wwPDB EM Validation Summary Report (i)

Jul 14, 2024 – 03:42 pm BST

PDB ID	:	8BHY
EMDB ID	:	EMD-16074
Title	:	DNA-PK Ku80 mediated dimer bound to PAXX and XLF
Authors	:	Hardwick, S.W.; Chaplin, A.K.
Deposited on	:	2022-11-01
Resolution	:	5.33 Å(reported)

This is a wwPDB EM Validation Summary 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/EMValidationReportHelp
with specific help available everywhere you see the (i) 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 (i)) were used in the production of this report:

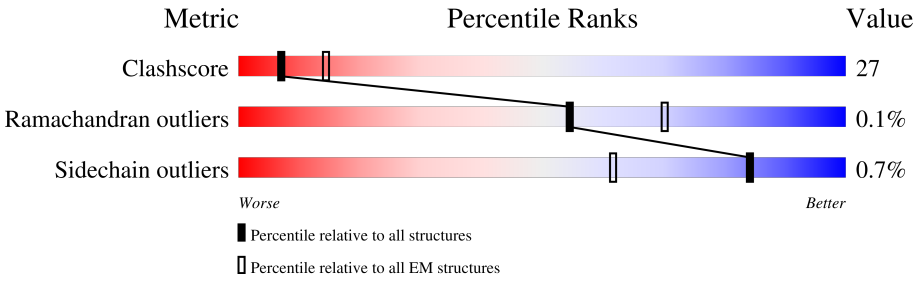
EMDB validation analysis	:	0.0.1.dev92
MolProbity	:	4.02b-467
Percentile statistics	:	20191225.v01 (using entries in the PDB archive December 25th 2019)
MapQ	:	1.9.13
Ideal geometry (proteins)	:	Engh & Huber (2001)
Ideal geometry (DNA, RNA)	:	Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP)	:	2.37.1

1 Overall quality at a glance (i)

The following experimental techniques were used to determine the structure:
ELECTRON MICROSCOPY

The reported resolution of this entry is 5.33 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)	EM structures (#Entries)
Clashscore	158937	4297
Ramachandran outliers	154571	4023
Sidechain outliers	154315	3826

The table below summarises the geometric issues observed across the polymeric chains and their fit to the map. The red, orange, yellow and green segments of the 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 EM map (all-atom inclusion < 40%). The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	A	4128	37% 48% · 14%
1	S	4128	42% 44% 14%
2	B	609	33% 50% 17%
2	T	609	40% 42% 18%
3	C	732	43% 47% · 9%
3	L	732	48% 41% · 11%
4	D	204	48% 45% 27% 28%
4	M	204	53% 60% 20% 20%

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Mol	Chain	Length	Quality of chain
5	G	336	50% 44% 15% 40%
5	H	336	47% 41% 17% 42%
5	P	336	56% 49% 11% 40%
5	Q	336	55% 43% 14% 42%
6	I	911	11% 17% 9% 73%
6	R	911	22% 18% 9% 73%
7	d	25	80% 20%
8	e	27	89% 11%
9	i	26	100%
10	j	24	92% 8%
11	f	299	98%
11	m	299	98%

2 Entry composition (i)

There are 11 unique types of molecules in this entry. The entry contains 90193 atoms, of which 0 are hydrogens and 0 are deuteriums.

In the tables below, 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 DNA-dependent protein kinase catalytic subunit.

Mol	Chain	Residues	Atoms					AltConf	Trace
1	A	3547	Total 28300	C 18182	N 4780	O 5151	S 187	0	0
1	S	3538	Total 28342	C 18207	N 4793	O 5154	S 188	0	0

- Molecule 2 is a protein called X-ray repair cross-complementing protein 6.

Mol	Chain	Residues	Atoms					AltConf	Trace
2	B	507	Total 4085	C 2614	N 693	O 760	S 18	0	0
2	T	502	Total 4037	C 2587	N 680	O 752	S 18	0	0

- Molecule 3 is a protein called X-ray repair cross-complementing protein 5.

Mol	Chain	Residues	Atoms					AltConf	Trace
3	C	668	Total 5318	C 3397	N 892	O 1003	S 26	0	0
3	L	652	Total 5204	C 3324	N 876	O 979	S 25	0	0

- Molecule 4 is a protein called Protein PAXX.

Mol	Chain	Residues	Atoms					AltConf	Trace
4	D	147	Total 1102	C 702	N 190	O 204	S 6	0	0
4	M	164	Total 1219	C 767	N 210	O 236	S 6	0	0

- Molecule 5 is a protein called DNA repair protein XRCC4.

Mol	Chain	Residues	Atoms					AltConf	Trace
5	G	201	Total	C	N	O	S	0	0
			1628	1031	278	312	7		
5	H	194	Total	C	N	O	S	0	0
			1589	1009	271	302	7		
5	P	201	Total	C	N	O	S	0	0
			1622	1028	275	312	7		
5	Q	194	Total	C	N	O	S	0	0
			1580	1003	268	302	7		

- Molecule 6 is a protein called DNA ligase 4.

Mol	Chain	Residues	Atoms					AltConf	Trace
6	I	246	Total	C	N	O	S	0	0
			1984	1262	336	373	13		
6	R	246	Total	C	N	O	S	0	0
			1970	1252	335	371	12		

- Molecule 7 is a DNA chain called DNA (25-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
7	d	25	Total	C	N	O	P	0	0
			516	249	87	155	25		

- Molecule 8 is a DNA chain called DNA (27-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
8	e	27	Total	C	N	O	P	0	0
			554	267	102	158	27		

- Molecule 9 is a DNA chain called DNA (26-MER).

Mol	Chain	Residues	Atoms					AltConf	Trace
9	i	26	Total	C	N	O	P	0	0
			532	257	97	152	26		

- Molecule 10 is a DNA chain called DNA (5'-D(P*AP*AP*TP*AP*AP*TP*AP*GP*TP*TP*TP*TP*TP*AP*GP*TP*TP*TP*AP*TP*TP*GP*GP*G)-3').

Mol	Chain	Residues	Atoms					AltConf	Trace
10	j	24	Total	C	N	O	P	0	0
			497	240	84	149	24		

- Molecule 11 is a protein called Non-homologous end-joining factor 1.

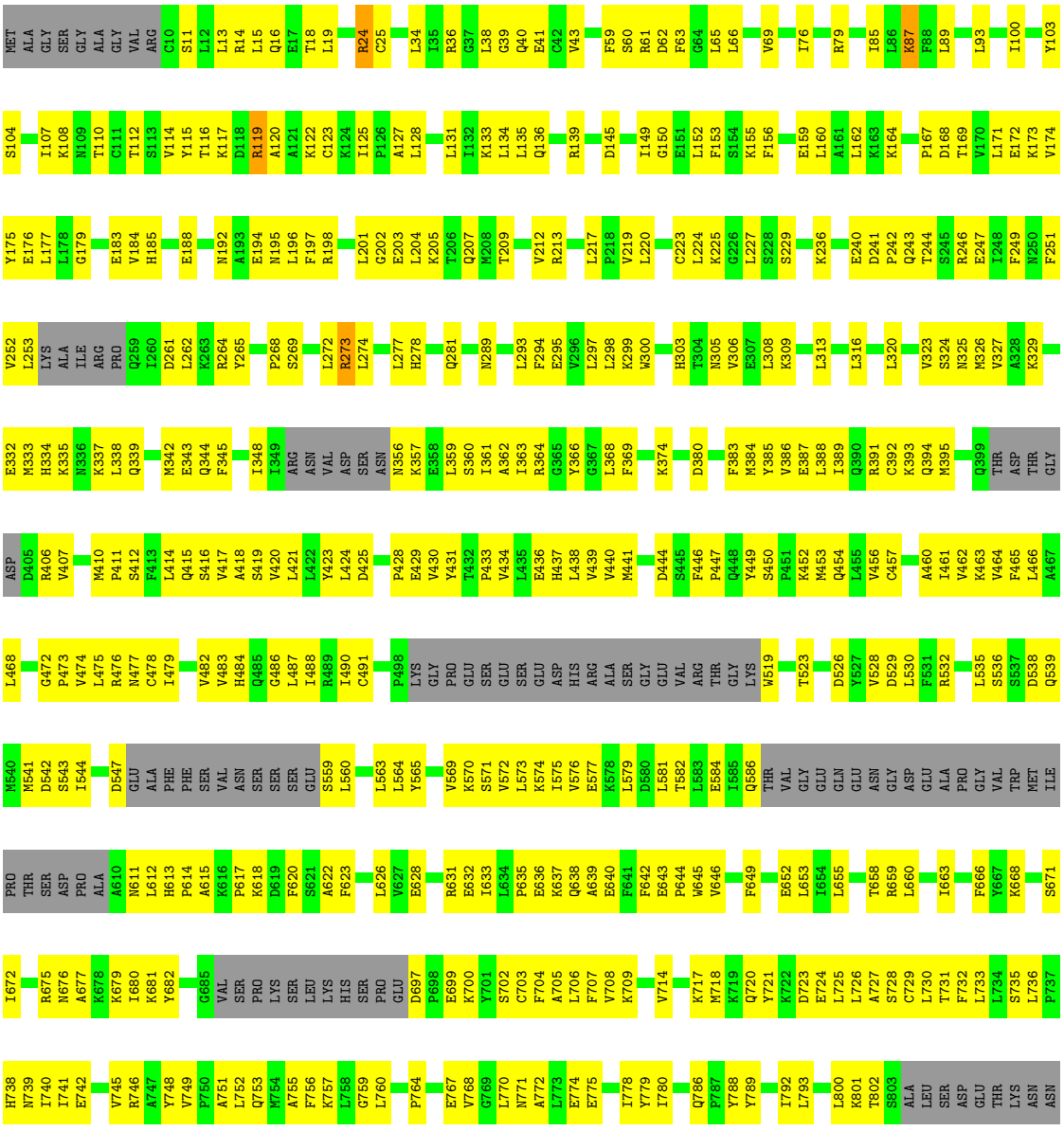
Mol	Chain	Residues	Atoms				AltConf	Trace
11	f	7	Total	C	N	O	0	0
			57	37	11	9		
11	m	7	Total	C	N	O	0	0
			57	37	11	9		

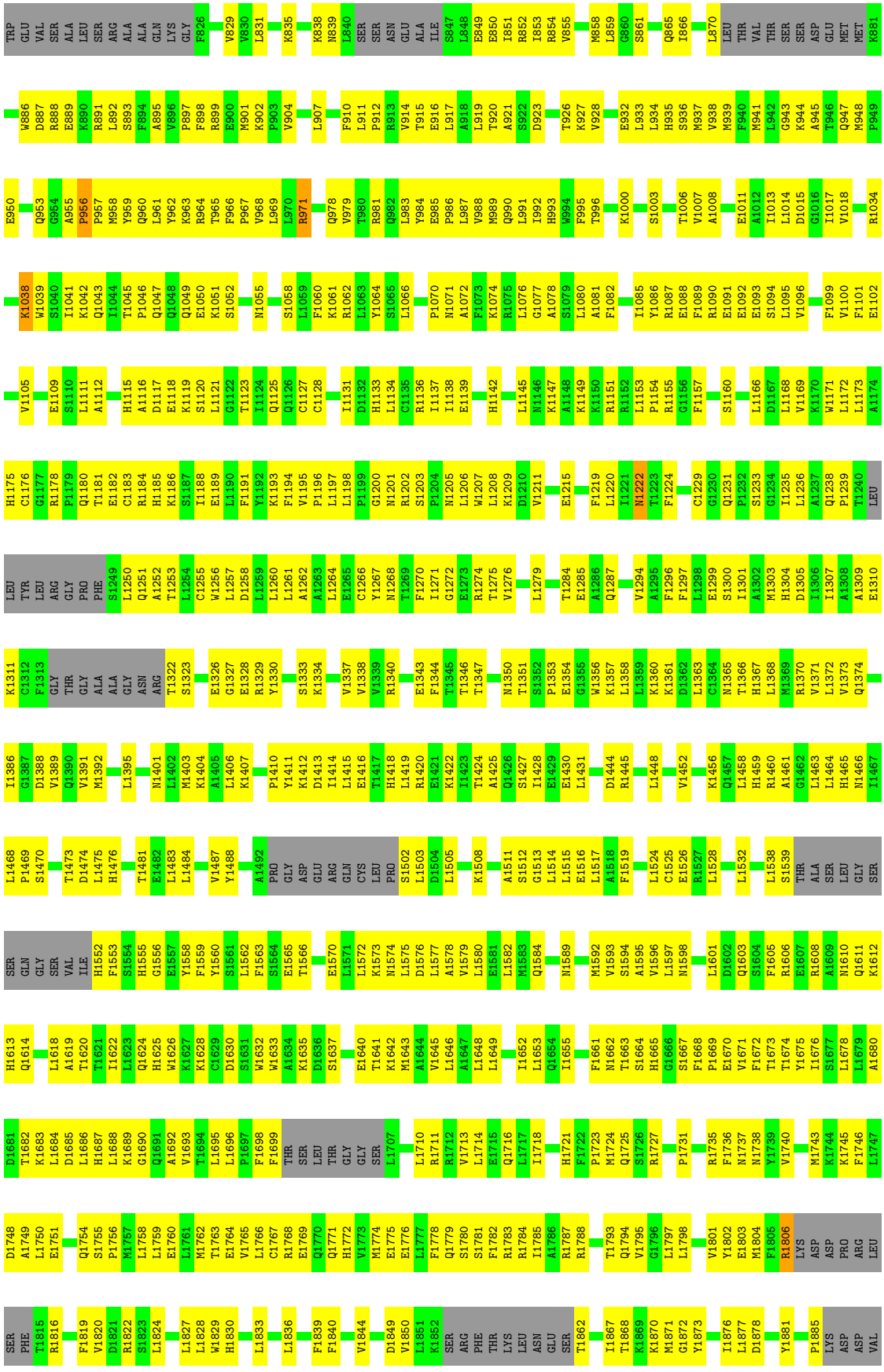
3 Residue-property plots (i)

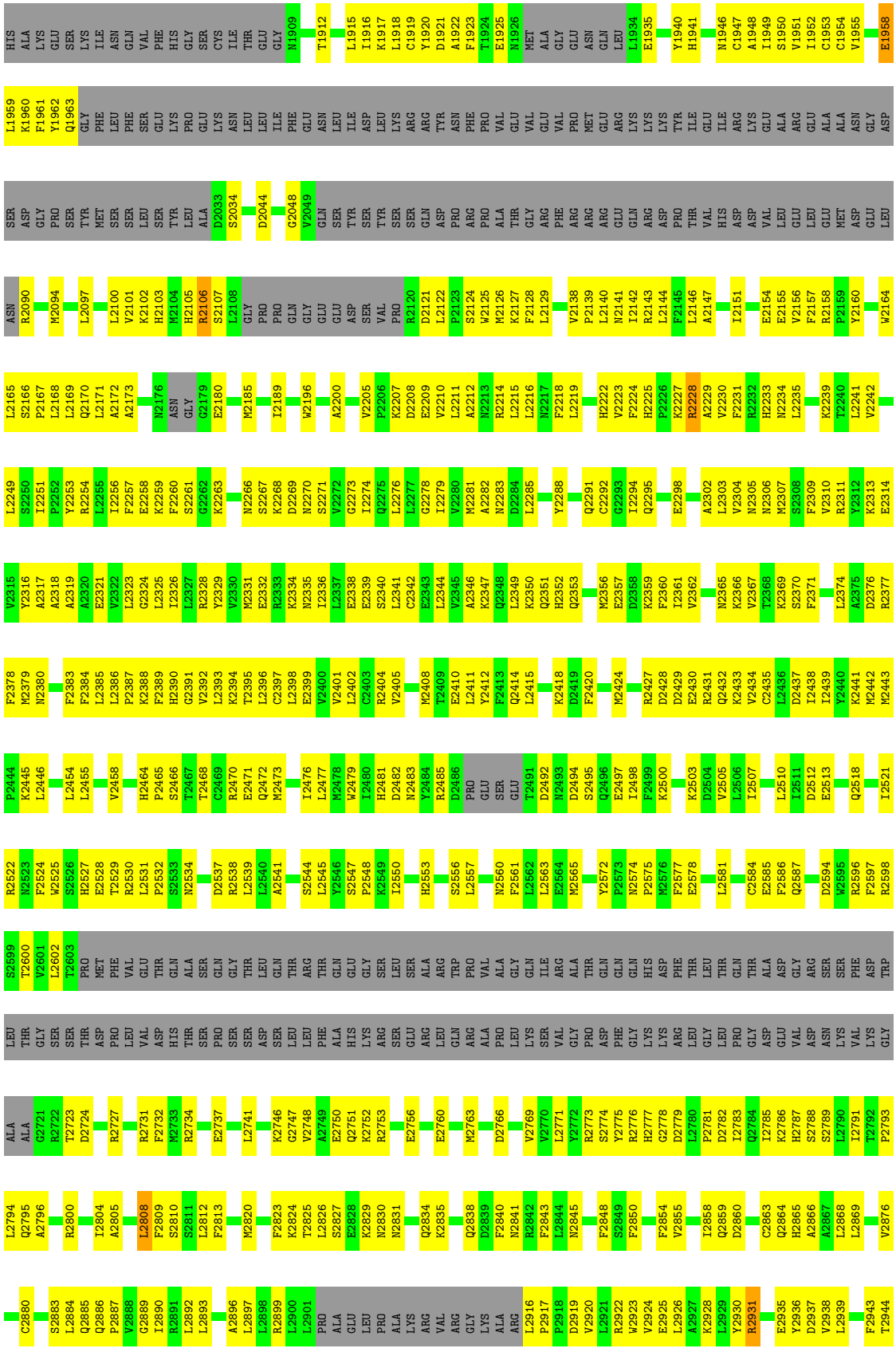
These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and atom inclusion in map 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 diamond above a residue indicates a poor fit to the EM map for this residue (all-atom inclusion < 40%). 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.

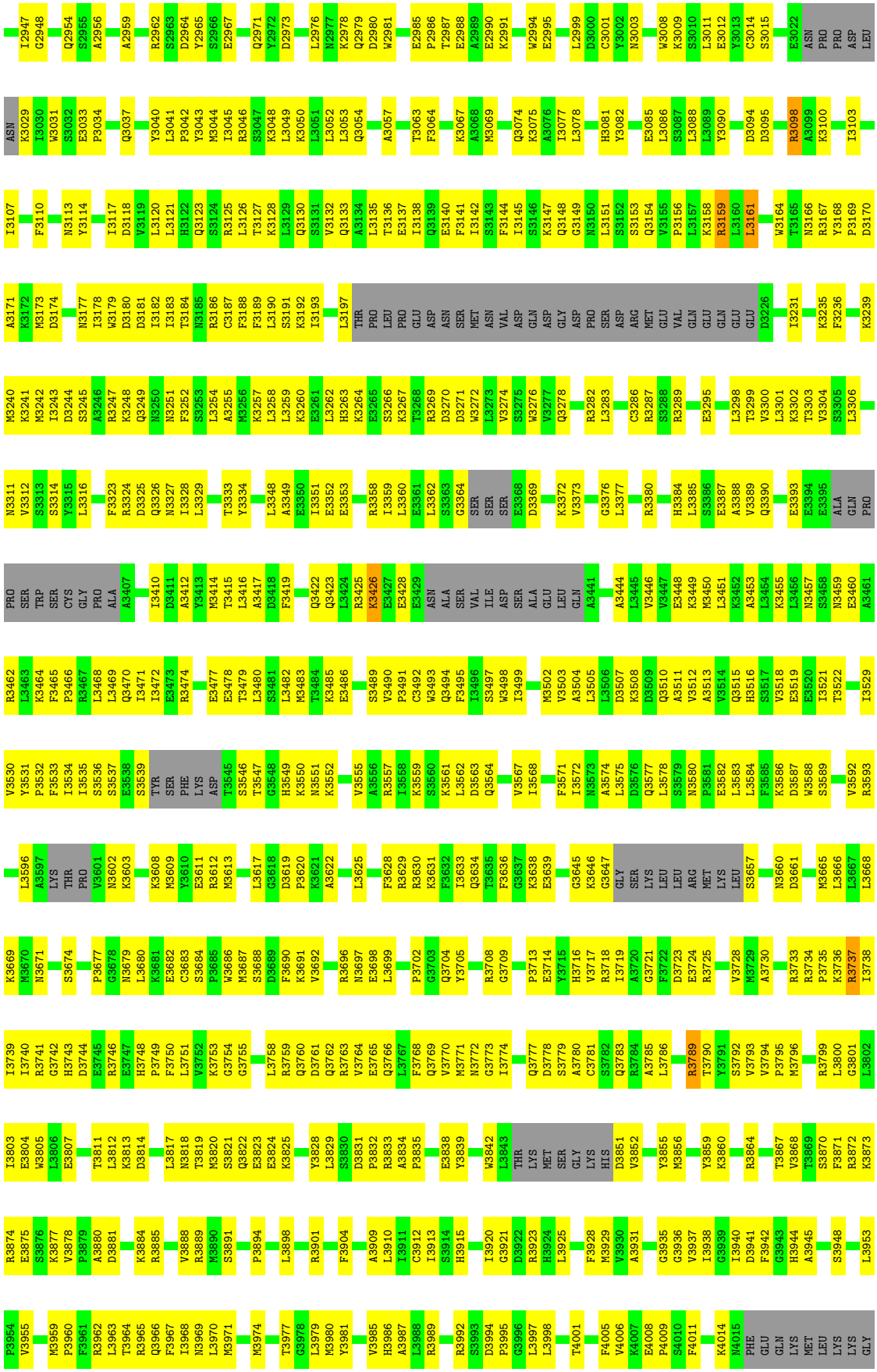
- Molecule 1: DNA-dependent protein kinase catalytic subunit

Chain A:





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ASN K3029 I3030 W3031 S3032 E3033 P3034 Q3037 Y3040 L3041 P3042 Y3043 M3044 I3045 R3046 S3047 K3048 L3049 K3050 L3051 L3052 L3053 Q3054 A3057 T3063 F3064 K3067 A3068 M3069 Q3074 K3075 A3076 I3077 L3078 H3081 Y3082 E3085 L3086 S3087 L3088 L3089 Y3090 D3094 D3095 R3098 A3099 K3100 I3103
I3107 F3110 N3113 Y3114 I3117 D3118 V3119 L3120 L3121 H3122 Q3123 S3124 R3125 L3126 T3127 K3128 L3129 Q3130 S3131 V3132 Q3133 A3134 L3135 T3136 E3137 I3138 Q3139 E3140 F3141 I3142 S3143 F3144 I3145 S3146 K3147 Q3148 G3149 N3150 L3151 S3152 S3153 Q3154 V3155 P3156 L3157 K3158 R3159 L3160 L3161 W3164 T3165 N3166 R3167 Y3168 P3169 D3170
A3171 K3172 M3173 D3174 N3177 I3178 W3179 D3180 D3181 I3182 I3183 T3184 N3185 R3186 C3187 F3188 F3189 L3190 S3191 K3192 I3193 L3197 THR PRO LEU PRO GLU ASP ASN VAL ASP GLN ASP PRO SER ASP ARG MET GLU VAL GLN GLU GLN GLU GLU D3226 I3231 K3235 F3236 K3239
M3240 K3241 M3242 I3243 D3244 S3245 A3246 R3247 K3248 D3249 N3250 N3251 F3252 S3253 L3254 A3255 M3256 K3257 L3258 L3259 K3260 E3261 L3262 H3263 K3264 E3265 S3266 K3267 T3268 R3269 D3270 D3271 W3272 L3273 V3274 S3275 W3276 V3277 Q3278 R3282 L3283 C3286 R3287 S3288 R3289 E3295 L3298 T3299 V3300 L3301 K3302 T3303 V3304 S3305 L3306
N3311 V3312 S3313 S3314 Y3315 L3316 F3323 R3324 D3325 Q3326 N3327 I3328 L3329 T3333 Y3334 L3348 A3349 E3350 I3351 E3352 E3353 R3358 I3359 L3360 E3361 L3362 S3363 G3364 SER SER E3368 D3369 K3372 V3373 G3376 L3377 R3380 H3384 L3385 S3386 E3387 A3388 V3389 Q3390 E3393 E3394 E3395 ALA GLN PRO
PRO SER TRP SER CYS GLY PRO ALA A3407 I3410 D3411 A3412 Y3413 M3414 T3415 L3416 A3417 D3418 F3419 Q3422 Q3423 L3424 R3425 K3426 E3427 E3428 E3429 ASN ALA SER VAL ILE ASP SER ALA GLU LEU GLN A3441 A3444 L3445 V3446 V3447 E3448 K3449 M3450 L3451 K3452 A3453 L3454 K3455 L3456 N3457 S3458 N3459 E3460 A3461
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V3530 Y3531 P3532 F3533 I3534 I3535 S3536 S3537 E3538 S3539 TYR SER PHE LYS ASP T3545 S3546 T3547 G3548 H3549 K3550 N3551 K3552 V3555 A3556 R3557 I3558 K3559 S3560 K3561 L3562 D3563 Q3564 V3567 I3568 F3571 I3572 N3573 A3574 L3575 D3576 Q3577 L3578 S3579 N3580 P3581 E3582 L3583 L3584 F3585 K3586 D3587 W3588 S3589 V3592 R3593
L3596 A3597 LYS THR PRO V3601 N3602 K3603 K3608 M3609 Y3610 E3611 R3612 M3613 L3617 G3618 D3619 P3620 K3621 A3622 L3625 F3628 R3629 R3630 K3631 F3632 I3633 Q3634 T3635 F3636 G3637 K3638 E3639 G3645 K3646 G3647 GLY SER LYS LEU LEU ARG MET LYS LEU S3657 N3660 D3661
K3669 M3670 N3671 S3674 P3677 G3678 N3679 L3680 K3681 E3682 C3683 S3684 P3685 W3686 M3687 S3688 D3689 F3690 K3691 V3692 R3696 N3697 E3698 L3699 P3702 G3703 Q3704 Y3705 R3708 G3709 P3713 E3714 Y3715 H3716 V3717 R3718 I3719 A3720 G3721 F3722 D3723 E3724 R3725 V3728 M3729 A3730 R3733 R3734 P3735 K3736 R3737 I3738
I3739 I3740 R3741 G3742 H3743 D3744 E3745 R3746 E3747 H3748 P3749 F3750 L3751 V3752 K3753 G3754 G3755 L3758 R3759 Q3760 D3761 Q3762 R3763 V3764 E3765 Q3766 L3767 F3768 Q3769 V3770 M3771 N3772 G3773 I3774 Q3777 D3778 S3779 A3780 C3781 S3782 Q3783 R3784 A3785 L3786 R3789 T3790 Y3791 S3792 V3793 P3795 M3796 R3799 L3800 G3801 L3802
I3803 E3804 W3805 L3806 E3807 T3811 L3812 K3813 D3814 L3817 N3818 T3819 M3820 S3821 Q3822 E3823 E3824 K3825 Y3828 L3829 S3830 D3831 P3832 R3833 A3834 P3835 E3838 Y3839 W3842 L3843 THR LYS MET SER GLY LYS HIS D3851 V3852 Y3855 M3856 Y3859 K3860 R3864 T3867 V3868 T3869 S3870 F3871 R3872 K3873
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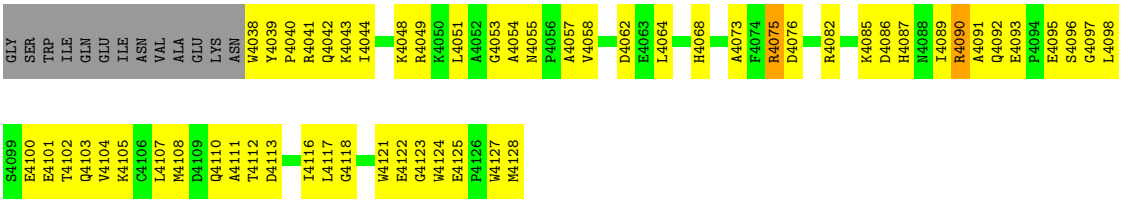
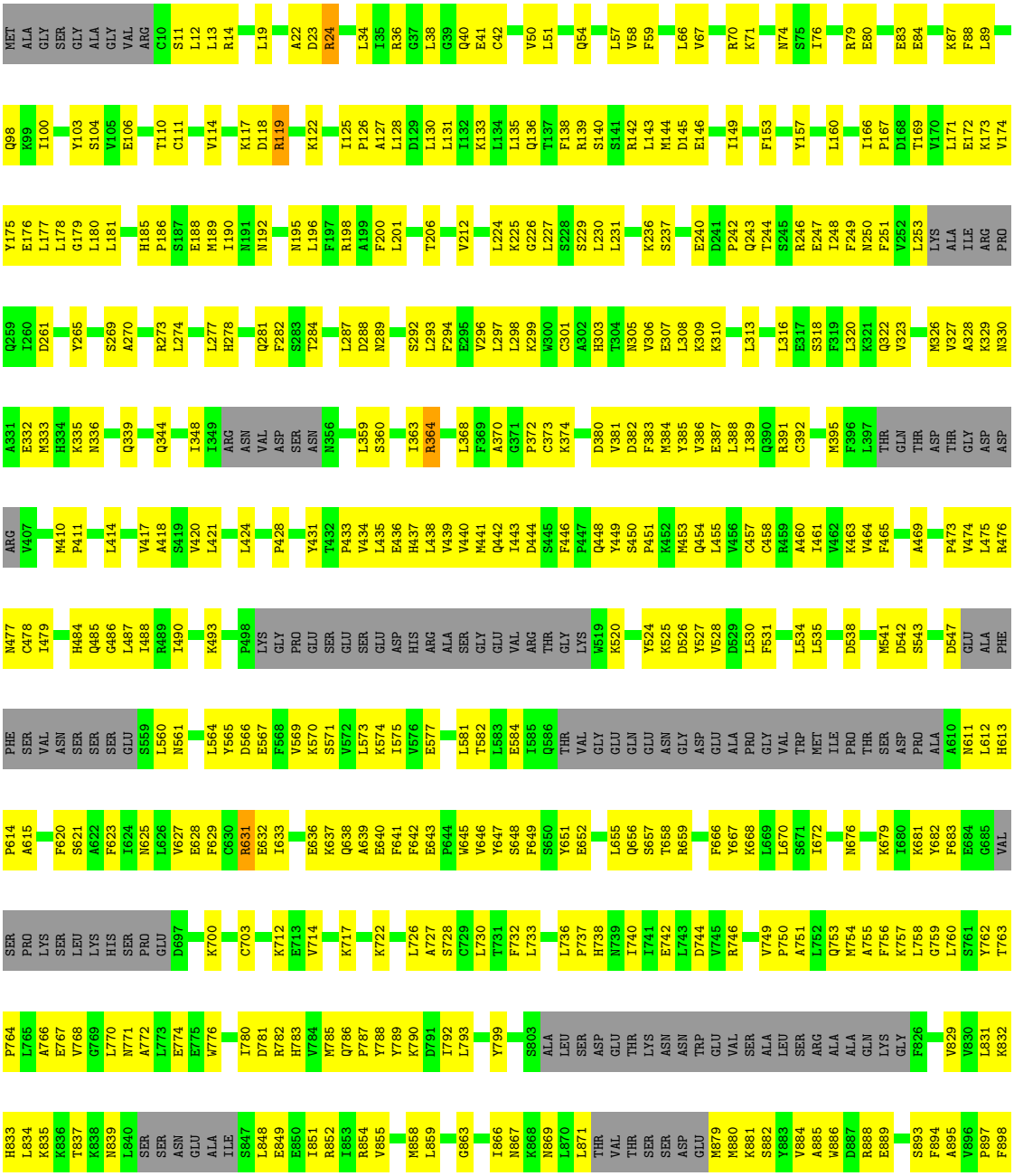
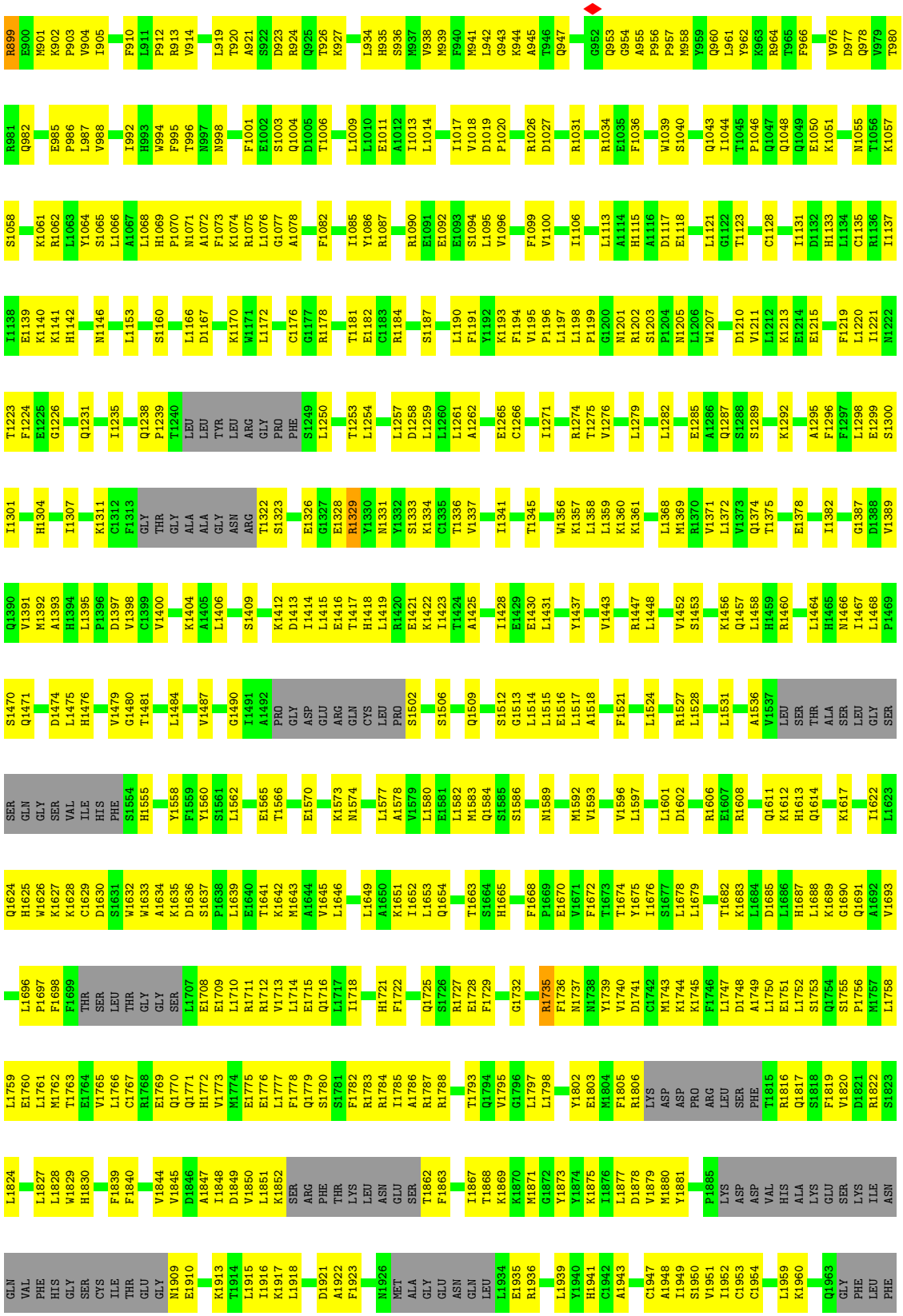
P3954 V3955 M3959 P3960 F3961 R3962 L3963 T3964 R3965 Q3966 F3967 I3968 N3969 L3970 M3971 M3974 T3977 G3978 L3979 M3980 Y3981 V3985 H3986 A3987 L3988 R3989 R3992 S3993 D3994 P3995 G3996 L3997 L3998 T4001 F4005 V4006 K4007 E4008 P4009 S4010 F4011 K4014 W4015 PHE GLU GLN LYS MET LEU LYS LYS GLY



• Molecule 1: DNA-dependent protein kinase catalytic subunit

Chain S:

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R981 Q982 E985 P986 L987 V988 I992 H993 W994 F995 T996 N997 N998 F1001 E1002 S1003 Q1004 D1005 T1006 L1009 L1010 E1011 A1012 I1013 L1014 I1017 V1018 D1019 P1020 R1026 D1027 R1031 R1034 E1035 F1036 W1039 S1040 Q1043 I1044 T1045 P1046 Q1047 Q1048 Q1049 E1050 K1051 N1055 T1056 K1057
S1058 K1061 R1062 L1063 Y1064 S1065 L1066 A1067 L1068 H1069 P1070 N1071 A1072 F1073 K1074 R1075 L1076 G1077 A1078 F1082 I1085 Y1086 R1087 R1090 E1091 E1092 E1093 S1094 L1095 V1096 F1099 V1100 I1106 L1113 A1114 H1115 A1116 D1117 E1118 L1121 G1122 T1123 C1128 I1131 D1132 H1133 L1134 C1135 R1136 I1137
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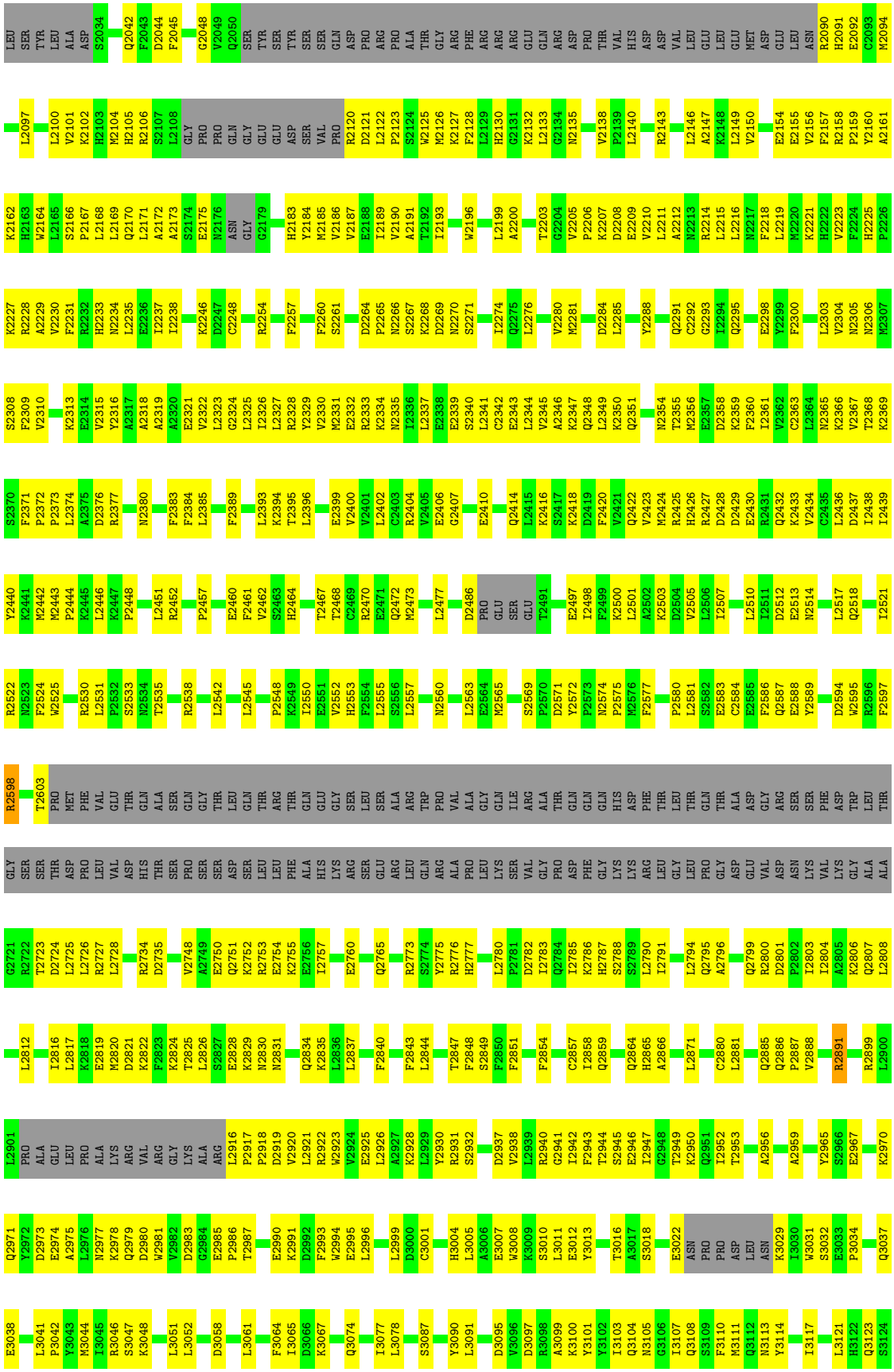
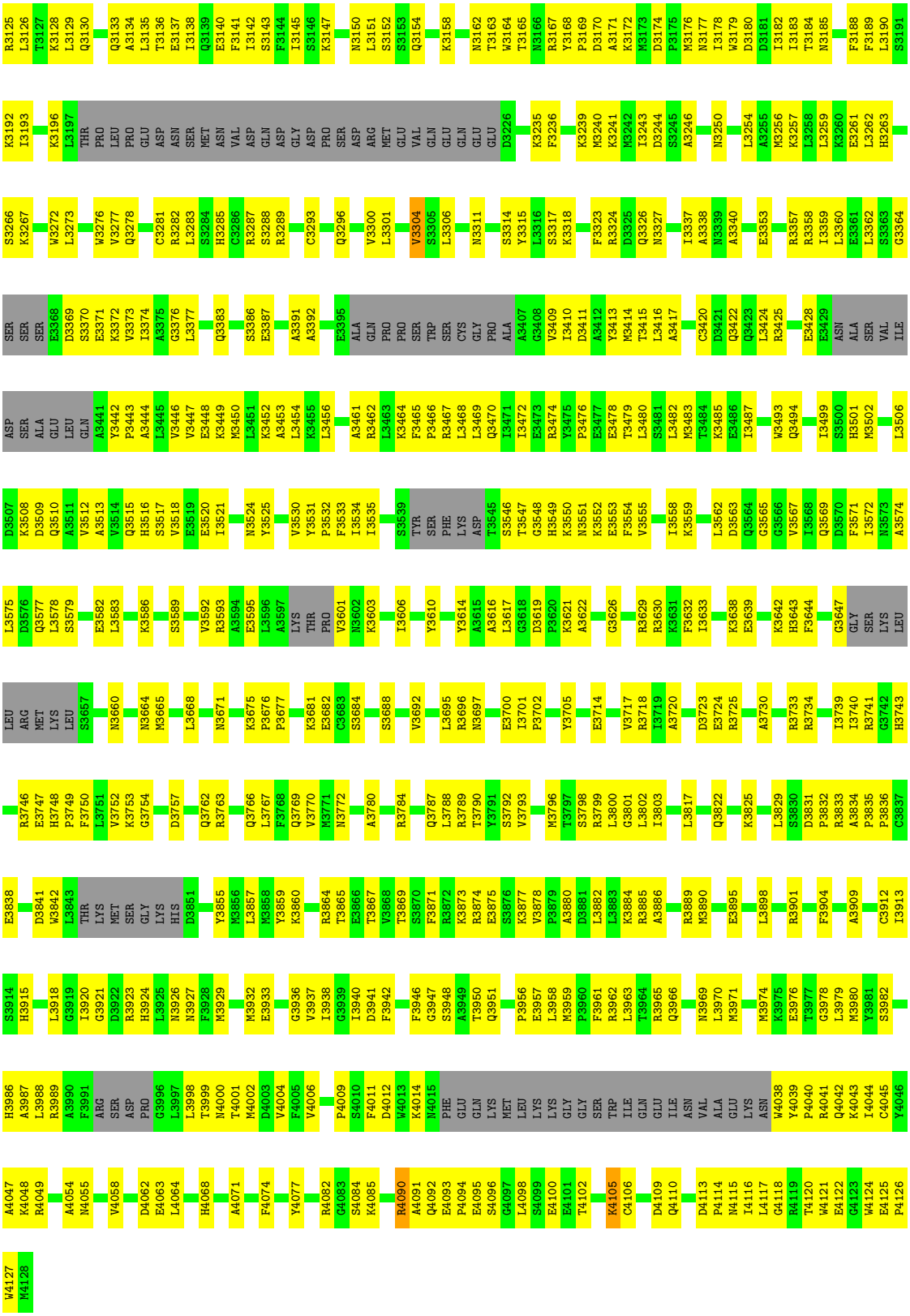
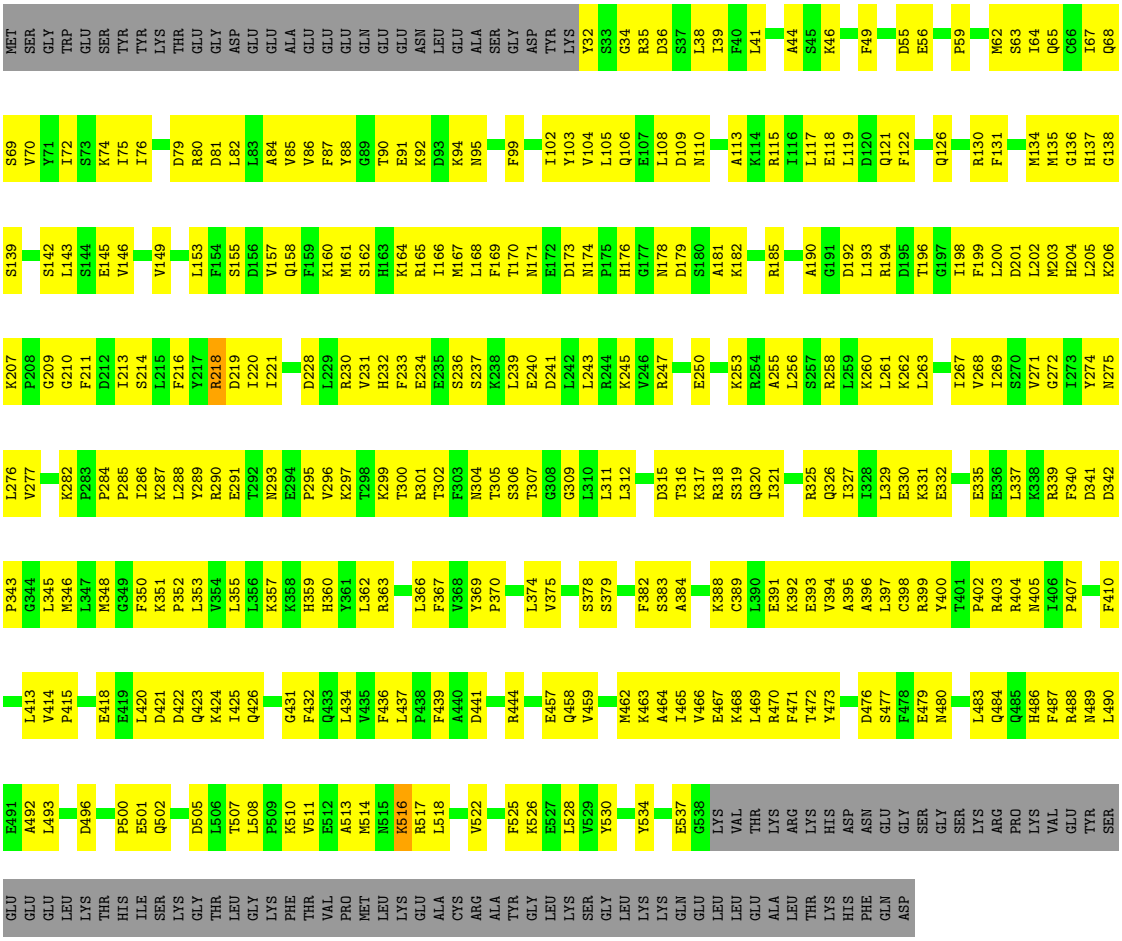
GLN VAL PHE HIS GLY SER CYS ILE THR GLU GLY N1909 E1910 K1913 T1914 L1915 I1916 K1917 L1918 D1921 A1922 F1923 N1926 MET ALA GLY GLU ASN GLN LEU L1934 E1935 R1936 L1939 Y1940 H1941 C1942 A1943 C1947 A1948 I1949 S1950 V1951 I1952 C1953 C1954 L1959 K1960 Q1963 GLY PHE LEU PHE
SER GLU LYS PRO GLU LYS ASN LEU LEU ILE PHE GLU ASN LEU ILE ASP LEU LYS ARG ARG TYR ASN PHE PRO VAL GLU VAL GLU VAL PRO MET GLN ARG LYS LYS LYS TYR ILE GLU ILE ARG LYS GLU ALA ARG GLU ALA ALA ASN GLY ASP GLY PRO SER TYR MET SER SER





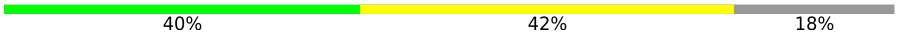
• Molecule 2: X-ray repair cross-complementing protein 6

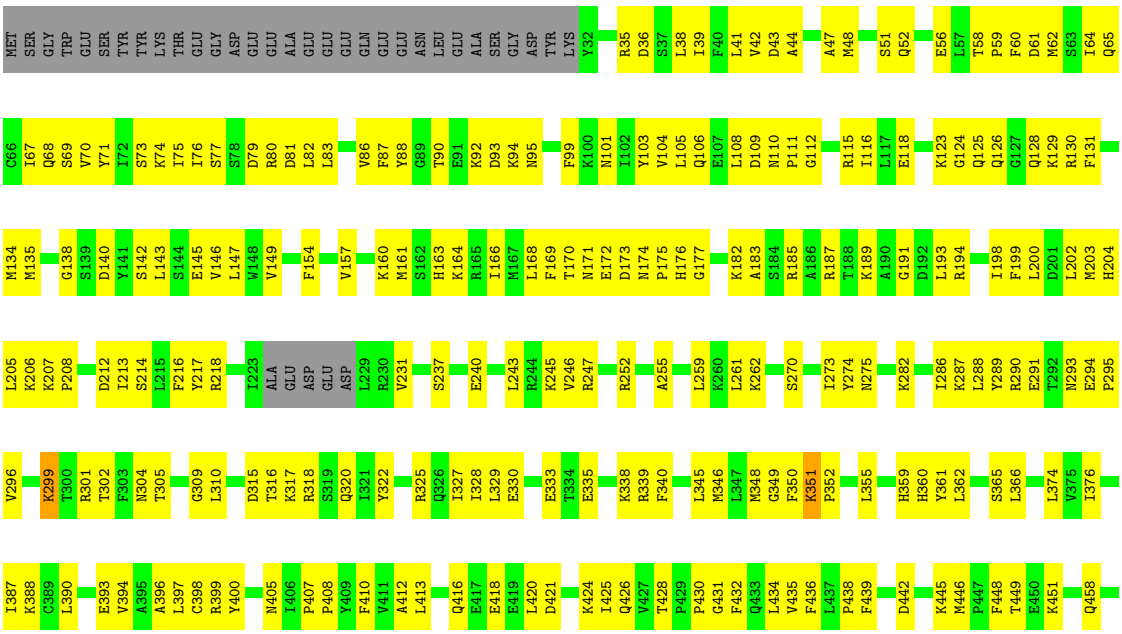
Chain B:

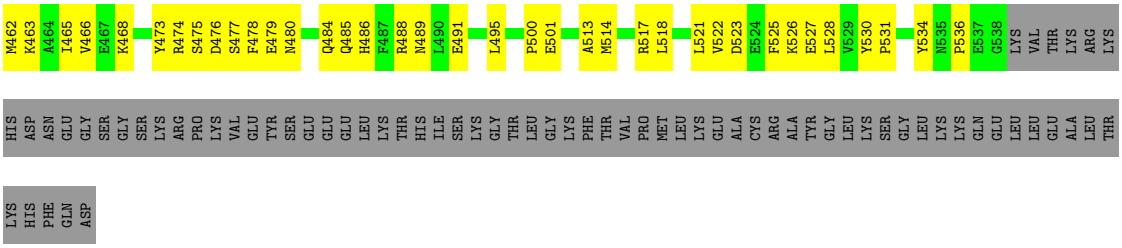


• Molecule 2: X-ray repair cross-complementing protein 6

Chain T:

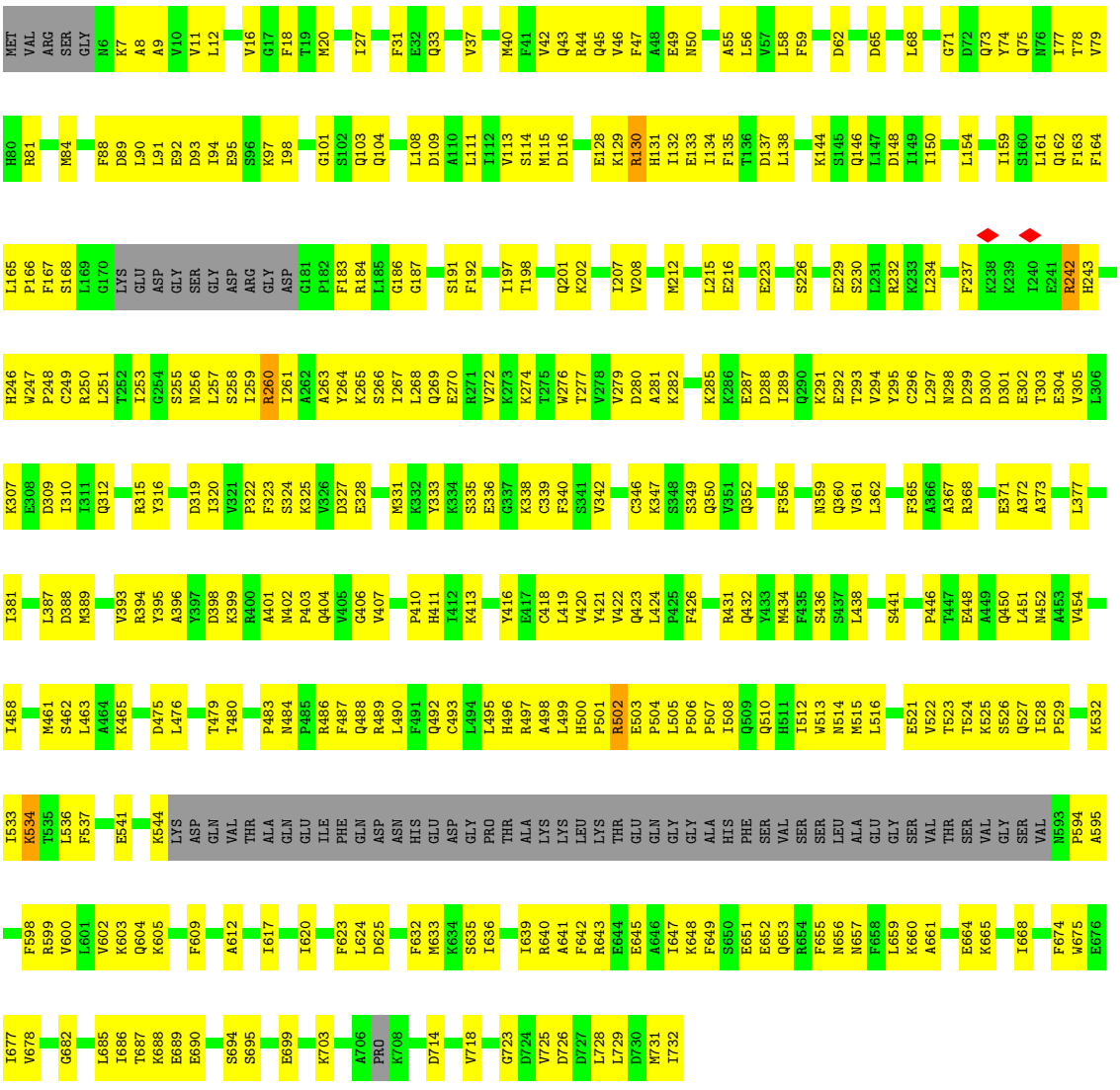






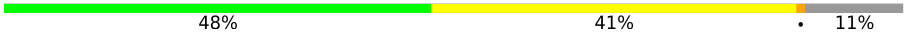
• Molecule 3: X-ray repair cross-complementing protein 5

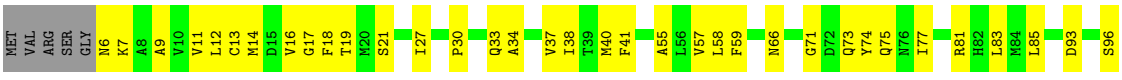
Chain C:

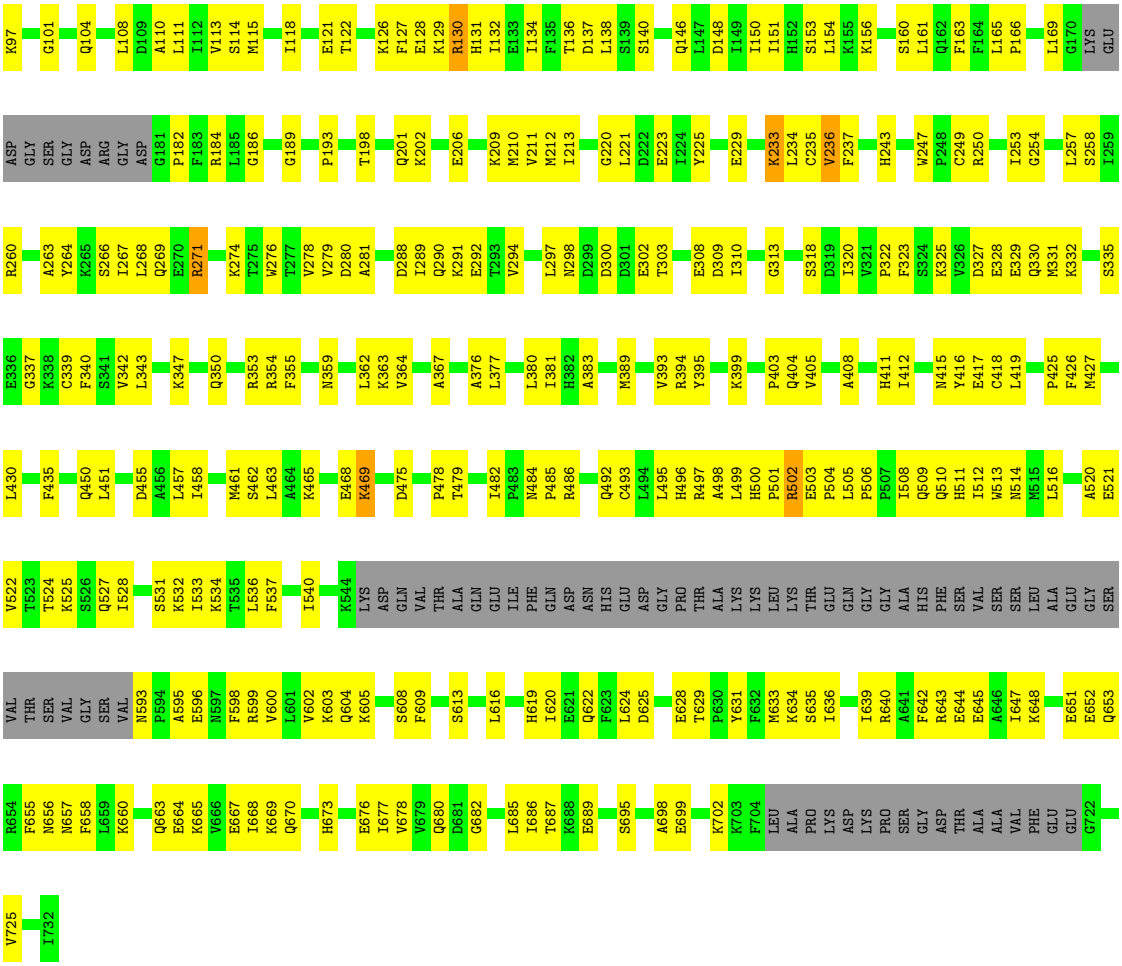


• Molecule 3: X-ray repair cross-complementing protein 5

Chain L:

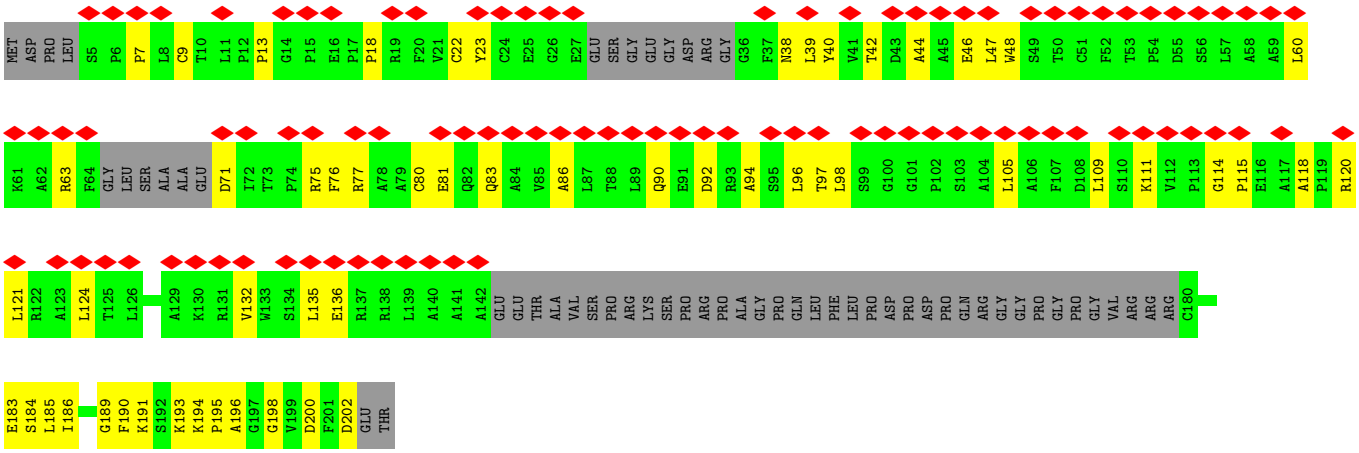






• Molecule 4: Protein PAXX

Chain D:

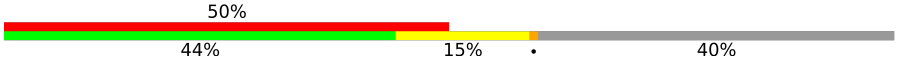


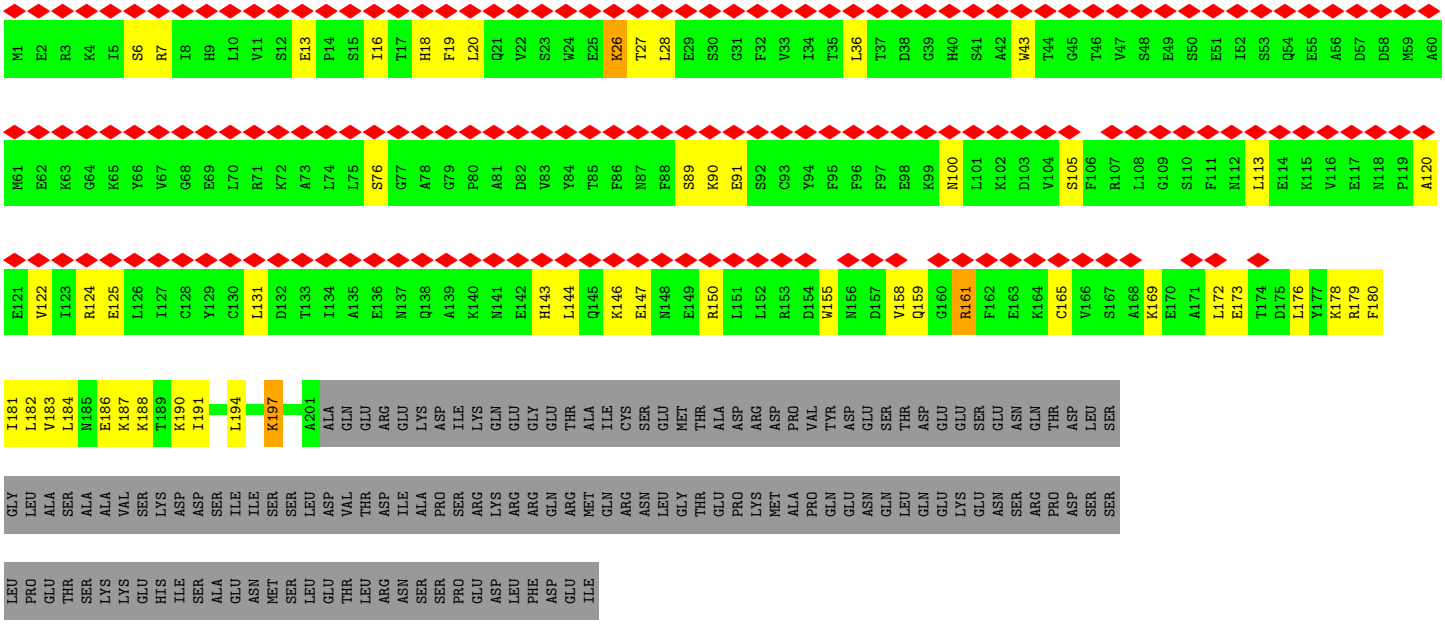
• Molecule 4: Protein PAXX

Chain M:

• Molecule 5: DNA repair protein XRCC4

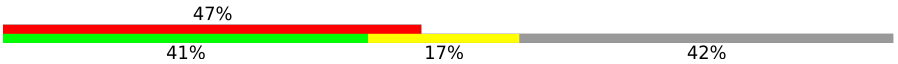
Chain G:

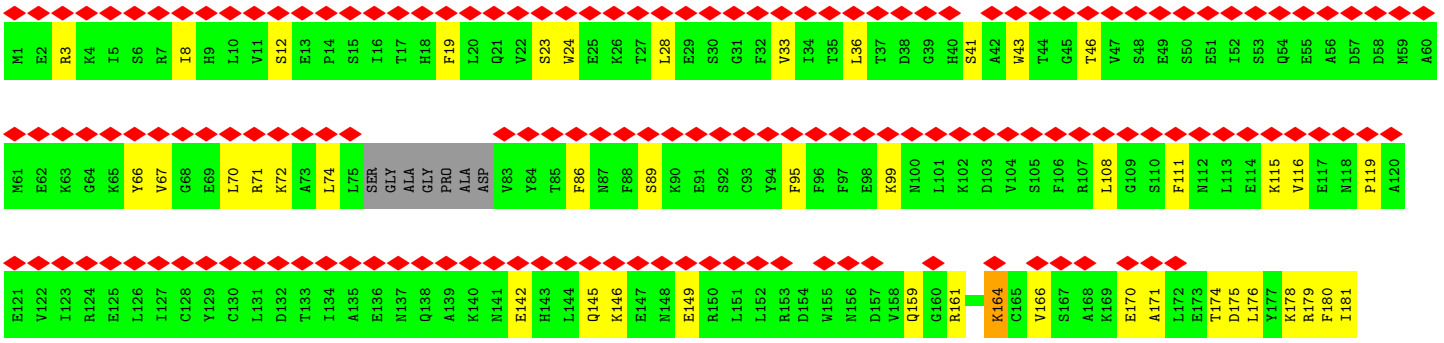


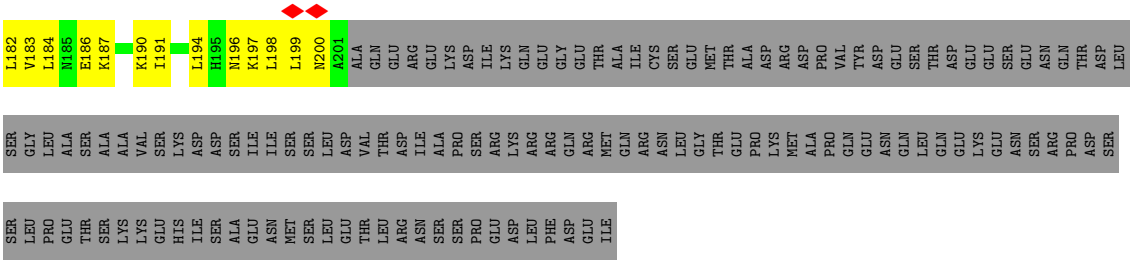


• Molecule 5: DNA repair protein XRCC4

Chain H:

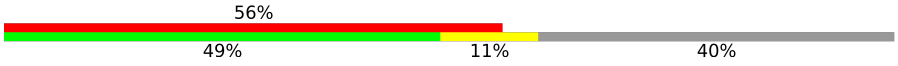


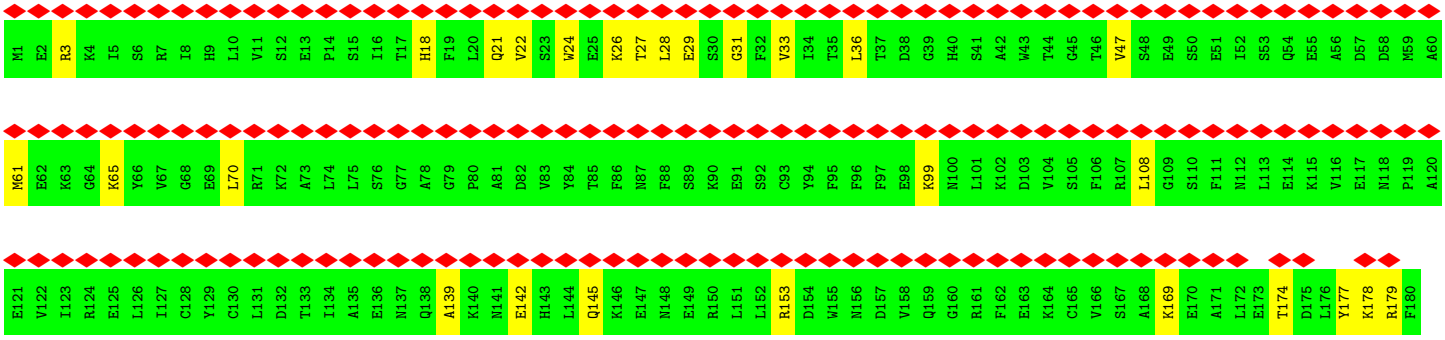




• Molecule 5: DNA repair protein XRCC4

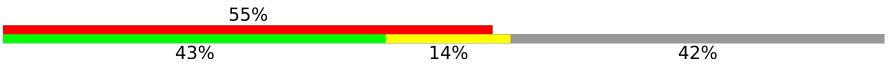
Chain P:

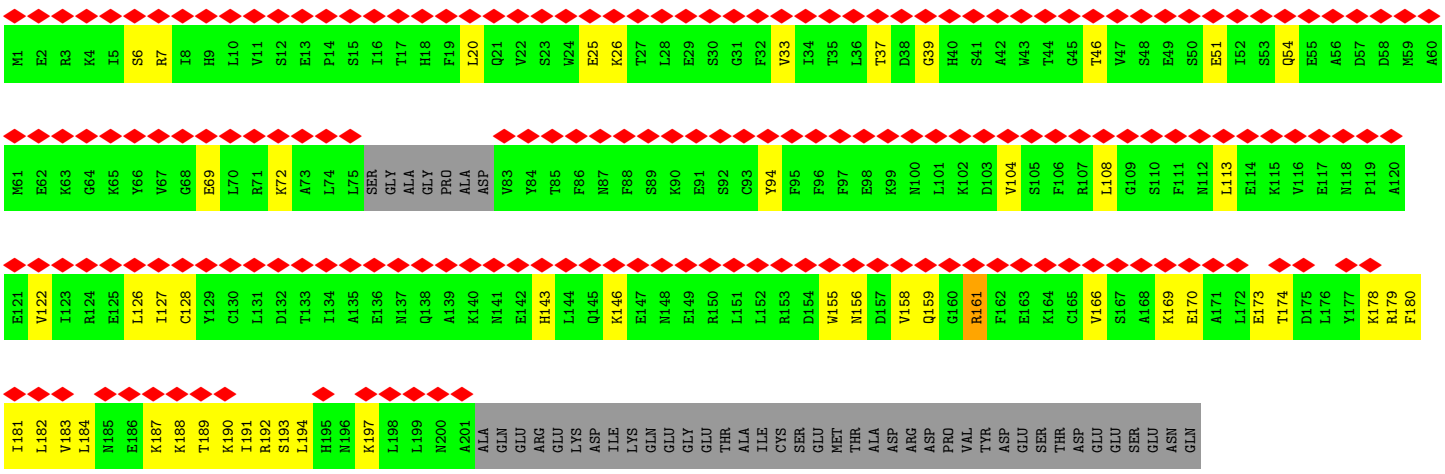


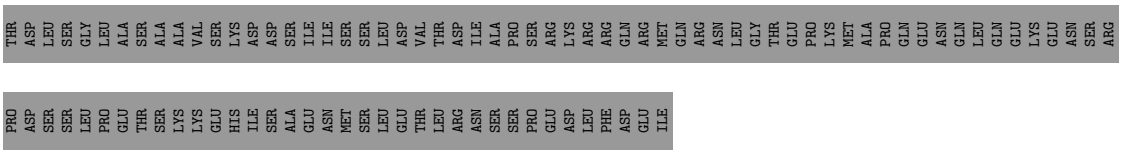


• Molecule 5: DNA repair protein XRCC4

Chain Q:

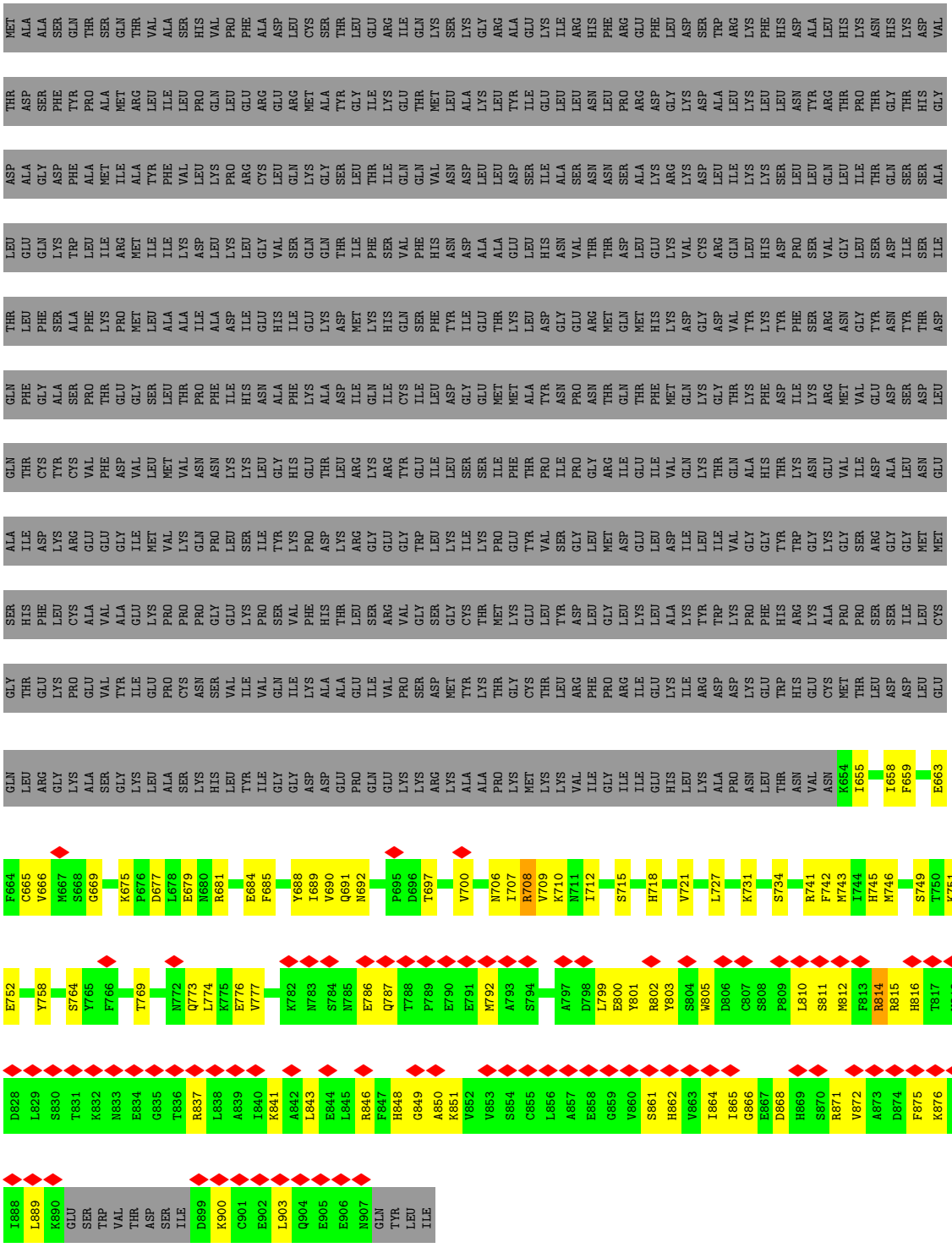






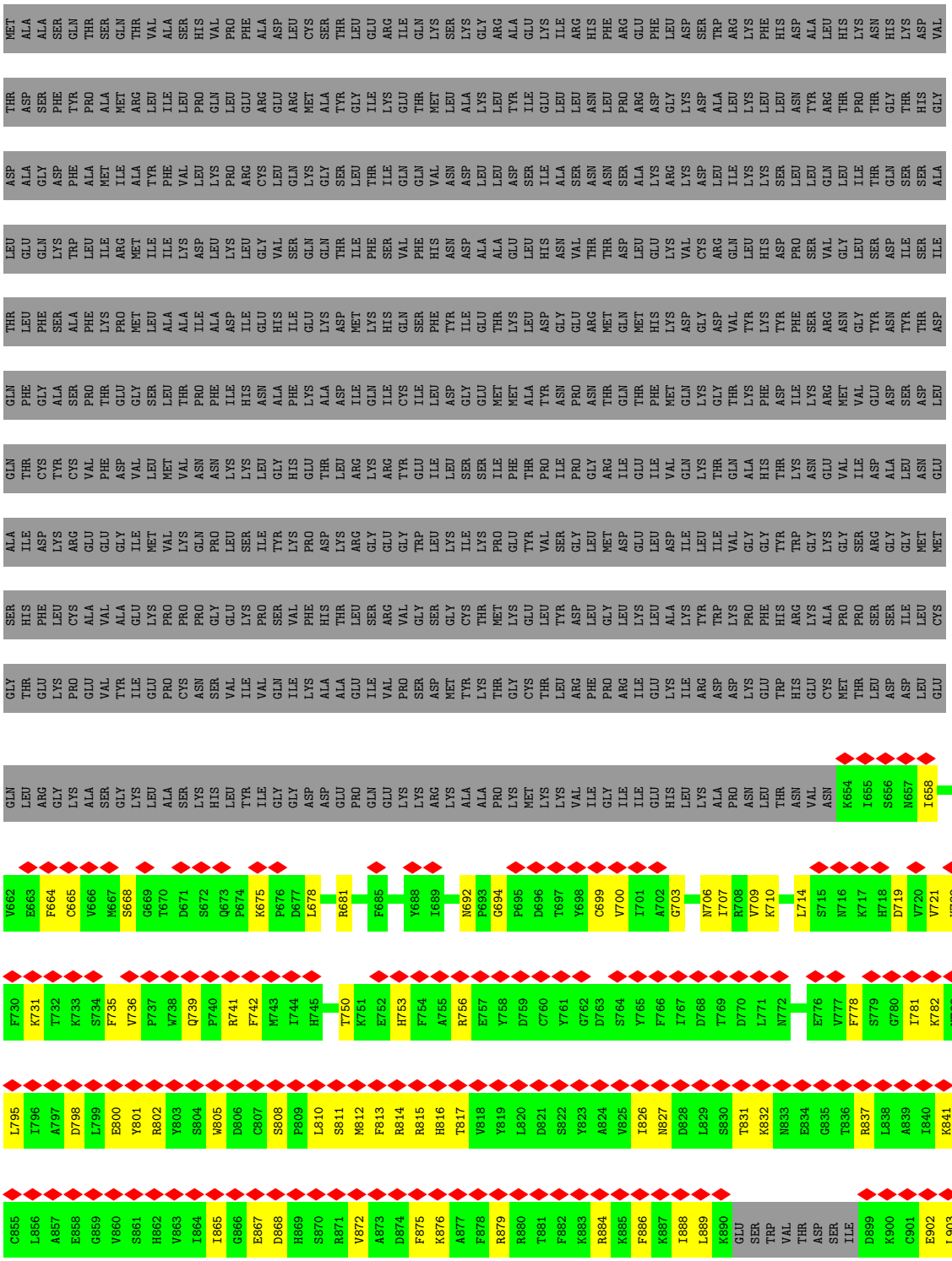
• Molecule 6: DNA ligase 4

Chain I:



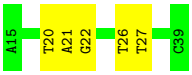
• Molecule 6: DNA ligase 4

Chain R:



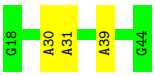
• Molecule 7: DNA (25-MER)

Chain d:



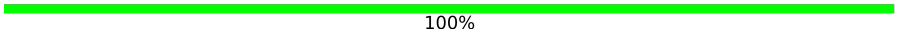
• Molecule 8: DNA (27-MER)

Chain e:



• Molecule 9: DNA (26-MER)

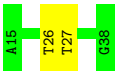
Chain i:



There are no outlier residues recorded for this chain.

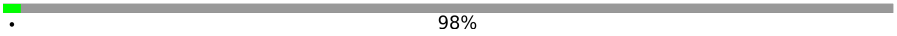
• Molecule 10: DNA (5'-D(P*AP*AP*TP*AP*AP*TP*AP*GP*TP*TP*TP*TP*TP*AP*GP*TP*TP*TP*AP*TP*TP*GP*GP*G)-3')

Chain j:



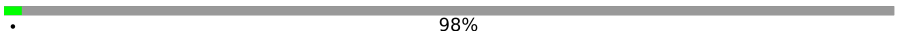
• Molecule 11: Non-homologous end-joining factor 1

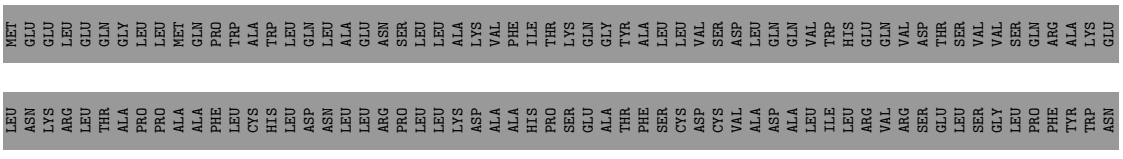
Chain f:

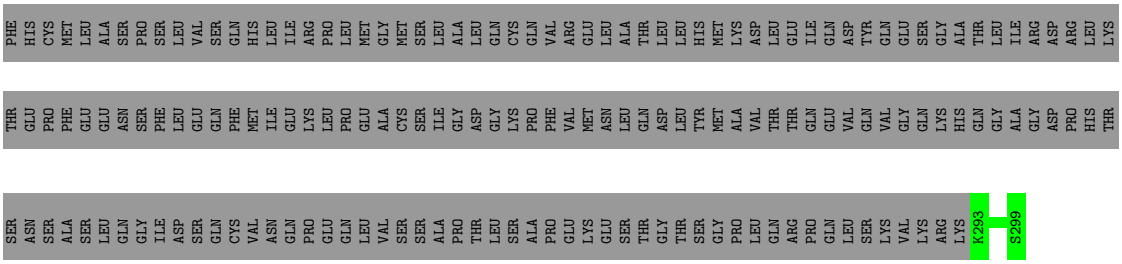


• Molecule 11: Non-homologous end-joining factor 1

Chain m:






PHE HIS CYS MET LEU ALA SER PRO SER LEU VAL SER GLN HIS LEU ILE ARG PRO LEU MET GLY MET SER LEU ALA LEU GLN CYS GLN VAL ARG GLU LEU ALA THR LEU LEU HIS MET LYS ASP LEU GLU ILE GLN ASP TYR GLN GLU SER GLY ALA THR LEU ILE ARG ASP ARG LEU LYS
THR GLU PRO PHE GLU GLU ASN SER PHE LEU GLU GLN PHE MET ILE GLU LYS LEU PRO GLU ALA CYS SER ILE GLY ASP GLY LYS PRO PHE VAL MET ASN LEU GLN ASP LEU TYR MET ALA VAL THR THR GLN GLU VAL GLN VAL GLY GLN LYS HIS GLN GLY ALA GLY ASP PRO HIS THR
SER ASN SER ALA SER LEU GLN GLY ILE ASP SER GLN CYS VAL ASN GLN PRO GLU GLN LEU VAL SER SER ALA PRO THR LEU SER ALA PRO GLU LYS GLU SER THR GLY THR SER GLY PRO LEU GLN ARG PRO GLN LEU SER LYS VAL LYS ARG LYS
K293
S299

4 Experimental information (i)

Property	Value	Source
EM reconstruction method	SINGLE PARTICLE	Depositor
Imposed symmetry	POINT, C1	Depositor
Number of particles used	30390	Depositor
Resolution determination method	FSC 0.143 CUT-OFF	Depositor
CTF correction method	PHASE FLIPPING AND AMPLITUDE CORRECTION	Depositor
Microscope	FEI TITAN KRIOS	Depositor
Voltage (kV)	300	Depositor
Electron dose ($e^-/Å^2$)	48.03	Depositor
Minimum defocus (nm)	900	Depositor
Maximum defocus (nm)	2400	Depositor
Magnification	130000	Depositor
Image detector	GATAN K3 BIOQUANTUM (6k x 4k)	Depositor
Maximum map value	0.544	Depositor
Minimum map value	-0.204	Depositor
Average map value	0.000	Depositor
Map value standard deviation	0.016	Depositor
Recommended contour level	0.045	Depositor
Map size (Å)	678.08, 678.08, 678.08	wwPDB
Map dimensions	520, 520, 520	wwPDB
Map angles (°)	90.0, 90.0, 90.0	wwPDB
Pixel spacing (Å)	1.304, 1.304, 1.304	Depositor

5 Model quality

5.1 Standard geometry

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	0.30	0/28856	0.52	1/38971 (0.0%)
1	S	0.27	0/28899	0.51	0/39012
2	B	0.29	0/4166	0.53	0/5615
2	T	0.27	0/4116	0.51	0/5547
3	C	0.27	0/5419	0.50	0/7303
3	L	0.26	0/5303	0.49	0/7147
4	D	0.26	0/1128	0.52	0/1533
4	M	0.26	0/1247	0.53	0/1695
5	G	0.25	0/1657	0.49	0/2228
5	H	0.25	0/1616	0.48	0/2170
5	P	0.24	0/1651	0.51	1/2221 (0.0%)
5	Q	0.25	0/1607	0.49	0/2159
6	I	0.25	0/2028	0.51	0/2735
6	R	0.26	0/2014	0.54	0/2719
7	d	0.76	0/577	1.20	5/890 (0.6%)
8	e	0.66	0/622	1.06	3/957 (0.3%)
9	i	0.58	0/597	0.98	0/918
10	j	0.59	0/556	1.12	2/858 (0.2%)
11	f	0.33	0/58	0.83	0/74
11	m	0.27	0/58	0.75	0/74
All	All	0.29	0/92175	0.54	12/124826 (0.0%)

There are no bond length outliers.

The worst 5 of 12 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(^{o})	Ideal(^{o})
10	j	27	DT	P-O3'-C3'	-10.06	107.62	119.70
7	d	26	DT	P-O3'-C3'	-8.78	109.16	119.70
7	d	21	DA	P-O3'-C3'	-8.30	109.74	119.70
8	e	31	DA	P-O3'-C3'	-7.35	110.88	119.70
8	e	30	DA	P-O3'-C3'	-6.77	111.58	119.70

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	28300	0	28587	1746	0
1	S	28342	0	28717	1528	0
2	B	4085	0	4143	334	0
2	T	4037	0	4105	244	0
3	C	5318	0	5327	334	0
3	L	5204	0	5210	260	0
4	D	1102	0	1098	42	0
4	M	1219	0	1197	31	0
5	G	1628	0	1620	37	0
5	H	1589	0	1587	51	0
5	P	1622	0	1609	27	0
5	Q	1580	0	1567	42	0
6	I	1984	0	1940	82	0
6	R	1970	0	1916	64	0
7	d	516	0	288	0	0
8	e	554	0	307	0	0
9	i	532	0	296	0	0
10	j	497	0	277	0	0
11	f	57	0	60	0	0
11	m	57	0	60	0	0
All	All	90193	0	89911	4601	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 27.

The worst 5 of 4601 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)
6:I:814:ARG:H	6:I:850:ALA:H	1.19	0.91
1:S:2225:HIS:HB2	1:S:2231:PHE:HB2	1.51	0.90
1:S:2461:PHE:HB3	1:S:2464:HIS:HE2	1.37	0.90
1:S:2321:GLU:HG2	1:S:2366:LYS:HE3	1.52	0.89
3:C:461:MET:HE1	3:C:522:VAL:HG12	1.55	0.88

There are no symmetry-related clashes.

5.3 Torsion angles (i)

5.3.1 Protein backbone (i)

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	3473/4128 (84%)	3140 (90%)	330 (10%)	3 (0%)	51 85
1	S	3462/4128 (84%)	3180 (92%)	280 (8%)	2 (0%)	51 85
2	B	505/609 (83%)	468 (93%)	37 (7%)	0	100 100
2	T	498/609 (82%)	468 (94%)	30 (6%)	0	100 100
3	C	660/732 (90%)	619 (94%)	41 (6%)	0	100 100
3	L	644/732 (88%)	608 (94%)	35 (5%)	1 (0%)	47 81
4	D	139/204 (68%)	132 (95%)	7 (5%)	0	100 100
4	M	160/204 (78%)	156 (98%)	4 (2%)	0	100 100
5	G	199/336 (59%)	195 (98%)	4 (2%)	0	100 100
5	H	190/336 (56%)	188 (99%)	2 (1%)	0	100 100
5	P	199/336 (59%)	196 (98%)	3 (2%)	0	100 100
5	Q	190/336 (56%)	184 (97%)	6 (3%)	0	100 100
6	I	242/911 (27%)	213 (88%)	29 (12%)	0	100 100
6	R	242/911 (27%)	215 (89%)	27 (11%)	0	100 100
11	f	5/299 (2%)	3 (60%)	2 (40%)	0	100 100
11	m	5/299 (2%)	4 (80%)	1 (20%)	0	100 100
All	All	10813/15110 (72%)	9969 (92%)	838 (8%)	6 (0%)	54 85

5 of 6 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	3304	VAL
1	S	3304	VAL
1	A	1960	LYS
3	L	236	VAL

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Mol	Chain	Res	Type
1	S	956	PRO

5.3.2 Protein sidechains (i)

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all PDB entries followed by that with respect to all EM entries.

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	3123/3671 (85%)	3100 (99%)	23 (1%)	84 90
1	S	3142/3671 (86%)	3125 (100%)	17 (0%)	88 93
2	B	455/548 (83%)	453 (100%)	2 (0%)	91 94
2	T	452/548 (82%)	449 (99%)	3 (1%)	84 90
3	C	589/649 (91%)	583 (99%)	6 (1%)	76 86
3	L	576/649 (89%)	571 (99%)	5 (1%)	78 88
4	D	116/160 (72%)	115 (99%)	1 (1%)	78 88
4	M	127/160 (79%)	127 (100%)	0	100 100
5	G	180/303 (59%)	177 (98%)	3 (2%)	60 78
5	H	177/303 (58%)	176 (99%)	1 (1%)	86 91
5	P	179/303 (59%)	177 (99%)	2 (1%)	73 84
5	Q	175/303 (58%)	173 (99%)	2 (1%)	73 84
6	I	220/808 (27%)	217 (99%)	3 (1%)	67 81
6	R	217/808 (27%)	216 (100%)	1 (0%)	88 93
11	f	6/262 (2%)	6 (100%)	0	100 100
11	m	6/262 (2%)	6 (100%)	0	100 100
All	All	9740/13408 (73%)	9671 (99%)	69 (1%)	84 90

5 of 69 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	S	2228	ARG
1	S	2891	ARG
1	S	4105	LYS
2	B	516	LYS

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Mol	Chain	Res	Type
2	B	218	ARG

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 94 such sidechains are listed below:

Mol	Chain	Res	Type
1	S	1043	GLN
1	S	2518	GLN
1	S	1146	ASN
1	S	1625	HIS
1	S	3004	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

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.

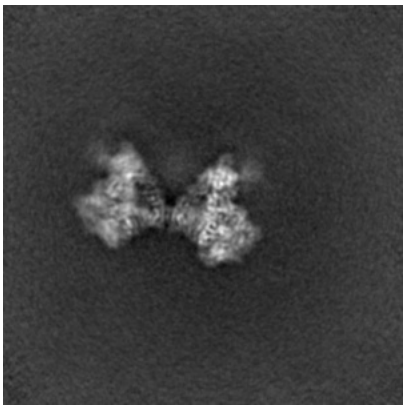
6 Map visualisation

This section contains visualisations of the EMDB entry EMD-16074. These allow visual inspection of the internal detail of the map and identification of artifacts.

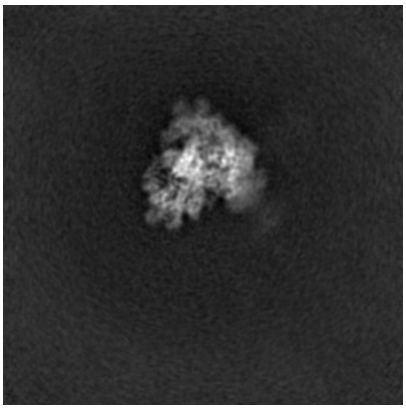
Images derived from a raw map, generated by summing the deposited half-maps, are presented below the corresponding image components of the primary map to allow further visual inspection and comparison with those of the primary map.

6.1 Orthogonal projections

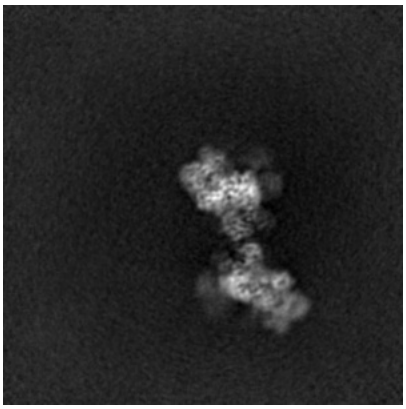
6.1.1 Primary map



X

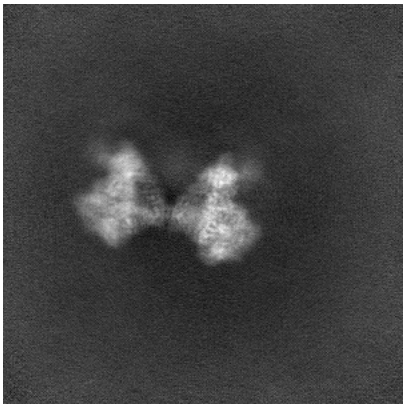


Y

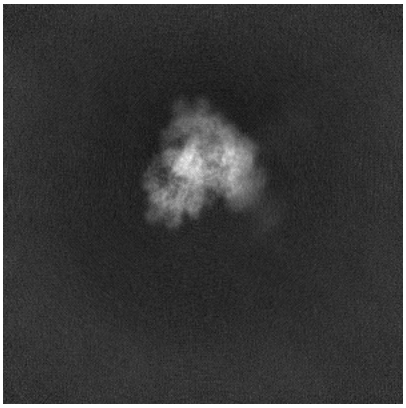


Z

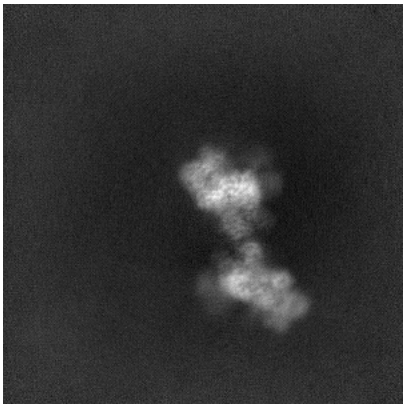
6.1.2 Raw map



X



Y

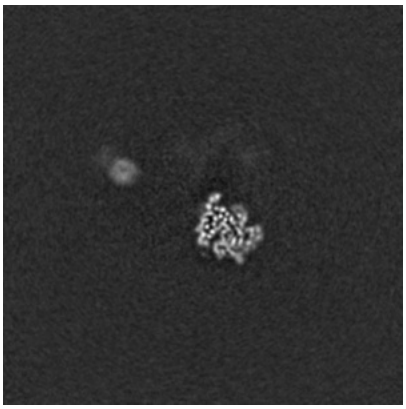


Z

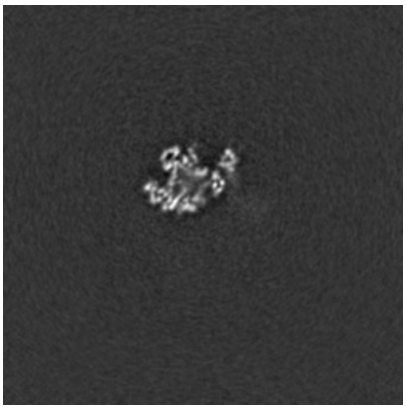
The images above show the map projected in three orthogonal directions.

6.2 Central slices (i)

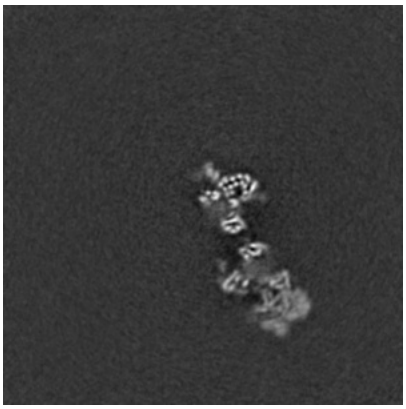
6.2.1 Primary map



X Index: 260

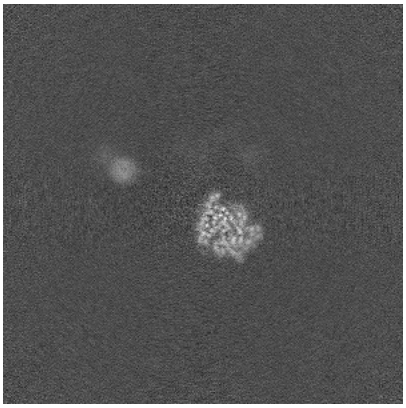


Y Index: 260

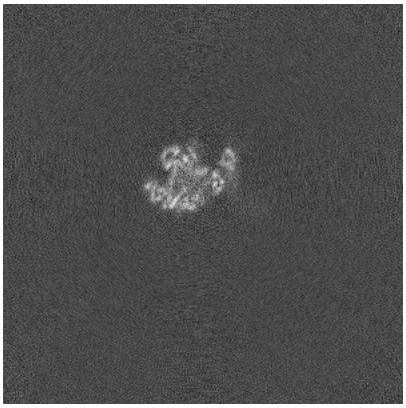


Z Index: 260

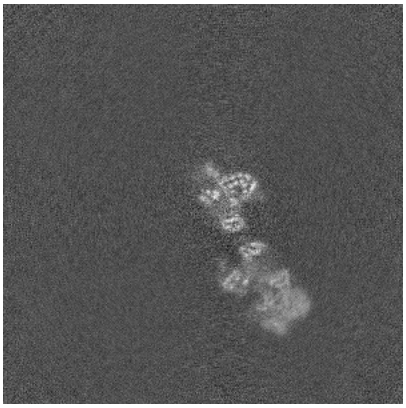
6.2.2 Raw map



X Index: 260



Y Index: 260

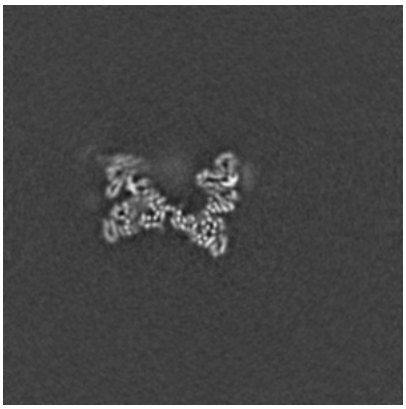


Z Index: 260

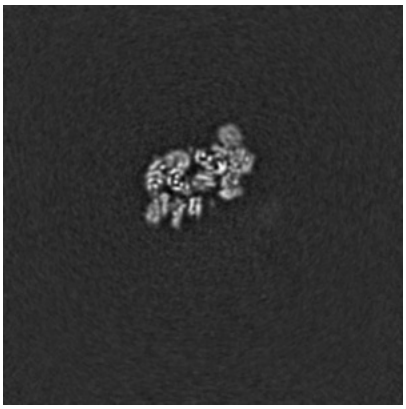
The images above show central slices of the map in three orthogonal directions.

6.3 Largest variance slices (i)

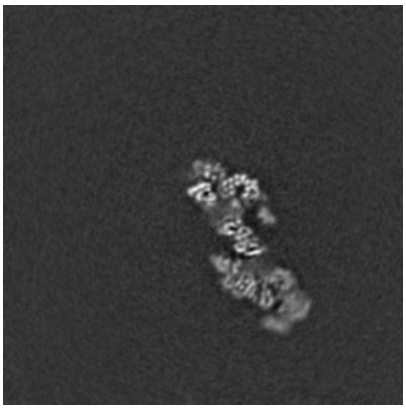
6.3.1 Primary map



X Index: 316

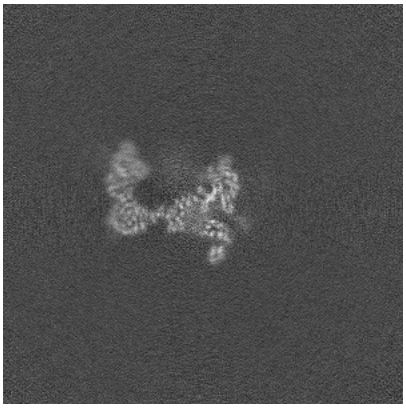


Y Index: 283

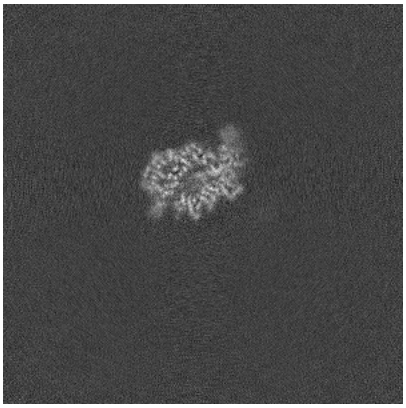


Z Index: 253

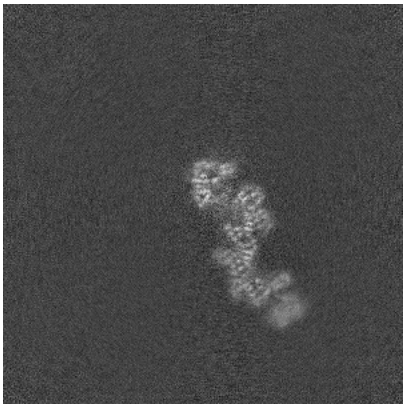
6.3.2 Raw map



X Index: 302



Y Index: 275

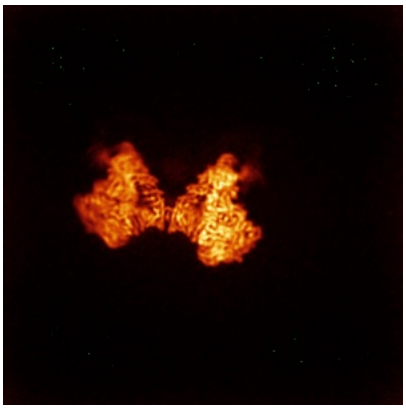


Z Index: 242

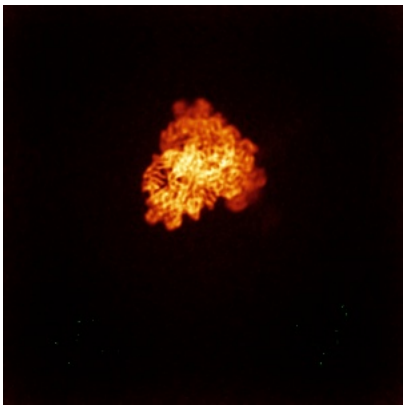
The images above show the largest variance slices of the map in three orthogonal directions.

6.4 Orthogonal standard-deviation projections (False-color) (i)

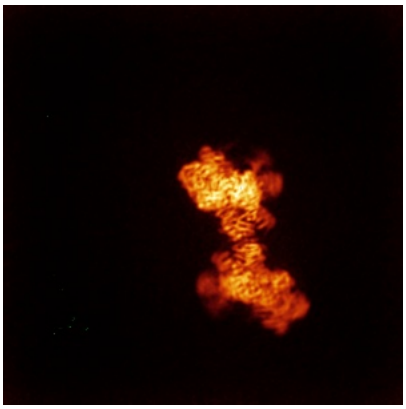
6.4.1 Primary map



X

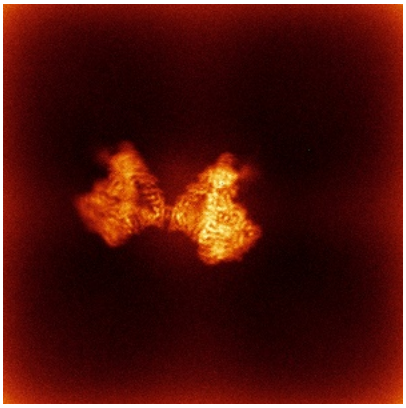


Y

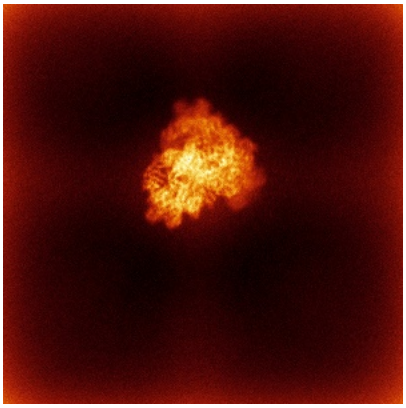


Z

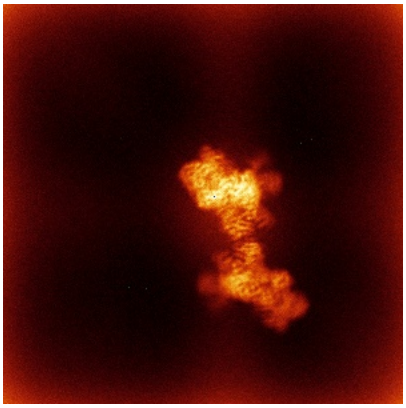
6.4.2 Raw map



X



Y



Z

The images above show the map standard deviation projections with false color in three orthogonal directions. Minimum values are shown in green, max in blue, and dark to light orange shades represent small to large values respectively.

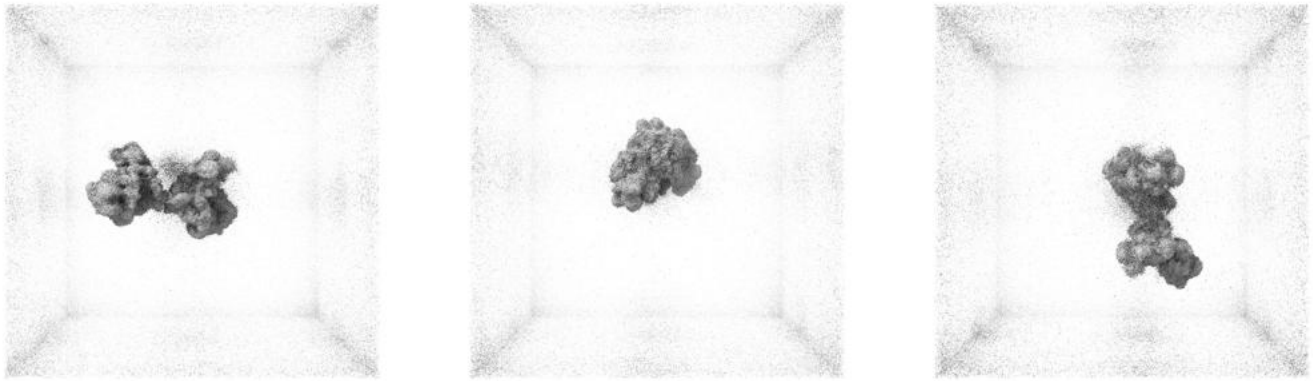
6.5 Orthogonal surface views (i)

6.5.1 Primary map

X Y Z

The images above show the 3D surface view of the map at the recommended contour level 0.045. These images, in conjunction with the slice images, may facilitate assessment of whether an appropriate contour level has been provided.

6.5.2 Raw map



X Y Z

These images show the 3D surface of the raw map. The raw map's contour level was selected so that its surface encloses the same volume as the primary map does at its recommended contour level.

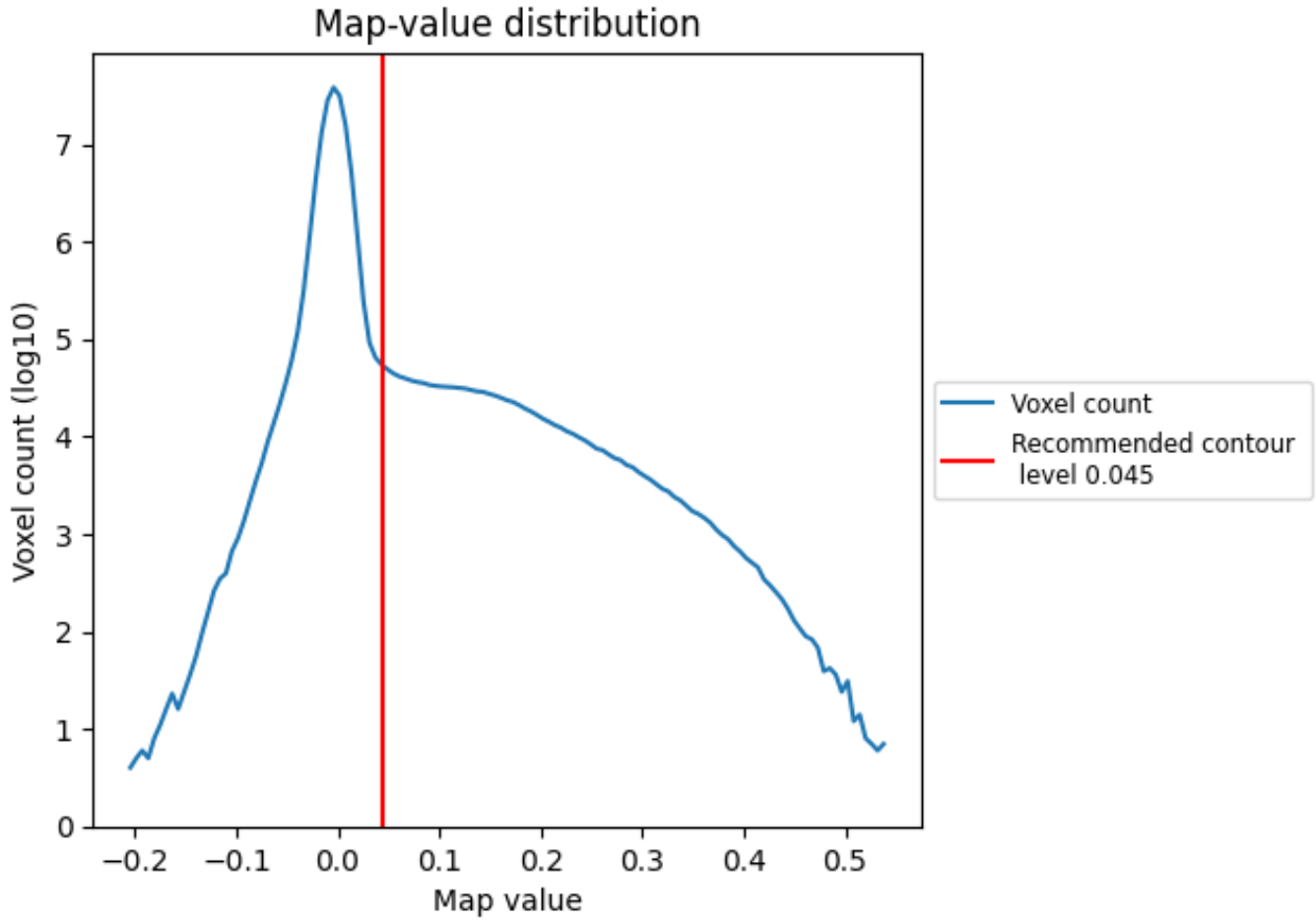
6.6 Mask visualisation (i)

This section was not generated. No masks/segmentation were deposited.

7 Map analysis

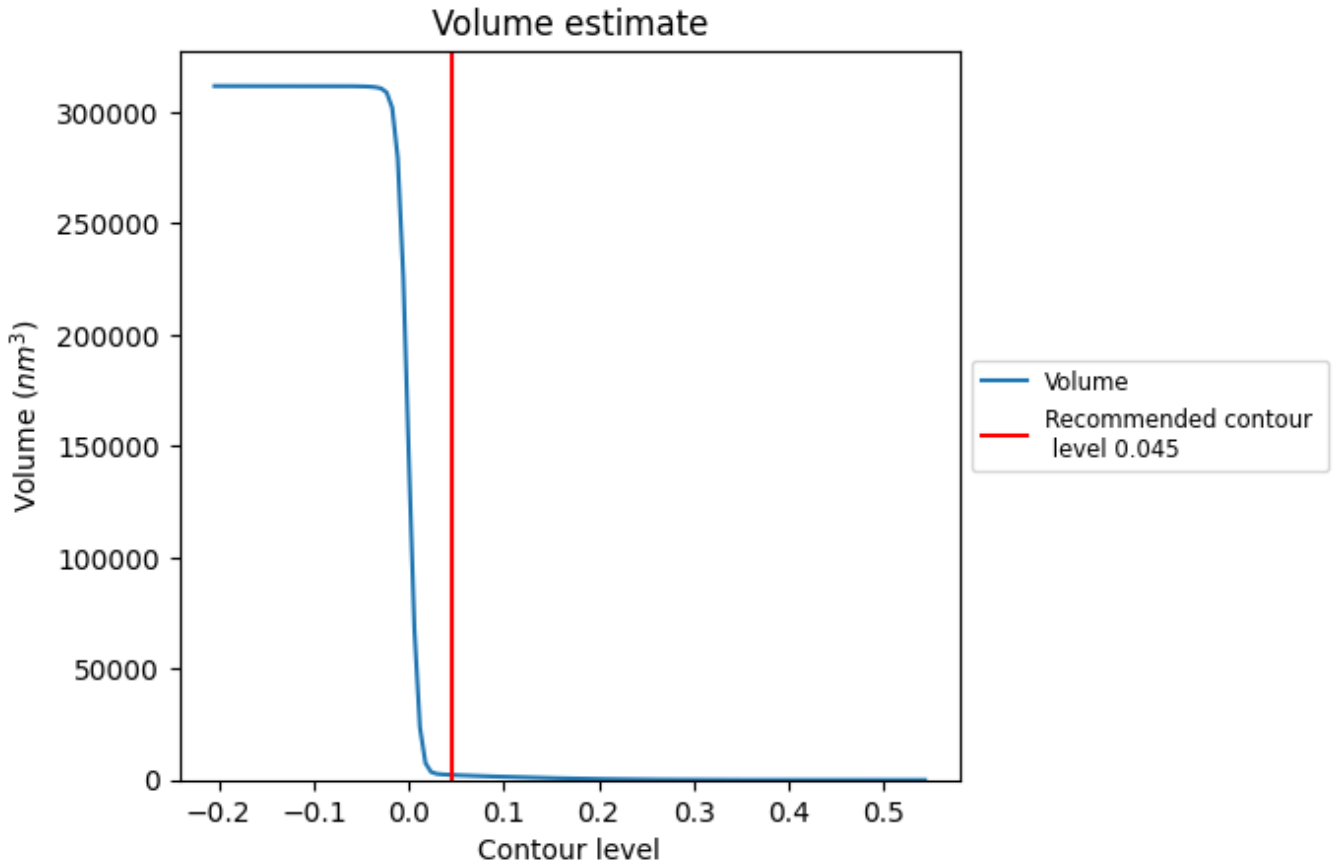
This section contains the results of statistical analysis of the map.

7.1 Map-value distribution



The map-value distribution is plotted in 128 intervals along the x-axis. The y-axis is logarithmic. A spike in this graph at zero usually indicates that the volume has been masked.

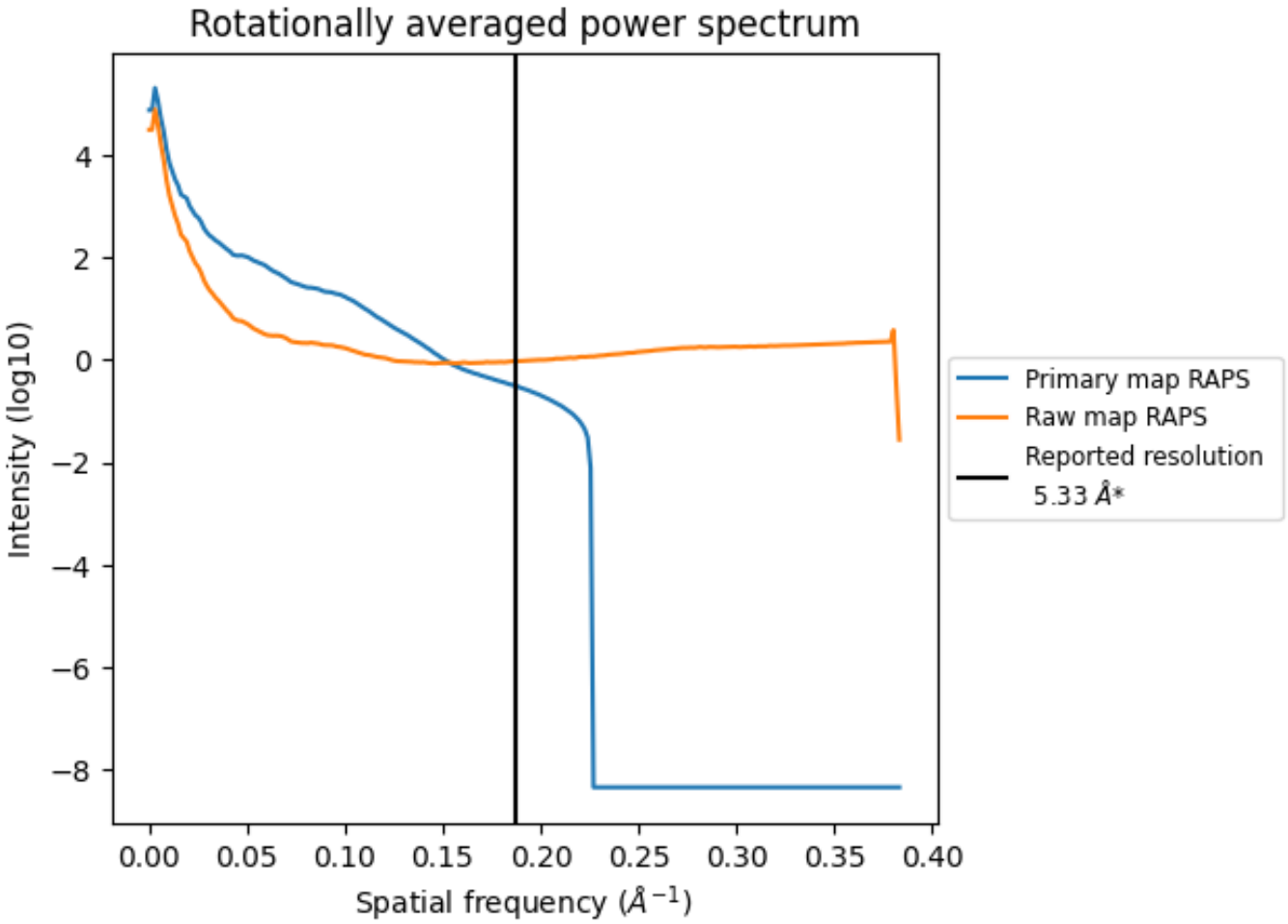
7.2 Volume estimate (i)



The volume at the recommended contour level is 2267 nm^3; this corresponds to an approximate mass of 2048 kDa.

The volume estimate graph shows how the enclosed volume varies with the contour level. The recommended contour level is shown as a vertical line and the intersection between the line and the curve gives the volume of the enclosed surface at the given level.

7.3 Rotationally averaged power spectrum (i)

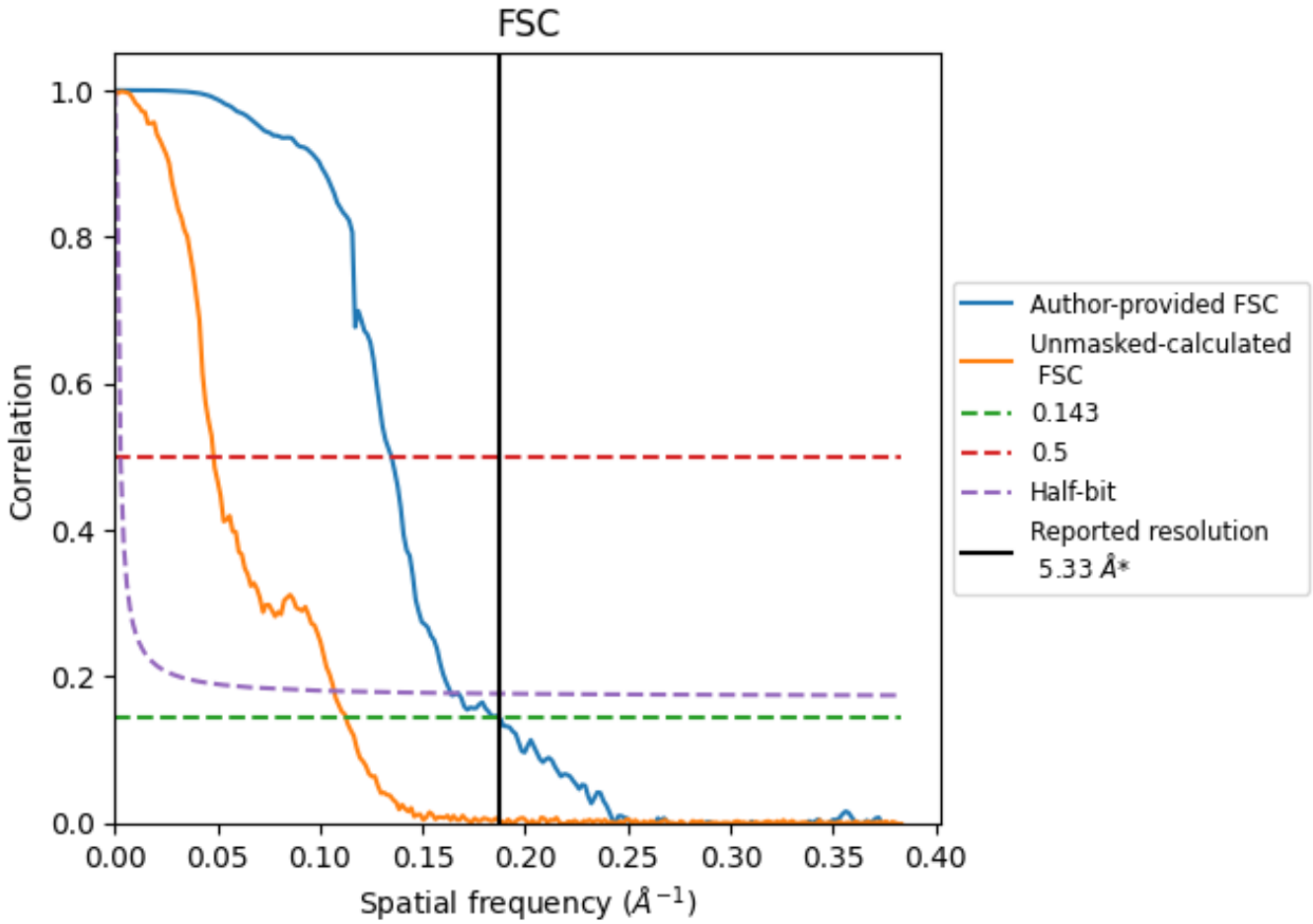


*Reported resolution corresponds to spatial frequency of 0.188 Å^{-1}

8 Fourier-Shell correlation

Fourier-Shell Correlation (FSC) is the most commonly used method to estimate the resolution of single-particle and subtomogram-averaged maps. The shape of the curve depends on the imposed symmetry, mask and whether or not the two 3D reconstructions used were processed from a common reference. The reported resolution is shown as a black line. A curve is displayed for the half-bit criterion in addition to lines showing the 0.143 gold standard cut-off and 0.5 cut-off.

8.1 FSC



*Reported resolution corresponds to spatial frequency of 0.188 Å^{-1}

8.2 Resolution estimates (i)

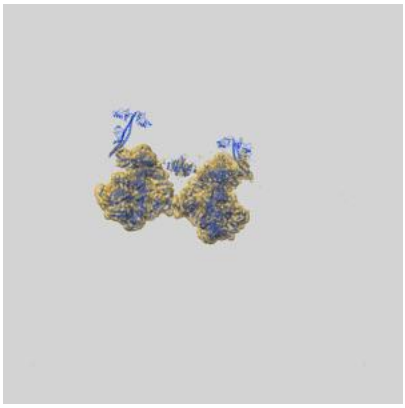
Resolution estimate (Å)	Estimation criterion (FSC cut-off)		
	0.143	0.5	Half-bit
Reported by author	5.33	-	-
Author-provided FSC curve	5.33	7.42	6.10
Unmasked-calculated*	8.88	20.79	9.35

*Resolution estimate based on FSC curve calculated by comparison of deposited half-maps. The value from deposited half-maps intersecting FSC 0.143 CUT-OFF 8.88 differs from the reported value 5.33 by more than 10 %

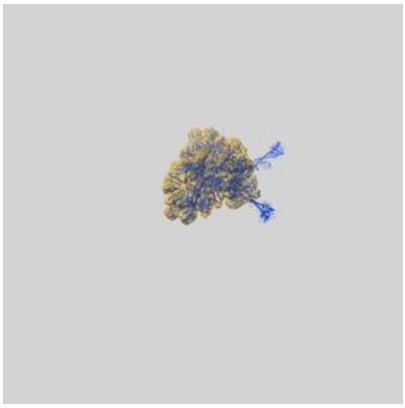
9 Map-model fit

This section contains information regarding the fit between EMDB map EMD-16074 and PDB model 8BHY. Per-residue inclusion information can be found in section 3 on page 7.

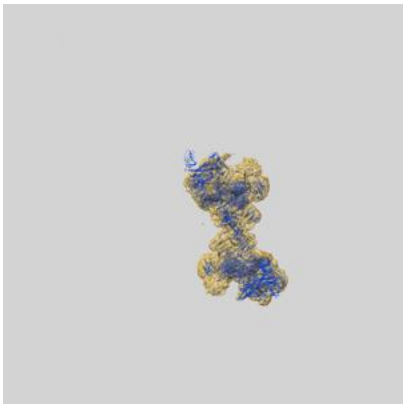
9.1 Map-model overlay



X



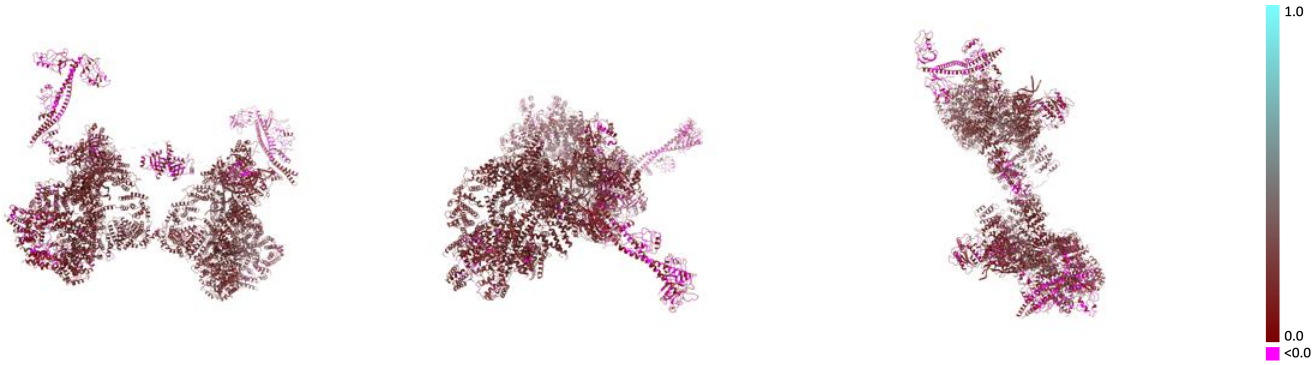
Y



Z

The images above show the 3D surface view of the map at the recommended contour level 0.045 at 50% transparency in yellow overlaid with a ribbon representation of the model coloured in blue. These images allow for the visual assessment of the quality of fit between the atomic model and the map.

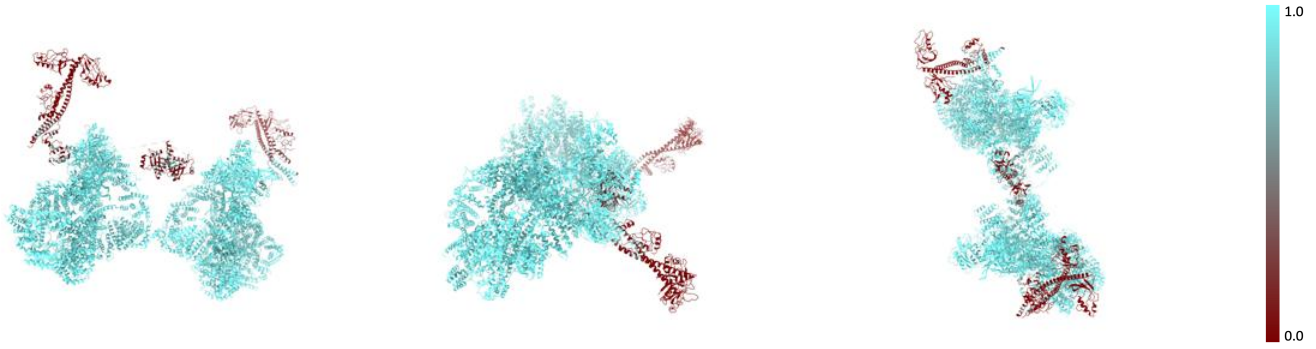
9.2 Q-score mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according its Q-score. This shows their resolvability in the map with higher Q-score values reflecting better resolvability. Please note: Q-score is calculating the resolvability of atoms, and thus high values are only expected at resolutions at which atoms can be resolved. Low Q-score values may therefore be expected for many entries.

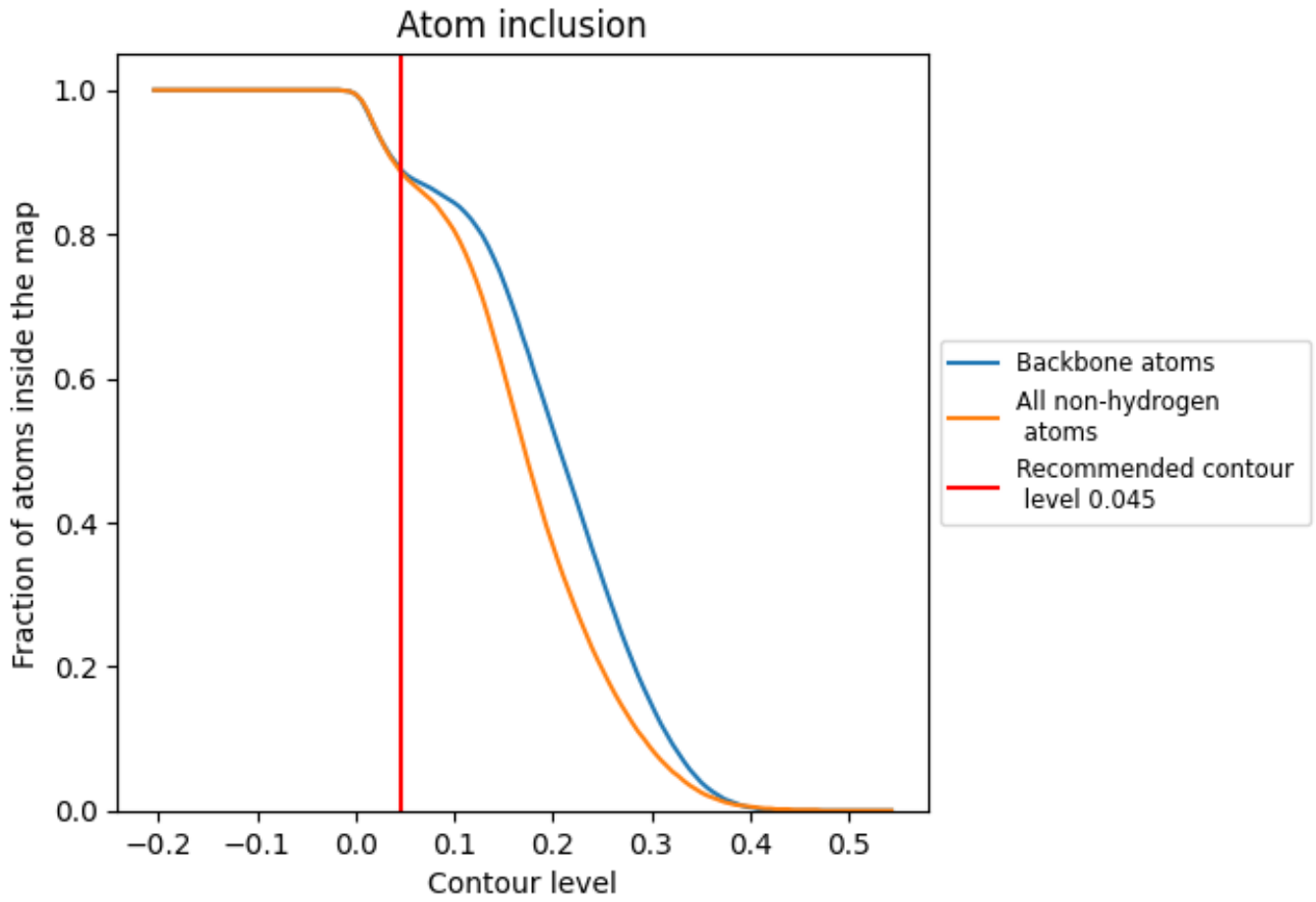
9.3 Atom inclusion mapped to coordinate model (i)



X Y Z

The images above show the model with each residue coloured according to its atom inclusion. This shows to what extent they are inside the map at the recommended contour level (0.045).

9.4 Atom inclusion (i)



At the recommended contour level, 89% of all backbone atoms, 89% of all non-hydrogen atoms, are inside the map.

9.5 Map-model fit summary

The table lists the average atom inclusion at the recommended contour level (0.045) and Q-score for the entire model and for each chain.

Chain	Atom inclusion	Q-score
All	0.8880	0.1660
A	0.9940	0.1980
B	0.9970	0.2050
C	0.9930	0.1680
D	0.3220	0.0840
G	0.1640	0.0630
H	0.1830	0.0900
I	0.5710	0.1120
L	0.9970	0.1310
M	0.3140	0.0980
P	0.0650	0.0810
Q	0.0430	0.0600
R	0.1750	0.0790
S	0.9950	0.1680
T	0.9970	0.1550
d	1.0000	0.2620
e	1.0000	0.2710
f	0.9820	0.0580
i	1.0000	0.2200
j	1.0000	0.2340
m	1.0000	0.0260