



Full wwPDB X-ray Structure Validation Report ⓘ

Apr 25, 2026 – 07:15 AM EDT

PDB ID : 2HDX / pdb_00002hdx
Title : Crystal structure of the Src homology-2 domain of SH2-B in complex with Jak2 pTyr813 phosphopeptide
Authors : Hu, J.; Hubbard, S.R.
Deposited on : 2006-06-21
Resolution : 2.35 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:

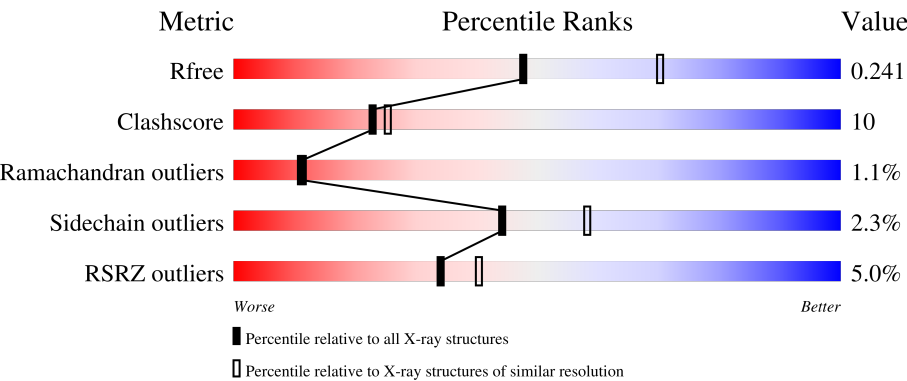
MolProbity	:	4-5-2 with Phenix2.0
Mogul	:	2022.3.0, CSD as543be (2022)
Xtriage (Phenix)	:	2.0
EDS	:	3.0
Percentile statistics	:	20250101.v01 (using entries in the PDB archive January 1st 2025)
CCP4	:	9.0.010 (Gargrove)
Density-Fitness	:	1.0.12
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.49

1 Overall quality at a glance i

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

The reported resolution of this entry is 2.35 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.



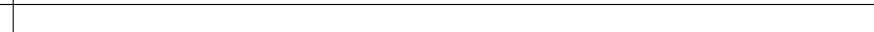
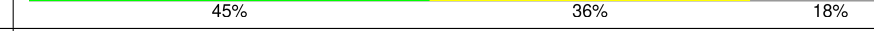
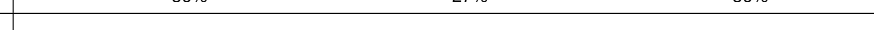
Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R _{free}	180053	1596 (2.36-2.36)
Clashscore	190562	1663 (2.36-2.36)
Ramachandran outliers	187476	1646 (2.36-2.36)
Sidechain outliers	187428	1646 (2.36-2.36)
RSRZ outliers	180081	1598 (2.36-2.36)

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 $\leq 5\%$. 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	111	5% 77% 17% • •
1	B	111	8% 70% 21% • 5%
1	C	111	6% 72% 23% • •
1	D	111	4% 74% 21% 5%
1	E	111	6% 80% 14% • •

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Mol	Chain	Length	Quality of chain
1	F	111	 69%22%6%
2	G	11	 45%36%18%
2	H	11	 9%36%27%36%
2	I	11	 55%9%36%
2	J	11	 36%18%9%36%
2	K	11	 36%27%36%
2	L	11	 36%36%9%18%

2 Entry composition

There are 3 unique types of molecules in this entry. The entry contains 5693 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 SH2-B PH domain containing signaling mediator 1 gamma isoform.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	108	Total	C	N	O	S	0	0	0
			837	534	155	144	4			
1	B	105	Total	C	N	O	S	0	0	0
			820	526	151	139	4			
1	C	108	Total	C	N	O	S	0	0	0
			834	533	154	143	4			
1	D	105	Total	C	N	O	S	0	0	0
			820	526	151	139	4			
1	E	108	Total	C	N	O	S	0	0	0
			834	533	154	143	4			
1	F	104	Total	C	N	O	S	0	0	0
			814	523	150	137	4			

There are 30 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	517	GLY	-	cloning artifact	UNP Q9WVM5
A	518	SER	-	cloning artifact	UNP Q9WVM5
A	583	ALA	GLU	engineered mutation	UNP Q9WVM5
A	584	ALA	GLU	engineered mutation	UNP Q9WVM5
A	593	HIS	TRP	engineered mutation	UNP Q9WVM5
B	517	GLY	-	cloning artifact	UNP Q9WVM5
B	518	SER	-	cloning artifact	UNP Q9WVM5
B	583	ALA	GLU	engineered mutation	UNP Q9WVM5
B	584	ALA	GLU	engineered mutation	UNP Q9WVM5
B	593	HIS	TRP	engineered mutation	UNP Q9WVM5
C	517	GLY	-	cloning artifact	UNP Q9WVM5
C	518	SER	-	cloning artifact	UNP Q9WVM5
C	583	ALA	GLU	engineered mutation	UNP Q9WVM5
C	584	ALA	GLU	engineered mutation	UNP Q9WVM5
C	593	HIS	TRP	engineered mutation	UNP Q9WVM5
D	517	GLY	-	cloning artifact	UNP Q9WVM5

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Chain	Residue	Modelled	Actual	Comment	Reference
D	518	SER	-	cloning artifact	UNP Q9WVM5
D	583	ALA	GLU	engineered mutation	UNP Q9WVM5
D	584	ALA	GLU	engineered mutation	UNP Q9WVM5
D	593	HIS	TRP	engineered mutation	UNP Q9WVM5
E	517	GLY	-	cloning artifact	UNP Q9WVM5
E	518	SER	-	cloning artifact	UNP Q9WVM5
E	583	ALA	GLU	engineered mutation	UNP Q9WVM5
E	584	ALA	GLU	engineered mutation	UNP Q9WVM5
E	593	HIS	TRP	engineered mutation	UNP Q9WVM5
F	517	GLY	-	cloning artifact	UNP Q9WVM5
F	518	SER	-	cloning artifact	UNP Q9WVM5
F	583	ALA	GLU	engineered mutation	UNP Q9WVM5
F	584	ALA	GLU	engineered mutation	UNP Q9WVM5
F	593	HIS	TRP	engineered mutation	UNP Q9WVM5

- Molecule 2 is a protein called Jak2 protein.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
2	G	9	Total	C	N	O	P	0	0	0
			79	48	9	21	1			
2	H	7	Total	C	N	O	P	0	0	0
			61	37	7	16	1			
2	I	7	Total	C	N	O	P	0	0	0
			65	39	7	18	1			
2	J	7	Total	C	N	O	P	0	0	0
			65	39	7	18	1			
2	K	7	Total	C	N	O	P	0	0	0
			65	39	7	18	1			
2	L	9	Total	C	N	O	P	0	0	0
			79	48	9	21	1			

There are 6 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
G	813	PTR	TYR	modified residue	UNP Q7TQD0
H	813	PTR	TYR	modified residue	UNP Q7TQD0
I	813	PTR	TYR	modified residue	UNP Q7TQD0
J	813	PTR	TYR	modified residue	UNP Q7TQD0
K	813	PTR	TYR	modified residue	UNP Q7TQD0
L	813	PTR	TYR	modified residue	UNP Q7TQD0

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	87	Total 87	O 87	0	0
3	B	24	Total 24	O 24	0	0
3	C	36	Total 36	O 36	0	0
3	D	41	Total 41	O 41	0	0
3	E	37	Total 37	O 37	0	0
3	F	42	Total 42	O 42	0	0
3	G	19	Total 19	O 19	0	0
3	H	4	Total 4	O 4	0	0
3	I	8	Total 8	O 8	0	0
3	J	7	Total 7	O 7	0	0
3	K	6	Total 6	O 6	0	0
3	L	9	Total 9	O 9	0	0

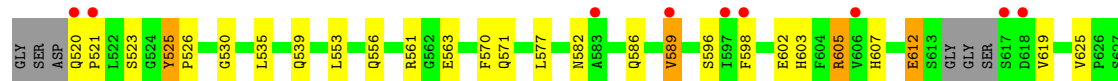
3 Residue-property plots [i](#)

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: SH2-B PH domain containing signaling mediator 1 gamma isoform



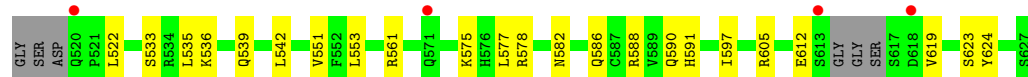
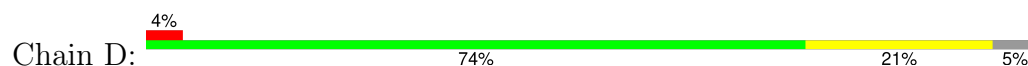
- Molecule 1: SH2-B PH domain containing signaling mediator 1 gamma isoform



- Molecule 1: SH2-B PH domain containing signaling mediator 1 gamma isoform



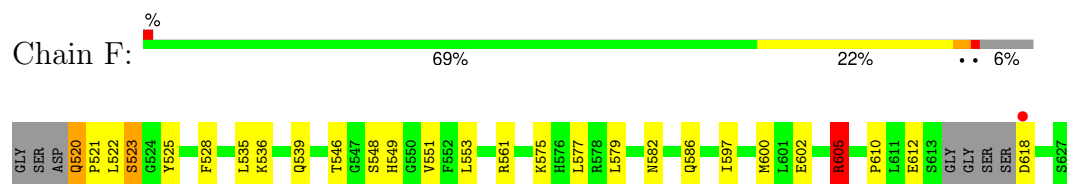
- Molecule 1: SH2-B PH domain containing signaling mediator 1 gamma isoform



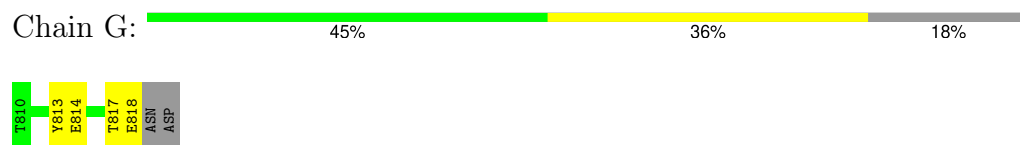
- Molecule 1: SH2-B PH domain containing signaling mediator 1 gamma isoform



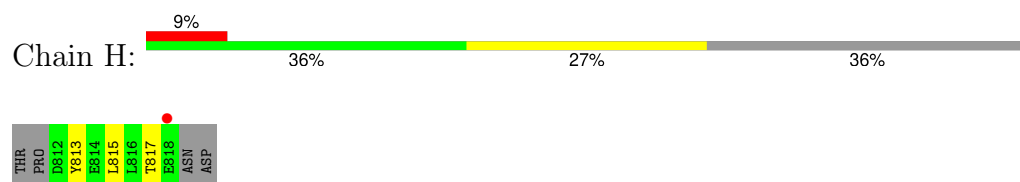
- Molecule 1: SH2-B PH domain containing signaling mediator 1 gamma isoform



- Molecule 2: Jak2 protein



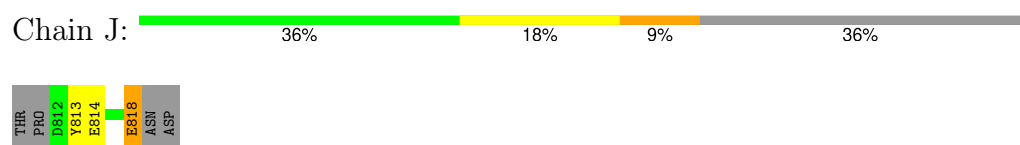
- Molecule 2: Jak2 protein



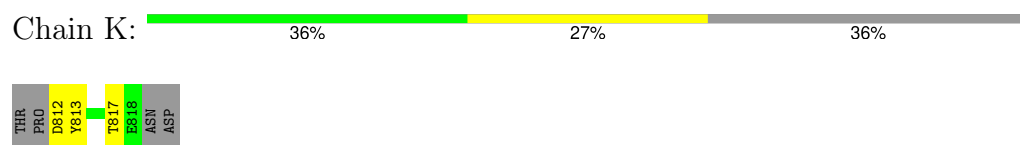
- Molecule 2: Jak2 protein



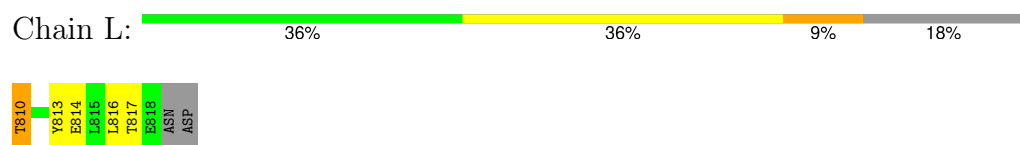
- Molecule 2: Jak2 protein



- Molecule 2: Jak2 protein



- Molecule 2: Jak2 protein



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	44.21Å 74.19Å 239.22Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	30.00 – 2.35 30.00 – 2.35	Depositor EDS
% Data completeness (in resolution range)	(Not available) (30.00-2.35) 95.3 (30.00-2.35)	Depositor EDS
R_{merge}	0.07	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	6.29 (at 2.34Å)	Xtriage
Refinement program	CNS	Depositor
R, R_{free}	0.210 , 0.240 0.202 , 0.241	Depositor DCC
R_{free} test set	1604 reflections (4.96%)	wwPDB-VP
Wilson B-factor (Å ²)	25.6	Xtriage
Anisotropy	0.424	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.35 , 49.2	EDS
L-test for twinning ²	$\langle L \rangle = 0.48$, $\langle L^2 \rangle = 0.31$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.93	EDS
Total number of atoms	5693	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 4.90% of the height of the origin peak. No significant pseudotranslation is detected.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ 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: PTR

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	0.45	0/858	0.91	3/1158 (0.3%)
1	B	0.36	0/841	0.88	5/1136 (0.4%)
1	C	0.38	0/856	0.87	3/1157 (0.3%)
1	D	0.37	0/841	0.85	2/1136 (0.2%)
1	E	0.37	0/856	0.86	1/1157 (0.1%)
1	F	0.37	0/835	0.93	5/1128 (0.4%)
2	G	0.38	0/62	1.10	0/83
2	H	0.43	0/43	0.58	0/55
2	I	0.38	0/47	0.82	0/61
2	J	0.37	0/47	0.66	0/61
2	K	0.37	0/47	0.60	0/61
2	L	0.34	0/62	1.11	2/83 (2.4%)
All	All	0.38	0/5395	0.88	21/7276 (0.3%)

There are no bond length outliers.

All (21) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	625	VAL	N-CA-C	-8.90	100.98	108.63
1	B	525	TYR	CA-C-N	6.56	126.50	119.28
1	B	525	TYR	C-N-CA	6.56	126.50	119.28
1	F	605	ARG	N-CA-C	-6.43	105.25	113.23
1	C	605	ARG	N-CA-C	-6.18	103.86	112.45
2	L	810	THR	CA-C-N	6.06	125.94	119.28
2	L	810	THR	C-N-CA	6.06	125.94	119.28
1	E	605	ARG	N-CA-C	-5.55	105.63	112.90
1	A	563	GLU	N-CA-C	5.46	118.46	109.72
1	F	525	TYR	CA-C-N	5.41	125.08	119.56
1	F	525	TYR	C-N-CA	5.41	125.08	119.56
1	D	605	ARG	N-CA-C	-5.33	105.92	112.90

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	A	605	ARG	N-CA-C	-5.30	105.56	112.23
1	F	520	GLN	CA-C-N	5.29	125.75	120.14
1	F	520	GLN	C-N-CA	5.29	125.75	120.14
1	B	605	ARG	N-CA-C	-5.26	105.22	111.69
1	B	563	GLU	N-CA-C	5.21	118.06	109.72
1	D	612	GLU	N-CA-C	-5.16	106.83	113.23
1	C	525	TYR	CA-C-N	5.15	124.95	119.28
1	C	525	TYR	C-N-CA	5.15	124.95	119.28
1	A	606	VAL	N-CA-C	5.15	116.24	111.81

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	837	0	824	18	0
1	B	820	0	810	21	0
1	C	834	0	822	26	0
1	D	820	0	810	17	0
1	E	834	0	822	17	0
1	F	814	0	805	21	0
2	G	79	0	65	5	0
2	H	61	0	48	2	0
2	I	65	0	51	0	0
2	J	65	0	51	3	0
2	K	65	0	51	2	0
2	L	79	0	65	5	0
3	A	87	0	0	1	0
3	B	24	0	0	0	0
3	C	36	0	0	0	0
3	D	41	0	0	1	0
3	E	37	0	0	1	0
3	F	42	0	0	2	0
3	G	19	0	0	0	0
3	H	4	0	0	0	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	I	8	0	0	0	0
3	J	7	0	0	0	0
3	K	6	0	0	0	0
3	L	9	0	0	1	0
All	All	5693	0	5224	110	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 10.

All (110) 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:605:ARG:HH21	1:E:531:MET:HB3	1.15	1.07
1:C:605:ARG:NH2	1:E:531:MET:HB3	1.71	1.03
1:B:582:ASN:HD21	1:B:586:GLN:HB2	1.36	0.90
1:A:571:GLN:CB	1:A:571:GLN:CD	2.50	0.84
1:C:581:LEU:HD11	1:C:597:ILE:HD11	1.65	0.76
1:D:582:ASN:HD21	1:D:586:GLN:HB2	1.51	0.76
1:A:523:SER:O	1:C:561:ARG:NH2	2.20	0.74
1:F:612:GLU:OE2	2:L:817:THR:HG22	1.87	0.74
1:E:612:GLU:OE2	2:K:817:THR:HG22	1.89	0.73
1:D:535:LEU:HG	1:D:539:GLN:HE21	1.56	0.70
1:B:582:ASN:ND2	1:B:586:GLN:HB2	2.07	0.69
1:D:582:ASN:ND2	1:D:586:GLN:HB2	2.07	0.68
1:B:612:GLU:OE2	2:H:817:THR:HG22	1.96	0.66
1:B:602:GLU:O	1:B:605:ARG:HB3	1.97	0.65
1:A:591:HIS:CE1	2:G:818:GLU:HG3	2.33	0.63
1:C:553:LEU:HD12	1:C:553:LEU:C	2.23	0.63
1:E:615:GLY:O	1:E:616:SER:HB2	1.99	0.62
1:E:553:LEU:C	1:E:553:LEU:HD12	2.25	0.61
1:F:602:GLU:HG2	1:F:605:ARG:NH2	2.16	0.60
1:E:535:LEU:O	1:E:539:GLN:HG3	2.01	0.60
1:D:553:LEU:HD12	1:D:553:LEU:C	2.28	0.59
1:C:523:SER:O	1:E:561:ARG:NH2	2.37	0.58
1:F:602:GLU:HG2	1:F:605:ARG:HH21	1.69	0.58
1:C:522:LEU:HD11	1:C:597:ILE:HD12	1.85	0.57
1:F:582:ASN:HD21	1:F:586:GLN:HB2	1.68	0.57
1:A:615:GLY:O	1:A:616:SER:CB	2.52	0.57
1:C:615:GLY:O	1:C:616:SER:HB2	2.05	0.57
1:E:601:LEU:O	1:E:605:ARG:HG3	2.04	0.57
1:B:553:LEU:C	1:B:553:LEU:HD12	2.31	0.56

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:E:615:GLY:O	1:E:616:SER:CB	2.54	0.56
1:B:561:ARG:NH2	1:E:523:SER:O	2.39	0.55
1:A:612:GLU:CD	2:G:817:THR:HG22	2.31	0.55
1:F:553:LEU:C	1:F:553:LEU:HD12	2.31	0.55
1:A:627:SER:OG	1:C:561:ARG:NH1	2.39	0.55
1:F:575:LYS:HD2	2:L:814:GLU:CD	2.31	0.55
1:C:605:ARG:NH1	1:C:621:LEU:O	2.40	0.55
1:A:591:HIS:ND1	2:G:818:GLU:HG3	2.22	0.55
1:B:526:PRO:HB3	1:F:561:ARG:HA	1.88	0.55
1:F:536:LYS:HD2	3:F:152:HOH:O	2.06	0.55
1:A:614:GLY:O	1:A:615:GLY:C	2.50	0.54
1:F:579:LEU:HD22	1:F:600:MET:HE2	1.89	0.54
1:E:536:LYS:HD2	3:E:203:HOH:O	2.08	0.54
1:F:522:LEU:HD21	1:F:597:ILE:HD12	1.90	0.54
1:A:535:LEU:O	1:A:539:GLN:HG3	2.09	0.53
1:A:612:GLU:OE2	2:G:817:THR:HG22	2.08	0.53
1:E:614:GLY:O	1:E:615:GLY:C	2.50	0.52
1:A:575:LYS:HD2	2:G:814:GLU:OE2	2.08	0.52
1:B:612:GLU:HB2	2:H:815:LEU:O	2.11	0.51
1:C:613:SER:O	1:C:615:GLY:N	2.39	0.50
1:D:551:VAL:HA	1:D:623:SER:O	2.12	0.50
1:C:597:ILE:O	1:C:601:LEU:HG	2.12	0.49
1:D:578:ARG:HG3	3:D:12:HOH:O	2.12	0.49
1:F:575:LYS:HD2	2:L:814:GLU:OE2	2.11	0.49
1:D:522:LEU:HD11	1:D:597:ILE:HD12	1.94	0.49
1:D:591:HIS:CD2	2:J:818:GLU:HG3	2.48	0.49
1:D:575:LYS:HD2	2:J:814:GLU:CD	2.38	0.48
1:D:591:HIS:CG	2:J:818:GLU:HG3	2.49	0.47
1:B:589:VAL:O	1:B:589:VAL:HG22	2.14	0.47
1:A:615:GLY:O	1:A:616:SER:HB2	2.15	0.46
1:F:618:ASP:OD1	1:F:618:ASP:N	2.49	0.46
1:A:553:LEU:C	1:A:553:LEU:HD12	2.40	0.46
1:C:553:LEU:HD12	1:C:553:LEU:O	2.16	0.46
1:C:582:ASN:HD21	1:C:584:ALA:HB3	1.81	0.46
1:C:619:VAL:HG13	1:C:619:VAL:O	2.15	0.46
1:D:533:SER:OG	1:D:536:LYS:HG2	2.16	0.46
1:A:591:HIS:H	1:A:591:HIS:CD2	2.35	0.45
1:C:532:LEU:HD11	1:C:536:LYS:CG	2.46	0.45
1:F:520:GLN:HA	1:F:521:PRO:HD3	1.81	0.45
1:F:535:LEU:O	1:F:539:GLN:HG3	2.16	0.45
1:F:522:LEU:HD11	1:F:597:ILE:HD12	1.97	0.45

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:C:613:SER:C	1:C:615:GLY:H	2.22	0.45
1:B:525:TYR:CZ	1:B:598:PHE:HE2	2.35	0.44
1:C:535:LEU:O	1:C:539:GLN:HG3	2.17	0.44
1:B:535:LEU:O	1:B:539:GLN:HG3	2.18	0.44
1:C:613:SER:OG	1:C:614:GLY:N	2.50	0.44
1:B:619:VAL:HG13	1:B:619:VAL:O	2.16	0.44
1:F:548:SER:O	1:F:549:HIS:C	2.60	0.44
1:A:586:GLN:HE21	1:A:595:GLN:HE22	1.64	0.44
1:C:614:GLY:O	1:C:615:GLY:C	2.61	0.44
1:B:530:GLY:HA3	1:E:623:SER:HB3	1.99	0.44
2:L:810:THR:N	3:L:199:HOH:O	2.49	0.44
1:A:603:HIS:HE1	3:A:48:HOH:O	2.01	0.43
1:B:525:TYR:CZ	1:B:598:PHE:CE2	3.05	0.43
1:D:561:ARG:HG3	3:F:247:HOH:O	2.18	0.43
1:A:525:TYR:O	1:C:561:ARG:NH1	2.51	0.43
1:C:551:VAL:HA	1:C:623:SER:O	2.17	0.43
1:C:582:ASN:ND2	1:C:584:ALA:HB3	2.34	0.43
1:D:542:LEU:HD23	1:D:542:LEU:HA	1.89	0.43
1:D:588:ARG:NH1	1:D:590:GLN:O	2.51	0.43
1:B:523:SER:O	1:F:561:ARG:NH2	2.51	0.43
1:D:535:LEU:HG	1:D:539:GLN:NE2	2.30	0.43
1:B:520:GLN:HA	1:B:521:PRO:HD3	1.84	0.42
1:C:563:GLU:OE1	1:C:578:ARG:NH2	2.52	0.42
1:D:624:TYR:C	1:D:624:TYR:CD1	2.97	0.42
1:C:600:MET:HE3	1:C:600:MET:HB3	1.95	0.42
1:F:523:SER:HA	1:F:528:PHE:CE2	2.55	0.42
1:B:556:GLN:OE1	1:E:623:SER:HB2	2.20	0.42
1:B:603:HIS:CE1	1:B:607:HIS:HB2	2.55	0.41
1:E:520:GLN:HA	1:E:521:PRO:HD3	1.89	0.41
1:F:582:ASN:ND2	1:F:586:GLN:HB2	2.35	0.41
1:A:579:LEU:HD22	1:A:600:MET:HE2	2.02	0.41
1:E:534:ARG:NH2	2:K:812:ASP:HB2	2.35	0.41
1:F:548:SER:O	1:F:551:VAL:HG23	2.20	0.41
1:D:619:VAL:O	1:D:619:VAL:HG13	2.20	0.41
1:F:610:PRO:HG2	2:L:816:LEU:HD22	2.02	0.41
1:B:596:SER:HB2	1:B:598:PHE:HD1	1.86	0.41
1:E:602:GLU:HA	1:E:605:ARG:HD3	2.02	0.41
1:B:598:PHE:O	1:B:602:GLU:HG2	2.21	0.40
1:C:553:LEU:C	1:C:553:LEU:CD1	2.93	0.40
1:B:570:PHE:O	1:B:571:GLN:C	2.65	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	106/111 (96%)	101 (95%)	3 (3%)	2 (2%)	6	5
1	B	101/111 (91%)	96 (95%)	5 (5%)	0	100	100
1	C	106/111 (96%)	96 (91%)	8 (8%)	2 (2%)	6	5
1	D	101/111 (91%)	94 (93%)	7 (7%)	0	100	100
1	E	106/111 (96%)	99 (93%)	5 (5%)	2 (2%)	6	5
1	F	100/111 (90%)	94 (94%)	5 (5%)	1 (1%)	12	12
2	G	6/11 (54%)	6 (100%)	0	0	100	100
2	H	4/11 (36%)	4 (100%)	0	0	100	100
2	I	4/11 (36%)	4 (100%)	0	0	100	100
2	J	4/11 (36%)	4 (100%)	0	0	100	100
2	K	4/11 (36%)	4 (100%)	0	0	100	100
2	L	6/11 (54%)	6 (100%)	0	0	100	100
All	All	648/732 (88%)	608 (94%)	33 (5%)	7 (1%)	11	11

All (7) Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	616	SER
1	C	616	SER
1	E	616	SER
1	A	615	GLY
1	C	615	GLY
1	E	615	GLY
1	F	523	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	89/94 (95%)	87 (98%)	2 (2%)	45	59
1	B	88/94 (94%)	85 (97%)	3 (3%)	32	43
1	C	89/94 (95%)	87 (98%)	2 (2%)	45	59
1	D	88/94 (94%)	87 (99%)	1 (1%)	65	79
1	E	89/94 (95%)	88 (99%)	1 (1%)	65	79
1	F	87/94 (93%)	84 (97%)	3 (3%)	32	43
2	G	8/10 (80%)	8 (100%)	0	100	100
2	H	5/10 (50%)	5 (100%)	0	100	100
2	I	6/10 (60%)	6 (100%)	0	100	100
2	J	6/10 (60%)	5 (83%)	1 (17%)	2	2
2	K	6/10 (60%)	6 (100%)	0	100	100
2	L	8/10 (80%)	8 (100%)	0	100	100
All	All	569/624 (91%)	556 (98%)	13 (2%)	44	58

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

Mol	Chain	Res	Type
1	A	523	SER
1	A	577	LEU
1	B	577	LEU
1	B	589	VAL
1	B	612	GLU
1	C	560	ARG
1	C	577	LEU
1	D	577	LEU
1	E	577	LEU
1	F	546	THR
1	F	577	LEU
1	F	605	ARG
2	J	818	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. All (10) such sidechains are listed below:

Mol	Chain	Res	Type
1	A	539	GLN
1	A	556	GLN
1	A	591	HIS
1	A	595	GLN
1	A	603	HIS
1	A	607	HIS
1	C	539	GLN
1	D	539	GLN
1	D	607	HIS
1	F	539	GLN

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

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

6 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	PTR	J	813	2	15,16,17	0.78	0	17,22,24	0.90	1 (5%)
2	PTR	K	813	2	15,16,17	0.89	0	17,22,24	1.14	1 (5%)
2	PTR	G	813	2	15,16,17	0.74	0	17,22,24	1.09	2 (11%)
2	PTR	L	813	2	15,16,17	0.83	0	17,22,24	1.06	2 (11%)
2	PTR	I	813	2	15,16,17	0.79	0	17,22,24	1.12	2 (11%)
2	PTR	H	813	2	15,16,17	0.87	0	17,22,24	0.98	1 (5%)

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	PTR	J	813	2	-	1/10/11/13	0/1/1/1
2	PTR	K	813	2	-	0/10/11/13	0/1/1/1
2	PTR	G	813	2	-	0/10/11/13	0/1/1/1
2	PTR	L	813	2	-	0/10/11/13	0/1/1/1
2	PTR	I	813	2	-	2/10/11/13	0/1/1/1
2	PTR	H	813	2	-	0/10/11/13	0/1/1/1

There are no bond length outliers.

All (9) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	K	813	PTR	P-OH-CZ	3.44	136.12	123.88
2	I	813	PTR	OH-P-O1P	-3.02	99.41	109.48
2	G	813	PTR	OH-P-O1P	-2.61	100.76	109.48
2	I	813	PTR	P-OH-CZ	2.59	133.10	123.88
2	H	813	PTR	OH-P-O1P	-2.34	101.68	109.48
2	J	813	PTR	O3P-P-O2P	2.33	116.53	107.80
2	L	813	PTR	O3P-P-OH	-2.21	98.79	105.32
2	G	813	PTR	P-OH-CZ	2.10	131.35	123.88
2	L	813	PTR	O3P-P-O2P	2.05	115.49	107.80

There are no chirality outliers.

All (3) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	I	813	PTR	O-C-CA-CB
2	I	813	PTR	CZ-OH-P-O1P
2	J	813	PTR	CZ-OH-P-O2P

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates

There are no oligosaccharides in this entry.

5.6 Ligand geometry

There are no ligands in this entry.

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(Å ²)	Q<0.9
1	A	108/111 (97%)	-0.26	5 (4%) 37 43	5, 15, 31, 48	0
1	B	105/111 (94%)	0.55	9 (8%) 16 18	16, 34, 52, 59	0
1	C	108/111 (97%)	0.22	7 (6%) 25 28	10, 27, 48, 64	0
1	D	105/111 (94%)	0.21	4 (3%) 44 50	11, 28, 42, 51	0
1	E	108/111 (97%)	0.24	7 (6%) 25 28	15, 27, 52, 68	0
1	F	104/111 (93%)	0.22	1 (0%) 79 83	14, 29, 43, 46	0
2	G	8/11 (72%)	-0.36	0 100 100	12, 16, 23, 25	0
2	H	6/11 (54%)	1.10	1 (16%) 4 4	35, 40, 49, 60	0
2	I	6/11 (54%)	0.70	0 100 100	28, 31, 44, 47	0
2	J	6/11 (54%)	0.66	0 100 100	30, 33, 40, 46	0
2	K	6/11 (54%)	0.54	0 100 100	29, 34, 40, 42	0
2	L	8/11 (72%)	0.54	0 100 100	29, 36, 48, 60	0
All	All	678/732 (92%)	0.21	34 (5%) 34 40	5, 27, 49, 68	0

All (34) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	C	605	ARG	4.4
1	C	616	SER	4.3
1	A	615	GLY	4.2
1	C	615	GLY	4.0
1	B	521	PRO	3.7
1	B	520	GLN	3.7
1	E	616	SER	3.5
1	A	520	GLN	3.5
1	B	589	VAL	3.4
1	C	614	GLY	3.4
1	E	615	GLY	3.1

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Mol	Chain	Res	Type	RSRZ
1	E	520	GLN	3.1
1	E	617	SER	3.0
1	B	617	SER	2.9
1	F	618	ASP	2.9
1	D	618	ASP	2.6
1	E	614	GLY	2.6
1	B	618	ASP	2.6
1	D	520	GLN	2.6
1	D	571	GLN	2.5
1	E	521	PRO	2.4
1	B	598	PHE	2.4
1	B	597	ILE	2.3
1	C	617	SER	2.3
1	C	613	SER	2.2
1	D	613	SER	2.2
1	A	521	PRO	2.2
1	B	583	ALA	2.1
1	E	613	SER	2.1
1	B	606	VAL	2.1
1	A	614	GLY	2.1
2	H	818	GLU	2.1
1	A	616	SER	2.0
1	C	597	ILE	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

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

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
2	PTR	H	813	16/17	0.95	0.09	25,32,33,33	0
2	PTR	J	813	16/17	0.96	0.07	17,25,30,31	0
2	PTR	L	813	16/17	0.96	0.07	23,25,27,27	0
2	PTR	K	813	16/17	0.97	0.07	22,25,29,29	0
2	PTR	I	813	16/17	0.97	0.06	18,22,27,28	0
2	PTR	G	813	16/17	0.99	0.04	8,10,13,15	0

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

There are no ligands in this entry.

6.5 Other polymers [i](#)

There are no such residues in this entry.