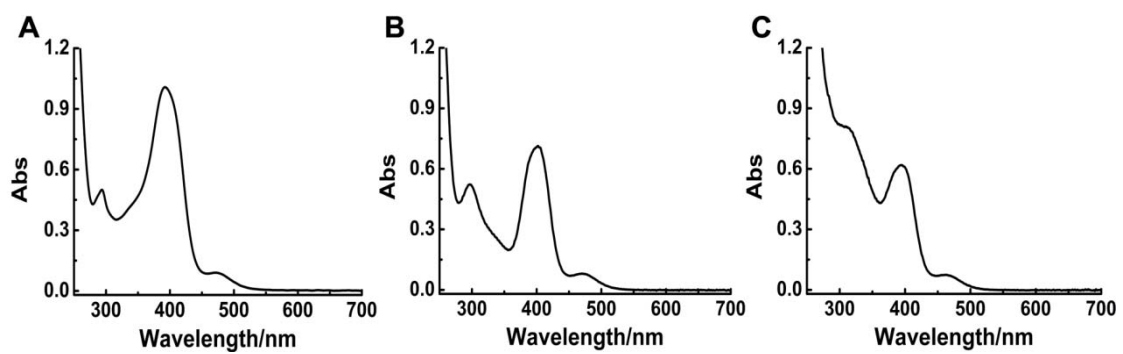


*Supplementary Information*

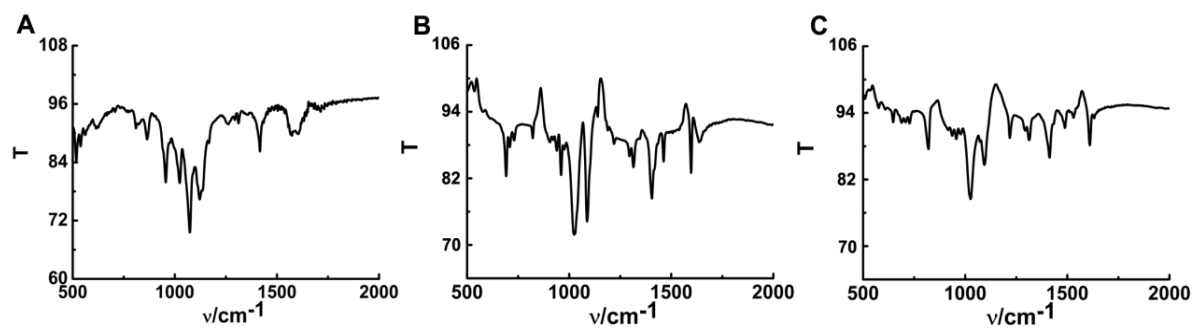
**Binuclear ruthenium complexes inhibit the fibril formation  
of human islet amyloid polypeptide**

Gehui Gong, Wenji Wang, Weihong Du<sup>\*</sup>

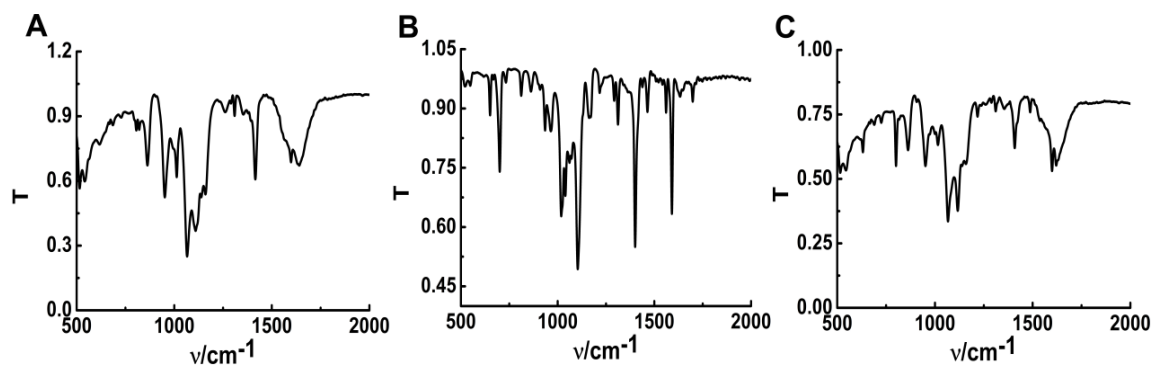
Department of Chemistry, Renmin University of China, Beijing, 100872



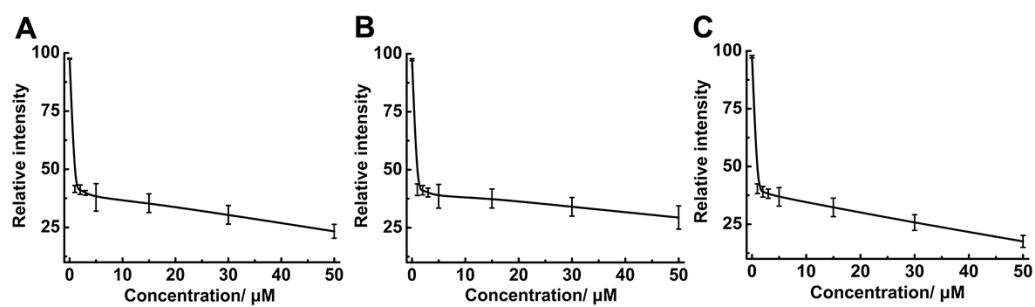
**Fig. S1** UV absorption spectra of Ru complex **1** (A), **2** (B), and **3** (C). The concentration of complex was 20  $\mu$ M.



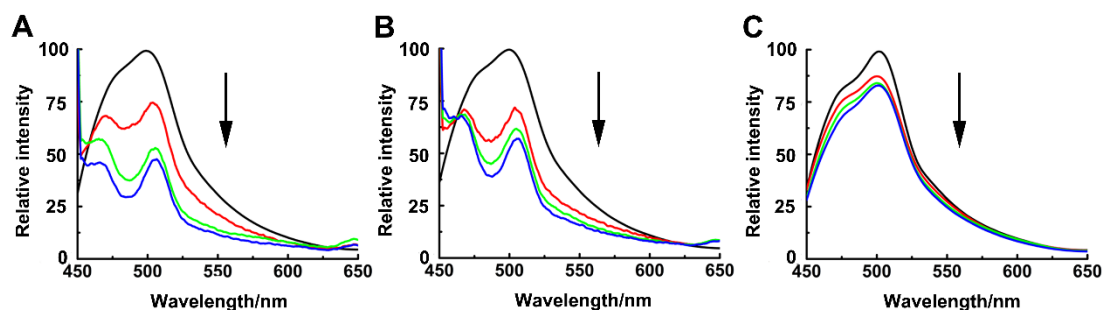
**Fig. S2** IR spectra of Ru complexes **1** (A), **2** (B) and **3** (C).



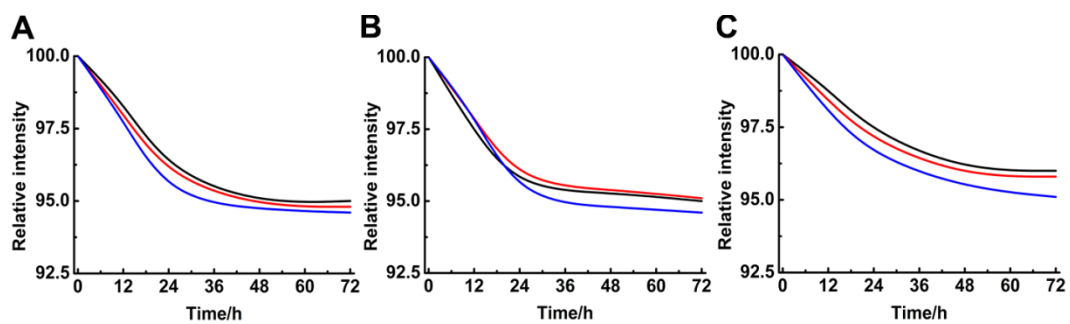
**Fig. S3** IR spectra of Ru complexes **4** (A), **5** (B) and **6** (C).



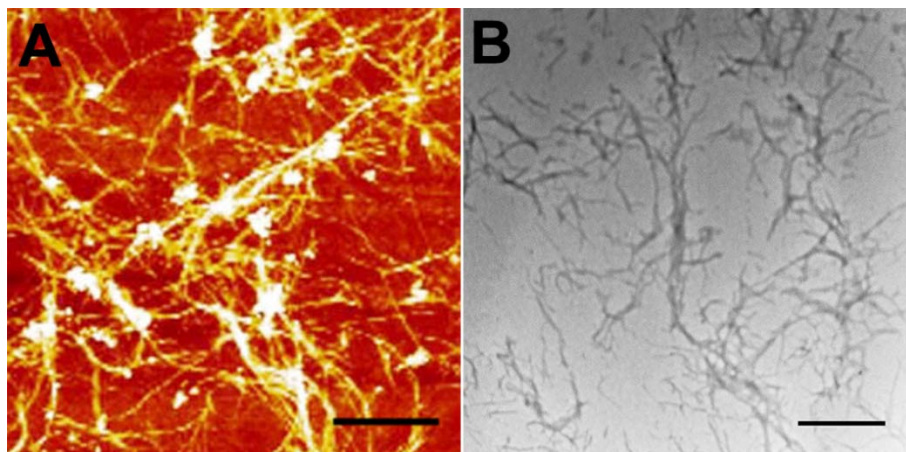
**Fig. S4** ThT fluorescence monitored at 490 nm for the inhibition of Ru complexes **1** (A), **2** (B) and **3** (C) on 5  $\mu\text{M}$  hIAPP aggregation. The error bar was obtained by three repeated experiments.



**Fig. S5** Fluorescence spectra of 20  $\mu\text{M}$  ThT in the absence (black) and presence of complexes **1** (A), **2** (B), and **3** (C). The concentrations of Ru complex were 0, 20, 60, and 100  $\mu\text{M}$  (from top to bottom) respectively.

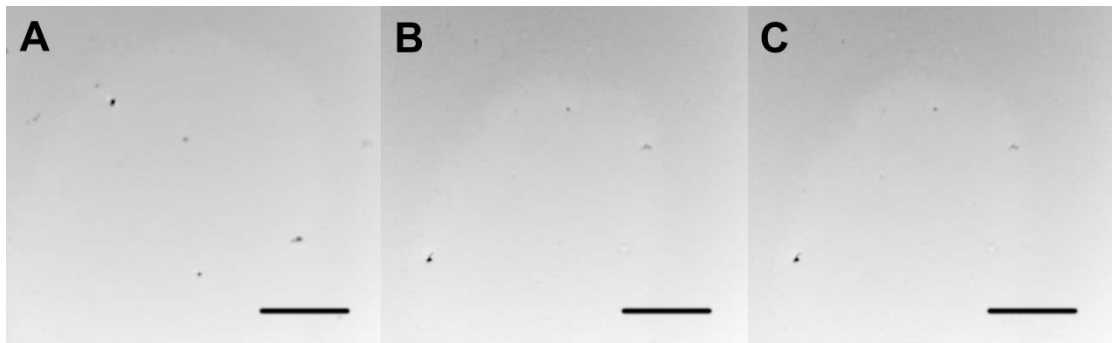


**Fig. S6** ThT fluorescence monitored at 490 nm to detect the influence of Ru complexes on the interaction between 5  $\mu$ M hIAPP and 20  $\mu$ M ThT for **1** (A), **2** (B), and **3** (C). The molar ratio of Ru complex to hIAPP was 1 (black), 5 (red), and 10 (blue) respectively.

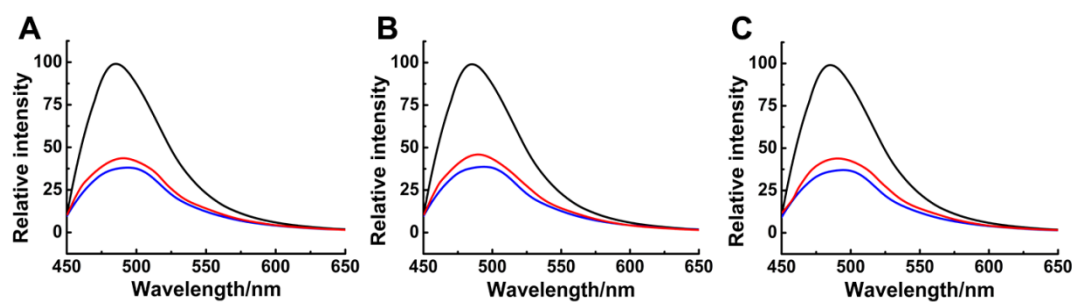


**Fig. S7** AFM (A) and TEM (B) images of 5  $\mu\text{M}$  hIAPP in the absence of Ru complexes. The scale bar is 3  $\mu\text{m}$  in AFM and 500 nm in TEM.

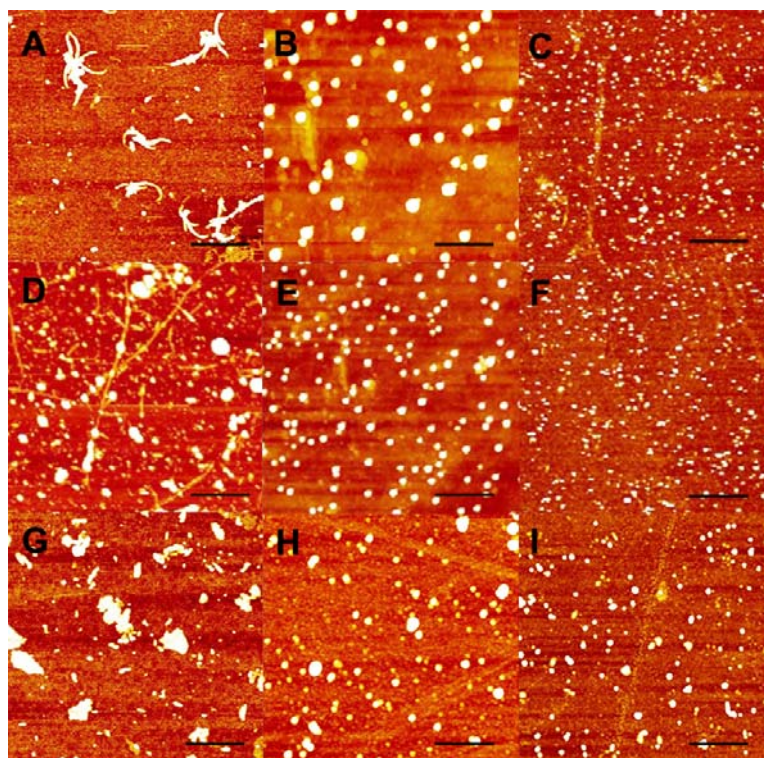




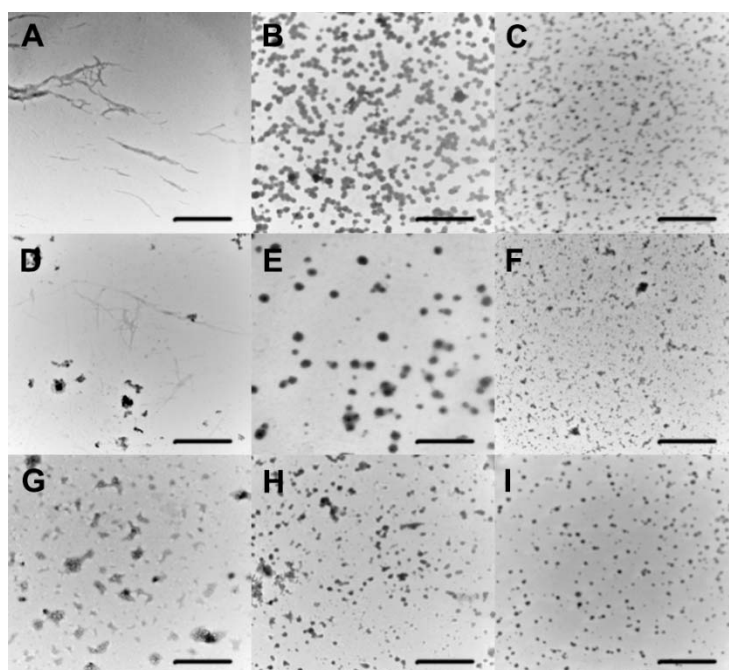
**Fig. S8** TEM images of 5  $\mu\text{M}$  hIAPP in the presence of decuple amounts of Ru complexes 1 (A), 2 (B), and 3 (C). The scale bar is 500 nm.



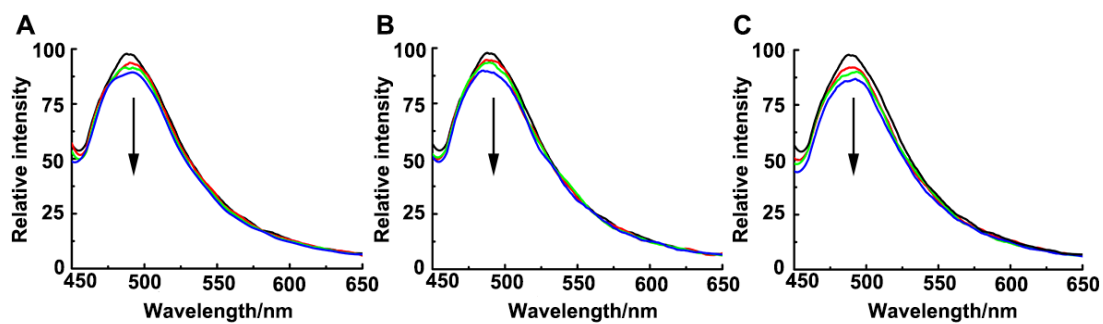
**Fig. S9** Evaluation of the ability of equivalent amounts of six Ru complexes to inhibit 5  $\mu$ M hiAPP aggregation as measured by ThT fluorescence. The binuclear complexes **1** (A), **2** (B) and **3** (C) were in blue. The mononuclear complexes **4** (A), **5** (B) and **6** (C) were in red.



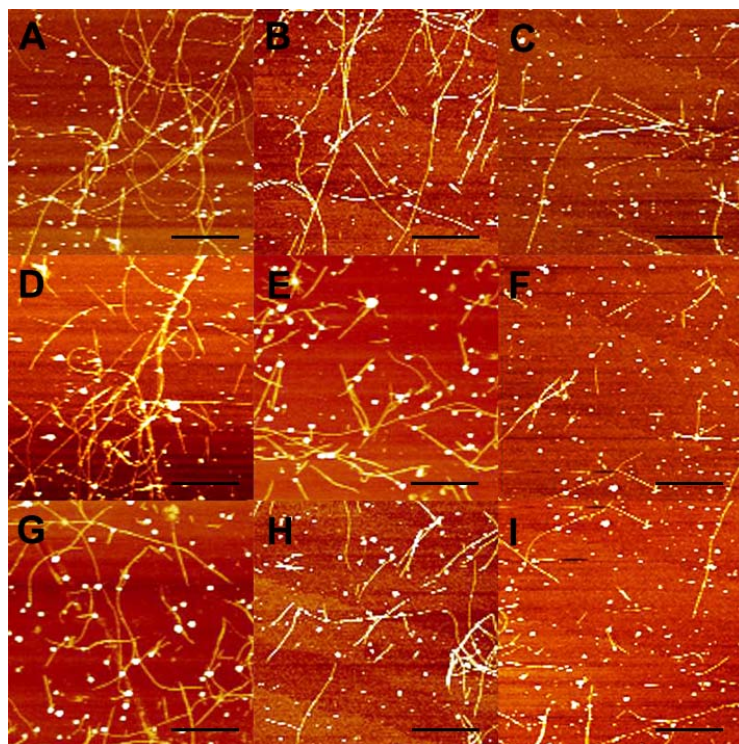
**Fig. S10** AFM images of 5  $\mu\text{M}$  hIAPP in the presence of different concentration of complexes **4** (A, B, C), **5** (D, E, F), and **6** (G, H, I). The molar ratio of Ru complex to hIAPP is 1 (A, D, G), 5 (B, E, H), and 10 (C, F, I) respectively. The scale bar is 3  $\mu\text{m}$ .



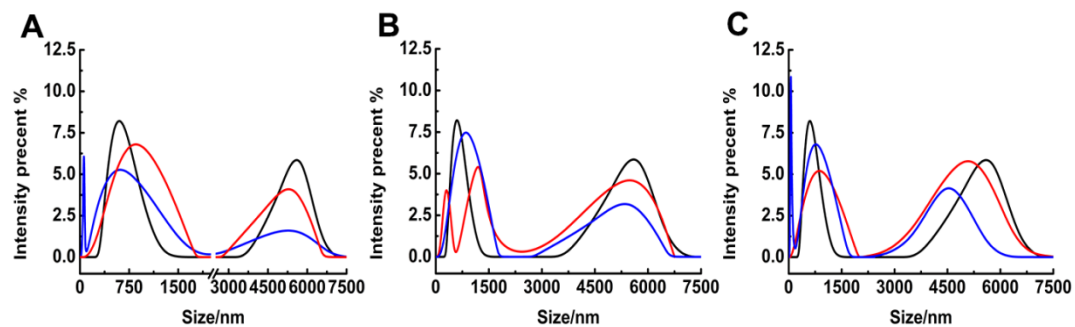
**Fig. S11** TEM images of 5  $\mu$ M hiAPP in the presence of different concentration of complexes **4** (A, B, C), **5** (D, E, F), and **6** (G, H, I). The molar ratio of Ru complex to hiAPP was 1 (A, D, G), 5 (B, E, H), and 10 (C, F, I) respectively. The scale bar is 500 nm.



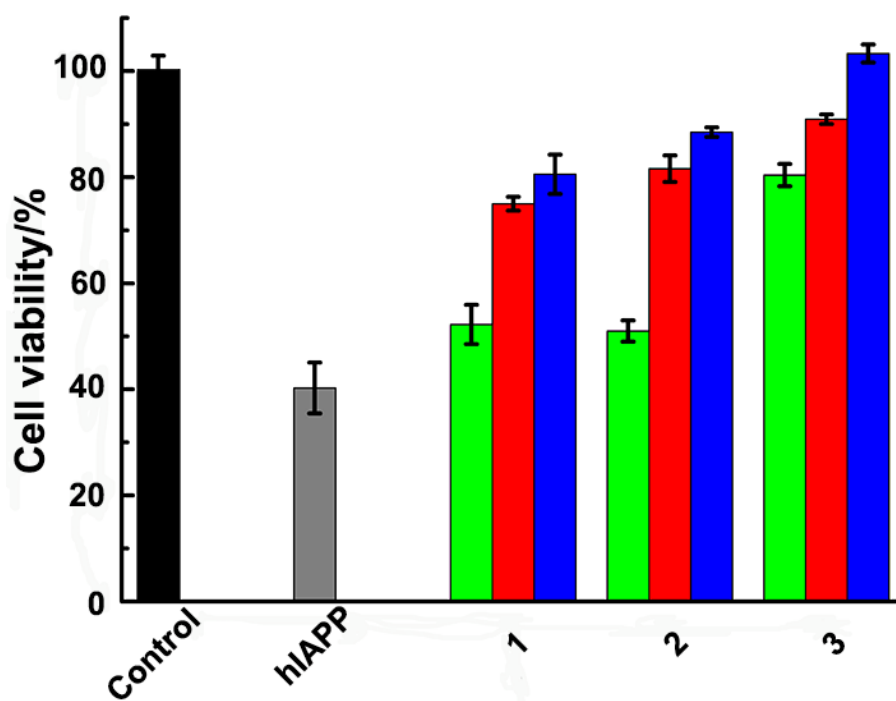
**Fig. S12** ThT fluorescence of 5  $\mu$ M hIAPP in the absence (black) and presence of pyrazine (A), pyrimidine (B), and 4,4'-dipyridyl (C). The molar ratio of ligand to hIAPP was 1 (red), 5 (green), and 10 (blue) respectively.



**Fig. S13** AFM images of 5  $\mu\text{M}$  hIAPP in the presence of different concentration of pyrazine (A, B, C), pyrimidine (D, E, F), and 4,4'- dipyridyl (G, H, I). The molar ratio of ligand to hIAPP was 1 (A, D, G), 5 (B, E, H), and 10 (C, F, I) respectively. The scale bar is 3  $\mu\text{m}$ .

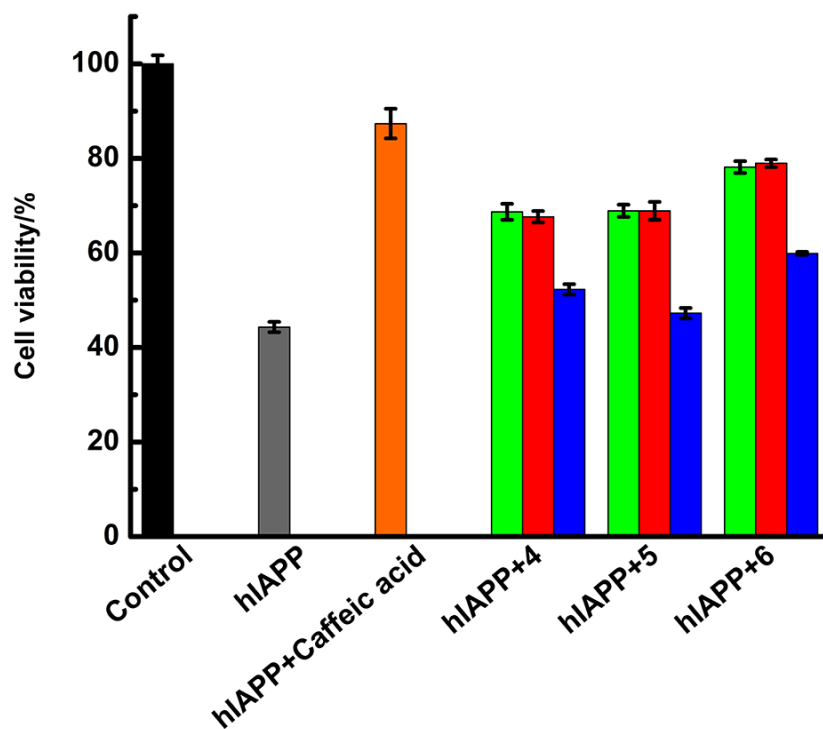


**Fig. S14** DLS analysis of the multimodal size distribution of 5  $\mu\text{M}$  hiAPP aggregates in the absence (black) and presence of 5 (red) and 10 equivalents (blue) of pyrazine (A), pyrimidine (B), and 4,4'-dipyridyl (C).

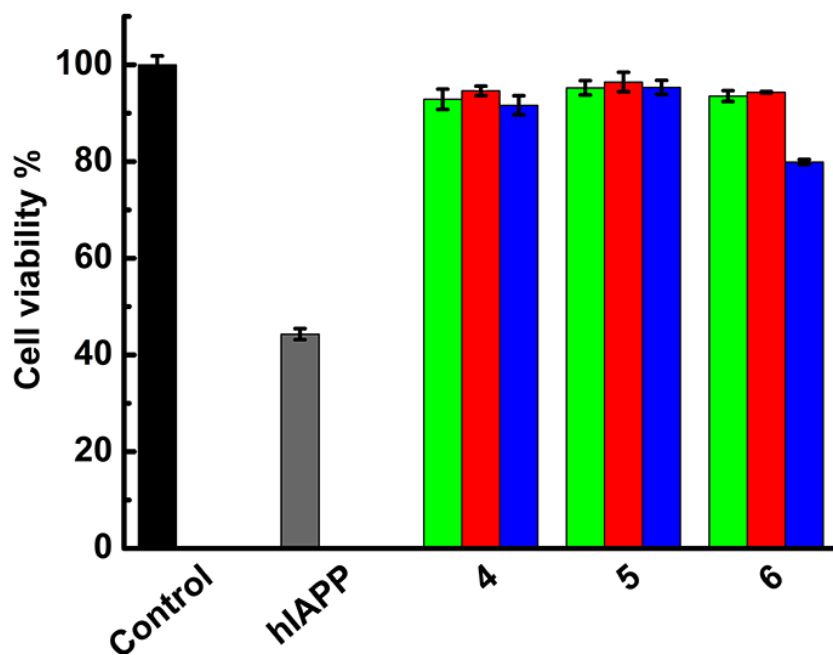


**Fig. S15** Cell viability monitored by the MTT assay. INS-1 cells were treated with different concentration of Ru complexes **1**, **2** and **3** at 1.5  $\mu\text{M}$  (green), 15  $\mu\text{M}$  (red) and 75  $\mu\text{M}$  (blue) respectively. The cytotoxicity of treating with hIAPP (grey) was used for comparison.





**Fig. S16** Cell viability after incubating 15  $\mu\text{M}$  hIAPP without (grey) or with mononuclear Ru complexes **4**, **5** and **6** at 1.5  $\mu\text{M}$  (green), 15  $\mu\text{M}$  (red), and 75  $\mu\text{M}$  (blue) respectively. The negative control sample of hIAPP incubated with 15  $\mu\text{M}$  caffeic acid was in orange.



**Fig. S17** Cell viability monitored by the MTT assay. INS-1 cells were treated with different concentration of Ru complexes **4**, **5** and **6** at 1.5  $\mu\text{M}$  (green), 15  $\mu\text{M}$  (red) and 75  $\mu\text{M}$  (blue) respectively. The cytotoxicity of treating with hIAPP (grey) was used for comparison.