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Nonpeptide Small Molecules with a Ten-Membered Macrolactam or a Morpholine Motif from the Insect American Cockroach and Their Antiangiogenic Activity

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Figure S1. Optimized geometries of predominant conformers for (7*S*,8*R*,8′*R*)-**1** at the B3LYP/6-31G(d,p) level

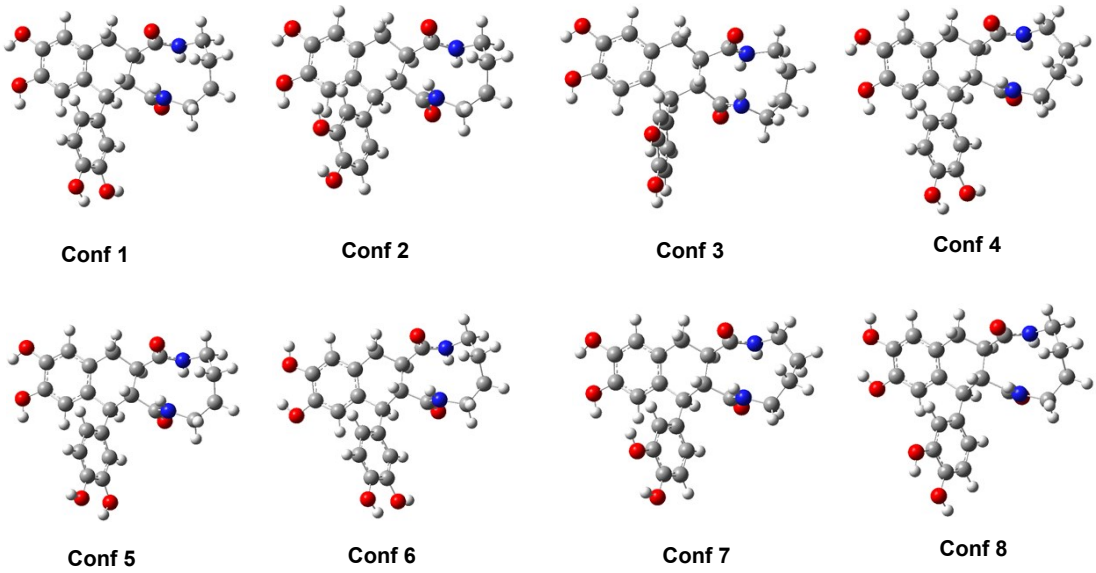


Figure S2. Optimized geometries of predominant conformers for (2*S*,4*S*)-**2** at the B3LYP/6-31G(d,p) level

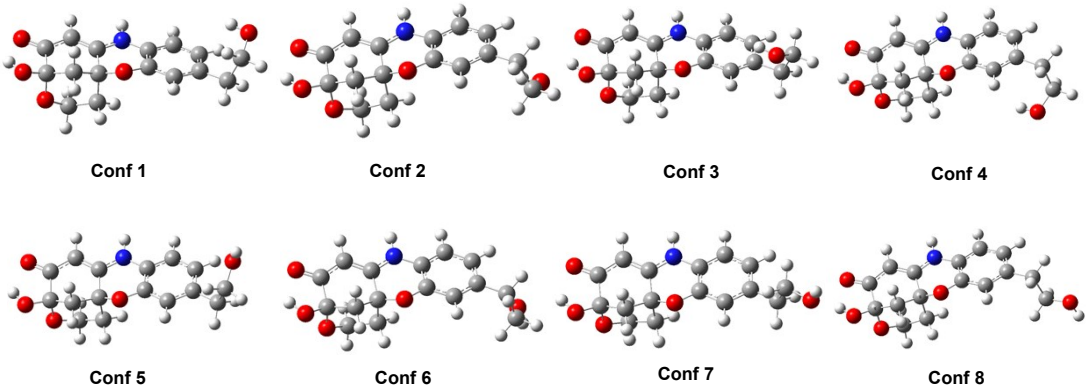


Figure S3. Optimized geometries of predominant conformers for (3*R*,5′*S*)-**3** at the B3LYP/6-31G(d,p) level

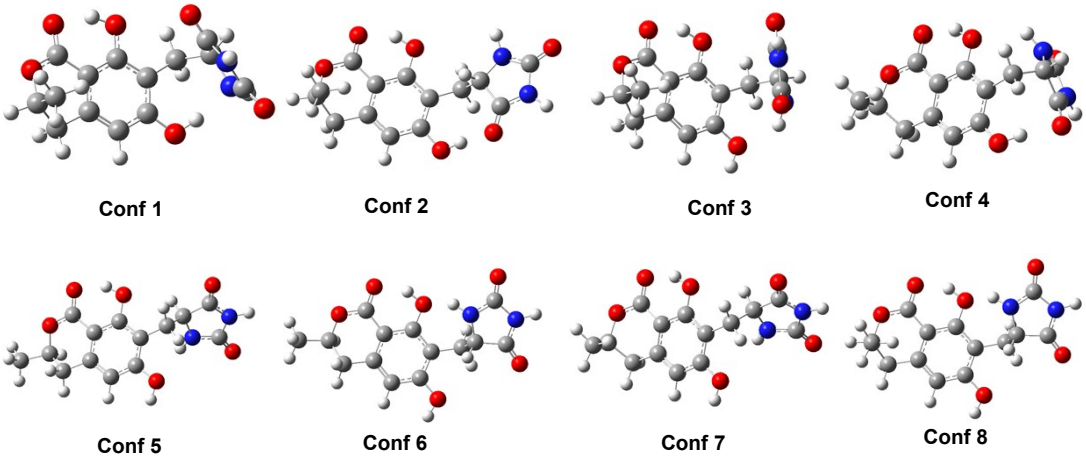


Figure S4. Optimized geometries of predominant conformers for (3*R*,5′*R*)-**4** at the B3LYP/6-31G(d,p) level

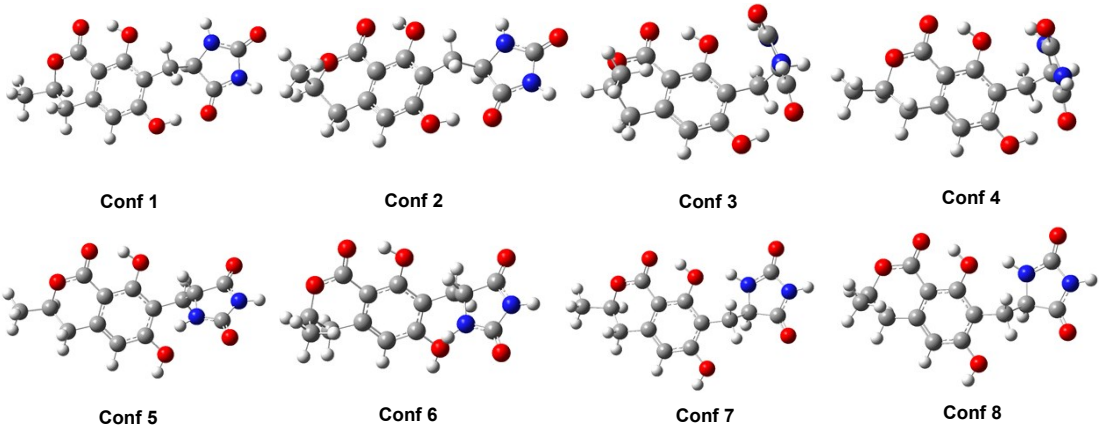


Table S1. The Cartesian coordinates of the lowest energy conformers for (7*S*,8*R*,8′*R*)-**1**

Conf 1	X axis(Å)	Y axis(Å)	Z axis(Å)	Conf 2	X axis(Å)	Y axis(Å)	Z axis(Å)
C	1.315813	-2.35036	0.2207	C	1.221951	-2.27315	0.304351
C	1.661231	-1.08568	-0.28144	C	1.565359	-1.10264	-0.39011
C	0.628966	0.023527	-0.50223	C	0.551255	0.000672	-0.70242
C	-0.10941	-2.68594	0.613455	C	-0.18669	-2.50668	0.813619
N	-2.763	1.038724	0.411242	N	-2.77652	1.224969	0.167589
C	-1.84031	0.591914	-0.47545	C	-1.9064	0.61598	-0.67405
C	-4.0165	1.668204	0.005058	C	-4.03357	1.817441	-0.28162
C	-5.06017	0.688772	-0.56883	C	-5.1219	0.789195	-0.65139
C	-5.39553	-0.51743	0.34477	C	-5.43678	-0.2529	0.451874
C	-4.94263	-1.88712	-0.20084	C	-5.03807	-1.70196	0.104713
N	-3.52243	-1.95982	-0.5313	N	-3.63714	-1.86217	-0.27364
C	-2.55058	-2.04678	0.412384	C	-2.62335	-1.84236	0.629002
C	-1.12855	-1.79612	-0.10155	C	-1.22247	-1.70532	0.021811
C	-0.74671	-0.30324	0.123492	C	-0.80559	-0.20522	0.011644
O	-2.79289	-2.24711	1.605385	O	-2.81157	-1.87021	1.847896
O	-1.90807	0.824654	-1.68597	O	-2.02808	0.651551	-1.90205
C	1.109026	1.394856	-0.02846	C	1.084155	1.404973	-0.42171
C	2.307346	-3.33508	0.352962	C	2.197046	-3.2602	0.517731
C	3.625883	-3.08459	-0.00264	C	3.497143	-3.10209	0.056821
C	3.969845	-1.82236	-0.51578	C	3.838339	-1.93473	-0.64779
C	2.994982	-0.84363	-0.65234	C	2.879631	-0.955	-0.86556
C	0.997322	2.507954	-0.87422	C	1.655866	1.723244	0.820879
C	1.389993	3.77321	-0.44192	C	2.095197	3.015106	1.089664
C	1.90318	3.95148	0.852974	C	1.974568	4.024044	0.116725
C	2.014999	2.850633	1.699496	C	1.408584	3.716745	-1.1162
C	1.622078	1.584712	1.26092	C	0.966449	2.416195	-1.38063
O	4.574854	-4.06056	0.140184	O	4.430524	-4.07758	0.281554
O	5.292973	-1.67012	-0.85653	O	5.142482	-1.87058	-1.07714
O	2.293539	5.19078	1.282872	O	2.413223	5.293849	0.376392
O	1.32578	4.913741	-1.20527	O	2.664122	3.416761	2.273473
H	0.450033	0.103059	-1.58178	H	0.329961	-0.04244	-1.77574
H	-0.31508	-3.73813	0.388633	H	-0.42492	-3.57451	0.760236
H	-0.25476	-2.57191	1.694839	H	-0.27338	-2.22818	1.871223
H	-2.65529	0.778166	1.379461	H	-2.62543	1.125974	1.159648
H	-4.42064	2.17415	0.886338	H	-4.38762	2.465443	0.524964
H	-3.7889	2.434001	-0.74163	H	-3.82359	2.45095	-1.14793

H	-5.9655	1.273071	-0.76826	H	-6.02418	1.359588	-0.89887
H	-4.70522	0.337899	-1.54376	H	-4.82076	0.28372	-1.57522
H	-6.47821	-0.57993	0.502196	H	-6.51146	-0.26067	0.66603
H	-4.95232	-0.37669	1.336626	H	-4.94272	0.026386	1.388904
H	-5.15889	-2.66285	0.538491	H	-5.23244	-2.34916	0.963999
H	-5.49851	-2.1314	-1.11059	H	-5.6425	-2.06783	-0.73025
H	-3.24448	-1.74433	-1.47669	H	-3.399	-1.78222	-1.25061
H	-1.09191	-1.99408	-1.17984	H	-1.23974	-2.05783	-1.01669
H	-0.69533	-0.1379	1.205805	H	-0.71354	0.11347	1.056306
H	2.053669	-4.31929	0.736186	H	1.944282	-4.17426	1.047356
H	3.274357	0.129324	-1.04862	H	3.156543	-0.05503	-1.40913
H	0.588748	2.387698	-1.8742	H	1.768813	0.955314	1.5824
H	2.414359	2.997933	2.69795	H	1.320572	4.500612	-1.86168
H	1.726379	0.736429	1.930046	H	0.516702	2.190836	-2.34204
H	5.418565	-3.68792	-0.15753	H	5.25992	-3.78169	-0.12324
H	5.458572	-0.76749	-1.15931	H	5.297918	-1.04184	-1.54918
H	2.128664	5.812839	0.558136	H	2.771869	5.297233	1.276809
H	0.918398	4.722305	-2.06047	H	2.740309	2.668072	2.879924
Conf 3	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 4**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	1.219677	-2.29235	0.286097	C	1.33636	-2.3437	0.236542
C	1.570933	-1.10825	-0.38122	C	1.676287	-1.08654	-0.29071
C	0.5543	-0.00758	-0.69839	C	0.639601	0.022371	-0.50703
C	-0.19446	-2.53932	0.773149	C	-0.08456	-2.66465	0.66012
N	-2.7629	1.22046	0.200885	N	-2.79757	0.974462	0.39965
C	-1.8996	0.619567	-0.65361	C	-1.8343	0.589352	-0.48013
C	-4.01752	1.828251	-0.2342	C	-4.0639	1.587533	0.019409
C	-5.11039	0.813802	-0.62731	C	-5.29974	0.722589	0.345402
C	-5.42925	-0.25303	0.450891	C	-5.58833	-0.49621	-0.57412
C	-5.03942	-1.69517	0.06723	C	-4.93499	-1.84284	-0.20098
N	-3.63871	-1.85481	-0.3121	N	-3.50879	-1.90017	-0.49335
C	-2.62765	-1.86467	0.593902	C	-2.53507	-2.05058	0.447269
C	-1.22424	-1.71772	-0.00523	C	-1.11167	-1.79246	-0.06609
C	-0.80162	-0.21882	0.014523	C	-0.73424	-0.29387	0.128376
O	-2.82073	-1.92319	1.810901	O	-2.78092	-2.29113	1.629214
O	-2.02645	0.674372	-1.88038	O	-1.89691	0.832935	-1.68609
C	1.083219	1.397775	-0.41832	C	1.13071	1.393831	-0.04075
C	2.194853	-3.27873	0.501199	C	2.333244	-3.32193	0.389369
C	3.502535	-3.10834	0.066675	C	3.648366	-3.07774	0.009961
C	3.85166	-1.92799	-0.61133	C	3.982869	-1.83256	-0.53729
C	2.893163	-0.94791	-0.82929	C	3.003988	-0.85536	-0.68818

C	1.611729	1.728249	0.839352	C	0.995554	2.512137	-0.87665
C	2.053322	3.018726	1.110675	C	1.407937	3.776121	-0.45002
C	1.975612	4.010783	0.116279	C	1.966652	3.945111	0.822951
C	1.454186	3.694923	-1.13402	C	2.101731	2.839313	1.660542
C	1.009343	2.394119	-1.39686	C	1.685894	1.575548	1.231762
O	4.435514	-4.08416	0.291792	O	4.607626	-4.04977	0.166817
O	5.161839	-1.85463	-1.02163	O	5.301686	-1.67748	-0.8966
O	2.446556	5.246409	0.488585	O	2.377036	5.187684	1.24401
O	2.566799	3.316289	2.343441	O	1.311289	4.919457	-1.20699
H	0.333567	-0.0541	-1.77191	H	0.471553	0.09042	-1.58866
H	-0.43195	-3.60534	0.688703	H	-0.29792	-3.72134	0.464301
H	-0.29079	-2.29003	1.837182	H	-0.19747	-2.52024	1.741049
H	-2.60855	1.105589	1.190675	H	-2.67143	0.747858	1.375591
H	-4.36838	2.458464	0.587699	H	-4.15811	2.547947	0.544088
H	-3.80631	2.481532	-1.08561	H	-4.01759	1.802628	-1.04871
H	-6.01017	1.39419	-0.8604	H	-5.2469	0.397148	1.391304
H	-4.81199	0.329106	-1.56308	H	-6.16684	1.392388	0.282829
H	-6.50368	-0.26021	0.666493	H	-5.33563	-0.24801	-1.61207
H	-4.9318	0.000221	1.393523	H	-6.67217	-0.6678	-0.56207
H	-5.24036	-2.36341	0.908722	H	-5.06052	-2.04886	0.862544
H	-5.64431	-2.03476	-0.77845	H	-5.44309	-2.64541	-0.75326
H	-3.39741	-1.75068	-1.28603	H	-3.22729	-1.7159	-1.44552
H	-1.23996	-2.04883	-1.05088	H	-1.0735	-2.02001	-1.13819
H	-0.70432	0.079594	1.064787	H	-0.67805	-0.10302	1.205858
H	1.936592	-4.2015	1.012813	H	2.087745	-4.29448	0.804365
H	3.17617	-0.03829	-1.35303	H	3.273722	0.107056	-1.11526
H	1.695749	0.980907	1.6224	H	0.553035	2.393276	-1.86175
H	1.395344	4.461284	-1.90262	H	2.53463	2.976714	2.645671
H	0.592709	2.159293	-2.37051	H	1.802902	0.724689	1.895924
H	5.274438	-3.77117	-0.07905	H	5.457361	-3.69876	-0.14873
H	5.336735	-0.99652	-1.43018	H	5.454799	-0.77847	-1.21818
H	2.352815	5.873686	-0.24061	H	2.199068	5.828737	0.535369
H	2.816579	4.252776	2.335085	H	0.863344	4.726958	-2.04217
Conf 5	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 6**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	1.308841	-2.34673	0.245372	C	1.356863	-2.3259	0.220882
C	1.651671	-1.09168	-0.28171	C	1.680761	-1.05696	-0.28471
C	0.622516	0.019699	-0.50175	C	0.628636	0.033769	-0.50251
C	-0.1138	-2.66997	0.65801	C	-0.06166	-2.68667	0.615328
N	-2.76001	1.071827	0.371711	N	-2.76552	1.01291	0.417232
C	-1.84602	0.582027	-0.50049	C	-1.84966	0.559303	-0.4723

C	-4.01032	1.694844	-0.05456	C	-4.02678	1.630538	0.016228
C	-5.05696	0.703732	-0.60275	C	-5.06291	0.641643	-0.55522
C	-5.39442	-0.47811	0.341391	C	-5.37543	-0.57514	0.352489
C	-4.94869	-1.86201	-0.17302	C	-4.90774	-1.93387	-0.20734
N	-3.52906	-1.94744	-0.5019	N	-3.48684	-1.98608	-0.53742
C	-2.55772	-2.03776	0.442742	C	-2.51519	-2.09681	0.404825
C	-1.13469	-1.79617	-0.07407	C	-1.09557	-1.81605	-0.10171
C	-0.75532	-0.29916	0.123971	C	-0.74081	-0.317	0.12523
O	-2.79987	-2.24007	1.63521	O	-2.75544	-2.34835	1.588228
O	-1.92358	0.759814	-1.71977	O	-1.93747	0.766011	-1.68658
C	1.10958	1.39001	-0.03146	C	1.084483	1.413169	-0.02921
C	2.298609	-3.33335	0.377299	C	2.36715	-3.2929	0.350399
C	3.612347	-3.09283	-0.00194	C	3.678679	-3.01489	-0.01128
C	3.953325	-1.83969	-0.53919	C	4.003651	-1.74876	-0.52716
C	2.980477	-0.8591	-0.67565	C	3.007989	-0.79077	-0.65932
C	1.009454	2.498345	-0.88317	C	0.95091	2.523883	-0.87484
C	1.408598	3.764697	-0.45987	C	1.321359	3.796091	-0.44329
C	1.916657	3.940159	0.83728	C	1.832553	3.983694	0.851035
C	2.018316	2.84552	1.693357	C	1.9652	2.88525	1.6976
C	1.617631	1.579499	1.260008	C	1.594775	1.612345	1.259723
O	4.559715	-4.07054	0.139762	O	4.727453	-3.89746	0.081978
O	5.272406	-1.697	-0.89856	O	5.288631	-1.459	-0.90234
O	2.2829	5.226071	1.153969	O	2.200667	5.229976	1.280594
O	1.303844	4.829376	-1.31267	O	1.231862	4.935785	-1.20516
H	0.443719	0.09926	-1.58107	H	0.446963	0.110086	-1.58181
H	-0.32268	-3.72734	0.462741	H	-0.24905	-3.74281	0.392778
H	-0.252	-2.527	1.736892	H	-0.20973	-2.57324	1.696386
H	-2.64397	0.860184	1.350788	H	-2.63677	0.784787	1.390932
H	-4.41354	2.226178	0.811912	H	-4.43217	2.129769	0.900602
H	-3.7796	2.439398	-0.82176	H	-3.81182	2.401116	-0.72961
H	-5.96104	1.284972	-0.81601	H	-5.97708	1.215997	-0.74272
H	-4.70406	0.327577	-1.56895	H	-4.71269	0.30201	-1.53579
H	-6.47663	-0.53163	0.505262	H	-6.45596	-0.65292	0.517872
H	-4.94541	-0.31581	1.327391	H	-4.92562	-0.43588	1.341668
H	-5.16581	-2.61966	0.584285	H	-5.11316	-2.7199	0.523849
H	-5.50703	-2.12509	-1.07616	H	-5.46174	-2.17499	-1.11926
H	-3.24829	-1.72134	-1.44421	H	-3.20884	-1.7214	-1.47049
H	-1.09727	-2.01419	-1.14832	H	-1.0522	-2.01204	-1.18011
H	-0.71226	-0.11395	1.20325	H	-0.6905	-0.15216	1.20767
H	2.046965	-4.31151	0.776992	H	2.119097	-4.2794	0.736006

H	3.257309	0.107277	-1.09007	H	3.281873	0.181449	-1.05632
H	0.608465	2.390031	-1.88592	H	0.544411	2.396001	-1.87484
H	2.414865	2.982461	2.696203	H	2.364587	3.03968	2.694979
H	1.713303	0.73402	1.933892	H	1.716337	0.765884	1.928313
H	5.397486	-3.7092	-0.1872	H	4.425673	-4.73707	0.4536
H	5.425719	-0.81494	-1.26219	H	5.824968	-2.24713	-0.72791
H	2.618669	5.264291	2.059378	H	2.039111	5.846388	0.550333
H	1.622798	5.612123	-0.83814	H	0.871733	4.728452	-2.07772
Conf 7	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 8**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	1.265203	-2.26213	0.322193	C	1.241254	-2.27945	0.279539
C	1.594326	-1.09394	-0.38334	C	1.579508	-1.09269	-0.38968
C	0.567477	-0.00409	-0.70208	C	0.550288	-0.00196	-0.70025
C	-0.13955	-2.50638	0.837242	C	-0.16915	-2.54271	0.76903
N	-2.79336	1.147949	0.170208	N	-2.76099	1.213951	0.207564
C	-1.90258	0.572303	-0.67356	C	-1.90778	0.601465	-0.64795
C	-4.06906	1.713909	-0.24907	C	-4.01886	1.820035	-0.22109
C	-5.30296	0.938117	0.252824	C	-5.11113	0.804062	-0.61243
C	-5.65357	-0.39914	-0.44533	C	-5.41662	-0.27323	0.459247
C	-5.00227	-1.68796	0.09246	C	-5.02246	-1.7095	0.058925
N	-3.59557	-1.83535	-0.25653	N	-3.62111	-1.8588	-0.3213
C	-2.5844	-1.86373	0.648807	C	-2.61182	-1.8995	0.586665
C	-1.18474	-1.72319	0.040763	C	-1.20812	-1.73139	-0.00775
C	-0.78469	-0.21903	0.017239	C	-0.8015	-0.22828	0.016231
O	-2.76396	-1.9301	1.867595	O	-2.8063	-2.00738	1.799841
O	-2.01214	0.602954	-1.90301	O	-2.05311	0.633669	-1.87381
C	1.085444	1.408313	-0.43434	C	1.06674	1.407484	-0.41916
C	2.251446	-3.2366	0.541899	C	2.229314	-3.25494	0.490685
C	3.548434	-3.06843	0.076105	C	3.533014	-3.06407	0.05238
C	3.875292	-1.90394	-0.63988	C	3.87195	-1.88088	-0.62583
C	2.90569	-0.93655	-0.86395	C	2.897978	-0.91544	-0.83977
C	1.660439	1.742683	0.802561	C	1.589912	1.742234	0.839575
C	2.08606	3.041578	1.058746	C	2.023864	3.035324	1.110274
C	1.947938	4.041456	0.078851	C	1.942547	4.025991	0.114735
C	1.378476	3.718417	-1.14832	C	1.426354	3.70593	-1.13651
C	0.950134	2.410862	-1.40016	C	0.99009	2.402064	-1.39907
O	4.492847	-4.03154	0.307263	O	4.560495	-3.96123	0.217251
O	5.177474	-1.82951	-1.07341	O	5.149123	-1.67883	-1.07738
O	2.373111	5.318108	0.326266	O	2.401865	5.265692	0.488086
O	2.656871	3.458754	2.236244	O	2.532345	3.337298	2.343982

H	0.344122	-0.05862	-1.77435	H	0.326516	-0.04796	-1.77312
H	-0.36669	-3.57707	0.794268	H	-0.39556	-3.61119	0.684495
H	-0.22605	-2.21928	1.892457	H	-0.2674	-2.29545	1.833332
H	-2.62301	1.076354	1.162877	H	-2.58579	1.129368	1.196809
H	-4.13309	2.747564	0.11147	H	-4.36735	2.446076	0.604825
H	-4.05039	1.746706	-1.34006	H	-3.81463	2.477464	-1.07126
H	-5.21689	0.780678	1.33597	H	-6.0151	1.382967	-0.83252
H	-6.15646	1.613023	0.117232	H	-4.82008	0.328319	-1.55504
H	-5.4609	-0.31682	-1.52316	H	-6.48922	-0.2869	0.683534
H	-6.73567	-0.54719	-0.34816	H	-4.91196	-0.02627	1.399786
H	-5.05675	-1.72437	1.182313	H	-5.21909	-2.38849	0.892502
H	-5.56086	-2.5498	-0.29348	H	-5.62696	-2.04138	-0.7903
H	-3.35284	-1.76798	-1.23466	H	-3.37607	-1.70742	-1.28835
H	-1.20025	-2.08346	-0.99527	H	-1.21881	-2.05959	-1.05438
H	-0.69495	0.110423	1.058905	H	-0.70487	0.067616	1.067267
H	2.009924	-4.14857	1.080376	H	1.970242	-4.17906	1.002946
H	3.1715	-0.03867	-1.41654	H	3.182069	-0.00716	-1.36154
H	1.78644	0.982076	1.569399	H	1.678283	0.995813	1.623149
H	1.276757	4.495486	-1.89921	H	1.364566	4.471202	-1.90594
H	0.497116	2.172996	-2.35703	H	0.579054	2.16398	-2.37452
H	5.317306	-3.72919	-0.10279	H	4.253574	-4.73331	0.71104
H	5.322186	-1.00343	-1.55351	H	5.671182	-2.45447	-0.82243
H	2.736842	5.33116	1.224548	H	2.341561	5.881958	-0.25394
H	2.746237	2.715145	2.847181	H	2.793014	4.270749	2.329297

Table S2. The Cartesian coordinates of the lowest energy conformers for (2*S*,4*S*)-**2**

Conf 1	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 2**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	1.135035	-0.48052	0.030173	C	1.047095	-0.40583	-0.24512
N	0.094545	1.718918	0.111475	N	0.104383	1.764968	0.328024
O	-0.15638	-0.97613	-0.3712	O	-0.15349	-0.62408	-1.01005
O	-6.01665	0.254998	-1.36366	O	-5.77885	-0.81491	1.357816
C	-5.65801	-1.01384	-0.81672	C	-5.53792	-1.38927	0.073417
C	-4.98382	-0.89592	0.560318	C	-5.06287	-0.35346	-0.95906
O	4.752576	1.361887	-0.81524	O	4.834419	1.220589	0.208653
C	3.629495	0.878714	-0.63523	C	3.679469	0.824556	0.017993
O	4.514891	-1.2615	-1.23359	O	4.579524	-1.11746	-1.05057
C	3.539028	-0.662	-0.45568	C	3.4903	-0.6811	-0.31574
C	2.427508	1.634225	-0.44515	C	2.496369	1.608244	0.212244
C	1.229061	1.030272	-0.14835	C	1.238302	1.07098	0.079243

C	2.160772	-1.16954	-0.86661	C	2.205992	-0.89668	-1.10963
C	1.425672	-0.86484	1.497242	C	1.014002	-1.23986	1.054108
C	2.871402	-0.52482	1.878242	C	2.363406	-1.18118	1.779797
O	3.813879	-1.00706	0.907622	O	3.464311	-1.44529	0.896082
C	-1.15719	1.112337	0.278585	C	-1.17907	1.270099	0.061274
C	-1.26001	-0.26448	0.031372	C	-1.28548	0.047045	-0.61722
C	-2.4868	-0.90872	0.138486	C	-2.53306	-0.46488	-0.95297
C	-3.64097	-0.19792	0.498414	C	-3.70574	0.23126	-0.62596
C	-3.52451	1.177642	0.751929	C	-3.58777	1.447015	0.065606
C	-2.29708	1.829461	0.647587	C	-2.33985	1.964032	0.408889
H	0.134755	2.730092	0.095754	H	0.190118	2.726931	0.631184
H	-5.1953	0.739036	-1.52265	H	-4.93202	-0.48163	1.683772
H	-6.59255	-1.57606	-0.72611	H	-4.80538	-2.2089	0.134049
H	-4.99937	-1.57108	-1.50045	H	-6.49164	-1.82107	-0.24524
H	-4.87445	-1.90179	0.983139	H	-5.81009	0.446034	-0.99652
H	-5.66055	-0.33812	1.216025	H	-5.04299	-0.82898	-1.94705
H	5.249069	-0.62169	-1.23188	H	5.323625	-0.58708	-0.71386
H	2.500018	2.716261	-0.52137	H	2.627504	2.649871	0.494265
H	2.10913	-2.25284	-0.7291	H	2.081871	-1.95996	-1.33126
H	1.971457	-0.93108	-1.91496	H	2.246298	-0.33693	-2.046
H	0.737783	-0.35579	2.180139	H	0.222186	-0.89094	1.724904
H	1.251505	-1.94226	1.579567	H	0.78218	-2.2683	0.76017
H	3.145604	-1.01033	2.816923	H	2.487791	-0.20559	2.267837
H	2.981011	0.559036	2.014953	H	2.418158	-1.95135	2.551707
H	-2.52455	-1.97458	-0.06449	H	-2.57145	-1.40916	-1.48733
H	-4.40213	1.746068	1.041035	H	-4.48128	2.001378	0.332537
H	-2.21726	2.894796	0.843964	H	-2.25838	2.911898	0.933018
Conf 3	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 4**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	1.091162	-0.41199	0.170605	C	1.035473	-0.34303	-0.27074
N	0.124459	1.791103	-0.27495	N	0.183328	1.851154	0.352447
O	-0.22279	-0.95306	-0.08744	O	-0.17678	-0.48403	-1.03269
O	-5.35065	-1.57121	-1.46006	O	-4.8557	-2.09916	0.666279
C	-5.87612	-0.59316	-0.5601	C	-5.62871	-0.93481	0.396674
C	-5.0521	-0.4764	0.729069	C	-5.06897	-0.1116	-0.77862
O	4.744745	1.00672	-1.20523	O	4.87879	1.167735	0.067718
C	3.644288	0.63768	-0.79151	C	3.697548	0.790124	0.031711
O	4.440408	-1.6128	-0.88802	O	4.531245	-1.1349	-1.12932
C	3.490987	-0.80129	-0.25145	C	3.46129	-0.69693	-0.38462
C	2.451872	1.472992	-0.80073	C	2.559139	1.615223	0.228492
C	1.244303	1.014635	-0.35522	C	1.280603	1.120389	0.088573

C	2.088446	-1.31719	-0.55153	C	2.160421	-0.8584	-1.16458
C	1.393747	-0.46278	1.681415	C	0.974598	-1.21728	1.003919
C	2.856604	-0.11546	1.970613	C	2.332412	-1.2432	1.715854
O	3.761284	-0.85761	1.144055	O	3.417543	-1.5036	0.811147
C	-1.14631	1.271468	0.001236	C	-1.12219	1.393628	0.126064
C	-1.29672	-0.11514	0.099298	C	-1.27917	0.190664	-0.57719
C	-2.55131	-0.67545	0.339601	C	-2.54994	-0.28665	-0.88048
C	-3.68205	0.136686	0.503303	C	-3.68892	0.433128	-0.4975
C	-3.51974	1.52795	0.418077	C	-3.51767	1.632881	0.215499
C	-2.26761	2.090004	0.174959	C	-2.25076	2.114964	0.524141
H	0.194164	2.765569	-0.53528	H	0.305631	2.804364	0.674351
H	-4.47142	-1.2652	-1.72526	H	-3.96991	-1.80514	0.921022
H	-5.94728	0.388454	-1.0492	H	-6.6345	-1.28821	0.150861
H	-6.89376	-0.91895	-0.3221	H	-5.70799	-0.29551	1.290368
H	-4.94424	-1.4807	1.151576	H	-5.76834	0.705964	-0.98521
H	-5.61023	0.120827	1.461219	H	-5.04331	-0.75704	-1.66377
H	5.246618	-1.06954	-0.94126	H	5.269889	-0.57445	-0.82246
H	2.584444	2.487283	-1.16112	H	2.707335	2.654019	0.51817
H	1.985561	-2.34566	-0.19238	H	1.996872	-1.91258	-1.40333
H	1.897394	-1.32247	-1.62876	H	2.210633	-0.27087	-2.08281
H	1.174204	-1.48156	2.018888	H	0.206996	-0.85085	1.692312
H	0.736348	0.211079	2.242033	H	0.697415	-2.22391	0.675906
H	3.11128	-0.37689	3.000761	H	2.365293	-2.05014	2.450076
H	3.032897	0.962678	1.8569	H	2.494044	-0.29409	2.241185
H	-2.63075	-1.75595	0.399029	H	-2.63183	-1.21504	-1.43795
H	-4.37669	2.182398	0.54585	H	-4.38936	2.20232	0.523649
H	-2.1605	3.16915	0.111345	H	-2.1238	3.050118	1.062125
Conf 5	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 6**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	1.138856	-0.50561	-0.03037	C	1.097837	-0.4429	-0.22168
N	0.036932	1.646499	0.258153	N	0.097105	1.743931	0.156881
O	-0.12465	-0.9848	-0.52765	O	-0.07847	-0.73339	-0.99602
O	-6.37681	0.557734	-0.69214	O	-6.07665	-0.17594	1.182859
C	-5.87553	-0.76377	-0.91061	C	-5.67882	-1.24574	0.330883
C	-4.97532	-1.13315	0.272648	C	-4.98734	-0.65287	-0.9064
O	4.729988	1.505163	-0.54445	O	4.832117	1.331625	0.059779
C	3.616244	0.977171	-0.45167	C	3.676766	0.878711	0.038694
O	4.577072	-1.05998	-1.25891	O	4.663098	-1.09029	-0.90508
C	3.561473	-0.57556	-0.4504	C	3.54348	-0.65291	-0.23609
C	2.388343	1.679153	-0.22264	C	2.485912	1.646268	0.119544
C	1.197541	1.018341	-0.03617	C	1.243492	1.06136	-0.00372

C	2.210962	-1.06437	-0.96292	C	2.28048	-0.97007	-1.03043
C	1.394733	-1.04635	1.393223	C	1.049704	-1.18989	1.132002
C	2.818551	-0.72044	1.85894	C	2.383471	-1.06215	1.877559
O	3.802793	-1.0686	0.8729	O	3.509995	-1.34199	1.031418
C	-1.20205	0.992959	0.315419	C	-1.17199	1.184003	-0.05158
C	-1.25909	-0.34739	-0.08403	C	-1.23497	-0.09035	-0.63207
C	-2.47209	-1.02993	-0.08628	C	-2.46475	-0.67547	-0.91045
C	-3.65434	-0.39155	0.307252	C	-3.65609	0.000766	-0.62182
C	-3.58409	0.949829	0.718787	C	-3.58059	1.278015	-0.04007
C	-2.37359	1.6365	0.725418	C	-2.35366	1.867438	0.245447
H	0.047751	2.654241	0.352179	H	0.152105	2.729813	0.385654
H	-6.85967	0.824141	-1.48453	H	-6.42705	-0.55814	1.998115
H	-6.69609	-1.49372	-0.98634	H	-4.99531	-1.9337	0.852328
H	-5.29601	-0.81913	-1.84416	H	-6.55175	-1.83214	0.009174
H	-4.79521	-2.21263	0.239707	H	-5.68017	0.074544	-1.34732
H	-5.54403	-0.93236	1.18827	H	-4.85562	-1.45529	-1.63991
H	5.294027	-0.40847	-1.15887	H	5.353889	-0.45392	-0.63677
H	2.435094	2.764284	-0.17696	H	2.563095	2.716137	0.304943
H	2.183381	-2.15733	-0.95065	H	2.188143	-2.05048	-1.16915
H	2.048226	-0.71377	-1.98407	H	2.324983	-0.47156	-2.00032
H	0.672794	-0.63433	2.105846	H	0.24029	-0.80628	1.76065
H	1.246376	-2.1299	1.348244	H	0.842915	-2.23909	0.898979
H	3.075201	-1.30316	2.745976	H	2.440994	-1.79022	2.688771
H	2.897018	0.342925	2.120801	H	2.472326	-0.05829	2.310574
H	-2.47507	-2.06756	-0.40585	H	-2.47296	-1.66144	-1.3666
H	-4.48785	1.460857	1.027443	H	-4.49523	1.807948	0.197368
H	-2.32788	2.675462	1.039964	H	-2.29802	2.857945	0.688455
Conf 7	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 8**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	1.114185	-0.45053	0.091344	C	1.082769	-0.40876	-0.16049
N	0.193095	1.813211	-0.02741	N	0.23718	1.83571	0.32337
O	-0.1993	-0.91969	-0.28308	O	-0.16573	-0.64732	-0.84593
O	-7.00803	-1.18929	-0.68411	O	-6.88569	-1.45456	0.152137
C	-5.70871	-0.61991	-0.88591	C	-5.56403	-1.01325	0.485463
C	-5.03599	-0.48811	0.475339	C	-5.05178	-0.15194	-0.66286
O	4.825909	1.097509	-0.95017	O	4.941586	1.129655	-0.11987
C	3.708846	0.688873	-0.62813	C	3.780071	0.718386	-0.10527
O	4.474274	-1.53327	-1.05697	O	4.558698	-1.30551	-1.10727
C	3.519227	-0.81384	-0.32495	C	3.515617	-0.7871	-0.3272
C	2.529671	1.537635	-0.53567	C	2.618004	1.574294	0.085744

C	1.303272	1.037922	-0.19902	C	1.344586	1.079134	0.069829
C	2.11841	-1.24972	-0.73839	C	2.187851	-0.97511	-1.05149
C	1.373226	-0.7436	1.582774	C	1.100826	-1.17036	1.180112
C	2.832229	-0.47352	1.960131	C	2.488349	-1.13161	1.826012
O	3.748964	-1.09388	1.050655	O	3.522923	-1.49769	0.905214
C	-1.09296	1.281252	0.129801	C	-1.06798	1.371655	0.115562
C	-1.26649	-0.10131	0.004858	C	-1.24757	0.11396	-0.47013
C	-2.53402	-0.66847	0.121174	C	-2.52882	-0.36723	-0.7326
C	-3.65633	0.129411	0.380402	C	-3.66124	0.389333	-0.40351
C	-3.47266	1.512469	0.519776	C	-3.47403	1.639556	0.203298
C	-2.20574	2.083405	0.400719	C	-2.19301	2.125663	0.463351
H	0.284567	2.815001	-0.12864	H	0.36355	2.812104	0.553723
H	-7.41948	-1.28593	-1.55317	H	-7.1957	-2.01249	0.877684
H	-5.0922	-1.256	-1.53785	H	-5.56292	-0.42169	1.412906
H	-5.77648	0.372285	-1.35604	H	-4.88495	-1.86578	0.633412
H	-4.97974	-1.48174	0.936418	H	-5.75625	0.672607	-0.8235
H	-5.67809	0.116815	1.126257	H	-5.0634	-0.74999	-1.58218
H	5.289839	-1.00436	-1.0023	H	5.365475	-0.87449	-0.77368
H	2.687094	2.593266	-0.72826	H	2.824056	2.624121	0.263945
H	1.990432	-2.31975	-0.5486	H	2.010568	-2.03941	-1.2336
H	1.95784	-1.0825	-1.80761	H	2.199011	-0.47134	-2.02261
H	0.710326	-0.15379	2.225654	H	0.357519	-0.76746	1.877067
H	1.129258	-1.79834	1.750338	H	0.813374	-2.20548	0.965896
H	3.053991	-0.8975	2.942711	H	2.546221	-1.85528	2.642961
H	3.027146	0.605642	2.021431	H	2.69256	-0.14148	2.255247
H	-2.63087	-1.74331	0.007008	H	-2.62857	-1.33971	-1.20392
H	-4.32481	2.152797	0.725781	H	-4.33462	2.243674	0.473574
H	-2.08152	3.157042	0.51001	H	-2.06542	3.100753	0.924784

Table S3. The Cartesian coordinates of the lowest energy conformers for (3*R*,5′*S*)-**3**

Conf 1	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 2**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	0.529785	0.199714	-1.13889	C	-0.23173	0.261756	-0.80079
C	0.440871	-1.2029	-1.19414	C	0.176919	1.605536	-0.82214
C	-0.75146	-1.88223	-0.90308	C	1.521803	1.966087	-0.6464
C	-1.87922	-1.17371	-0.5129	C	2.481137	0.990455	-0.4011
C	-1.82962	0.230725	-0.42689	C	2.09998	-0.3631	-0.32851
C	-0.62922	0.903056	-0.76102	C	0.744559	-0.71162	-0.53725
C	-3.19148	-1.85423	-0.21775	C	3.944118	1.31999	-0.24473
C	-3.98415	-1.07111	0.829691	C	4.626405	0.328222	0.698911

O	-4.10393	0.319874	0.43986	O	4.359706	-1.03503	0.283036
C	-3.03409	0.991558	-0.02215	C	3.116336	-1.40809	-0.06607
O	-3.14529	2.214107	-0.09604	O	2.915794	-2.61687	-0.17517
C	-3.41838	-1.16052	2.245823	C	4.252861	0.49779	2.170411
O	-0.56413	2.250943	-0.76184	O	0.325769	-1.99744	-0.49198
C	1.783848	0.958951	-1.53839	C	-1.66085	-0.16988	-1.07238
O	1.498719	-1.97664	-1.56962	O	-0.72695	2.604568	-1.0505
C	2.943409	0.993959	-0.52279	C	-2.49526	-0.44779	0.198905
C	2.503362	1.218151	0.929543	C	-3.23623	0.803979	0.6946
N	3.68966	-0.27064	-0.40116	N	-3.62247	-1.35987	-0.00737
C	3.768576	-0.73057	0.89866	C	-4.83245	-0.83331	0.347926
O	4.385868	-1.70382	1.304974	O	-5.93174	-1.36867	0.308082
N	2.993917	0.14457	1.646545	N	-4.55961	0.467865	0.772808
O	1.865006	2.156622	1.368211	O	-2.75567	1.905407	0.942917
H	-0.77099	-2.96402	-0.97837	H	1.79449	3.01447	-0.69872
H	-3.77648	-1.90511	-1.14559	H	4.423772	1.262993	-1.23097
H	-3.03645	-2.87875	0.128104	H	4.082432	2.337428	0.128201
H	-5.01629	-1.43126	0.843411	H	5.71079	0.426678	0.601264
H	-3.38955	-2.20279	2.573781	H	4.514865	1.502658	2.511472
H	-2.4059	-0.74934	2.305937	H	3.182696	0.341881	2.338583
H	-4.04833	-0.59604	2.939875	H	4.794914	-0.22867	2.783324
H	-1.47947	2.53833	-0.54908	H	1.153779	-2.52081	-0.40114
H	2.182734	0.545876	-2.47332	H	-2.16256	0.573316	-1.69948
H	1.502356	1.988857	-1.76724	H	-1.63077	-1.09385	-1.6569
H	2.326183	-1.51741	-1.33997	H	-1.47447	2.477101	-0.42485
H	3.631042	1.804934	-0.79304	H	-1.85479	-0.81862	1.007082
H	4.354689	-0.61015	-1.08162	H	-3.5456	-2.32013	-0.30261
H	2.865	0.040789	2.643461	H	-5.28508	1.10565	1.071046
Conf 3	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 4**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	-0.62782	0.410928	-1.25045	C	-0.51309	0.646304	0.853017
C	-0.23721	1.744527	-1.06852	C	-0.21531	1.848038	0.174864
C	1.055416	2.09216	-0.648	C	0.992628	2.01614	-0.53015
C	1.986133	1.095158	-0.38219	C	1.919023	0.991683	-0.57213
C	1.632143	-0.25679	-0.54486	C	1.655999	-0.21865	0.104005
C	0.326399	-0.5835	-0.98837	C	0.433228	-0.38993	0.794334
C	3.399936	1.409111	0.037364	C	3.198408	1.063882	-1.37049
C	3.95441	0.304161	0.937557	C	4.306931	0.240556	-0.71
O	3.793137	-0.99056	0.306311	O	3.83626	-1.11644	-0.43557
C	2.626212	-1.32094	-0.27539	C	2.617449	-1.31368	0.095443
O	2.476827	-2.50465	-0.57243	O	2.375578	-2.42932	0.568406

C	3.353305	0.271258	2.341521	C	4.87205	0.849572	0.570606
O	-0.04641	-1.86457	-1.18602	O	0.162607	-1.54419	1.439456
C	-2.03237	0.082158	-1.712	C	-1.75792	0.479235	1.692437
O	-1.18401	2.695933	-1.31148	O	-1.04709	2.922823	0.202074
C	-3.09138	-0.00946	-0.59332	C	-2.97467	-0.15445	0.987532
C	-3.01986	-1.29821	0.235586	C	-3.43775	0.643019	-0.23726
N	-2.96104	1.007431	0.447804	N	-2.77408	-1.47831	0.412981
C	-2.74255	0.487171	1.694061	C	-3.15554	-1.57096	-0.88971
O	-2.55218	1.095922	2.740336	O	-3.12922	-2.53292	-1.64014
N	-2.79467	-0.8956	1.534703	N	-3.6048	-0.26866	-1.24015
O	-3.1583	-2.43999	-0.16733	O	-3.60565	1.856148	-0.30115
H	1.328935	3.13598	-0.52163	H	1.169444	2.953855	-1.04371
H	4.025225	1.485248	-0.86203	H	3.020635	0.671248	-2.38025
H	3.454756	2.369065	0.555972	H	3.532385	2.097469	-1.48648
H	5.03778	0.421565	1.024781	H	5.117998	0.075117	-1.42167
H	3.533049	1.222436	2.849256	H	5.320028	1.821238	0.345423
H	2.274514	0.088566	2.318335	H	4.092649	0.996873	1.323806
H	3.813843	-0.52805	2.929847	H	5.646541	0.201243	0.98809
H	0.776061	-2.38176	-1.04071	H	0.905036	-2.17052	1.244059
H	-2.35799	0.86539	-2.40435	H	-1.52846	-0.13173	2.568371
H	-2.03793	-0.85067	-2.28263	H	-2.09018	1.45207	2.06654
H	-0.78597	3.573693	-1.22113	H	-1.98507	2.647894	0.260269
H	-4.08987	0.024549	-1.04695	H	-3.80644	-0.1564	1.707669
H	-2.9168	2.000085	0.280238	H	-2.34322	-2.24819	0.894354
H	-2.68991	-1.53916	2.305924	H	-3.90228	-0.03146	-2.17679
Conf 5	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 6**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	-0.33834	-0.0773	-0.84435	C	0.310692	0.825851	0.481497
C	0.013459	-1.41958	-1.04981	C	-0.24241	2.013714	-0.02561
C	1.327132	-1.87785	-0.85703	C	-1.58715	2.105721	-0.42538
C	2.313956	-0.99638	-0.43248	C	-2.4104	0.999775	-0.31537
C	1.994811	0.355104	-0.20034	C	-1.90014	-0.20968	0.204357
C	0.668414	0.79902	-0.41712	C	-0.52722	-0.2956	0.570036
C	3.749459	-1.42357	-0.23797	C	-3.84966	1.009415	-0.7676
C	4.388729	-0.59369	0.870662	C	-4.68125	0.054048	0.079477
O	4.253163	0.81971	0.572503	O	-4.06654	-1.27472	0.080374
C	3.046481	1.305656	0.226752	C	-2.74871	-1.39052	0.321462
O	2.910182	2.527216	0.253935	O	-2.3157	-2.52312	0.56872
C	5.875856	-0.85645	1.057208	C	-6.10494	-0.13823	-0.40574
O	0.310255	2.086336	-0.21801	O	0.005076	-1.44837	1.01878
C	-1.74924	0.42563	-1.06593	C	1.75608	0.767142	0.910922

O	-0.97739	-2.26403	-1.44724	O	0.598073	3.075844	-0.11769
C	-2.54633	0.595779	0.236006	C	2.736505	0.496323	-0.25228
C	-3.94804	1.153231	-0.0413	C	4.204749	0.624288	0.186517
N	-2.87065	-0.65877	0.9175	N	2.700885	-0.86027	-0.77921
C	-4.21385	-0.87926	1.048064	C	3.894625	-1.50796	-0.69559
O	-4.7715	-1.84092	1.563293	O	4.175597	-2.64887	-1.026
N	-4.83114	0.22835	0.470804	N	4.79706	-0.57676	-0.1291
O	-4.22203	2.189641	-0.62394	O	4.728959	1.58969	0.707458
H	1.573086	-2.92076	-1.03578	H	-1.97031	3.042321	-0.8207
H	3.809296	-2.48549	0.012578	H	-4.27178	2.015862	-0.70262
H	4.306454	-1.26407	-1.17025	H	-3.91458	0.701253	-1.82058
H	3.860566	-0.77788	1.81387	H	-4.67645	0.398566	1.121371
H	6.038157	-1.90546	1.314545	H	-6.6373	0.816188	-0.36709
H	6.427297	-0.62828	0.139341	H	-6.1155	-0.5021	-1.4374
H	6.287147	-0.23386	1.858135	H	-6.63231	-0.85393	0.229151
H	1.157969	2.549345	-0.0349	H	-0.71616	-2.13063	0.979327
H	-1.71405	1.39621	-1.57207	H	2.05007	1.725616	1.345843
H	-2.28796	-0.25466	-1.73062	H	1.88661	-0.01431	1.662965
H	-0.59878	-3.13672	-1.62538	H	0.122446	3.84896	-0.45414
H	-2.02981	1.283511	0.914898	H	2.555471	1.235999	-1.04252
H	-2.20003	-1.33374	1.246919	H	1.865969	-1.33269	-1.08627
H	-5.83487	0.32906	0.420583	H	5.766421	-0.79931	0.051609
Conf 7	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 8**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	0.248061	-0.20493	0.685283	C	-0.2503	0.880397	-0.56705
C	-0.09426	-1.56634	0.72144	C	0.308857	2.06732	-0.06172
C	-1.36673	-2.02647	0.333344	C	1.679531	2.187247	0.231017
C	-2.32271	-1.12487	-0.09714	C	2.517067	1.101681	0.037265
C	-2.02677	0.254852	-0.12789	C	1.986293	-0.11447	-0.43356
C	-0.72922	0.70093	0.242726	C	0.608427	-0.21369	-0.74525
C	-3.67789	-1.55082	-0.60388	C	4.007939	1.160645	0.263776
C	-4.7371	-0.48777	-0.31224	C	4.54778	-0.2	0.712053
O	-4.28547	0.819625	-0.79367	O	4.114234	-1.2459	-0.20872
C	-3.02621	1.227291	-0.55785	C	2.841849	-1.27885	-0.6425
O	-2.76688	2.417052	-0.78001	O	2.447498	-2.31518	-1.18375
C	-5.14038	-0.37511	1.15476	C	4.173788	-0.59116	2.139799
O	-0.3948	2.003714	0.196536	O	0.093556	-1.37019	-1.21947
C	1.60963	0.293128	1.102477	C	-1.72167	0.801	-0.90396
O	0.865447	-2.42876	1.144541	O	-0.55273	3.100656	0.127046
C	2.527884	0.634942	-0.09239	C	-2.6161	0.44089	0.299907

C	3.882415	1.192964	0.371651	C	-4.1109	0.59085	-0.02803
N	2.936914	-0.50772	-0.89579	N	-2.54331	-0.95632	0.721056
C	4.285848	-0.68198	-0.94853	C	-3.74177	-1.60417	0.67168
O	4.927653	-1.54555	-1.52475	O	-3.99449	-2.7699	0.943379
N	4.837551	0.36931	-0.17977	N	-4.67351	-0.63887	0.237481
O	4.068078	2.158668	1.086668	O	-4.67296	1.58769	-0.44211
H	-1.58777	-3.08961	0.364928	H	2.076828	3.126895	0.604294
H	-3.62535	-1.71039	-1.68857	H	4.504319	1.447649	-0.67255
H	-3.98458	-2.50151	-0.15957	H	4.26517	1.918968	1.00681
H	-5.62263	-0.67669	-0.92201	H	5.634642	-0.21601	0.607704
H	-5.60734	-1.31024	1.477045	H	4.582728	0.141861	2.840291
H	-4.2751	-0.18538	1.796025	H	3.089101	-0.63009	2.276242
H	-5.86282	0.433931	1.287152	H	4.590551	-1.57176	2.38424
H	-1.18191	2.487255	-0.169003	H	0.851741	-1.98748	-1.36678
H	1.506126	1.215445	1.680699	H	-2.0633	1.77005	-1.27684
H	2.103106	-0.45506	1.725937	H	-1.88298	0.057049	-1.68709
H	0.516111	-3.33137	1.156364	H	-0.06622	3.883746	0.420686
H	2.032274	1.397701	-0.70532	H	-2.38536	1.119805	1.13028
H	2.304972	-1.14325	-1.35545	H	-1.6943	-1.44665	0.943814
H	5.833037	0.478296	-0.04188	H	-5.65292	-0.84921	0.10707

Table S4. The Cartesian coordinates of the lowest energy conformers for (3*R*,5′*R*)-**4**

Conf 1	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 2**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	0.304677	0.23183	-0.72614	C	-0.20824	0.280416	0.546998
C	-0.08112	1.582752	-0.69041	C	0.159741	1.625794	0.376993
C	-1.41943	1.960766	-0.48867	C	1.463694	1.989868	0.000298
C	-2.39051	0.993979	-0.26916	C	2.42007	1.011794	-0.23304
C	-2.02688	-0.36794	-0.23923	C	2.074128	-0.34881	-0.10674
C	-0.68159	-0.73538	-0.47736	C	0.754244	-0.70069	0.261458
C	-3.85052	1.328219	-0.06893	C	3.820437	1.332746	-0.69622
C	-4.49826	0.309549	0.864015	C	4.812934	0.274511	-0.20904
O	-4.28141	-1.03765	0.357349	O	4.351884	-1.0576	-0.56753
C	-3.04318	-1.40974	-0.01175	C	3.067727	-1.40225	-0.37657
O	-2.84594	-2.61644	-0.15893	O	2.802754	-2.6027	-0.45567
C	-6.00186	0.47139	1.022045	C	5.109728	0.326707	1.288236
O	-0.2979	-2.03064	-0.48736	O	0.372024	-1.99192	0.363762
C	1.720617	-0.2064	-1.03891	C	-1.58521	-0.13866	1.019599
O	0.84509	2.570854	-0.87491	O	-0.75172	2.623049	0.587004
C	2.602024	-0.4303	0.213113	C	-2.57777	-0.44673	-0.12748

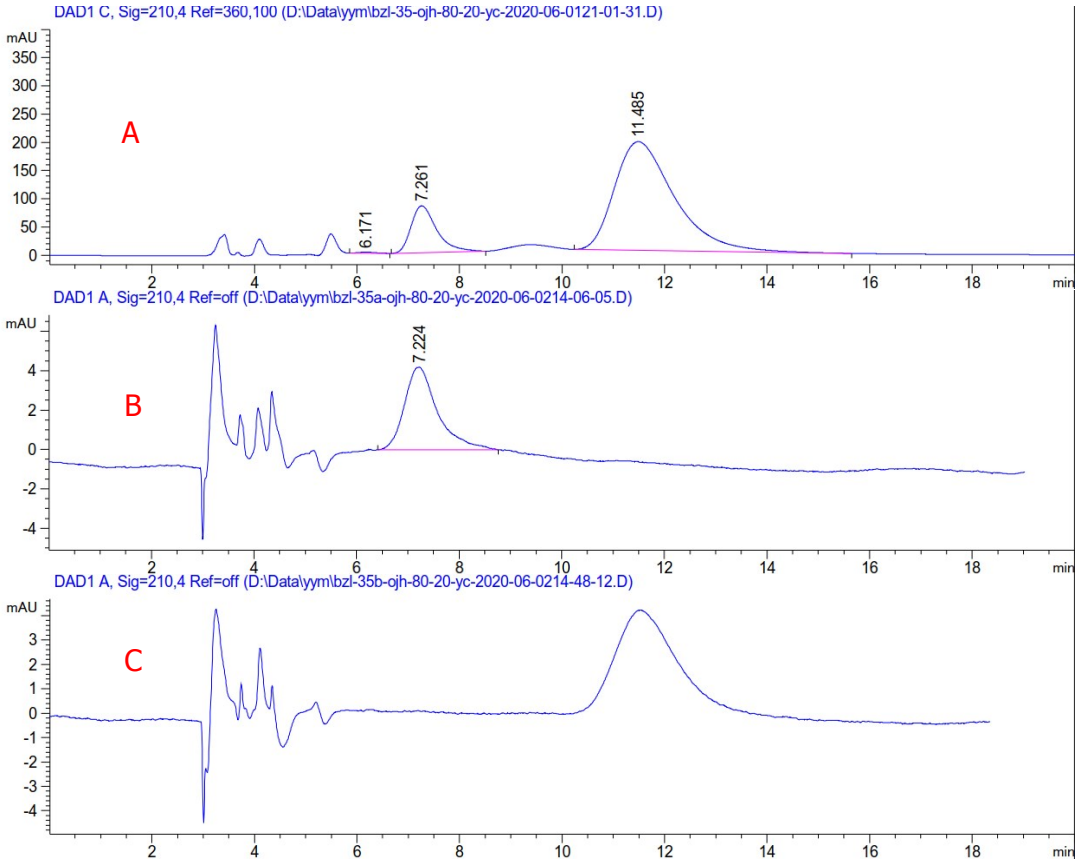
C	3.318822	0.859531	0.639027	C	-3.34357	0.809388	-0.56914
N	3.741645	-1.3286	0.014179	N	-3.68513	-1.33423	0.236004
C	4.9461	-0.77115	0.332471	C	-4.91949	-0.80398	-0.00399
O	6.058181	-1.27878	0.297313	O	-6.01865	-1.31195	0.1684
N	4.649784	0.55043	0.710399	N	-4.6723	0.491013	-0.49437
O	2.816172	1.962508	0.829223	O	-2.87235	1.898983	-0.87922
H	-1.67177	3.01504	-0.49257	H	1.700277	3.041392	-0.11593
H	-3.96674	2.33274	0.344164	H	3.837827	1.357362	-1.79398
H	-4.37078	1.302051	-1.03573	H	4.134837	2.318111	-0.34569
H	-4.01302	0.363369	1.846005	H	5.751582	0.375471	-0.7588
H	-6.22361	1.458133	1.434744	H	5.530621	1.301101	1.549259
H	-6.50456	0.372281	0.054806	H	4.206922	0.167918	1.88582
H	-6.409	-0.28723	1.697182	H	5.835082	-0.44668	1.556396
H	-1.13272	-2.54723	-0.40272	H	1.154391	-2.51474	0.0711
H	1.679244	-1.14667	-1.59462	H	-1.48657	-1.04003	1.62975
H	2.198691	0.528133	-1.69279	H	-2.00546	0.637058	1.665267
H	1.605299	2.383799	-0.28183	H	-1.56679	2.395336	0.08849
H	1.980297	-0.77505	1.047613	H	-2.03222	-0.84353	-0.99152
H	3.673476	-2.29931	-0.24023	H	-3.58374	-2.28579	0.545136
H	5.366887	1.216061	0.96322	H	-5.41629	1.135549	-0.72285
Conf 3	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 4**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	-0.62466	0.735798	-0.96019	C	-0.64003	0.646144	-0.96095
C	-0.35528	1.936349	-0.2688	C	-0.32558	1.86694	-0.3373
C	0.920339	2.209721	0.262207	C	0.916755	2.072784	0.283121
C	1.936529	1.281232	0.137717	C	1.869398	1.062373	0.294463
C	1.68831	0.053144	-0.5114	C	1.587113	-0.17551	-0.31727
C	0.415812	-0.20063	-1.07579	C	0.327243	-0.37233	-0.92998
C	3.342066	1.52231	0.632716	C	3.2054	1.220498	0.980565
C	4.008042	0.21286	1.062365	C	4.260224	0.393009	0.253682
O	3.900987	-0.78205	-0.00378	O	3.82895	-0.98952	0.159966
C	2.737348	-0.94928	-0.65497	C	2.592203	-1.26324	-0.29436
O	2.618343	-1.95709	-1.36029	O	2.369926	-2.42584	-0.6287
C	3.470584	-0.37697	2.363602	C	5.616096	0.377965	0.944209
O	0.179163	-1.3399	-1.76002	O	0.015	-1.54253	-1.53408
C	-1.94429	0.478461	-1.64805	C	-1.953	0.435508	-1.68332
O	-1.28348	2.919144	-0.1299	O	-1.18497	2.926354	-0.35086
C	-2.9866	-0.31936	-0.83842	C	-3.07773	-0.21411	-0.86166
C	-3.35682	0.357739	0.48616	C	-3.44262	0.600179	0.382085
N	-2.57794	-1.64129	-0.38353	N	-2.78209	-1.5124	-0.26741
C	-2.76551	-1.84064	0.949477	C	-3.01091	-1.55981	1.078908

O	-2.53766	-2.83069	1.625	O	-2.86377	-2.50748	1.838572
N	-3.29348	-0.61675	1.440528	N	-3.45099	-0.27982	1.428855
O	-3.63424	1.540734	0.650769	O	-3.64958	1.808874	0.430122
H	1.081266	3.152876	0.771251	H	1.116929	3.031602	0.748747
H	3.937385	1.973824	-0.17178	H	3.508688	2.2699	1.002524
H	3.350875	2.22693	1.46764	H	3.128189	0.86902	2.017632
H	5.086407	0.359364	1.149018	H	4.372744	0.766347	-0.77122
H	3.649331	0.324094	3.183478	H	6.006974	1.39534	1.016186
H	2.3956	-0.56988	2.304478	H	5.532255	-0.04055	1.952388
H	3.983307	-1.31432	2.593862	H	6.334191	-0.23226	0.387128
H	1.035664	-1.83684	-1.80349	H	0.784419	-2.12625	-1.34416
H	-2.41928	1.426741	-1.91651	H	-2.32415	1.39899	-2.04851
H	-1.76824	-0.06003	-2.58211	H	-1.78392	-0.1766	-2.57416
H	-2.18912	2.551004	-0.07909	H	-2.11472	2.623367	-0.29541
H	-3.90255	-0.37631	-1.44469	H	-3.97679	-0.27887	-1.49121
H	-2.13672	-2.33269	-0.96549	H	-2.39549	-2.30138	-0.75961
H	-3.48219	-0.46233	2.421714	H	-3.65887	-0.02029	2.38351
Conf 5	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 6**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	0.326355	-0.17536	-0.77378	C	0.267642	-0.061	-0.91415
C	-0.0324	-1.52959	-0.86122	C	-0.09004	-1.39245	-1.17796
C	-1.32761	-1.98049	-0.54424	C	-1.40928	-1.85655	-1.01653
C	-2.29249	-1.07583	-0.14161	C	-2.39337	-0.99327	-0.57187
C	-1.98015	0.298743	-0.0569	C	-2.07175	0.347324	-0.2669
C	-0.65754	0.733372	-0.35059	C	-0.73997	0.807992	-0.46309
C	-3.68436	-1.49409	0.257314	C	-3.83878	-1.39983	-0.44129
C	-4.68746	-0.39781	-0.07869	C	-4.52509	-0.64605	0.696802
O	-4.25853	0.874633	0.512025	O	-4.30683	0.798664	0.551538
C	-2.98093	1.269288	0.371865	C	-3.08937	1.267895	0.228215
O	-2.72819	2.462353	0.592358	O	-2.88829	2.479393	0.398902
C	-6.08841	-0.65254	0.44083	C	-4.10127	-1.08057	2.095235
O	-0.30252	2.024034	-0.23603	O	-0.39762	2.08503	-0.22616
C	1.713018	0.311117	-1.11271	C	1.671409	0.449775	-1.1204
O	0.931395	-2.39636	-1.26344	O	0.896364	-2.2216	-1.60416
C	2.574253	0.614852	0.135581	C	2.455469	0.625428	0.201399
C	3.958777	1.158052	-0.24732	C	3.859825	1.198379	-0.04069
N	2.923014	-0.547	0.935135	N	2.75666	-0.61122	0.902219
C	4.262882	-0.74593	1.053974	C	4.086999	-0.8262	1.083376
O	4.860788	-1.6292	1.644446	O	4.649644	-1.76543	1.619567
N	4.872179	0.310122	0.33326	N	4.737552	0.293581	0.508604
O	4.193535	2.12988	-0.93948	O	4.134634	2.233173	-0.61691

H	-1.55872	-3.0397	-0.61553	H	-1.64497	-2.89227	-1.24466
H	-3.97475	-2.41802	-0.25124	H	-4.36213	-1.18125	-1.38088
H	-3.71952	-1.69885	1.336643	H	-3.93253	-2.47632	-0.27164
H	-4.70544	-0.24266	-1.16485	H	-5.60806	-0.73755	0.595695
H	-6.4935	-1.55774	-0.02083	H	-4.39994	-2.12028	2.259398
H	-6.07924	-0.78977	1.525997	H	-3.01793	-1.01077	2.226168
H	-6.74497	0.184491	0.193028	H	-4.59084	-0.45897	2.848529
H	-1.09882	2.496581	0.127837	H	-1.23874	2.552168	0.02857
H	2.227425	-0.43059	-1.72685	H	2.223367	-0.22943	-1.77293
H	1.651453	1.247751	-1.67396	H	1.640786	1.438058	-1.58763
H	0.57154	-3.29397	-1.3086	H	0.532794	-3.09842	-1.79471
H	2.059571	1.374268	0.737064	H	1.904337	1.324437	0.842708
H	2.255446	-1.17913	1.349053	H	2.066073	-1.2771	1.212317
H	5.87549	0.400489	0.24715	H	5.744059	0.388048	0.493915
Conf 7	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**	**Conf 8**	**X axis(Å)**	**Y axis(Å)**	**Z axis(Å)**
C	0.327421	0.842627	-0.55108	C	-0.22558	0.792201	0.394677
C	-0.2254	2.043625	-0.08375	C	0.328644	1.965904	-0.14301
C	-1.58888	2.16436	0.225521	C	1.65465	2.02687	-0.60642
C	-2.42776	1.064657	0.090001	C	2.456961	0.902585	-0.53251
C	-1.9065	-0.1647	-0.35605	C	1.945899	-0.29327	0.015781
C	-0.52944	-0.25975	-0.6752	C	0.59157	-0.34692	0.450146
C	-3.90878	1.139701	0.376013	C	3.864112	0.8688	-1.07424
C	-4.404	-0.20953	0.886094	C	4.741481	-0.09428	-0.27475
O	-4.06237	-1.2526	-0.06249	O	4.090809	-1.40244	-0.17548
C	-2.80086	-1.33315	-0.52482	C	2.781792	-1.48508	0.119523
O	-2.48507	-2.374	-1.09793	O	2.340549	-2.60383	0.413273
C	-5.91137	-0.27837	1.082514	C	5.115764	0.392619	1.121808
O	0.013454	-1.42194	-1.10248	O	0.058027	-1.48401	0.935439
C	1.801346	0.756774	-0.89404	C	-1.64901	0.767598	0.894954
O	0.632798	3.090374	0.058413	O	-0.49156	3.046314	-0.20013
C	2.693356	0.453242	0.319275	C	-2.69263	0.519171	-0.21713
C	4.181713	0.606771	-0.02128	C	-4.13321	0.682289	0.295313
N	2.648916	-0.93779	0.772797	N	-2.71598	-0.83827	-0.74251
C	3.862922	-1.56493	0.732244	C	-3.9188	-1.4576	-0.5967
O	4.122366	-2.72235	1.039214	O	-4.24305	-2.59189	-0.90985
N	4.762309	-0.60855	0.26428	N	-4.76901	-0.50474	0.013072
O	4.730051	1.598202	-0.47445	O	-4.60746	1.660493	0.839771
H	-1.98916	3.11256	0.573359	H	2.038635	2.952856	-1.02499
H	-4.12399	1.916527	1.113771	H	3.841839	0.541636	-2.12173

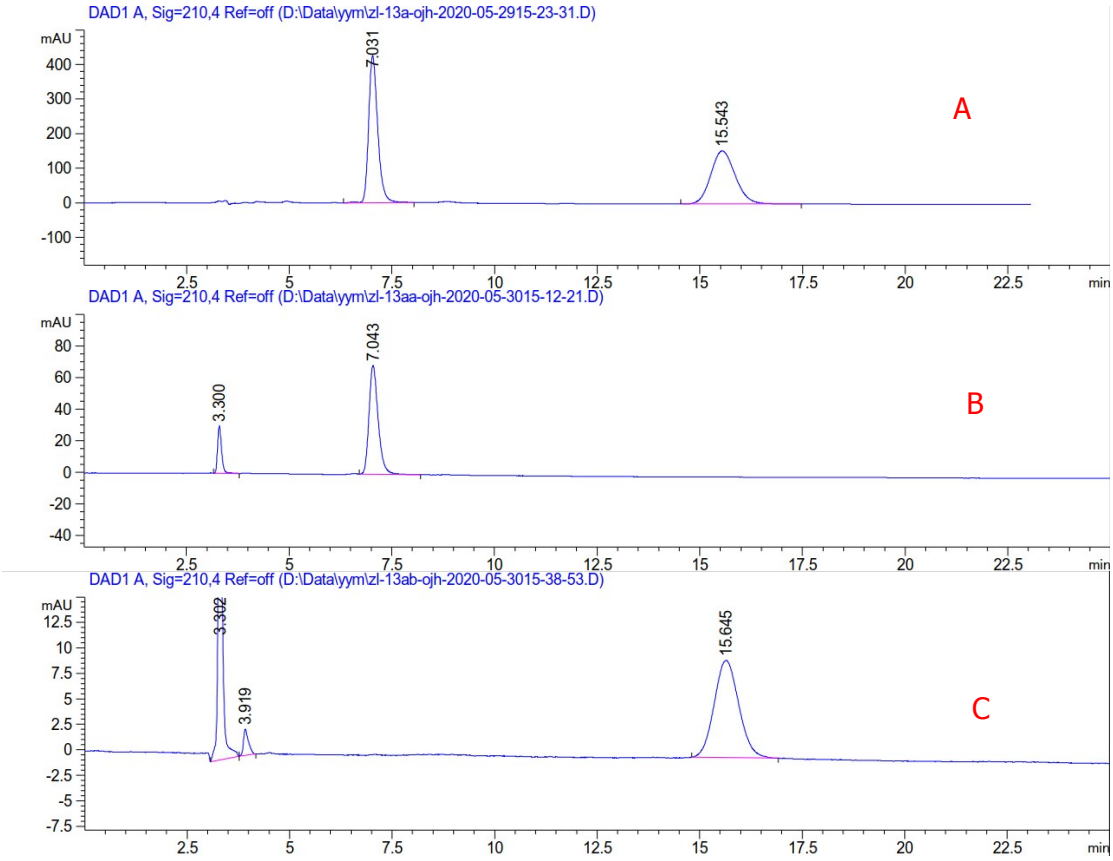
H	-4.44585	1.391933	-0.54742	H	4.314196	1.865125	-1.06448
H	-3.89801	-0.45048	1.82865	H	5.648313	-0.31845	-0.83961
H	-6.22492	0.469822	1.813898	H	5.722045	1.299423	1.040965
H	-6.43373	-0.0908	0.138832	H	4.228805	0.625338	1.717658
H	-6.21564	-1.26625	1.442768	H	5.702253	-0.36809	1.642687
H	-0.75861	-2.01588	-1.23526	H	0.764966	-2.17977	0.87286
H	1.96434	-0.00994	-1.65578	H	-1.76073	-0.00968	1.654385
H	2.125481	1.70761	-1.32976	H	-1.89857	1.733161	1.341768
H	0.133868	3.881131	0.308453	H	-0.01437	3.807743	-0.56024
H	2.462259	1.137045	1.14444	H	-2.53434	1.253591	-1.01711
H	1.813967	-1.44015	1.027426	H	-1.90903	-1.33059	-1.09043
H	5.743344	-0.805	0.126098	H	-5.73297	-0.7039	0.243217

Figure S5. Compound **1** was analyzed and isolated by chiral HPLC



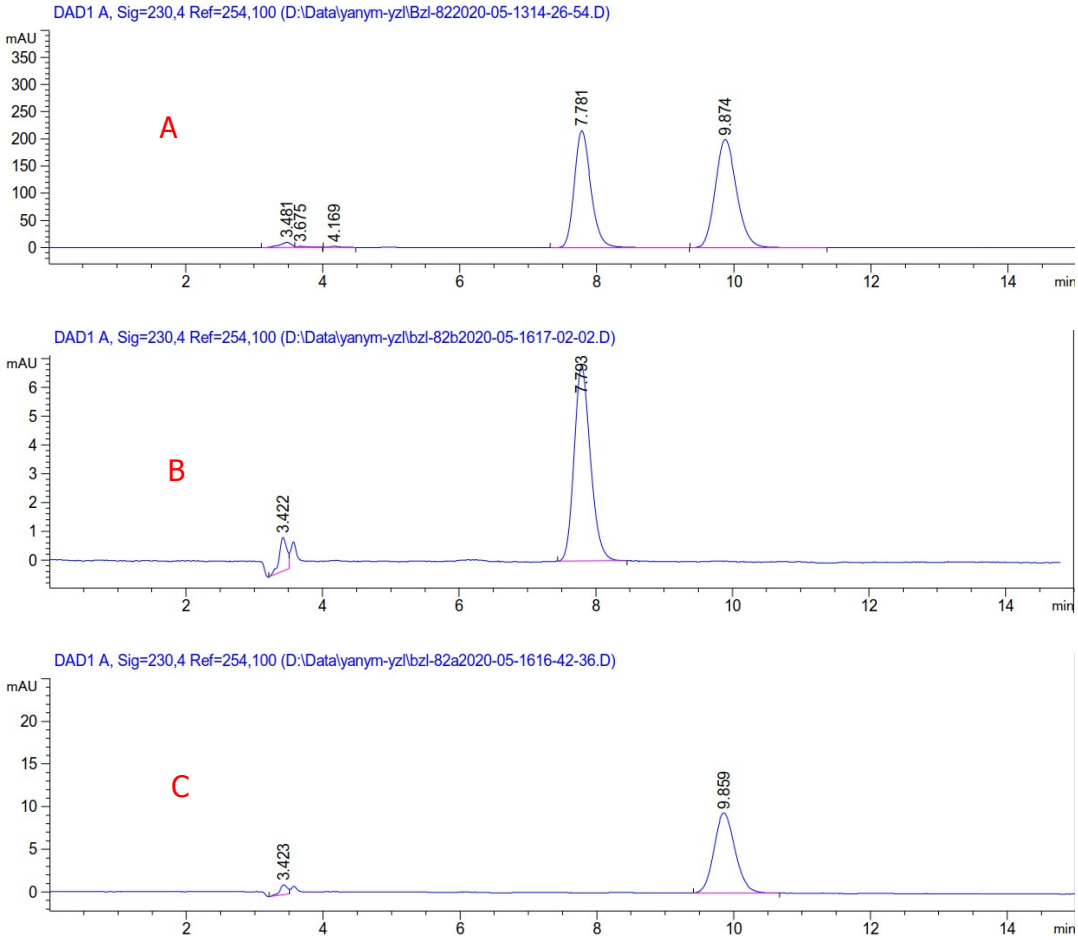
[**A**) HPLC analysis of **1** (OJ-H, *n*-hexane/ethanol, 80:20, flow rate: 1 mL/min); **B**) HPLC analysis of (+)-**1** (OJ-H, *n*-hexane/ethanol, 80:20, flow rate: 1 mL/min); **C**) HPLC analysis of (–)-**1** (OJ-H, *n*-hexane/ethanol, 80:20, flow rate: 1 mL/min)]

Figure S6. Compound **2** was analyzed and isolated by chiral HPLC



[**A**) HPLC analysis of **2** (OJ-H, *n*-hexane/ethanol, 65:35, flow rate: 1 mL/min); **B**) HPLC analysis of (–)-**2** (OJ-H, *n*-hexane/ethanol, 65:35, flow rate: 1 mL/min); **C**) HPLC analysis of (+)-**2** (OJ-H, *n*-hexane/ethanol, 65:35, flow rate: 1 mL/min)]

Figure S7. Compounds **3** and **4** were analyzed and isolated by chiral HPLC



[**A**) HPLC analysis of **3**/**4** (IC, *n*-hexane/ethanol, 55:45, flow rate: 1 mL/min); **B**) HPLC analysis of **3** (IC, *n*-hexane/ethanol, 55:45, flow rate: 1 mL/min); **C**) HPLC analysis of **4** (AD-H, *n*-hexane/ethanol, 55:45, flow rate: 1 mL/min)]

Figure S8. ^{1}H NMR (600 MHz) spectrum of **1** in methanol-d_4

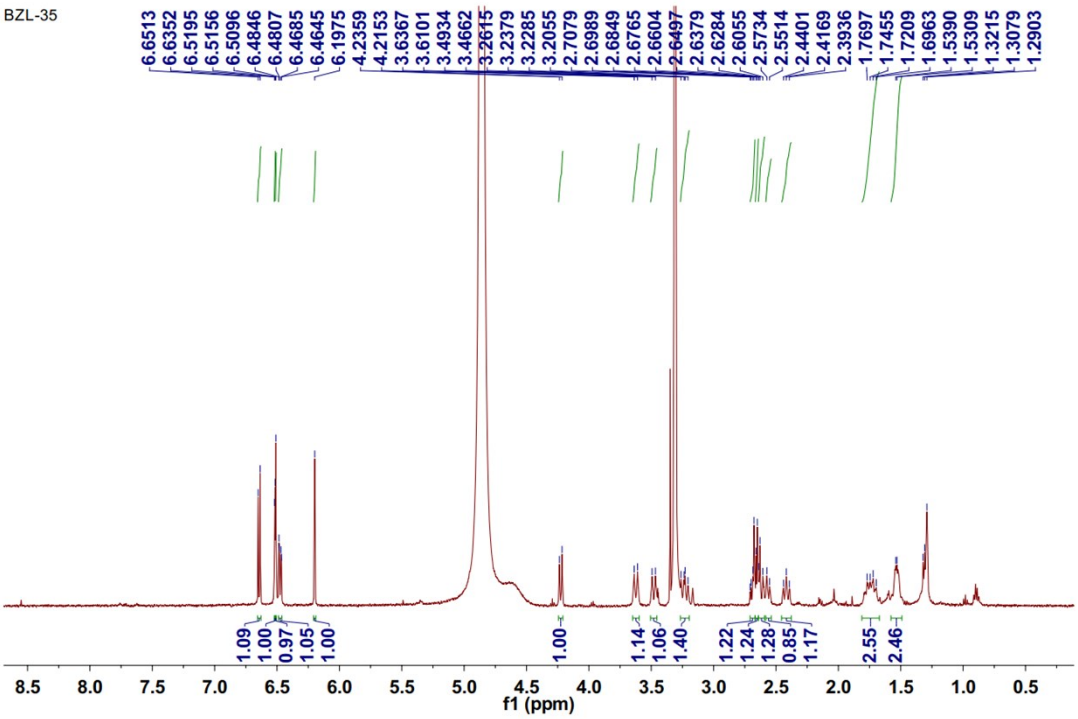


Figure S9. ^{13}C NMR and DEPT (150 MHz) spectra of **1** in methanol-d_4

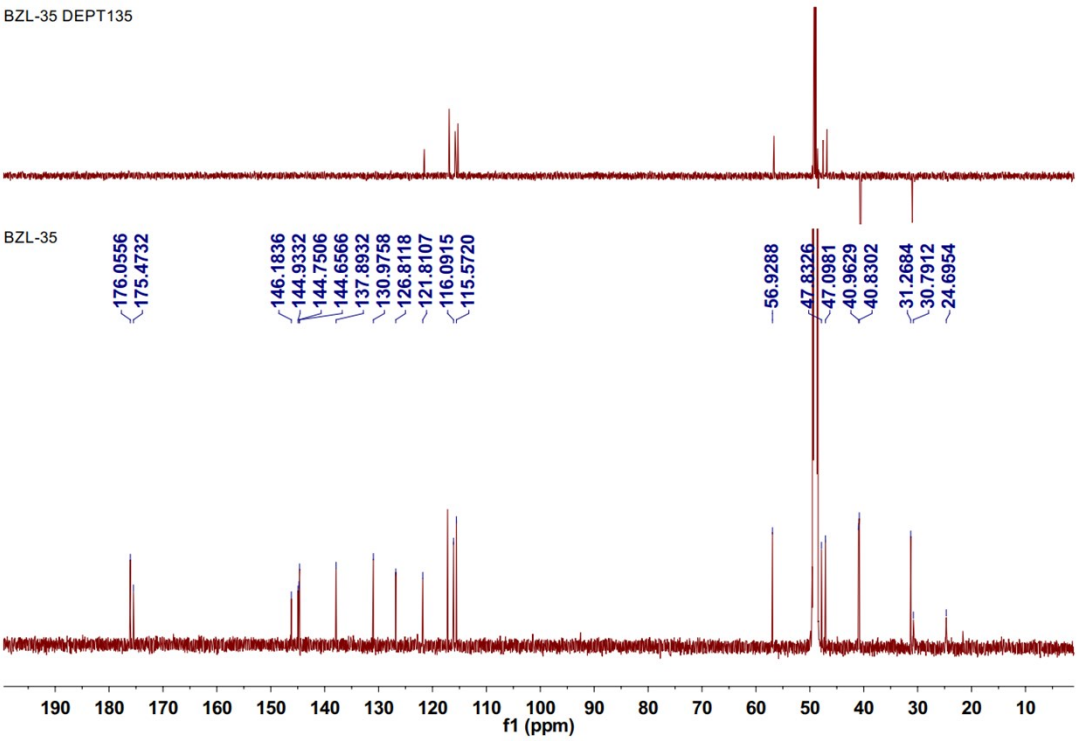


Figure S10. ^{1}H-^{1}H COSY (600 MHz) spectrum of **1** in methanol-d_4

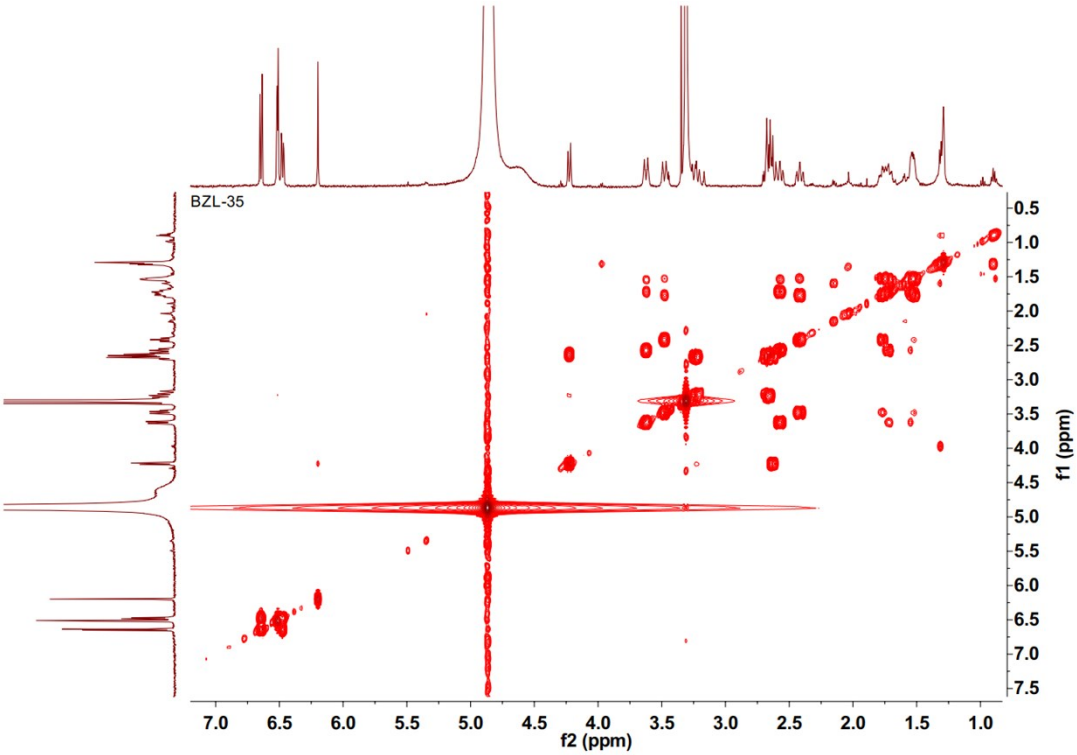


Figure S11. HSQC (600 MHz) spectrum of **1** in methanol-d_4

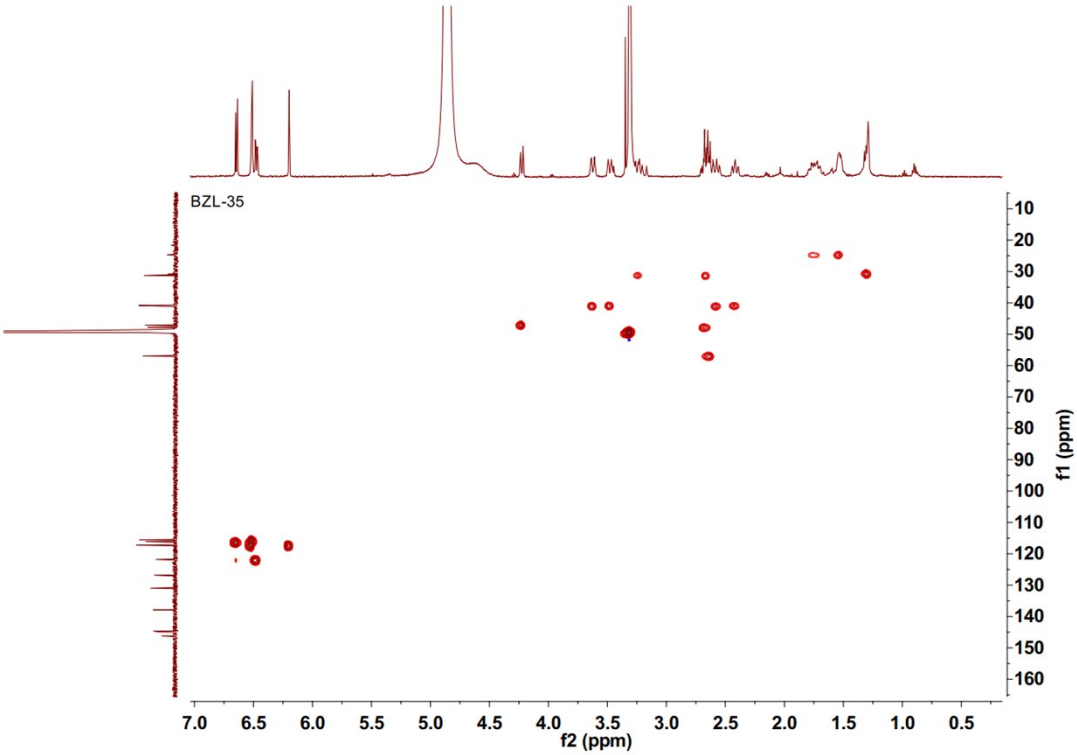


Figure S12. HMBC (600 MHz) spectrum of **1** in methanol-d_4

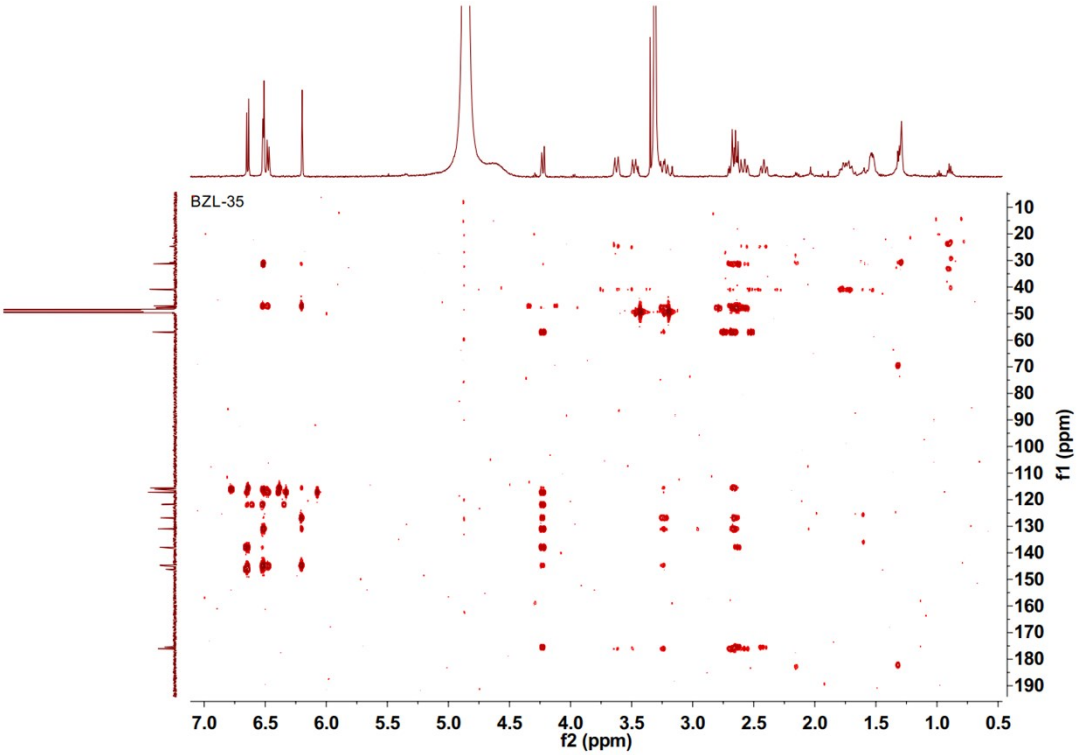


Figure S13. ROESY (600 MHz) spectrum of **1** in methanol-d_4

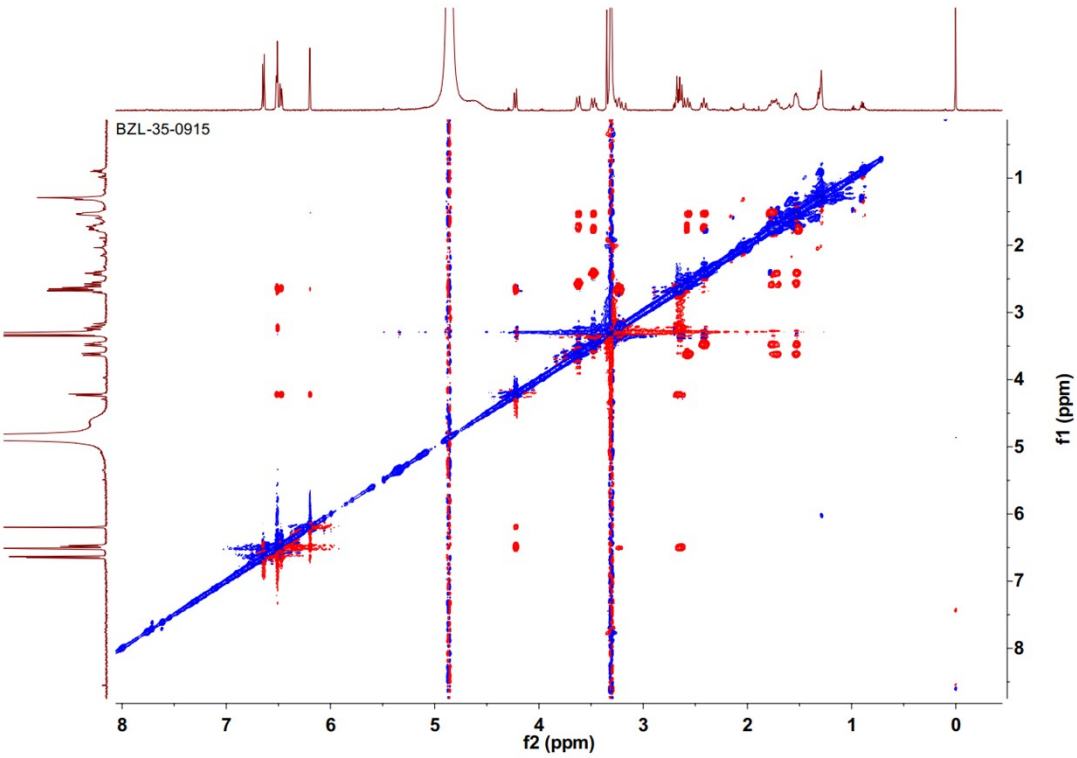
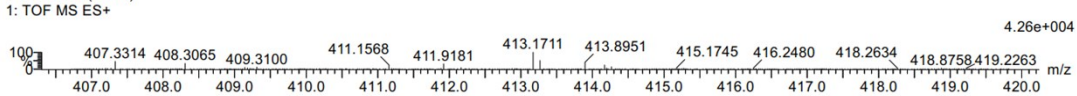


Figure S14. HRESIMS of **1**

Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 5.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
236 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 22-22 H: 0-100 N: 0-10 O: 0-10 Na: 0-1
BZ1-35 120 (0.678)
1: TOF MS ES+



Minimum:				-1.5				
Maximum:		20.0	5.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
413.1711	413.1713	-0.2	-0.5	11.5	867.7	n/a	n/a	C22 H25 N2 O6

Figure S15. ^{1}H NMR (600 MHz) spectrum of **1** in DMSO-d_6

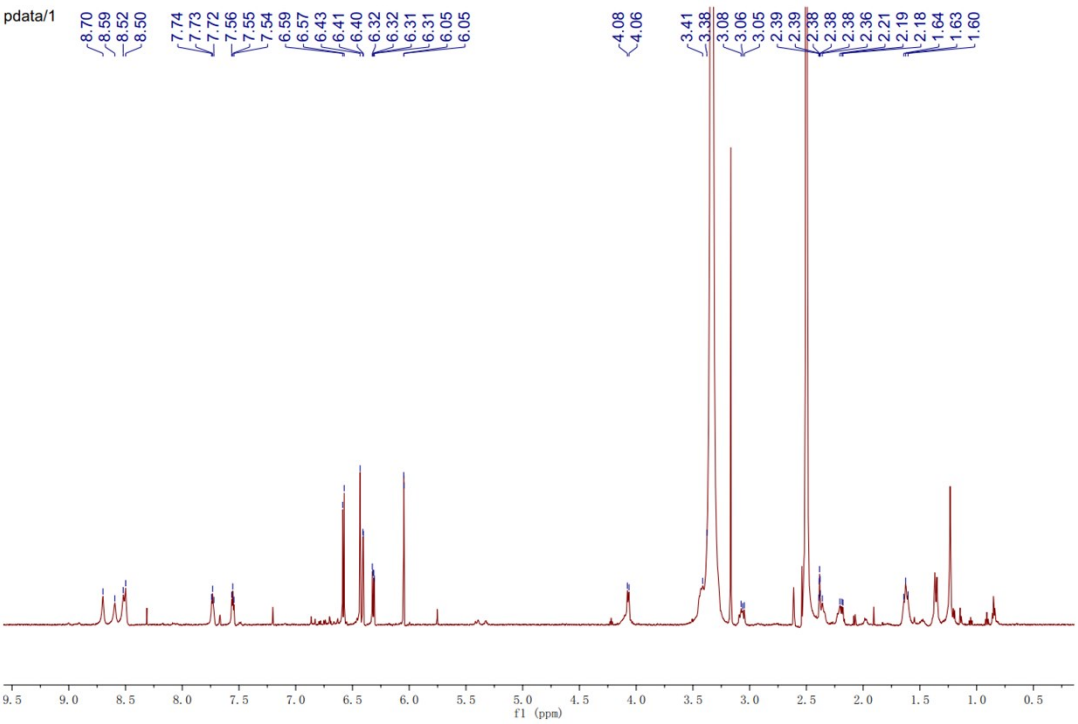


Figure S16. ^{13}C NMR (150 MHz) spectrum of **1** in DMSO-d_6

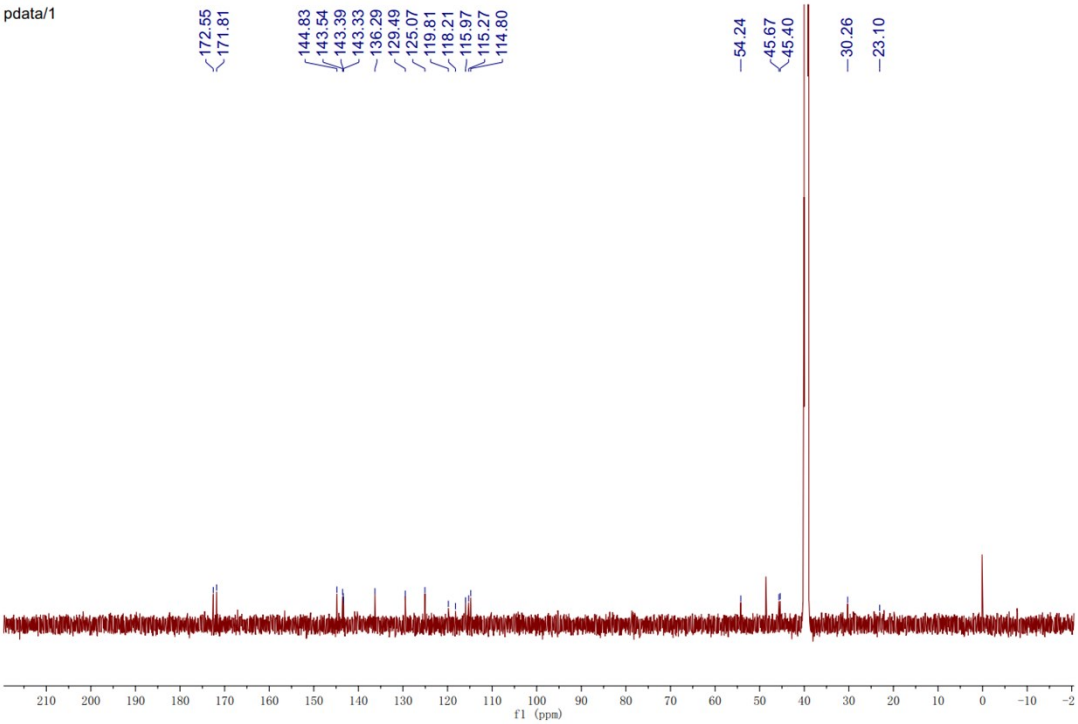


Figure S17. ^{1}H-^{1}H COSY (600 MHz) spectrum of **1** in DMSO-d_6

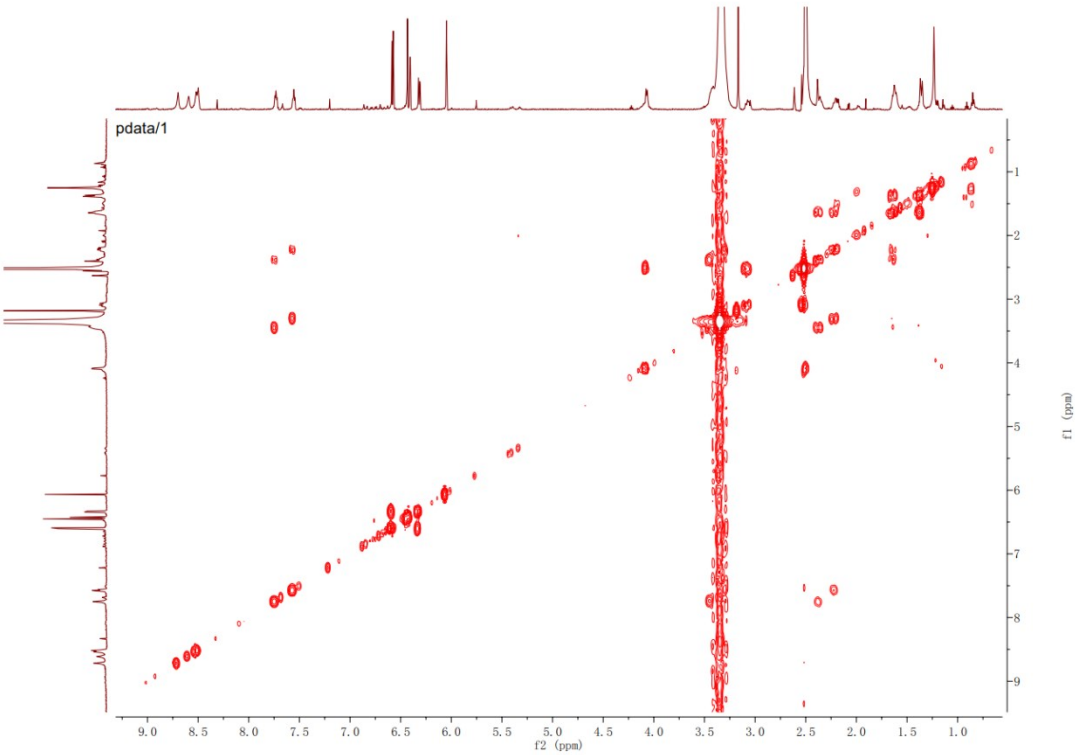


Figure S18. HSQC (600 MHz) spectrum of **1** in DMSO-d_6

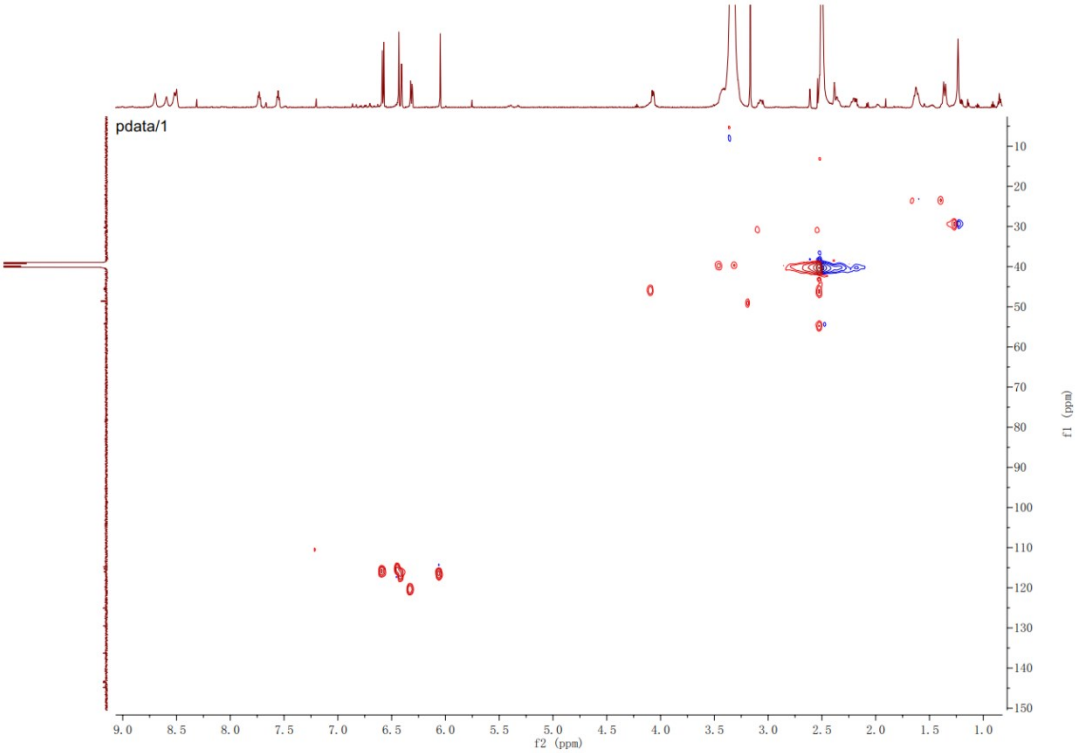


Figure S19. HMBC (600 MHz) spectrum of **1** in DMSO-d_6

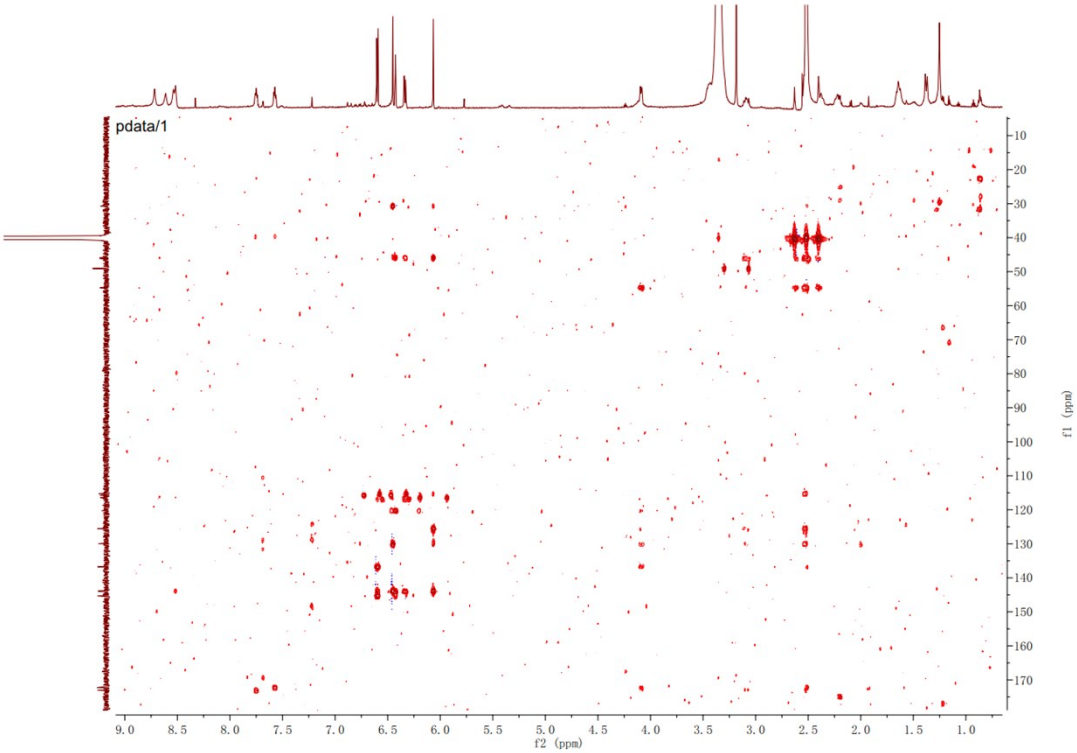


Figure S20. ROESY (600 MHz) spectrum of **1** in DMSO-d_6

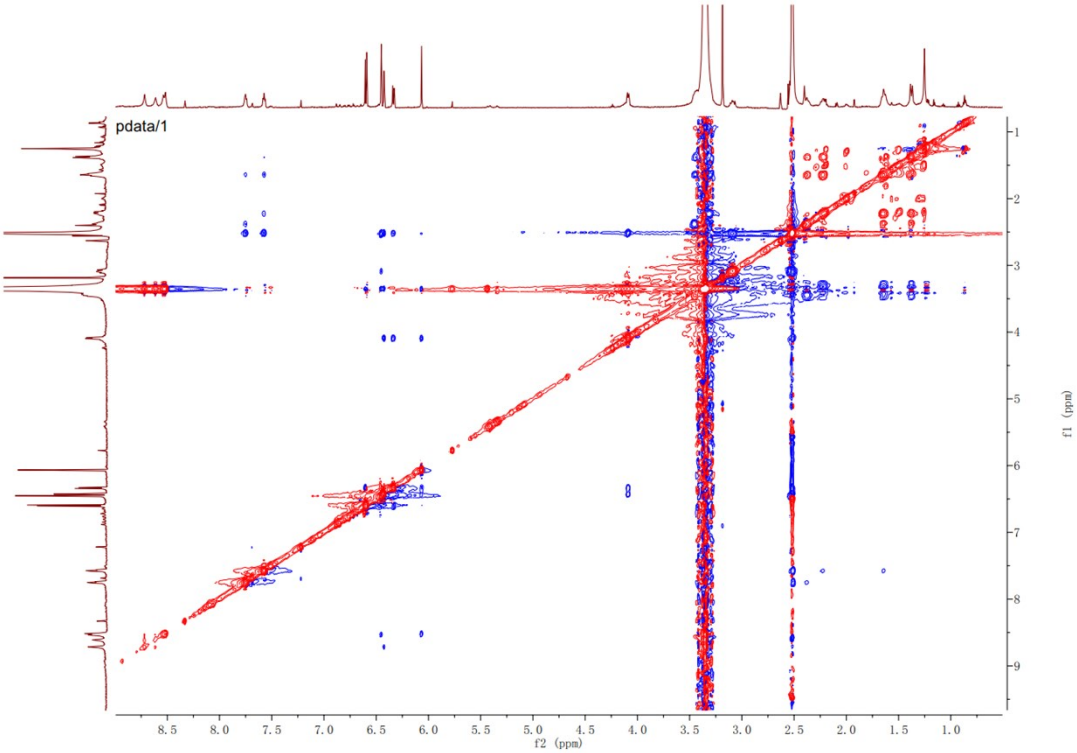


Figure S21. ^{1}H NMR (600 MHz) spectrum of **2** in methanol-d_4

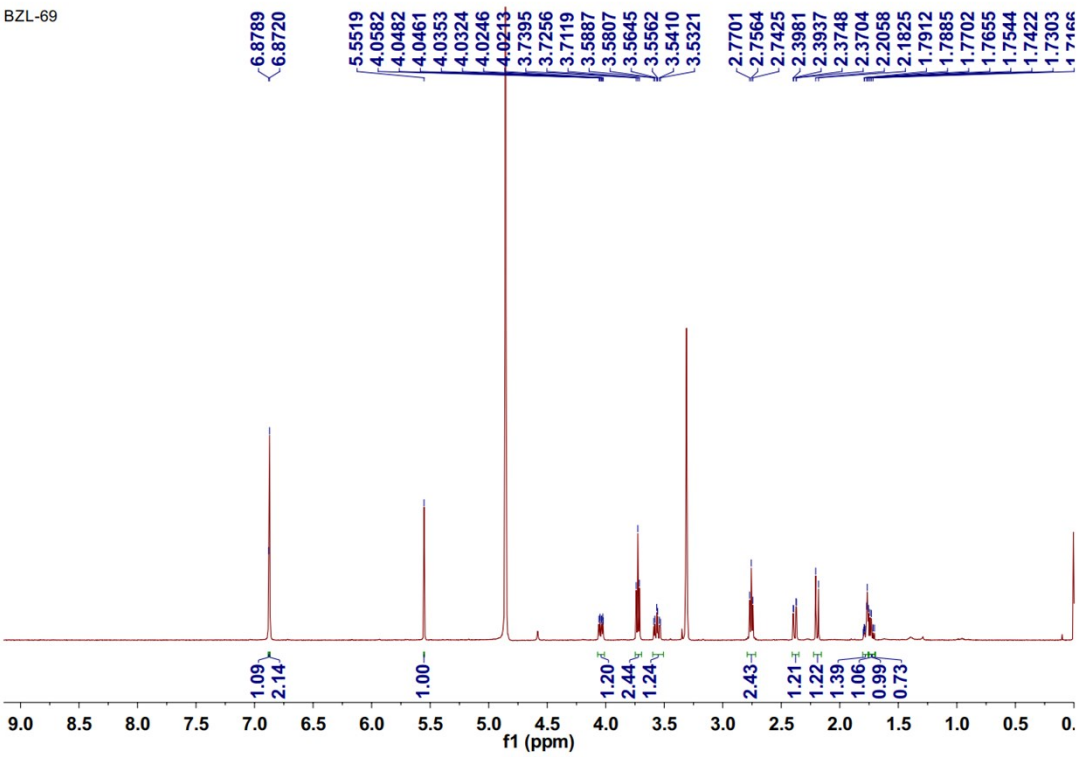


Figure S22. ^{13}C NMR and DEPT (150 MHz) spectra of **2** in methanol-d_4

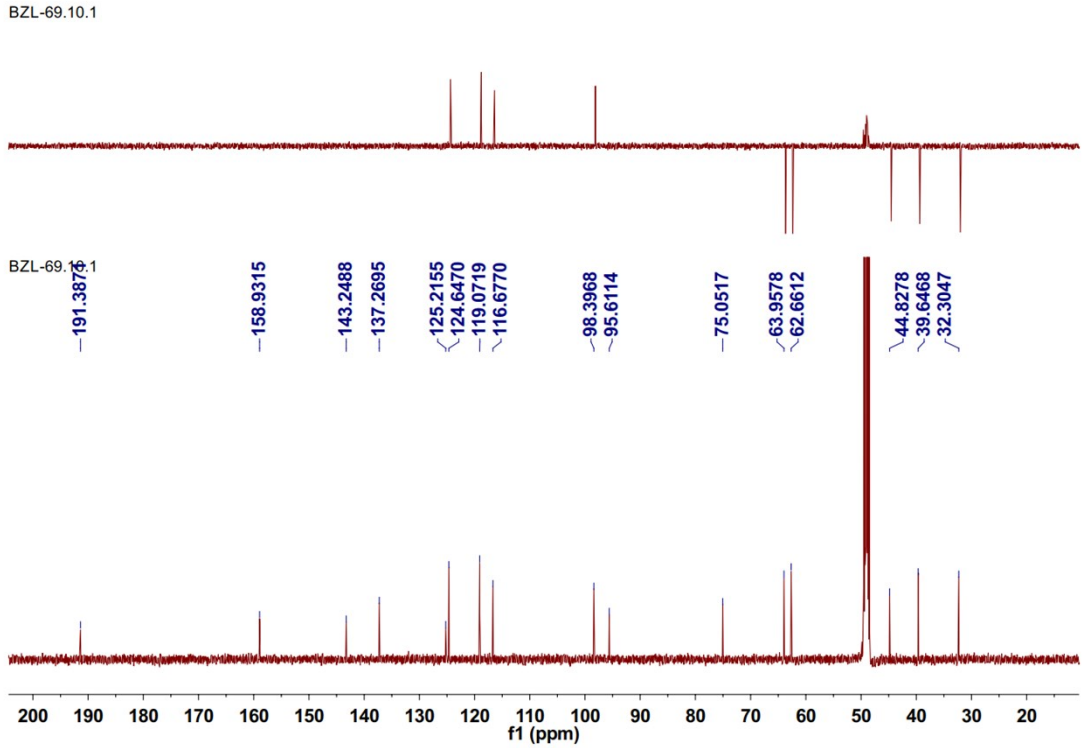


Figure S23. ^{1}H-^{1}H COSY (600 MHz) spectrum of **2** in methanol-d_4

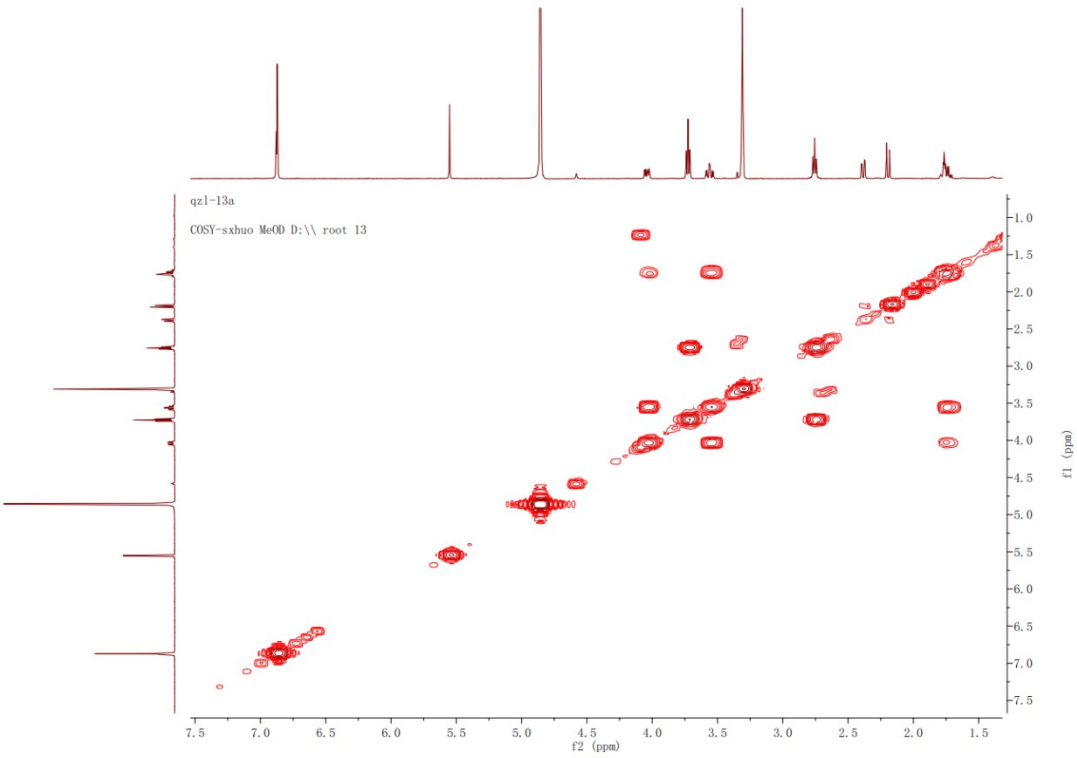


Figure S24. HSQC (600 MHz) spectrum of **2** in methanol-d_4

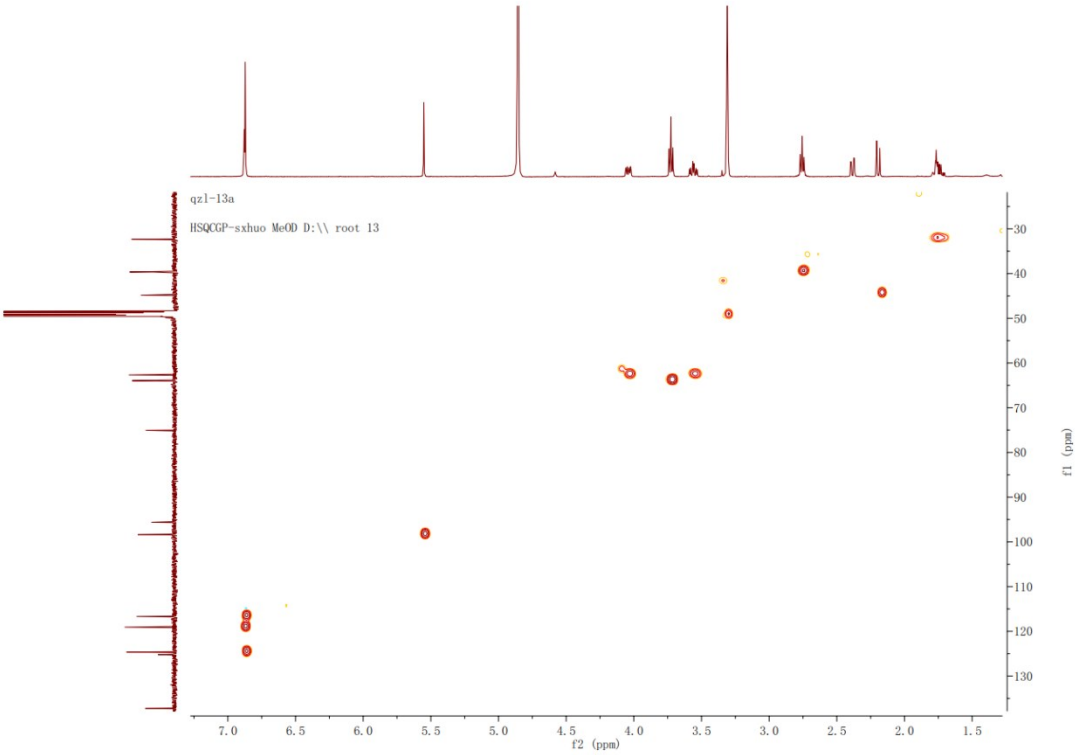


Figure S25. HMBC (600 MHz) spectrum of **2** in methanol-d_4

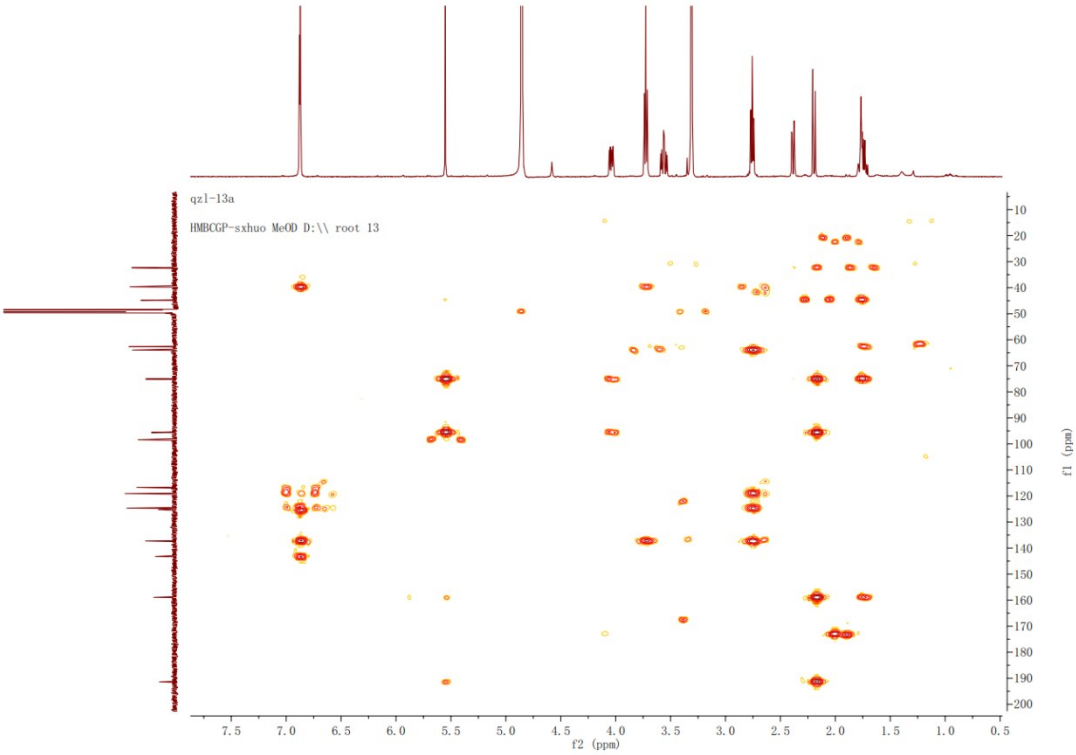


Figure S26. ROESY (600 MHz) spectrum of **2** in methanol-d_4

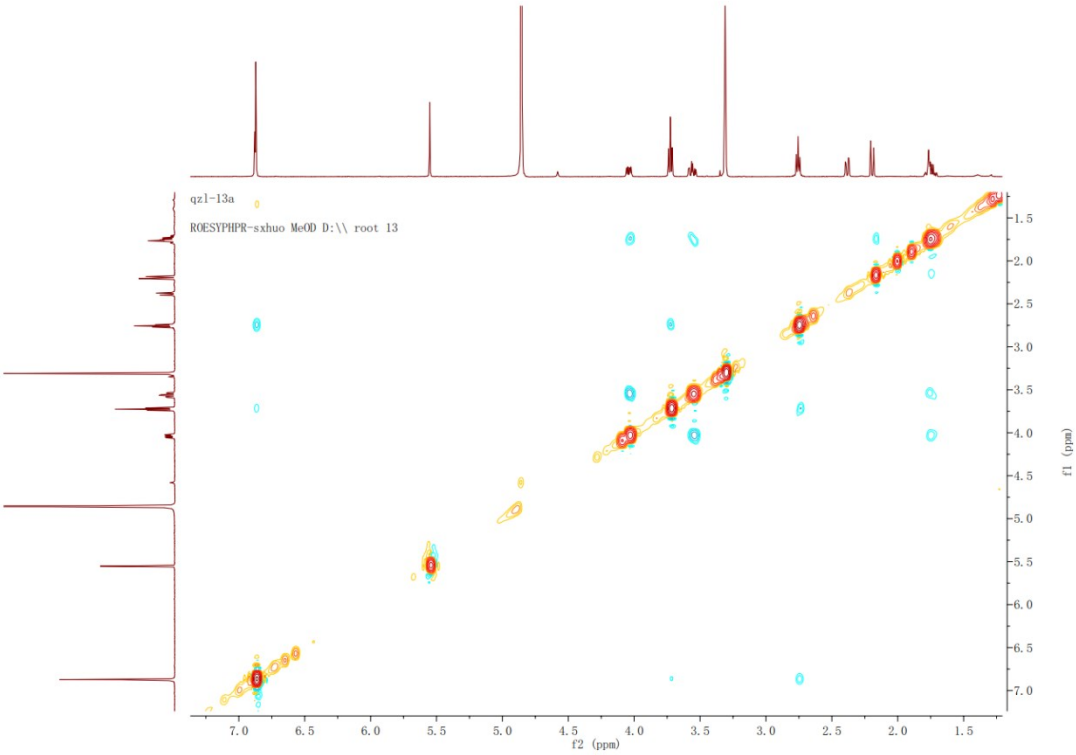
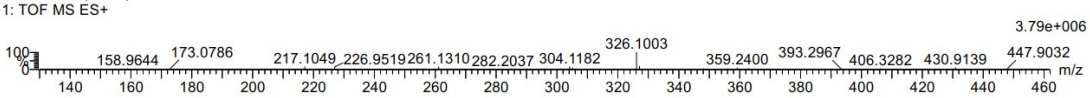


Figure S27. HRESIMS of **2**

Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 5.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
236 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 16-16 H: 0-100 N: 0-10 O: 0-10 Na: 0-1
Z1-13a 131 (0.744)
1: TOF MS ES+



Minimum:				-1.5				
Maximum:		20.0	5.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
326.1003	326.1004	-0.1	-0.3	8.5	1287.7	n/a	n/a	C16 H17 N O5 Na

Figure S28. ^{1}H NMR (600 MHz) spectrum of **2** in DMSO-d_6

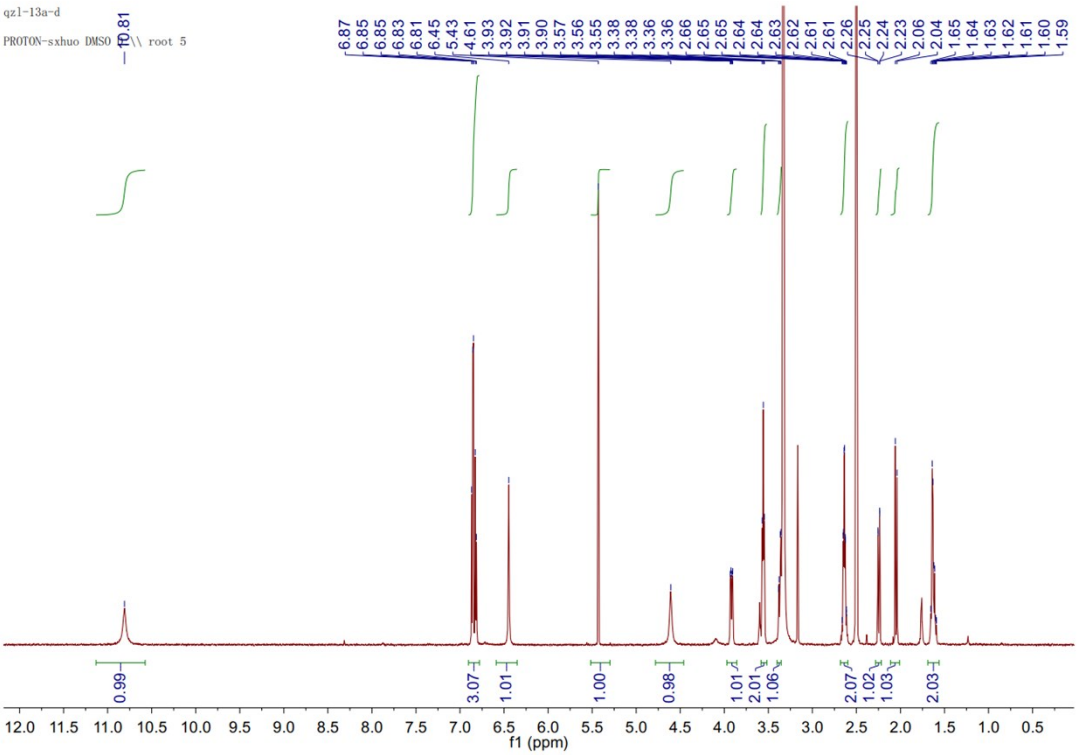


Figure S29. ^{13}C NMR and DEPT (150 MHz) spectra of **2** in DMSO-d_6

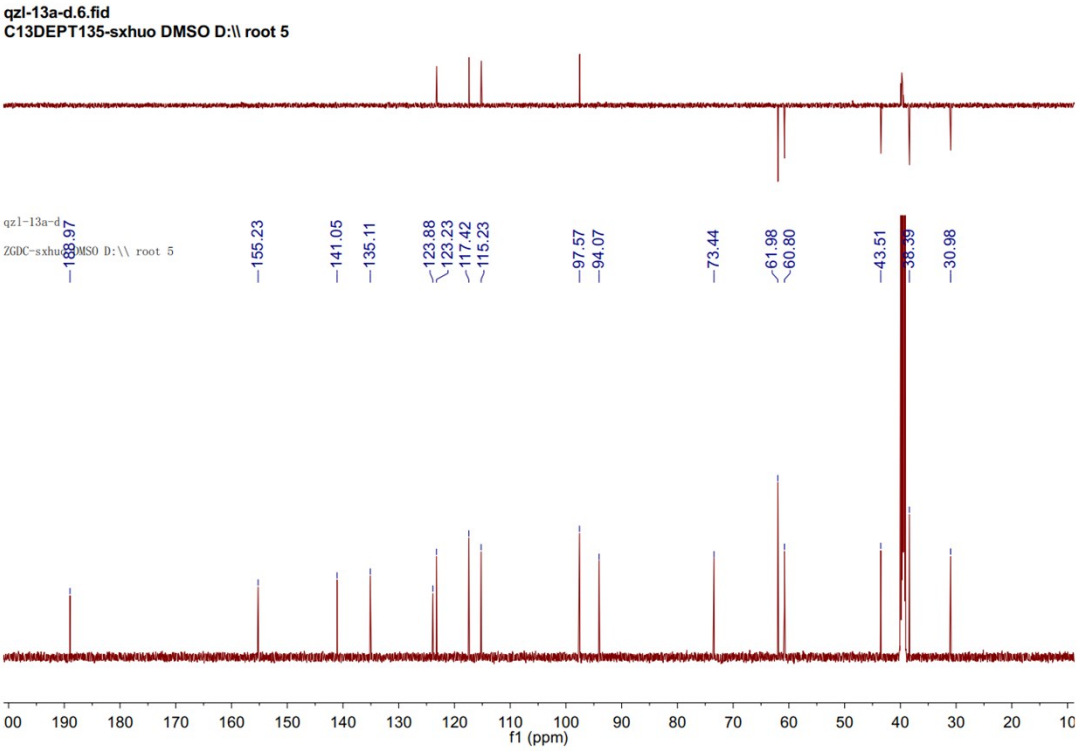


Figure S30. ^{1}H-^{1}H COSY (600 MHz) spectrum of **2** in DMSO-d_6

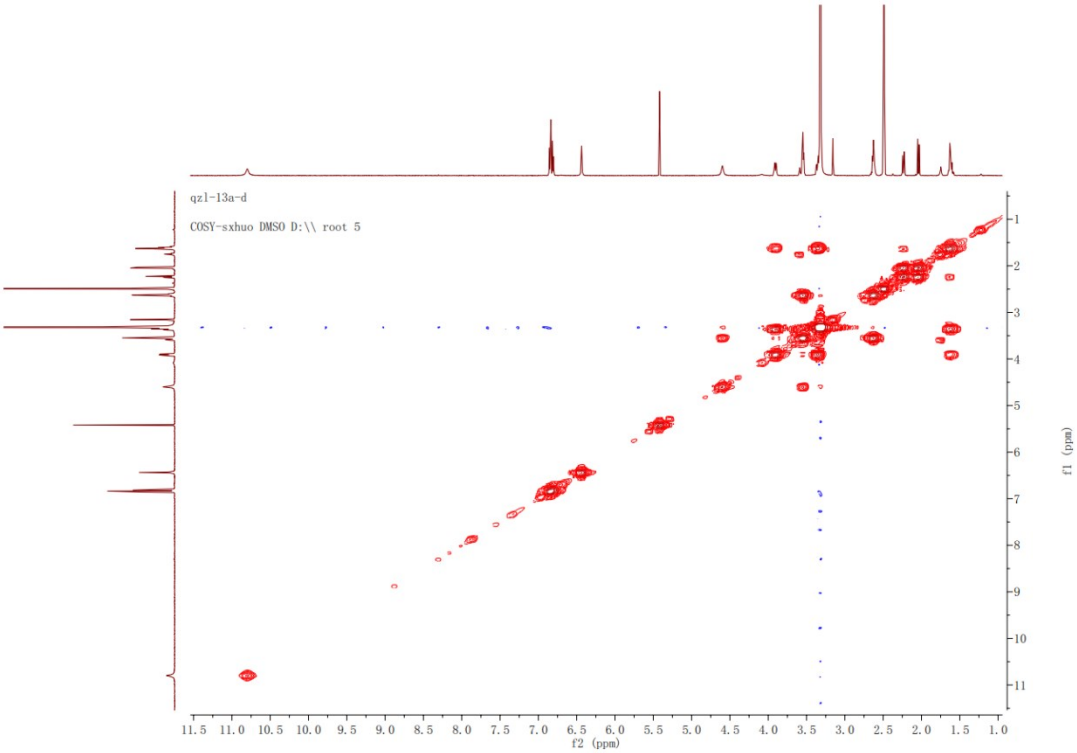


Figure S31. HSQC (600 MHz) spectrum of **2** in DMSO-d_6

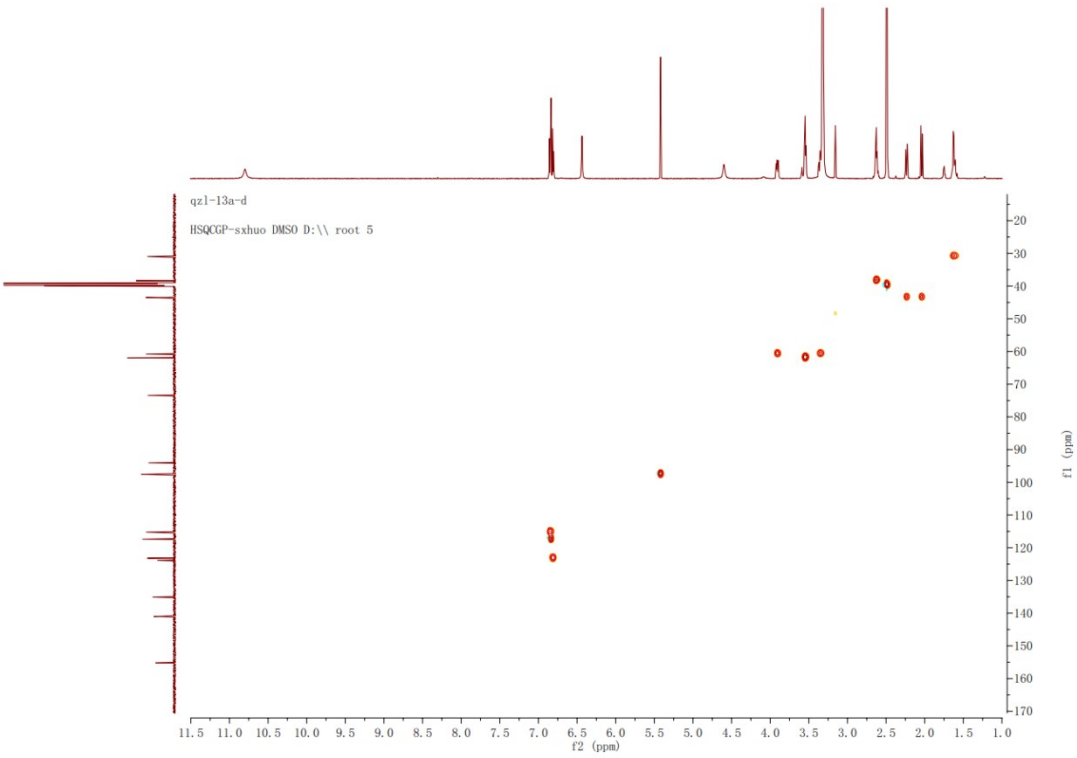


Figure S32. HMBC (600 MHz) spectrum of **2** in DMSO-d_6

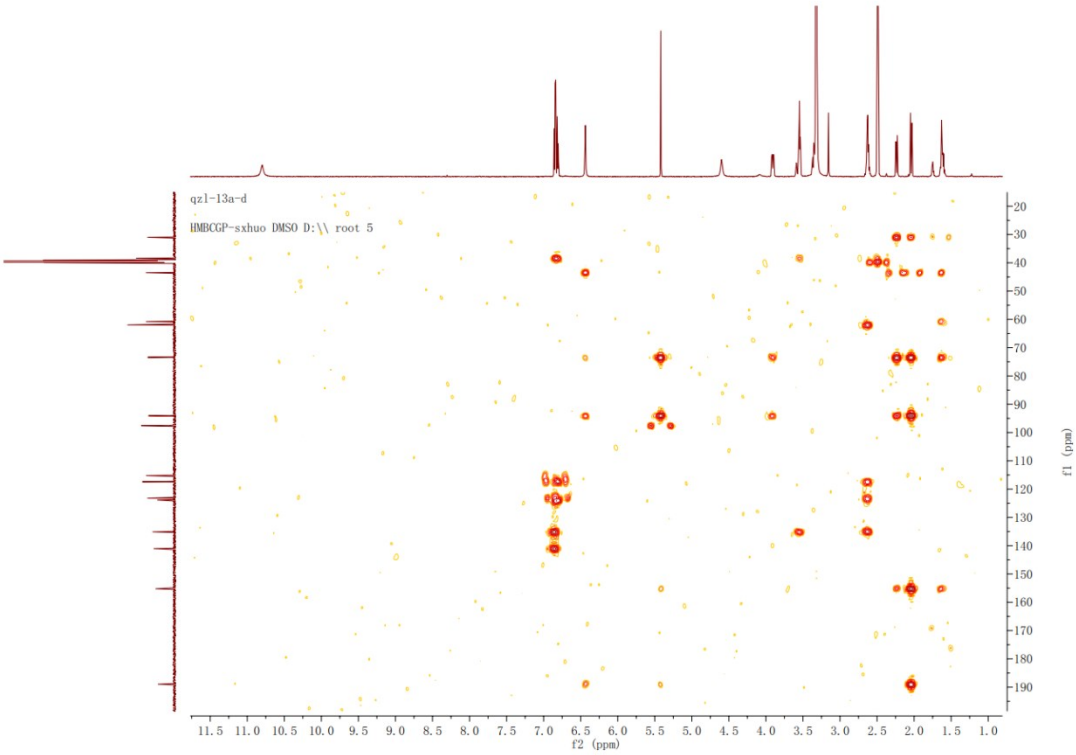


Figure S33. ROESY (600 MHz) spectrum of **2** in DMSO-d_6

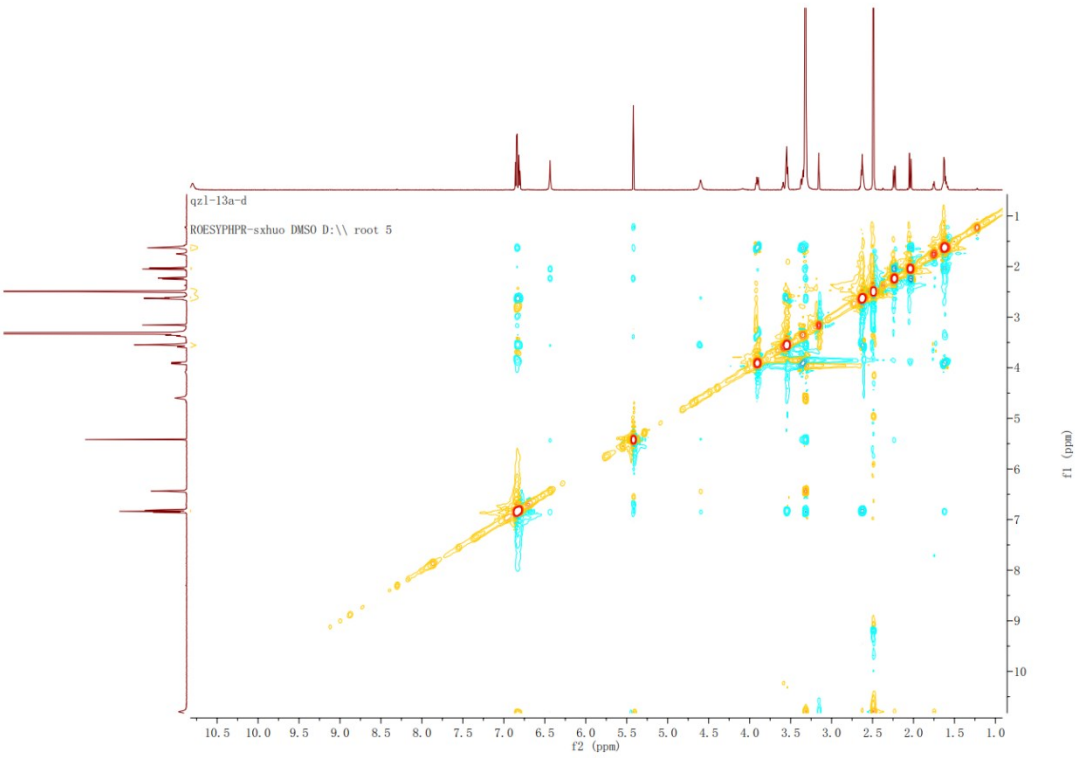


Figure S34. ^{1}H NMR (600 MHz) spectrum of **3/4** in methanol-d_4

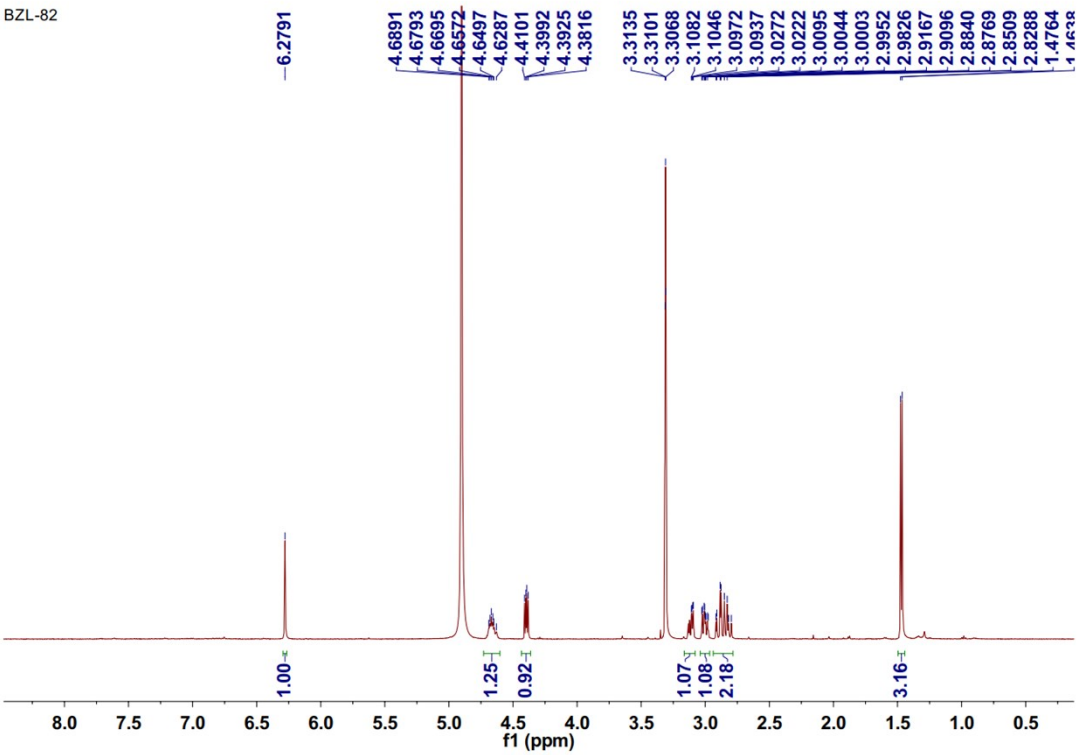


Figure S35. ^{13}C NMR and DEPT (150 MHz) spectra of **3/4** in methanol-d_4

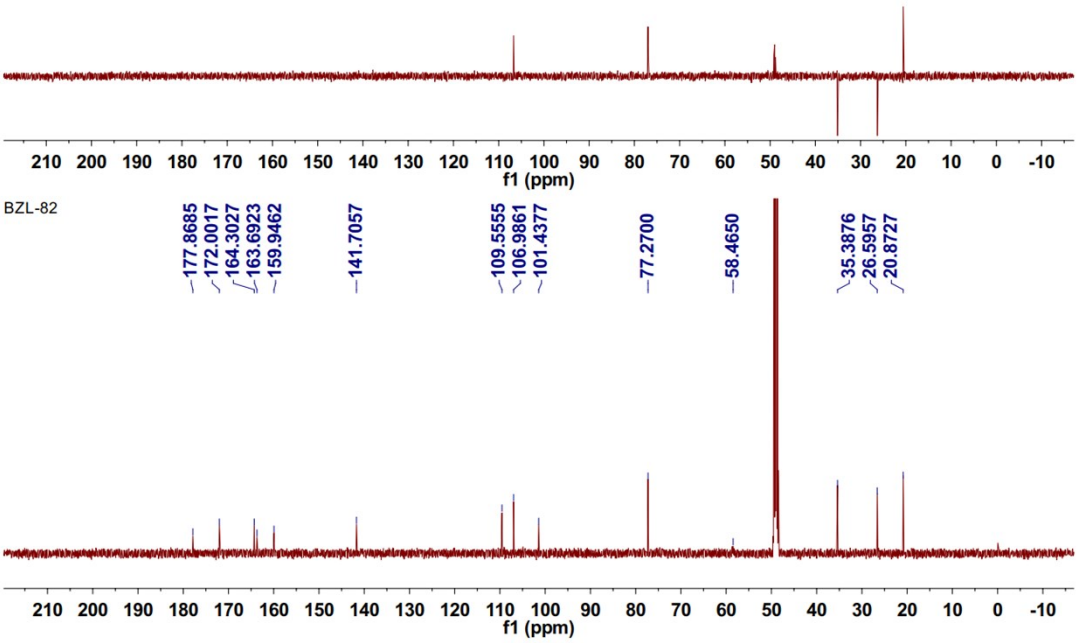


Figure S36. ^{1}H-^{1}H COSY (600 MHz) spectrum of **3/4** in DMSO-d_6

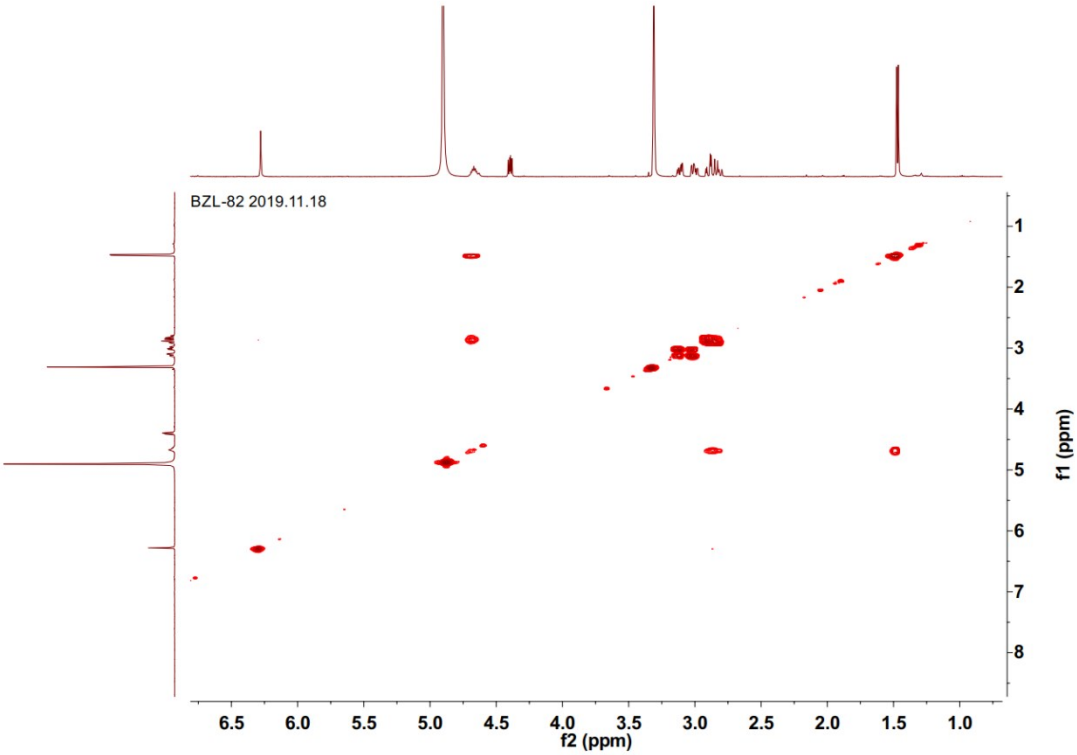


Figure S37. HSQC (600 MHz) spectrum of **3/4** in DMSO-d_6

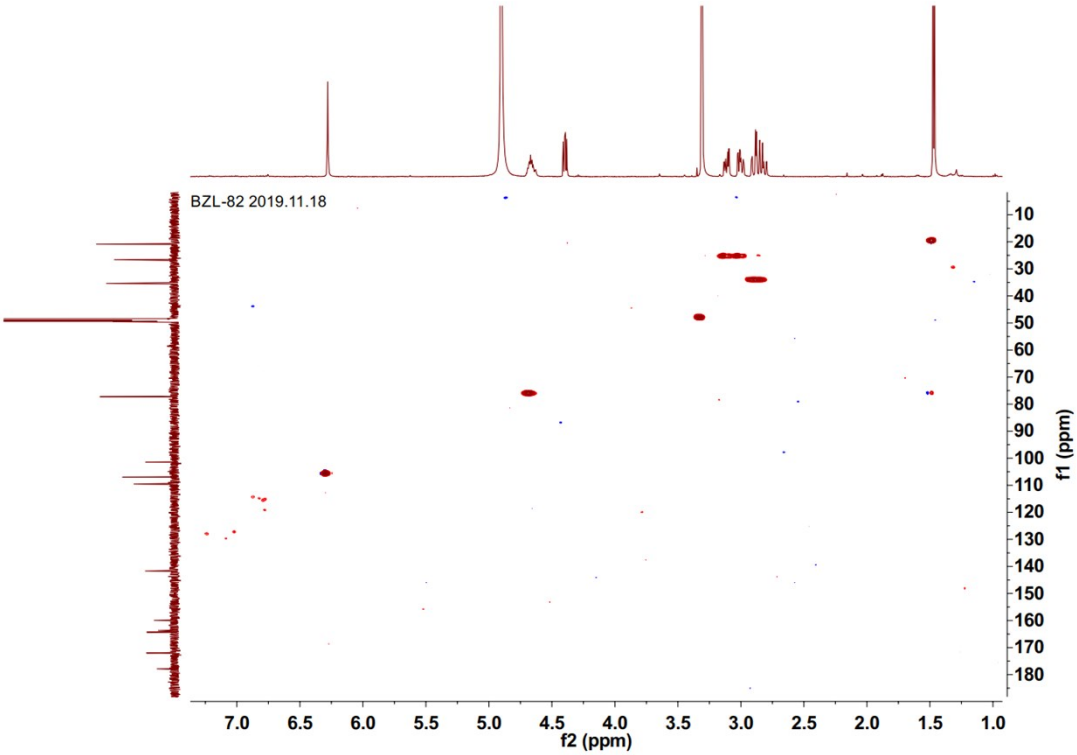


Figure S38. HMBC (600 MHz) spectrum of **3/4** in DMSO-d_6

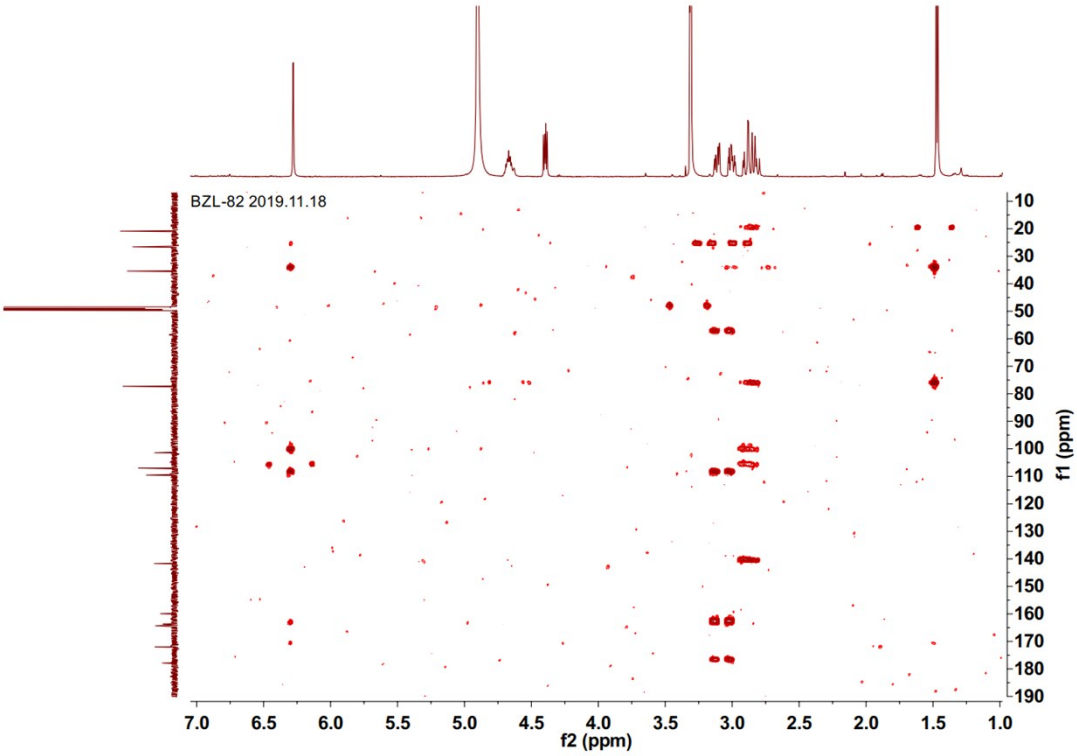


Figure S39. ROESY (600 MHz) spectrum of **3/4** in DMSO-d_6

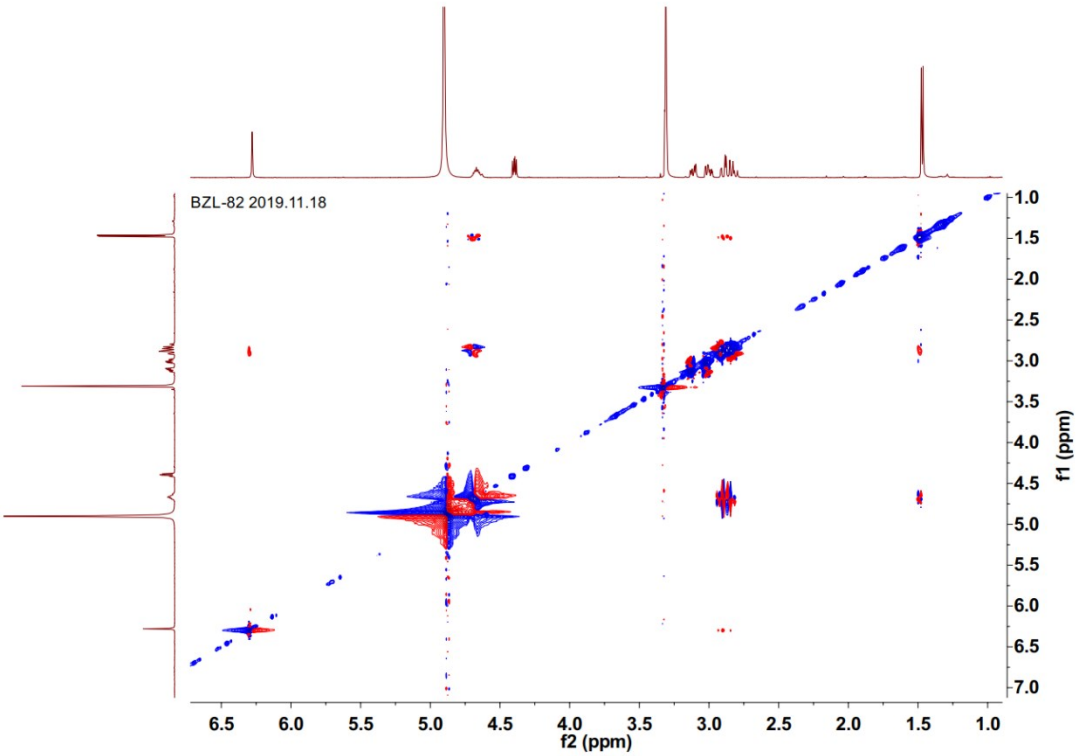
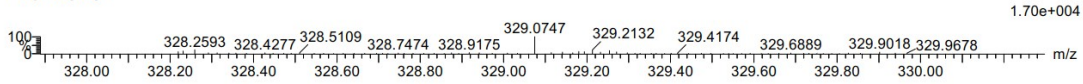


Figure S40. HRESIMS of **3/4**

Elemental Composition Report **Page 1**

Single Mass Analysis
Tolerance = 5.0 PPM / DBE: min = -1.5, max = 50.0
Element prediction: Off
Number of isotope peaks used for i-FIT = 3

Monoisotopic Mass, Even Electron Ions
234 formula(e) evaluated with 1 results within limits (up to 50 closest results for each mass)
Elements Used:
C: 14-14 H: 0-100 N: 0-10 O: 0-10 Na: 0-1
BZ1-82 125 (0.712)
1: TOF MS ES+



Minimum:				-1.5				
Maximum:		20.0	5.0	50.0				
Mass	Calc. Mass	mDa	PPM	DBE	i-FIT	Norm	Conf(%)	Formula
329.0747	329.0750	-0.3	-0.9	8.5	480.9	n/a	n/a	C14 H14 N2 O6 Na

Figure S41. ^{1}H NMR (600 MHz) spectrum of **3/4** in DMSO-d_6

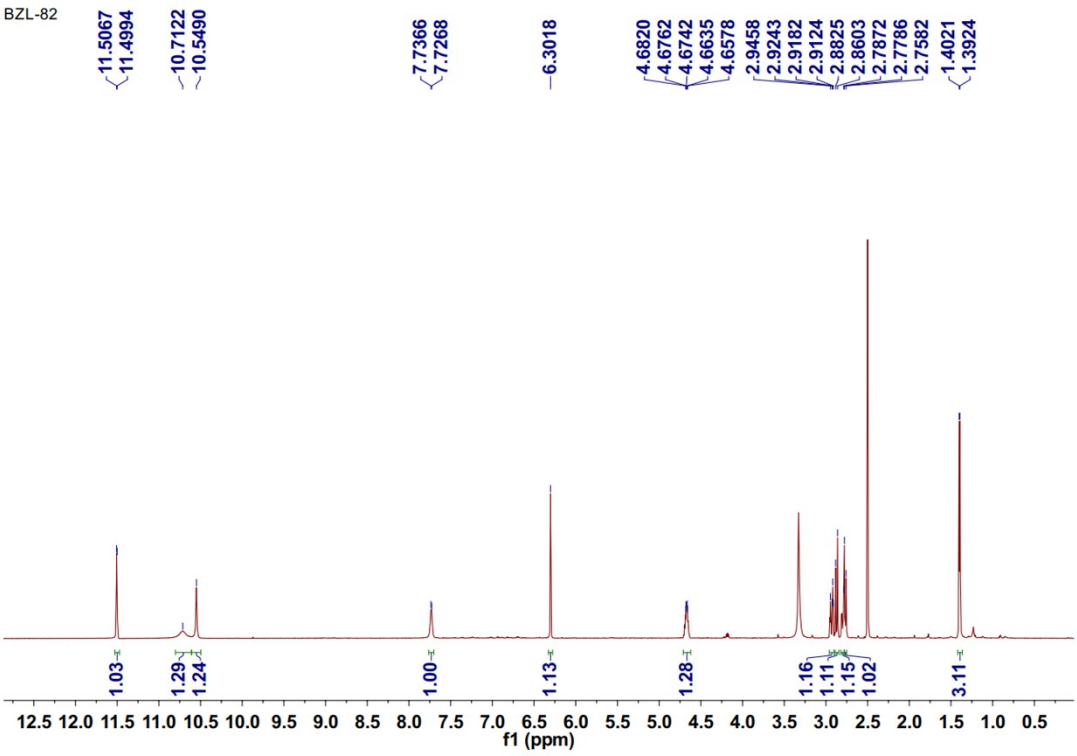


Figure S42. ^{13}C NMR and DEPT (150 MHz) spectra of **3/4** in DMSO-d_6

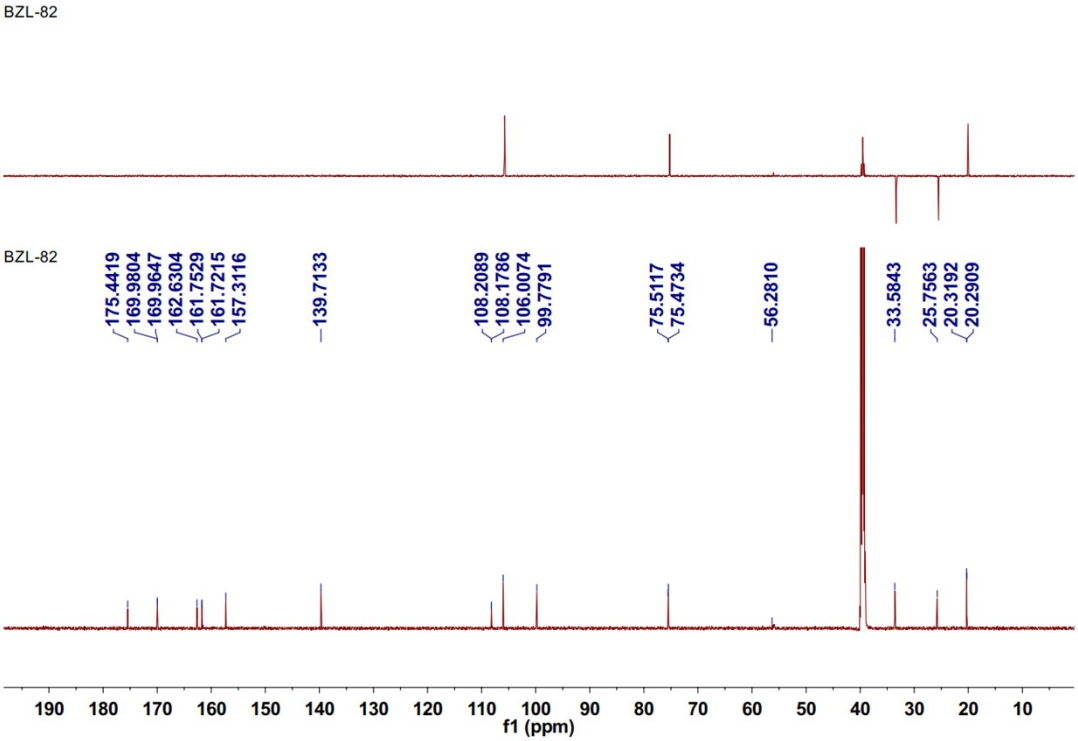


Figure S43. ^{1}H NMR (600 MHz) spectrum of **3** in DMSO-d_6

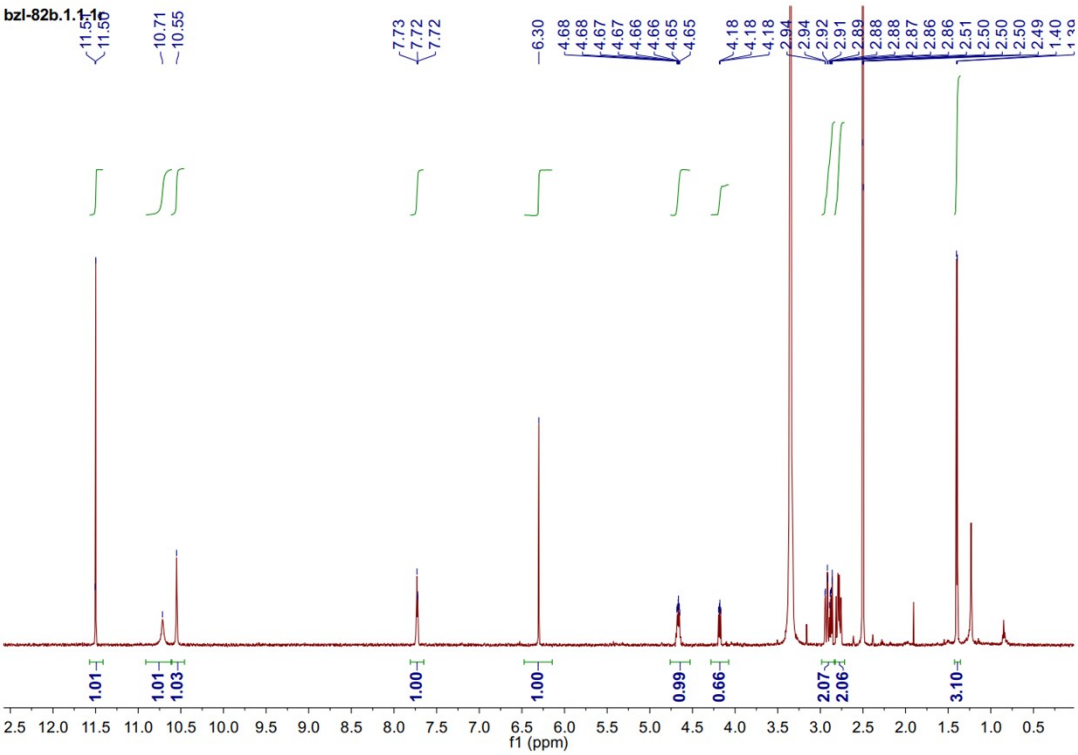


Figure S44. ^{13}C NMR (150 MHz) spectrum of **3** in DMSO-d_6

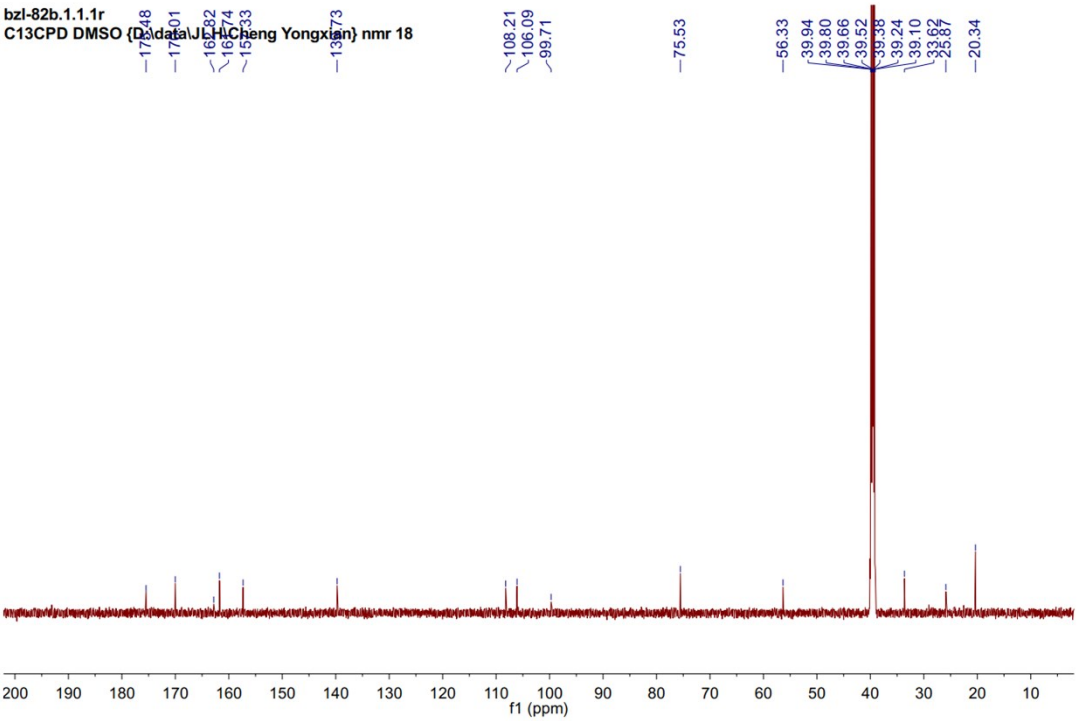


Figure S45. ^{1}H-^{1}H COSY (600 MHz) spectrum of **3** in DMSO-d_6

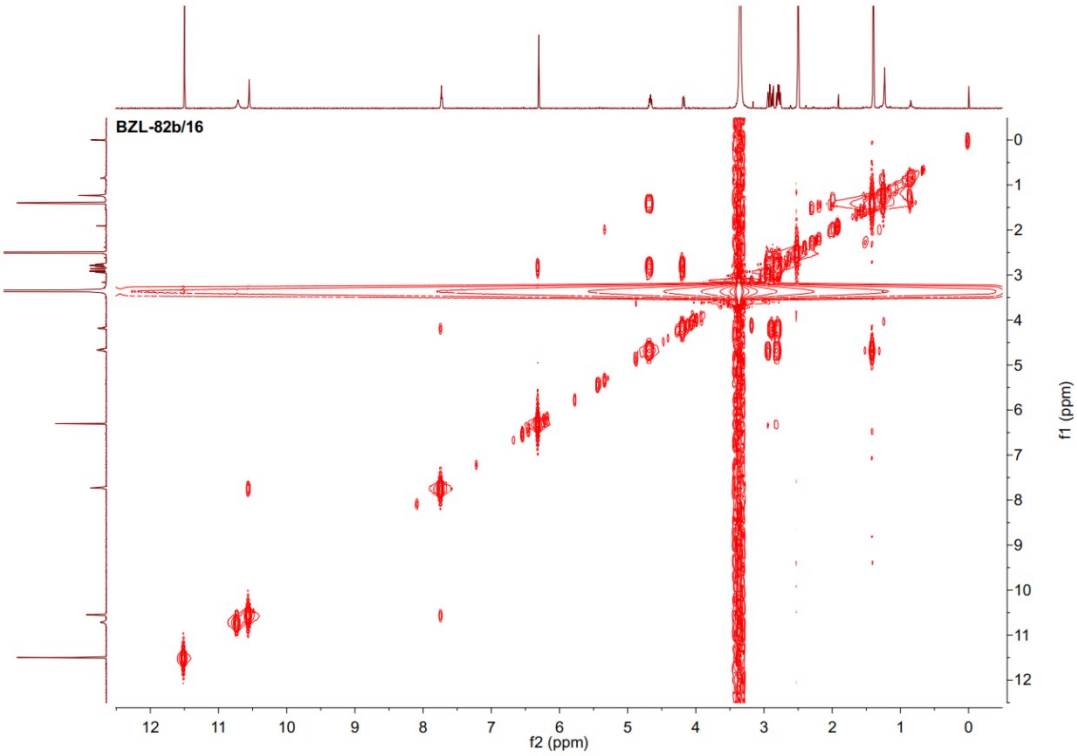


Figure S46. HSQC (600 MHz) spectrum of **3** in DMSO-d_6

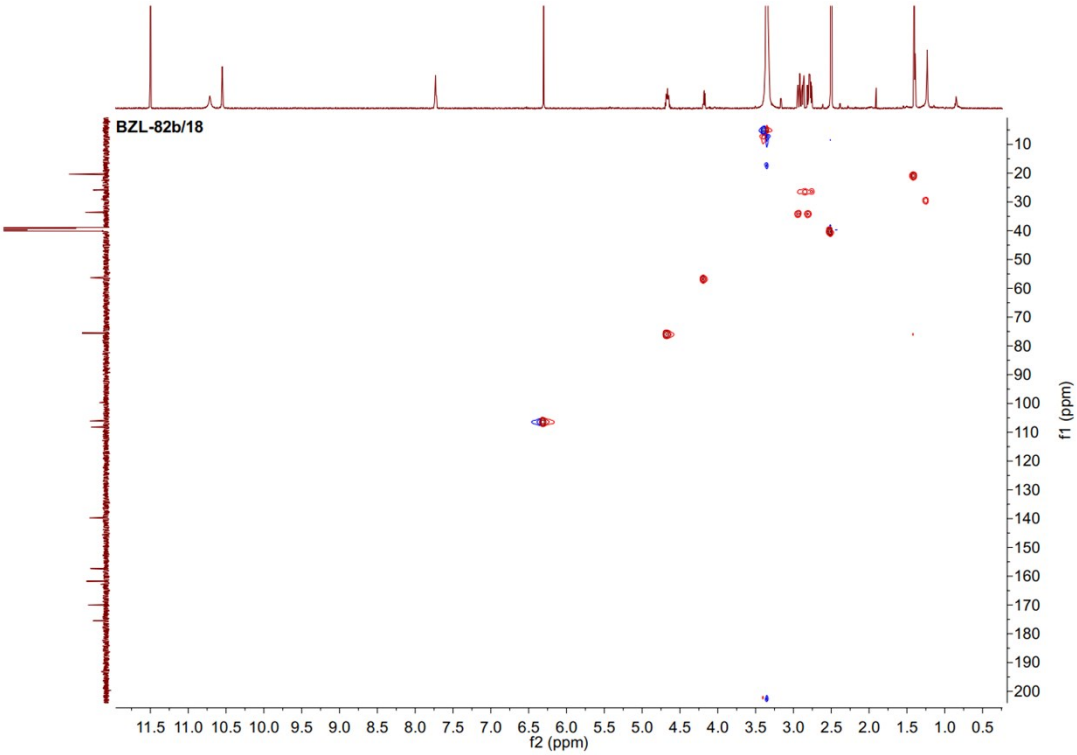


Figure S47. HMBC (600 MHz) spectrum of **3** in DMSO-d_6

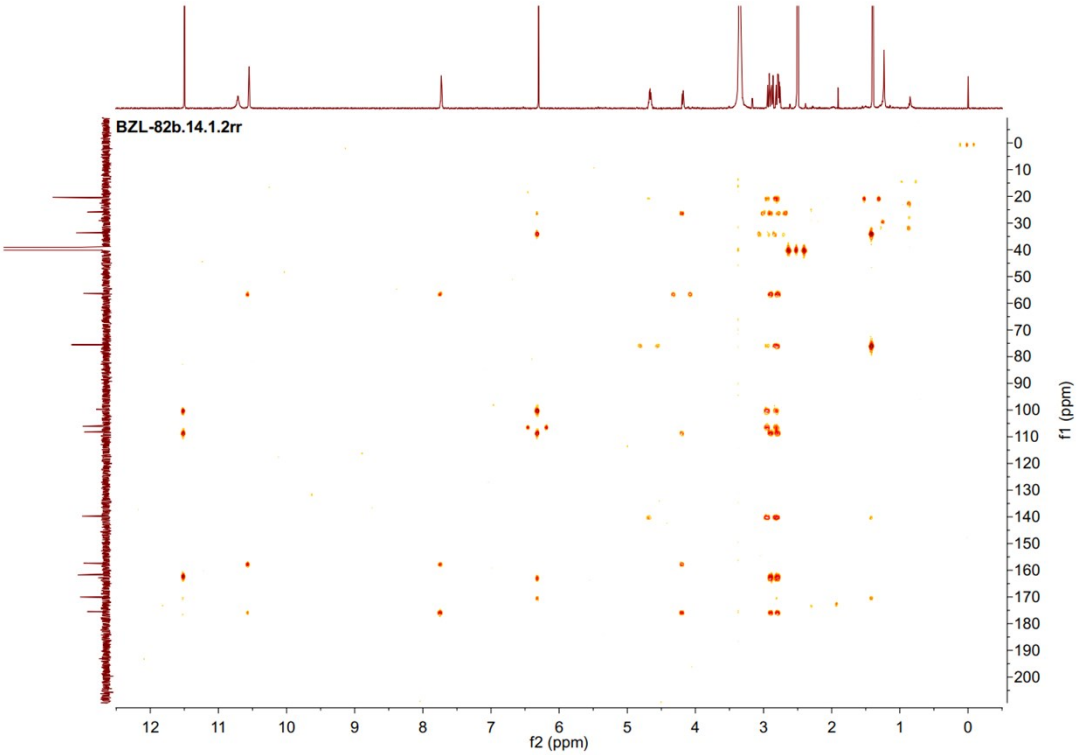


Figure S48. ROESY (600 MHz) spectrum of **3** in DMSO-d_6

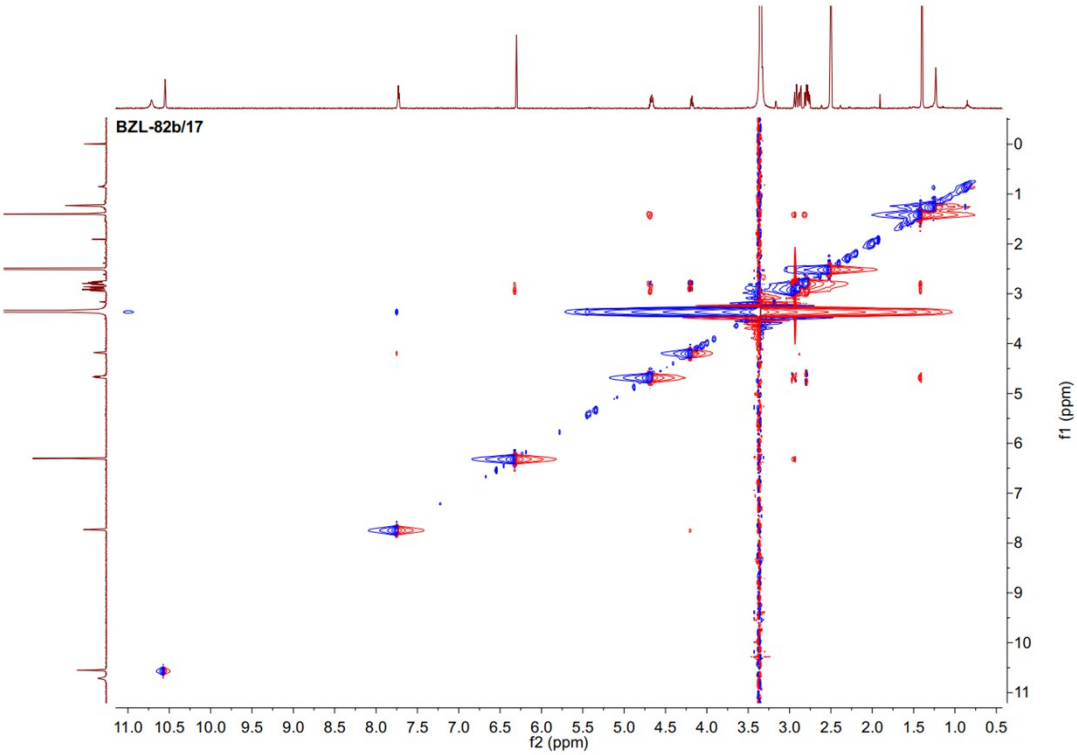


Figure S49. ^{1}H NMR (600 MHz) spectrum of **4** in DMSO-d_6

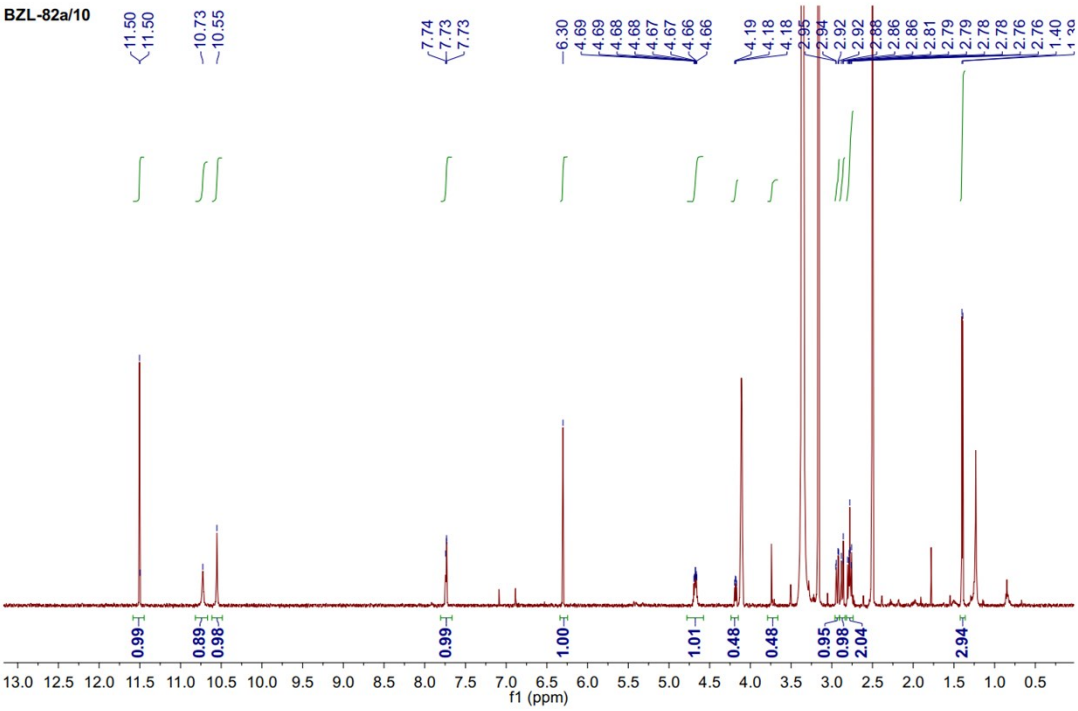


Figure S50. ^{13}C NMR (150 MHz) spectrum of **4** in DMSO-d_6

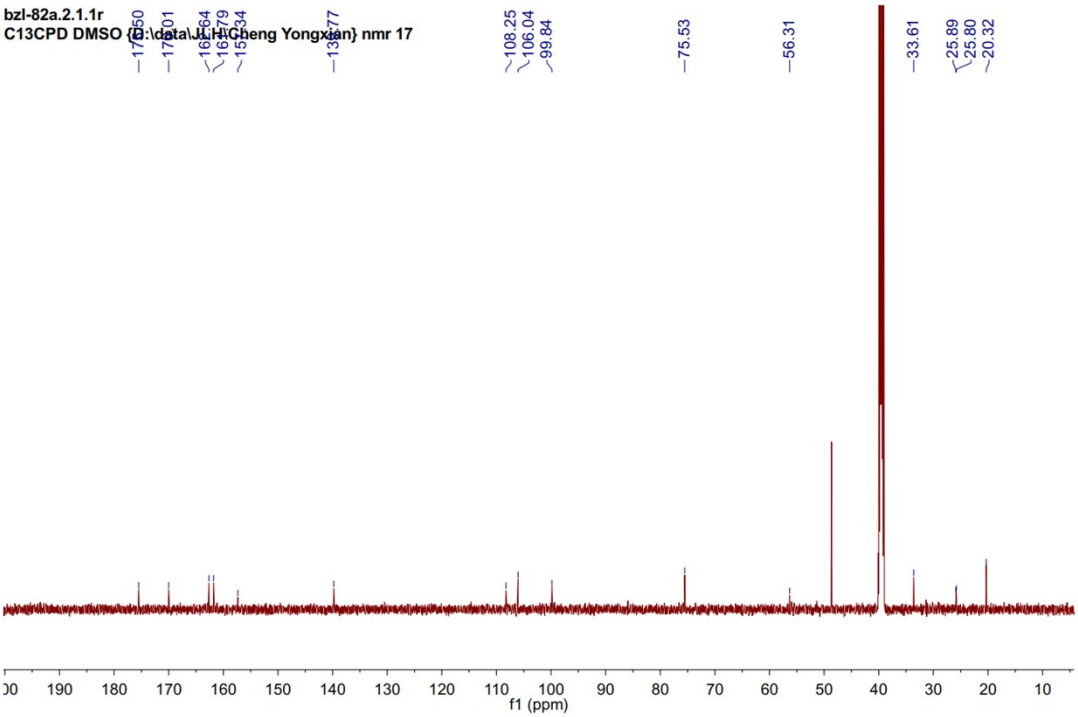


Figure S51. ^{1}H-^{1}H COSY (600 MHz) spectrum of **4** in DMSO-d_6

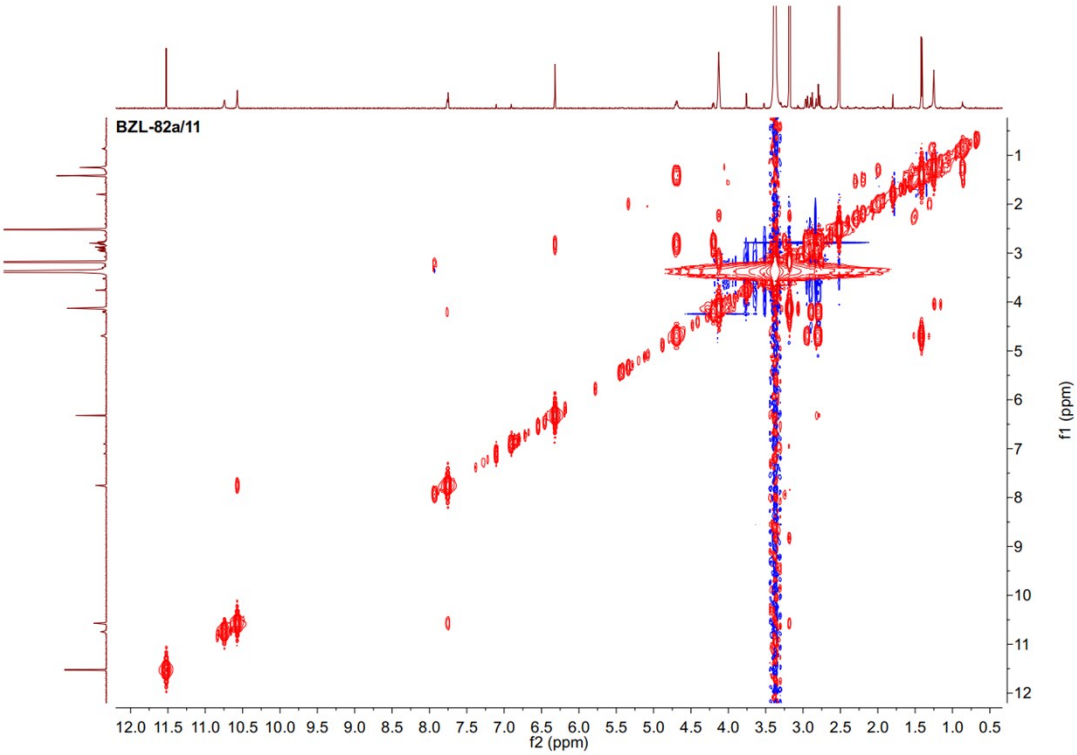


Figure S52. HSQC (600 MHz) spectrum of **4** in DMSO-d_6

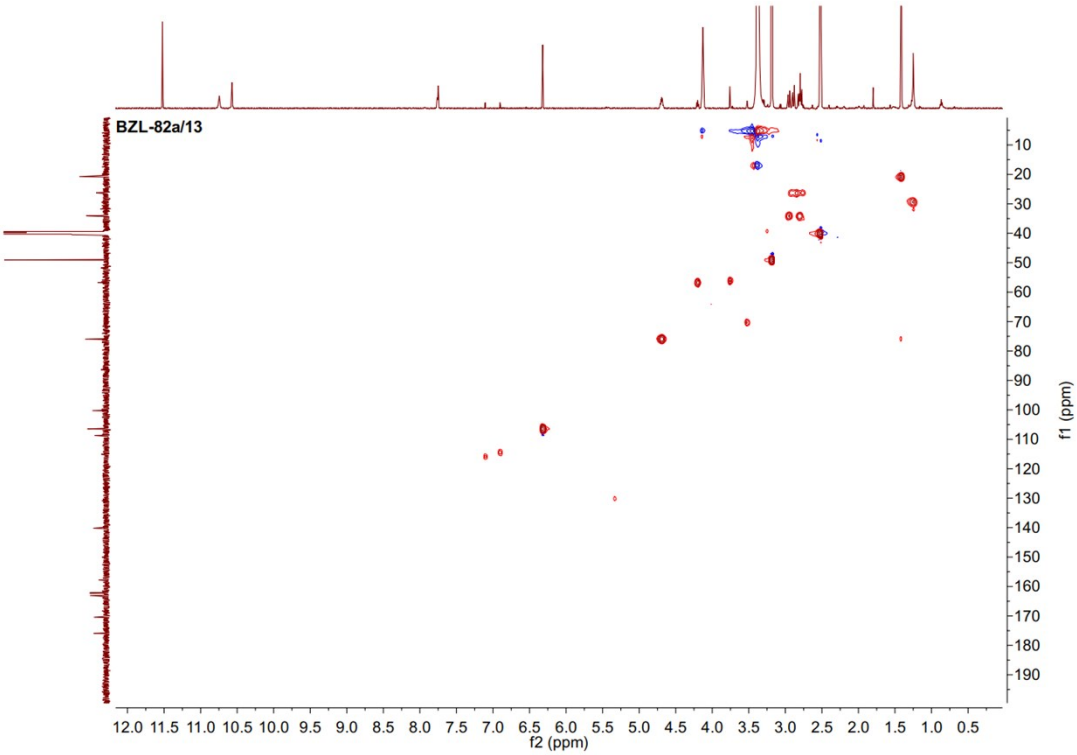


Figure S53. HMBC (600 MHz) spectrum of **4** in DMSO-d_6

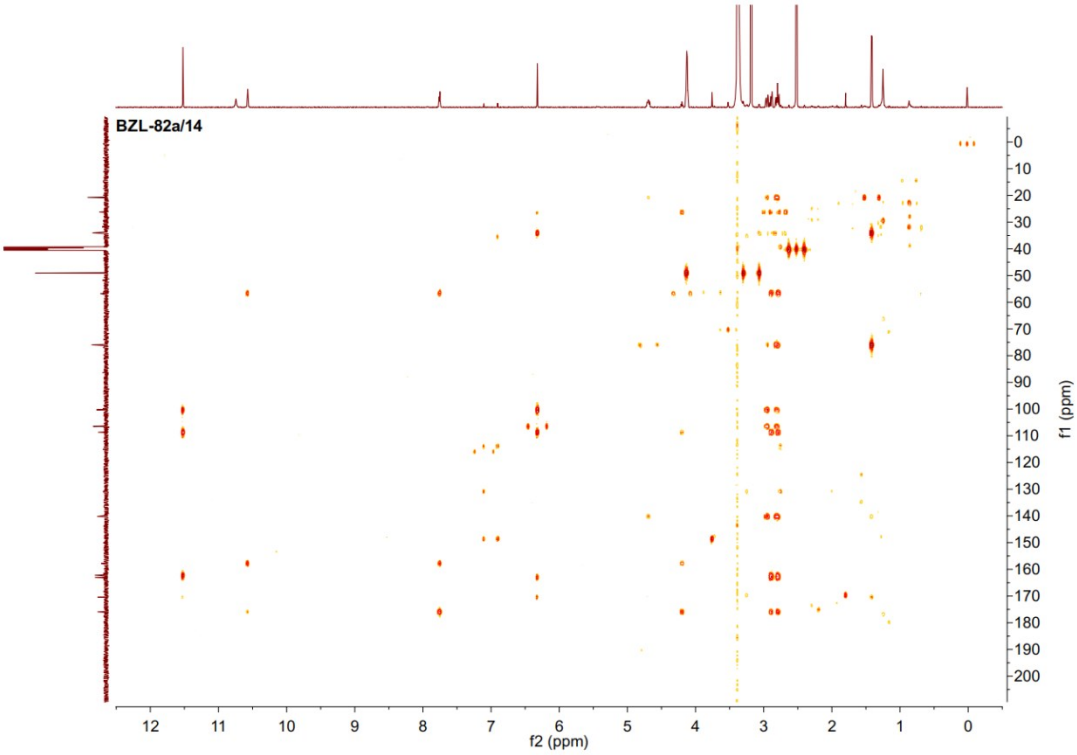
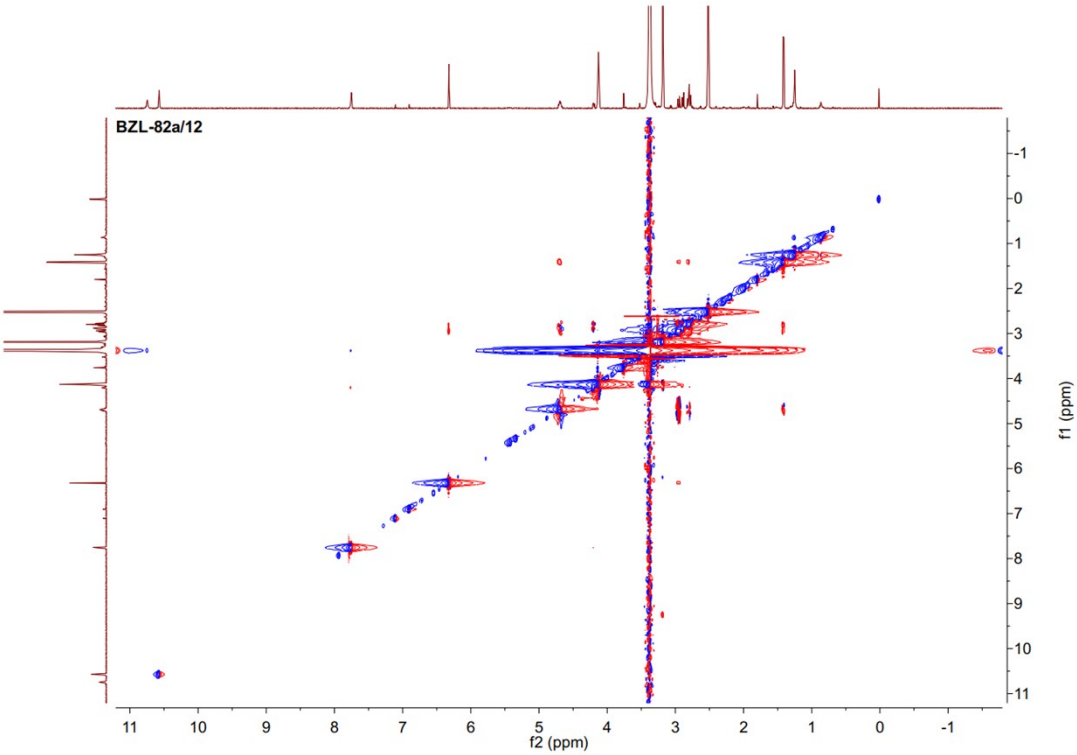
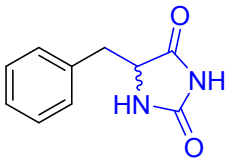


Figure S54. ROESY (600 MHz) spectrum of **4** in DMSO-d_6

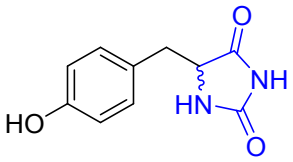


Synthesis derivative of the hydantoin

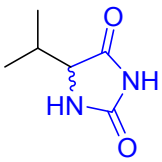
Characterization of 5–7



5-benzylimidazolidine-2,4-dione (5): A mixture of *L*-phenylalanine (0.1 g, 0.61 mmol) and urea (0.11 g, 1.83 mmol) could react directly in the absence of solvent at 150 ℃ for 2 h. This reaction was carried out in a 20 mL test tube under stirring using oil bath. After 2 h, the reaction mixture was added water (3 mL) and put into the refrigerator for 3 h. The colorless solid by vacuum filtration to afford **5** (0.08 g, 70%). **^{1}H NMR (500 MHz, DMSO-d_6)**: δ 10.42 (s, 1H), 7.91 (s, 1H), 7.18−7.29 (m, 5H), 4.33 (td, J = 5.1, 1.2 Hz, 1H), 2.94 (dd, J = 14.0, 4.8 Hz, 1H), 2.91 (dd, J = 14.0, 5.3 Hz, 1H); **^{13}C NMR (125 MHz, DMSO-d_6)**: δ 175.2, 157.1, 135.6, 129.7, 128.1, 126.7, 58.4, 36.4; MS (ESI) *m/z*: 191 $[M+H]^+$.



5-(4-hydroxybenzyl)imidazolidine-2,4-dione (6): A mixture of *L*-tyrosine (0.1 g, 0.55 mmol) and urea (0.10 g, 1.65 mmol) could react directly in the absence of solvent at 150 ℃ for 2 h. This reaction was carried out in a 20 mL test tube under stirring using oil bath. After 2 h, the reaction mixture was added water (3 mL) and put into the refrigerator for 3 h. The colorless solid by vacuum filtration to afford **6** (0.07 g, 60 %). **^{1}H NMR (500 MHz, DMSO-d_6)**: δ 10.37 (s, 1H), 9.22 (s, 1H), 7.84 (s, 1H), 6.96 (d, J = 8.4 Hz, 2H), 6.64 (d, J = 8.4 Hz, 2H), 4.23 (td, J = 4.9, 1.1 Hz, 1H), 2.82 (dd, J = 14.0, 4.7 Hz, 1H), 2.79 (dd, J = 14.0, 5.1 Hz, 1H); **^{13}C NMR (125 MHz, DMSO-d_6)**: δ 175.3, 157.2, 130.7, 130.7, 125.5, 114.9, 114.9, 58.7, 35.6; MS (ESI) *m/z*: 207 $[M+H]^+$.



5-isopropylimidazolidine-2,4-dione (7): A mixture of *L*-valine (0.1 g, 0.85 mmol) and urea (0.15 g, 2.55 mmol) could react directly in the absence of solvent at 150 ℃ for 2 h. This reaction was carried out in a 20 mL test tube under stirring using oil bath. After 2 h, the reaction mixture was added water (3 mL) and put into the refrigerator for 3 h. The colorless solid by vacuum filtration to afford **7** (0.07 g, 60 %). **^{1}H NMR (500 MHz, methanol-d_4)**: δ 4.00 (d, J = 3.6 Hz, 1H), 2.14 (m, 1H), 1.04 (d, J = 7.0 Hz, 1H), 0.92 (d, J = 7.0 Hz, 1H); **^{13}C NMR (125 MHz, methanol-d_4)**: δ 177.6, 160.4, 65.0, 31.4, 19.0, 16.2; MS (ESI) *m/z*: 143 $[M+H]^+$.

Figure S55. ^{1}H NMR (500 MHz) spectrum of **5** in DMSO-d_6

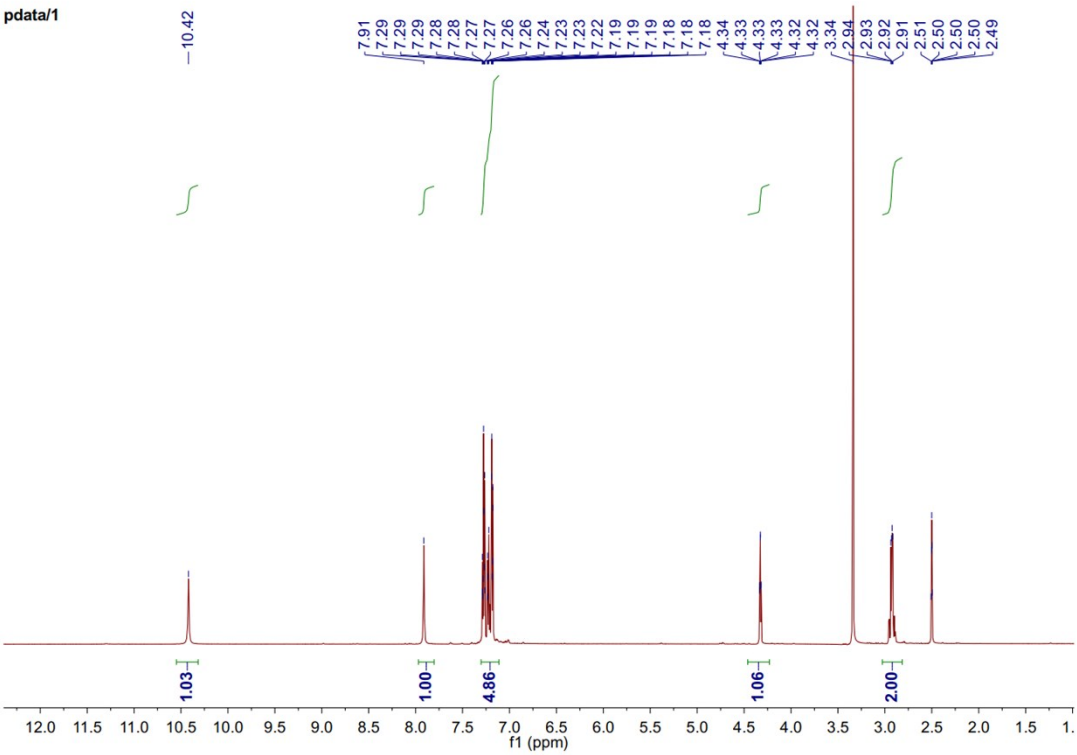


Figure S56. ^{13}C NMR (125 MHz) spectrum of **5** in DMSO-d_6

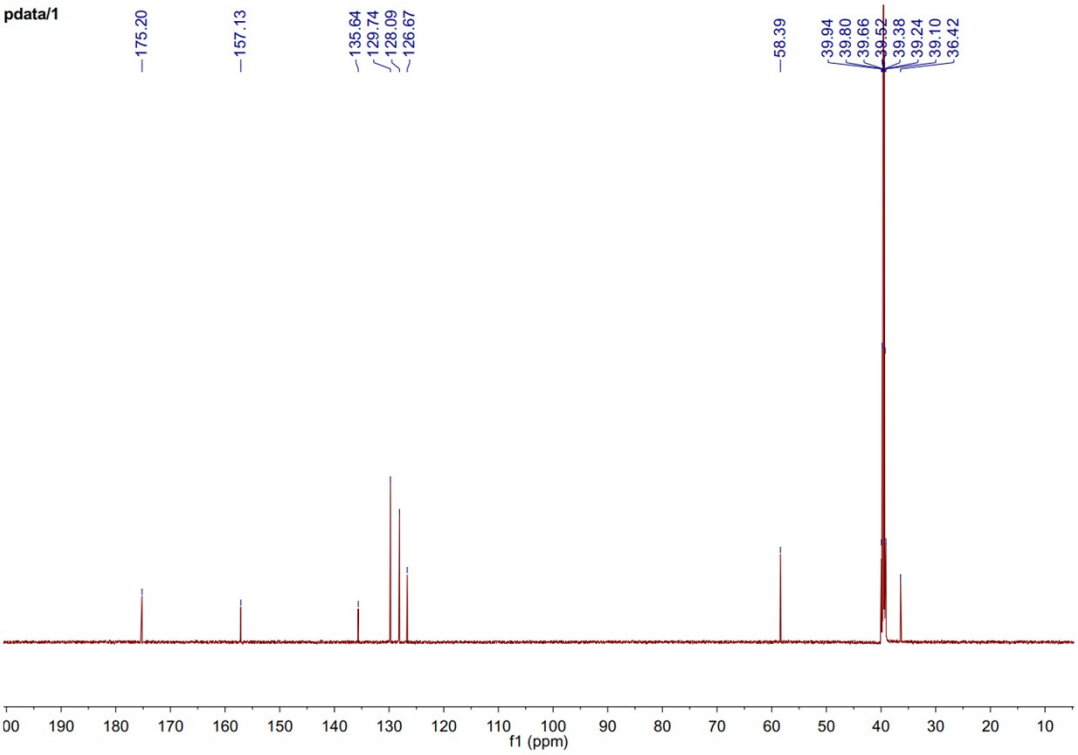


Figure S57. ^{1}H NMR (500 MHz) spectrum of **6** in DMSO-d_6

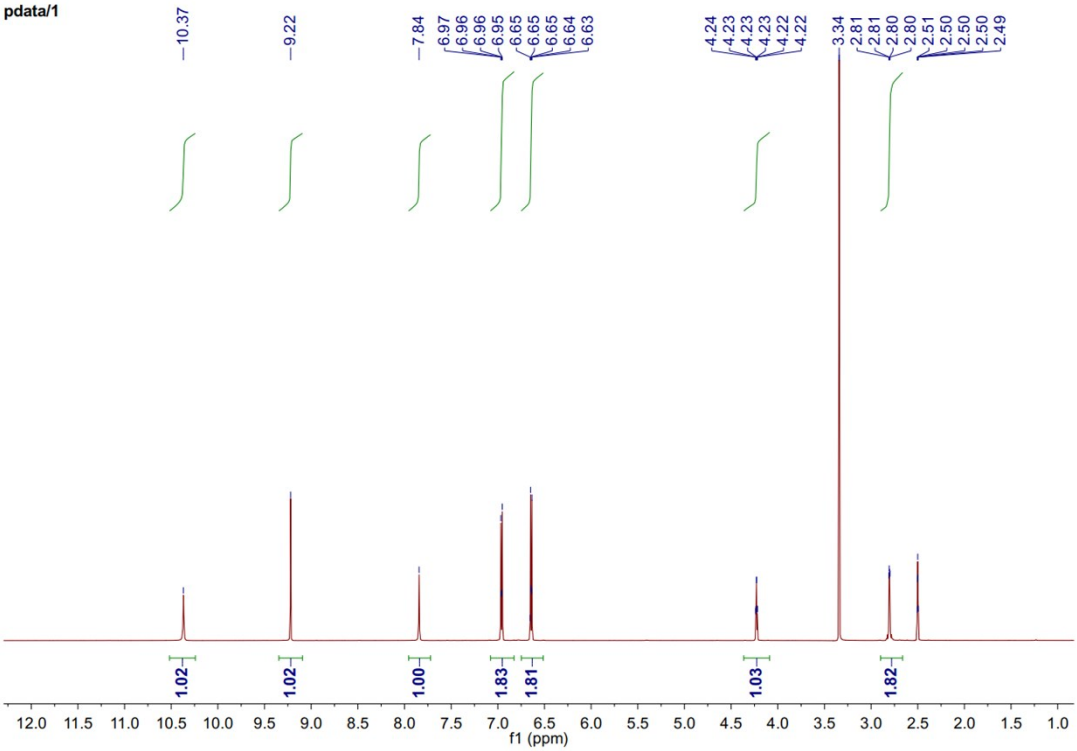


Figure S58. ^{13}C NMR (125 MHz) spectrum of **6** in DMSO-d_6

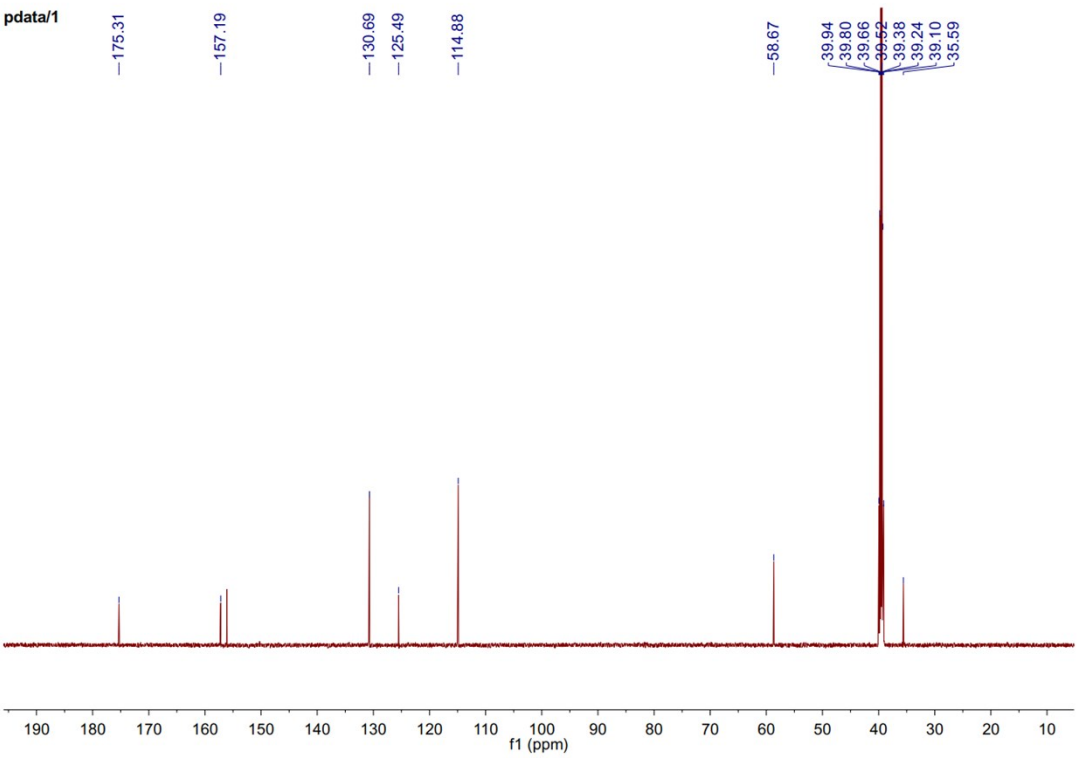


Figure S59. ^{1}H NMR (500 MHz) spectrum of **7** in methanol-d_4

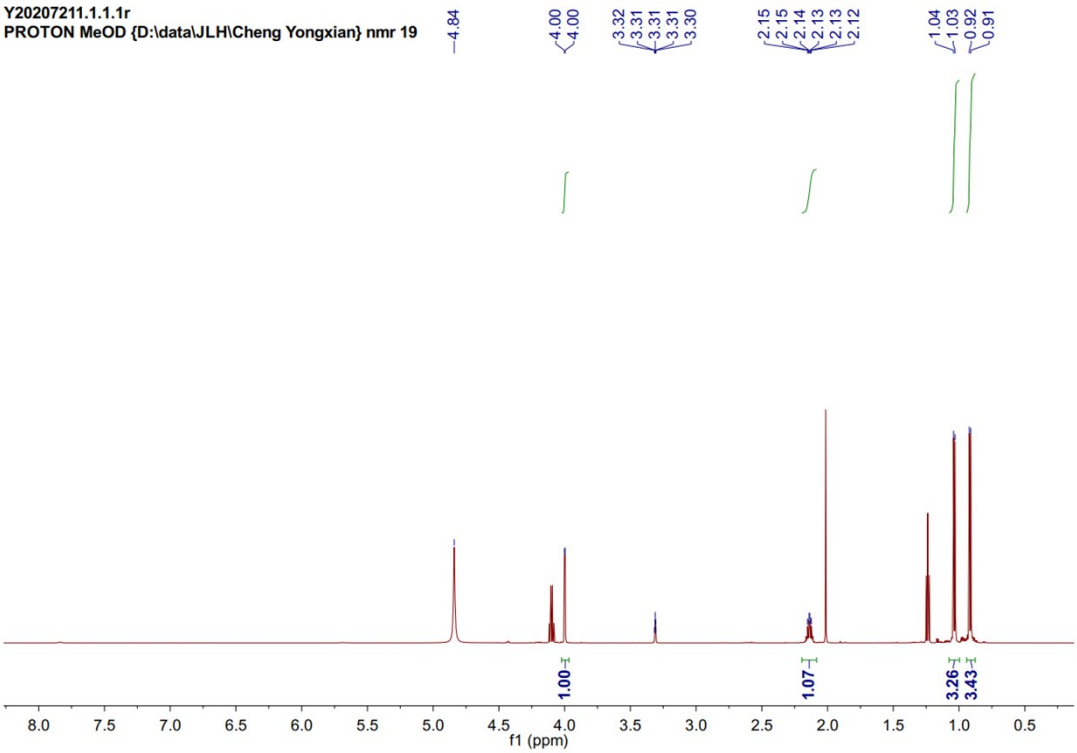
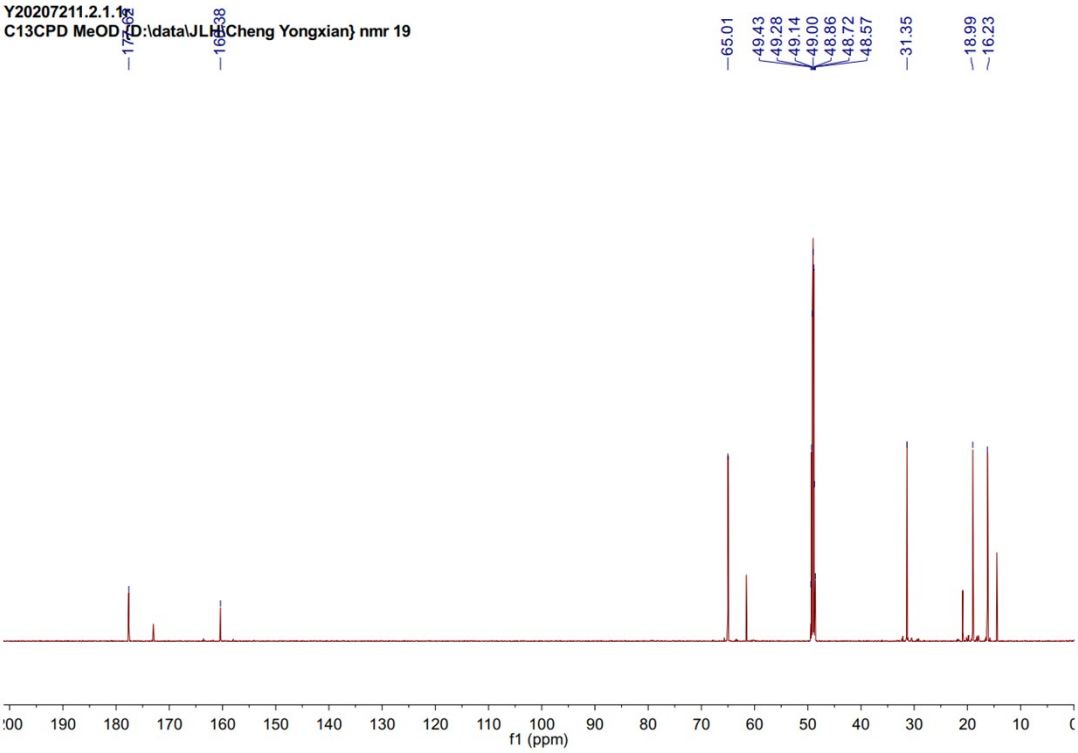


Figure S60. ^{13}C NMR (125 MHz) spectrum of **7** in methanol-d_4



Biological Assays

1. Cell culture

Primary human umbilical vein endothelial cells (HUVECs) were purchased from the iCell Bioscience Inc (Shanghai, P.R. China). HUVECs were cultured in Endothelial Cell Medium (ECM) (#1001, ScienCell) containing 5% fetal bovine serum (FBS) (#0025, ScienCell), 1% Endothelial Cell Growth Supplement (ECGS) (#1052, ScienCell), 1% penicillin/streptomycin solution (P/S) (#0503, ScienCell), The cells were cultured in a humidified atmosphere of 5% CO_2 at 37°C.

2. Cell proliferation assay[1]

HUVECs viability was measured by CCK8 assay. Briefly, HUVECs were seeded at 5×10^3 cells/well in 96-well plates, and allowed to adhere to obtain 50% confluent monolayer. After starving about 6 h, the medium was replaced with normal growth medium containing compounds respectively. After 24 h incubation, the growth of cells was measured at 450 nm using a CYTATION1 (BioTek, Winooski, VT, USA). In control cells, equivalent amount of DMSO was added as vehicle, BFGF (50 ng/mL) was added as a positive control. The number of viable cells was presented relative to untreated controls.

3. Wound healing assay[2]

HUVECs were seeded at 1.2×10^4 cells/well to grow into full confluence in 96-well plates and scratches were produced after 24 h. The medium was replaced with normal growth medium containing compounds respectively. Images of the wounded region, using CYTATION1 (BioTek, Winooski, VT, USA) were captured after scratches had occured. Cell migration into this region was monitored after compounds effect 0 h and 24 h (T0, T24, respectively). The percentage of the scratch area (% scratch) that showed wound closure was calculated as follows: % scratch = (width at T0 − width at T24)/width at T0 × 100. The data was calculated using the CYTATION1 and Prism 7 program.

4. Tube formation assay

HUVECs [2×10^4 in 50 μL ECM medium containing DMSO or compounds with 40 μM] were seeded on the μ-slide angiogenesis (Ibidi, Martinsried, Germany) pre-coated

with 10 μL Matrigel, and the formation of tubular like structure was recorded by a CYTATION1 (BioTek, Winooski, VT, USA) at 6 h and using a customised version of the Angiogenesis Analyser developed for the ImageJ software.

5. Western bolt assay

To determine the effects of the compounds on VEGFR-dependent signaling cascade, starved HUVECs were treated with DMSO or various compounds with 40 μM for 1 h, followed by 50 ng/mL VEGF 165A treatments for 30 min. Cells were lysed with RIPA lysis buffer (Beyotime, Nantong, China) containing a 1:50 dilution of a protease inhibitor cocktail (Sigma, Aldrich). Proteins were applied to 10% SDS-PAGE gels and transferred onto a PVDF membrance (Bio-Rad, USA). The membranes were blocked with 5% defatted milk in TBST buffer at room temperature for 1 h, and then incubated with the following primary antibodies, respectively: Phospho-Akt (Ser473) (D9E) XP® Rabbit mAb (#84336, Cell Signaling Technology), Akt (pan) (C67E7) Rabbit mAb (#4691, Cell Signaling Technology), Phospho-p44/42 MAPK (Erk1/2) (Thr202/Tyr204) Antibody (#9101, Cell Signaling Technology), p44/42 MAPK (Erk1/2) Antibody (#9102, Cell Signaling Technology), GAPDH (D16H11) XP® Rabbit mAb (#5174, Cell Signaling Technology). After extensive washing, the membranes were incubated with the secondary antibodies (Cell Signaling Technology). Images were then detected by the chemiluminescence detection (Bio red). Similar experiments were performed at least three times.

1. Tang, N.; Shi, L.; Yu, Z.; Dong, P.; Wang, C.; Huo, X.; Zhang, B.; Huang, S.; Deng, S.; Liu, K.; Ma, T.; Wang, X.; Wu L; Ma XC. *Oncotarget*. *Lett.* **2016**, *7(3)*, 3533–3547.

2. Balogh, E.; Veale, D.J.; McGarry, T.; Orr, C.; Szekanecz, Z.; Ng, C.T.; Fearon, U.; Biniecka, M. *Arthritis Res. Ther*. *Lett.* **2018**, *20(1)*, 95.

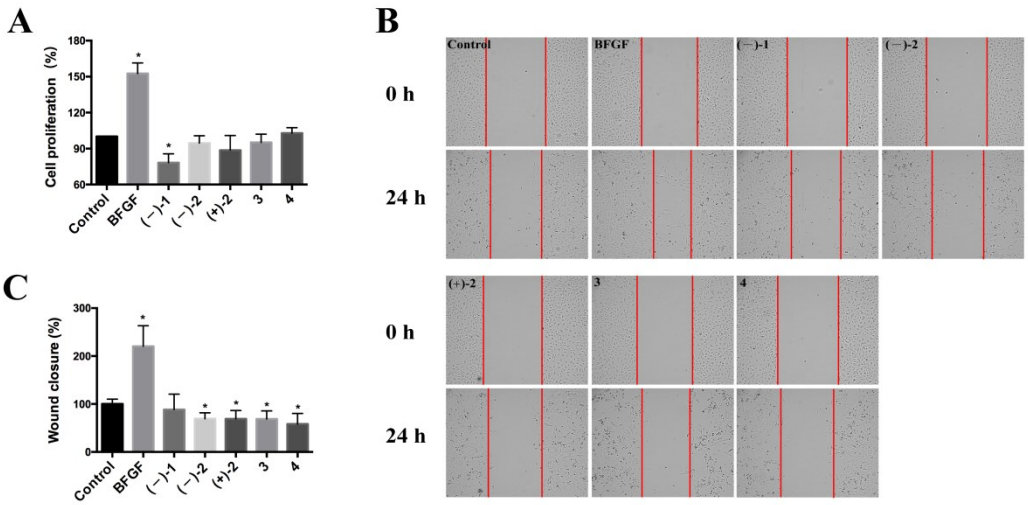


Figure S61. HUVECs proliferation and migration influenced by the isolated compounds.

A: Cell viability in HUVECs. HUVECs were exposed to various compounds at 40 μM for 24 h, BFGF (50 ng/mL) was used as a positive control, and viability was measured by CCK8 assay. Data were represented as percentage of vehicle-treated control. B/C: Cell migration in HUVECs in wound healing assay. HUVECs were plated, scratched and then incubated with various compounds at 40 μM, BFGF (50 ng/mL) was used as a positive control. Cell migration was measured by manual counting. The percentage of the scratch area (% scratch) that showed wound closure was calculated as follows:% scratch = (width at T0 − width at T24)/width at T0 × 100. Three independent experiments were performed (*p <0.05, compound-treated group vs DMSO group).