



# wwPDB X-ray Structure Validation Summary Report ⓘ

Jan 31, 2016 – 09:54 PM GMT

PDB ID : 1QO5  
Title : FRUCTOSE 1,6-BISPHOSPHATE ALDOLASE FROM HUMAN LIVER  
TISSUE  
Authors : Dalby, A.R.; Littlechild, J.A.  
Deposited on : 1999-11-03  
Resolution : 2.50 Å(reported)

This is a wwPDB X-ray Structure Validation Summary Report for a publicly released PDB entry.  
We welcome your comments at [validation@mail.wwpdb.org](mailto:validation@mail.wwpdb.org)  
A user guide is available at  
<http://wwpdb.org/validation/2016/XrayValidationReportHelp>  
with specific help available everywhere you see the ⓘ symbol.

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

MolProbity : 4.02b-467  
Mogul : 1.7 (RC4), CSD as536be (2015)  
Xtriage (Phenix) : **NOT EXECUTED**  
EDS : **NOT EXECUTED**  
Percentile statistics : 20151230.v01 (using entries in the PDB archive December 30th 2015)  
Ideal geometry (proteins) : Engh & Huber (2001)  
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)  
Validation Pipeline (wwPDB-VP) : trunk26865

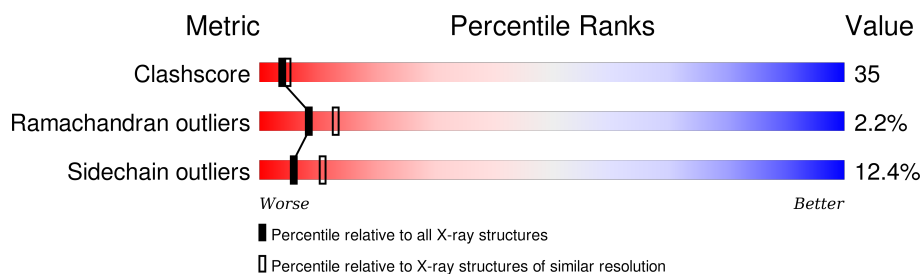
# 1 Overall quality at a glance ⓘ

The following experimental techniques were used to determine the structure:

## *X-RAY DIFFRACTION*

The reported resolution of this entry is 2.50 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))
Clashscore	102246	4242 (2.50-2.50)
Ramachandran outliers	100387	4156 (2.50-2.50)
Sidechain outliers	100360	4158 (2.50-2.50)

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 on the lower bar indicate the fraction of residues that contain outliers for  $\geq 3$ , 2, 1 and 0 types of geometric quality criteria. 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.

Note EDS was not executed.

Mol	Chain	Length	Quality of chain
1	A	363	
1	B	363	
1	C	363	
1	D	363	
1	E	363	
1	F	363	
1	G	363	

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Mol	Chain	Length	Quality of chain
1	H	363	
1	I	363	
1	J	363	
1	K	363	
1	L	363	
1	M	363	
1	N	363	
1	O	363	
1	P	363	
1	Q	363	
1	R	363	

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
2	SO4	A	400	-	-	X	-
2	SO4	D	400	-	X	-	-
2	SO4	S	1	-	-	X	-

## 2 Entry composition [i](#)

There are 3 unique types of molecules in this entry. The entry contains 49278 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 FRUCTOSE-BISPHOSPHATE ALDOLASE B.

Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	A	360	Total	C	N	O	S	0	0	0
			2730	1708	486	521	15			
1	B	348	Total	C	N	O	S	0	0	0
			2651	1660	473	504	14			
1	C	345	Total	C	N	O	S	0	0	0
			2635	1652	470	499	14			
1	D	356	Total	C	N	O	S	0	0	0
			2701	1689	482	516	14			
1	E	354	Total	C	N	O	S	0	0	0
			2687	1680	480	513	14			
1	F	353	Total	C	N	O	S	0	0	0
			2675	1674	474	513	14			
1	G	344	Total	C	N	O	S	0	0	0
			2628	1648	469	497	14			
1	H	357	Total	C	N	O	S	0	0	0
			2712	1698	483	517	14			
1	I	344	Total	C	N	O	S	0	0	0
			2628	1648	469	497	14			
1	J	356	Total	C	N	O	S	0	0	0
			2701	1689	482	516	14			
1	K	354	Total	C	N	O	S	0	0	0
			2686	1683	475	514	14			
1	L	344	Total	C	N	O	S	0	0	0
			2628	1648	469	497	14			
1	M	360	Total	C	N	O	S	29	0	0
			2730	1708	486	521	15			
1	N	344	Total	C	N	O	S	0	0	0
			2628	1648	469	497	14			
1	O	344	Total	C	N	O	S	0	0	0
			2628	1648	469	497	14			
1	P	360	Total	C	N	O	S	0	0	0
			2730	1708	486	521	15			

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Mol	Chain	Residues	Atoms					ZeroOcc	AltConf	Trace
1	Q	344	Total	C	N	O	S	0	0	0
			2628	1648	469	497	14			
1	R	344	Total	C	N	O	S	0	0	0
			2628	1648	469	497	14			

- Molecule 2 is SULFATE ION (three-letter code: SO4) (formula: O<sub>4</sub>S).



Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	A	1	Total	O	S	0	0
			5	4	1		
2	D	1	Total	O	S	0	0
			5	4	1		
2	E	1	Total	O	S	0	0
			5	4	1		
2	G	1	Total	O	S	0	0
			5	4	1		
2	J	1	Total	O	S	0	0
			5	4	1		
2	K	1	Total	O	S	0	0
			5	4	1		
2	N	1	Total	O	S	0	0
			5	4	1		
2	R	1	Total	O	S	0	0
			5	4	1		
2	S	1	Total	O	S	0	0
			5	4	1		

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Mol	Chain	Residues	Atoms			ZeroOcc	AltConf
2	S	1	Total	O	S	0	0
			5	4	1		
2	S	1	Total	O	S	0	0
			5	4	1		
2	S	1	Total	O	S	0	0
			5	4	1		
2	S	1	Total	O	S	0	0
			5	4	1		
2	S	1	Total	O	S	0	0
			5	4	1		

- Molecule 3 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	A	87	Total	O	0	0
			87	87		
3	B	32	Total	O	0	0
			32	32		
3	C	46	Total	O	0	0
			46	46		
3	D	79	Total	O	0	0
			79	79		
3	E	74	Total	O	0	0
			74	74		
3	F	81	Total	O	0	0
			81	81		
3	G	74	Total	O	0	0
			74	74		
3	H	71	Total	O	0	0
			71	71		
3	I	46	Total	O	0	0
			46	46		
3	J	77	Total	O	0	0
			77	77		
3	K	72	Total	O	0	0
			72	72		
3	L	27	Total	O	0	0
			27	27		
3	M	81	Total	O	0	0
			81	81		

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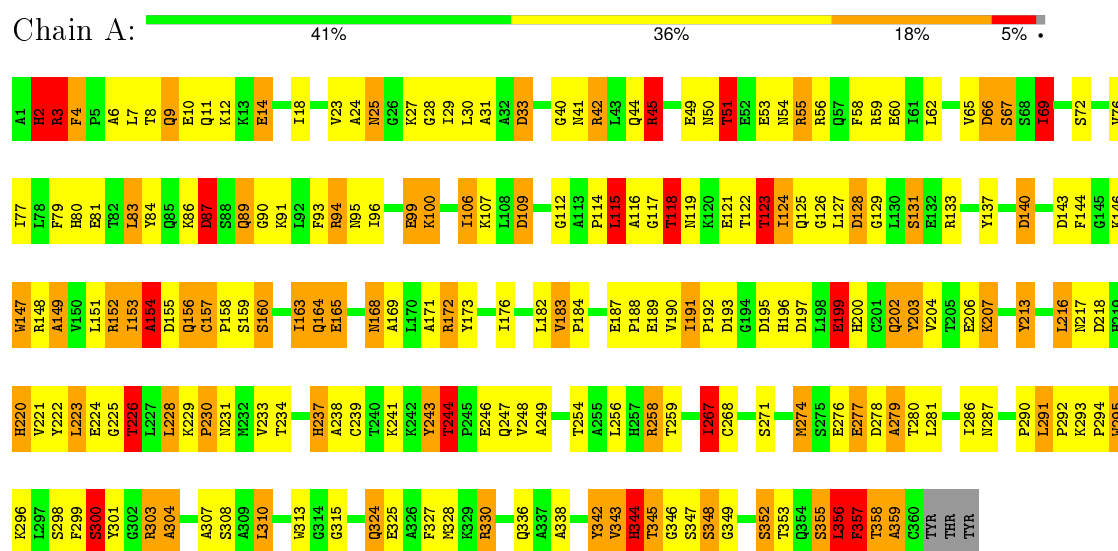
Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	N	55	Total 55	O 55	0	0
3	O	36	Total 36	O 36	0	0
3	P	77	Total 77	O 77	0	0
3	Q	81	Total 81	O 81	0	0
3	R	71	Total 71	O 71	0	0
3	S	2	Total 2	O 2	0	0

### 3 Residue-property plots

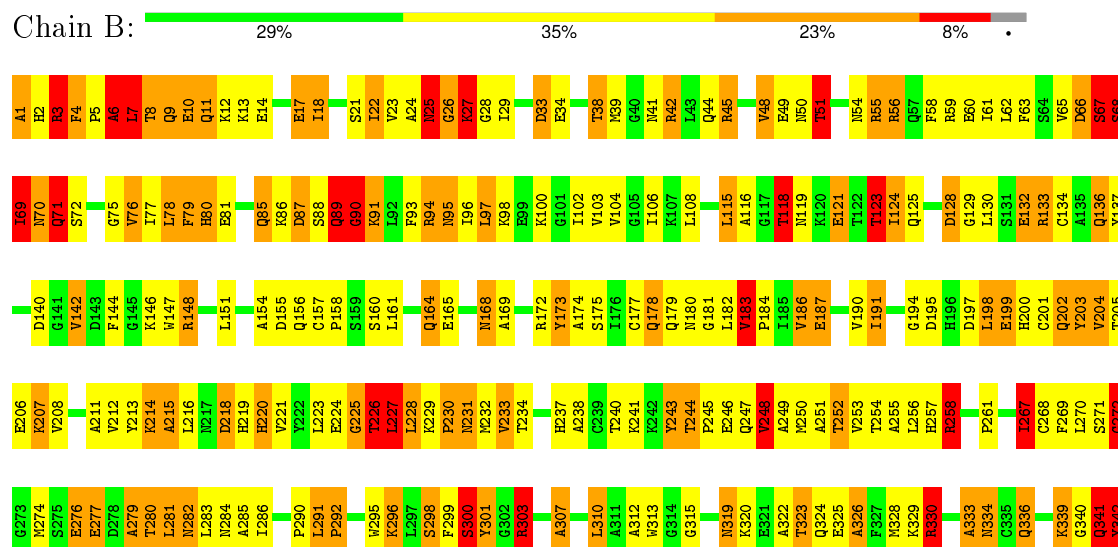
These plots are drawn for all protein, RNA and DNA chains in the entry. The first graphic for a chain summarises the proportions of errors displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according 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.

Note EDS was not executed.

#### • Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B

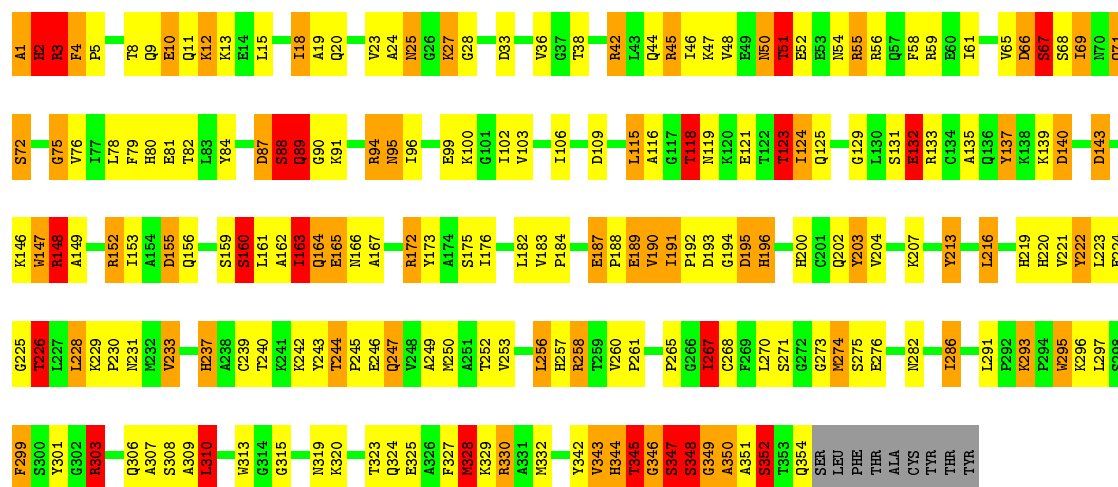


#### • Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B



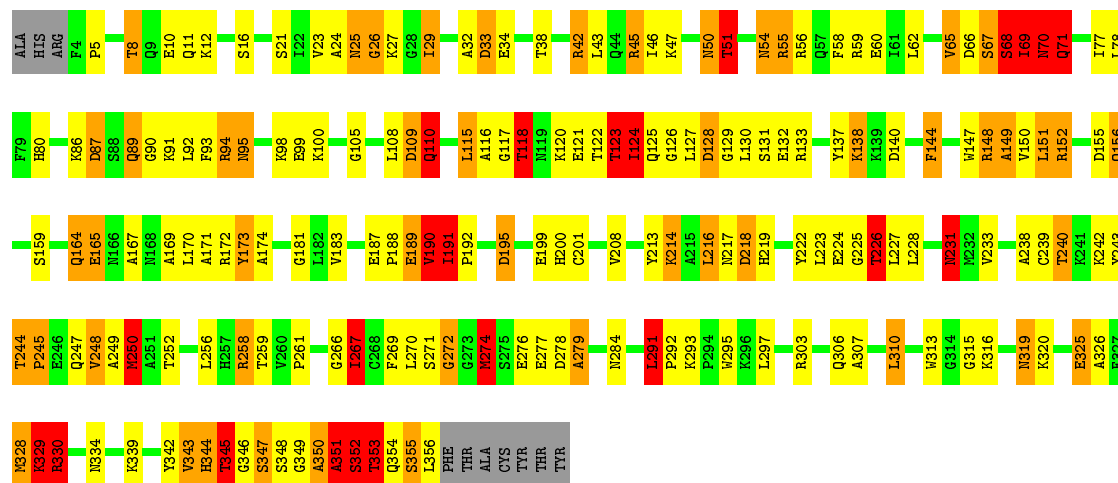






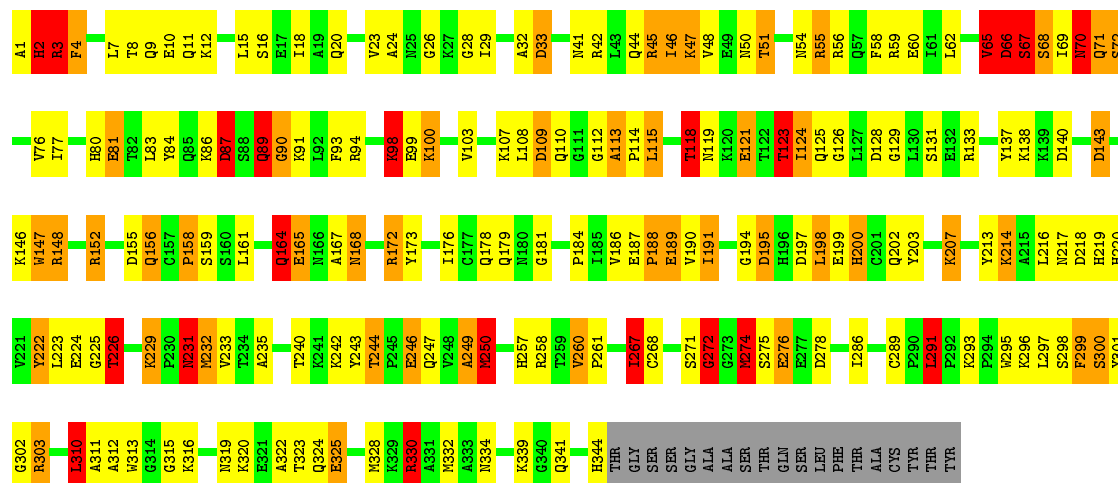
• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B

Chain F: 45% 32% 14% 6%

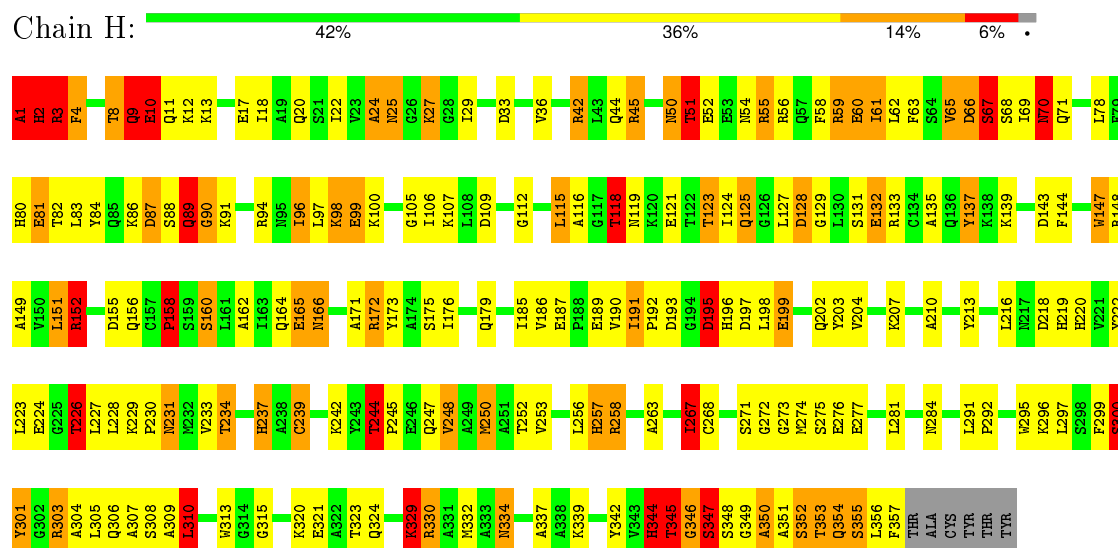


• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B

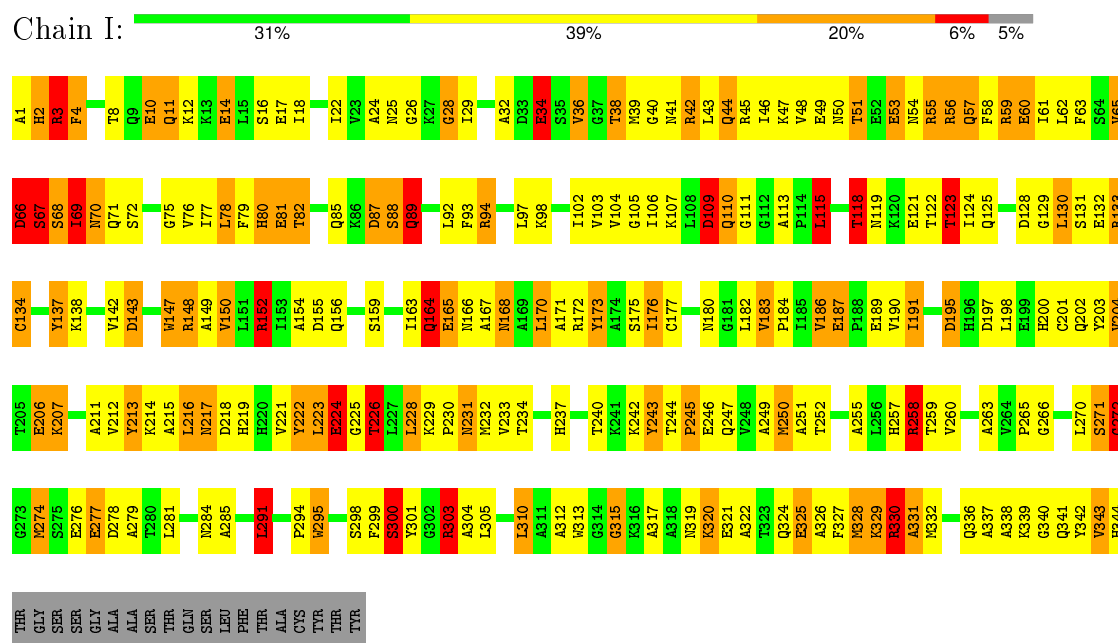
Chain G: 43% 33% 13% 6% 5%



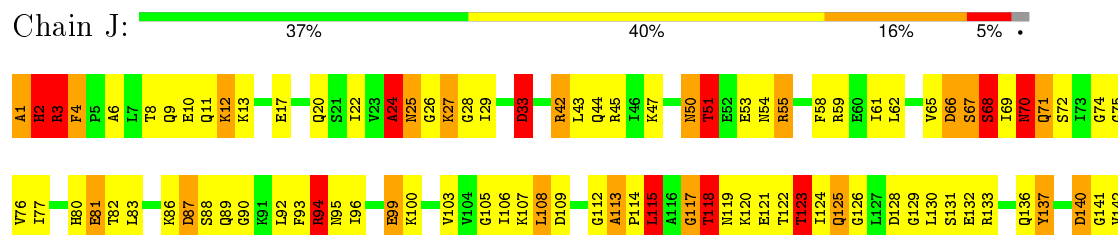
• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B

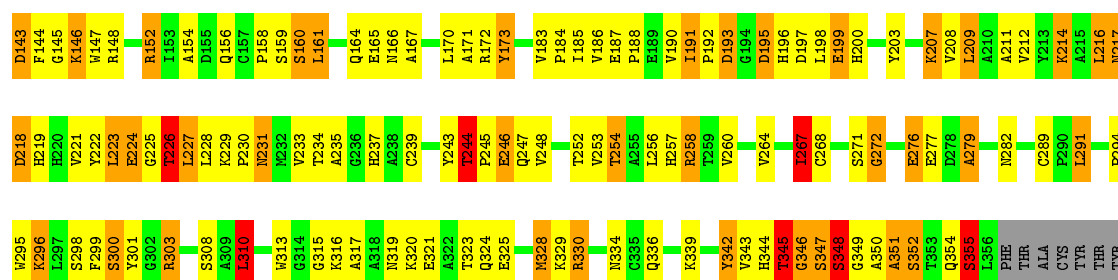


• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B



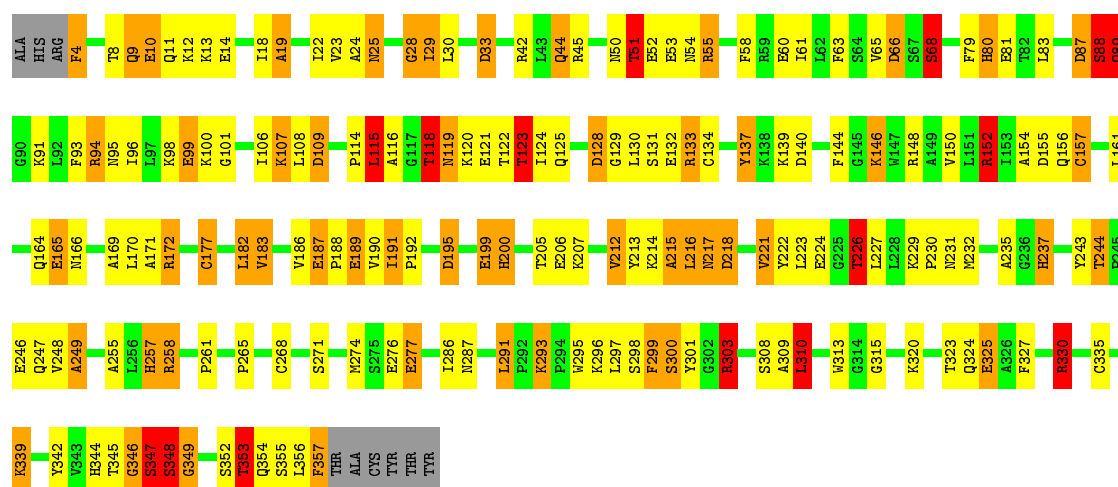
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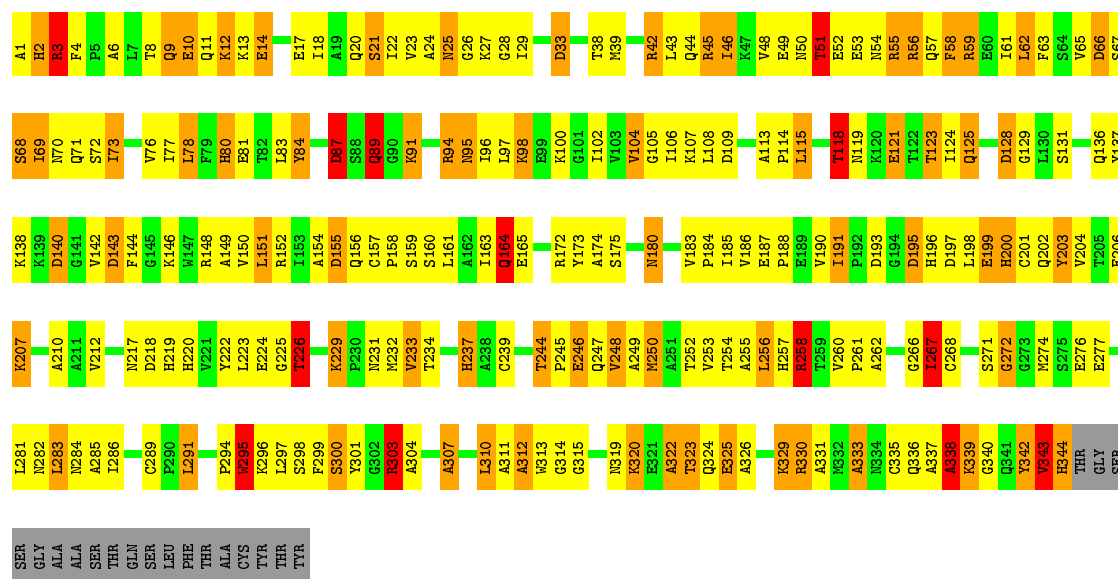
• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B

Chain K: 48% 31% 15%

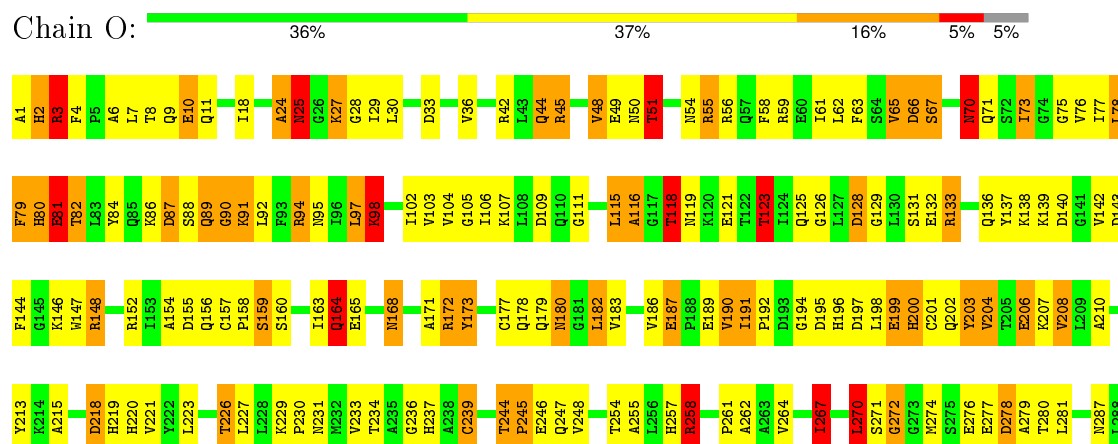


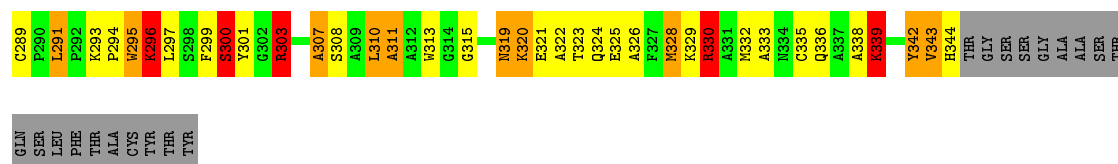
• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B

Chain L: 32% 40% 19% 5%

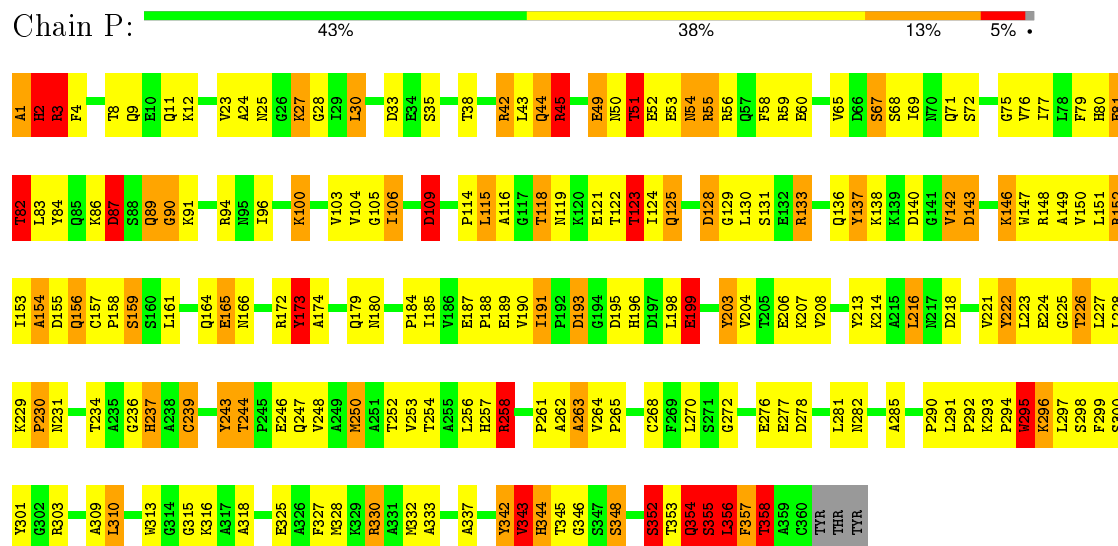


• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B

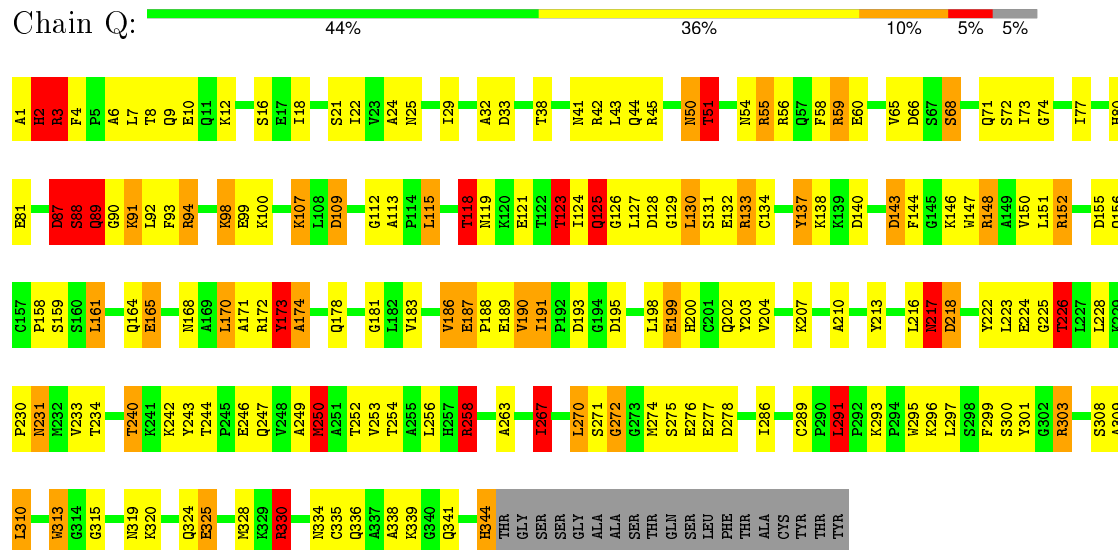




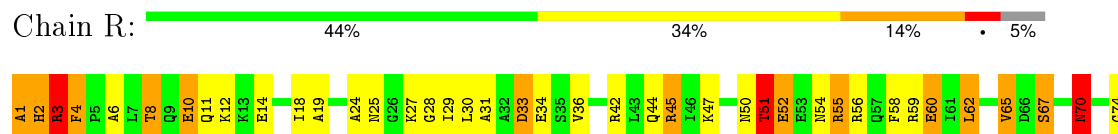
• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B



• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B



• Molecule 1: FRUCTOSE-BISPHOSPHATE ALDOLASE B



A309	A310	A311	A312	A313	A314	A315	A316	A317	A318	A319	A320	A321	A322	A323	A324	A325	A326	A327	A328	A329	A330	A331	A332	A333	A334	A335	A336	A337	A338	A339	A340	A341	A342	A343	A344	A345	A346	A347	A348	A349	A350	A351	A352	A353	A354	A355	A356	A357	A358	A359	A360	A361	A362	A363	A364	A365	A366	A367	A368	A369	A370	A371	A372	A373	A374	A375	A376	A377	A378	A379	A380	A381	A382	A383	A384	A385	A386	A387	A388	A389	A390	A391	A392	A393	A394	A395	A396	A397	A398	A399	A400	A401	A402	A403	A404	A405	A406	A407	A408	A409	A410	A411	A412	A413	A414	A415	A416	A417	A418	A419	A420	A421	A422	A423	A424	A425	A426	A427	A428	A429	A430	A431	A432	A433	A434	A435	A436	A437	A438	A439	A440	A441	A442	A443	A444	A445	A446	A447	A448	A449	A450	A451	A452	A453	A454	A455	A456	A457	A458	A459	A460	A461	A462	A463	A464	A465	A466	A467	A468	A469	A470	A471	A472	A473	A474	A475	A476	A477	A478	A479	A480	A481	A482	A483	A484	A485	A486	A487	A488	A489	A490	A491	A492	A493	A494	A495	A496	A497	A498	A499	A500	A501	A502	A503	A504	A505	A506	A507	A508	A509	A510	A511	A512	A513	A514	A515	A516	A517	A518	A519	A520	A521	A522	A523	A524	A525	A526	A527	A528	A529	A530	A531	A532	A533	A534	A535	A536	A537	A538	A539	A540	A541	A542	A543	A544	A545	A546	A547	A548	A549	A550	A551	A552	A553	A554	A555	A556	A557	A558	A559	A560	A561	A562	A563	A564	A565	A566	A567	A568	A569	A570	A571	A572	A573	A574	A575	A576	A577	A578	A579	A580	A581	A582	A583	A584	A585	A586	A587	A588	A589	A590	A591	A592	A593	A594	A595	A596	A597	A598	A599	A600	A601	A602	A603	A604	A605	A606	A607	A608	A609	A610	A611	A612	A613	A614	A615	A616	A617	A618	A619	A620	A621	A622	A623	A624	A625	A626	A627	A628	A629	A630	A631	A632	A633	A634	A635	A636	A637	A638	A639	A640	A641	A642	A643	A644	A645	A646	A647	A648	A649	A650	A651	A652	A653	A654	A655	A656	A657	A658	A659	A660	A661	A662	A663	A664	A665	A666	A667	A668	A669	A670	A671	A672	A673	A674	A675	A676	A677	A678	A679	A680	A681	A682	A683	A684	A685	A686	A687	A688	A689	A690	A691	A692	A693	A694	A695	A696	A697	A698	A699	A700	A701	A702	A703	A704	A705	A706	A707	A708	A709	A710	A711	A712	A713	A714	A715	A716	A717	A718	A719	A720	A721	A722	A723	A724	A725	A726	A727	A728	A729	A730	A731	A732	A733	A734	A735	A736	A737	A738	A739	A740	A741	A742	A743	A744	A745	A746	A747	A748	A749	A750	A751	A752	A753	A754	A755	A756	A757	A758	A759	A760	A761	A762	A763	A764	A765	A766	A767	A768	A769	A770	A771	A772	A773	A774	A775	A776	A777	A778	A779	A780	A781	A782	A783	A784	A785	A786	A787	A788	A789	A790	A791	A792	A793	A794	A795	A796	A797	A798	A799	A800	A801	A802	A803	A804	A805	A806	A807	A808	A809	A810	A811	A812	A813	A814	A815	A816	A817	A818	A819	A820	A821	A822	A823	A824	A825	A826	A827	A828	A829	A830	A831	A832	A833	A834	A835	A836	A837	A838	A839	A840	A841	A842	A843	A844	A845	A846	A847	A848	A849	A850	A851	A852	A853	A854	A855	A856	A857	A858	A859	A860	A861	A862	A863	A864	A865	A866	A867	A868	A869	A870	A871	A872	A873	A874	A875	A876	A877	A878	A879	A880	A881	A882	A883	A884	A885	A886	A887	A888	A889	A890	A891	A892	A893	A894	A895	A896	A897	A898	A899	A900	A901	A902	A903	A904	A905	A906	A907	A908	A909	A910	A911	A912	A913	A914	A915	A916	A917	A918	A919	A920	A921	A922	A923	A924	A925	A926	A927	A928	A929	A930	A931	A932	A933	A934	A935	A936	A937	A938	A939	A940	A941	A942	A943	A944	A945	A946	A947	A948	A949	A950	A951	A952	A953	A954	A955	A956	A957	A958	A959	A960	A961	A962	A963	A964	A965	A966	A967	A968	A969	A970	A971	A972	A973	A974	A975	A976	A977	A978	A979	A980	A981	A982	A983	A984	A985	A986	A987	A988	A989	A990	A991	A992	A993	A994	A995	A996	A997	A998	A999	A1000	A1001	A1002	A1003	A1004	A1005	A1006	A1007	A1008	A1009	A1010	A1011	A1012	A1013	A1014	A1015	A1016	A1017	A1018	A1019	A1020	A1021	A1022	A1023	A1024	A1025	A1026	A1027	A1028	A1029	A1030	A1031	A1032	A1033	A1034	A1035	A1036	A1037	A1038	A1039	A1040	A1041	A1042	A1043	A1044	A1045	A1046	A1047	A1048	A1049	A1050	A1051	A1052	A1053	A1054	A1055	A1056	A1057	A1058	A1059	A1060	A1061	A1062	A1063	A1064	A1065	A1066	A1067	A1068	A1069	A1070	A1071	A1072	A1073	A1074	A1075	A1076	A1077	A1078	A1079	A1080	A1081	A1082	A1083	A1084	A1085	A1086	A1087	A1088	A1089	A1090	A1091	A1092	A1093	A1094	A1095	A1096	A1097	A1098	A1099	A1100	A1101	A1102	A1103	A1104	A1105	A1106	A1107	A1108	A1109	A1110	A1111	A1112	A1113	A1114	A1115	A1116	A1117	A1118	A1119	A1120	A1121	A1122	A1123	A1124	A1125	A1126	A1127	A1128	A1129	A1130	A1131	A1132	A1133	A1134	A1135	A1136	A1137	A1138	A1139	A1140	A1141	A1142	A1143	A1144	A1145	A1146	A1147	A1148	A1149	A1150	A1151	A1152	A1153	A1154	A1155	A1156	A1157	A1158	A1159	A1160	A1161	A1162	A1163	A1164	A1165	A1166	A1167	A1168	A1169	A1170	A1171	A1172	A1173	A1174	A1175	A1176	A1177	A1178	A1179	A1180	A1181	A1182	A1183	A1184	A1185	A1186	A1187	A1188	A1189	A1190	A1191	A1192	A1193	A1194	A1195	A1196	A1197	A1198	A1199	A1200	A1201	A1202	A1203	A1204	A1205	A1206	A1207	A1208	A1209	A1210	A1211	A1212	A1213	A1214	A1215	A1216	A1217	A1218	A1219	A1220	A1221	A1222	A1223	A1224	A1225	A1226	A1227	A1228	A1229	A1230	A1231	A1232	A1233	A1234	A1235	A1236	A1237	A1238	A1239	A1240	A1241	A1242	A1243	A1244	A1245	A1246	A1247	A1248	A1249	A1250	A1251	A1252	A1253	A1254	A1255	A1256	A1257	A1258	A1259	A1260	A1261	A1262	A1263	A1264	A1265	A1266	A1267	A1268	A1269	A1270	A1271	A1272	A1273	A1274	A1275	A1276	A1277	A1278	A1279	A1280	A1281	A1282	A1283	A1284	A1285	A1286	A1287	A1288	A1289	A1290	A1291	A1292	A1293	A1294	A1295	A1296	A1297	A1298	A1299	A1300	A1301	A1302	A1303	A1304	A1305	A1306	A1307	A1308	A1309	A1310	A1311	A1312	A1313	A1314	A1315	A1316	A1317	A1318	A1319	A1320	A1321	A1322	A1323	A1324	A1325	A1326	A1327	A1328	A1329	A1330	A1331	A1332	A1333	A1334	A1335	A1336	A1337	A1338	A1339	A1340	A1341	A1342	A1343	A1344	A1345	A1346	A1347	A1348	A1349	A1350	A1351	A1352	A1353	A1354	A1355	A1356	A1357	A1358	A1359	A1360	A1361	A1362	A1363	A1364	A1365	A1366	A1367	A1368	A1369	A1370	A1371	A1372	A1373	A1374	A1375	A1376	A1377	A1378	A1379	A1380	A1381	A1382	A1383	A1384	A1385	A1386	A1387	A1388	A1389	A1390	A1391	A1392	A1393	A1394	A1395	A1396	A1397	A1398	A1399	A1400	A1401	A1402	A1403	A1404	A1405	A1406	A1407	A1408	A1409	A1410	A1411	A1412	A1413	A1414	A1415	A1416	A1417	A1418	A1419	A1420	A1421	A1422	A1423	A1424	A1425	A1426	A1427	A1428	A1429	A1430	A1431	A1432	A1433	A1434	A1435	A1436	A1437	A1438	A1439	A1440	A1441	A1442	A1443	A1444	A1445	A1446	A1447	A1448	A1449	A1450	A1451	A1452	A1453	A1454	A1455	A1456	A1457	A1458	A1459	A1460	A1461	A1462	A1463	A1464	A1465	A1466	A1467	A1468	A1469	A1470	A1471	A1472	A1473	A1474	A1475	A1476	A1477	A1478	A1479	A1480	A1481	A1482	A1483	A1484	A1485	A1486	A1487	A1488	A1489	A1490	A1491	A1492	A1493	A1494	A1495	A1496	A1497	A1498	A1499	A1500	A1501	A1502	A1503	A1504	A1505	A1506	A1507	A1508	A1509	A1510	A1511	A1512	A1513	A1514	A1515	A1516	A1517	A1518	A1519	A1520	A1521	A1522	A1523	A1524	A1525	A1526	A1527	A1528	A1529	A1530	A1531	A1532	A1533	A1534	A1535	A1536	A1537	A1538	A1539	A1540	A1541	A1542	A1543	A1544	A1545	A1546	A1547	A1548	A1549	A1550	A1551	A1552	A1553	A1554	A1555	A1556	A1557	A1558	A1559	A1560	A1561	A1562	A1563	A1564	A1565	A1566	A1567	A1568	A1569	A1570	A1571	A1572	A1573	A1574	A1575	A1576	A1577	A1578	A1579	A1580	A1581	A1582	A1583	A1584	A1585	A1586	A1587	A1588	A1589	A1590	A1591	A1592	A1593	A1594	A1595	A1596	A1597	A1598	A1599	A1600	A1601	A1602	A1603	A1604	A1605	A1606	A1607	A1608	A1609	A1610	A1611	A1612	A1613	A1614	A1615	A1616	A1617	A1618	A1619	A1620	A1621	A1622	A1623	A1624	A1625	A1626	A1627	A1628	A1629	A1630	A1631	A1632	A1633	A1634	A1635	A1636	A1637	A1638	A1639	A1640	A1641	A1642	A1643	A1644	A1645	A1646	A1647	A1648	A1649	A1650	A1651	A1652	A1653	A1654	A1655	A1656	A1657	A1658	A1659	A1660	A1661	A1662	A1663	A1664	A1665	A1666	A1667	A1668	A1669	A1670	A1671	A1672	A1673	A1674	A1675	A1676	A1677	A1678	A1679	A1680	A1681	A1682	A1683	A1684	A1685	A1686	A1687	A1688	A1689	A1690	A1691	A1692	A1693	A1694	A1695	A1696	A1697	A1698	A1699	A1700	A1701	A1702	A1703	A1704	A1705	A1706	A1707	A1708	A1709	A1710	A1711	A1712	A1713	A1714	A1715	A1716	A1717	A1718	A1719	A1720	A1721	A1722	A1723	A1724	A1725	A1726	A1727	A1728	A1729	A1730	A1731	A1732	A1733	A1734	A1735	A1736	A1737	A1738	A1739	A1740	A1741	A1742	A1743	A1744	A1745
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## 4 Data and refinement statistics

Xtriage (Phenix) and EDS were not executed - this section will therefore be incomplete.

Property	Value	Source
Space group	C 1 2 1	Depositor
Cell constants a, b, c, $\alpha$ , $\beta$ , $\gamma$	291.10 Å   489.84 Å   103.36 Å 90.00°   103.68°   90.00°	Depositor
Resolution (Å)	29.00 – 2.50	Depositor
% Data completeness (in resolution range)	71.0 (29.00-2.50)	Depositor
$R_{merge}$	0.15	Depositor
$R_{sym}$	0.12	Depositor
Refinement program	REFMAC	Depositor
R, $R_{free}$	0.224 , 0.276	Depositor
Estimated twinning fraction	No twinning to report.	Xtriage
Total number of atoms	49278	wwPDB-VP
Average B, all atoms (Å <sup>2</sup> )	39.0	wwPDB-VP



## 5 Model quality ⓘ

### 5.1 Standard geometry ⓘ

Bond lengths and bond angles in the following residue types are not validated in this section: SO4

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	1.13	2/2776 (0.1%)	2.86	194/3754 (5.2%)
1	B	1.31	11/2696 (0.4%)	2.80	253/3645 (6.9%)
1	C	1.01	0/2680	2.67	155/3624 (4.3%)
1	D	1.28	13/2746 (0.5%)	2.90	248/3713 (6.7%)
1	E	1.08	7/2732 (0.3%)	2.93	189/3694 (5.1%)
1	F	1.03	4/2719 (0.1%)	2.80	183/3677 (5.0%)
1	G	1.03	1/2673 (0.0%)	2.64	169/3614 (4.7%)
1	H	1.01	4/2758 (0.1%)	2.67	175/3729 (4.7%)
1	I	1.08	3/2673 (0.1%)	2.70	210/3614 (5.8%)
1	J	1.06	2/2746 (0.1%)	2.93	184/3713 (5.0%)
1	K	1.06	2/2731 (0.1%)	2.68	163/3693 (4.4%)
1	L	1.06	1/2673 (0.0%)	2.54	160/3614 (4.4%)
1	M	1.06	5/2776 (0.2%)	2.62	170/3754 (4.5%)
1	N	1.06	2/2673 (0.1%)	2.86	180/3614 (5.0%)
1	O	1.07	0/2673	2.49	155/3614 (4.3%)
1	P	1.04	1/2776 (0.0%)	2.69	168/3754 (4.5%)
1	Q	1.02	2/2673 (0.1%)	2.80	158/3614 (4.4%)
1	R	1.04	1/2673 (0.0%)	2.66	156/3614 (4.3%)
All	All	1.08	61/48847 (0.1%)	2.74	3270/66048 (5.0%)

Chiral center outliers are detected by calculating the chiral volume of a chiral center and verifying if the center is modelled as a planar moiety or with the opposite hand. A planarity outlier is detected by checking planarity of atoms in a peptide group, atoms in a mainchain group or atoms of a sidechain that are expected to be planar.

Mol	Chain	#Chirality outliers	#Planarity outliers
1	A	0	7
1	B	0	13
1	C	0	6
1	D	0	13
1	E	0	7

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Mol	Chain	#Chirality outliers	#Planarity outliers
1	F	0	4
1	G	0	8
1	H	0	7
1	I	0	11
1	J	0	4
1	K	0	6
1	L	0	6
1	M	0	8
1	N	0	6
1	O	0	5
1	P	0	6
1	Q	0	6
1	R	0	10
All	All	0	133

The worst 5 of 61 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
1	D	187	GLU	CD-OE1	-12.36	1.12	1.25
1	I	67	SER	CA-CB	9.89	1.67	1.52
1	D	187	GLU	CD-OE2	9.61	1.36	1.25
1	J	25	ASN	N-CA	8.98	1.64	1.46
1	E	25	ASN	N-CA	8.96	1.64	1.46

The worst 5 of 3270 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	J	42	ARG	NE-CZ-NH2	58.27	149.44	120.30
1	A	258	ARG	NE-CZ-NH1	54.61	147.61	120.30
1	Q	258	ARG	NE-CZ-NH1	48.20	144.40	120.30
1	D	258	ARG	NE-CZ-NH1	42.36	141.48	120.30
1	L	258	ARG	NE-CZ-NH2	-41.78	99.41	120.30

There are no chirality outliers.

5 of 133 planarity outliers are listed below:

Mol	Chain	Res	Type	Group
1	A	122	THR	Mainchain
1	A	153	ILE	Mainchain
1	A	159	SER	Mainchain
1	A	220	HIS	Mainchain

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Mol	Chain	Res	Type	Group
1	A	4	PHE	Mainchain

## 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	2730	0	2736	243	0
1	B	2651	0	2662	264	0
1	C	2635	0	2651	219	0
1	D	2701	0	2711	217	0
1	E	2687	0	2693	194	0
1	F	2675	0	2683	168	0
1	G	2628	0	2644	153	0
1	H	2712	0	2720	209	0
1	I	2628	0	2644	256	0
1	J	2701	0	2714	195	0
1	K	2686	0	2694	151	0
1	L	2628	0	2645	191	0
1	M	2730	0	2739	251	0
1	N	2628	0	2644	234	0
1	O	2628	0	2645	209	0
1	P	2730	0	2739	177	0
1	Q	2628	0	2645	147	0
1	R	2628	0	2644	155	0
2	A	5	0	0	2	0
2	D	5	0	0	0	0
2	E	5	0	0	0	0
2	G	5	0	0	0	0
2	J	5	0	0	0	0
2	K	5	0	0	0	0
2	N	5	0	0	0	0
2	R	5	0	0	0	0
2	S	35	0	0	3	0
3	A	87	0	0	17	0
3	B	32	0	0	4	0
3	C	46	0	0	3	0
3	D	79	0	0	6	0
3	E	74	0	0	7	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
3	F	81	0	0	14	0
3	G	74	0	0	5	0
3	H	71	0	0	9	0
3	I	46	0	0	7	0
3	J	77	0	0	18	0
3	K	72	0	0	6	0
3	L	27	0	0	2	0
3	M	81	0	0	9	0
3	N	55	0	0	5	0
3	O	36	0	0	8	0
3	P	77	0	0	12	0
3	Q	81	0	0	10	0
3	R	71	0	0	10	0
3	S	2	0	0	0	0
All	All	49278	0	48253	3328	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 35.

The worst 5 of 3328 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:D:70:ASN:CB	1:D:70:ASN:CA	1.74	1.64
1:D:70:ASN:HD22	1:D:70:ASN:CA	1.30	1.41
1:E:89:GLN:OE1	1:E:89:GLN:CB	1.72	1.36
1:D:70:ASN:ND2	1:D:70:ASN:CA	1.87	1.35
1:A:356:LEU:HD13	1:A:357:PHE:CE1	1.65	1.32

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	358/363 (99%)	324 (90%)	27 (8%)	7 (2%)	9	15
1	B	346/363 (95%)	300 (87%)	35 (10%)	11 (3%)	5	6
1	C	343/363 (94%)	317 (92%)	22 (6%)	4 (1%)	16	29
1	D	354/363 (98%)	319 (90%)	24 (7%)	11 (3%)	5	7
1	E	352/363 (97%)	316 (90%)	25 (7%)	11 (3%)	5	7
1	F	351/363 (97%)	315 (90%)	25 (7%)	11 (3%)	5	7
1	G	342/363 (94%)	311 (91%)	25 (7%)	6 (2%)	11	18
1	H	355/363 (98%)	319 (90%)	22 (6%)	14 (4%)	4	5
1	I	342/363 (94%)	300 (88%)	34 (10%)	8 (2%)	8	12
1	J	354/363 (98%)	320 (90%)	24 (7%)	10 (3%)	6	9
1	K	352/363 (97%)	325 (92%)	22 (6%)	5 (1%)	14	24
1	L	342/363 (94%)	307 (90%)	30 (9%)	5 (2%)	13	22
1	M	358/363 (99%)	318 (89%)	29 (8%)	11 (3%)	5	7
1	N	342/363 (94%)	307 (90%)	29 (8%)	6 (2%)	11	18
1	O	342/363 (94%)	305 (89%)	33 (10%)	4 (1%)	16	29
1	P	358/363 (99%)	328 (92%)	23 (6%)	7 (2%)	9	15
1	Q	342/363 (94%)	319 (93%)	18 (5%)	5 (2%)	13	22
1	R	342/363 (94%)	316 (92%)	23 (7%)	3 (1%)	21	37
All	All	6275/6534 (96%)	5666 (90%)	470 (8%)	139 (2%)	8	13

5 of 139 Ramachandran outliers are listed below:

Mol	Chain	Res	Type
1	A	2	HIS
1	A	3	ARG
1	A	87	ASP
1	A	357	PHE
1	B	69	ILE

### 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	287/290 (99%)	250 (87%)	37 (13%)	5	10
1	B	279/290 (96%)	244 (88%)	35 (12%)	6	10
1	C	277/290 (96%)	240 (87%)	37 (13%)	5	9
1	D	284/290 (98%)	250 (88%)	34 (12%)	6	12
1	E	282/290 (97%)	247 (88%)	35 (12%)	6	11
1	F	282/290 (97%)	241 (86%)	41 (14%)	4	7
1	G	276/290 (95%)	238 (86%)	38 (14%)	4	8
1	H	285/290 (98%)	252 (88%)	33 (12%)	7	13
1	I	276/290 (95%)	236 (86%)	40 (14%)	4	7
1	J	284/290 (98%)	249 (88%)	35 (12%)	6	11
1	K	283/290 (98%)	249 (88%)	34 (12%)	6	12
1	L	276/290 (95%)	240 (87%)	36 (13%)	5	9
1	M	287/290 (99%)	256 (89%)	31 (11%)	8	15
1	N	276/290 (95%)	242 (88%)	34 (12%)	6	11
1	O	276/290 (95%)	243 (88%)	33 (12%)	6	12
1	P	287/290 (99%)	255 (89%)	32 (11%)	8	14
1	Q	276/290 (95%)	245 (89%)	31 (11%)	7	14
1	R	276/290 (95%)	244 (88%)	32 (12%)	7	13
All	All	5049/5220 (97%)	4421 (88%)	628 (12%)	6	11

5 of 628 residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	H	267	ILE
1	J	231	ASN
1	Q	173	TYR
1	I	16	SER
1	I	245	PRO

Some sidechains can be flipped to improve hydrogen bonding and reduce clashes. 5 of 157 such sidechains are listed below:

Mol	Chain	Res	Type
1	I	70	ASN
1	J	287	ASN
1	Q	125	GLN
1	I	89	GLN

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Mol	Chain	Res	Type
1	J	50	ASN

### 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 carbohydrates in this entry.

## 5.6 Ligand geometry [i](#)

15 ligands are modelled in this entry.

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

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# $ Z  > 2$	Counts	RMSZ	# $ Z  > 2$
2	SO4	A	400	-	4,4,4	1.03	0	6,6,6	1.20	0
2	SO4	D	400	-	4,4,4	2.17	2 (50%)	6,6,6	2.19	2 (33%)
2	SO4	E	400	-	4,4,4	1.48	0	6,6,6	0.38	0
2	SO4	G	400	-	4,4,4	1.88	1 (25%)	6,6,6	0.36	0
2	SO4	J	400	-	4,4,4	1.40	0	6,6,6	0.45	0
2	SO4	K	400	-	4,4,4	1.67	1 (25%)	6,6,6	1.23	1 (16%)
2	SO4	N	400	-	4,4,4	1.46	1 (25%)	6,6,6	1.12	1 (16%)
2	SO4	R	400	-	4,4,4	1.62	0	6,6,6	1.67	1 (16%)
2	SO4	S	1	-	4,4,4	1.68	1 (25%)	6,6,6	0.78	0
2	SO4	S	2	-	4,4,4	1.10	0	6,6,6	1.04	1 (16%)
2	SO4	S	3	-	4,4,4	1.16	0	6,6,6	0.80	0

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z  > 2	Counts	RMSZ	# Z  > 2
2	SO4	S	4	-	4,4,4	0.91	0	6,6,6	0.79	0
2	SO4	S	5	-	4,4,4	1.50	1 (25%)	6,6,6	1.10	1 (16%)
2	SO4	S	6	-	4,4,4	1.00	0	6,6,6	1.49	2 (33%)
2	SO4	S	7	-	4,4,4	0.77	0	6,6,6	0.83	0

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	SO4	A	400	-	-	0/0/0/0	0/0/0/0
2	SO4	D	400	-	-	0/0/0/0	0/0/0/0
2	SO4	E	400	-	-	0/0/0/0	0/0/0/0
2	SO4	G	400	-	-	0/0/0/0	0/0/0/0
2	SO4	J	400	-	-	0/0/0/0	0/0/0/0
2	SO4	K	400	-	-	0/0/0/0	0/0/0/0
2	SO4	N	400	-	-	0/0/0/0	0/0/0/0
2	SO4	R	400	-	-	0/0/0/0	0/0/0/0
2	SO4	S	1	-	-	0/0/0/0	0/0/0/0
2	SO4	S	2	-	-	0/0/0/0	0/0/0/0
2	SO4	S	3	-	-	0/0/0/0	0/0/0/0
2	SO4	S	4	-	-	0/0/0/0	0/0/0/0
2	SO4	S	5	-	-	0/0/0/0	0/0/0/0
2	SO4	S	6	-	-	0/0/0/0	0/0/0/0
2	SO4	S	7	-	-	0/0/0/0	0/0/0/0

The worst 5 of 7 bond length outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(Å)	Ideal(Å)
2	S	1	SO4	O1-S	2.22	1.54	1.47
2	N	400	SO4	O1-S	2.36	1.55	1.47
2	D	400	SO4	O2-S	2.73	1.56	1.47
2	S	5	SO4	O4-S	2.76	1.57	1.47
2	K	400	SO4	O2-S	3.11	1.57	1.47

The worst 5 of 9 bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	D	400	SO4	O4-S-O3	-3.57	94.46	108.98
2	S	6	SO4	O2-S-O1	-2.74	100.82	109.50
2	N	400	SO4	O4-S-O3	-2.39	99.27	108.98

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Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
2	K	400	SO4	O2-S-O1	-2.31	102.17	109.50
2	S	2	SO4	O4-S-O3	2.01	117.14	108.98

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

3 monomers are involved in 5 short contacts:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	A	400	SO4	2	0
2	S	1	SO4	2	0
2	S	6	SO4	1	0

## 5.7 Other polymers [i](#)

There are no such residues in this entry.

## 5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

## 6 Fit of model and data [i](#)

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

EDS was not executed - this section will therefore be empty.

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

EDS was not executed - this section will therefore be empty.

### 6.3 Carbohydrates [i](#)

EDS was not executed - this section will therefore be empty.

### 6.4 Ligands [i](#)

EDS was not executed - this section will therefore be empty.

### 6.5 Other polymers [i](#)

EDS was not executed - this section will therefore be empty.