Supporting Information

Combating multidrug-resistant bacteria with nanostructured guanidine-based polymers

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Characterization

Proton Nuclear Magnetic Resonance (^{1}H NMR)

The NMR spectra were recorded on a Bruker AV 400 MHz spectrometer using tetramethylsilane as an internal standard and DMSO-d_6 and D_2O as the solvents.

UV-vis Spectroscopy

The UV-vis absorption spectra were recorded on an Agilent 8453 UV-visible spectrophotometer (Agilent Technologies, CA, USA) using a quartz cell with a path length of 1.0 cm. The absorbance and transmittance spectra of GH and PGH@AgNPs were measured.

X-ray photoelectron spectroscopy (XPS)

The reduction of silver ions (Ag^+) to metallic silver was characterized using a VG Micro Tech ESCA 3000 X-ray photoelectron spectroscope (VG Scientific, Sussex, United Kingdom) equipped with a multichanneltron hemispherical electron energy analyzer. The sample was placed on Si(111) substrate, and the spectra were recorded.

X-ray diffraction (XRD)

The crystal structure of PGH@AgNPs was investigated on a Rigaku, D/max-2500 X-

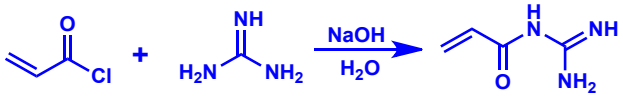
ray diffractometer using a Cu Kα X-ray source at 60 Kv and 300 mA. The PGH@AgNPs solution was freeze-dried for XRD measurement. The XRD pattern was taken in the 2θ range of 30-80° at a scan speed of 0.2 sec/step.

Scanning Electron Microscopy (SEM)

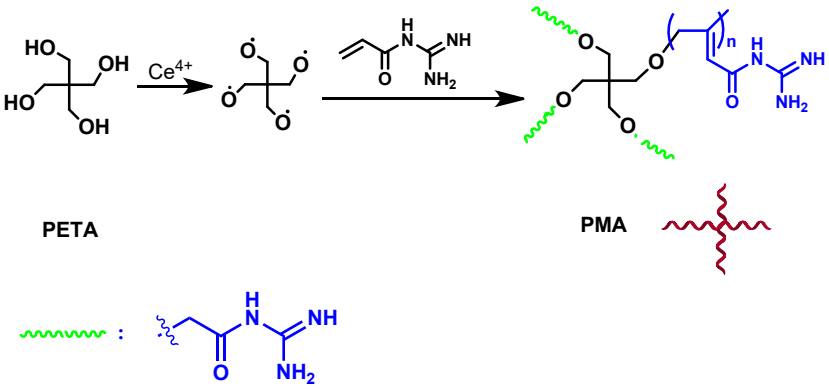
The morphologies of PGH@AgNPs and bacteria were observed using SEM. The PGH@AgNPs solution was spread on the silicon wafer and freeze-dried. Bacterial cells at the mid-log growth phase (OD_{600}=0.4~0.6) were treated with PGH@AgNPs. After treatment, bacteria were collected, washed with PBS, and fixed with 2.5% (v/v) glutaraldehyde for 2-4 h. Then, bacteria were dehydrated using 30, 50, 70, 90 and 100% ethanol. After dehydration, bacteria were re-suspended in tertiary butyl alcohol, dripped on the silicon wafer, and freeze-dried. Samples were coated with gold before observation.

Zeta Potential

Zeta potential was measured on a water Nano-ZS 90 Nanosizer (Malvern Instrument Ltd., Worcestershire, UK) at a fixed scattering angle of 90º at room temperature.



Scheme S1. Synthetic route of GH



Scheme S2. Synthetic route of PGH

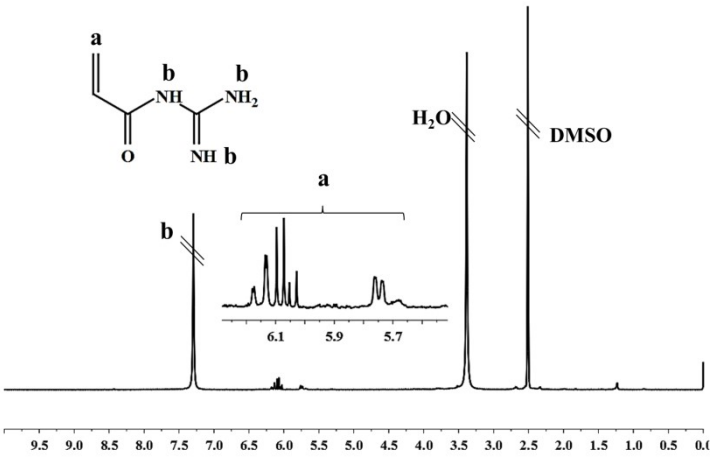


Figure S1. ^{1}H NMR spectrum of GH in DMSO-*d*6

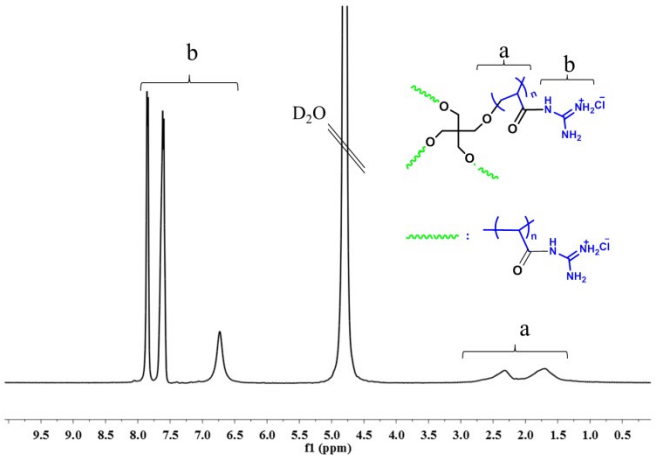


Figure S2. ^{1}H NMR spectrum of PGH in D_2O

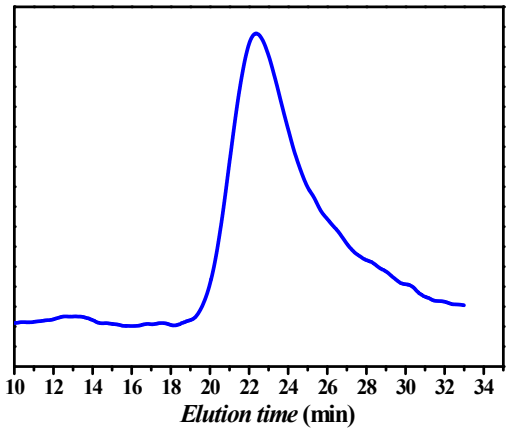


Figure S3. GPC trace of PGH in water at 40℃

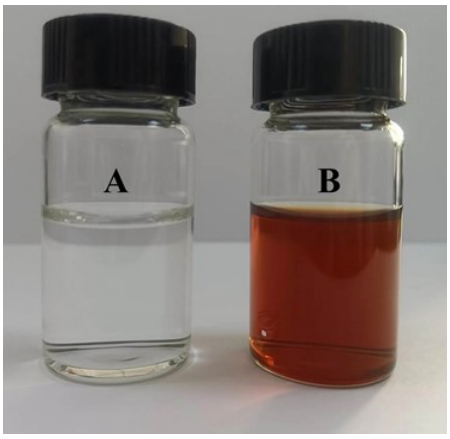


Figure S4. Photographs of PGH (A) and PGH@AgNPs dispersed in aqueous solution