## Biomass derived self-assembled DNA-dot hydrogel for enhanced bacterial annihilation

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Figure S1: A. UV-Vis spectra of onion DNA, B. Digital image of precipitated DNA during the extraction.



Figure S2: A. Zeta potential of synthesized DNA dot. B. Zeta potential of extracted onion DNA.



Figure S3: HRTEM image of DNA dot



Figure S4: A. Average height distribution of DNA dot in AFM study. B. Powder-XRD data DNA dot. C. SAED pattern of DNA dot. D. Raman spectra of DNA dot



Figure S5: Energy dispersive spectrometry (EDS) analysis of the DNA dot



Figure S6: A. Reverse phase –HPLC of annealed product B. UV-Vis spectra of DNA dot-DNA dot conjugate C. Steady-state fluorescence spectra of DNA dot-DNA. D. life time of the DNA dot in the hydrogel solution

Sample Name	Lifetime (ns)			T <sub>average</sub> (ns)	a²(%)	χ²
	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>			
DNA-dot	0.20	1.88	7.14	4.141	11.85, 41.37, 46.78	1.27
DNA-dot (hydrogel)	0.20	1.88	7.22	4.156	11.59, 42.14, 46.27	1.25

Table-1: Lifetime data



Figure S7: Circular dichroism spectra of DNA dot-DNA formulation.



**Figure S8:** Digital images of the hydrogel at different concentration of DNA dot (0, 0.3, 0.5, 0.7 and 1mg/ml, from left to right)



Figure S9: FESEM images of the hydrogel at A. 0 mg/ml, B. 0.3 mg/ml, C. 1 mg/ml of the DNA dot.



Figure S10: Frequency sweep test of hydrogel (0.3mg/ml of DNA dot) at 0.1% strain



Figure S11: Heat responsive sol-gel transfer of DNA dot-DNA hydrogel



Figure S12: DNase responsiveness of DNA dot-DNA hydrogel



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gure S13: A. Digital images of DNA dot-DNA hydrogel at different pH. B. Rheological data of

DNA dot-DNA hydrogel at pH-5 and 9. C. Redox responsive mechanical property of DNA dot-DNA hydrogel in presence of oxidizing and reducing agent.



**Figure S14: A.** Digital image of MTT assay of only hydrogel (Hg) and Cpfx loaded hydrogel (Hg-Cpfx), under light and dark against THP-1with different concentration. **B.** digital image of PBMC cells **C.** Bar diagram corresponding to PBMC cells survival

S. N.	Bacterial strain name	MIC (μg/ml)			
		Only hydrogel(HG)	Hydrogel- Cpfx (D)	Hydrogel- Cpfx (L)	Only Cpfx
1	<i>E. coli</i> (DH5α)	No significant effect	0.5±0.01	0.01±0.01	0.05±0.01
2	S. aureus	No significant effect	5±0.1	1±0.1	7.5±0.1
3	<i>E. coli</i> Norfloxacin resistant (K12) strain	No significant effect	0.5±0.01	0.01±0.01	0.05±0.01
4.	<i>E. coli</i> multidrug- resistant (IDH 12138) strain	No significant effect	2±0.1	0.02±0.01	5±0.1

Table-2: MIC data

S.no	Short name	Drug name		
1.	NA	Nalidixic acid		
2.	CIP	Ciprofloxacin		
3.	NOR	Norfloxacin		
4.	OFX	Oflaxacin		
5.	AM	Amoxicillin		
6.	CRO	Ceftriaxone		
7.	S	Streptomycin		
8.	E	Erythromycin		
9.	AZM	Azithromycin		
10.	CAZ	Ceftazidine		
11.	CTX	Cefotaxime		

Table-3: Detail of Multi-drug resistant E. coli strain (IDH 12138). Drug resistance profile-

NA, CIP, NOR, OFX, AM, CRO, S, E, AZM, CAZ, CTX



**Figure S15: A.** Antibacterial activity with low intensity light source (20W) against *E. Coli* resistant strain (IDH12138) **B.** Plates with CFU counts after different treatments.



**Figure S16:** Antibacterial activity after shorter time of exposure (100 W for 12 minutes) of the light source against **A.** *E. Coli* resistant strain (IDH12138) **B.** Plates with CFU counts after different treatments.



**Figure S17:** ZOI of HG-Cpfx was evaluated. **A.** Only Cpfx ( $5\mu g/ml$ ) was compared with only HG, only DNA dot, and untreated cells-control. HG-Cpfx of different concentrations was used under dark and light conditions to compare the effect between without and with light-induced treatment **B**., and **C**. respectively. 1, 2, 3 and 4 represents 0.5, 1, 2.5 and 5  $\mu g/ml$  of Cpfx containing hydrogel