Supplementary Information

$CaCO_3$/Chitin Hybrids: Effects of Recombinant Acidic Peptides Designed Based on a Peptide Extracted from an Exoskeleton of a Crayfish on Morphologies of the Hybrids

Hiromu Kumagai,[a] Ryou Matsunaga,[b] Tatsuya Nishimura,[a]*

Yuya Yamamoto,[a] Satoshi Kajiyama,[a] Yuya Oaki,[a] Kei Akaiwa,[a]

Hirotaka Inoue,[c] Hiromichi Nagasawa,[c] Kohei Tsumoto,[b,d]

and Takashi Kato [a]*

[a] *Department of Chemistry and Biotechnology, School of Engineering, The University of Tokyo, Bunkyo-ku, Tokyo 113-8656, Japan; E-mail: kato@chiral.t.u-tokyo.ac.jp; tatsuya@chembio.t.u-tokyo.ac.jp*
[b] *Department of Medical Genome Science, School of Frontier Sciences, The University of Tokyo, Kashiwa, Chiba 277-8562, Japan*
[c] *Department of Applied Biological Chemistry, Graduate School of Agricultural and Life Sciences, The University of Tokyo, Bunkyo-ku, Tokyo 113-8657, Japan*
[d] *Medical Proteomics Laboratory, Institute of Medical Science, The University of Tokyo, Minato-ku, Tokyo 108-8639, Japan*

Magnified SEM images of the obtained platelike tripodal hybrids

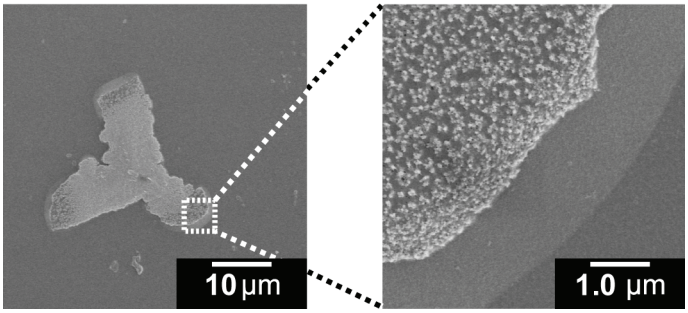

Fig. S1 (left) SEM images of platelike tripodal crystals and (right) magnified images of the front area of the hybrid formed in the presence of rCAP-1-CT.

Circular dichroism spectra of the recombinant peptides

The circular dichroism (CD) measurement of the peptides was carried out to examine the effects of elongated acidic C-terminus on the secondary structure in solution (Figure S1). We previously reported that CAP-1 and its related recombinant peptides contained a high proportion of random coil based on their CD spectra.[1] In addition, they did not show any CD bands in the α-helix characteristic regions around 200 and 220 nm. However, each negative CD band (λ = 200 nm) for the obtained recombinant peptides is red-shifted with respect to that of CAP-1 (λ = 196 nm), which can be ascribed the α-helix formation. Because the acidic C-terminal parts of these peptides contain elongated

Asp-rich sequences, these peptides may form α-helix. In contrast, the CD intensity around 200 nm decreases with increasing the concentration of calcium. It indicates that the binding of calcium ions changes the secondary structure of the peptides accompanied with decreasing random coil structure in the solution.

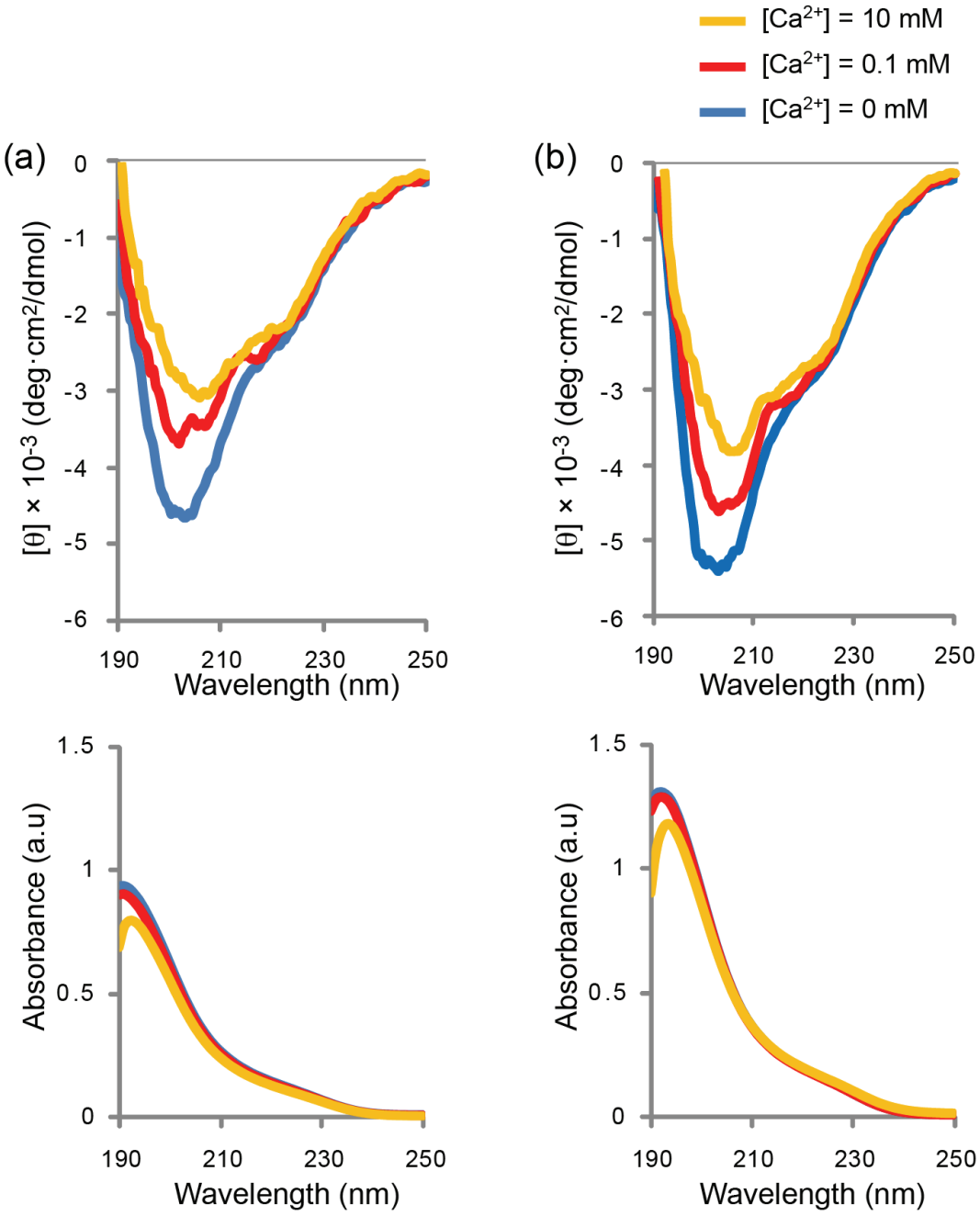

Fig. S2 Absorption and circular dichroism spectral changes in solutions of peptides ((a): rCAP-1-CD; (b): rCAP-1-CT) in borate buffer (pH = 6.8) at 25 °C with increasing the concentration of $CaCl_2$ (0 mM, 0.1 mM and 10 mM).

Reference

1 H. Inoue, T. Ohira, and H. Nagasawa, *Peptides*, 2007, **28**, 566–573.