

**Supporting Information**

**Colorimetric paper sensor for visual detection of date-rape drug**

**$\gamma$ -hydroxybutyric acid (GHB)**

Seong Uk Son<sup>a,b,f</sup>, Soojin Jang<sup>a,b,f</sup>, Byunghoon Kang<sup>a,f</sup>, Junseok Kim<sup>c</sup>, Jaewoo Lim<sup>a,b</sup>,  
Seungbeom Seo<sup>a,e</sup>, Taejoon Kang<sup>a</sup>, Juyeon Jung<sup>a,b</sup>, Kyu-Sun Lee<sup>a</sup>, Hyungjun Kim<sup>c,d,\*</sup> and  
Eun-Kyung Lim<sup>a,b,\*</sup>

<sup>a</sup>BioNanotechnology Research Center, KRIBB, 125 Gwahak-ro, Yuseong-gu, Daejeon 34141, Korea

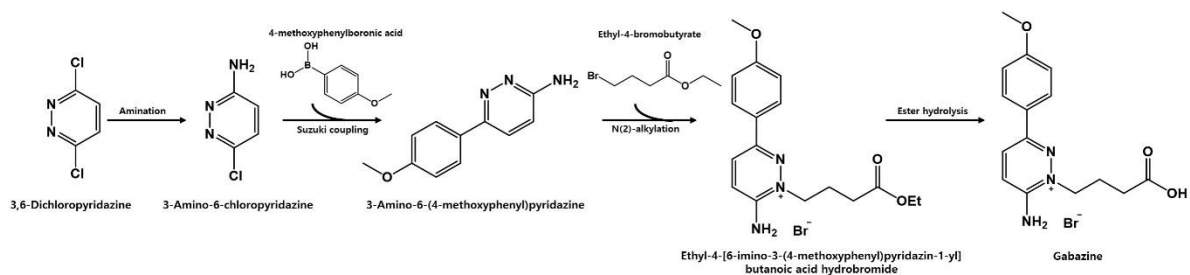
<sup>b</sup>Department of Nanobiotechnology, KRIBB School of Biotechnology, 217 Gajeong-ro, Yuseong-gu, UST, Daejeon 34113, Korea

<sup>c</sup>Department of Chemistry, Incheon National University, 119 Academy-ro, Yeonsu-gu, Incheon 22012, Korea

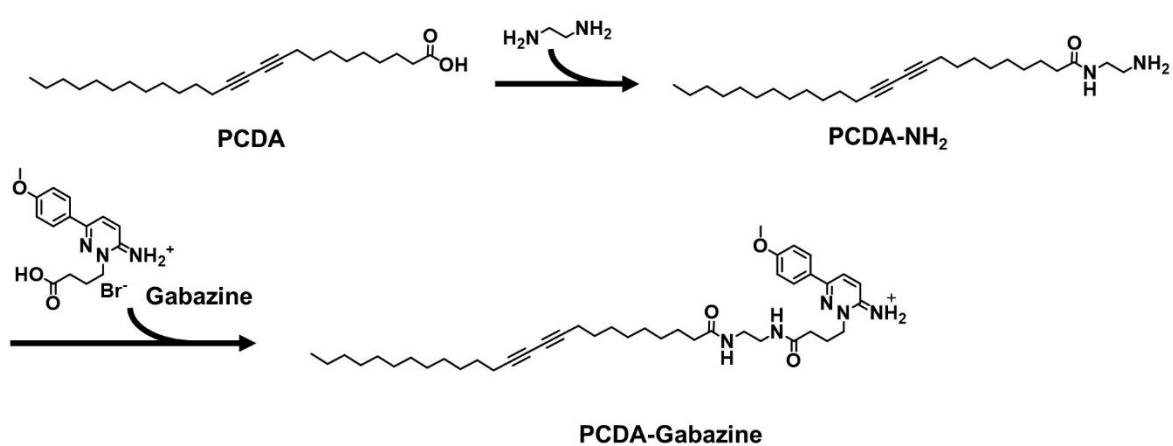
<sup>d</sup>Research Institute of basic Sciences, Incheon National University, 119 Academy-ro, Yeonsu-gu, Incheon 22012, Korea

<sup>e</sup>Department of Cogno-Mechatronics Engineering, Pusan National University, 2 Busandaehak-ro, Gumjeong-gu, Busan 46241, Korea

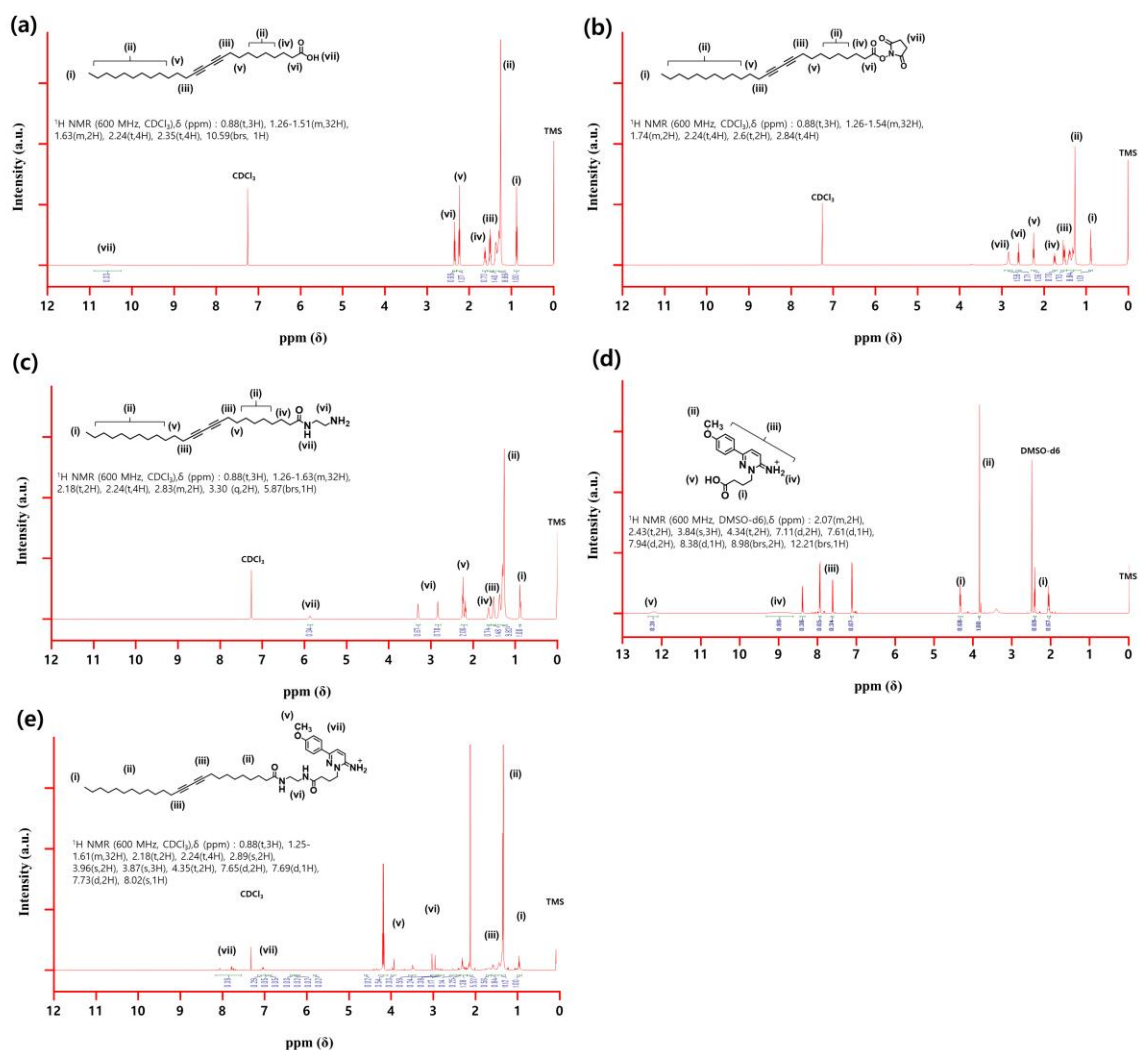
<sup>f</sup>These authors contributed equally to this work



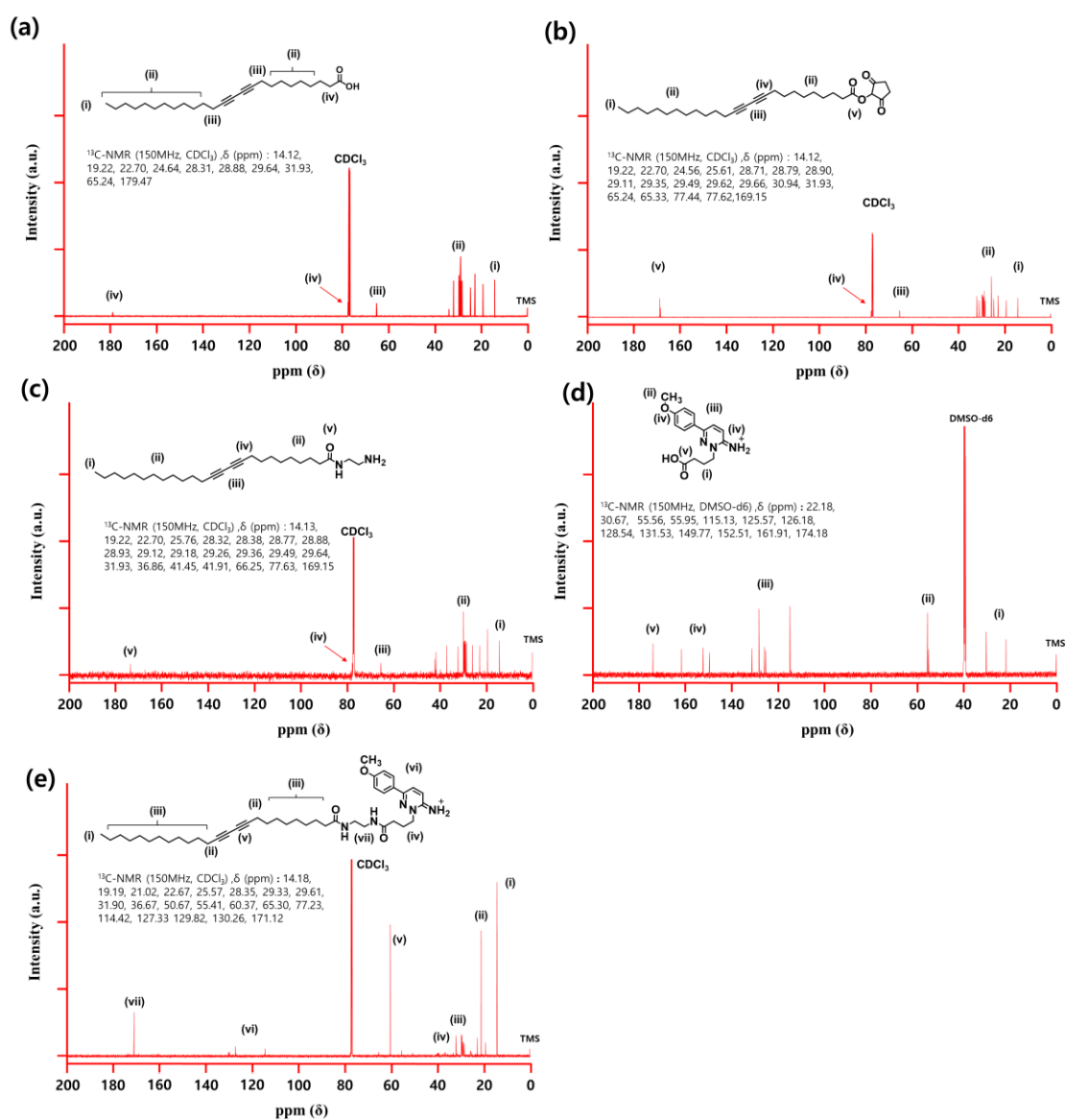
**Figure S1.** Synthetic procedure of gabazine.



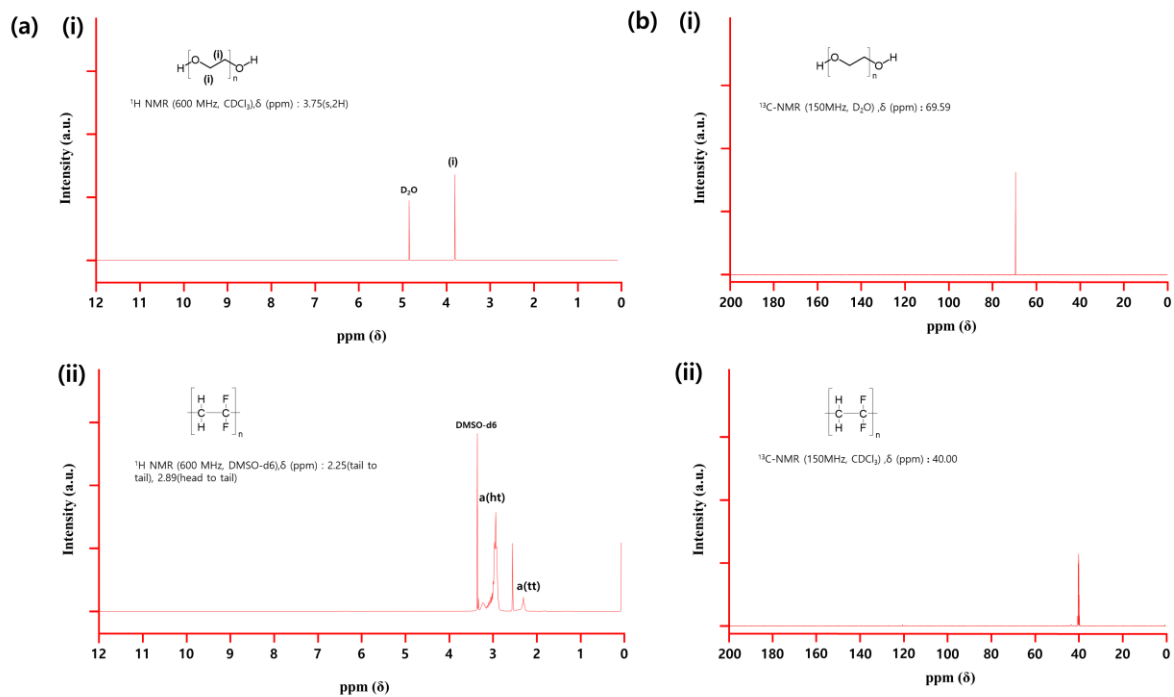
**Figure S2.** Synthetic scheme of PCDA-Gabazine.



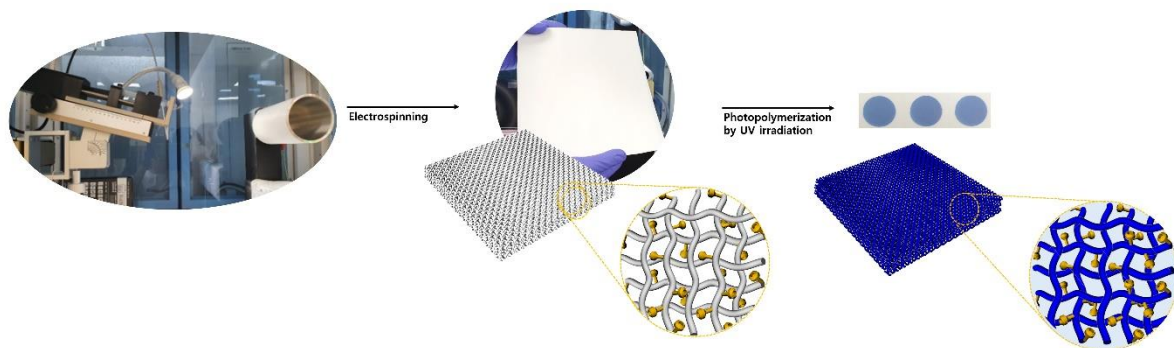
**Figure S3.** <sup>1</sup>H-NMR spectra of a) PCDA, b) PCDA-NHS, c) PCDA-NH<sub>2</sub>, d) Gabazine and e) PCDA-Gabazine.



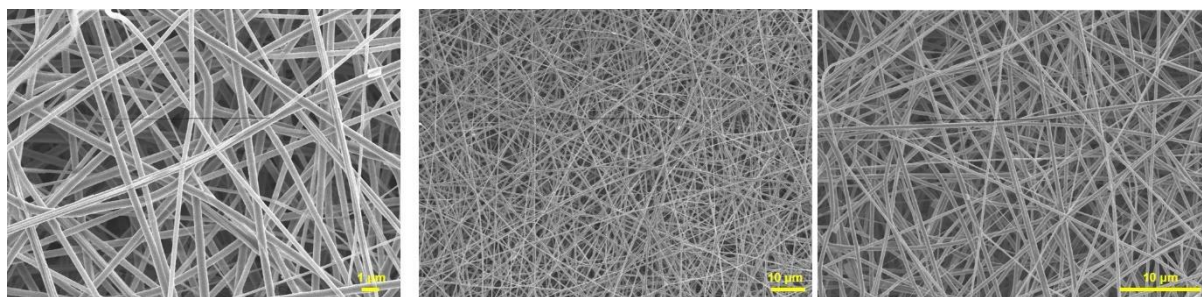
**Figure S4.** <sup>13</sup>C-NMR spectra of a) PCDA, b) PCDA-NHS, c) PCDA-NH<sub>2</sub>, d) Gabazine and e) PCDA-Gabazine.



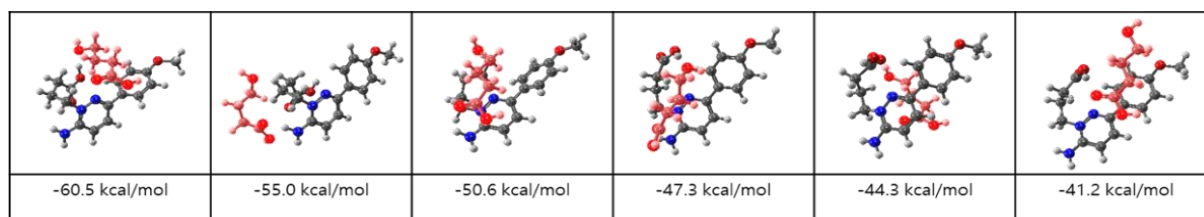
**Figure S5.** (a)  $^1\text{H-NMR}$  and (b)  $^{13}\text{C-NMR}$  spectra of (i) PEO and (ii) PVDF.



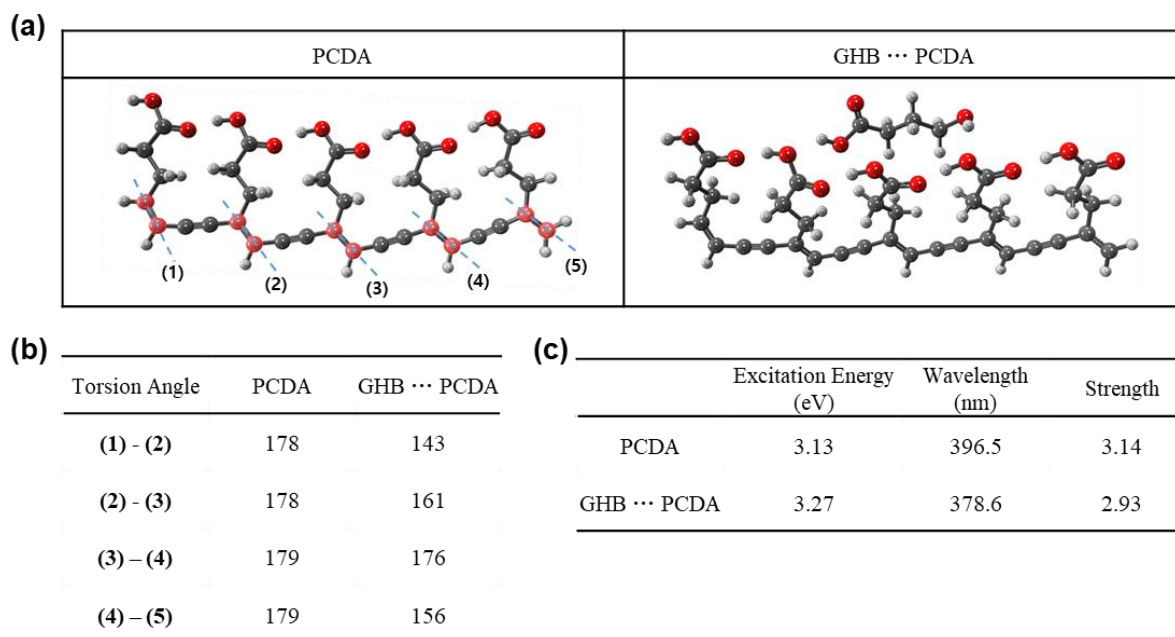
**Figure S6.** Fabrication of GHB detection kit by electrospinning.



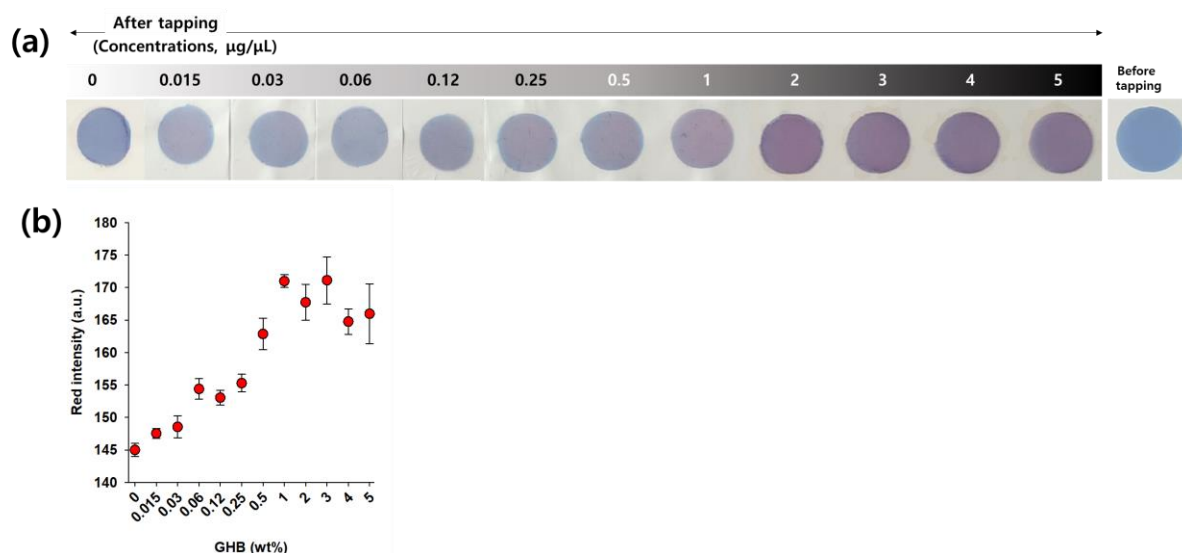
**Figure S7.** SEM images of electrospun GHB detection kit.



**Figure S8.** Representative chemical structures of gabazine-GHB complex and their interaction energies (GHB  $\cdots$  Gabazine). GHB molecules are highlighted in red.



**Figure S9.** (a) Optimized geometries of PCDA and GHB...PCDA. Torsion angle is measured with the four selected carbon atoms among the highlighted ones. (b) Numerical values of four torsion angles (in degree). (c) Vertical excitation energies, corresponding wavelength, and oscillator strength of the transition into the first allowed singlet state in PCDA and GHB...PCDA.



**Figure S10.** Colorimetric detection of GHB using GHB detection kit (ii). (a) Color transition images of GHB detection kit (ii) after exposure to solutions containing different GHB concentrations and (b) their red intensities. All tests were performed in triplicate. The dot plots indicate the red intensity of the detection kits, and the bar graphs represent their average values ( $\pm$  standard deviation).