Electronic Supplementary Material (ESI) for RSC Advances.

Electronic Supplementary Information

Regulation of divalent metal ions to the aggregation and membrane damage of human islet amyloid polypeptide oligomers

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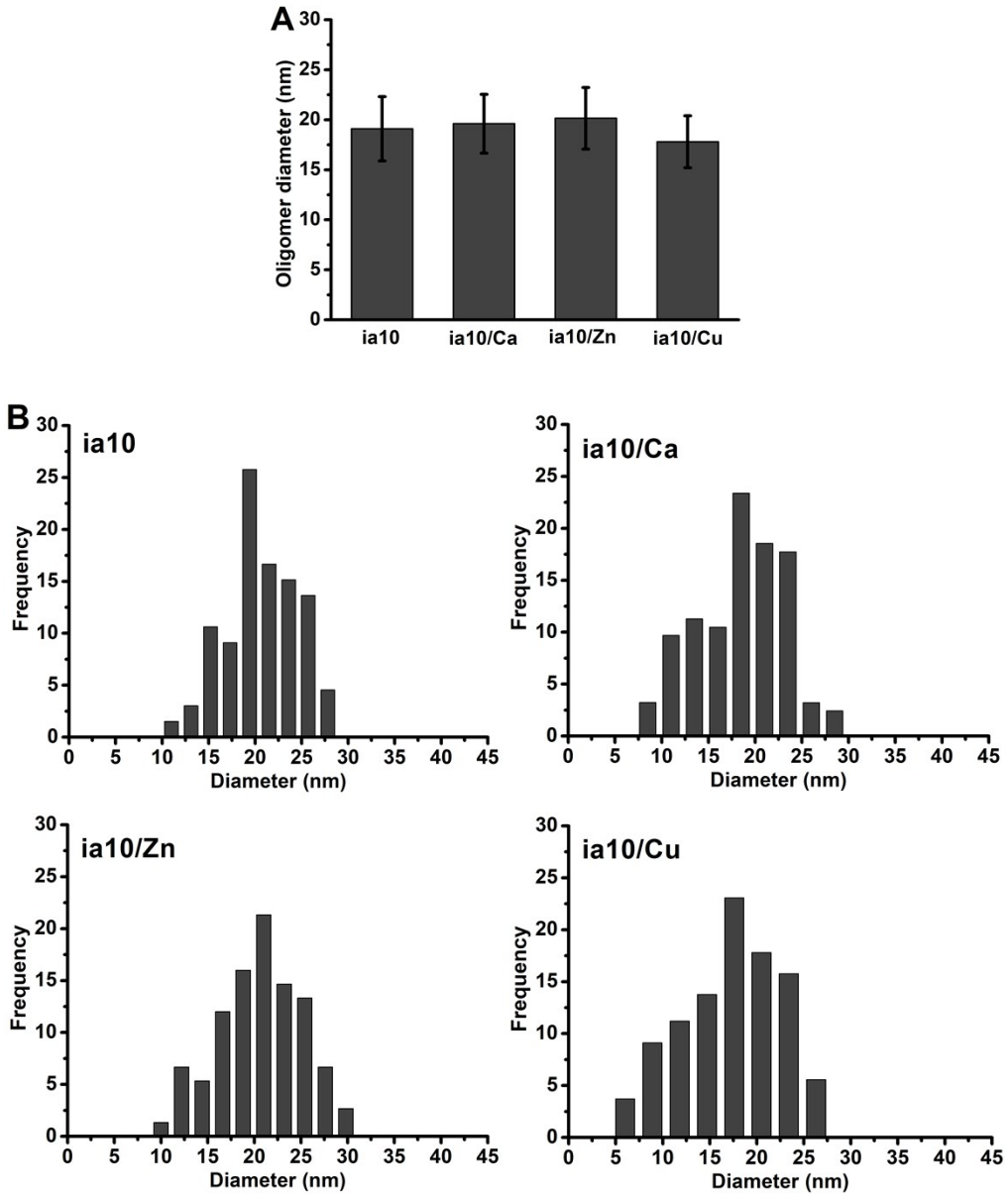

Fig. S1. Mean diameters (A) and size distributions (B) of ia10, ia10/Ca, ia10/Zn and ia10/Cu oligomers obtained by counting 100 particles in TEM images.

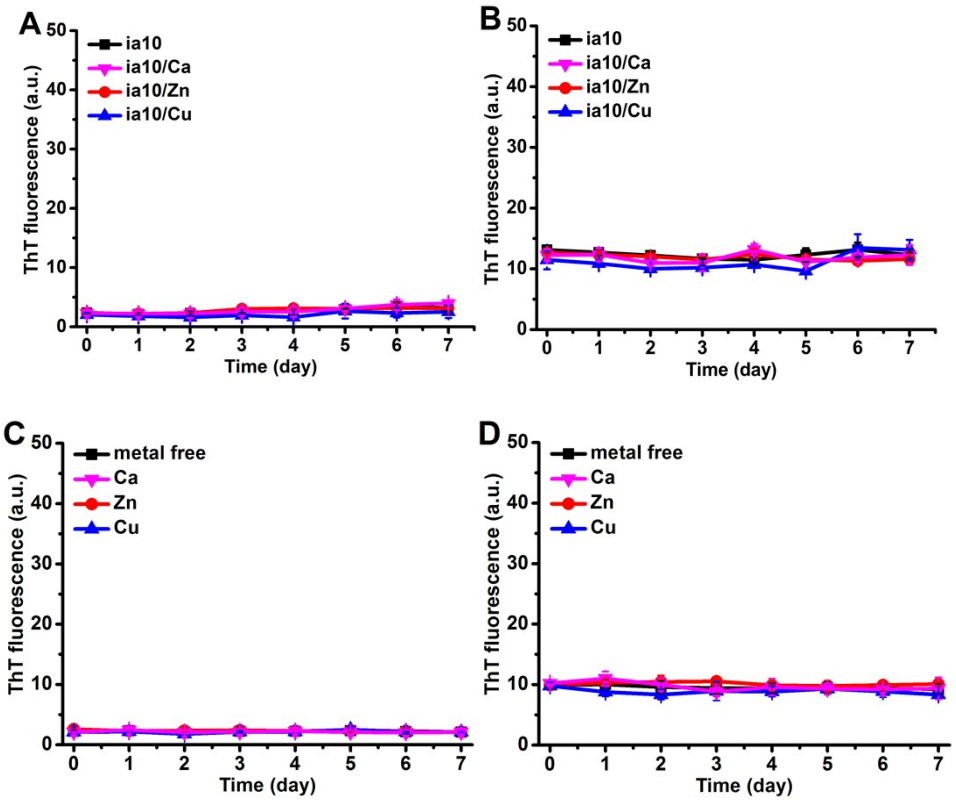

Fig. S2. The ThT fluorescence results of the 10-peptide oligomers incubated in phosphate buffer at pH 7.4 in the absence (A) and presence (B) of POPC/POPG 4:1 LUVs for different days, and the ThT fluorescence results of Zn(II), Cu(II) and Ca(II) ions alone incubated in phosphate buffer at pH 7.4 in the absence (C) and presence (D) of POPC/POPG 4:1 LUVs for different days. The concentrations of peptide, metal ion and total lipids were 50 μM, 50 μM and 500 μM, respectively.

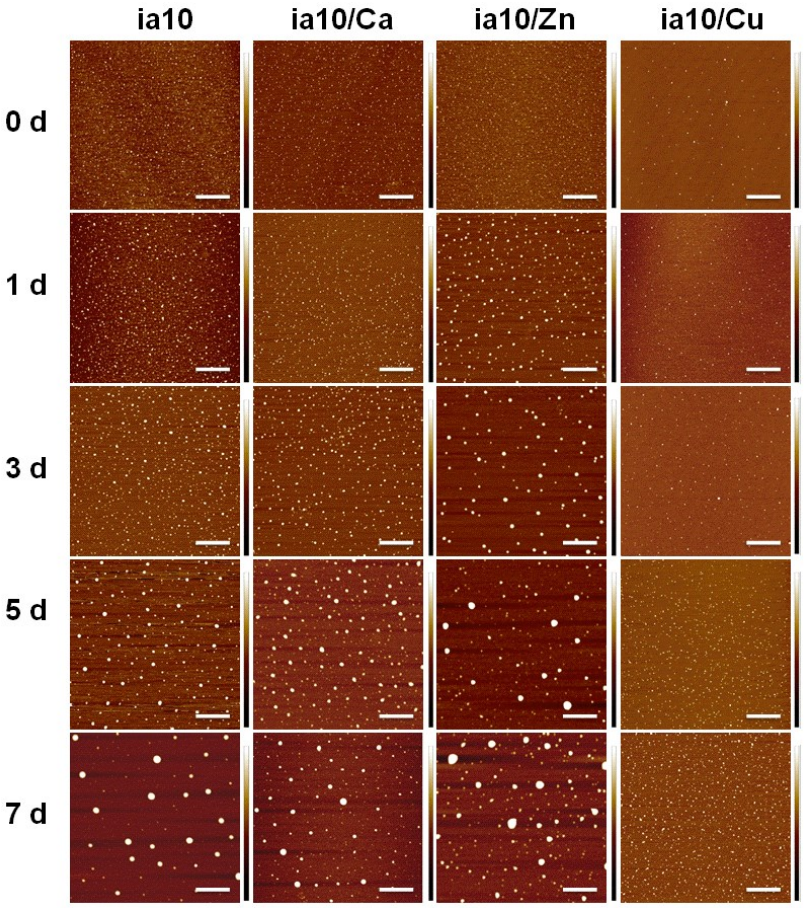

Fig. S3. AFM images of ia10, ia10/Ca, ia10/Zn and ia10/Cu oligomers recorded at the initial time of incubation (0 d) and after various days of incubation (1-7 d) in phosphate buffer at pH 7.4 at a peptide concentration of 50 μM. The scale bars in the images are 1 μm.

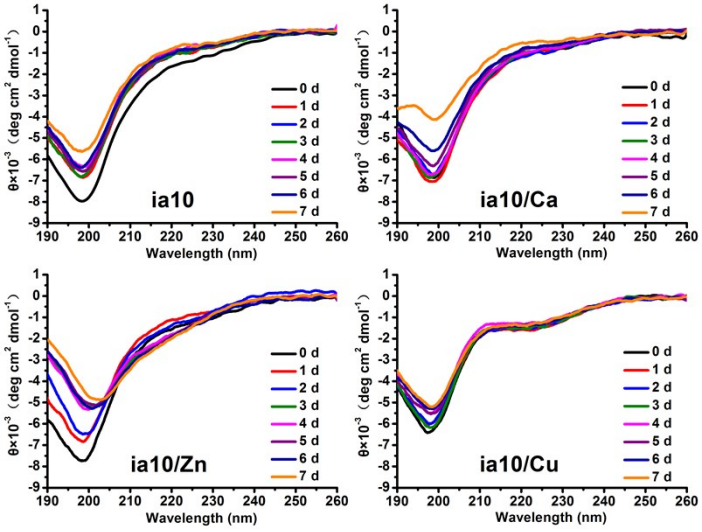

Fig. S4. CD spectra of ia10, ia10/Ca, ia10/Zn and ia10/Cu oligomers recorded at the initial time of incubation (0 d) and after various days of incubation (1-7 d) in phosphate buffer at pH 7.4. The concentration of peptide was 50 μM.

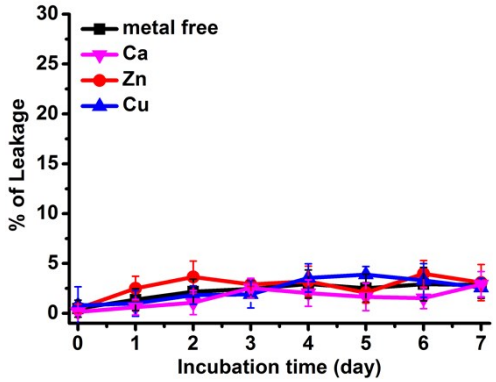

Fig. S5. Percentage of calcein releasing from POPC/POPG 4:1 LUVs upon incubation with the divalent metal ions in 25 mM phosphate buffer containing 50 mM NaCl at pH 7.4 for different days. The concentrations of metal ion and total lipids were 50 μM and 500 μM, respectively.

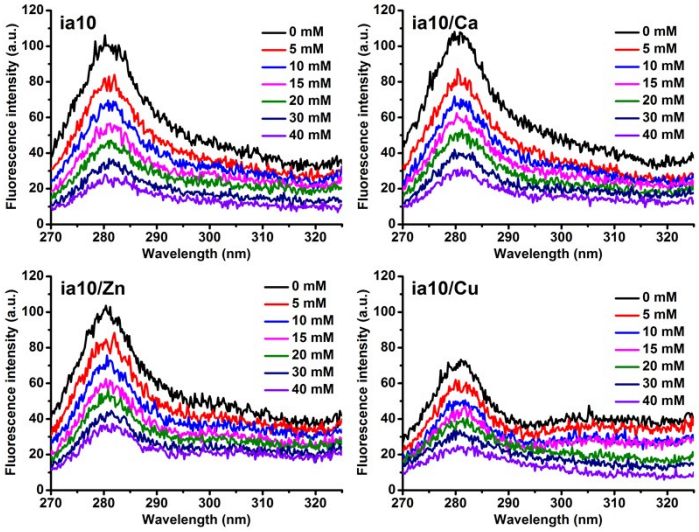

Fig. S6. Fluorescence quenching of phenylalanine by acrylamine (0-40 mM) for ia10, ia10/Ca, ia10/Zn and ia10/Cu oligomers in Milli-Q water at a peptide concentration of 50 μM.

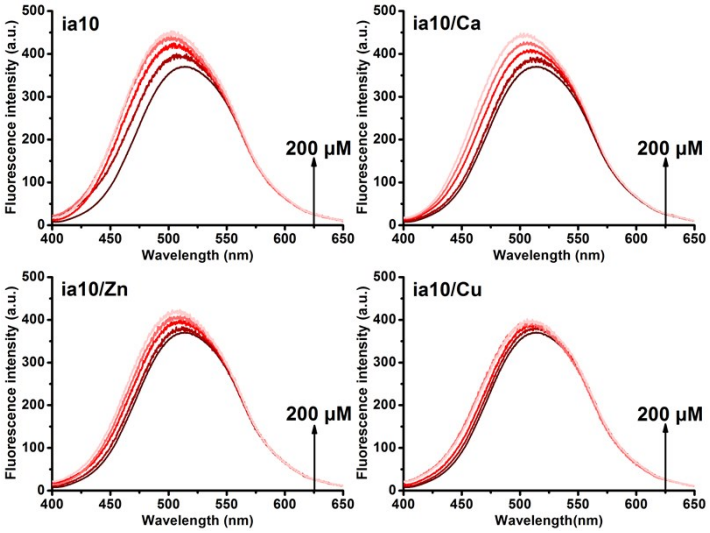

Fig. S7. The ANS fluorescence emission for ia10, ia10/Ca, ia10/Zn and ia10/Cu oligomers in Milli-Q water at varied peptide concentrations and a fixed ANS concentration of 300 μM.

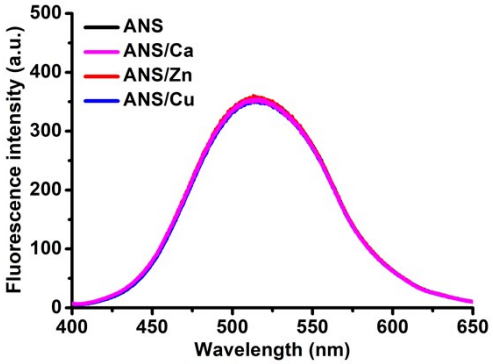

Fig. S8. Fluorescence spectra of ANS in Milli-Q water containing Ca(II) ,Zn(II) and Cu(II) ions. The concentrations of the metal ions were 200 μM and the concentration of ANS was 300 μM.

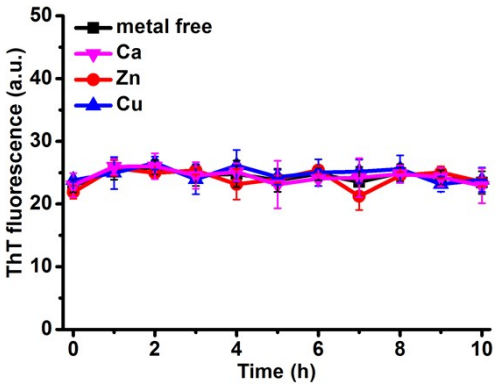

Fig. S9. The ThT fluorescence results of Ca(II) ,Zn(II) and Cu(II) ions incubated in phosphate buffer at pH 7.4 in the presence of POPC/POPG 4:1 LUVs for different time. The concentrations of metal ion and total lipids were 15 μM and 1.5 mM, respectively.

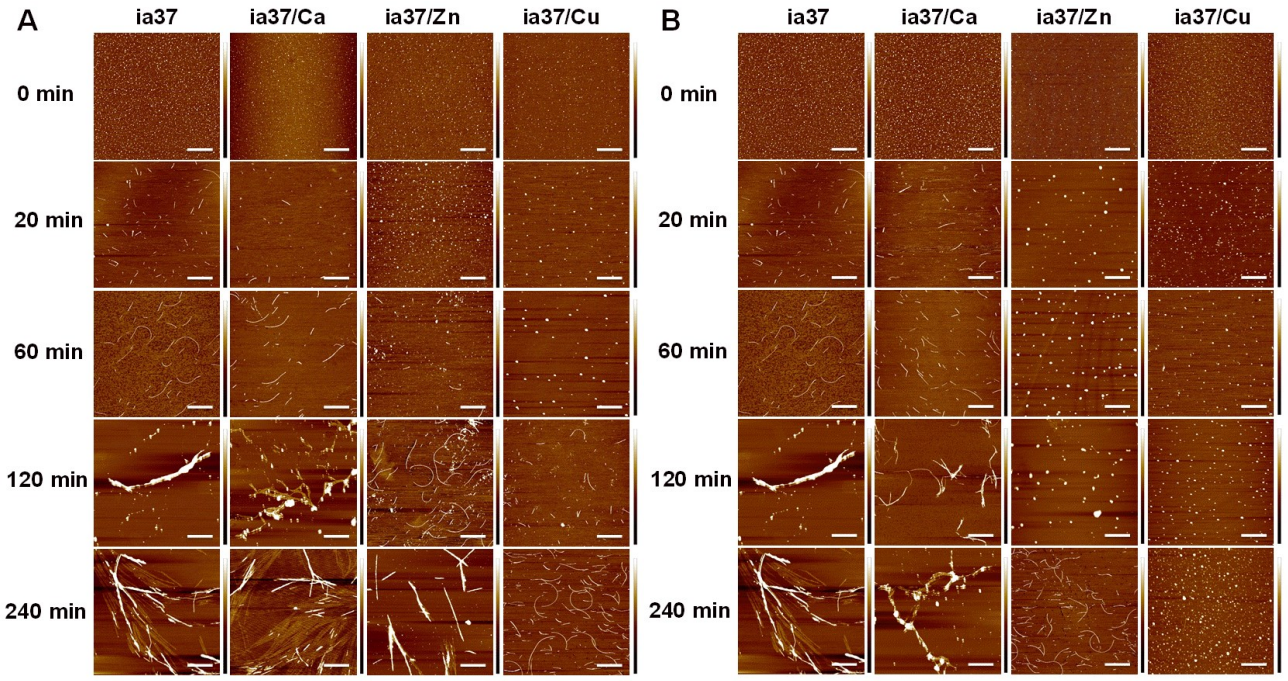

Fig. S10. AFM images of hIAPP alone (ia37), hIAPP mixed with Ca(II) (ia37/Ca), Zn(II) (ia37/Zn) and Cu(II) (ia37/Cu) at peptide-to-metal molar ratios of 1:0.33 (A) and 1:1 (B) recorded after incubation with POPC/POPG 4:1 LUVs in phosphate buffer at pH 7.4 for 0 min, 20 min, 60 min, 120 min and 240 min. The concentrations of peptide and total lipids were 15 μM and 1.5 mM, respectively. The scale bars are 1 μm.

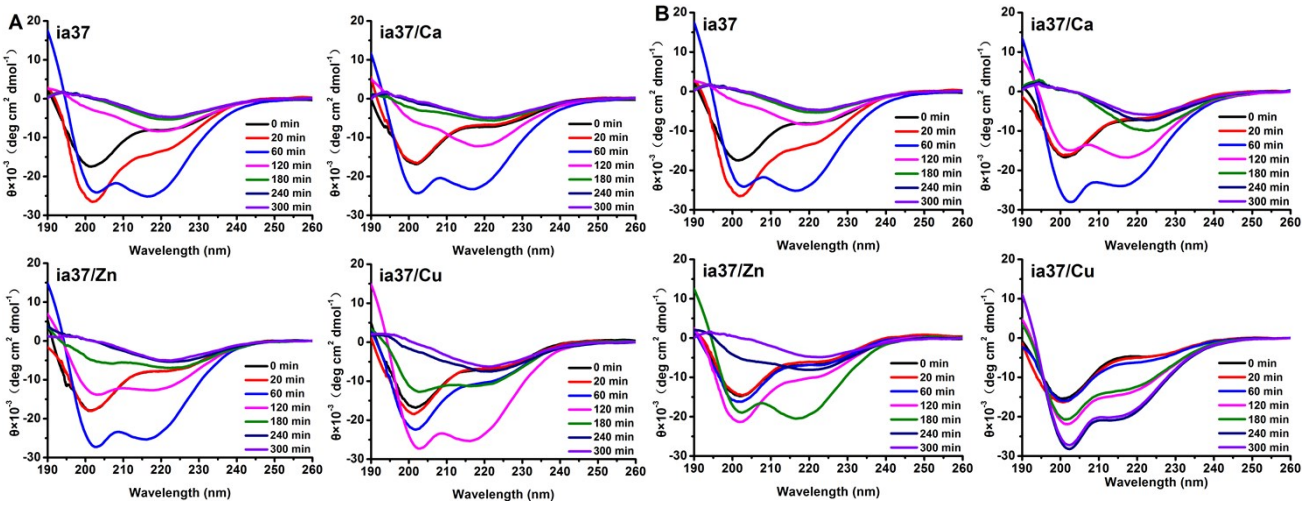

Fig. S11. CD spectra of hIAPP alone and hIAPP mixed with the metal ions at a peptide-to-metal ratios of 1:0.33 (A) and 1:1 (B) in POPC/POPG 4:1 LUV suspended phosphate buffer at pH 7.4 for different incubation time. The concentrations of peptide and total lipids were 15 μM and 1.5 mM, respectively.