Electronic Supplementary Information

Organic/Inorganic Double-Layered Shells for Multiple Cytoprotection of Individual Living Cells

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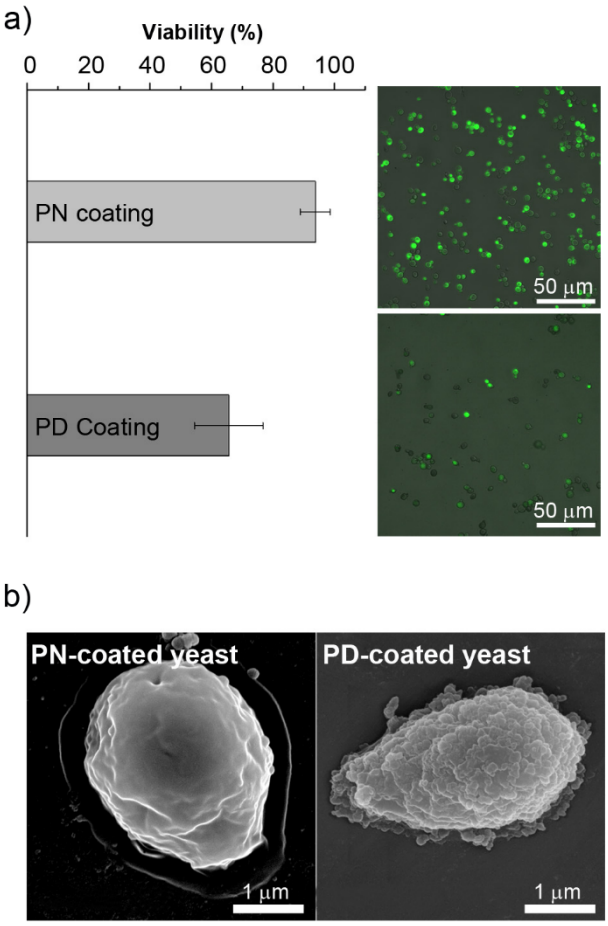

Figure S1. a) Viability of poly(norepinephrine) (PN)-coated and poly(dopamine) (PD)-coated yeast cells. The coating was done for 3 h. The viability was much higher for yeast@PN (94%) than yeast@PD (66%). Cells in green after FDA treatment were considered alive. b) SEM images of PN-coated and PD-coated yeast cells. PN-coated yeast cells showed uniform shells, while irregular particles were observed for PD-coated yeast cells.

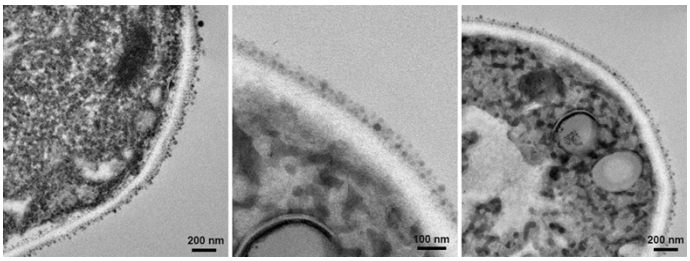

Figure S2. TEM images of the microtome-sliced yeast^{ECP} cells with various magnifications.

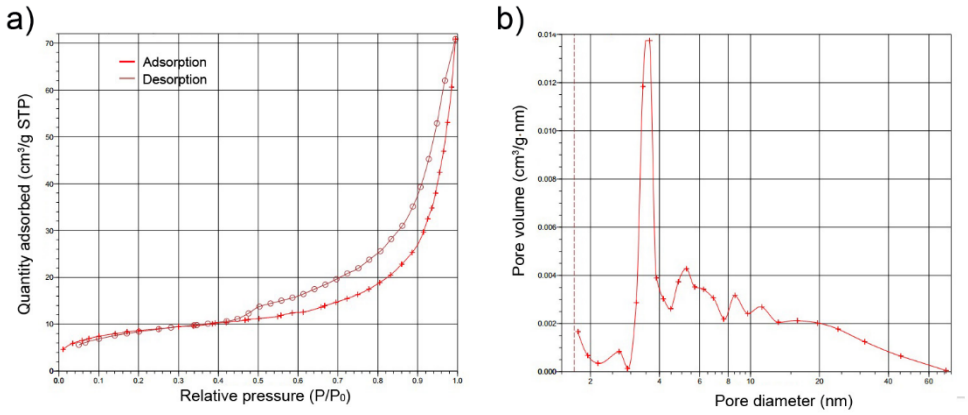

Figure S3. Pore size analyses of the shell in yeast^{ECP}. a) Isotherm linear plot and b) BJH pore-size distribution.

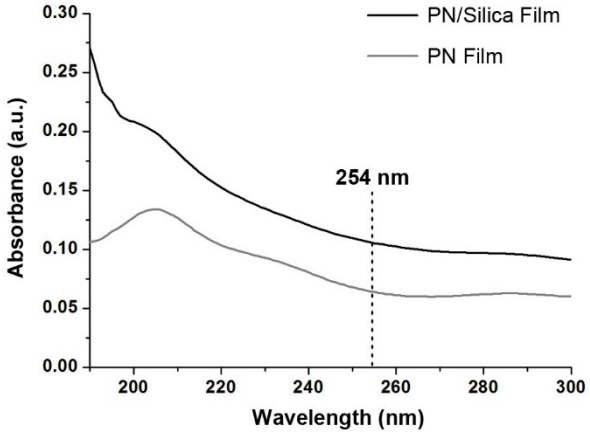

Figure S4. UV-Visible spectra of PN and PN/silica films coated on quartz.

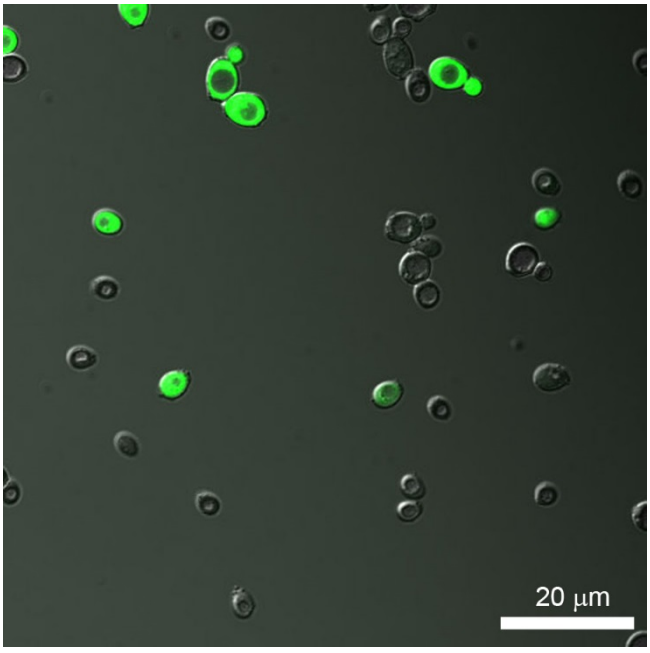

Figure S5. Viability of PN-coated yeast under UV-C irradiation. The FDA assay showed that ~80% of the PN-coated yeast cells were dead after 500-sec UV-C irradiation. Cells in green after FDA treatment were considered alive.

Figure S6. Full data set for a) cellular process or b) metabolic process.


b)
Up-regulated proteins
Down-regulated proteins
translation
oxidation reduction
glucose metabolsim
rRNA processing
protein folding
amino acid biosynthetic process
tRNA aminoacylation
metabolic process
pentose-phosphate shunt
GTP catabolic process
transcription, DNA-dependent
proteolysis
tricarboxylic acid cycle
DNA repair
maturation of LSU-rRNA
isoprenoid biosynthetic process
cellular carbohydrate metabolic process
cellular protein metabolic process
nuclear-transcribed mRNA catabolic process,...
fatty acid beta-oxidation
ATP synthesis coupled proton transport
nitrogen compound metabolic process
ubiquitin-dependent protein catabolic process
trehalose biosynthetic process
glutamate biosynthetic process
translational elongation
maturation of LSU-rRNA from tricistronic rRNA...
hydrogen peroxide catabolic process
purine base biosynthetic process
homocysteine catabolic process
endonucleolytic cleavage to generate mature...
purine nucleotide biosynthetic process
carnitine metabolic process
glutamine metabolic process
glyoxylate cycle
mRNA processing
bypass DNA synthesis
acetyl-CoA metabolic process
threonine biosynthetic process
endonucleolytic cleavage in ITS1 to separate...
N-terminal protein amino acid acetylation
peptide catabolic process
mannose biosynthetic process
pyridine nucleotide biosynthetic process
glutathione biosynthetic process
glycerol catabolic process
oligosaccharide catabolic process
purine base metabolic process
oxalate catabolic process
nucleotide metabolic process
microautophagy
dephosphorylation
butanediol biosynthetic process
propionate catabolic process, 2-methylcitrate...
riboflavin biosynthetic process
protein modification process
nuclear-transcribed mRNA catabolic process,...
glutathione metabolic process
tRNA methylation
glycogen metabolic process
fatty acid biosynthetic process
aspartate biosynthetic process
DNA replication
glutamine catabolic process
RNA modification
mRNA metabolic process
transcription-coupled nucleotide-excision repair
cell wall chitin catabolic process
proteasomal ubiquitin-dependent protein...
UDP-N-acetylglucosamine biosynthetic process
glycogen biosynthetic process
leucyl-tRNA aminoacylation
isoleucyl-tRNA aminoacylation
histidyl-tRNA aminoacylation
proteolysis involved in cellular protein...
translational initiation
0
10
20
30
40
50
60
Number of proteins

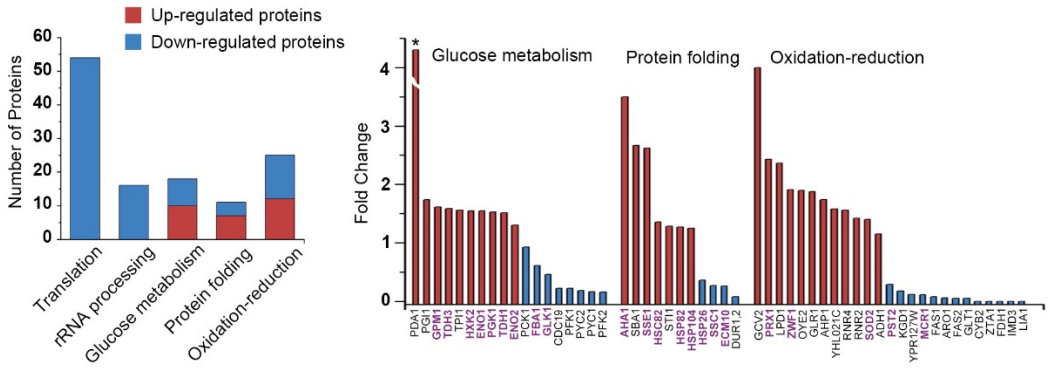

Figure S7. Comparative analysis between yeast^{ECP} and yeast^{WT} before UV-C irradiation. Left bar graph: the number of the changed proteins for each sub-categories in metabolic process. All the proteins involved in translation and rRNA processing were down-regulated (blue). Right bar graph: quantitative analysis of the proteins in glucose metabolism, protein folding, and oxidation-reduction. * indicates that the denominator of Fc is zero.