:C:550:ASN:HD21	1:C:565:ASN:ND2	1.88	0.72
1:C:850:ASP:OD2	1:C:852:LYS:HB2	1.91	0.71
1:A:646:ASN:ND2	1:A:712:TYR:H	1.85	0.71
1:A:201:ASP:HB3	4:A:2330:HOH:O	1.91	0.70
1:C:784:ALA:HB1	1:C:891:TYR:CD2	2.27	0.70

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:673:ASN:ND2	1:C:771:ALA:H	1.90	0.69
1:C:168:LYS:HE3	4:C:2240:HOH:O	1.93	0.68
1:A:784:ALA:HB1	1:A:891:TYR:CD2	2.27	0.68
1:A:230:MET:HB2	1:A:231:PRO:HD3	1.77	0.67
1:C:646:ASN:ND2	1:C:712:TYR:H	1.92	0.67
2:B:51:PHE:HE2	2:B:54:PRO:HG3	1.60	0.66
1:A:421:VAL:HA	1:A:425:GLU:OE1	1.97	0.65
1:C:735:HIS:HE1	4:C:2630:HOH:O	1.79	0.65
1:C:463:LYS:HE3	1:C:826:THR:OG1	1.95	0.64
1:A:796:GLU:HG3	4:A:2527:HOH:O	1.98	0.63
1:A:92:PRO:O	1:A:93:TYR:HB2	1.98	0.62
2:D:69:ASN:HD22	2:D:70:TRP:H	1.48	0.62
2:B:51:PHE:CE2	2:B:54:PRO:HG3	2.34	0.62
1:C:863:LYS:HE2	4:C:2923:HOH:O	1.99	0.61
1:A:204:LYS:HG3	4:A:2329:HOH:O	2.00	0.61
1:C:731:TYR:O	1:C:735:HIS:HD2	1.84	0.59
2:D:43:GLU:OE1	2:D:78:SER:HA	2.03	0.59
1:A:735:HIS:HE1	4:A:2670:HOH:O	1.84	0.58
1:C:112:TRP:HD1	1:C:604:ASN:HD21	1.52	0.58
1:A:204:LYS:HE3	4:A:2347:HOH:O	2.04	0.58
4:A:2041:HOH:O	2:B:67:LYS:HD2	2.03	0.57
1:A:112:TRP:HD1	1:A:604:ASN:HD21	1.52	0.57
1:A:731:TYR:O	1:A:735:HIS:HD2	1.86	0.57
1:A:131:ALA:HB2	4:A:2194:HOH:O	2.03	0.57
2:B:53:ASN:HA	4:B:2032:HOH:O	2.05	0.57
2:B:43:GLU:HG2	2:B:83:TYR:CE2	2.40	0.56
1:C:658:ASP:HB3	1:C:660:LYS:HG2	1.86	0.56
1:C:97:VAL:H	1:C:328:GLN:NE2	1.99	0.56
2:D:34:GLU:CD	2:D:34:GLU:H	2.09	0.55
1:C:67:ASP:HA	1:C:74:ARG:CZ	2.36	0.55
2:D:10:ILE:HB	2:D:18:LEU:HB2	1.87	0.54
2:D:12:LEU:HD11	2:D:18:LEU:HG	1.88	0.54
4:C:2030:HOH:O	2:D:67:LYS:HD2	2.07	0.54
1:A:231:PRO:HG2	1:A:333:CYS:SG	2.48	0.54
1:A:385:THR:HA	1:A:439:GLN:HB2	1.90	0.54
1:A:834:ARG:HD3	4:A:2969:HOH:O	2.07	0.53
2:B:12:LEU:HG	2:B:17:GLY:HA2	1.90	0.53
2:B:49:LYS:CG	2:B:86:GLU:HA	2.38	0.53
1:C:149:ASN:HD21	1:C:163:LYS:NZ	2.07	0.53
1:A:241:LYS:HE3	4:A:2399:HOH:O	2.09	0.52
1:C:676:PHE:CD1	1:C:690:ARG:HG2	2.45	0.52

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:677:LYS:HE2	1:C:693:THR:HG22	1.90	0.52
1:C:698:LYS:HE3	4:C:2792:HOH:O	2.08	0.52
1:A:350:ARG:NH2	1:A:496:ARG:O	2.31	0.52
1:A:149:ASN:HD21	1:A:163:LYS:NZ	2.07	0.52
1:C:500:LEU:N	1:C:500:LEU:HD22	2.25	0.52
1:A:778:GLY:HA2	1:A:810:GLN:OE1	2.10	0.52
1:A:792:TYR:HD2	4:A:2939:HOH:O	1.93	0.52
1:A:550:ASN:HD21	1:A:565:ASN:ND2	2.08	0.52
1:A:861:PRO:HB2	4:A:2107:HOH:O	2.09	0.52
1:C:824:ASN:O	1:C:828:LYS:HG3	2.09	0.51
1:C:176:LYS:HE3	2:D:70:TRP:CG	2.46	0.51
1:A:350:ARG:HD2	1:A:524:PRO:HG3	1.92	0.51
1:A:695:LYS:O	1:A:698:LYS:HB3	2.11	0.51
1:C:896:ASP:O	1:C:897:LYS:HG3	2.10	0.51
1:A:350:ARG:HD3	1:A:353:GLN:NE2	2.25	0.50
1:C:97:VAL:N	1:C:328:GLN:HE22	2.00	0.50
1:C:149:ASN:ND2	1:C:163:LYS:HZ2	2.10	0.50
1:A:111:PRO:HD2	1:A:112:TRP:CZ3	2.47	0.50
1:C:682:THR:OG1	1:C:684:VAL:HG12	2.12	0.50
1:A:693:THR:HG22	1:A:695:LYS:H	1.77	0.50
1:C:852:LYS:H	1:C:852:LYS:HD2	1.77	0.50
1:C:673:ASN:ND2	1:C:764:ALA:HB2	2.22	0.49
2:D:36:CYS:SG	2:D:38:ASN:HB2	2.53	0.49
1:A:677:LYS:HD3	1:A:681:GLU:CD	2.33	0.49
1:C:97:VAL:O	1:C:98:MET:HB2	2.13	0.49
1:C:242:LEU:O	1:C:246:LYS:HG2	2.11	0.49
1:C:405:PHE:CE2	1:C:874:PHE:HB3	2.48	0.49
1:C:500:LEU:HD22	1:C:500:LEU:H	1.78	0.49
1:A:226:ILE:HD12	1:A:346:LEU:HD21	1.94	0.48
2:B:10:ILE:HB	2:B:18:LEU:HB2	1.95	0.48
1:A:780:VAL:HG23	1:A:811:MET:HB2	1.94	0.48
1:A:110:PHE:CG	1:A:342:PRO:HD3	2.48	0.48
1:C:515:GLU:HB3	4:C:2663:HOH:O	2.12	0.48
1:A:301:ILE:HD12	2:B:23:LYS:HE2	1.95	0.48
1:A:485:TYR:CE2	1:A:508:PRO:HG3	2.48	0.48
1:A:505:GLU:OE2	1:A:750:ILE:HD13	2.13	0.48
2:D:65:LEU:HB2	4:D:2041:HOH:O	2.13	0.48
1:C:824:ASN:HB3	1:C:828:LYS:HZ2	1.79	0.47
1:C:98:MET:HA	1:C:285:TYR:CE1	2.49	0.47
1:C:497:ALA:HB2	1:C:511:PHE:CE2	2.49	0.47
2:B:69:ASN:HD22	2:B:70:TRP:N	2.08	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:92:PRO:O	1:C:93:TYR:HB2	2.14	0.47
1:C:824:ASN:HB3	1:C:828:LYS:NZ	2.29	0.47
2:B:49:LYS:HG3	2:B:86:GLU:HA	1.95	0.47
1:C:149:ASN:HD21	1:C:163:LYS:HZ2	1.62	0.47
1:C:755:HIS:HB2	1:C:775:TYR:HB2	1.97	0.47
1:C:731:TYR:O	1:C:735:HIS:CD2	2.67	0.47
2:D:22:THR:C	2:D:23:LYS:HG2	2.35	0.47
1:C:503:CYS:HB2	1:C:873:GLY:HA3	1.97	0.47
1:C:747:LEU:HD23	1:C:806:HIS:CD2	2.50	0.47
1:A:350:ARG:HD3	1:A:353:GLN:HE22	1.80	0.47
1:C:334:HIS:O	1:C:338:VAL:HG22	2.15	0.47
1:A:503:CYS:HB2	1:A:873:GLY:HA3	1.97	0.46
1:C:834:ARG:HD3	4:C:2905:HOH:O	2.14	0.46
1:A:816:HIS:CE1	1:A:818:THR:HG23	2.50	0.46
1:C:230:MET:HB2	1:C:231:PRO:HD3	1.97	0.46
2:D:1:MET:SD	2:D:2:ARG:HG3	2.56	0.46
1:C:109:PRO:HB3	1:C:390:PHE:CE2	2.50	0.46
1:A:63:TRP:HH2	1:A:71:ILE:HD11	1.80	0.46
1:C:676:PHE:CZ	1:C:690:ARG:HD3	2.51	0.46
1:C:225:VAL:O	1:C:526:GLY:HA3	2.16	0.45
1:A:149:ASN:HD21	1:A:163:LYS:HZ2	1.63	0.45
1:A:47:LEU:HD13	1:A:104:VAL:HB	1.98	0.45
1:A:67:ASP:HA	1:A:74:ARG:CZ	2.47	0.45
1:C:217:PHE:H	1:C:596:GLN:NE2	2.13	0.45
1:C:307:LYS:HE2	1:C:324:TRP:CE3	2.51	0.45
1:A:202:GLN:OE1	1:A:562:PRO:HD3	2.16	0.45
1:C:211:ILE:O	1:C:538:ILE:HA	2.17	0.45
1:C:697:THR:O	1:C:700:GLU:HG2	2.16	0.45
1:C:572:GLU:HG2	4:C:2706:HOH:O	2.15	0.45
1:A:828:LYS:HE2	1:A:897:LYS:HG2	1.98	0.45
1:C:421:VAL:HA	1:C:425:GLU:OE1	2.16	0.45
1:A:149:ASN:ND2	1:A:163:LYS:HZ2	2.14	0.45
1:C:217:PHE:CD1	1:C:217:PHE:C	2.91	0.45
1:C:558:LYS:NZ	4:C:2689:HOH:O	2.50	0.45
1:A:684:VAL:HG13	1:A:684:VAL:O	2.17	0.44
2:B:49:LYS:HG2	2:B:86:GLU:HA	1.98	0.44
1:C:897:LYS:HB2	4:C:2957:HOH:O	2.17	0.44
1:C:667:THR:O	1:C:671:LEU:HG	2.18	0.44
1:C:381:ARG:HG2	1:C:440:PRO:HD2	1.98	0.44
1:C:468:TYR:HA	1:C:469:PRO:C	2.38	0.44
1:A:405:PHE:CE2	1:A:874:PHE:HB3	2.53	0.44

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:467:GLY:HA3	1:C:870:ARG:HD3	1.99	0.44
1:A:835:ALA:O	1:A:839:LYS:HG3	2.17	0.43
2:B:3:HIS:O	2:B:9:TYR:HB2	2.18	0.43
1:A:39:LYS:HD3	1:A:93:TYR:CZ	2.53	0.43
1:A:97:VAL:O	1:A:98:MET:HB2	2.18	0.43
1:A:98:MET:HA	1:A:285:TYR:CE2	2.53	0.43
1:A:519:LYS:HE2	4:A:2704:HOH:O	2.17	0.43
1:C:689:PHE:CZ	1:C:691:GLU:HB2	2.54	0.43
1:A:885:ILE:CG1	4:A:2596:HOH:O	2.67	0.43
1:A:755:HIS:HB2	1:A:775:TYR:HB2	2.01	0.43
1:A:176:LYS:HD3	2:B:70:TRP:CD2	2.54	0.43
1:A:211:ILE:O	1:A:538:ILE:HA	2.19	0.43
1:A:217:PHE:CD1	1:A:217:PHE:C	2.92	0.43
1:C:109:PRO:HG3	1:C:174:LEU:HD13	2.01	0.43
1:C:115:ALA:HA	1:C:118:PHE:CE2	2.54	0.43
1:A:885:ILE:HG13	4:A:2596:HOH:O	2.18	0.43
1:C:578:TRP:CZ2	1:C:582:MET:HG3	2.53	0.43
1:A:34:LYS:HG3	1:A:375:GLU:HB2	2.00	0.43
1:C:182:GLU:HG2	4:C:2274:HOH:O	2.18	0.43
1:A:693:THR:O	1:A:695:LYS:N	2.51	0.43
1:A:292:LEU:HB3	1:A:305:TYR:CE2	2.54	0.42
1:A:655:VAL:O	1:A:659:SER:HA	2.19	0.42
1:A:295:ILE:HG13	4:A:2505:HOH:O	2.19	0.42
1:C:125:LEU:HG	4:C:2170:HOH:O	2.19	0.42
1:C:210:VAL:HG12	1:C:210:VAL:O	2.19	0.42
1:A:267:TYR:O	1:A:271:MET:HG2	2.18	0.42
1:C:398:GLY:CA	1:C:757:PRO:HG3	2.50	0.42
1:C:215:ASP:HB3	1:C:596:GLN:HE22	1.84	0.42
1:C:217:PHE:H	1:C:596:GLN:HE21	1.67	0.42
1:C:536:HIS:O	1:C:537:PHE:C	2.58	0.42
1:A:67:ASP:OD2	1:C:67:ASP:OD2	2.38	0.42
1:A:530:THR:HG22	4:A:2362:HOH:O	2.19	0.42
1:C:126:MET:HG3	1:C:175:VAL:HG21	2.01	0.42
1:A:686:SER:C	1:A:688:ASP:H	2.22	0.42
1:A:885:ILE:O	1:A:889:VAL:HG23	2.20	0.42
2:B:51:PHE:HB2	3:B:88:SF4:S2	2.60	0.42
1:C:109:PRO:HA	1:C:390:PHE:CD2	2.55	0.42
1:A:225:VAL:O	1:A:526:GLY:HA3	2.20	0.42
1:C:594:ASN:HD21	1:C:739:SER:HA	1.83	0.42
1:C:601:ARG:HB2	1:C:624:GLY:HA2	2.01	0.42
2:B:49:LYS:HE3	2:B:85:ALA:O	2.20	0.42

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:485:TYR:CD1	1:C:630:TYR:HB3	2.55	0.42
1:A:179:LYS:N	1:A:180:PRO:CD	2.83	0.41
1:A:689:PHE:O	1:A:690:ARG:HB2	2.19	0.41
1:C:212:CYS:HA	1:C:537:PHE:O	2.20	0.41
1:A:112:TRP:HB3	1:A:181:TRP:CZ2	2.55	0.41
1:A:112:TRP:HB3	1:A:181:TRP:CE2	2.55	0.41
1:A:168:LYS:HE2	4:A:2278:HOH:O	2.20	0.41
1:A:485:TYR:HA	4:A:2677:HOH:O	2.20	0.41
1:A:788:LYS:NZ	4:A:2932:HOH:O	2.51	0.41
1:C:439:GLN:HB3	1:C:440:PRO:HA	2.02	0.41
1:C:439:GLN:HG3	4:C:2587:HOH:O	2.20	0.41
1:C:176:LYS:HE3	2:D:70:TRP:CD1	2.56	0.41
1:A:578:TRP:CZ2	1:A:582:MET:HG3	2.55	0.41
1:C:492:LEU:O	1:C:496:ARG:HG3	2.20	0.41
2:D:18:LEU:HD21	2:D:25:MET:HE3	2.03	0.41
1:A:173:VAL:HG22	2:B:59:LEU:HD21	2.02	0.41
1:A:673:ASN:HD21	1:A:770:LEU:HB3	1.86	0.41
2:B:43:GLU:OE1	2:B:78:SER:HA	2.21	0.41
1:C:34:LYS:HG3	1:C:375:GLU:HB2	2.03	0.41
1:A:554:LYS:HG2	4:A:2712:HOH:O	2.20	0.40
1:A:813:LEU:O	1:A:846:PHE:HA	2.21	0.40
2:B:36:CYS:SG	2:B:38:ASN:HB2	2.61	0.40
1:C:195:LYS:HA	1:C:200:TYR:CG	2.56	0.40
1:C:267:TYR:O	1:C:271:MET:HG2	2.21	0.40
1:C:618:LYS:HE3	4:C:2735:HOH:O	2.21	0.40
1:A:675:GLY:O	1:A:693:THR:HB	2.21	0.40
1:C:88:PRO:HG3	1:C:284:ASN:HB3	2.03	0.40
1:C:441:THR:HG22	4:C:2586:HOH:O	2.21	0.40
1:A:471:TRP:O	1:A:843:HIS:HA	2.21	0.40
1:A:682:THR:OG1	1:A:684:VAL:HG12	2.21	0.40
1:C:131:ALA:HB2	4:C:2170:HOH:O	2.21	0.40
1:C:398:GLY:HA2	1:C:757:PRO:HG3	2.03	0.40
1:C:550:ASN:HD21	1:C:565:ASN:HD21	1.63	0.40
1:C:673:ASN:HD21	1:C:770:LEU:HB3	1.87	0.40
1:C:195:LYS:HG2	1:C:200:TYR:CE2	2.57	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	867/897 (97%)	829 (96%)	33 (4%)	5 (1%)	25	10
1	C	867/897 (97%)	833 (96%)	30 (4%)	4 (0%)	29	12
2	B	84/86 (98%)	81 (96%)	3 (4%)	0	100	100
2	D	84/86 (98%)	80 (95%)	4 (5%)	0	100	100
All	All	1902/1966 (97%)	1823 (96%)	70 (4%)	9 (0%)	29	12

All (9) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	694	ASP
1	A	98	MET
1	A	537	PHE
1	A	752	VAL
1	C	98	MET
1	C	537	PHE
1	C	752	VAL
1	A	529	PRO
1	C	210	VAL

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	733/761 (96%)	727 (99%)	6 (1%)	81	72
1	C	736/761 (97%)	731 (99%)	5 (1%)	84	75

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Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
2	B	69/69 (100%)	66 (96%)	3 (4%)	29	9
2	D	69/69 (100%)	67 (97%)	2 (3%)	42	19
All	All	1607/1660 (97%)	1591 (99%)	16 (1%)	76	63

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

Mol	Chain	Res	Type
1	A	223	ARG
1	A	605	MET
1	A	659	SER
1	A	752	VAL
1	A	827	ARG
1	A	856	ASP
2	B	1	MET
2	B	36	CYS
2	B	69	ASN
1	C	223	ARG
1	C	505	GLU
1	C	659	SER
1	C	752	VAL
1	C	852	LYS
2	D	1	MET
2	D	69	ASN

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (32) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	38	GLN
1	A	127	ASN
1	A	149	ASN
1	A	328	GLN
1	A	484	ASN
1	A	565	ASN
1	A	594	ASN
1	A	604	ASN
1	A	646	ASN
1	A	673	ASN
1	A	708	ASN
1	A	735	HIS
1	A	824	ASN

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Mol	Chain	Res	Type
1	A	858	GLN
2	B	69	ASN
1	C	127	ASN
1	C	149	ASN
1	C	156	ASN
1	C	328	GLN
1	C	413	GLN
1	C	484	ASN
1	C	565	ASN
1	C	594	ASN
1	C	596	GLN
1	C	604	ASN
1	C	646	ASN
1	C	673	ASN
1	C	708	ASN
1	C	735	HIS
1	C	824	ASN
1	C	858	GLN
2	D	69	ASN

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 ⓘ

4 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	SF4	D	88	2	0,12,12	-	-	-		
3	SF4	D	87	2	0,12,12	-	-	-		
3	SF4	B	88	2	0,12,12	-	-	-		
3	SF4	B	87	2	0,12,12	-	-	-		

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

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
3	SF4	D	88	2	-	-	0/6/5/5
3	SF4	D	87	2	-	-	0/6/5/5
3	SF4	B	88	2	-	-	0/6/5/5
3	SF4	B	87	2	-	-	0/6/5/5

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.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
3	B	88	SF4	1	0

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	869/897 (96%)	-0.30	13 (1%)	73	80	12, 20, 38, 62	0
1	C	869/897 (96%)	-0.23	23 (2%)	56	62	12, 21, 41, 67	0
2	B	86/86 (100%)	0.42	8 (9%)	8	11	24, 32, 46, 55	0
2	D	86/86 (100%)	0.74	15 (17%)	1	2	26, 37, 52, 56	0
All	All	1910/1966 (97%)	-0.19	59 (3%)	49	55	12, 22, 42, 67	0

All (59) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	689	PHE	8.3
1	C	689	PHE	6.9
1	A	692	SER	5.7
1	C	694	ASP	4.8
1	C	692	SER	4.7
1	A	897	LYS	4.6
2	D	1	MET	4.5
1	A	693	THR	4.2
1	C	897	LYS	4.1
2	B	38	ASN	3.9
1	A	823	ILE	3.9
2	D	30	GLY	3.9
1	C	693	THR	3.9
2	B	37	PRO	3.9
1	C	129	VAL	3.8
2	D	37	PRO	3.8
1	A	859	LEU	3.8
1	C	823	ILE	3.7
2	B	36	CYS	3.6
2	D	86	GLU	3.5
2	B	1	MET	3.5

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Mol	Chain	Res	Type	RSRZ
1	C	863	LYS	3.4
1	C	127	ASN	3.4
1	C	859	LEU	3.4
1	C	695	LYS	3.4
1	A	691	GLU	3.3
1	A	694	ASP	3.2
2	D	65	LEU	3.2
1	C	691	GLU	3.1
1	C	130	ASP	3.1
2	D	49	LYS	3.0
1	C	696	SER	2.9
1	A	129	VAL	2.9
1	C	862	GLU	2.9
2	B	31	GLU	2.9
2	D	31	GLU	2.8
2	D	66	GLU	2.7
2	D	82	SER	2.7
1	A	695	LYS	2.7
2	D	36	CYS	2.6
2	D	84	LYS	2.6
1	C	821	LYS	2.6
2	D	34	GLU	2.5
1	A	130	ASP	2.5
1	A	688	ASP	2.4
1	C	690	ARG	2.4
1	C	697	THR	2.4
2	D	39	PHE	2.4
1	A	690	ARG	2.4
1	C	29	ASP	2.4
1	C	684	VAL	2.2
2	D	29	ASP	2.2
1	C	688	ASP	2.2
2	B	84	LYS	2.1
2	D	38	ASN	2.1
1	C	792	TYR	2.1
2	B	34	GLU	2.1
1	C	822	GLY	2.0
2	B	22	THR	2.0

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

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

6.3 Carbohydrates (i)

There are no monosaccharides in this entry.

6.4 Ligands (i)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å^2)	Q<0.9
3	SF4	D	87	8/8	0.96	0.06	37,41,47,49	0
3	SF4	B	87	8/8	0.97	0.06	35,41,44,48	0
3	SF4	B	88	8/8	0.99	0.03	26,27,30,30	0
3	SF4	D	88	8/8	0.99	0.03	29,31,32,33	0

6.5 Other polymers (i)

There are no such residues in this entry.