Supporting Information

Preparation of Luminescent Titania/Dye Hybrid Nanoparticles and Their Dissolution Properties for Controlling Cellular Environments

K. Shiba,*a,b M. Tagaya,*c,d T. Sugiyamab and N. Hanagatae

a. International Center for Young Scientists (ICYS), National Institute for Materials Science (NIMS), 1-1 Namiki, Tsukuba, Ibaraki 305-0044, Japan.

b. World Premier International Research Center Initiative (WPI), International Center for Materials Nanoarchitectonics (MANA), National Institute for Materials Science (NIMS), 1-1 Namiki, Tsukuba, Ibaraki 305-0044, Japan.

c. Top Runner Incubation Center for Academia-Industry Fusion, Nagaoka University of Technology, 1603-1 Kamitomioka, Nagaoka, Niigata 940-2188, Japan.

d. Department of Materials Science and Technology, Nagaoka University of Technology, 1603-1 Kamitomioka, Nagaoka 940-2188, Japan.

e. Nanotechnology Innovation Station, National Institute for Materials Science (NIMS), 1-2-1 Sengen, Tsukuba, Ibaraki 305-0047, Japan.

*To whom correspondence should be addressed:

SHIBA.Kota@nims.go.jp, tagaya@mst.nagaokaut.ac.jp



Fig. S1 FE-SEM images (Inset: magnified images of a single particle) and corresponding particle size distributions of titania/aminopropyl-silica/ODA hybrid NPs washed once and then immersed in PBS for (a) 6 h, (b) 24 h, and (c) 48 h (*i.e.*, (a) titania/aminopropyl-silica/ODA-*W*1-6h, (b) titania/aminopropyl-silica/ODA-*W*1-24h, and (c) titania/aminopropyl-silica/ODA-*W*1-48h).



Fig. S2 Excitation and luminescence spectra of the titania/aminopropyl-silica/ODA-*W*1 (a) before and (b) after the immersing in PBS for 72 h *(i.e.,* (a) titania/aminopropyl-silica/ODA-*W*1-0h and (b) titania/aminopropyl-silica/ODA-*W*1-72h). Here, the excitation spectra were collected for the luminescence maxima at 522 nm.



Fig. S3 (a) UV-Visible absorption spectra of the PBS solutions containing the different FITC concentrations, and (b) the calibration curve drawn based on the absorbance at 494 nm (R=0.99993).



Fig. S4 UV-Visible absorption spectra of the PBS solutions after the immersing titania/aminopropyl-silica/ODA/FITC (a) -*W***1**, (b) -*W***3** and (c) -*W***5**. The absorption spectra were recorded at 6 h, 24 h 48h and 72 h.



Fig. S5 FE-SEM images (Inset: magnified images of a single particle) and corresponding particle size distributions of the titania/aminopropyl-silica/ODA/FITC (a) -W1, (b) -W3 and (c) -W5 at the immersion time in PBS at 6 h.



Fig. S6 FE-SEM images (Inset: magnified images of a single particle) and corresponding particle size distributions of the titania/aminopropyl-silica/ODA/FITC (a) -W1, (b) -W3 and (c) -W5 at the immersion time in PBS at 24 h.



Fig. S7 FE-SEM images (Inset: magnified images of a single particle) and corresponding particle size distributions of the titania/aminopropyl-silica/ODA/FITC (a) -W1, (b) -W3 and (c) -W5 at the immersion time in PBS at 48 h.



Fig. S8 Excitation and luminescence spectra of the neat FITC powder.



Fig. S9 Excitation and luminescence spectra of PBS solutions with three different FITC concentrations (64, 128 and 257 mmol/L). Inset: the standard curve between the FITC concentration and integrated PL intensity (R=0.99973).