Supplementary information

Controllable drug release from nano-layered hollow carrier by non-omnipresent enzyme in human condition

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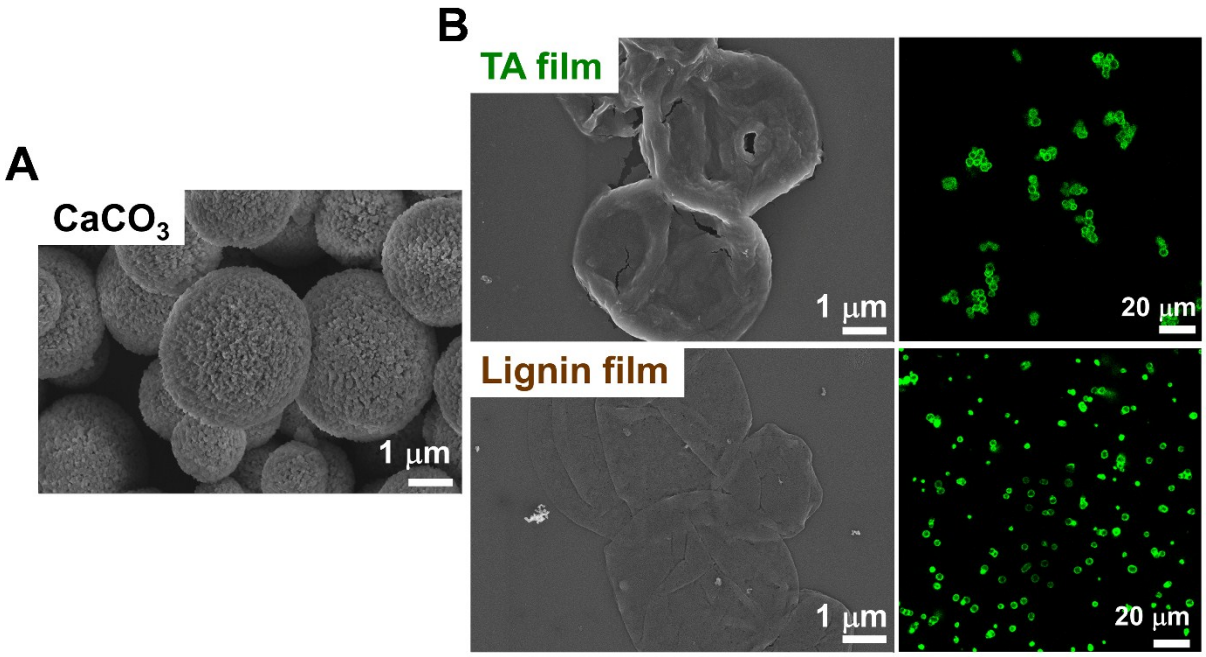

Figure S1. SEM and confocal microscope images of TA and lignin films prepared on CaCO3 microparticle. (A) Bare CaCO3 particles and (B) core removed TA and lignin film (hollow film), respectively. The green fluorescence indicates gelatin-FITC.

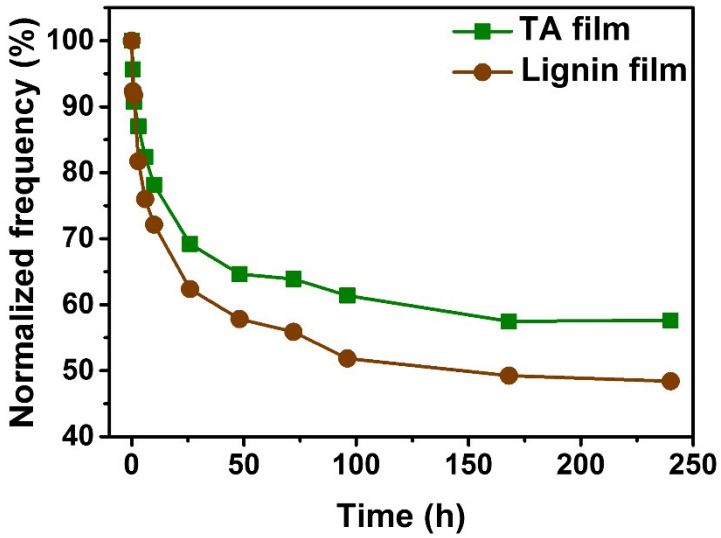

Figure S2. Normalized frequency increment of TA and lignin film at pH 5 with enzymes measured by QCM.

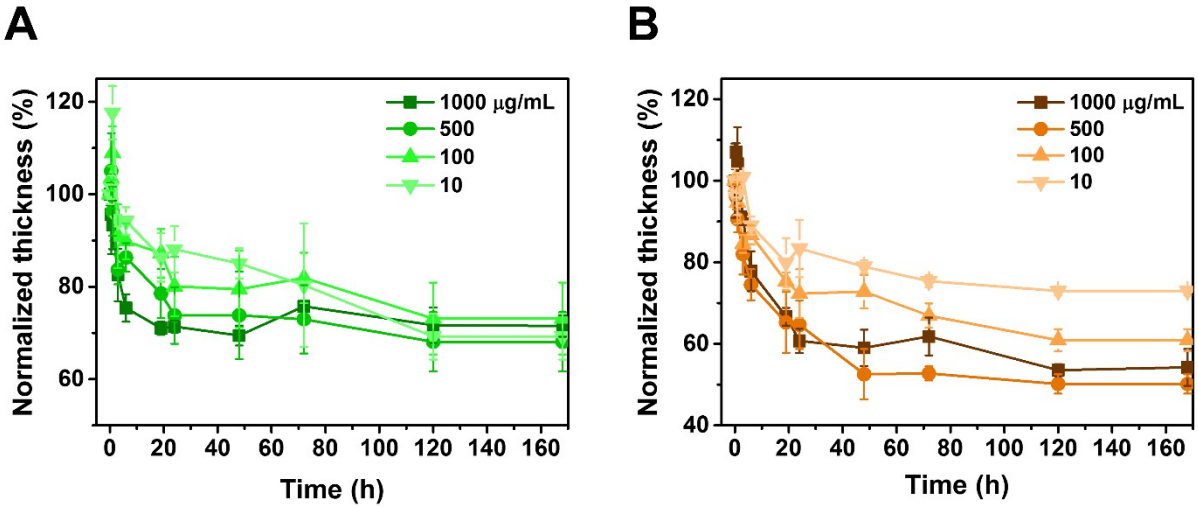

Figure S3. Normalized degradation of (A) TA and (B) lignin films depending on the concentration of enzymes

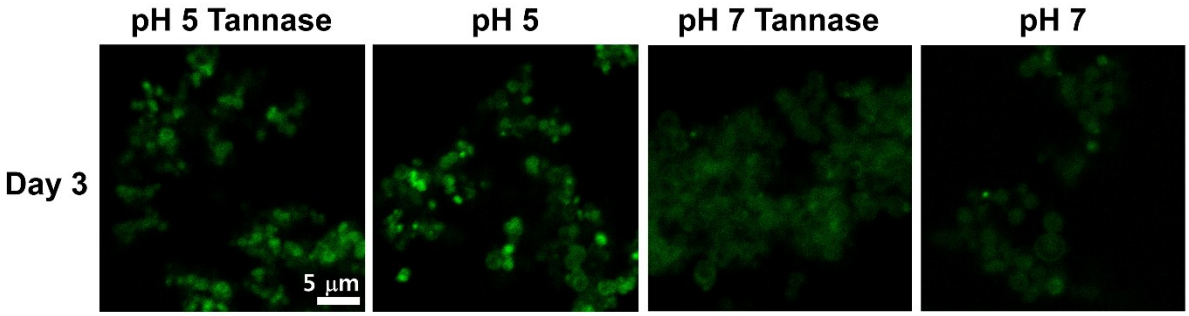

Figure S4. Fluorescence intensity change of TA film at day 3 after buffer and enzyme treatment measured by confocal microscope. Green fluorescence indicates gelatin-FITC. All images were measured under same gain and offset value.

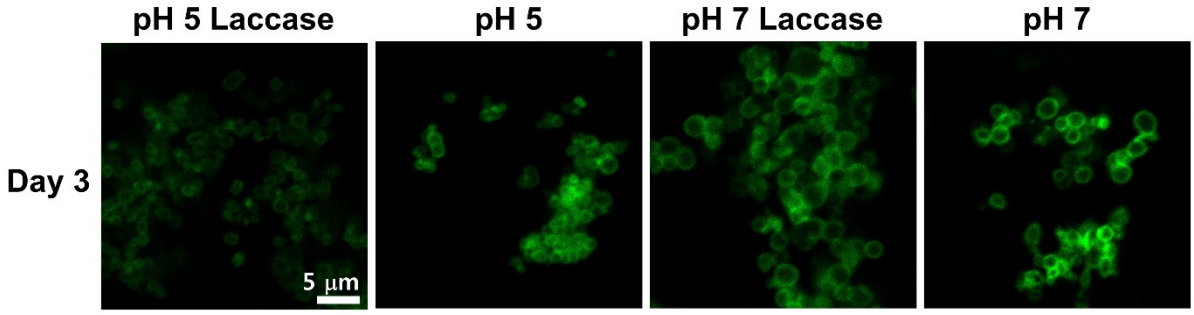

Figure S5. Fluorescence intensity change of lignin film at day 7 after buffer and enzyme treatment measured by confocal microscope. Green fluorescence indicates gelatin-FITC. All images were measured under same gain and offset value.

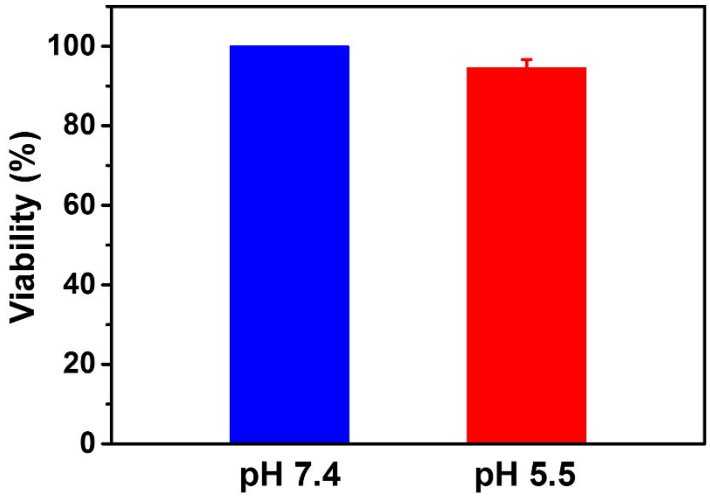

Figure S6. Cytotoxicity of pH 5.5 culture medium on HeLa based on that of pH 7.4 (100% viability).

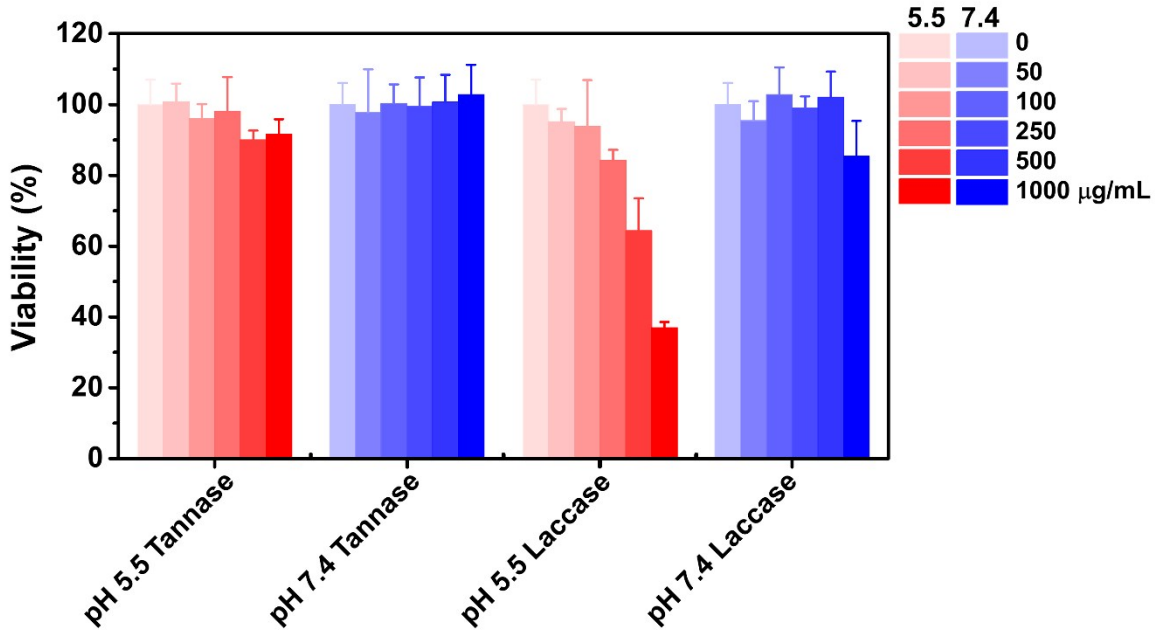

Figure S7. Cell viability test of tannase and laccase depending on the pH and concentration.

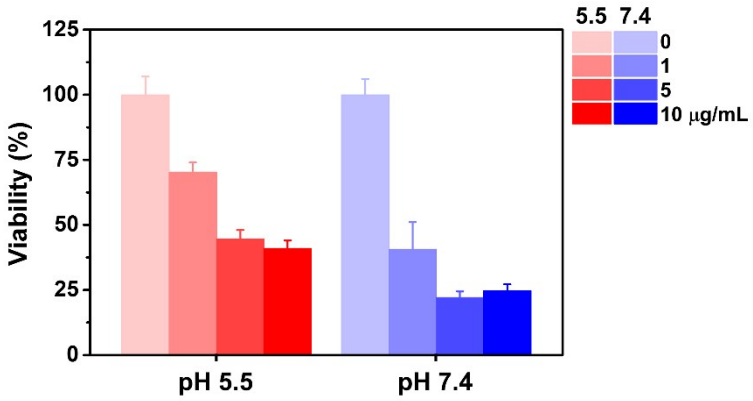

Figure S8. Cell viability of DOX at a different concentration.

Viability (%)

Control (5.5)	TA film	Lignin film
100 ± 2.24	93.53 ± 1.83	97.93 ± 5.31
Control (7.4)	**TA film**	**Lignin film**
100 ± 3.82	100.7 ± 1.16	93.37 ± 1.35

Table S1. Cell viability of TA and lignin hollow films (DOX unloaded) on HeLa.