## **Supplementary material**

## Biocompatible Polyelectrolyte Multilayers with Copper Oxide and Zinc Oxide Nanoparticles for Inhibiting Bacterial Growth

Nives Matijaković Mlinarić<sup>a</sup>\*, Stefanie Altenried<sup>b</sup>, Atiđa Selmani<sup>c</sup>, Juraj Nikolić<sup>d</sup>, Aleksander Učakar<sup>e</sup>, Anamarija Zore<sup>a</sup>, Anže Abram<sup>e</sup>, Sandro Lehner<sup>b</sup>, Andrijana Sever Škapin<sup>f</sup>, Monika Kušter<sup>e</sup>, Eva Roblegg<sup>c</sup>, Davor Kovačević<sup>d</sup>, Qun Ren<sup>b</sup>, Klemen Bohinc<sup>a</sup>\*

 <sup>a</sup> Faculty of Health Sciences, University of Ljubljana, Zdravstvena pot 5, 1000 Ljubljana, Slovenia,
<sup>b</sup> Laboratory for Biointerfaces, Empa, Swiss Federal Laboratories for Materials Science and Technology, Lerchenfeldstrasse 5, 9014 St. Gallen, Switzerland.
<sup>c</sup> Pharmaceutical Technology and Biopharmacy, Institute of Pharmaceutical Sciences, University of Graz, Universitätsplatz 1, 8010 Graz, Austria
<sup>d</sup> University of Zagreb Faculty of Science, Department of Chemistry, Horvatovac 102A, 10000 Zagreb, Croatia

<sup>e</sup> Jožef Stefan Institute, Jamova cesta 39, 1000 Ljubljana, Slovenia

<sup>f</sup> Slovenian National Building and Civil Engineering Institute, Dimčeva ulica 12, 1000 Ljubljana, Slovenia

## Table of Contents

<b>Figure S1.</b> SEM images of stainless-steel surfaces coated with PAH/ALG multilayers and CuO NPs. EDS mapping (second and third column) showing the placement of CuO NPs on the surface. PAH – poly(allylamine hydrochloride), ALG – alginate
<b>Figure S2.</b> SEM images of stainless-steel surfaces coated with PAH/ALG multilayers and ZnO NPs. EDS mapping (second and third column) showing the placement of ZnO NPs on the surface. PAH – poly(allylamine hydrochloride), ALG – alginate
<b>Figure S3.</b> Fourier transformed infrared spectra showing the absorbance ( <i>A</i> ) at specific wavenumber ( $v / cm^{-1}$ ) for PAH and ALG terminating multilayers containing CuO NPs exhibiting different morphology: (A) sheets, (B) rods and (C) spheres. PAH – poly(allylamine hydrochloride), ALG - alginate4
<b>Figure S4.</b> Fourier transformed infrared spectra showing the absorbance ( <i>A</i> ) at specific wavenumber ( $v / cm^{-1}$ ) for PAH and ALG terminating multilayers containing ZnO NPs exhibiting different morphology: (A) sheets, (B) rods and (C) spheres. PAH – poly(allylamine hydrochloride), ALG – alginate
Figure S5. SEM micrographs of the stainless-steel surfaces after the antibacterial tests



**Figure S1.** SEM images of stainless-steel surfaces coated with PAH/ALG multilayers and CuO NPs. EDS mapping (second and third column) showing the placement of CuO NPs on the surface. PAH – poly(allylamine hydrochloride), ALG – alginate



**Figure S2.** SEM images of stainless-steel surfaces coated with PAH/ALG multilayers and ZnO NPs. EDS mapping (second and third column) showing the placement of ZnO NPs on the surface. PAH – poly(allylamine hydrochloride), ALG – alginate



**Figure S3.** Fourier transformed infrared spectra showing the absorbance (*A*) at specific wavenumber  $(v/cm^{-1})$  for PAH and ALG terminating multilayers containing CuO NPs exhibiting different morphology: (A) sheets, (B) rods and (C) spheres. PAH – poly(allylamine hydrochloride), ALG - alginate



**Figure S4.** Fourier transformed infrared spectra showing the absorbance (*A*) at specific wavenumber  $(v / cm^{-1})$  for PAH and ALG terminating multilayers containing ZnO NPs exhibiting different morphology: (A) sheets, (B) rods and (C) spheres. PAH – poly(allylamine hydrochloride), ALG – alginate



Figure S5. SEM micrographs of the stainless-steel surfaces after the antibacterial tests.