Electronic Supplementary Material (ESI) for RSC Advances.

Biocompatible hyperbranched epoxy/silver-reduced graphene oxide-curcumin nanocomposite as an advanced antimicrobial material

*Shaswat Barua[a], Pronobesh Chattopadhyay[b], Mayur M. Phukan[c], Bolin K .Konwar[c] Johirul Islam[b] and Niranjan Karak[a]**

[a]Advanced Polymer and Nanomaterial Laboratory, Department of Chemical Sciences, Tezpur University, Napaam-784028, Assam, India

[b]Defence Research Laboratory, Tezpur, Assam, India

[c]Department of Molecular Biology and Biotechnology, Tezpur University, Napaam- 784028, Assam, India

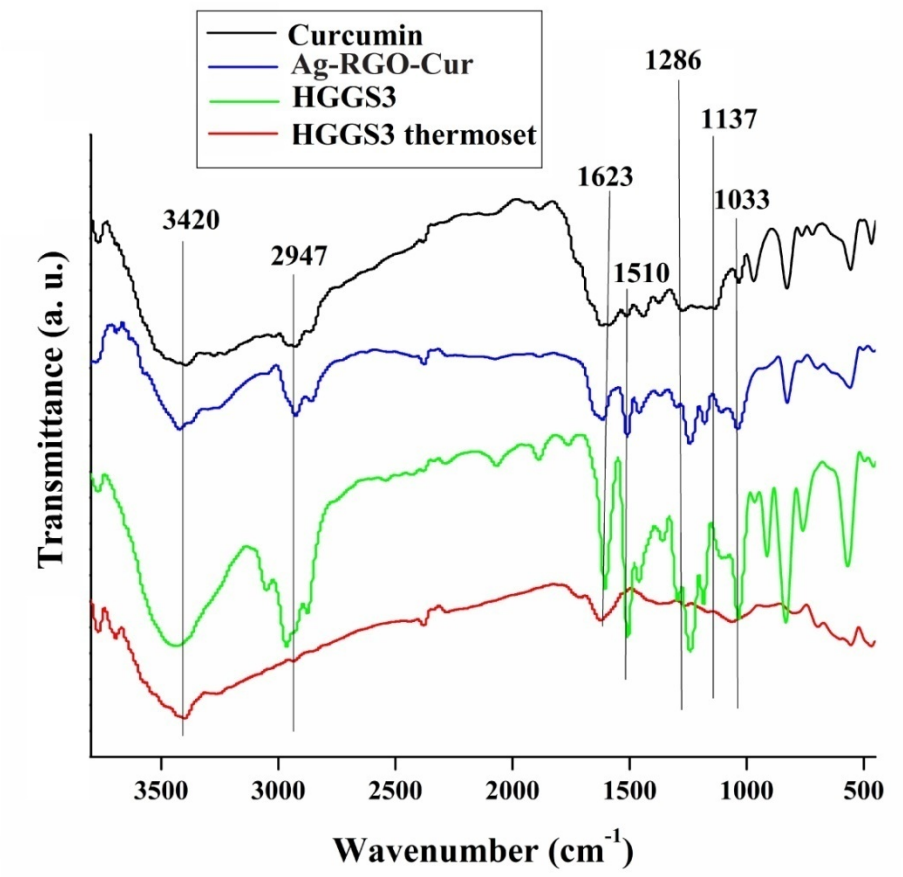

Fig S1: FTIR spectra of Curcumin, Ag-RGO-Cur and the cured and uncured nanocomposite

Supplementary Table 1: CFU/mL count for in vivo antimicrobial assay against *S. aureus*

Time (h)	Un-implanted	Implanted
24	5.0×10^{7}	4.2×10^{6}
48	3.0×10^{8}	1.2×10^{5}
72	7.4×10^{8}	2.3×10^{4}

Supplementary Table 2: Hematological parameters of the control and nanocomposite implanted rats

Parameters	0 days		15 days		30 days	
	Control	HGGS3	Control	HGGS3	Control	HGGS3
White blood cells	14.96±0.20	16.2±0.3	14.7±0.2	15±0.15	13.9±0.15	15.1±0.2
Lymphocyte (%)	30.1±0.2	28.4±0.5	29.1±0.2	33.6±0.73	30.7±1.22	29.4±0.5
Monocyte (%)	18.4±0.2	18.2±0.2	19.9±0.2	23.8±0.3	19.5±0.15	19.0±0.2
Neutrophil (%)	59.8±0.5	60.4±0.3	56.3±0.37	66.3±0.15	58.3±0.55	59.5±0.15
Eosinophil (%)	8.6±0.3	7.5±0.26	9.1±0.15	10.1±0.1	7.1±0.15	8.1±0.15
Basophil (%)	0.6±0.01	0.7±0.05	0.8±0.05	0.7±0.05	0.7±0.05	0.7±0.05
Red blood cells (m/mm^3)	9.6±0.3	7.8±0.35	9.7±0.34	8.6±0.25	9.3±0.1	8.7±0.36
Mean corpuscular volume (fl)	58.3±0.3	56.4±0.41	58.3±0.25	57.2±0.3	59.5±0.26	56.4±0.37
Hematocrit (%)	42.2±0.15	46.5±0.2	46.4±0.26	48.3±0.2	47.5±0.41	46.4±0.3
Mean corpuscular hemoglobin (pg)	18.6±0.32	16.5±0.2	18.3±0.32	16.4±0.35	17.3±0.15	17.5±0.36
Mean corpuscular hemoglobin concentration (g/dl)	31.4±0.25	33.4±0.32	35.5±0.45	35.5±0.36	36.6±0.43	36.5±0.25
Hemoglobin (g/dl)	15.7±0.26	16.3±0.28	17.7±0.15	16.2±0.25	18.4±0.15	17.6±0.26
Pletelet (%)	0.51±0.02	0.55±0.04	0.56±0.03	0.55±0.02	0.61±0.02	0.63±0.03

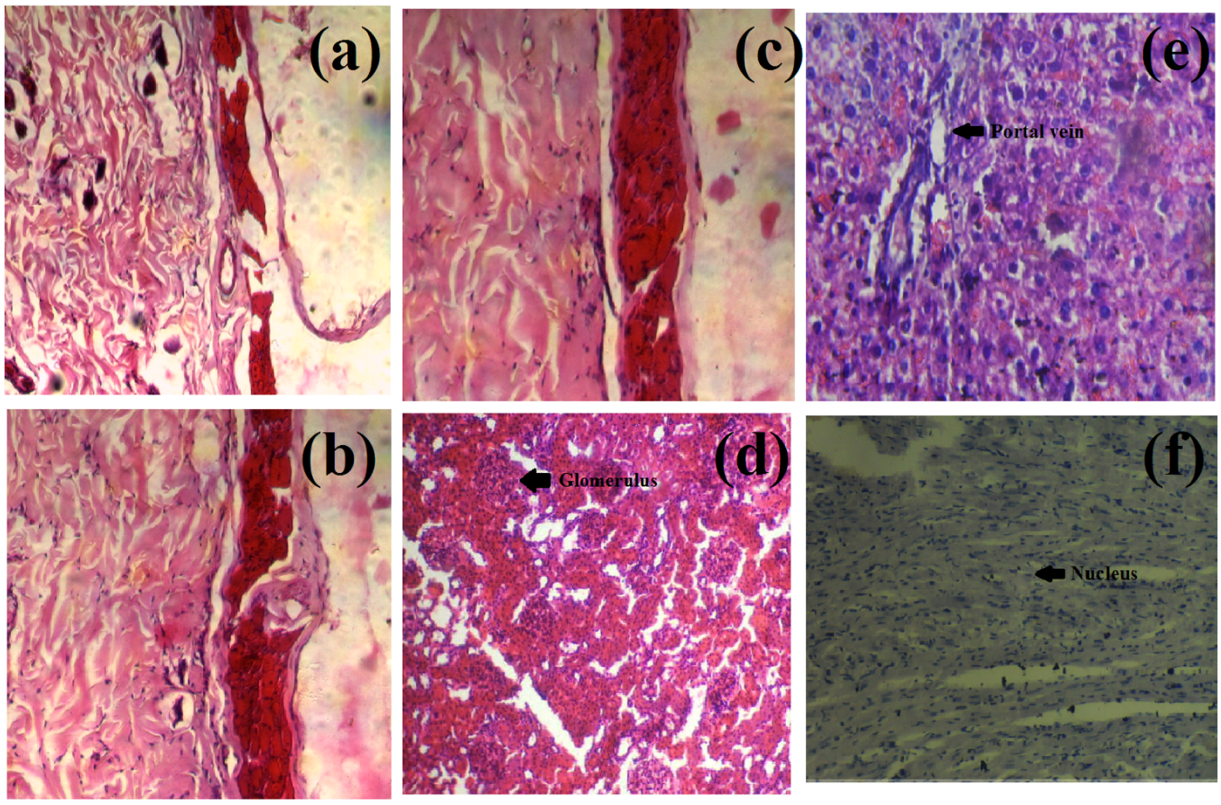

Fig S2: Representative histopathological sections of skin (a) 7, (b) 15 and (c) 30 days to post implantation and (d) kidney, (e) liver and (f) heart sections of the implanted rats

Supplementary Table 2: Comparative account of the antimicrobial/antifouling materials

Composition	Merit	Demerit	Reference
PEG-Based Coatings	Can resist protein absorption, thus restricts microbial growth	Low mechanical performance	Prime et al. 1991; Amiji et al. 1993; Llanos et al. 1993; Textor et al. 2003
Enzyme (e.g. protease) based antifouling Films	Degrades proteins, thus inhibits biofouling	Not cost-efficient, cannot withstand high temperature.	Statz et al. 2005
Superhydrophobic coatings	Do not allow microorganism to stick on their surfaces	Tedious fabrication process, cannot degrade fouling organisms	Coulson et al. 2000; Shang et al. 2005; Wu et al. 2010
Thermo- and pH-responsive polymeric coatings	Can release antimicrobial components in controlled manner	Difficult for field applications	Ista et al. 1998, 1999, 2010
Silver based coatings	Broad spectrum antimicrobial activity	Toxicity is a major concern Emergence of silver resistant microbes	Dai et al. 2002; Lee et al. 2005; Banerjee et al. 2001
CuO/ ZnO based antimicrobial coating	Highly effective against both bacteria and fungi	Health and environmental toxicity	Perelshtein et al. 2009
Silver-reduced graphene oxide-curcumin based hyperbranched epoxy nanocomposite	Easy processing, high mechanical properties, excellent biocompatibility, strong antimicrobial activity against bacteria, fungi and algae	Field trial is necessary	Present case

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