

Synthesis and discovery of new 3-cyanopyridine derivatives as anti-tumor and apoptosis inducers targeting survivin

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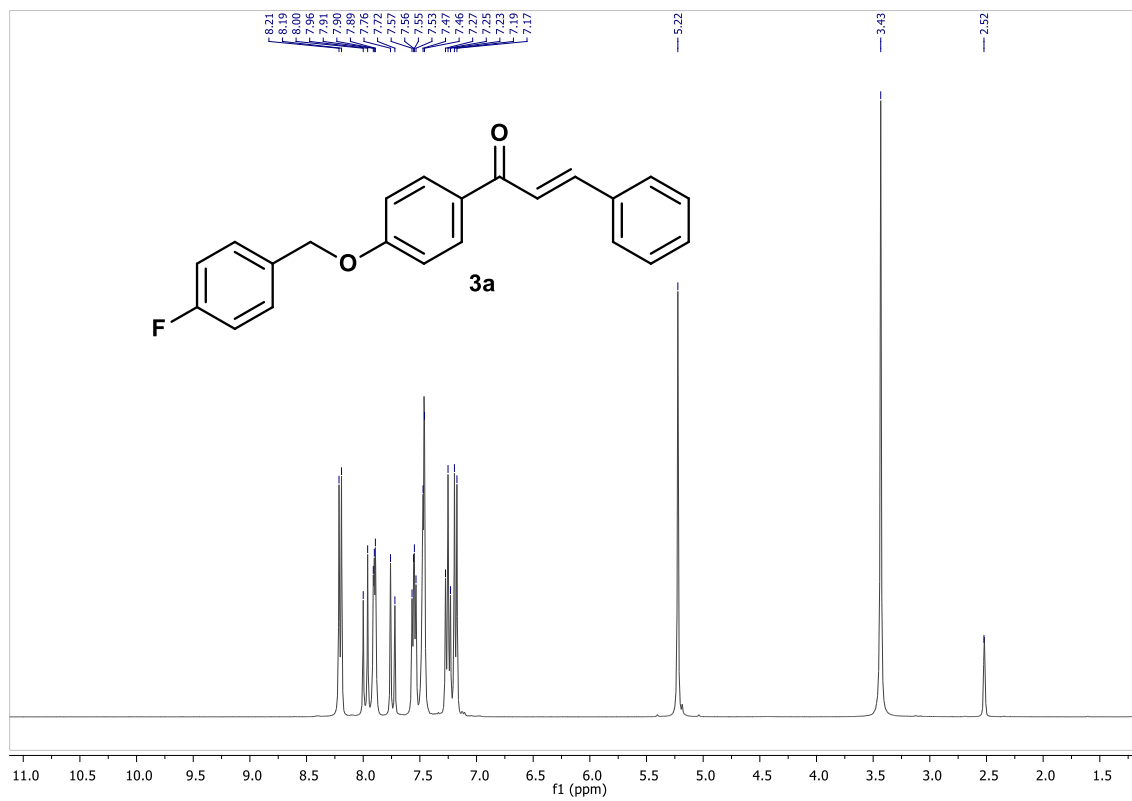


Figure S1. ¹H NMR spectrum of 3a

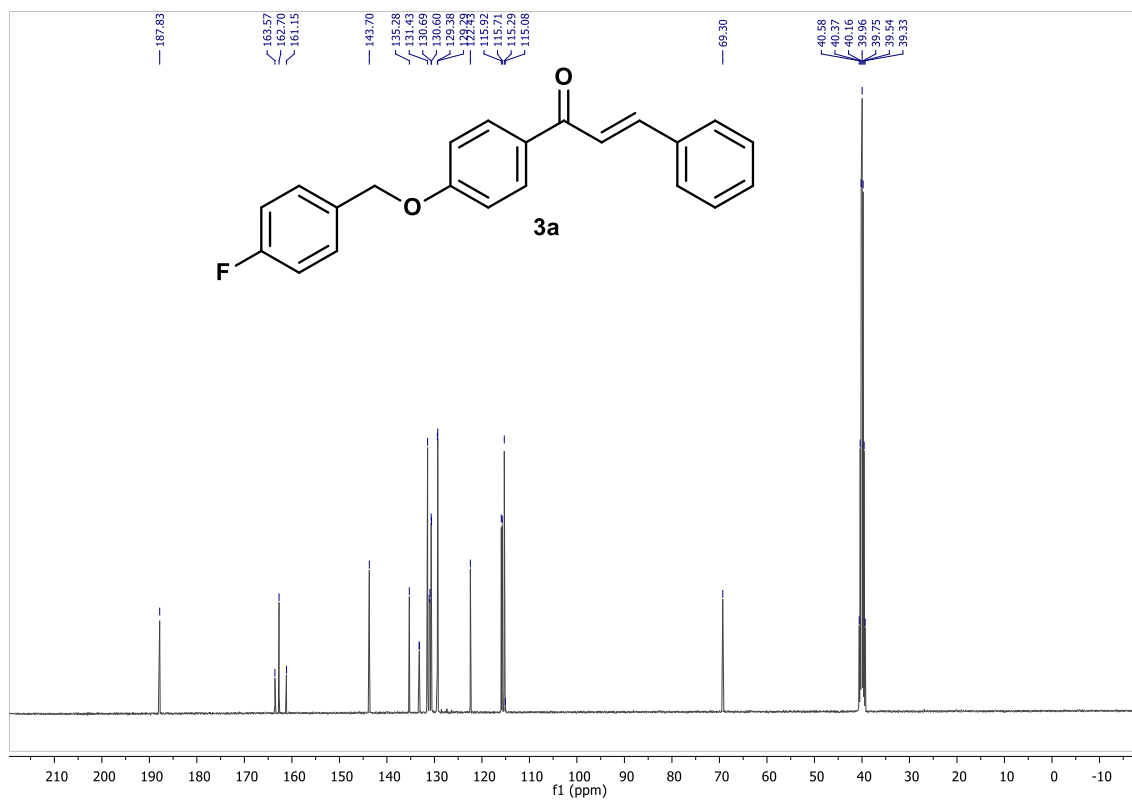


Figure S2. ¹³C NMR spectrum of 3a

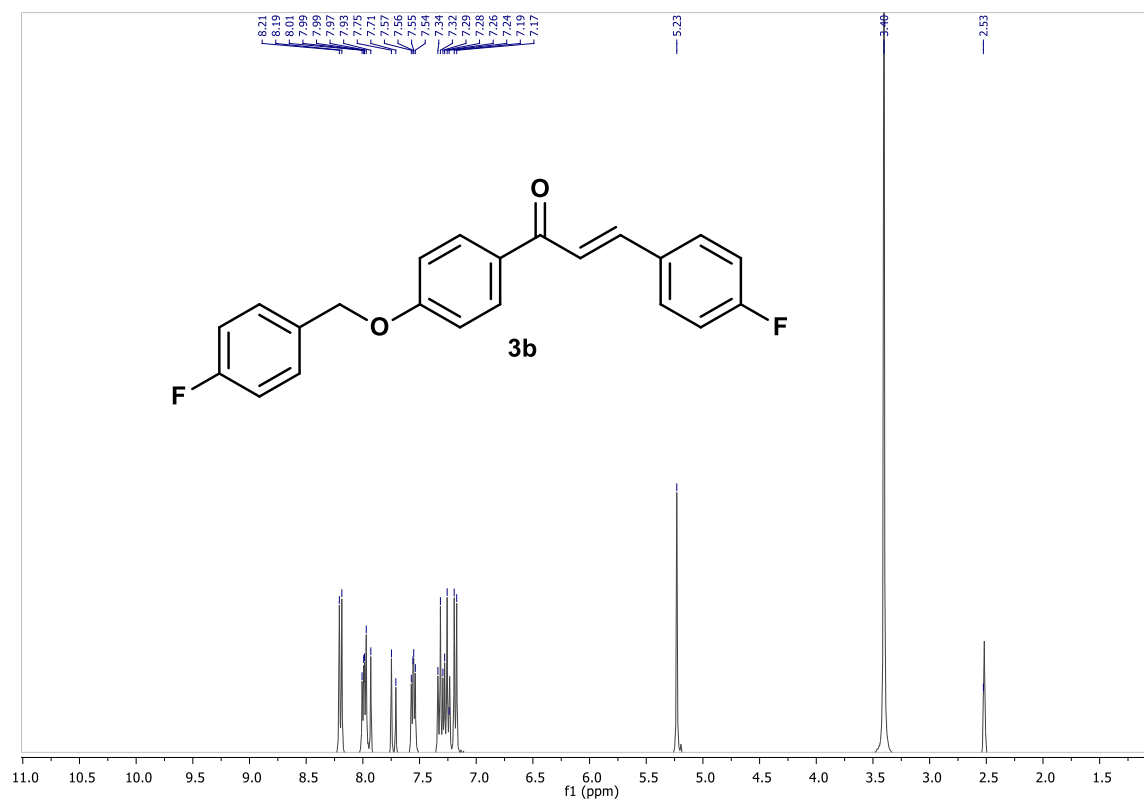


Figure S3. ¹H NMR spectrum of **3b**

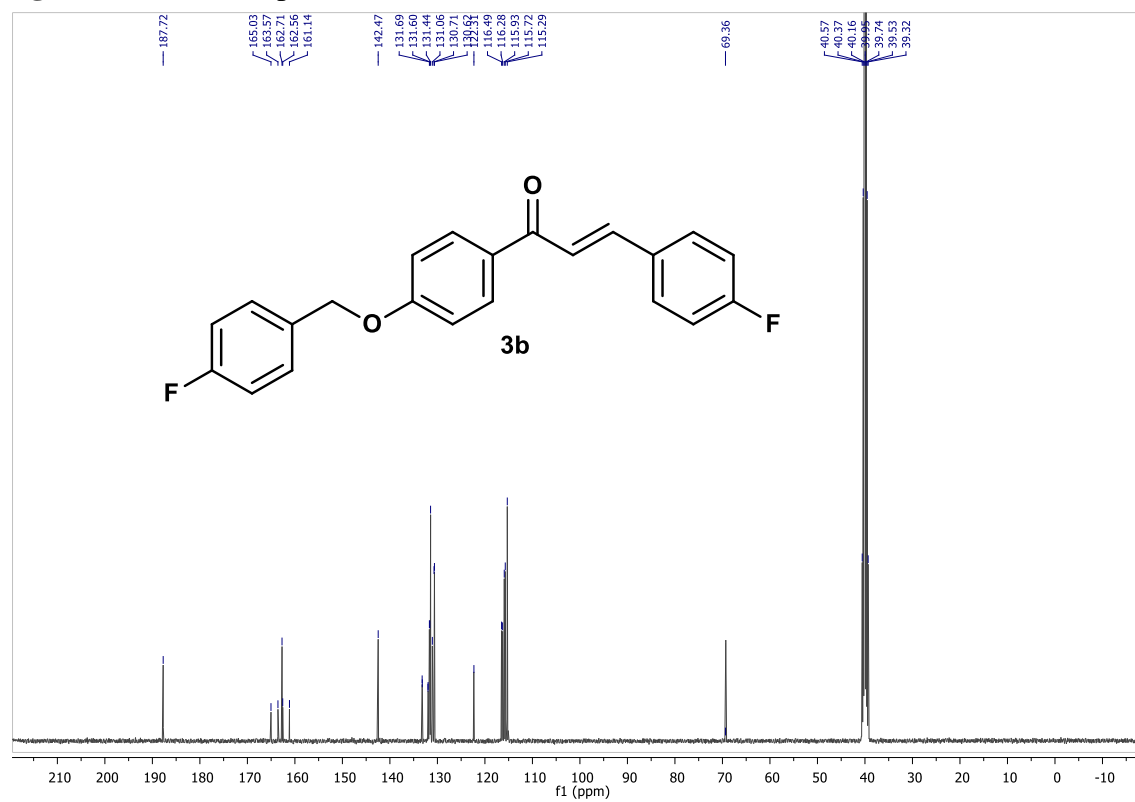


Figure S4. ¹³C NMR spectrum of **3b**

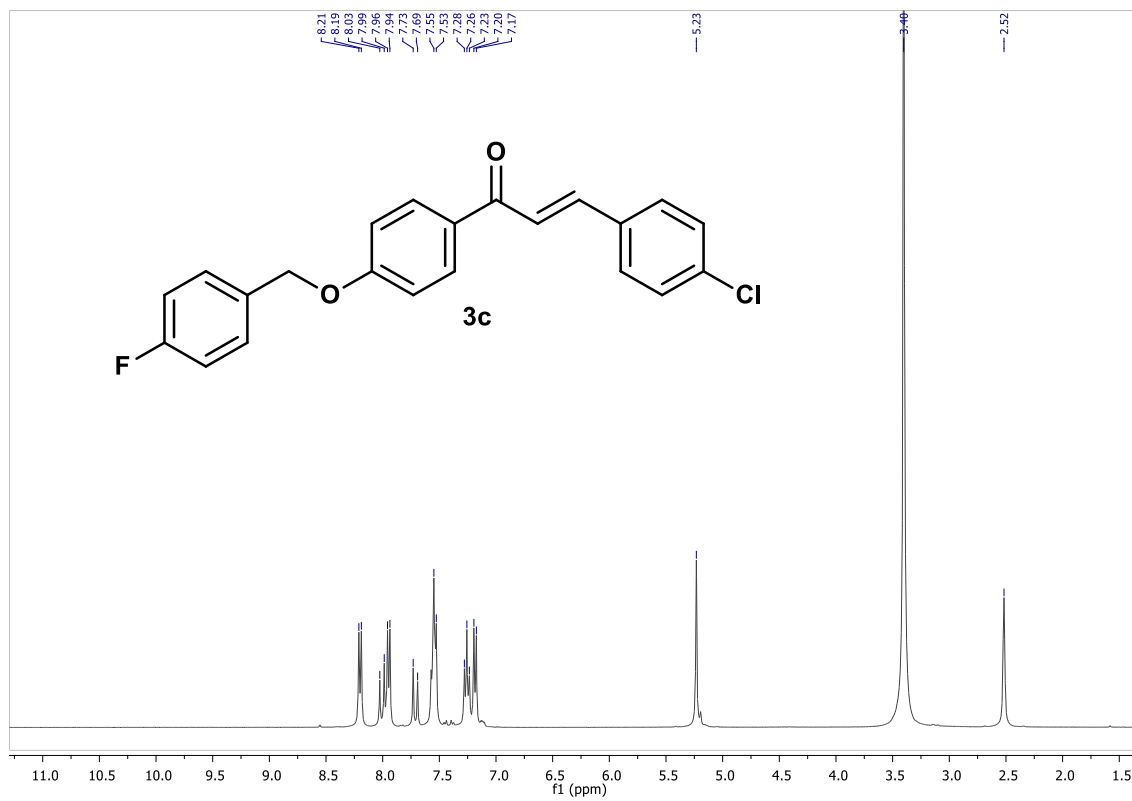


Figure S5. ¹H NMR spectrum of **3c**

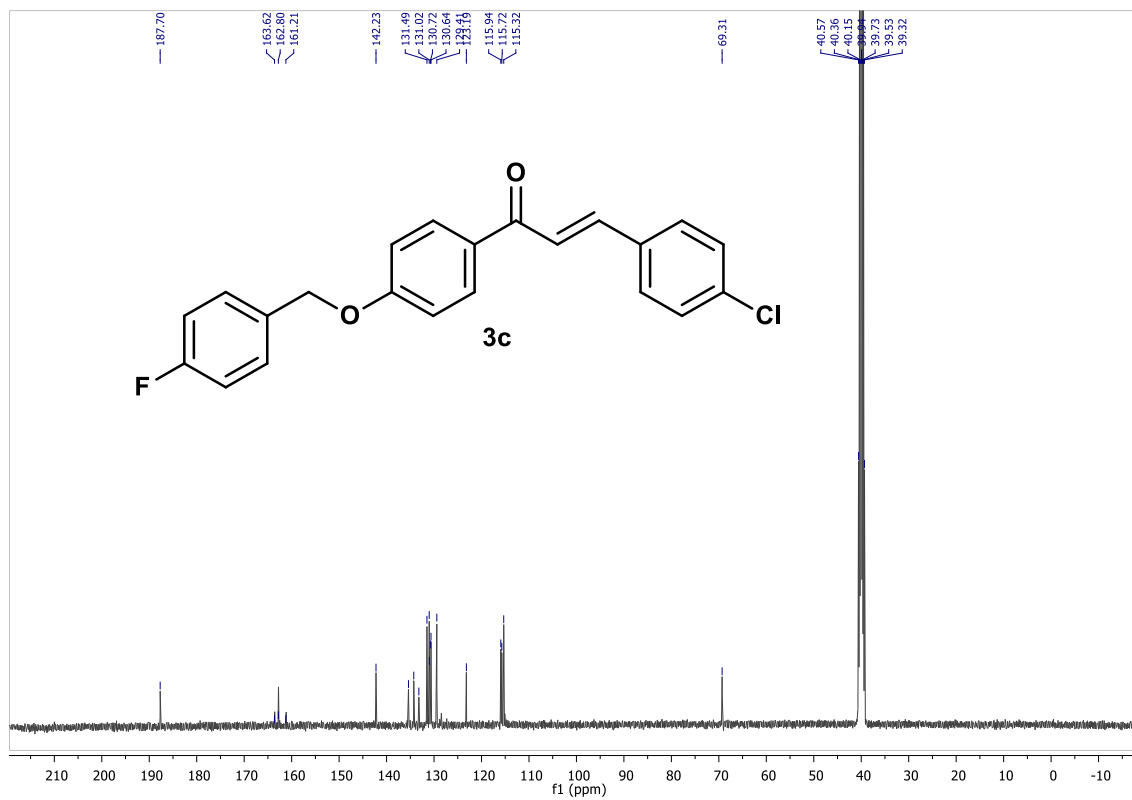


Figure S6. ¹³C NMR spectrum of **3c**

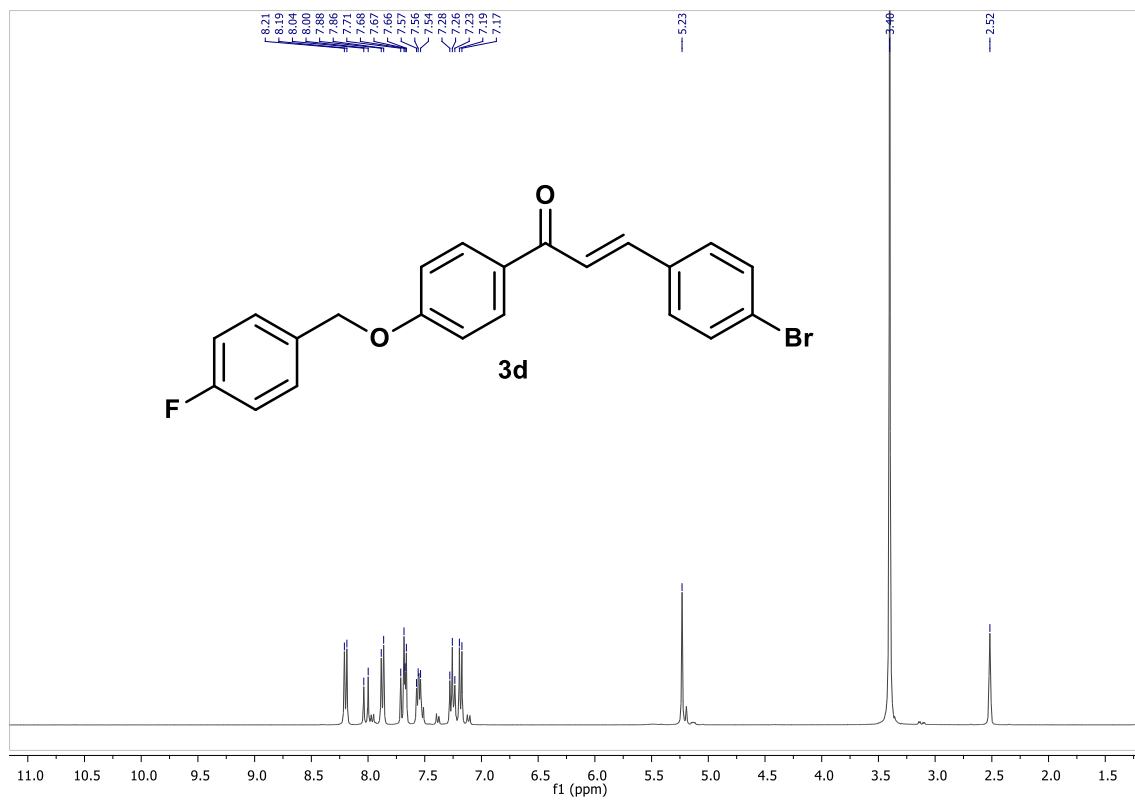


Figure S7. ¹H NMR spectrum of 3d

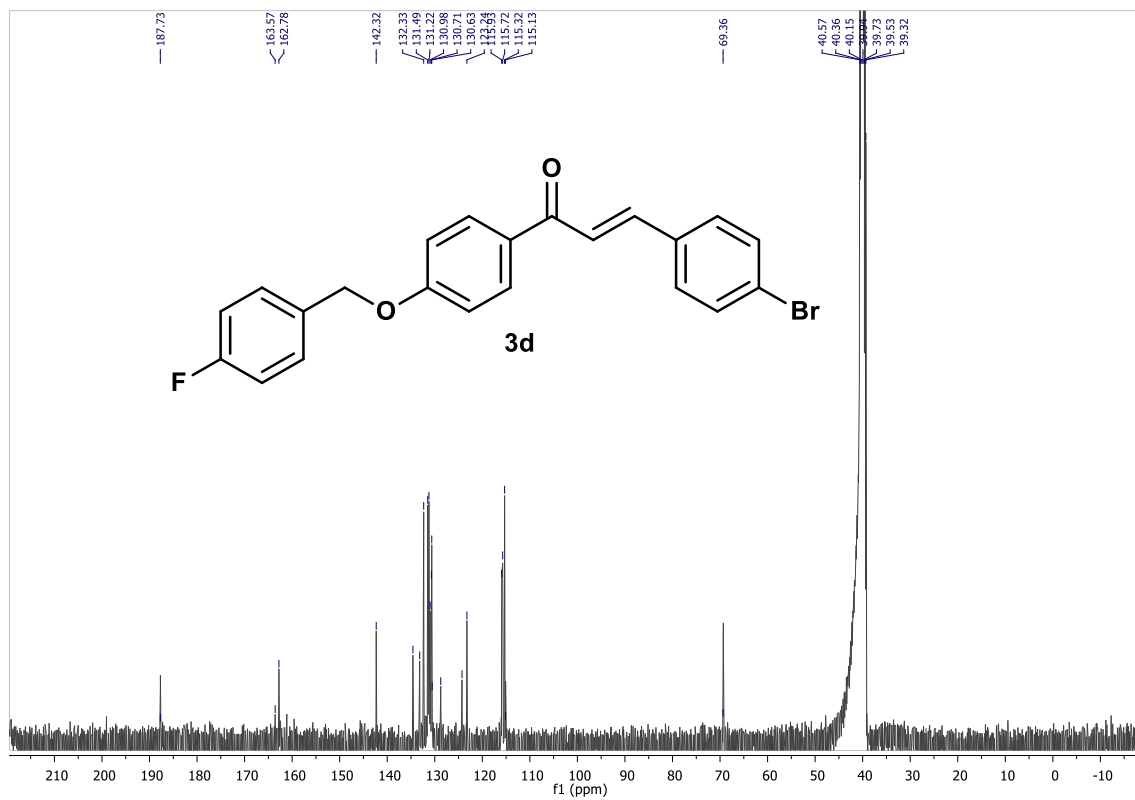


Figure S8. ¹³C NMR spectrum of 3d



Figure S9. ¹H NMR spectrum of **3e**

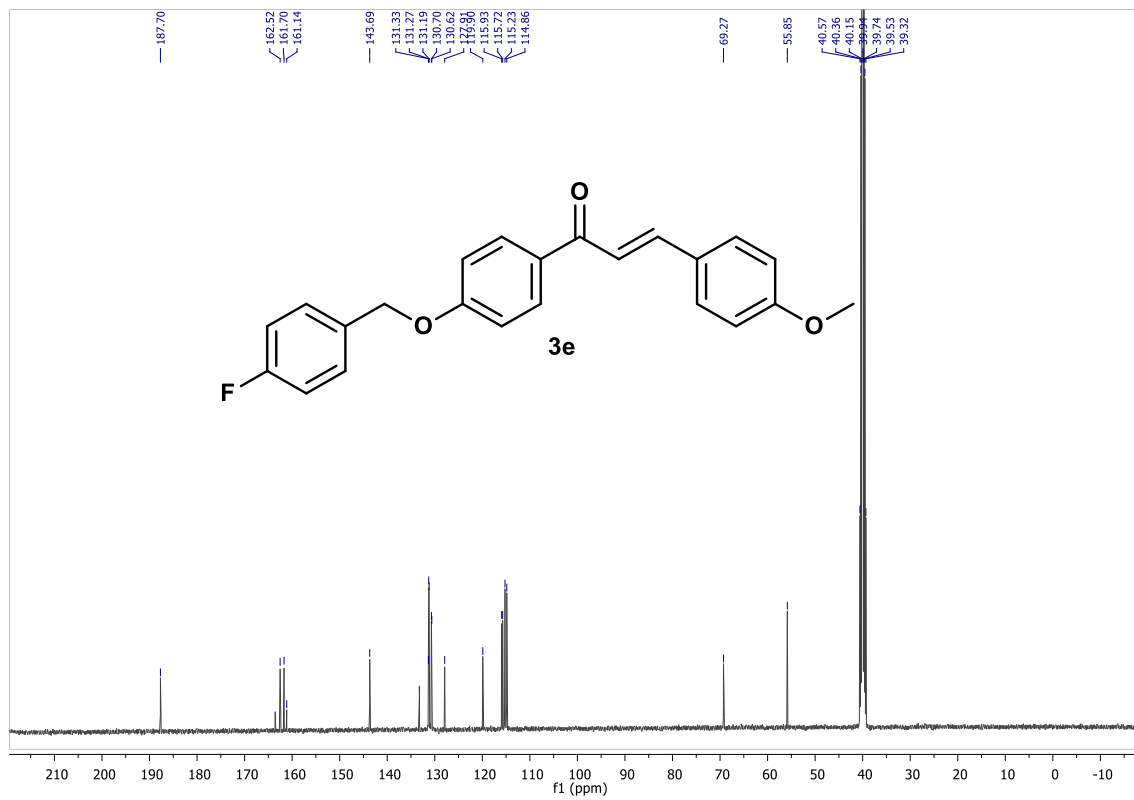


Figure S10. ¹³C NMR spectrum of **3e**

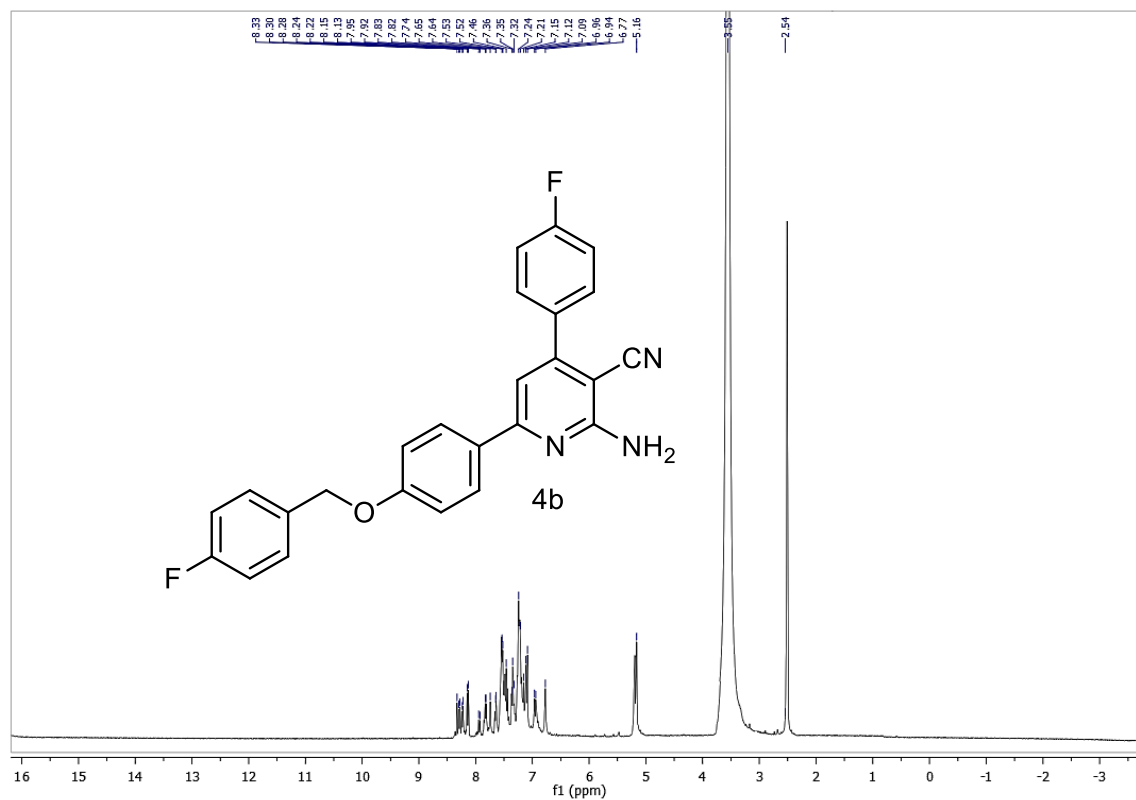


Figure S11. ¹H NMR spectrum of **4b**

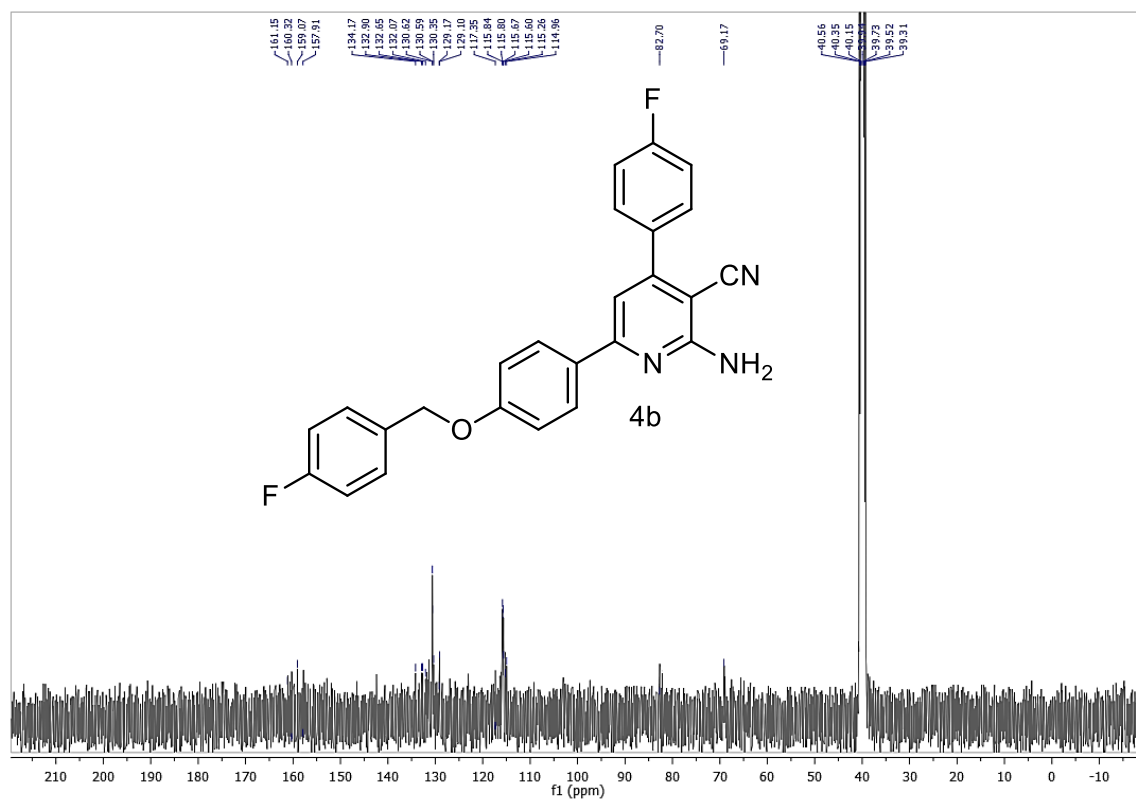


Figure S12. ¹³C NMR spectrum of **4b**

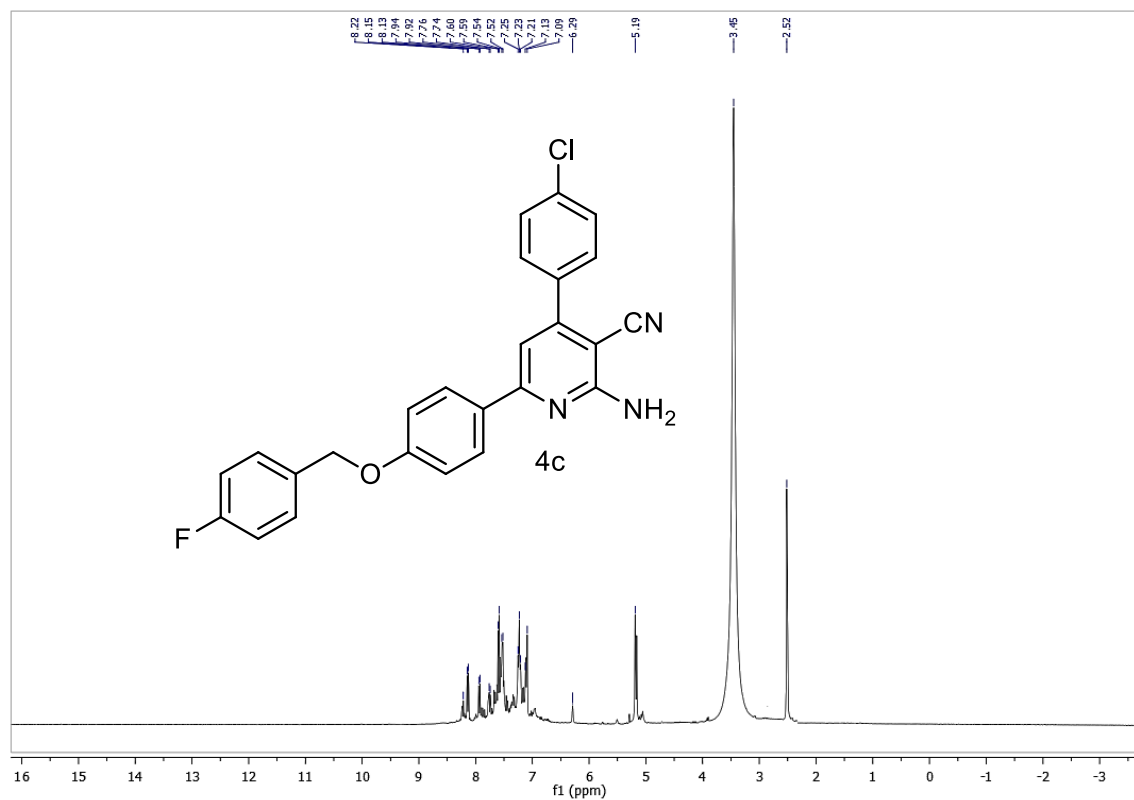


Figure S13. ¹H NMR spectrum of 4c

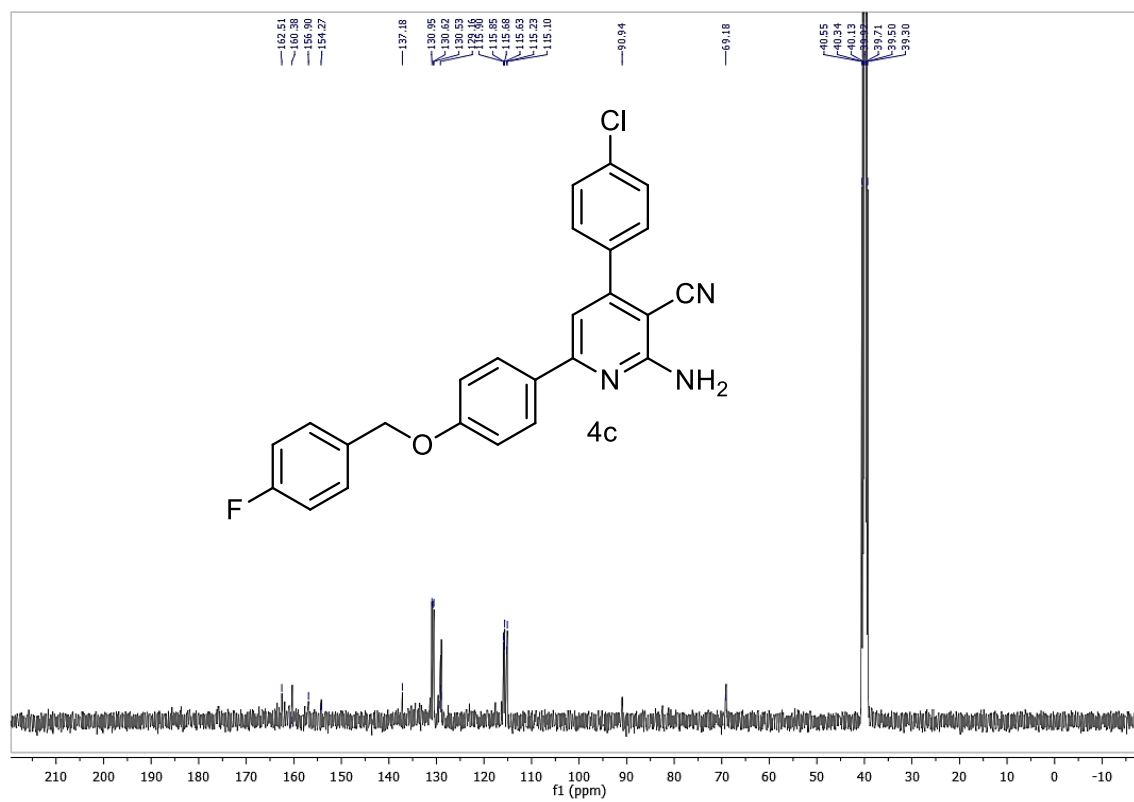


Figure S14. ¹³C NMR spectrum of 4b

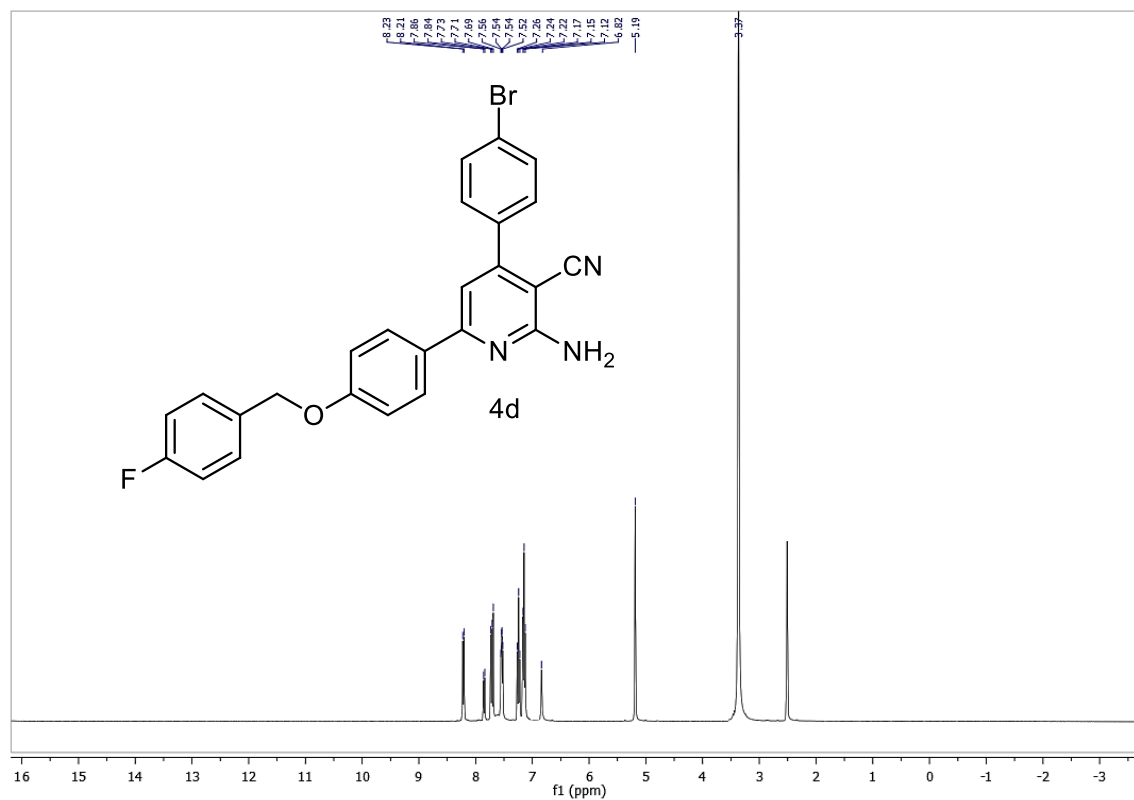


Figure S15. ¹H NMR spectrum of 4d

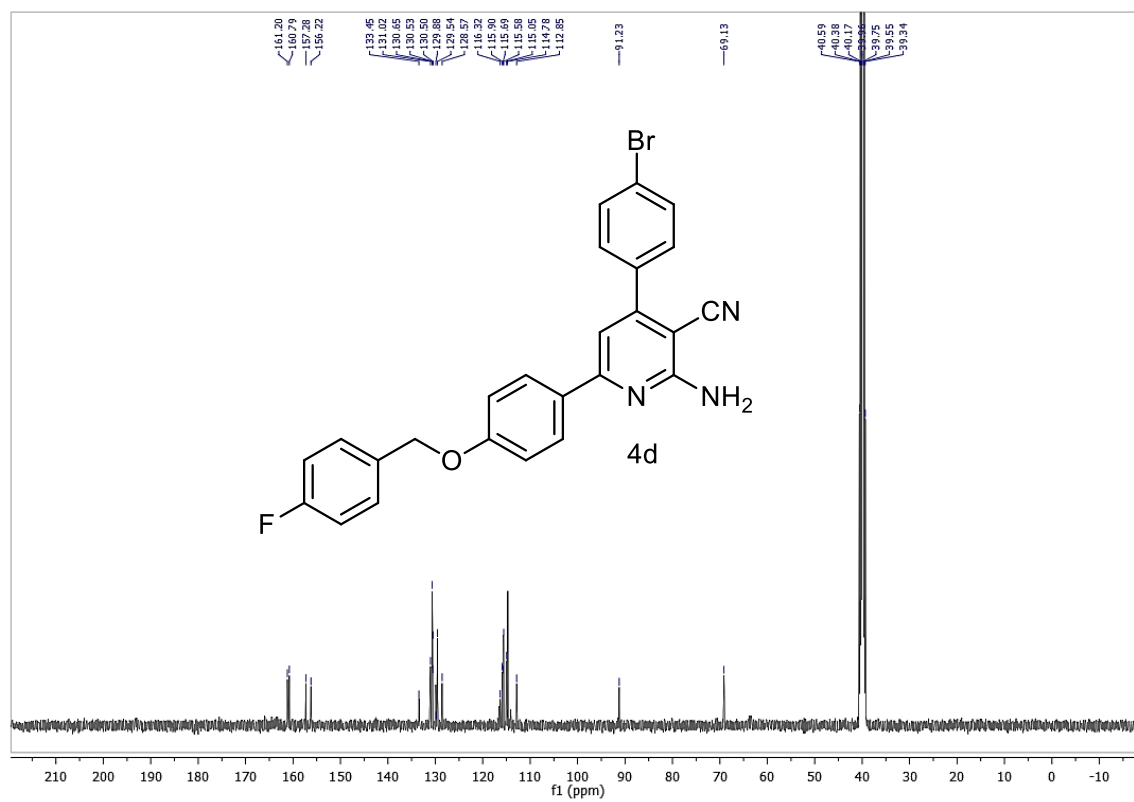


Figure S16. ¹³C NMR spectrum of 4d

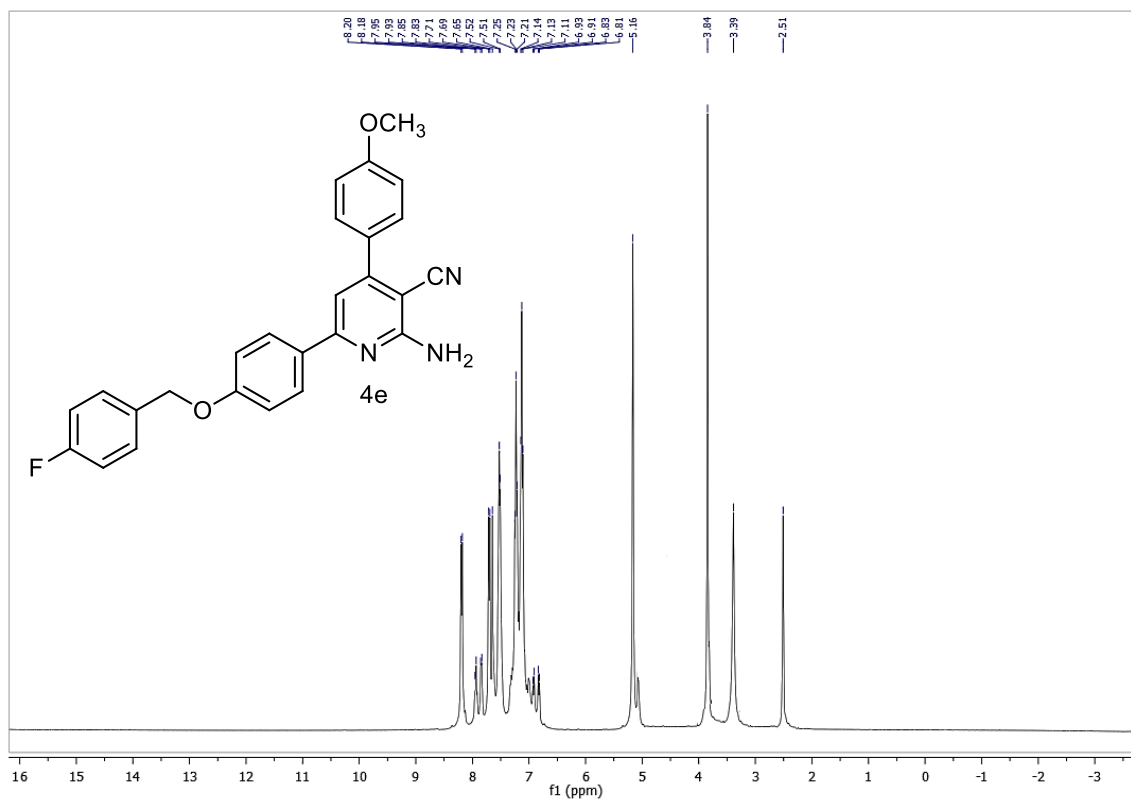


Figure S17. ^1H NMR spectrum of **4e**

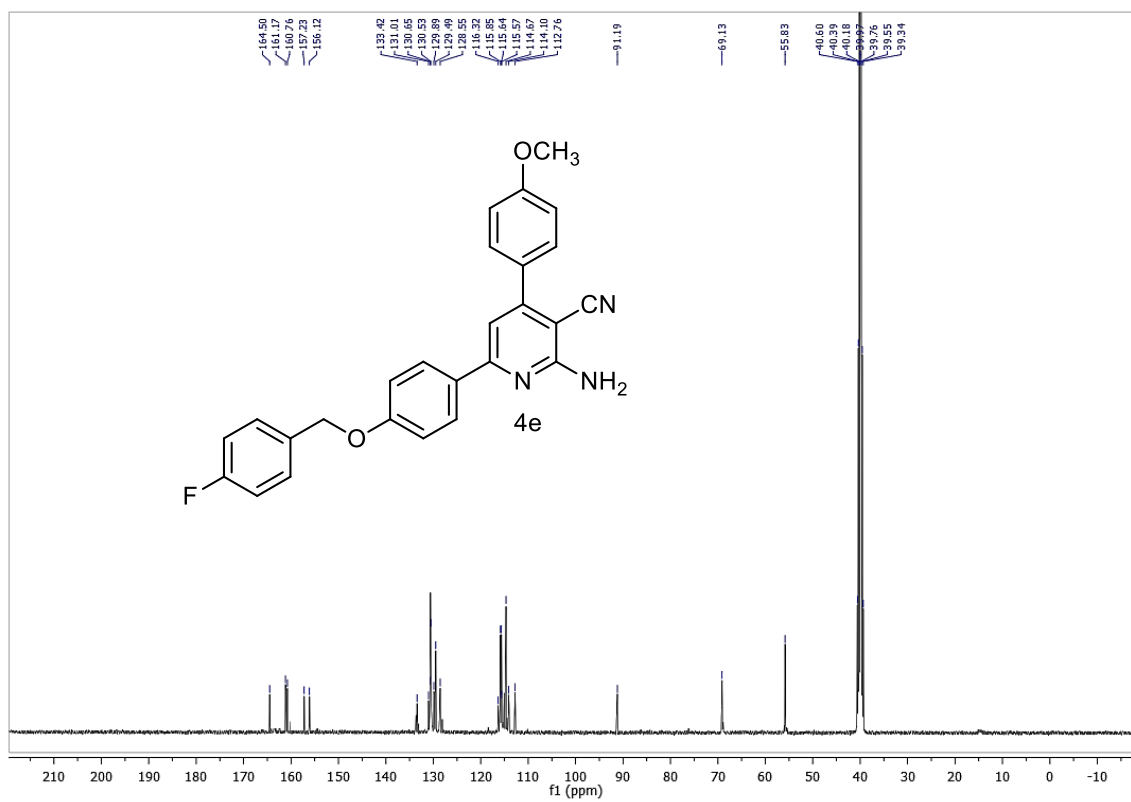


Figure S18. ^{13}C NMR spectrum of **4e**

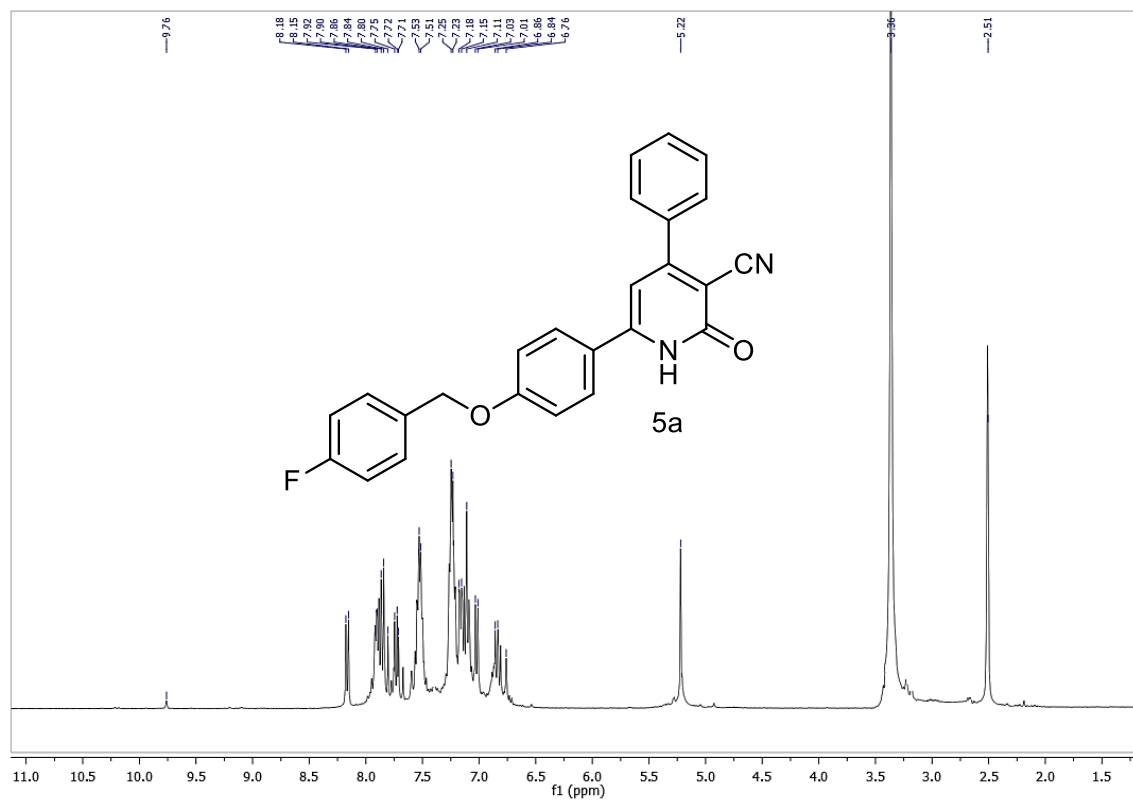


Figure S19. ¹H NMR spectrum of 5a

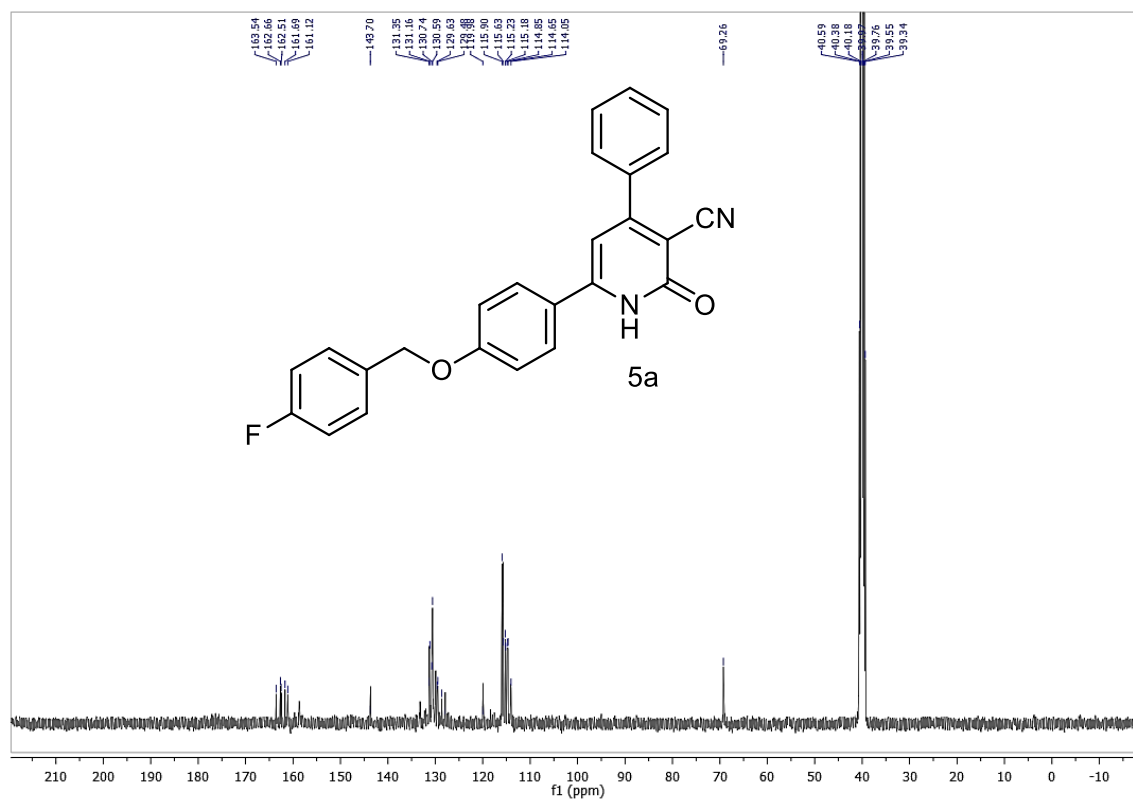


Figure S20. ¹³C NMR spectrum of 5a

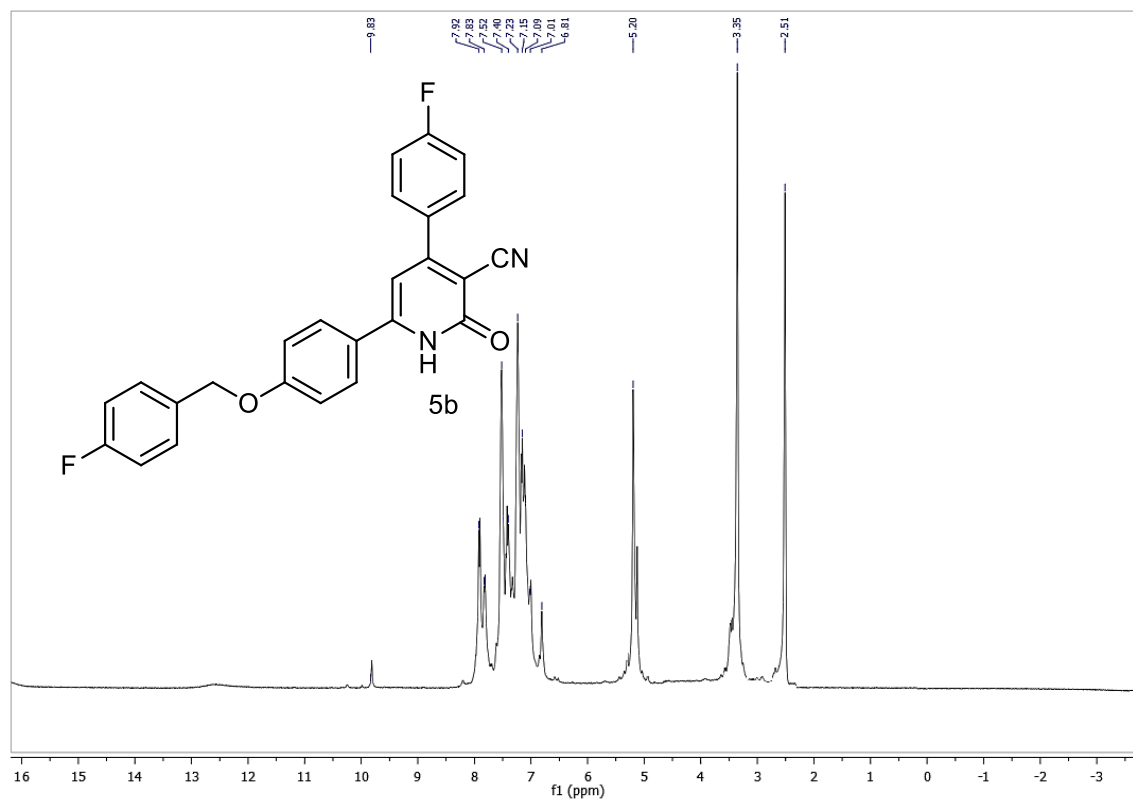


Figure S21. ¹H NMR spectrum of **5b**

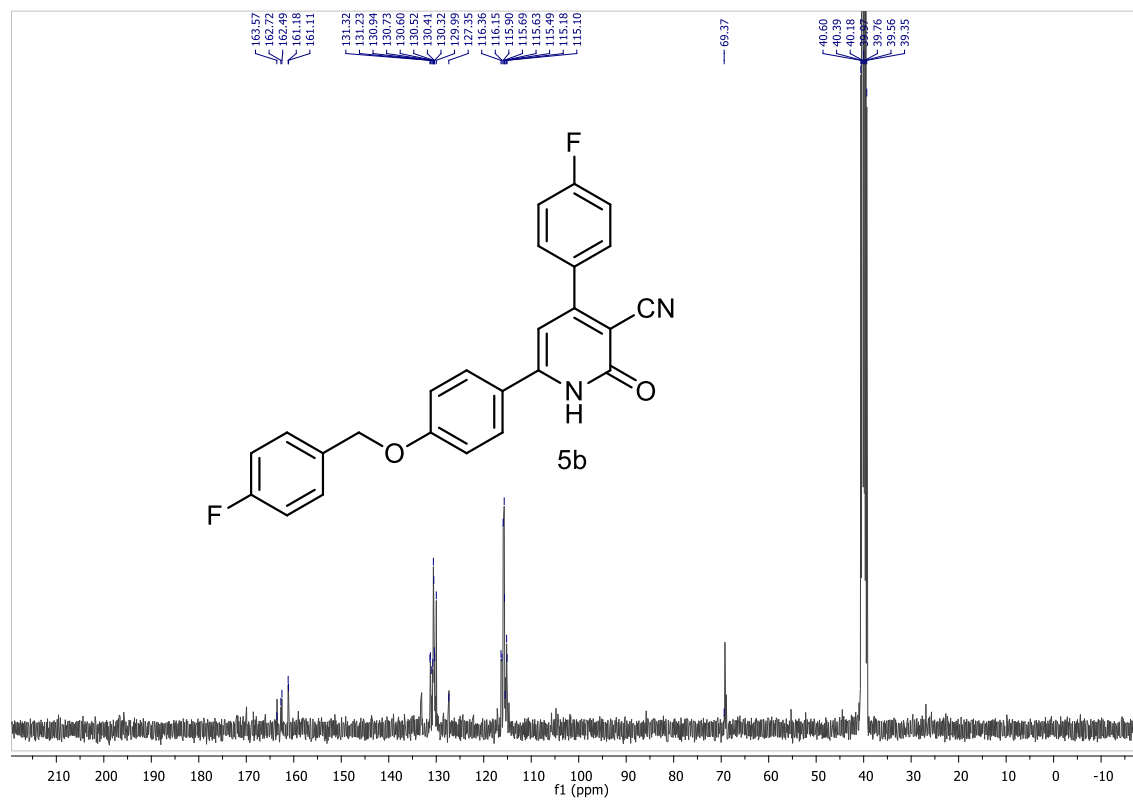


Figure S22. ¹³C NMR spectrum of **5b**

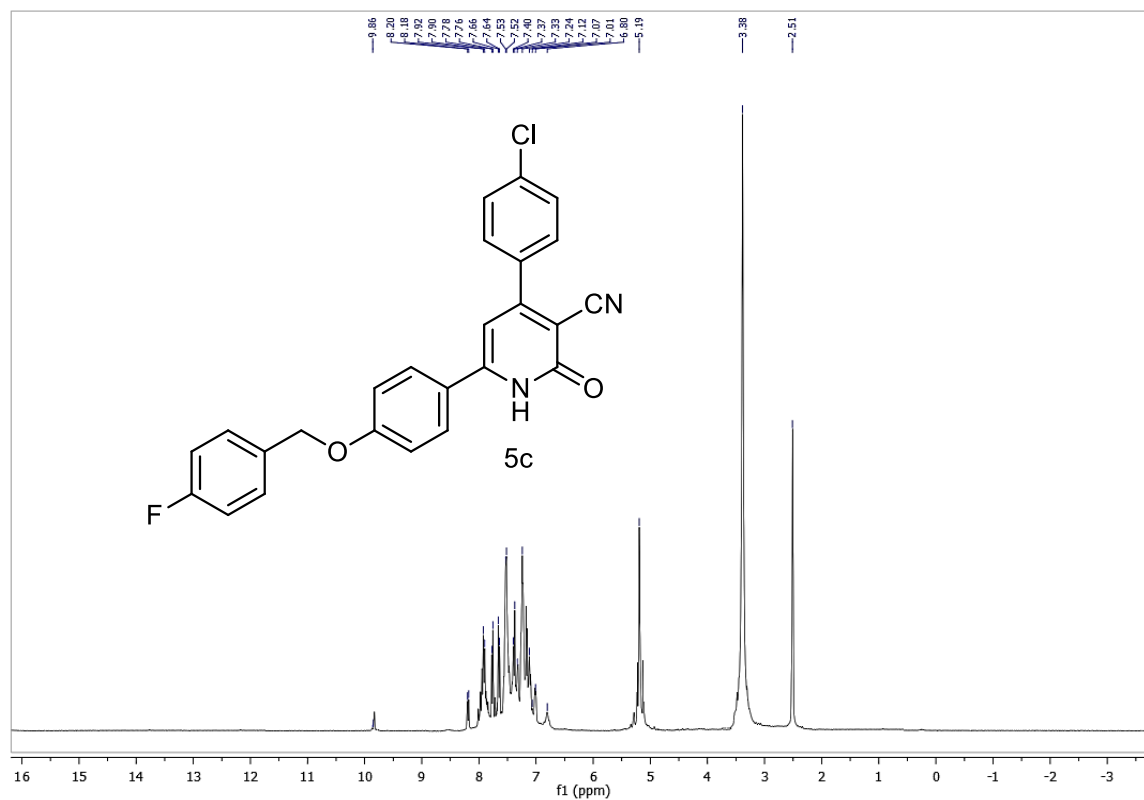


Figure S23. ¹H NMR spectrum of 5c

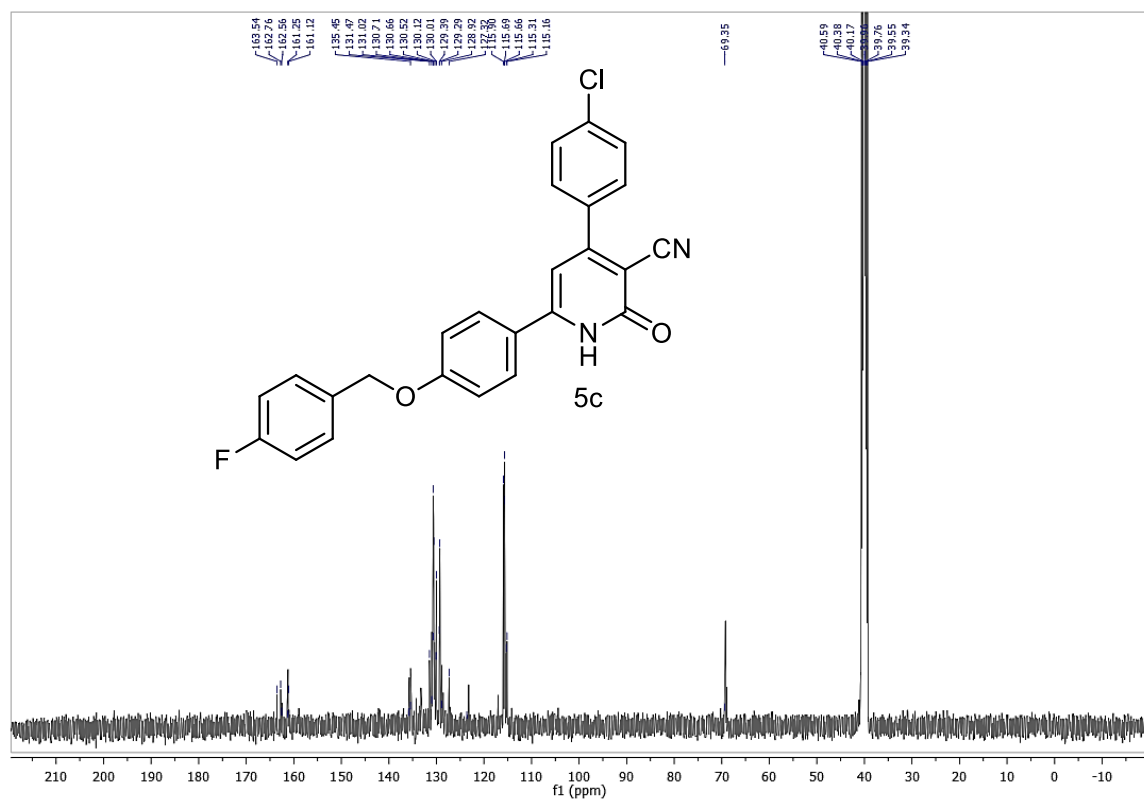


Figure S24. ¹³C NMR spectrum of 5c

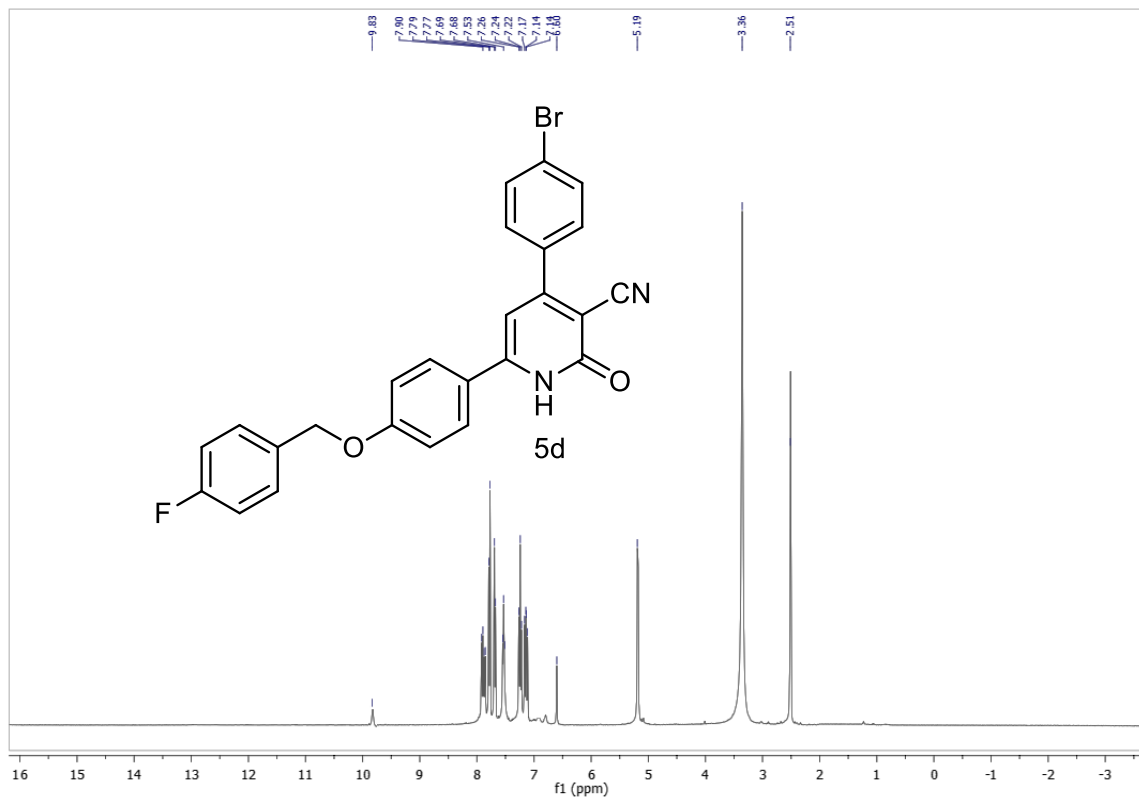


Figure S25. ¹H NMR spectrum of 5d

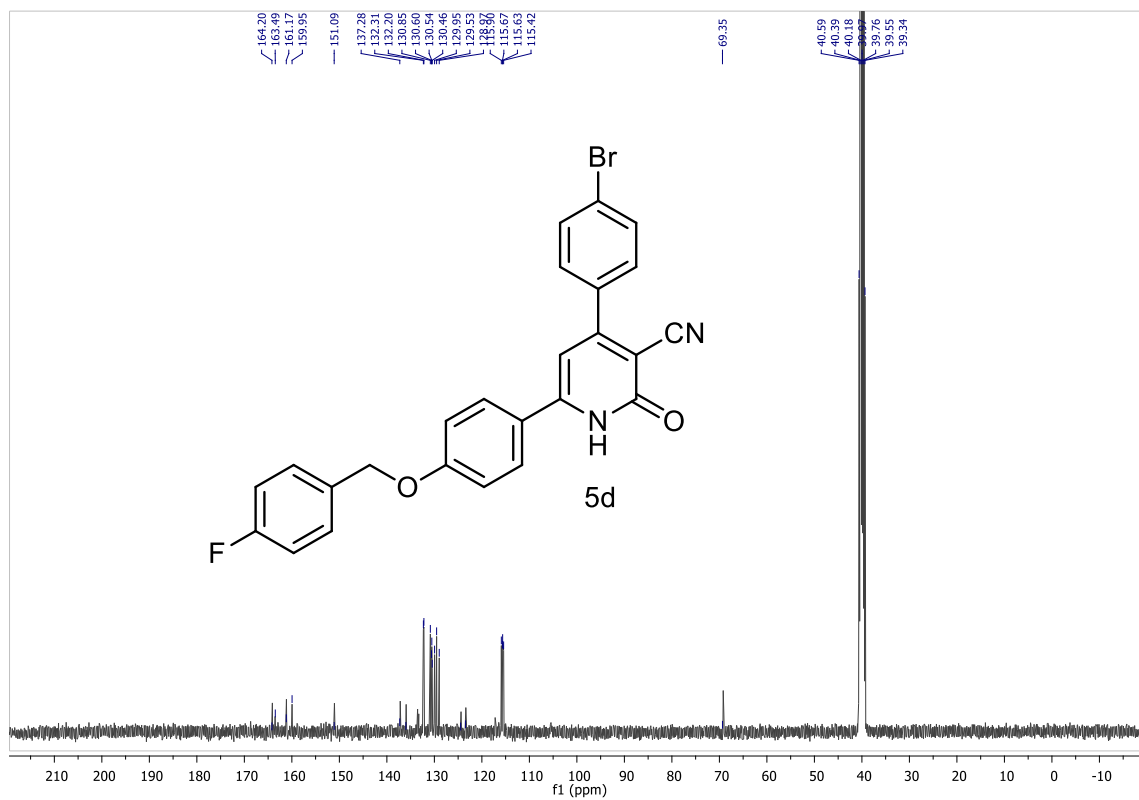


Figure S26. ¹³C NMR spectrum of 5d

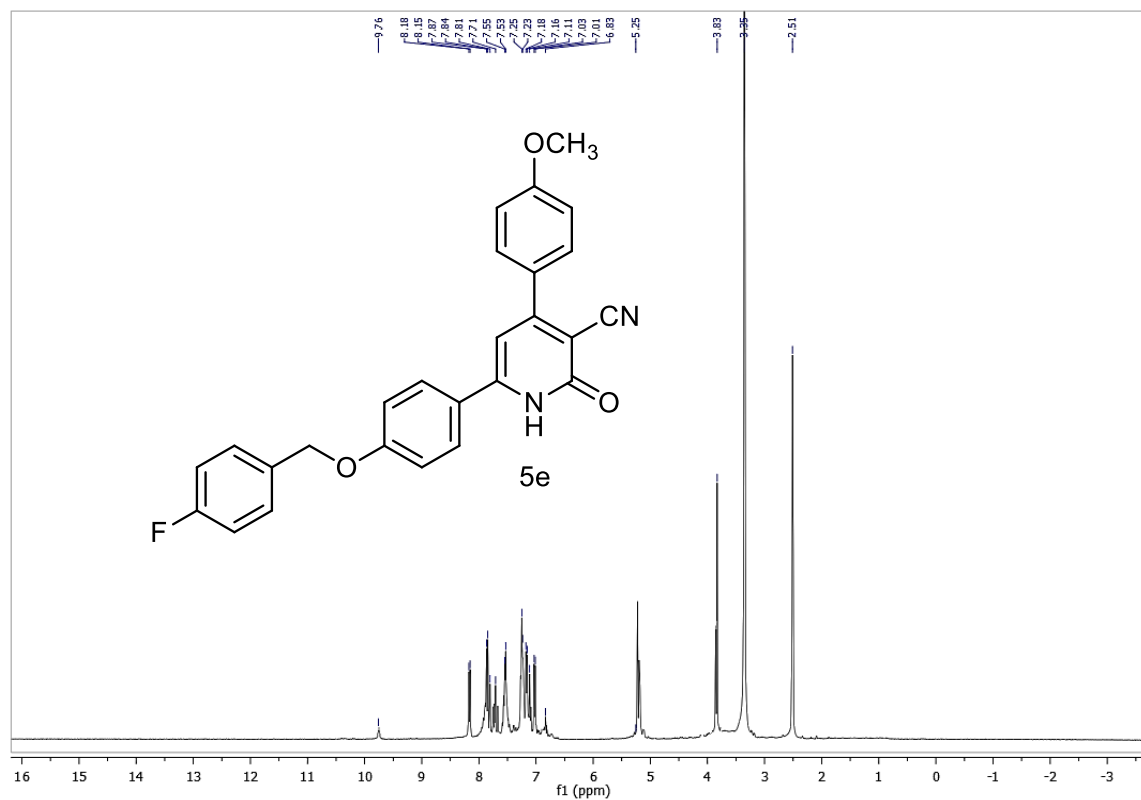


Figure S27. ¹H NMR spectrum of 5e

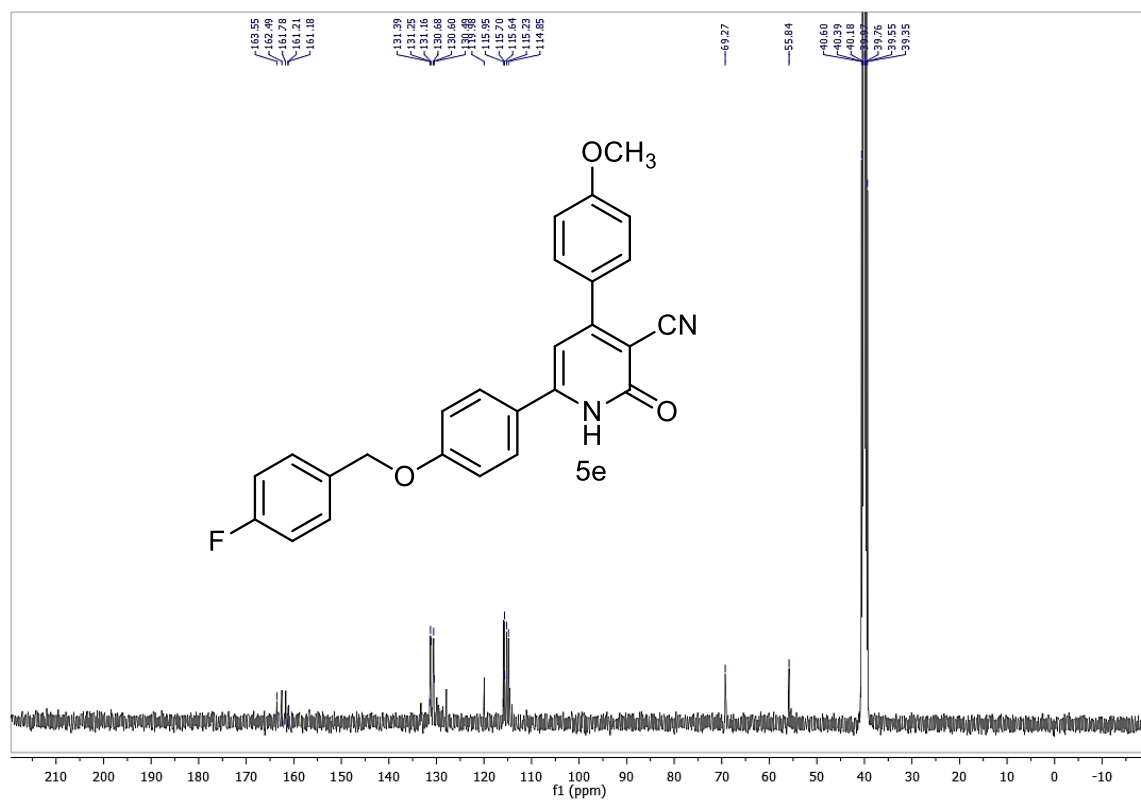


Figure S28. ¹³C NMR spectrum of 5e

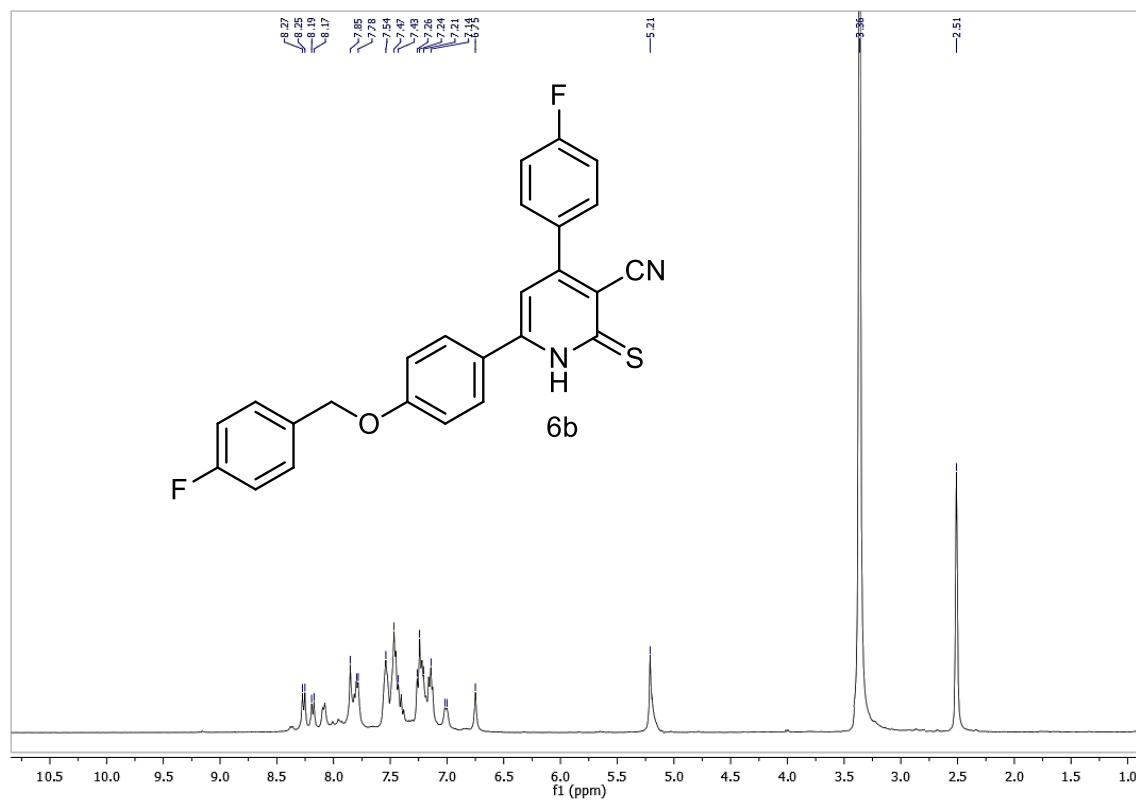


Figure S29. ¹H NMR spectrum of **6b**

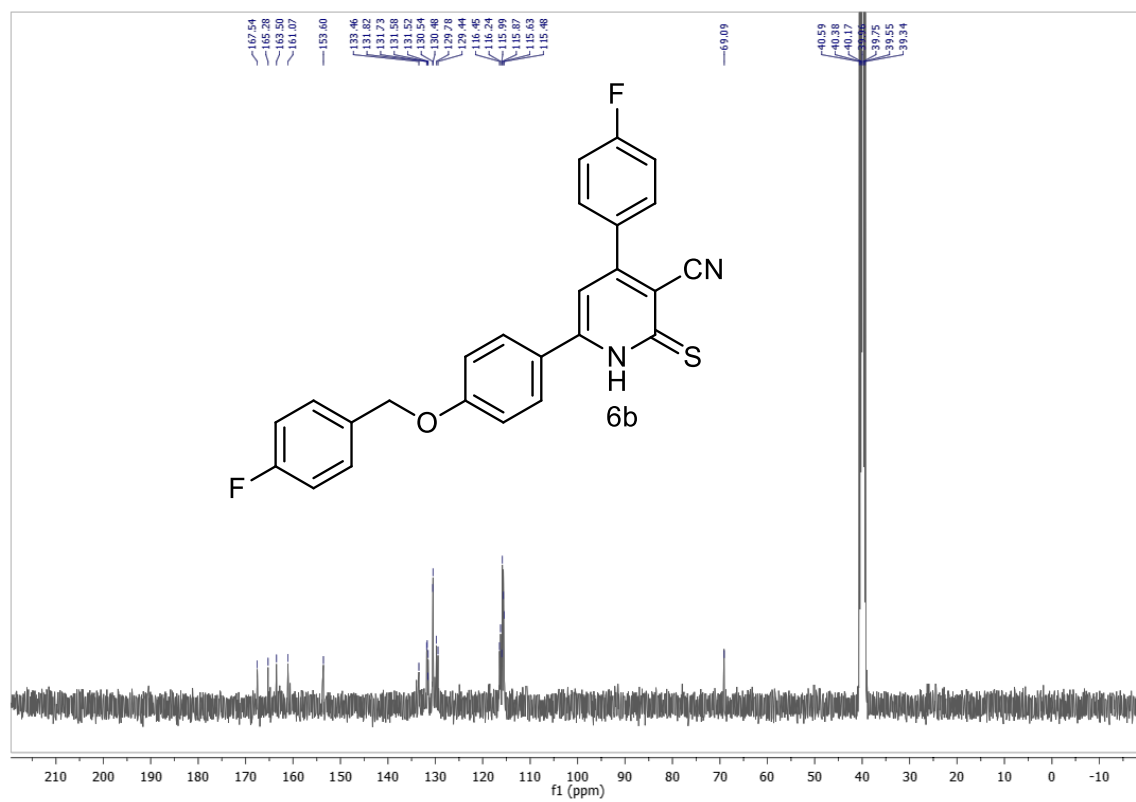


Figure S30. ¹³C NMR spectrum of **6b**

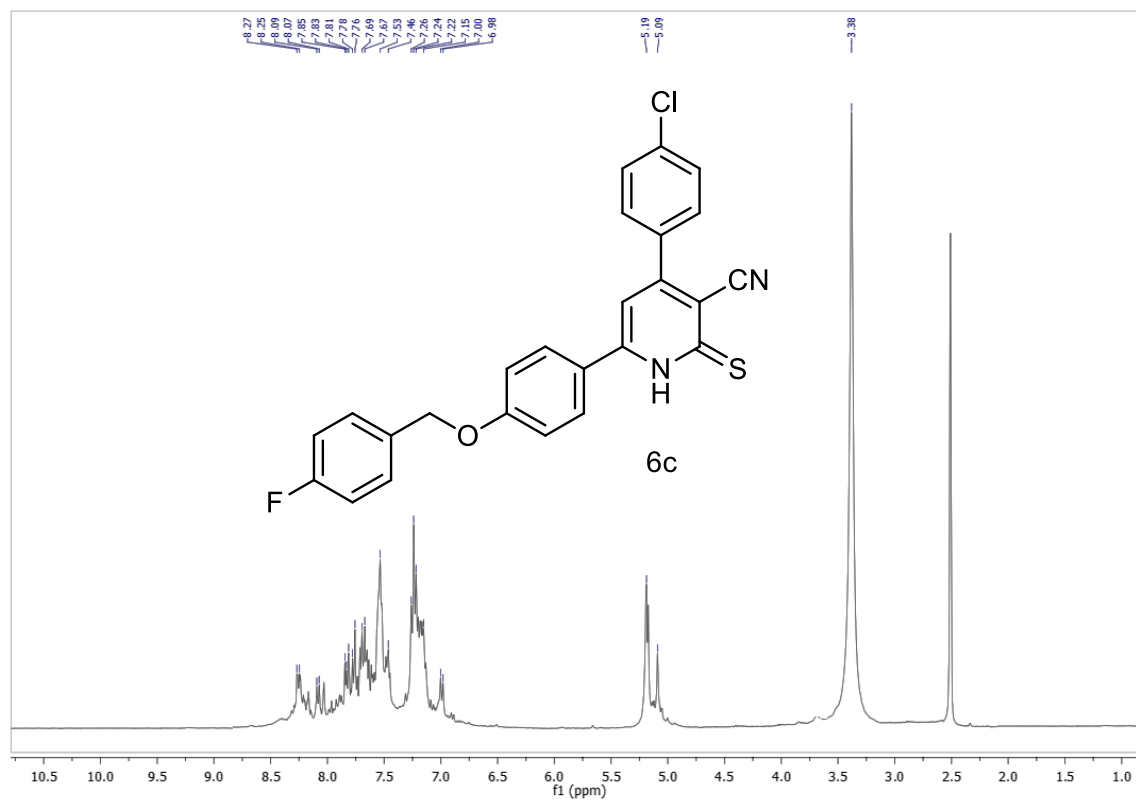


Figure S31. ¹H NMR spectrum of **6c**

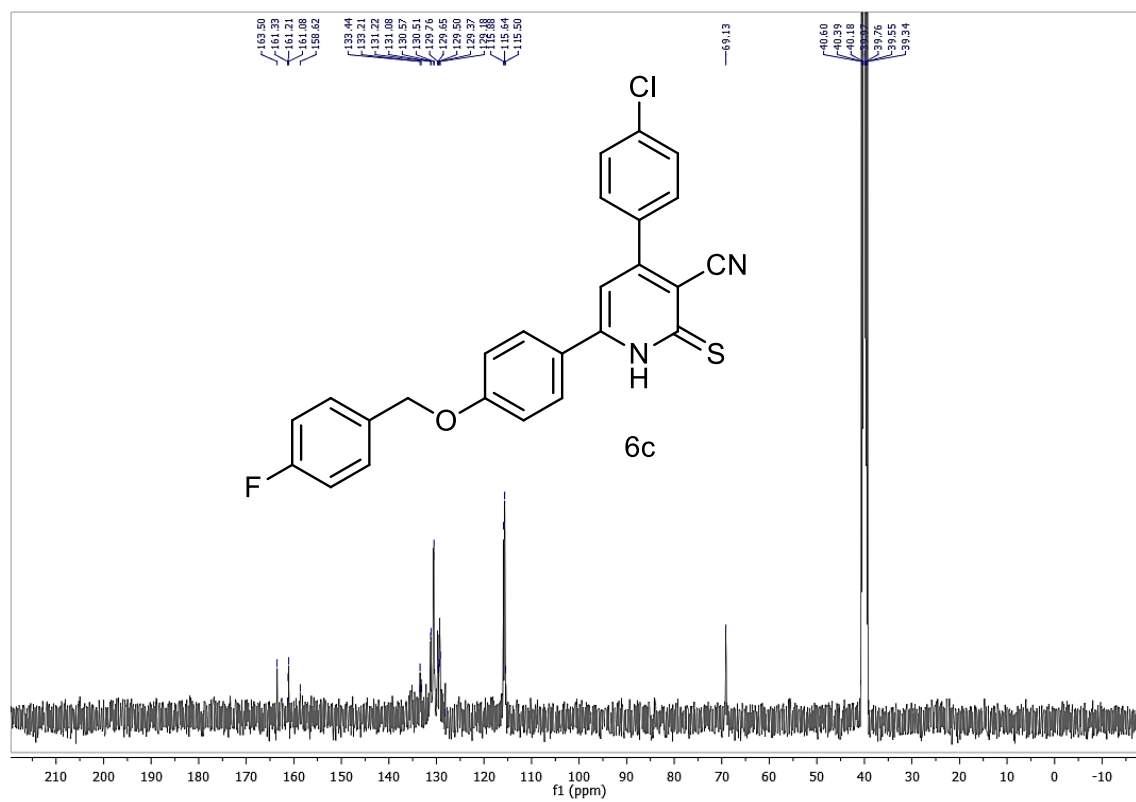


Figure S32. ¹³C NMR spectrum of **6c**

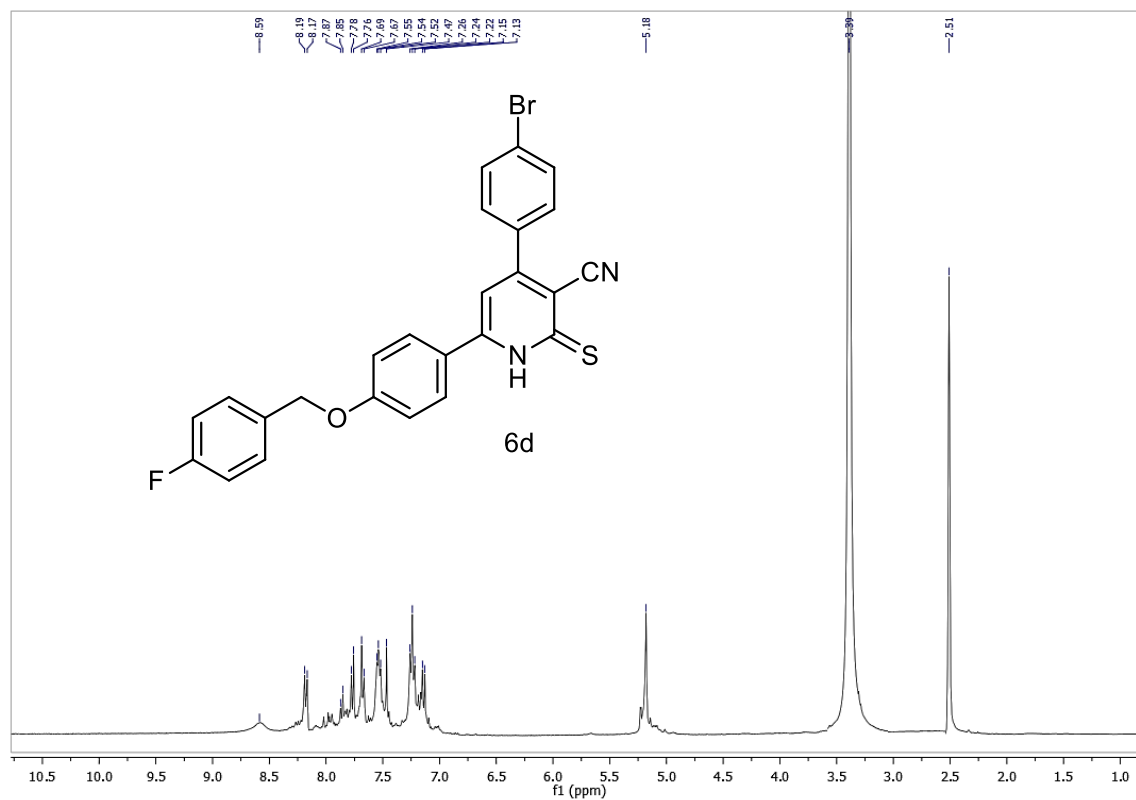


Figure S33. ¹H NMR spectrum of **6d**

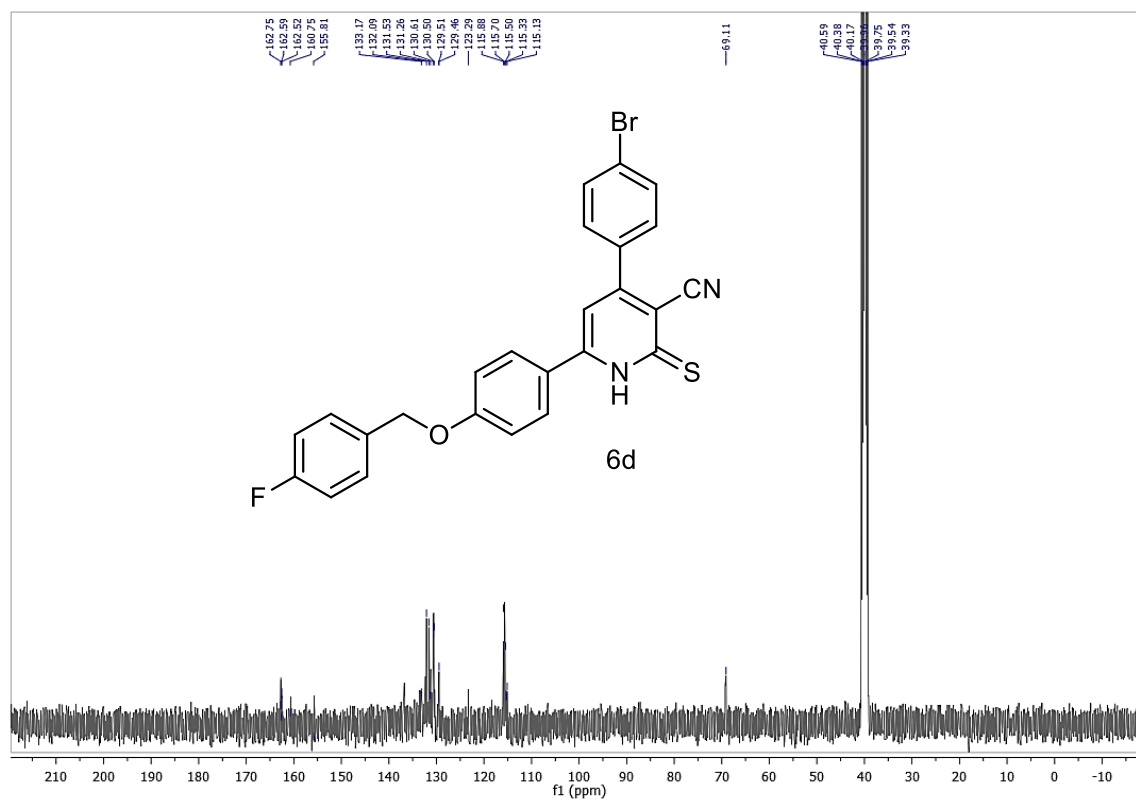


Figure S34. ¹³C NMR spectrum of **6d**

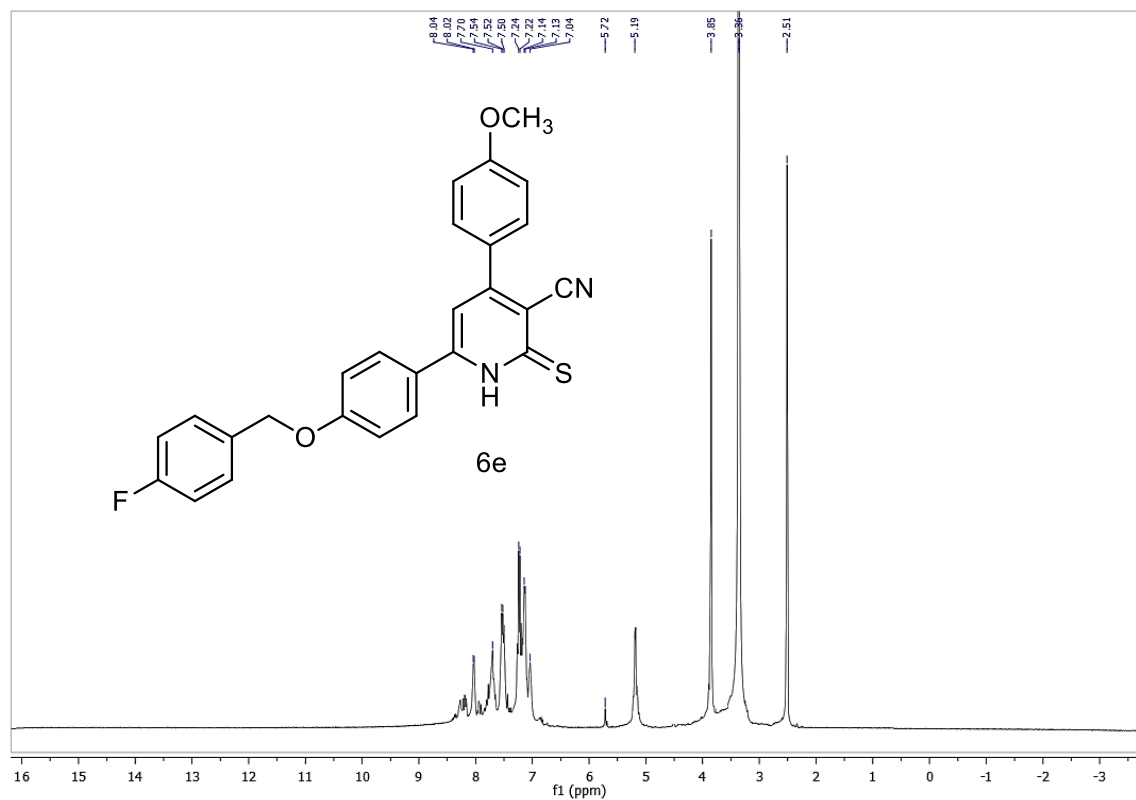


Figure S35. ¹H NMR spectrum of **6e**

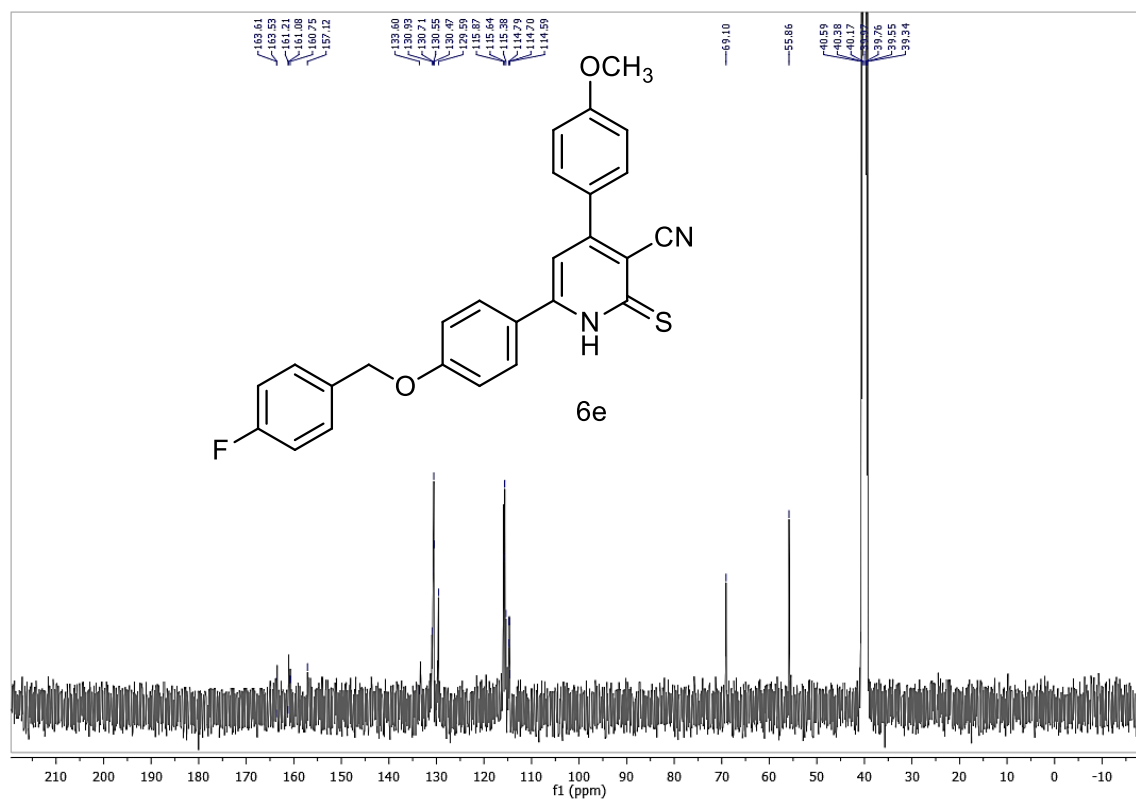


Figure S36. ¹³C NMR spectrum of **6e**

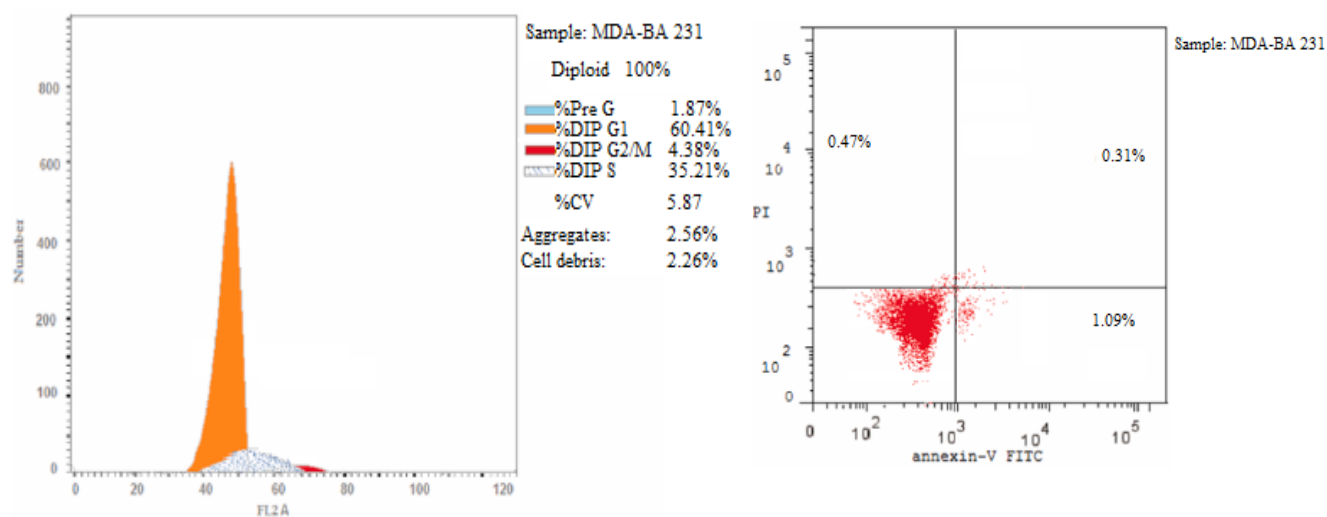


Figure S37. Cell cycle analysis and Annexin V-FITC apoptosis assessment for control MDA-BA 231.

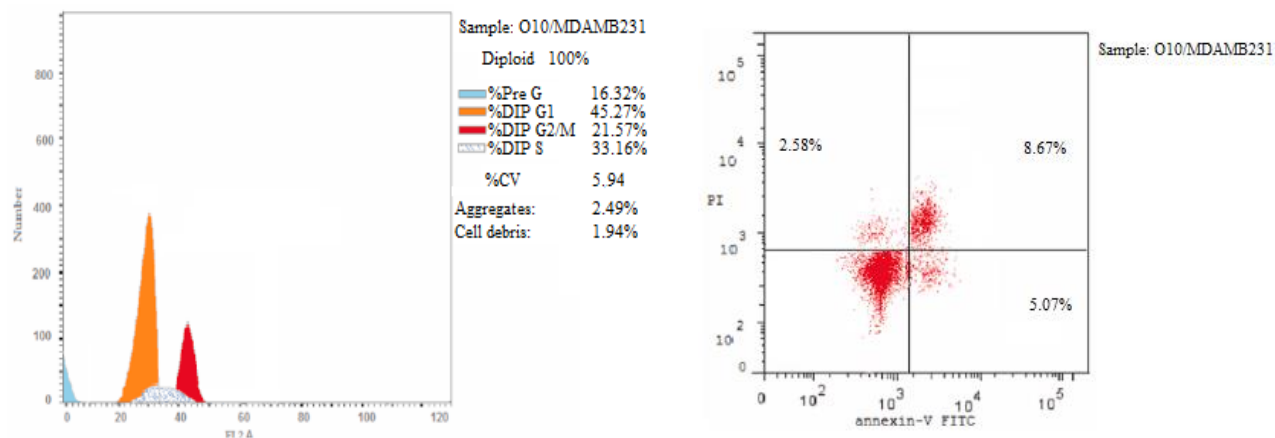


Figure S38. Cell cycle analysis and Annexin V-FITC apoptosis assessment for compound 5c.

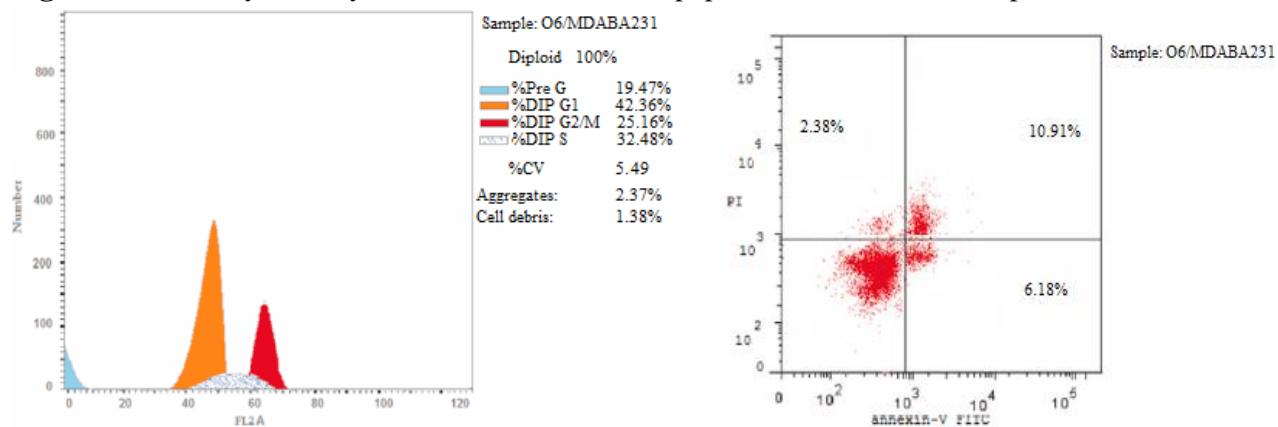
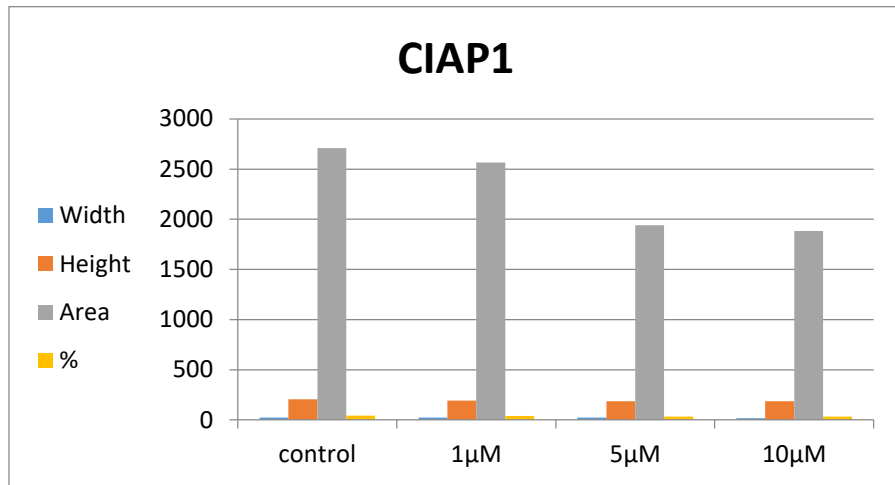


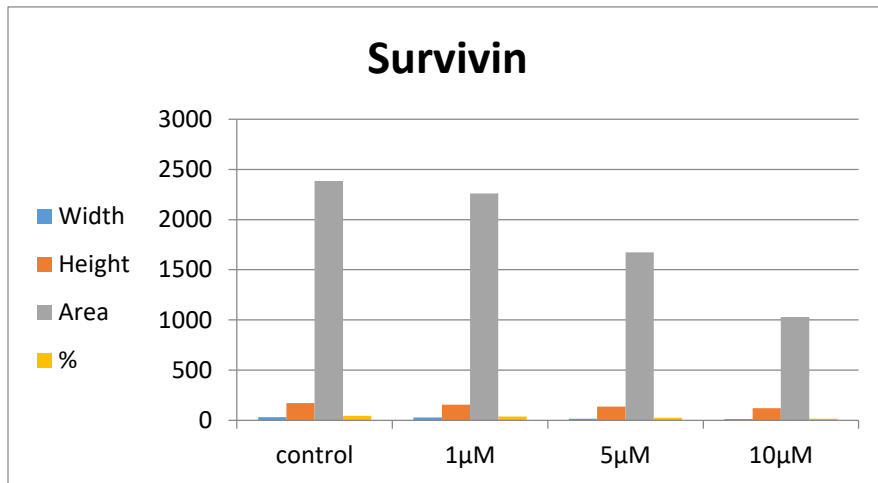
Figure S39. Cell cycle analysis and Annexin V-FITC apoptosis assessment for compound 5e.

A



	Width	Height	Area	%
control	24	205	2709	41.2
1µM	24	192	2565	39.7
5µM	22	187	1941	34.1
10µM	18	186	1884	31.9

B



	Width	Height	Area	%
control	32	172	2384	41.9
1µM	26	156	2261	38.3
5µM	16	137	1674	25.9
10µM	13	121	1028	15.6

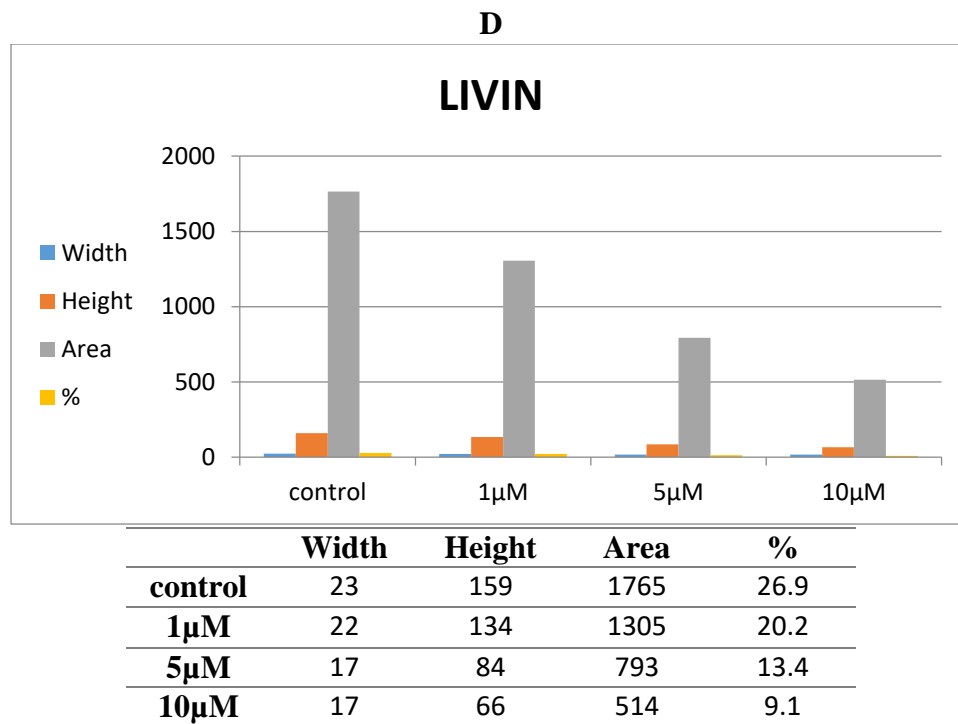
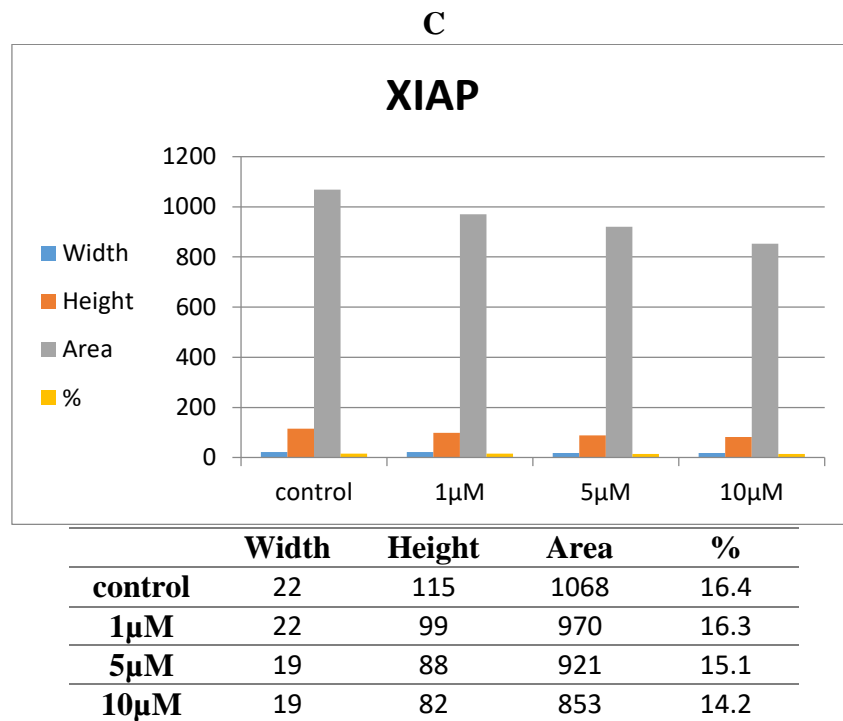
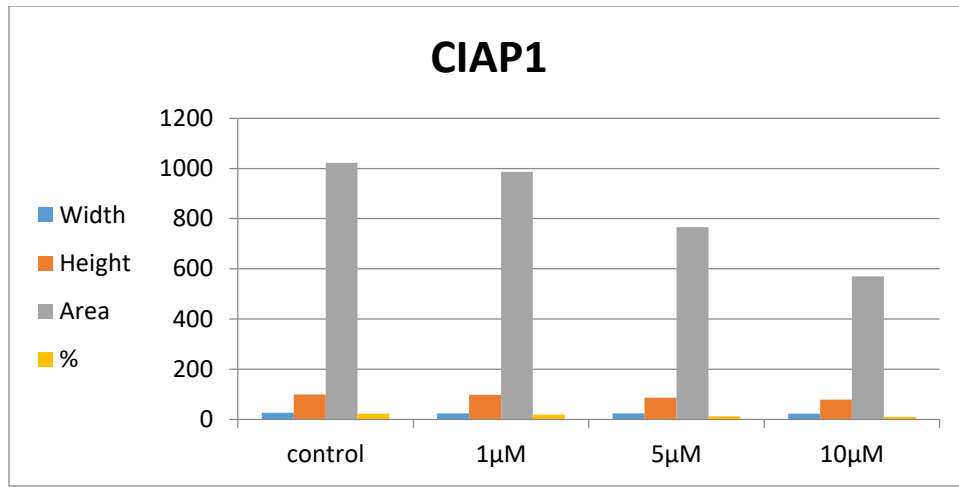


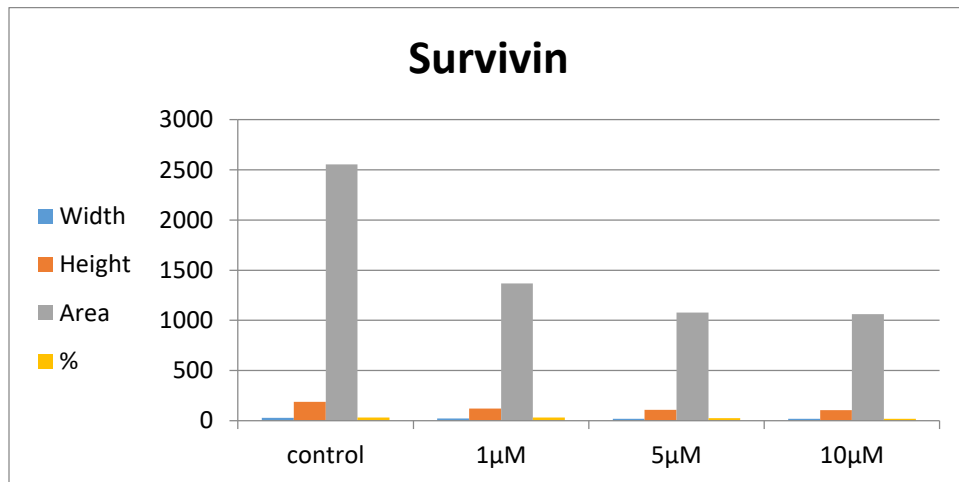
Figure S40. Western blotting assay analysis for **5c**; A: CIAP, B: Survivin, C: XIAP, D: Livin

A



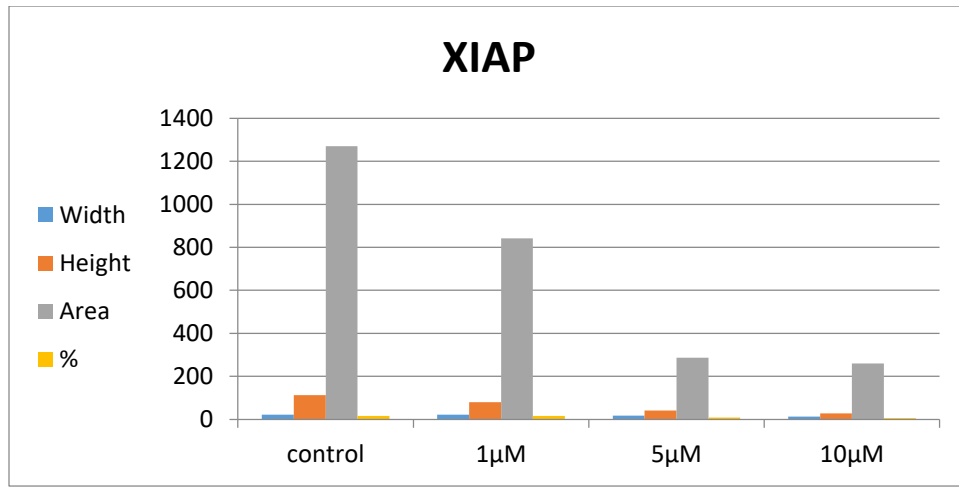
	Width	Height	Area	%
control	26	99	1022	22.8
1µM	24	98	987	18.2
5µM	23	86	766	12.6
10µM	22	79	570	10.2

B



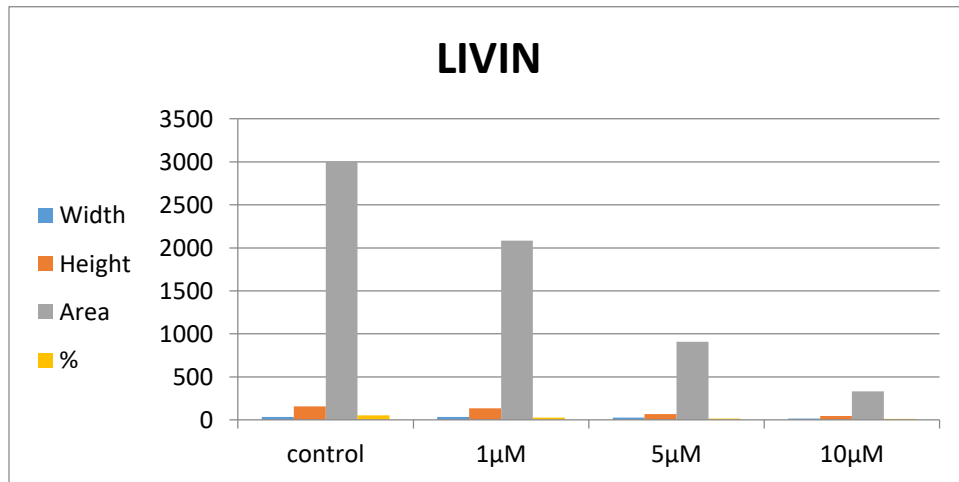
	Width	Height	Area	%
control	28	186	2554	32.2
1µM	22	120	1368	31.4
5µM	19	108	1079	25
10µM	18	105	1062	19.1

C



	Width	Height	Area	%
control	22	112	1270	15.6
1µM	22	80	841	15.4
5µM	17	41	287	8.6
10µM	13	28	260	4.7

D



	Width	Height	Area	%
control	33	158	3002	53.8
1µM	33	136	2085	25.7
5µM	27	68	907	16.6
10µM	14	44	330	9.8

Figure S41. Western blotting assay analysis for **5e** A: CIAP, B: Survivin, C: XIAP, D: Livin