Full wwPDB X-ray Structure Validation Report ⓘ

Sep 18, 2023 – 03:29 PM EDT

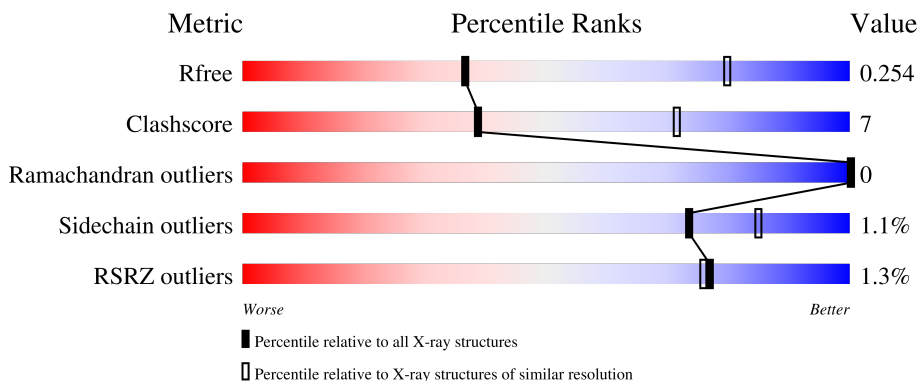|		
PDB ID	:	5CJO
Title	:	Crystal Structure Analysis of Elbow-Engineered-Fab-Bound Human Insulin Degrading Enzyme (IDE) in Complex with Insulin
Authors	:	liang, w.g.; bailey, L.; tang, w.j.
Deposited on	:	2015-07-14
Resolution	:	3.29 Å(reported)

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 3.29 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		0.254
Clashscore		7
Ramachandran outliers		0
Sidechain outliers		1.1%
RSRZ outliers		1.3%

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	1177 (3.32-3.24)
Clashscore	141614	1044 (3.30-3.26)
Ramachandran outliers	138981	1026 (3.30-3.26)
Sidechain outliers	138945	1025 (3.30-3.26)
RSRZ outliers	127900	1141 (3.32-3.24)

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	990	84% ... 13% ·
2	H	239	2% ... 68% ... 21% · 10%
3	L	216	4% ... 69% ... 18% · 12%
4	a	20	15% ... 30% 5% 65%

2 Entry composition ⓘ

There are 6 unique types of molecules in this entry. The entry contains 10966 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 Insulin-degrading enzyme.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	959	7848	5055	1318	1453	22	0	0	0

There are 26 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	30	MET	-	expression tag	UNP P14735
A	31	HIS	-	expression tag	UNP P14735
A	32	HIS	-	expression tag	UNP P14735
A	33	HIS	-	expression tag	UNP P14735
A	34	HIS	-	expression tag	UNP P14735
A	35	HIS	-	expression tag	UNP P14735
A	36	HIS	-	expression tag	UNP P14735
A	37	ALA	-	expression tag	UNP P14735
A	38	ALA	-	expression tag	UNP P14735
A	39	GLY	-	expression tag	UNP P14735
A	40	ILE	-	expression tag	UNP P14735
A	41	PRO	-	expression tag	UNP P14735
A	110	LEU	CYS	engineered mutation	UNP P14735
A	111	GLN	GLU	engineered mutation	UNP P14735
A	171	SER	CYS	engineered mutation	UNP P14735
A	178	ALA	CYS	engineered mutation	UNP P14735
A	257	VAL	CYS	engineered mutation	UNP P14735
A	414	LEU	CYS	engineered mutation	UNP P14735
A	573	ASN	CYS	engineered mutation	UNP P14735
A	590	SER	CYS	engineered mutation	UNP P14735
A	789	SER	CYS	engineered mutation	UNP P14735
A	812	ALA	CYS	engineered mutation	UNP P14735
A	819	ALA	CYS	engineered mutation	UNP P14735
A	904	SER	CYS	engineered mutation	UNP P14735
A	966	ASN	CYS	engineered mutation	UNP P14735
A	974	ALA	CYS	engineered mutation	UNP P14735

- Molecule 2 is a protein called FAB Heavy chain with engineered elbow.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	H	215	Total 1623	C 1032	N 269	O 315	S 7	0	0	0

- Molecule 3 is a protein called FAB light chain.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
3	L	190	Total 1422	C 895	N 239	O 283	S 5	0	0	0

- Molecule 4 is a protein called Insulin.

Mol	Chain	Residues	Atoms				ZeroOcc	AltConf	Trace
4	a	7	Total 57	C 38	N 8	O 11	0	0	0

- Molecule 5 is 4-(2-HYDROXYETHYL)-1-PIPERAZINE ETHANESULFONIC ACID (three-letter code: EPE) (formula: $C_8H_{18}N_2O_4S$).
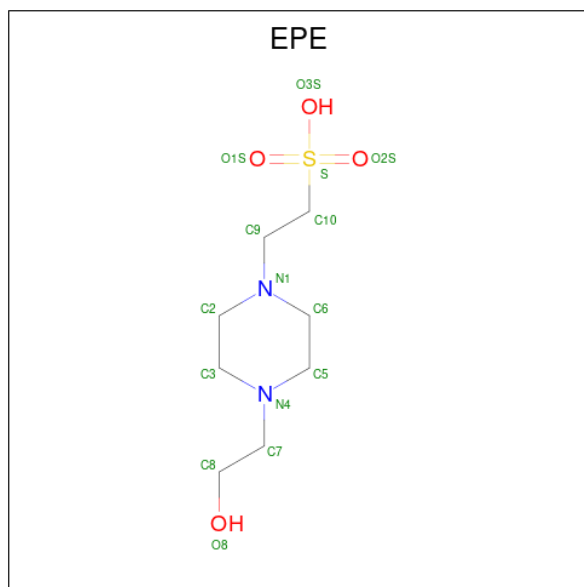
Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
5	A	1	Total 15	C 8	N 2	O 4	S 1	0	0

- Molecule 6 is ZINC ION (three-letter code: ZN) (formula: Zn).

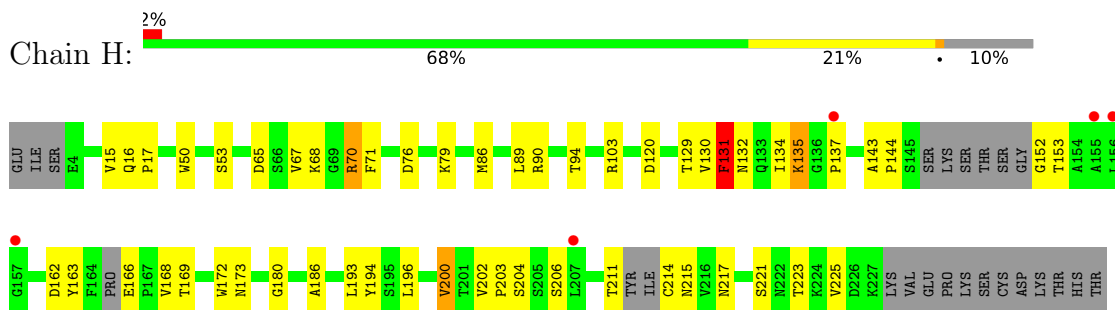| Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
6	A	1	Total 1	Zn 1	0	0

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: Insulin-degrading enzyme
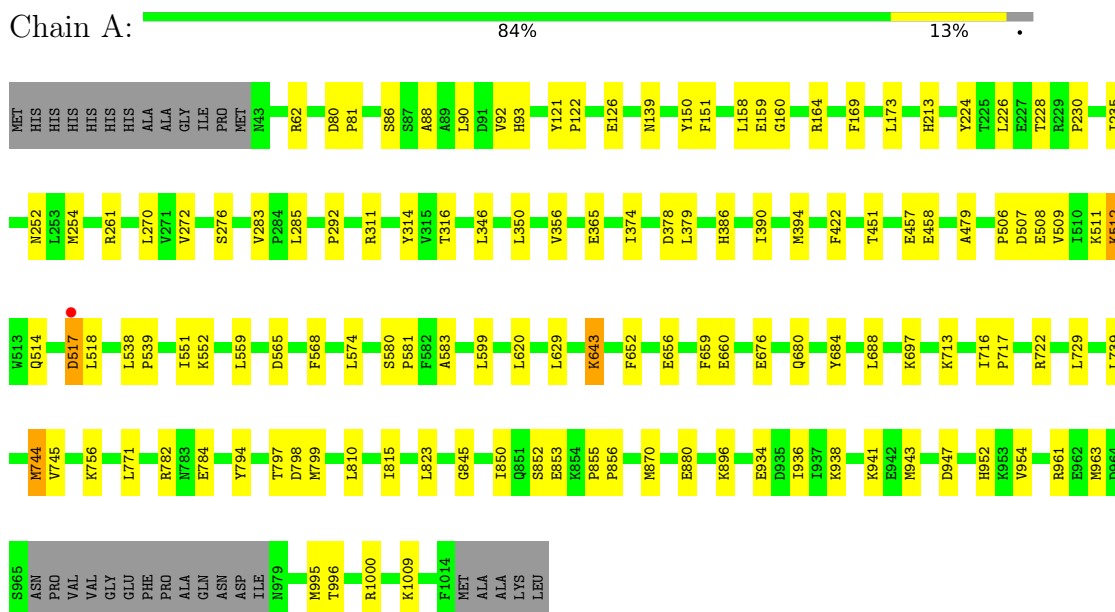
Chain A:

• Molecule 2: FAB Heavy chain with engineered elbow

Chain H:

• Molecule 3: FAB light chain

Chain L:

GLY T131 V135 C136 L137 F141 V148 Q149 W150 K151 VAL ASP ASN ALA L156 S161 Q162 E163 Y175 T180 L181 THR LEU SER K185 H191 LYS VAL TYR ALA C196 E197 V198 T199 S210 F211 N212 R213 GLY GLU CYS

• Molecule 4: Insulin

Chain a:

15%

30% 5% 65%

G1 E4 GLN CYS CYS THR SER ILE CYS SER LEU Y14 Q15 L16 GLU ASN TYR CYS
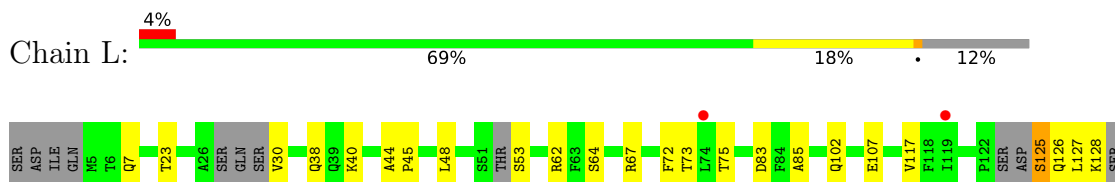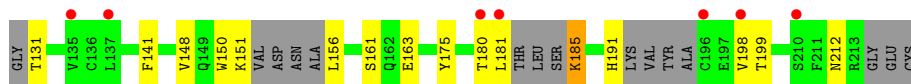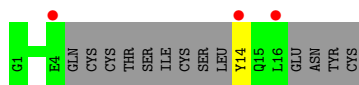
4 Data and refinement statistics (i)

Property	Value	Source
Space group	P 2 21 21	Depositor
Cell constants a, b, c, α, β, γ	75.69Å 109.22Å 263.40Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	47.45 – 3.29 47.45 – 3.29	Depositor EDS
% Data completeness (in resolution range)	99.5 (47.45-3.29) 91.3 (47.45-3.29)	Depositor EDS
R_{merge}	0.10	Depositor
R_{sym}	(Not available)	Depositor
$< I/\sigma(I) >$ [1]	4.74 (at 3.25Å)	Xtriage
Refinement program	PHENIX 1.9_1692	Depositor
R, R_{free}	0.196 , 0.245 0.209 , 0.254	Depositor DCC
R_{free} test set	1997 reflections (5.88%)	wwPDB-VP
Wilson B-factor (Å^2)	74.2	Xtriage
Anisotropy	0.693	Xtriage
Bulk solvent k_{sol}(e/Å^3), B_{sol}(Å^2)	0.28 , 51.8	EDS
L-test for twinning[2]	$< |L| > = 0.49, < L^2 > = 0.32$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o,F_c correlation	0.91	EDS
Total number of atoms	10966	wwPDB-VP
Average B, all atoms (Å^2)	85.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 3.03% 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: ZN, EPE

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	0.23	0/8044	0.46	5/10881 (0.0%)
2	H	0.26	0/1664	0.59	4/2264 (0.2%)
3	L	0.27	0/1448	0.55	2/1959 (0.1%)
4	a	0.31	0/56	0.71	0/73
All	All	0.24	0/11212	0.50	11/15177 (0.1%)

There are no bond length outliers.

All (11) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
1	A	512	LYS	N-CA-CB	6.42	122.15	110.60
2	H	206	SER	CB-CA-C	-5.81	99.06	110.10
1	A	583	ALA	CB-CA-C	5.72	118.67	110.10
3	L	53	SER	N-CA-CB	5.56	118.84	110.50
2	H	131	PHE	CB-CA-C	-5.54	99.31	110.40
1	A	507	ASP	CB-CG-OD1	5.42	123.18	118.30
2	H	215	ASN	N-CA-C	-5.36	96.52	111.00
1	A	457	GLU	N-CA-C	5.30	125.30	111.00
2	H	215	ASN	CB-CA-C	5.28	120.96	110.40
1	A	517	ASP	CB-CG-OD2	5.22	123.00	118.30
3	L	141	PHE	N-CA-CB	-5.02	101.56	110.60

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	7848	0	7786	77	0
2	H	1623	0	1547	53	0
3	L	1422	0	1354	27	0
4	a	57	0	58	0	0
5	A	15	0	17	0	0
6	A	1	0	0	0	0
All	All	10966	0	10762	156	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 7.

All (156) 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:H:163:TYR:CE1	2:H:168:VAL:HG23	1.69	1.26
3:L:128:LYS:O	3:L:131:THR:HG21	1.37	1.24
3:L:131:THR:N	3:L:185:LYS:HB2	1.54	1.21
2:H:131:PHE:CE2	2:H:134:ILE:HD11	1.87	1.10
2:H:131:PHE:O	2:H:131:PHE:CD1	2.06	1.09
2:H:131:PHE:O	2:H:131:PHE:HD1	1.37	1.07
2:H:131:PHE:HE2	2:H:134:ILE:HD11	1.09	1.06
3:L:126:GLN:OE1	3:L:127:LEU:N	1.95	0.98
2:H:163:TYR:CD1	2:H:168:VAL:CG2	2.53	0.92
3:L:128:LYS:O	3:L:131:THR:CG2	2.18	0.92
2:H:163:TYR:CE1	2:H:168:VAL:CG2	2.53	0.91
2:H:163:TYR:CD1	2:H:168:VAL:HG23	2.05	0.90
2:H:135:LYS:HD2	2:H:162:ASP:O	1.70	0.89
2:H:67:VAL:HG23	2:H:70:ARG:HG3	1.59	0.85
1:A:508:GLU:O	1:A:512:LYS:HE2	1.80	0.81
1:A:226:LEU:O	1:A:230:PRO:HG2	1.83	0.79
3:L:131:THR:N	3:L:185:LYS:CB	2.44	0.78
3:L:126:GLN:CD	3:L:127:LEU:H	1.89	0.76
2:H:15:VAL:O	2:H:130:VAL:HA	1.87	0.75
2:H:131:PHE:CD1	2:H:131:PHE:C	2.56	0.74
1:A:784:GLU:O	1:A:961:ARG:HG3	1.90	0.71
3:L:117:VAL:HG21	3:L:198:VAL:HG21	1.72	0.71
2:H:135:LYS:NZ	2:H:193:LEU:HD22	2.06	0.70
1:A:81:PRO:HA	1:A:261:ARG:HG3	1.74	0.69
1:A:688:LEU:HB3	1:A:995:MET:HE1	1.73	0.69

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:17:PRO:HD3	2:H:130:VAL:CG1	2.24	0.67
2:H:86:MET:HB3	2:H:89:LEU:HD21	1.75	0.67
1:A:722:ARG:HH21	1:A:756:LYS:HD2	1.61	0.66
3:L:125:SER:OG	3:L:126:GLN:N	2.28	0.66
1:A:643:LYS:HE2	1:A:744:MET:HG2	1.78	0.65
2:H:131:PHE:CE2	2:H:134:ILE:CD1	2.74	0.63
2:H:135:LYS:HZ3	2:H:193:LEU:HD22	1.63	0.63
1:A:643:LYS:NZ	1:A:745:VAL:HA	2.12	0.63
1:A:996:THR:O	1:A:1000:ARG:HG3	1.99	0.63
2:H:172:TRP:CH2	2:H:214:CYS:HB2	2.35	0.62
2:H:90:ARG:HH21	2:H:90:ARG:HG2	1.64	0.62
2:H:202:VAL:HB	2:H:203:PRO:HD2	1.81	0.62
1:A:713:LYS:HD3	1:A:716:ILE:HD12	1.82	0.61
3:L:7:GLN:O	3:L:102:GLN:NE2	2.34	0.61
1:A:508:GLU:O	1:A:512:LYS:CE	2.49	0.60
1:A:656:GLU:HA	1:A:659:PHE:HB3	1.84	0.59
3:L:23:THR:HG22	3:L:73:THR:HG22	1.83	0.59
2:H:134:ILE:HG22	2:H:221:SER:HB3	1.85	0.59
1:A:121:TYR:HB3	1:A:126:GLU:HG2	1.84	0.58
1:A:823:LEU:HD13	1:A:850:ILE:HD11	1.86	0.58
3:L:7:GLN:H	3:L:102:GLN:HE22	1.49	0.58
2:H:15:VAL:HG22	2:H:16:GLN:H	1.69	0.58
1:A:782:ARG:NH1	1:A:963:MET:O	2.34	0.57
2:H:169:THR:HB	2:H:217:ASN:HB3	1.86	0.57
1:A:880:GLU:N	1:A:880:GLU:OE1	2.36	0.56
1:A:350:LEU:HB3	1:A:356:VAL:HG22	1.86	0.56
1:A:643:LYS:HZ3	1:A:745:VAL:HA	1.69	0.56
1:A:771:LEU:HB2	1:A:952:HIS:HB3	1.88	0.55
1:A:599:LEU:HD21	1:A:659:PHE:HA	1.87	0.55
2:H:153:THR:HG22	2:H:203:PRO:HA	1.89	0.55
1:A:676:GLU:OE1	1:A:680:GLN:NE2	2.40	0.55
2:H:135:LYS:CD	2:H:162:ASP:O	2.51	0.55
3:L:161:SER:OG	3:L:180:THR:O	2.25	0.54
2:H:17:PRO:HD3	2:H:130:VAL:HG13	1.88	0.54
2:H:173:ASN:ND2	2:H:211:THR:O	2.39	0.54
2:H:65:ASP:HA	2:H:68:LYS:HE3	1.90	0.54
2:H:132:ASN:HD22	2:H:132:ASN:N	2.03	0.54
1:A:252:ASN:ND2	1:A:283:VAL:O	2.40	0.54
3:L:148:VAL:HG22	3:L:198:VAL:HG12	1.89	0.53
1:A:506:PRO:C	1:A:508:GLU:N	2.61	0.53
3:L:150:TRP:O	3:L:156:LEU:CB	2.56	0.53

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Full wwPDB X-ray Structure Validation Report

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:574:LEU:HD22	1:A:729:LEU:HD22	1.91	0.53
3:L:161:SER:HG	3:L:180:THR:HG1	1.57	0.53
1:A:511:LYS:HA	1:A:514:GLN:HB2	1.90	0.53
1:A:643:LYS:HD3	1:A:744:MET:SD	2.49	0.52
2:H:163:TYR:CD1	2:H:168:VAL:HG21	2.42	0.52
3:L:107:GLU:OE1	3:L:175:TYR:OH	2.22	0.51
1:A:86:SER:HB3	1:A:158:LEU:HD13	1.92	0.51
1:A:934:GLU:O	1:A:938:LYS:HB3	2.11	0.51
1:A:311:ARG:HB3	1:A:379:LEU:HB2	1.92	0.51
1:A:92:VAL:HG22	1:A:254:MET:HG2	1.93	0.50
2:H:223:THR:HG22	2:H:225:VAL:HG23	1.94	0.49
2:H:152:GLY:O	2:H:204:SER:N	2.41	0.49
2:H:50:TRP:HE1	2:H:53:SER:HB2	1.78	0.49
2:H:163:TYR:O	2:H:194:TYR:HB2	2.13	0.49
2:H:186:ALA:HB2	2:H:196:LEU:HD23	1.93	0.49
3:L:38:GLN:HB2	3:L:48:LEU:HD11	1.95	0.49
1:A:565:ASP:O	1:A:568:PHE:CZ	2.66	0.48
1:A:139:ASN:HB3	1:A:150:TYR:CE1	2.49	0.48
1:A:316:THR:HG23	1:A:374:ILE:HG22	1.94	0.48
1:A:797:THR:O	1:A:943:MET:HE1	2.13	0.48
3:L:163:GLU:N	3:L:163:GLU:OE1	2.46	0.48
1:A:458:GLU:OE2	2:H:103:ARG:NH2	2.47	0.47
1:A:517:ASP:OD1	1:A:518:LEU:N	2.47	0.47
2:H:67:VAL:HG21	2:H:71:PHE:CG	2.48	0.47
2:H:153:THR:HA	2:H:203:PRO:HA	1.95	0.47
2:H:186:ALA:HA	2:H:196:LEU:HB3	1.96	0.47
3:L:191:HIS:CE1	3:L:212:ASN:HD21	2.32	0.47
2:H:137:PRO:HD2	2:H:223:THR:HG21	1.95	0.47
1:A:797:THR:O	1:A:943:MET:CE	2.63	0.47
1:A:160:GLY:O	1:A:164:ARG:NH1	2.42	0.47
2:H:16:GLN:OE1	2:H:17:PRO:HD2	2.15	0.47
2:H:94:THR:HG23	2:H:129:THR:HA	1.96	0.46
1:A:346:LEU:HD21	1:A:394:MET:HG2	1.97	0.46
1:A:659:PHE:CD2	1:A:660:GLU:HG2	2.51	0.46
3:L:180:THR:O	3:L:181:LEU:HB2	2.16	0.46
3:L:67:ARG:HD2	3:L:72:PHE:HE1	1.81	0.45
1:A:90:LEU:HD13	1:A:169:PHE:CE2	2.51	0.45
1:A:230:PRO:HB3	1:A:235:ILE:HB	1.99	0.45
1:A:122:PRO:HA	1:A:173:LEU:HD11	1.98	0.45
1:A:552:LYS:HB3	1:A:559:LEU:HB3	1.99	0.45
1:A:896:LYS:H	1:A:896:LYS:HG3	1.50	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:A:810:LEU:HD23	1:A:936:ILE:HD11	1.98	0.45
1:A:422:PHE:CZ	1:A:451:THR:HG22	2.52	0.45
2:H:132:ASN:N	2:H:132:ASN:ND2	2.65	0.45
2:H:131:PHE:C	2:H:132:ASN:HD22	2.20	0.44
1:A:314:TYR:HB2	1:A:479:ALA:HB3	1.98	0.44
3:L:64:SER:HB2	3:L:75:THR:HB	1.98	0.44
1:A:1009:LYS:HD2	1:A:1009:LYS:HA	1.68	0.44
1:A:224:TYR:HA	1:A:228:THR:HB	2.00	0.44
1:A:797:THR:HG23	1:A:845:GLY:HA2	1.99	0.43
3:L:40:LYS:HD3	3:L:85:ALA:HB2	1.99	0.43
3:L:67:ARG:HD2	3:L:72:PHE:CE1	2.53	0.43
1:A:716:ILE:HB	1:A:717:PRO:HD3	2.00	0.43
1:A:684:TYR:OH	1:A:697:LYS:HG2	2.17	0.43
1:A:941:LYS:HB2	1:A:941:LYS:HE2	1.70	0.43
1:A:643:LYS:HD2	1:A:643:LYS:HA	1.11	0.43
1:A:794:TYR:HB3	1:A:954:VAL:HG13	1.99	0.43
1:A:88:ALA:HB3	1:A:151:PHE:CE2	2.54	0.43
2:H:143:ALA:HA	2:H:144:PRO:HD3	1.88	0.43
2:H:163:TYR:CG	2:H:168:VAL:HG21	2.54	0.43
2:H:180:GLY:O	2:H:200:VAL:HA	2.19	0.43
1:A:159:GLU:HG3	1:A:270:LEU:HD11	2.01	0.42
2:H:135:LYS:HZ1	2:H:193:LEU:HD22	1.81	0.42
1:A:855:PRO:HA	1:A:856:PRO:HD3	1.94	0.42
1:A:62:ARG:HG2	1:A:80:ASP:HB2	2.02	0.42
1:A:551:ILE:HD12	1:A:739:LEU:HG	2.02	0.42
1:A:272:VAL:O	1:A:276:SER:OG	2.35	0.42
1:A:356:VAL:HG12	1:A:378:ASP:O	2.20	0.42
1:A:947:ASP:N	1:A:947:ASP:OD1	2.53	0.42
1:A:580:SER:HA	1:A:581:PRO:HD3	1.87	0.41
2:H:120:ASP:N	2:H:120:ASP:OD1	2.53	0.41
1:A:852:SER:OG	1:A:853:GLU:N	2.53	0.41
3:L:62:ARG:NE	3:L:83:ASP:OD2	2.51	0.41
1:A:620:LEU:HD13	1:A:629:LEU:HD13	2.03	0.41
1:A:93:HIS:CG	1:A:285:LEU:HD11	2.55	0.41
1:A:538:LEU:HA	1:A:539:PRO:HD3	1.92	0.41
3:L:199:THR:O	3:L:199:THR:OG1	2.35	0.41
1:A:213:HIS:CE1	1:A:292:PRO:HG3	2.55	0.41
1:A:386:HIS:O	1:A:390:ILE:HG13	2.20	0.41
1:A:508:GLU:C	1:A:512:LYS:HE2	2.40	0.41
1:A:518:LEU:HD23	1:A:518:LEU:HA	1.89	0.41
1:A:565:ASP:OD1	1:A:565:ASP:N	2.53	0.41

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
2:H:16:GLN:CD	2:H:17:PRO:HD2	2.41	0.41
2:H:166:GLU:HG2	2:H:194:TYR:CE2	2.55	0.41
3:L:44:ALA:HA	3:L:45:PRO:HD3	1.88	0.41
1:A:798:ASP:OD1	1:A:799:MET:N	2.44	0.40
1:A:815:ILE:HG22	1:A:870:MET:HE2	2.03	0.40
1:A:506:PRO:O	1:A:509:VAL:N	2.55	0.40
2:H:76:ASP:CG	2:H:79:LYS:HD3	2.42	0.40
2:H:163:TYR:CZ	2:H:168:VAL:HG23	2.43	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	955/990 (96%)	929 (97%)	26 (3%)	0	100	100
2	H	207/239 (87%)	192 (93%)	15 (7%)	0	100	100
3	L	174/216 (81%)	168 (97%)	6 (3%)	0	100	100
4	a	3/20 (15%)	2 (67%)	1 (33%)	0	100	100
All	All	1339/1465 (91%)	1291 (96%)	48 (4%)	0	100	100

There are no Ramachandran outliers to report.

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	855/879 (97%)	851 (100%)	4 (0%)	88	93
2	H	176/202 (87%)	172 (98%)	4 (2%)	50	73
3	L	159/192 (83%)	155 (98%)	4 (2%)	47	72
4	a	6/19 (32%)	5 (83%)	1 (17%)	2	10
All	All	1196/1292 (93%)	1183 (99%)	13 (1%)	73	85

All (13) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	A	365	GLU
1	A	643	LYS
1	A	652	PHE
1	A	744	MET
2	H	70	ARG
2	H	131	PHE
2	H	135	LYS
2	H	200	VAL
3	L	30	VAL
3	L	125	SER
3	L	151	LYS
3	L	185	LYS
4	a	14	TYR

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (2) such sidechains are listed below:

Mol	Chain	Res	Type
2	H	132	ASN
3	L	191	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 ⓘ

Of 2 ligands modelled in this entry, 1 is monoatomic - leaving 1 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	$\#|Z| > 2$	Counts	RMSZ	$\#|Z| > 2$
5	EPE	A	2001	-	15,15,15	0.84	1 (6%)	18,20,20	1.87	5 (27%)

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
5	EPE	A	2001	-	-	3/9/19/19	0/1/1/1

All (1) bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
5	A	2001	EPE	C10-S	2.83	1.81	1.77

All (5) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
5	A	2001	EPE	C5-N4-C3	4.52	119.00	108.83
5	A	2001	EPE	C7-N4-C5	3.46	120.09	111.23
5	A	2001	EPE	C7-N4-C3	3.33	119.75	111.23
5	A	2001	EPE	O3S-S-C10	2.35	109.56	105.77
5	A	2001	EPE	O2S-S-C10	2.14	109.49	106.92

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
5	A	2001	EPE	C10-C9-N1-C2
5	A	2001	EPE	C8-C7-N4-C5
5	A	2001	EPE	C10-C9-N1-C6

There are no ring outliers.

No monomer is involved in short contacts.

5.7 Other polymers (i)

There are no such residues in this entry.

5.8 Polymer linkage issues (i)

There are no chain breaks in this entry.

6 Fit of model and data ⓘ

6.1 Protein, DNA and RNA chains ⓘ

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

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2			OWAB(Å^2)	Q<0.9
1	A	959/990 (96%)	-0.13	1 (0%)	95	96	45, 74, 107, 160	0
2	H	215/239 (89%)	0.21	5 (2%)	60	58	60, 99, 169, 187	0
3	L	190/216 (87%)	0.22	9 (4%)	31	29	60, 95, 171, 224	0
4	a	7/20 (35%)	1.93	3 (42%)	0	0	78, 104, 138, 158	0
All	All	1371/1465 (93%)	-0.02	18 (1%)	77	76	45, 78, 142, 224	0

All (18) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
2	H	156	LEU	7.3
4	a	4	GLU	5.4
3	L	210	SER	4.6
4	a	16	LEU	4.4
3	L	196	CYS	4.2
2	H	157	GLY	3.8
3	L	137	LEU	3.5
3	L	198	VAL	3.2
4	a	14	TYR	3.1
3	L	180	THR	3.0
3	L	135	VAL	3.0
2	H	155	ALA	2.9
1	A	517	ASP	2.5
2	H	137	PRO	2.5
3	L	74	LEU	2.4
3	L	119	ILE	2.3
2	H	207	LEU	2.1
3	L	181	LEU	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 ⓘ

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
5	EPE	A	2001	15/15	0.84	0.36	100,109,116,122	0
6	ZN	A	2002	1/1	0.99	0.19	67,67,67,67	0

6.5   Other polymers ⓘ

There are no such residues in this entry.

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