



wwPDB X-ray Structure Validation Summary Report ⓘ

Mar 9, 2024 – 11:15 PM EST

PDB ID : 3VKG
Title : X-ray structure of an MTBD truncation mutant of dynein motor domain
Authors : Kon, T.; Oyama, T.; Shimo-Kon, R.; Suto, K.; Kurisu, G.
Deposited on : 2011-11-16
Resolution : 2.81 Å(reported)

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

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A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

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

MolProbity : 4.02b-467
Mogul : 1.8.5 (274361), CSD as541be (2020)
Xtriage (Phenix) : 1.13
EDS : 2.36
buster-report : 1.1.7 (2018)
Percentile statistics : 20191225.v01 (using entries in the PDB archive December 25th 2019)
Refmac : 5.8.0158
CCP4 : 7.0.044 (Gargrove)
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.36

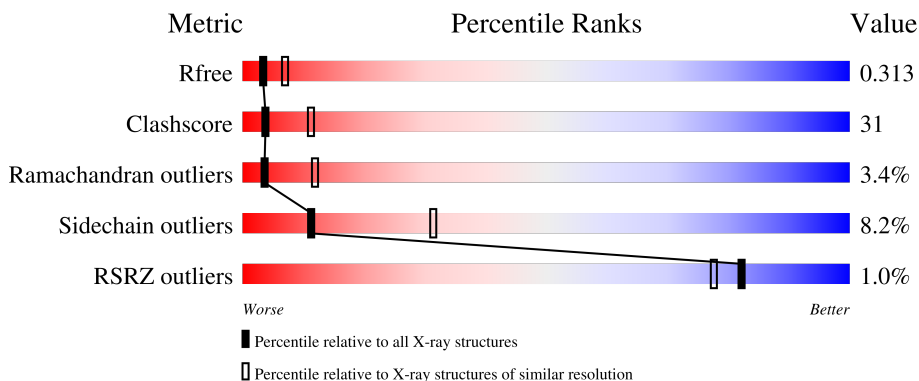
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 2.81 Å.

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



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	130704	3617 (2.84-2.80)
Clashscore	141614	4060 (2.84-2.80)
Ramachandran outliers	138981	3978 (2.84-2.80)
Sidechain outliers	138945	3980 (2.84-2.80)
RSRZ outliers	127900	3552 (2.84-2.80)

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	3245	
1	B	3245	

2 Entry composition [i](#)

There are 5 unique types of molecules in this entry. The entry contains 45284 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 Dynein heavy chain, cytoplasmic.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
			Total	C	N	O	S			
1	A	2954	22821	14585	3870	4270	96	0	0	0
1	B	2853	22146	14131	3745	4174	96	0	0	0

There are 52 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
A	1364	MET	-	expression tag	UNP P34036
A	1365	THR	-	expression tag	UNP P34036
A	1366	ARG	-	expression tag	UNP P34036
A	1367	HIS	-	expression tag	UNP P34036
A	1368	HIS	-	expression tag	UNP P34036
A	1369	HIS	-	expression tag	UNP P34036
A	1370	HIS	-	expression tag	UNP P34036
A	1371	HIS	-	expression tag	UNP P34036
A	1372	HIS	-	expression tag	UNP P34036
A	1373	GLY	-	expression tag	UNP P34036
A	1374	GLY	-	expression tag	UNP P34036
A	1375	GLY	-	expression tag	UNP P34036
A	1376	ASP	-	expression tag	UNP P34036
A	1377	TYR	-	expression tag	UNP P34036
A	1378	LYS	-	expression tag	UNP P34036
A	1379	ASP	-	expression tag	UNP P34036
A	1380	ASP	-	expression tag	UNP P34036
A	1381	ASP	-	expression tag	UNP P34036
A	1382	ASP	-	expression tag	UNP P34036
A	1383	LYS	-	expression tag	UNP P34036
A	1384	GLY	-	expression tag	UNP P34036
A	1385	GLY	-	expression tag	UNP P34036
A	1386	GLY	-	expression tag	UNP P34036
A	1387	LYS	-	expression tag	UNP P34036
A	3494	THR	-	linker	UNP P34036

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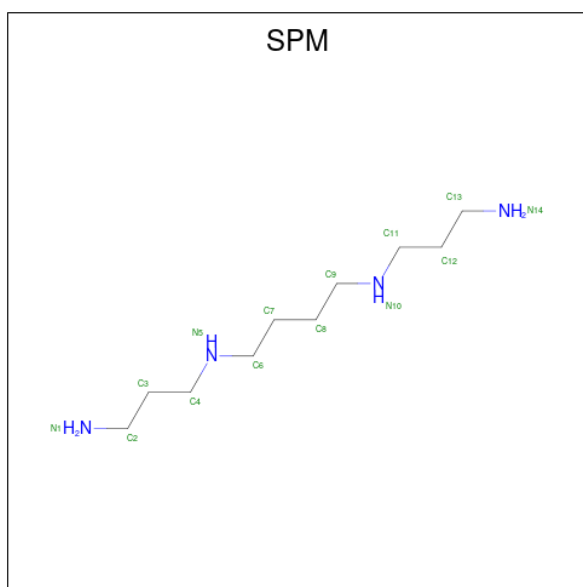
Chain	Residue	Modelled	Actual	Comment	Reference
A	3495	GLY	-	linker	UNP P34036
B	1364	MET	-	expression tag	UNP P34036
B	1365	THR	-	expression tag	UNP P34036
B	1366	ARG	-	expression tag	UNP P34036
B	1367	HIS	-	expression tag	UNP P34036
B	1368	HIS	-	expression tag	UNP P34036
B	1369	HIS	-	expression tag	UNP P34036
B	1370	HIS	-	expression tag	UNP P34036
B	1371	HIS	-	expression tag	UNP P34036
B	1372	HIS	-	expression tag	UNP P34036
B	1373	GLY	-	expression tag	UNP P34036
B	1374	GLY	-	expression tag	UNP P34036
B	1375	GLY	-	expression tag	UNP P34036
B	1376	ASP	-	expression tag	UNP P34036
B	1377	TYR	-	expression tag	UNP P34036
B	1378	LYS	-	expression tag	UNP P34036
B	1379	ASP	-	expression tag	UNP P34036
B	1380	ASP	-	expression tag	UNP P34036
B	1381	ASP	-	expression tag	UNP P34036
B	1382	ASP	-	expression tag	UNP P34036
B	1383	LYS	-	expression tag	UNP P34036
B	1384	GLY	-	expression tag	UNP P34036
B	1385	GLY	-	expression tag	UNP P34036
B	1386	GLY	-	expression tag	UNP P34036
B	1387	LYS	-	expression tag	UNP P34036
B	3494	THR	-	linker	UNP P34036
B	3495	GLY	-	linker	UNP P34036

- Molecule 2 is ADENOSINE-5'-DIPHOSPHATE (three-letter code: ADP) (formula: $C_{10}H_{15}N_5O_{10}P_2$).



Mol	Chain	Residues	Atoms					ZeroOcc	AltConf
			Total	C	N	O	P		
2	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	A	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		
2	B	1	Total	C	N	O	P	0	0
			27	10	5	10	2		

- Molecule 3 is SPERMINE (three-letter code: SPM) (formula: C₁₀H₂₆N₄).



Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
3	A	1	Total C N 14 10 4	0	0
3	A	1	Total C N 14 10 4	0	0
3	B	1	Total C N 14 10 4	0	0
3	B	1	Total C N 14 10 4	0	0

- Molecule 4 is MAGNESIUM ION (three-letter code: MG) (formula: Mg).

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
4	A	1	Total Mg 1 1	0	0
4	B	2	Total Mg 2 2	0	0

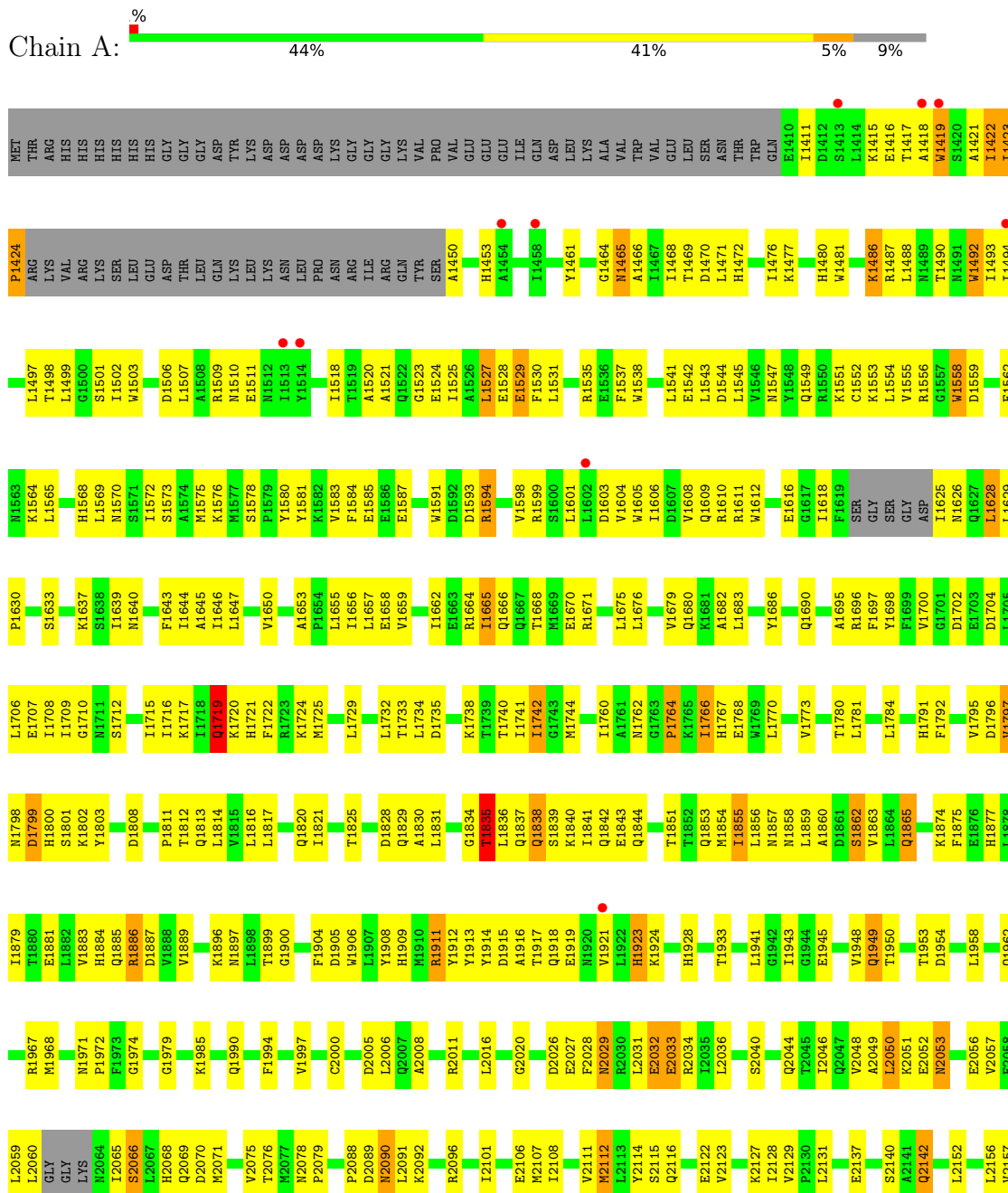
- Molecule 5 is water.

Mol	Chain	Residues	Atoms	ZeroOcc	AltConf
5	A	23	Total O 23 23	0	0
5	B	19	Total O 19 19	0	0

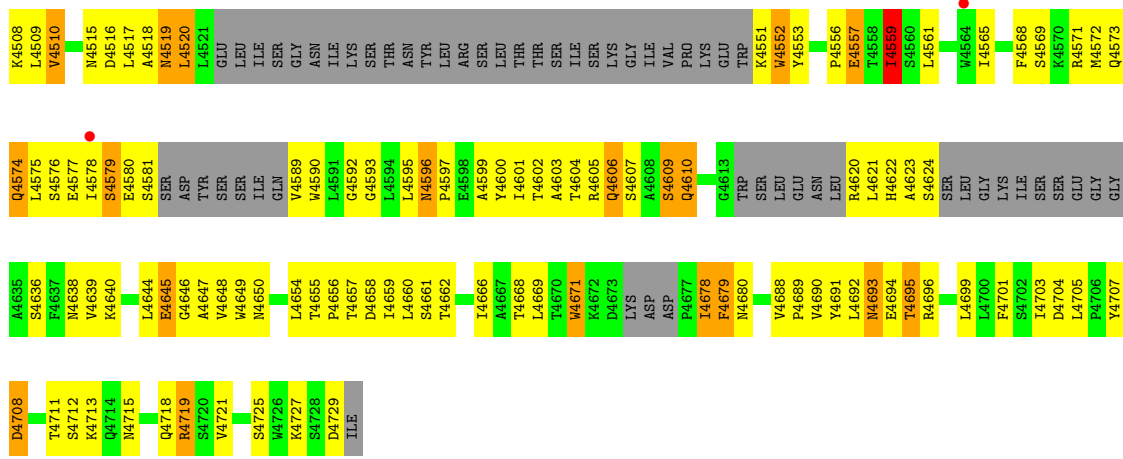
3 Residue-property plots

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.

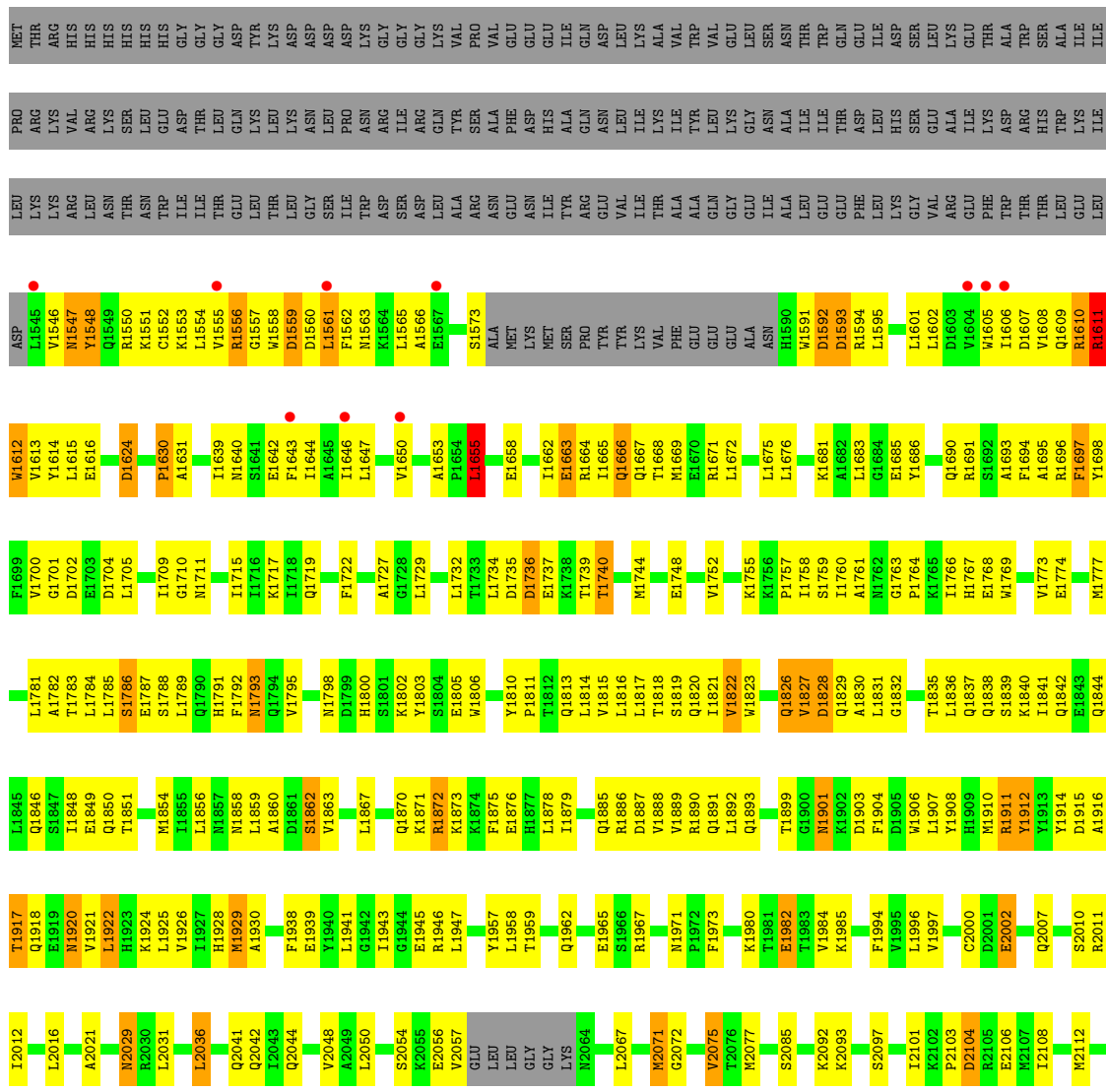
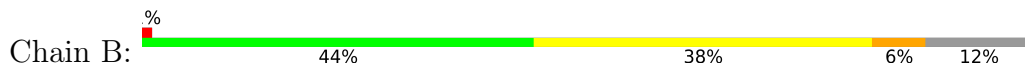
● Molecule 1: Dynein heavy chain, cytoplasmic



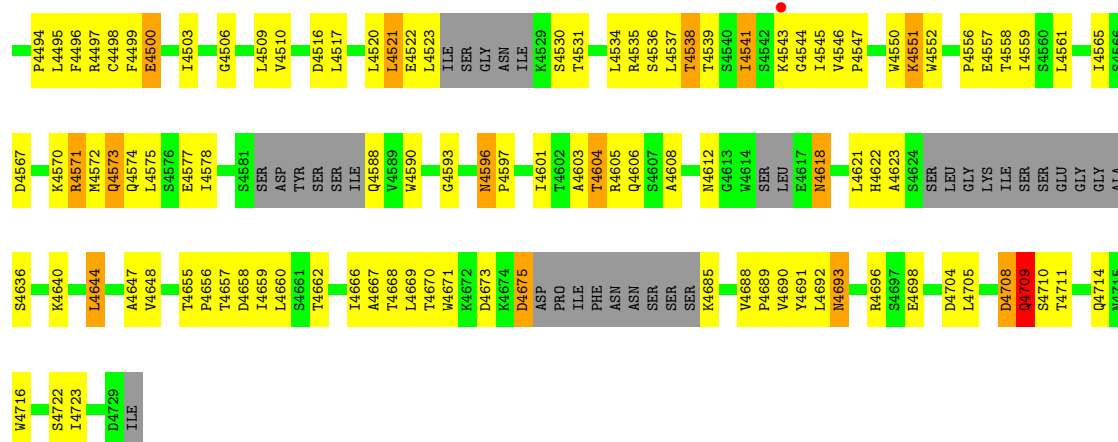
L3170	R3086	L3013	S2875	G2790	S2688	R2543	Q2398	T3208	L2162
D3171	M3087	L3014	P2876	A2791	L2689	S2644	D2399	D3209	K2289
W3172	N3088	I3015	R2877	C2792	N2700	L2545	L2400	D3229	P2169
E3175	N3089	G3016	E2878	N2793	F2701	V2546	K2401	L2331	G1N
L3091	L3090	S3017	L2879	S2702	N2705	N2547	Y2402	R2337	LEU
P3178	L3091	S3018	S2880	T2796	T2705	V2548	T2404	R2338	PRO
E3179	S2983	R2881	R2881	R2797	T2706	E2580	L2405	I3339	PRO
A3180	L2956	R2884	A2885	A2798	P2707	E2551	L2408	I3340	ILE
V3184	L2957	A2886	L2886	R2800	E2708	N2552	N2341	K2252	THR
G3185	L2957	L2887	L2886	T2804	L2711	Q2553	E2257	E2257	D2176
S3186	L3025	L2887	L2886	T2805	L2711	A2554	S2409	K2258	A2177
E3187	S3026	E2888	E2888	R2806	F2714	L2554	W2443	I2259	E2178
F3188	R3027	A2889	A2889	R2806	F2714	W2560	W2414	L2260	S2179
T3189	F3028	L2890	L2890	F2807	H2717	Q2565	W2416	Q2261	K2180
M3109	L2962	L2808	L2808	T2638	C2718	S2566	F2451	H2263	L2186
L3192	R2965	R2809	R2809	H2639	C2718	S2567	L2421	H2263	Y187
D3193	R2965	R2809	R2809	H2639	C2718	Y2568	T2422	H2263	C2188
L3194	S2966	L2813	L2813	T2723	T2723	M2571	T2423	L2266	Q2189
E3195	E2967	L2814	L2814	P2724	P2724	R2572	Q2424	W2267	Y2190
N3196	R2969	L2815	L2815	S2725	S2725	R2572	M2425	H2270	E2191
P3197	R2969	P2819	P2819	G2726	G2726	L2573	L2426	G2271	I2192
Q3198	ASP	E2805	E2805	E2727	E2727	L2574	P2360	V2272	G2193
I3199	TTR	H2806	H2806	T2728	T2728	V2575	D2360	M2273	P2361
I3200	GLN	R2806	R2806	L2728	L2728	Y2575	E2362	L2274	V2194
A3201	L2962	F2807	F2807	L2728	L2728	M2578	W2363	L2196	L2195
P3202	L2962	L2808	L2808	R2731	R2731	M2578	W2363	W2275	I2196
P3203	L2962	R2809	R2809	L2739	L2739	V2579	D2432	W2286	I2197
V3204	L2962	R2809	R2809	D2652	D2652	G2580	E2365	E2287	S2198
Q3207	L2962	F2831	F2831	T2653	T2653	L2581	E2365	K2282	I2199
L3211	L2962	M2832	M2832	V2741	V2741	G2582	L2434	T2284	W2200
MET	GLU	L2835	L2835	I2746	I2746	M2585	H2436	T2284	W2200
GLY	GLU	M2836	M2836	N2747	N2747	G2586	E2437	S2285	W2203
ASN	LEU	L2839	L2839	L2748	L2748	G2587	P2438	E2286	W2203
ASN	ASP	L2839	L2839	P2749	P2749	L2587	D2372	W2287	L2204
L3216	ASP	R2843	R2843	S2750	S2750	V2588	D2372	E2287	P2205
L3219	L2988	E2844	E2844	T2751	T2751	R2589	D2440	Y2288	P2205
P3220	L2988	F2844	F2844	T2756	T2756	R2590	Q2442	L2290	K2206
P3221	L2988	A2846	A2846	R2757	R2757	E2591	E2443	L2207	L2207
S3222	L2988	D2847	D2847	R2758	R2758	E2591	Q2446	V2209	V2209
H3223	L2988	M2848	M2848	V2759	V2759	E2591	Q2446	A2292	D2210
A3226	L2988	E2855	E2855	I2760	I2760	E2591	Q2446	E2291	D2211
V3227	L2988	F2856	F2856	T2761	T2761	E2591	Q2446	E2291	I2212
V3228	L2988	F2856	F2856	T2761	T2761	E2591	Q2446	E2291	I2212
Y3233	L2988	E2855	E2855	I2760	I2760	E2591	Q2446	E2291	I2212
I3234	L2988	F2856	F2856	T2761	T2761	E2591	Q2446	E2291	I2212
T3237	L2988	F2856	F2856	T2761	T2761	E2591	Q2446	E2291	I2212
I3238	L2988	F2856	F2856	T2761	T2761	E2591	Q2446	E2291	I2212
A3241	L2988	F2856	F2856	T2761	T2761	E2591	Q2446	E2291	I2212
N3242	L2988	F2856	F2856	T2761	T2761	E2591	Q2446	E2291	I2212
L3246	L2988	F2856	F2856	T2761	T2761	E2591	Q2446	E2291	I2212



● Molecule 1: Dynein heavy chain, cytoplasmic



F3152	R3086	G3019	V2941	A2662	E2745	L2839	V2941	A2662	E2745	L2839	G3019	R3086	F3152
R3157	M3087	K3022	L2942	P2640	L2746	P2840	N2842	P2840	L2746	P2840	M3043	M3087	R3157
S3158	N3088	S3023	L2943	N2841	N2747	N2841	L2748	E2666	L2748	E2666	N3044	N3088	R3157
A3159	T3091	L3024	A2945	R2843	R2749	R2843	P2750	R2667	R2749	R2667	N3045	T3091	A3159
T3160	L3091	L3025	L2946	S2844	S2750	S2844	R2668	P2669	S2750	P2669	F3028	L3091	T3160
S3161	A3092	F3028	K2947	F2845	T2751	F2845	L2670	L2670	T2751	L2670	V3029	A3092	S3161
A3163	G3093	V3029	F2948	N2848	T2756	N2848	P2676	P2676	T2756	P2676	A3030	G3093	A3163
L3164	E3095	A3030	L2950	Q2861	Q2757	Q2861	R2532	R2532	Q2757	R2532	E3095	E3095	L3164
F3165	VAL	W3031	L2951	Q2862	R2758	Q2862	A2601	P2388	R2758	P2388	P3032	VAL	F3165
R3166	GLY	M3032	Y2952	R2863	W2759	R2863	L2534	N2390	W2759	N2390	G3033	GLY	R3166
L3170	LEU	G3033	Y2960	F2864	L2761	F2864	T2688	L2688	L2761	L2688	L3034	LEU	L3170
D3171	PHE	L3035	Q2961	T2865	F2762	T2865	R2689	R2689	F2762	R2689	L3035	PHE	D3171
F3172	E3101	S3036	P2962	P2866	L2763	P2866	A2690	A2690	L2763	A2690	S3036	E3101	F3172
F3173	G3102	I3037	V2963	V2691	Q2766	V2691	P2692	P2692	Q2766	P2692	I3037	G3102	F3173
G3174	E3104	Y3038	N2964	Q2869	M2766	Q2869	A2870	D2693	M2766	A2870	Y3038	E3104	G3174
E3175	F3105	V3042	S2966	H2871	E2768	H2871	E2694	F2694	E2768	F2694	V3042	F3105	E3175
Q3183	T3106	M3043	D2967	Y2872	W2773	Y2872	E2695	E2695	W2773	E2695	M3043	T3106	Q3183
W3184	A3107	N3044	L2968	I2873	R2774	I2873	L2612	L2612	R2774	L2612	N3044	A3107	W3184
G3185	L3108	N3045	R2969	Y2874	R2775	Y2874	D2614	D2614	R2775	D2614	G3185	L3108	G3185
S3186	H3110	Y3046	E2970	S2875	T2775	S2875	V2549	V2549	T2775	V2549	S3186	H3110	S3186
E3187	A3111	K3047	Y2971	R2876	L2781	R2876	S2616	S2616	L2781	S2616	E3187	A3111	E3187
F3188	C3112	S3049	K2973	R2877	T2782	R2877	E2617	E2617	T2782	E2617	F3188	C3112	F3188
T3189	I3113	D3050	D2974	D2883	L2783	D2883	S2618	S2618	L2783	S2618	T3189	I3113	T3189
N3190	E3114	F3051	L2975	R2884	R2784	R2884	I2619	I2619	R2784	I2619	N3190	E3114	N3190
N3191	D3052	N3191	R2976	K2785	K2785	K2785	D2620	D2620	K2785	D2620	N3191	D3052	N3191
L3192	A3116	D3053	K2977	L2786	Q2786	L2786	H2655	H2655	Q2786	H2655	L3192	A3116	L3192
R3193	Q3117	D3054	E2978	E2888	Q2787	E2888	A2622	A2622	Q2787	A2622	R3193	Q3117	R3193
L3194	R3118	L3055	E2982	A2889	F2788	A2889	M2623	M2623	F2788	M2623	L3194	R3118	L3194
E3195	ASN	R3056	E2983	I2890	F2714	I2890	W2624	W2624	F2714	W2624	E3195	ASN	E3195
F3205	GLY	M3057	L2984	Q2891	A2791	Q2891	S2625	S2625	A2791	S2625	F3205	GLY	F3205
L3206	LEU	L3058	D2985	C2792	C2792	C2792	L2626	L2626	C2792	L2626	L3206	LEU	L3206
Q3207	ILE	L3059	Y2986	L2904	P2794	L2904	W2627	W2627	P2794	W2627	Q3207	ILE	Q3207
E3210	LEU	K3060	Y2987	H2907	F2795	H2907	E2634	E2634	F2795	E2634	E3210	LEU	E3210
M3211	ASP	R3061	L2990	E2907	T2796	E2907	S2630	S2630	T2796	S2630	M3211	ASP	M3211
N3212	E3126	G3062	F2991	E2909	D2797	E2909	N2667	N2667	D2797	N2667	N3212	E3126	N3212
GLY	C3064	K3063	L2995	L2910	A2798	L2910	Y2668	Y2668	A2798	Y2668	GLY	C3064	GLY
ASN	E3128	K3065	D2996	R2911	Q2799	R2911	L2429	L2429	Q2799	L2429	ASN	E3128	ASN
LEU	L3129	E3066	H2997	L2913	R2800	L2913	Q2431	Q2431	R2800	Q2431	LEU	L3129	LEU
R3217	Y3150	E3067	L2998	F2913	V2801	F2913	D2452	D2452	V2801	D2452	R3217	Y3150	R3217
A3218	K3131	K3068	L2999	H2916	H2810	H2916	E2433	E2433	H2810	E2433	A3218	K3131	A3218
I3219	F3133	I3069	R3000	L2917	A2811	L2917	E2497	E2497	A2811	E2497	I3219	F3133	I3219
P3220	T3134	C3070	R3003	V2918	P2812	V2918	C2498	C2498	P2812	C2498	P3220	T3134	P3220
H3223	F3073	F3073	U3004	R2731	S2823	F3073	I2801	I2801	S2823	I2801	H3223	F3073	H3223
R3224	D3074	D3074	Q3009	P2732	P2732	D3074	L2578	L2578	P2732	L2578	R3224	D3074	R3224
D3225	N3077	N3077	G3010	R2925	V2925	N3077	W2580	W2580	V2925	W2580	D3225	N3077	D3225
A3226	V3078	V3078	H3011	K2928	Q2734	V3078	G2582	G2582	Q2734	G2582	A3226	V3078	A3226
V3232	A3080	E3080	L3013	H2938	W2738	E3080	M2584	M2584	W2738	M2584	V3232	A3080	V3232
Y3233	F3083	F3083	L3014	P2938	L2739	F3083	M2585	M2585	L2739	M2585	Y3233	F3083	Y3233
L3234	V3144	V3144	V3017	K2836	V2740	V3144	G2586	G2586	V2740	G2586	L3234	V3144	L3234
H3235	T3146	E3085	S3018	L2838	V2741	E3085	V2588	V2588	V2741	V2588	H3235	T3146	H3235



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	204.26Å 221.81Å 192.90Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	96.45 – 2.81 96.45 – 2.81	Depositor EDS
% Data completeness (in resolution range)	98.0 (96.45-2.81) 98.1 (96.45-2.81)	Depositor EDS
R_{merge}	0.09	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	2.31 (at 2.82Å)	Xtrriage
Refinement program	CNS 1.3	Depositor
R, R_{free}	0.262 , 0.319 0.255 , 0.313	Depositor DCC
R_{free} test set	10425 reflections (4.98%)	wwPDB-VP
Wilson B-factor (Å ²)	52.6	Xtrriage
Anisotropy	0.144	Xtrriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.29 , 55.3	EDS
L-test for twinning ²	$\langle L \rangle = 0.50$, $\langle L^2 \rangle = 0.33$	Xtrriage
Estimated twinning fraction	No twinning to report.	Xtrriage
F_o, F_c correlation	0.89	EDS
Total number of atoms	45284	wwPDB-VP
Average B, all atoms (Å ²)	52.0	wwPDB-VP

Xtrriage's analysis on translational NCS is as follows: *The largest off-origin peak in the Patterson function is 1.79% 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: MG, ADP, SPM

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	0.50	0/23297	0.67	0/31692
1	B	0.47	0/22599	0.67	3/30724 (0.0%)
All	All	0.48	0/45896	0.67	3/62416 (0.0%)

There are no bond length outliers.

All (3) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	B	2376	LEU	CA-CB-CG	6.25	129.68	115.30
1	B	4054	GLY	N-CA-C	-5.92	98.30	113.10
1	B	3219	ILE	C-N-CD	-5.09	109.41	120.60

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	22821	0	21998	1375	0
1	B	22146	0	21438	1397	0
2	A	108	0	48	14	0
2	B	108	0	48	9	0
3	A	28	0	52	2	0
3	B	28	0	52	5	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
4	A	1	0	0	0	0
4	B	2	0	0	0	0
5	A	23	0	0	1	0
5	B	19	0	0	1	0
All	All	45284	0	43636	2766	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 31.

The worst 5 of 2766 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:A:3330:ASP:HB3	1:A:3532:TYR:HE2	1.12	1.12
1:A:2902:VAL:HG21	1:A:2941:VAL:HG21	1.31	1.12
1:A:3766:THR:HG22	1:A:3768:ASP:H	1.14	1.09
1:A:2548:VAL:HG11	1:A:2565:GLN:HE21	1.20	1.06
1:B:1655:LEU:H	1:B:1655:LEU:HD22	1.20	1.05

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 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	2908/3245 (90%)	2474 (85%)	332 (11%)	102 (4%)	3	11
1	B	2813/3245 (87%)	2376 (84%)	347 (12%)	90 (3%)	4	13
All	All	5721/6490 (88%)	4850 (85%)	679 (12%)	192 (3%)	3	12

5 of 192 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	1465	ASN
1	A	1583	VAL
1	A	1797	VAL
1	A	1835	THR
1	A	1839	SER

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 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	2408/2921 (82%)	2220 (92%)	188 (8%)	12	33
1	B	2369/2921 (81%)	2163 (91%)	206 (9%)	10	28
All	All	4777/5842 (82%)	4383 (92%)	394 (8%)	11	31

5 of 394 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	B	2185	GLN
1	B	3051	PHE
1	B	2254	GLU
1	B	2603	THR
1	B	3280	GLU

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 210 such sidechains are listed below:

Mol	Chain	Res	Type
1	B	1813	GLN
1	B	2495	GLN
1	B	4362	GLN
1	B	1857	ASN
1	B	2110	GLN

5.3.3 RNA [i](#)

There are no RNA molecules in this entry.

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

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

5.5 Carbohydrates [i](#)

There are no monosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 15 ligands modelled in this entry, 3 are monoatomic - leaving 12 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
2	ADP	A	9002	4	24,29,29	1.39	3 (12%)	29,45,45	1.58	5 (17%)
2	ADP	B	9008	4	24,29,29	1.43	3 (12%)	29,45,45	1.51	6 (20%)
2	ADP	A	9001	-	24,29,29	1.25	3 (12%)	29,45,45	1.57	6 (20%)
3	SPM	B	9018	-	13,13,13	0.57	0	12,12,12	0.86	0
3	SPM	B	9022	-	13,13,13	0.41	0	12,12,12	0.96	0
2	ADP	A	9004	-	24,29,29	1.16	2 (8%)	29,45,45	1.55	5 (17%)
2	ADP	B	9009	-	24,29,29	1.34	2 (8%)	29,45,45	1.47	6 (20%)
3	SPM	A	9016	-	13,13,13	0.53	0	12,12,12	0.89	0
2	ADP	A	9003	-	24,29,29	1.36	3 (12%)	29,45,45	1.58	6 (20%)
3	SPM	A	9012	-	13,13,13	0.60	0	12,12,12	0.82	0
2	ADP	B	9007	4	24,29,29	1.07	3 (12%)	29,45,45	1.60	5 (17%)
2	ADP	B	9010	-	24,29,29	1.08	1 (4%)	29,45,45	1.52	3 (10%)

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	ADP	A	9002	4	-	5/12/32/32	0/3/3/3

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Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	ADP	B	9008	4	-	4/12/32/32	0/3/3/3
2	ADP	A	9001	-	-	5/12/32/32	0/3/3/3
3	SPM	B	9018	-	-	8/11/11/11	-
3	SPM	B	9022	-	-	7/11/11/11	-
2	ADP	A	9004	-	-	3/12/32/32	0/3/3/3
2	ADP	B	9009	-	-	6/12/32/32	0/3/3/3
3	SPM	A	9016	-	-	11/11/11/11	-
2	ADP	A	9003	-	-	6/12/32/32	0/3/3/3
3	SPM	A	9012	-	-	6/11/11/11	-
2	ADP	B	9007	4	-	5/12/32/32	0/3/3/3
2	ADP	B	9010	-	-	6/12/32/32	0/3/3/3

The worst 5 of 20 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	B	9009	ADP	C5-C4	3.11	1.49	1.40
2	B	9008	ADP	C2-N3	3.02	1.37	1.32
2	B	9008	ADP	C5-C4	2.94	1.48	1.40
2	A	9002	ADP	C2-N3	2.91	1.36	1.32
2	A	9004	ADP	C5-C4	2.88	1.48	1.40

The worst 5 of 42 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	B	9007	ADP	N3-C2-N1	-4.83	121.13	128.68
2	A	9003	ADP	N3-C2-N1	-4.49	121.67	128.68
2	A	9001	ADP	N3-C2-N1	-4.36	121.86	128.68
2	A	9002	ADP	N3-C2-N1	-4.25	122.03	128.68
2	B	9008	ADP	N3-C2-N1	-4.16	122.17	128.68

There are no chirality outliers.

5 of 72 torsion outliers are listed below:

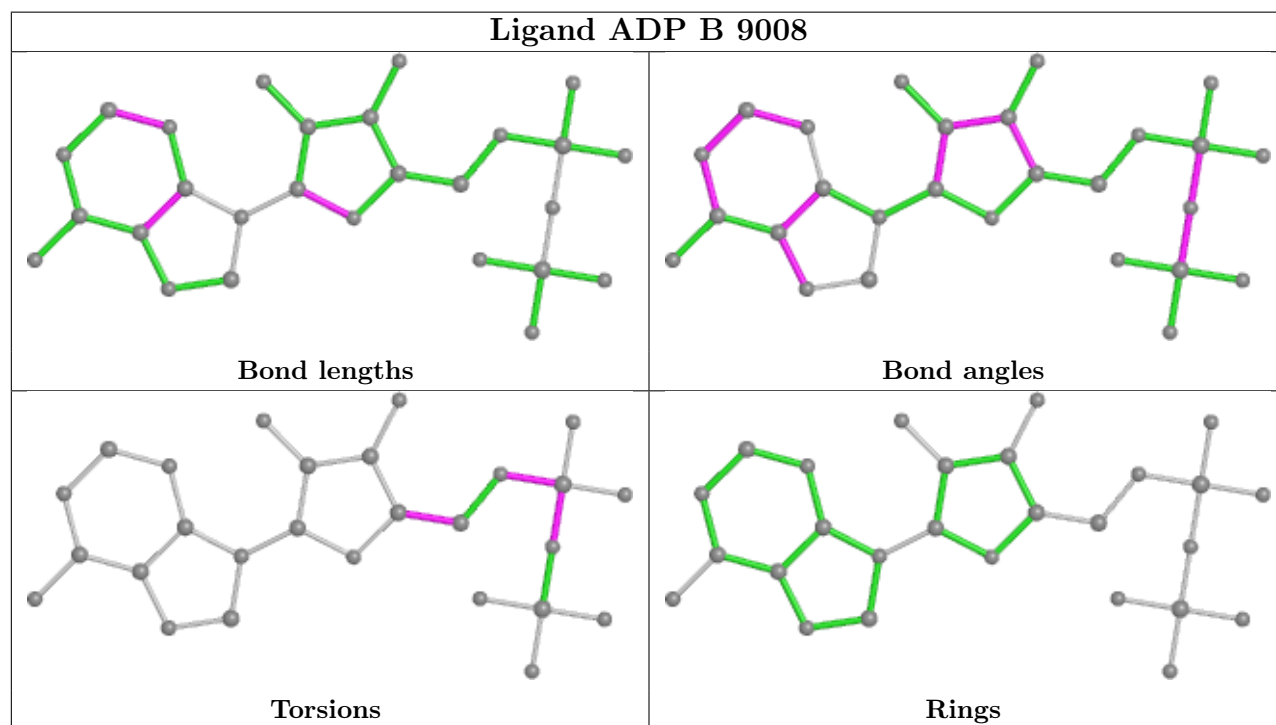
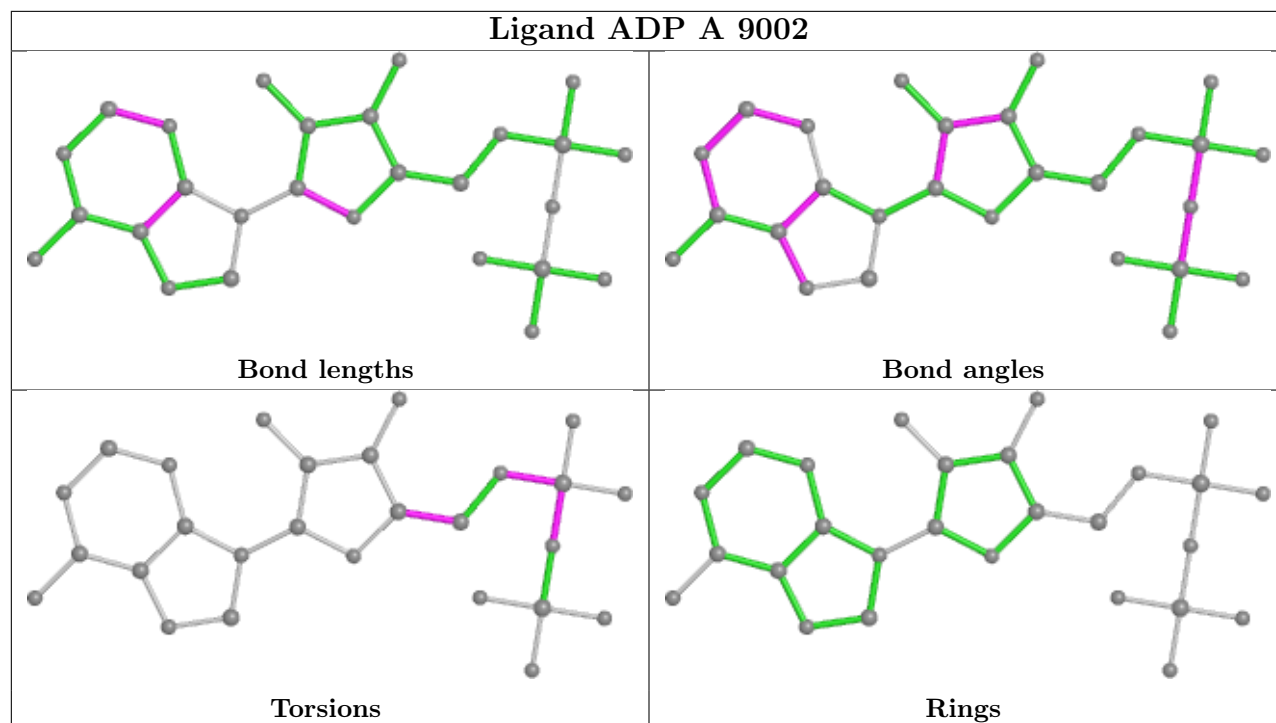
Mol	Chain	Res	Type	Atoms
2	A	9001	ADP	C5'-O5'-PA-O1A
2	A	9001	ADP	C5'-O5'-PA-O2A
2	A	9002	ADP	C5'-O5'-PA-O3A
2	A	9003	ADP	C5'-O5'-PA-O1A
2	A	9003	ADP	C5'-O5'-PA-O2A

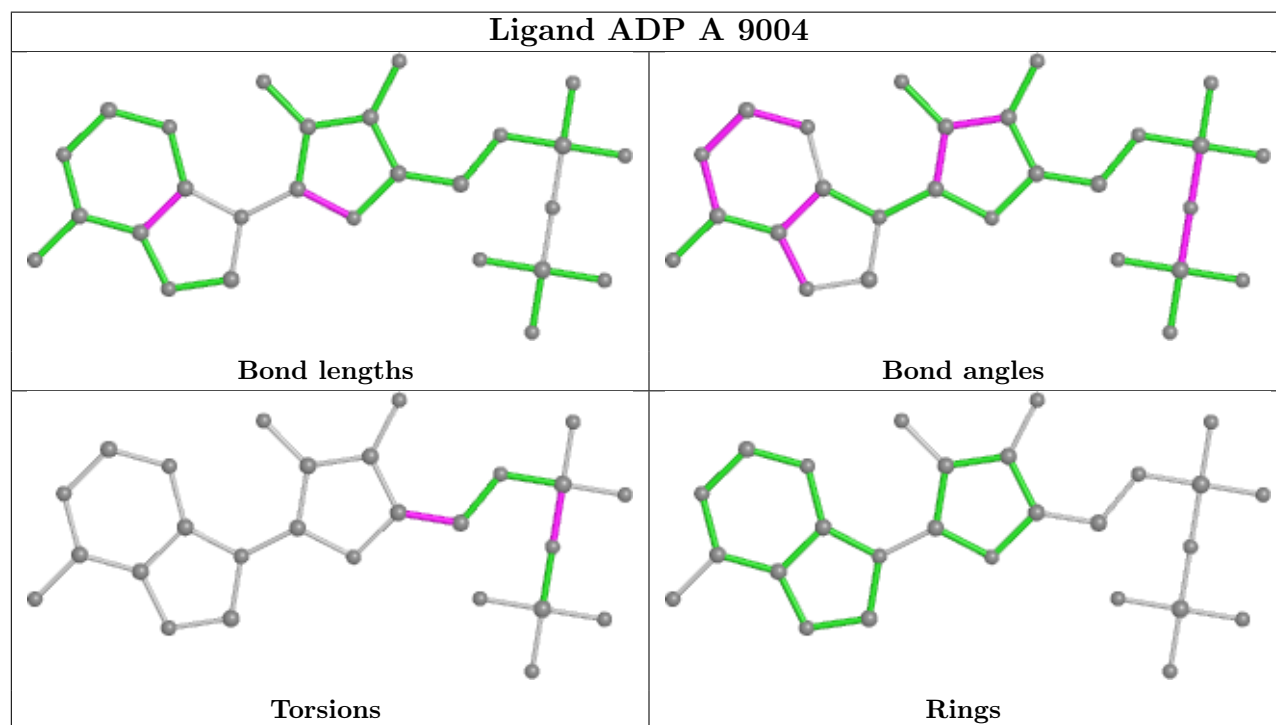
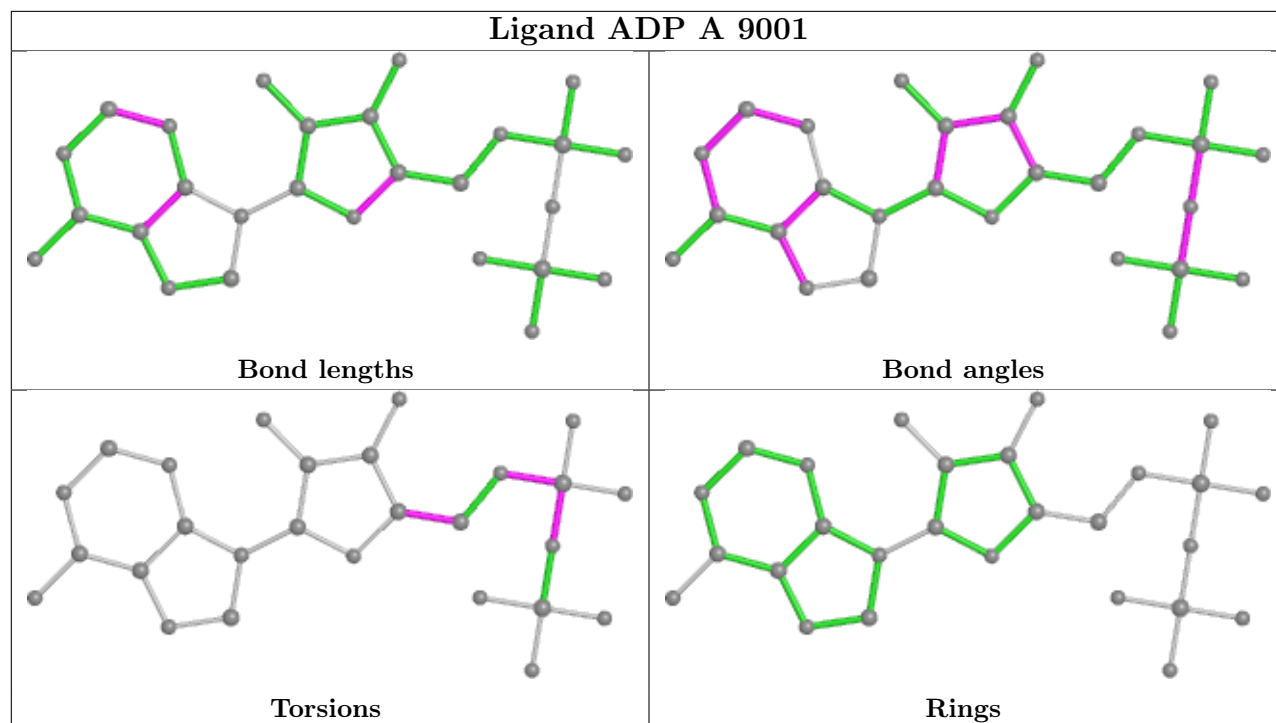
There are no ring outliers.

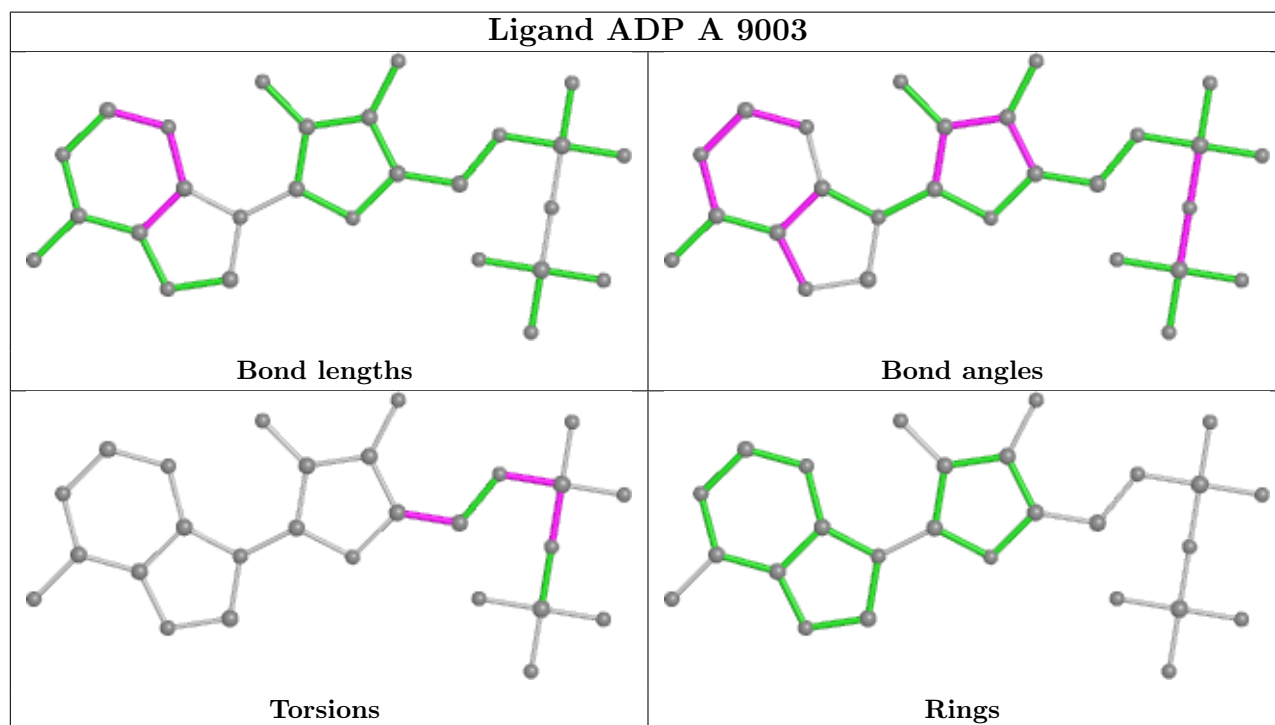
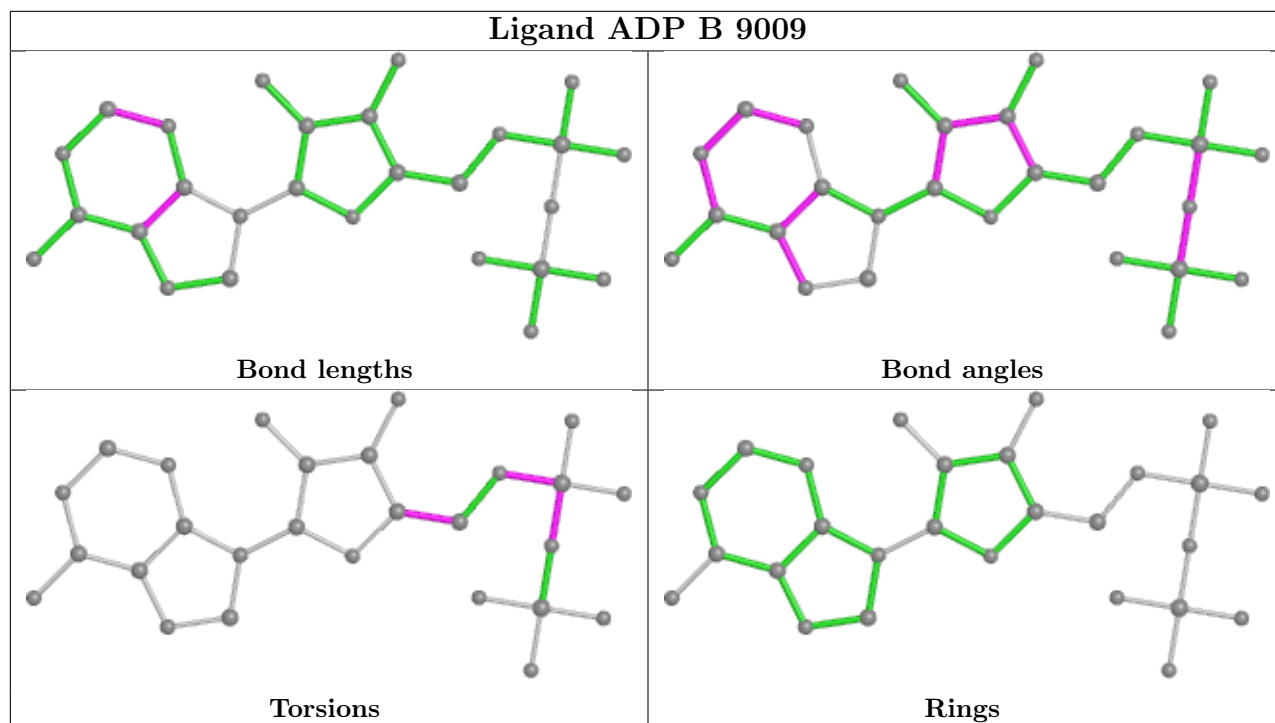
12 monomers are involved in 30 short contacts:

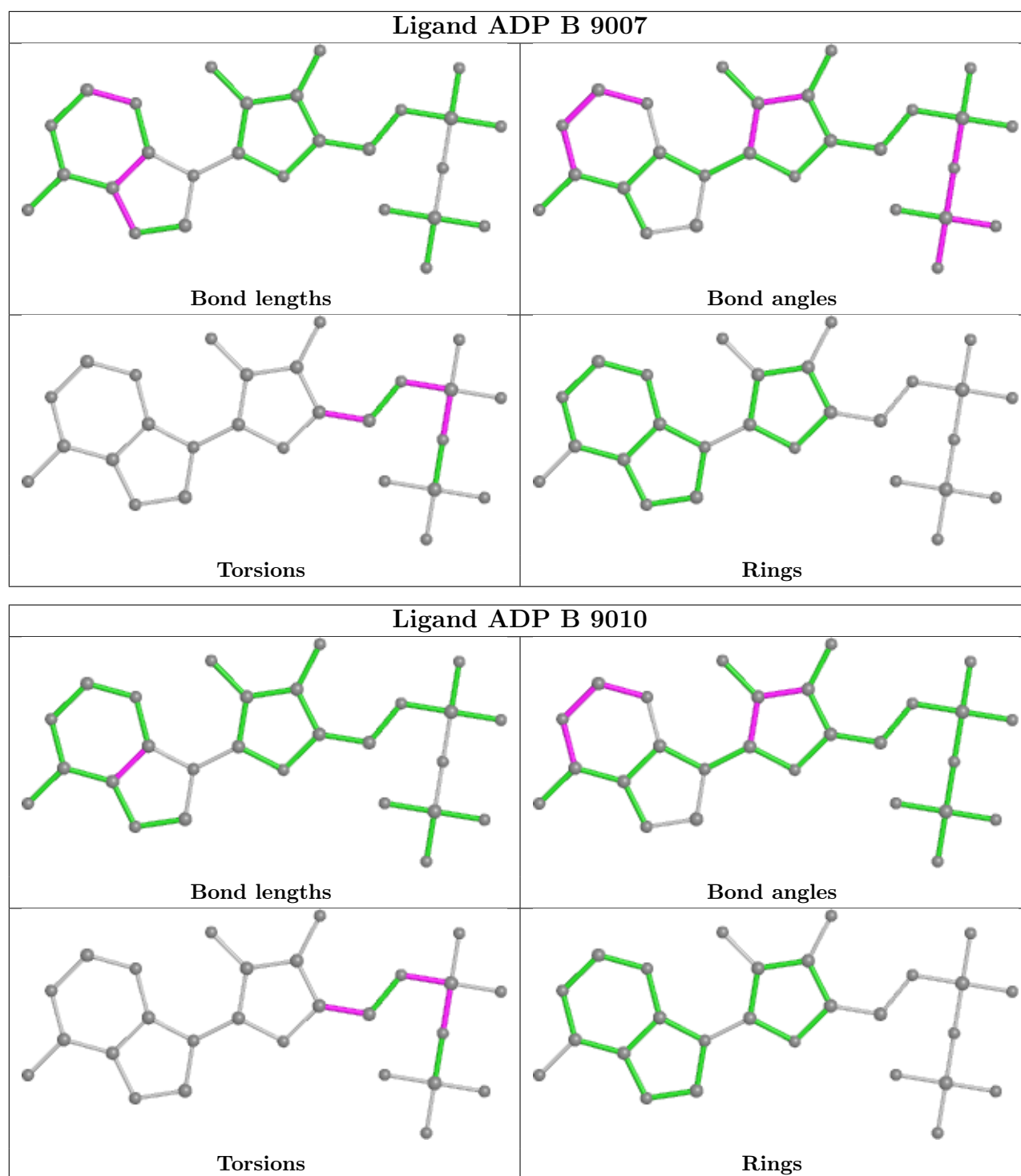
Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	9002	ADP	3	0
2	B	9008	ADP	2	0
2	A	9001	ADP	1	0
3	B	9018	SPM	2	0
3	B	9022	SPM	3	0
2	A	9004	ADP	6	0
2	B	9009	ADP	2	0
3	A	9016	SPM	1	0
2	A	9003	ADP	4	0
3	A	9012	SPM	1	0
2	B	9007	ADP	2	0
2	B	9010	ADP	3	0

The following is a two-dimensional graphical depiction of Mogul quality analysis of bond lengths, bond angles, torsion angles, and ring geometry for all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the validation Tables will also be included. For torsion angles, if less than 5% of the Mogul distribution of torsion angles is within 10 degrees of the torsion angle in question, then that torsion angle is considered an outlier. Any bond that is central to one or more torsion angles identified as an outlier by Mogul will be highlighted in the graph. For rings, the root-mean-square deviation (RMSD) between the ring in question and similar rings identified by Mogul is calculated over all ring torsion angles. If the average RMSD is greater than 60 degrees and the minimal RMSD between the ring in question and any Mogul-identified rings is also greater than 60 degrees, then that ring is considered an outlier. The outliers are highlighted in purple. The color gray indicates Mogul did not find sufficient equivalents in the CSD to analyse the geometry.









5.7 Other polymers [\(i\)](#)

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 [i](#)

6.1 Protein, DNA and RNA chains [i](#)

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	2954/3245 (91%)	-0.03	32 (1%) 80 75	17, 53, 78, 102	0
1	B	2853/3245 (87%)	-0.08	25 (0%) 84 80	24, 52, 75, 100	0
All	All	5807/6490 (89%)	-0.05	57 (0%) 82 77	17, 52, 77, 102	0

The worst 5 of 57 RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	A	1494	ILE	4.2
1	B	1643	PHE	3.8
1	B	1605	TRP	3.5
1	A	4191	HIS	3.2
1	B	1555	VAL	3.0

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

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

6.3 Carbohydrates [i](#)

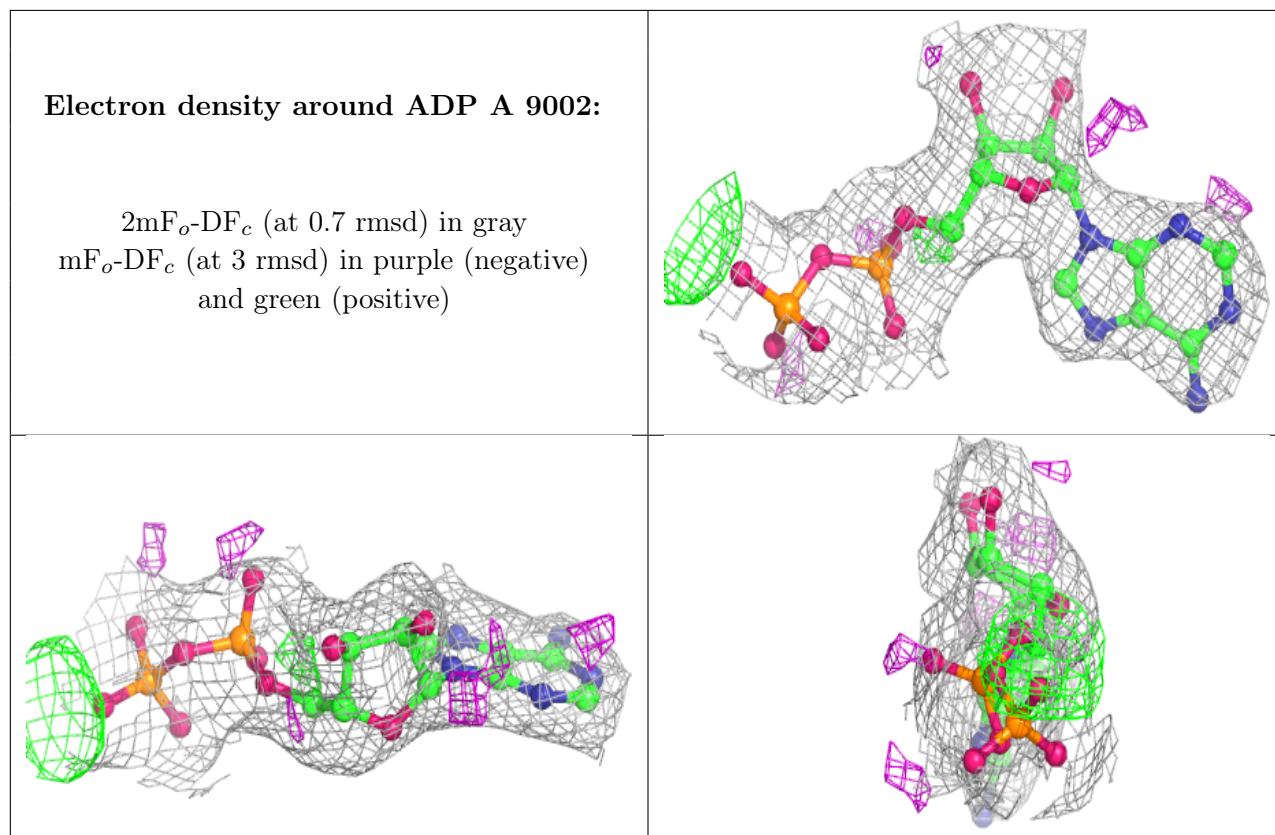
There are no monosaccharides in this entry.

6.4 Ligands [i](#)

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

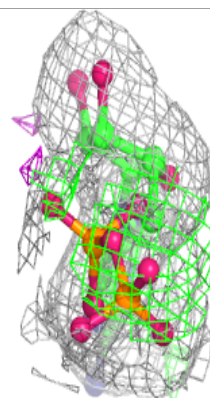
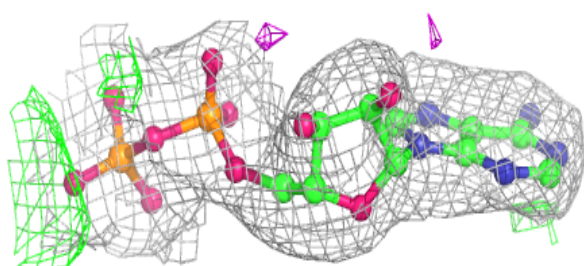
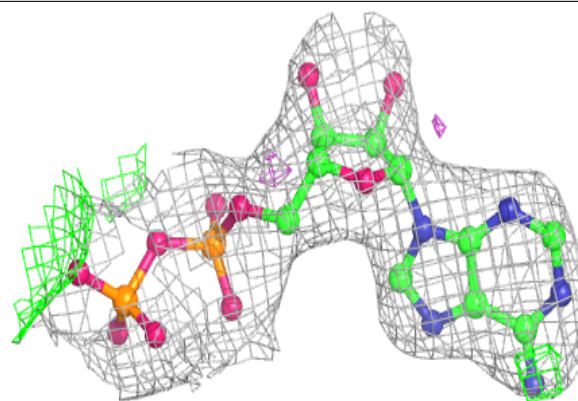
Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(\AA^2)	Q<0.9
3	SPM	A	9016	14/14	0.83	0.25	43,50,54,55	0
3	SPM	A	9012	14/14	0.87	0.22	37,41,45,47	0
4	MG	B	2	1/1	0.87	0.14	50,50,50,50	0
3	SPM	B	9018	14/14	0.89	0.21	57,57,59,59	0
3	SPM	B	9022	14/14	0.91	0.20	37,43,49,49	0
4	MG	B	3	1/1	0.91	0.22	28,28,28,28	0
2	ADP	A	9002	27/27	0.93	0.23	47,49,52,54	0
2	ADP	B	9008	27/27	0.93	0.23	41,51,53,54	0
2	ADP	A	9003	27/27	0.95	0.21	41,45,50,52	0
2	ADP	A	9001	27/27	0.96	0.21	32,38,42,44	0
2	ADP	B	9009	27/27	0.96	0.20	39,45,48,51	0
2	ADP	A	9004	27/27	0.96	0.15	44,49,54,56	0
2	ADP	B	9007	27/27	0.96	0.20	38,47,50,52	0
2	ADP	B	9010	27/27	0.97	0.18	31,37,46,48	0
4	MG	A	1	1/1	0.98	0.22	44,44,44,44	0

The following is a graphical depiction of the model fit to experimental electron density of all instances of the Ligand of Interest. In addition, ligands with molecular weight > 250 and outliers as shown on the geometry validation Tables will also be included. Each fit is shown from different orientation to approximate a three-dimensional view.

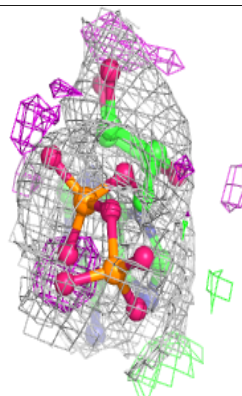
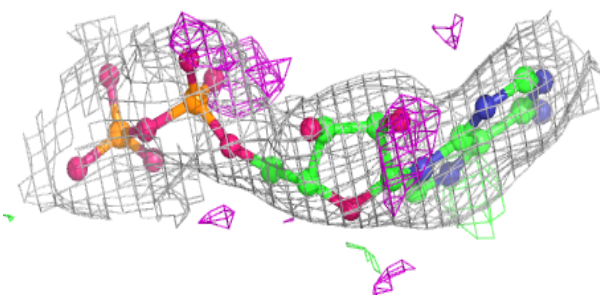
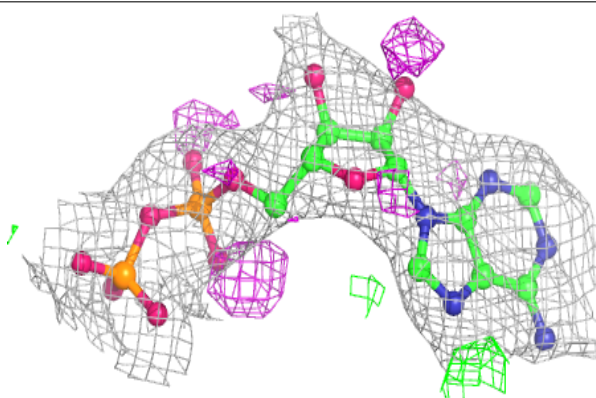


Electron density around ADP B 9008:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

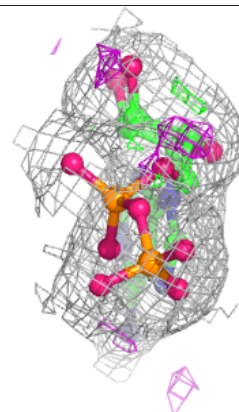
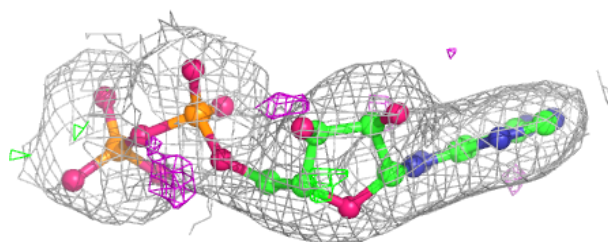
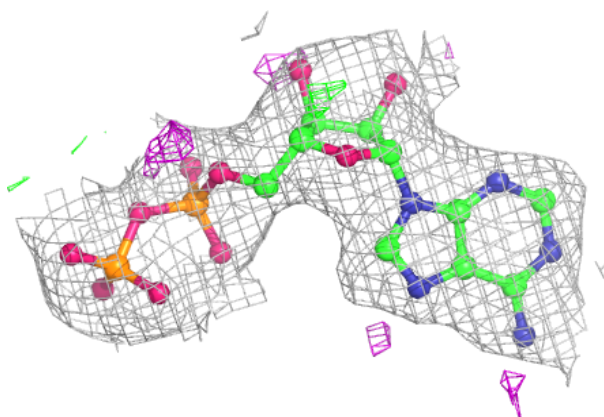
**Electron density around ADP A 9003:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

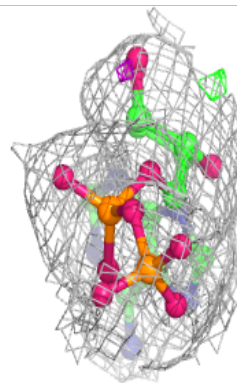
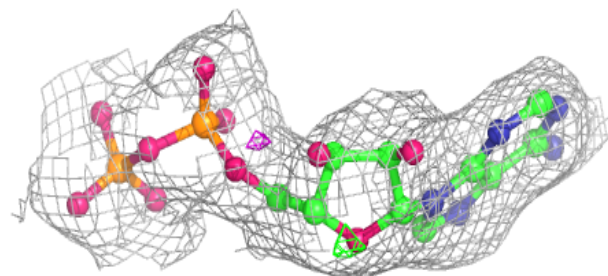
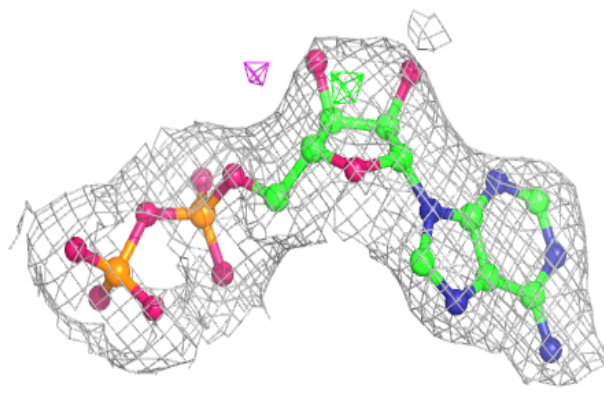


Electron density around ADP A 9001:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

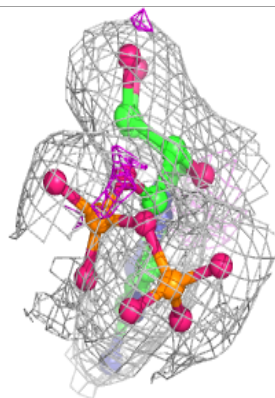
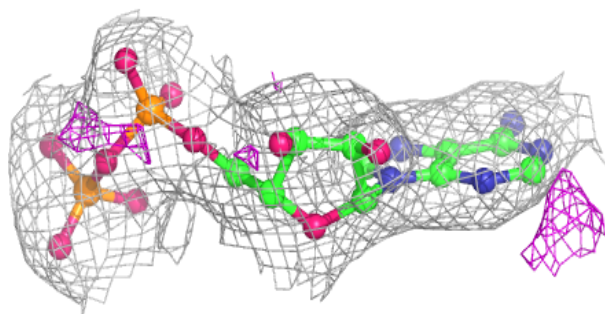
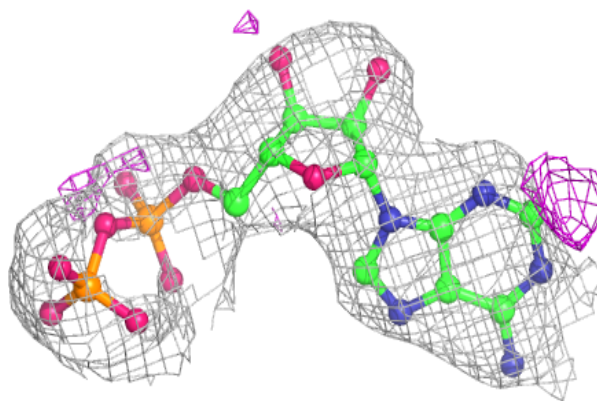
**Electron density around ADP B 9009:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

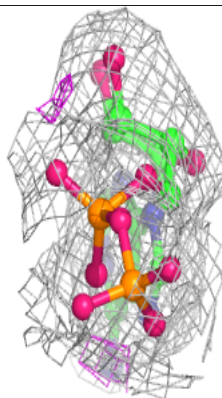
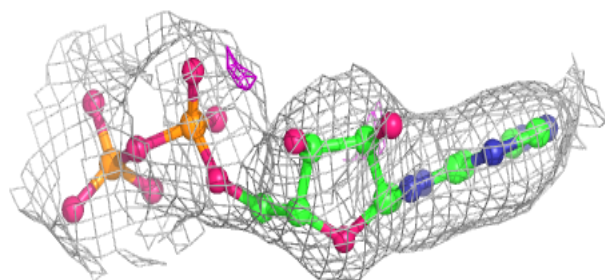
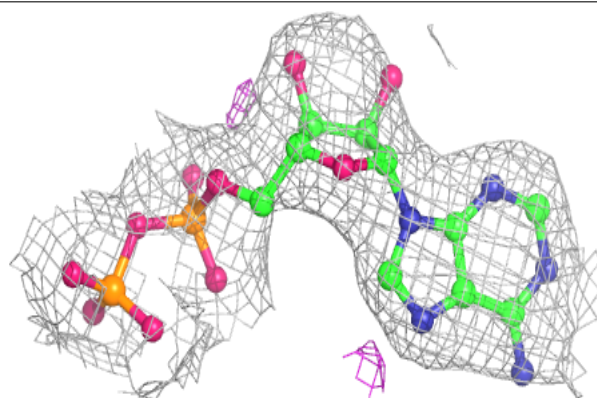


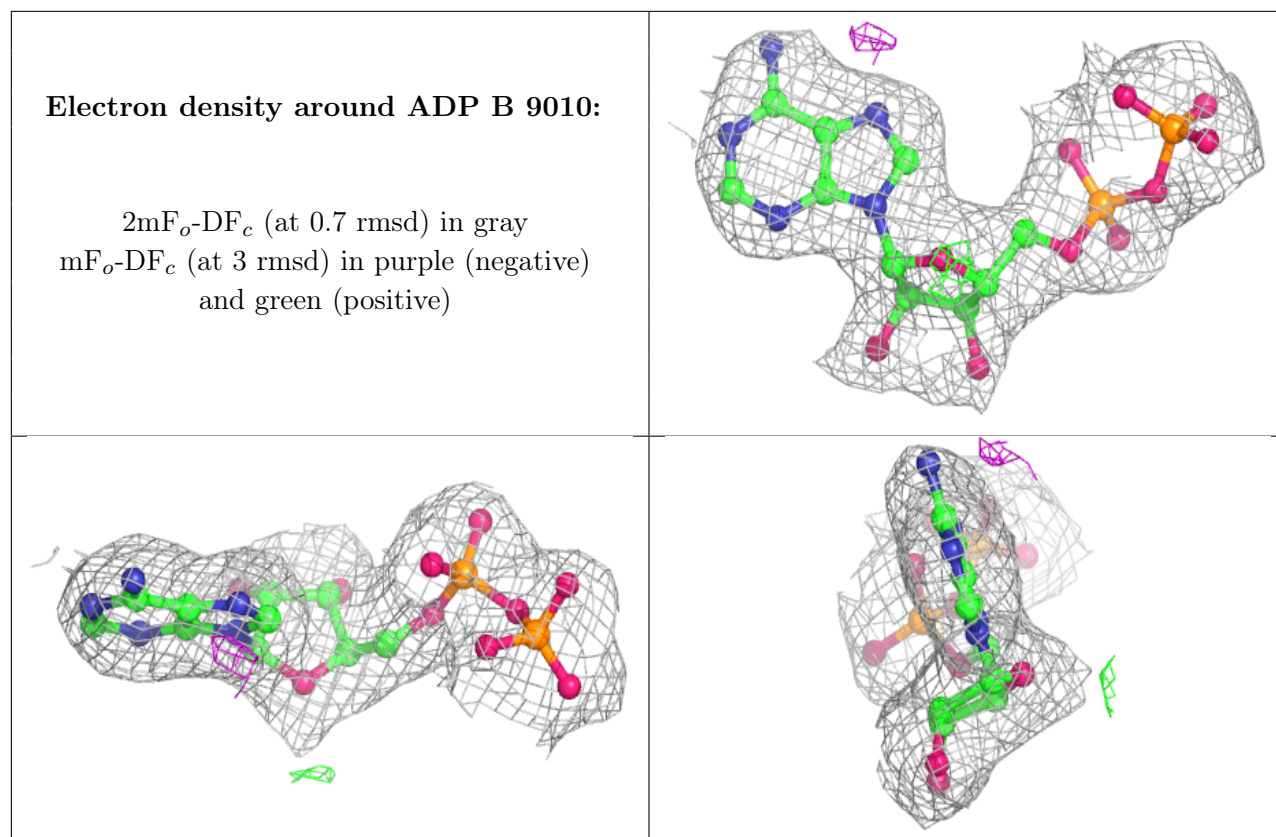
Electron density around ADP A 9004:

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)

**Electron density around ADP B 9007:**

$2mF_o-DF_c$ (at 0.7 rmsd) in gray
 mF_o-DF_c (at 3 rmsd) in purple (negative)
and green (positive)





6.5 Other polymers [i](#)

There are no such residues in this entry.