Supplementary Information

Preparation of tris[3-(2,3-dimethoxybenzamido)propyl]nitromethane (4). 1,7-Diamino-4-(3-aminopropyl)-4-nitroheptane (2.15 mmol), 2,3-dimethoxybenzoic acid (16.1 mmol), and 1-hydroxybenzotriazole (16.1 mmol) were dissolved in MeOH (15 mL). MeOH solutions of 1-ethyl-3-(3-dimethyl-aminopropyl)carbodiimide hydrochloride (EDC, 16.1 mmol) and Et_3N (16.1 mmol) were added to this solution and the mixture was stirred overnight. The resultant solution was evaporated completely and the residue was dissolved in $CHCl_3$. The organic solution was washed with saturated $NaHCO_3$ aqueous solution, 10% citric acid aqueous solution, and brine. Then the organic layer was dried over anhydrous $MgSO_4$. After removal of $MgSO_4$, the resultant solution was evaporated and purified by HPLC (column: JAIGEL-1H (Japan Analytical Industry Co., Ltd.), eluent: $CHCl_3$, detection wavelength: 254 nm). The purpose fractions were collected and evaporated completely. A colorless oil was obtained with a yield of 82%. ^{1}H-NMR (300 MHz, $CDCl_3$, *vs*. TMS): δ 1.54 (quintet, 6H, $CH_2CH_2CH_2NH$), 2.03 (t, 6H, $CH_2CH_2CH_2NH$), 3.46 (quartet, 6H, $CH_2CH_2CH_2NH$), 3.88 (s, 18H, $ArOCH_3$), 7.02 (dd, 3H, Ar-*H*), 7.12 (t, 3H, Ar-*H*), 7.64 (dd, 3H, Ar-*H*), 8.06 (t, 3H, CON*H*). FT-IR (KBr pellet, cm^{-1}): 3376 ($\nu_{N\text{-}H}$ of the amide group), 3078 ($\nu_{C\text{-}H}$ of the Ph ring), 3000, 2938, 2888, 2873 ($\nu_{C\text{-}H}$ of the methylene group and the methyl group), 1652 ($\nu_{C=O}$ of the amide group), 1533 (the $\nu_{C\text{-}N}$ and δ of amide group and the $\nu_{N\text{-}O}$ of

nitro group overlap each other), 1264 ($\nu_{C\text{-}O}$ of Ph-OMe), 1169 (δ of $C(CH_2)_3$), 1076 ($\nu_{C\text{-}O}$ of PhO-Me), 754 (δ of Ph ring), ESI TOF-MS: m/z = 725.3 $[M + H]^+$, 747.2 $[M + Na]^+$, 759.4 $[M + Cl]^-$.

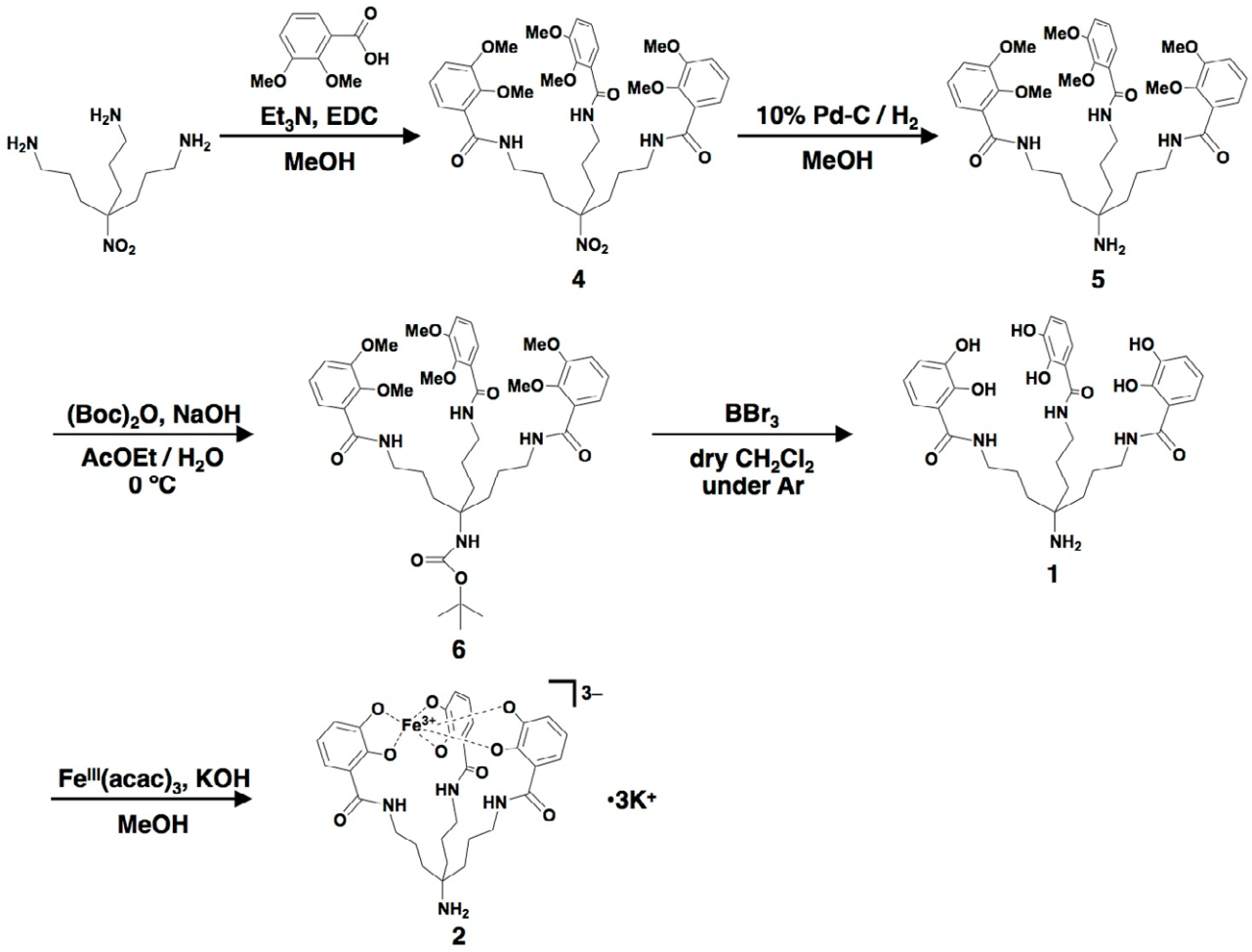
Preparation of tris[3-(2,3-dimethoxybenzamido)propyl] aminomethane (5). **4** (1.31 mmol) was dissolved in MeOH. A catalytic amount of 10% Pd-C was added to the solution and stirred for several days under 3 atm H_2 gas. After removal of Pd-C with Celite, the solution was evaporated completely. The residue was added to $CHCl_3$ and extracted with an aqueous solution of 10% citric acid. All aqueous layers were combined and adjusted to pH 11 with NaOH. The resultant solution was extracted with $CHCl_3$. All organic layers were combined and dried over anhydrous $MgSO_4$. After removal of $MgSO_4$, the resultant solution was evaporated and a pale yellow oil was obtained at a yield of 53%. ^{1}H-NMR (300 MHz, $CDCl_3$, *vs*. TMS): δ 1.43 (t, 6H, $CH_2CH_2CH_2NH$), 1.60 (quintet, 6H, $CH_2CH_2CH_2NH$), 3.45 (quartet, 6H, $CH_2CH_2CH_2NH$), 3.88 (s, 18H, $ArOCH_3$), 7.02 (dd, 3H, Ar-*H*), 7.13 (t, 3H, Ar-*H*), 7.67 (dd, 3H, Ar-*H*), 8.05 (t, 3H, CON*H*). FT-IR (KBr pellet, cm^{-1}): 3377 ($\nu_{N\text{-}H}$ of amide group), 3079 ($\nu_{C\text{-}H}$ of Ph ring), 2937, 2867, 2838 ($\nu_{C\text{-}H}$ of methylene and methyl group), 1653 ($\nu_{C=O}$ of amide group), 1534 (the $\nu_{C\text{-}H}$ and the δ of the amide group overlap each other), 1265 ($\nu_{C\text{-}O}$ of Ph-OMe), 1170 (δ of $C(CH_2)_3$), 1075 ($\nu_{C\text{-}O}$ of PhO-Me), 754 (δ of Ph ring). ESI TOF-MS: m/z = 695.3 $[M + H]^+$, 717.3 $[M + Na]^+$, 693.5 $[M + H]^-$, 729.4 $[M + Cl]^-$.

Preparation of *N*-Boc-tris[3-(2,3-dimethoxybenzamido)propyl]aminomethane (6). An

AcOEt solution of **5** (0.980 mmol) and di-*tert*-butyl dicarbonate (2.20 mmol) was added dropwise to an aqueous solution containing NaOH (2.50 mmol) in an ice bath. After vigorous stirring for 5 h, the resultant organic solution was washed with 1.0 M HCl aqueous solution, 5% $NaHCO_3$ aqueous solution, and brine. The organic layer was dried over anhydrous $MgSO_4$. After removal of $MgSO_4$, the resultant solution was evaporated and purified by HPLC (eluent: $CHCl_3$, detection wavelength: 254 nm). The purpose fractions were collected and evaporated completely. A colorless oil was obtained at a yield of 81%. ^{1}H-NMR (300 MHz, $CDCl_3$, *vs*. TMS): δ 1.37 (s, 6H, $(CH_3)_3COCONH$), 1.58 (t, 6H, $CH_2CH_2CH_2NH$), 1.70 (quintet, 6H, $CH_2CH_2CH_2NH$), 3.44 (quartet, 6H, $CH_2CH_2CH_2NH$), 3.88 (s, 18H, $ArOCH_3$), 7.01 (dd, 3H, Ar-*H*), 7.12 (t, 3H, Ar-*H*), 7.65 (dd, 3H, Ar-*H*), 8.02 (t, 3H, CON*H*). FT-IR (KBr pellet, cm^{-1}): 3376 (ν_{N-H} of the amide group), 3077 (ν_{C-H} of the Ph ring), 2939, 2869, 2838 (ν_{C-H} of the methylene group and the methyl group), 1713 ($\nu_{C=O}$ of the carbamide group), 1653 ($\nu_{C=O}$ of the amide group), 1532 (the ν_{C-H} and the δ of the amide group overlap each other), 1265 (ν_{C-O} of Ph-OMe), 1170 (δ of $C(CH_2)_3$ and C-O-C), 1087 (ν_{C-O} of PhO-Me), 755 (δ of the Ph ring). ESI TOF-MS : m/z = 795.2 $[M + H]^+$, 817.2 $[M + Na]^+$.

Preparation of tris[3-(2,3-dihydroxybenzamido)propyl]aminomethane (1). **6** (0.790 mmol) was dissolved to dry CH_2Cl_2 (25 mL). A CH_2Cl_2 solution of 1.0 M BBr_3 (13 mL) was added dropwise to the solution. The resultant mixture was stirred overnight. MeOH (10 mL) was added to

the solution and the resultant mixture was stirred for 1 h. After evaporation, the residue was purified by column chromatography (LH-20, eluent: 1/1 $CHCl_3$/MeOH). The purpose fraction was collected and evaporated completely. White powder was obtained at a yield of 80%. ^{1}H-NMR (600 MHz, DMSO-d_6, *vs*. TMS): δ 1.57 (br, 12H, CH_2CH_2CH_2NH), 3.30 (quartet, 6H, $CH_2CH_2CH_2$NH), 6.68 (t, 3H, Ar-*H*), 6.92 (dd, 3H, Ar-*H*), 7.30 (dd, 3H, Ar-*H*), 8.86 (t, 3H, CON*H*). FT-IR (KBr pellet, cm^{-1}): 3305 ($\nu_{N\text{-}H}$ of the amide group and $\nu_{O\text{-}H}$ of PhOH), 2952, 2879 ($\nu_{C\text{-}H}$ of the methylene group), 1640 ($\nu_{C=O}$ of the amide group), 1545 (the $\nu_{C\text{-}H}$ and the δ of the amide group, overlap each other), 1331 (δ of PhOH), 1261 ($\nu_{C\text{-}O}$ of Ph-OH), 1157 (δ of $C(CH_2)_3$), 739 (δ of Ph ring). ESI TOF-MS: m/z = 611.1 $[M + H]^+$.



Scheme S1. Synthetic scheme of **1** and **2**.

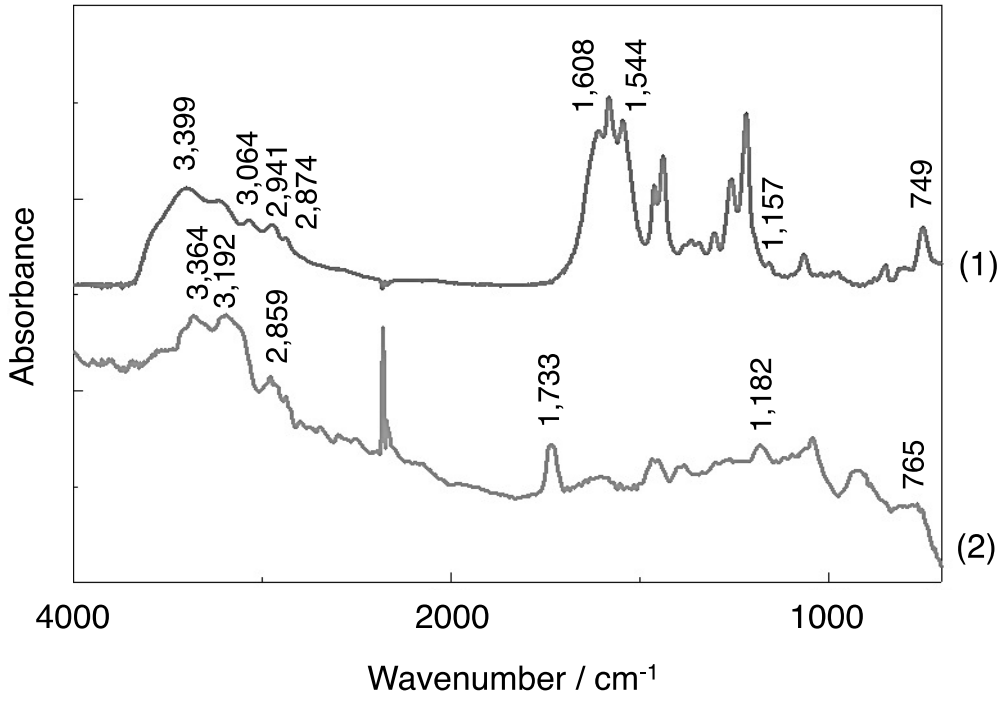


Fig. S1 FT-IR spectrum of **2** (KBr pellet, 1) and FT-IR-RAS spectrum of **2**/Au (2).

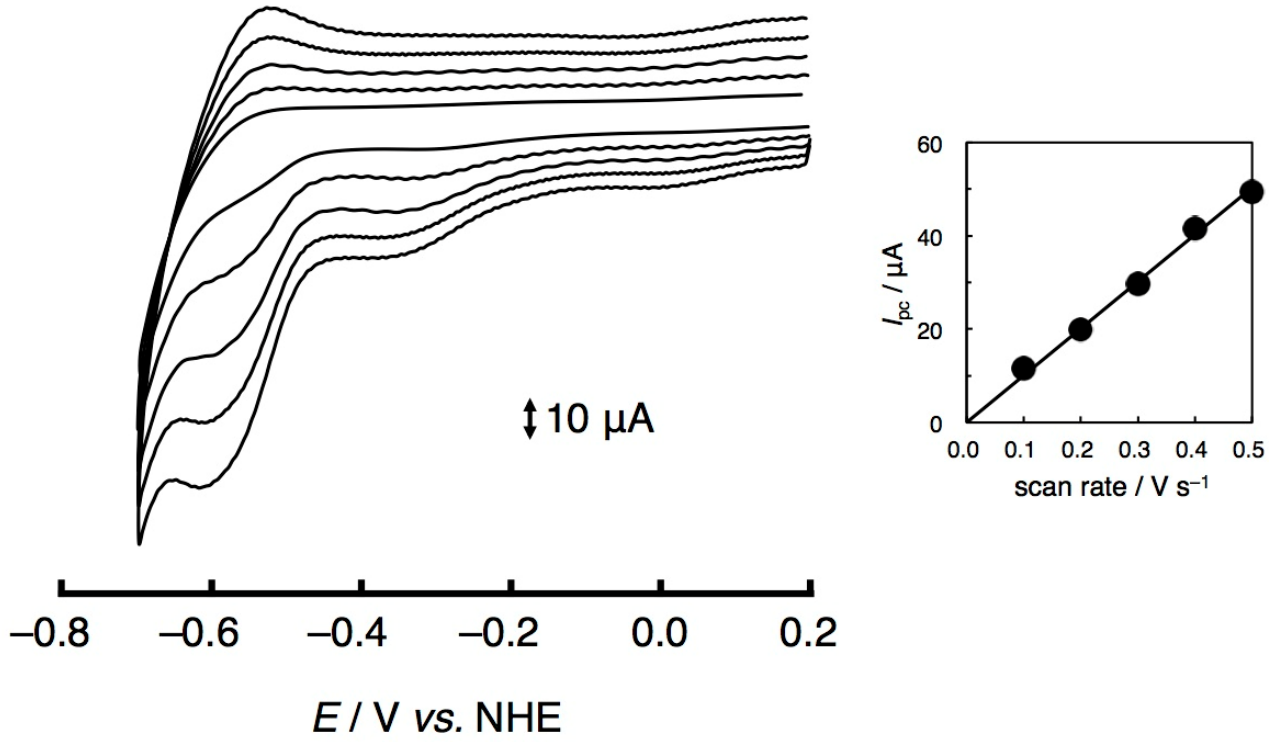


Fig. S2 Cyclic voltammograms of **2**/Au in 0.1 M $NaClO_4$ adjusted to pH 7 with 0.1 MPB buffer. Scan rates are 0.1 to 0.5 V s^{-1}. The inset indicates the relationship between scan rates and peak anode currents of **2**/Au.

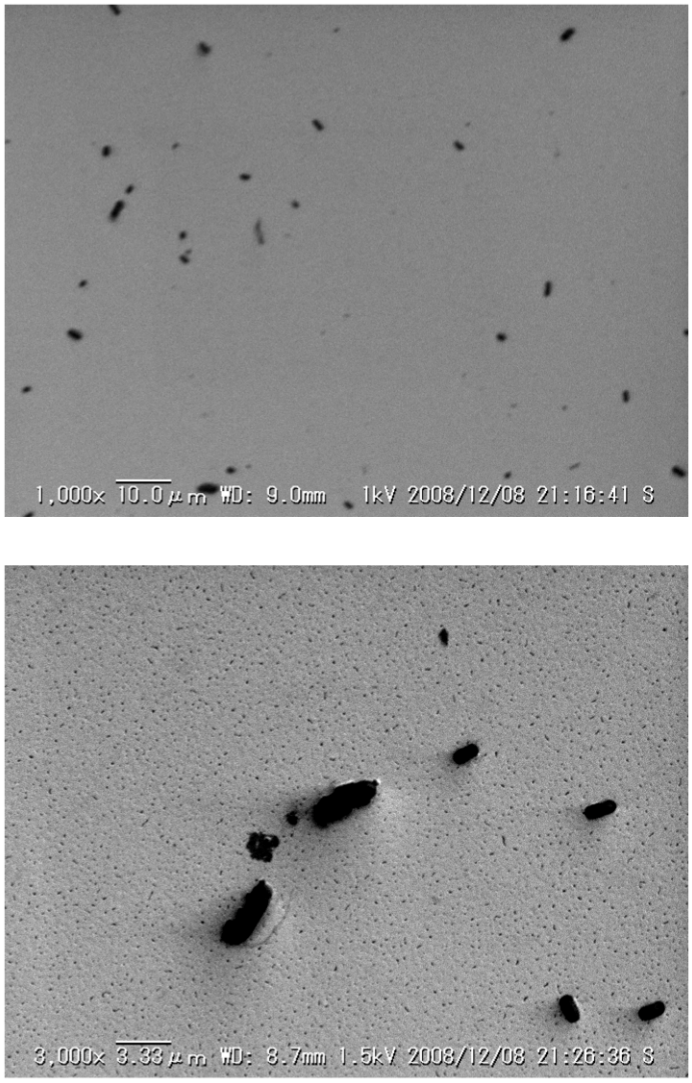


Fig. S3 Scanning electron microscopic images of **2**/Au after injection of the medium with *E.coli* (10^6 CFU mL^{-1}).

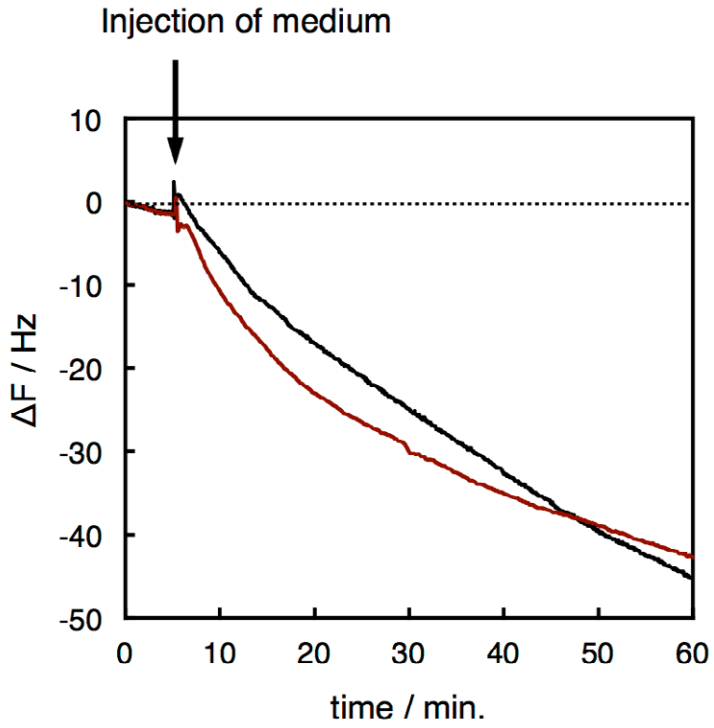


Fig. S4 The frequency change of the QCM chip modified by **2** (**2**/Au) after injection of the ATCC No. 242 broth (black line) with and (red line) without *M. flavescens* in 0.1 M phosphate buffer solution (pH 7.0) at room temperature. The concentration of the injected *M. flavescens* was 10^6 CFU mL^{-1}.