Fig. S1 FomA protein model with the color marked Ac-KGHNGEEGTPTVHNE-NH$_2$ peptide building loop number 4.
Fig. S2 NDMA decay UV-Vis spectra for $1\text{Cu}$ in the presence of $\text{H}_2\text{O}_2$ (50 µM) after 2 hours of measurements (Cu:L = 1:1 molar ratio, $[\text{Cu(II)}] = 50$ µM).

Fig. S3 Fluorescence spectra of TAOH formation for $2\text{Cu}$ in the presence of $\text{H}_2\text{O}_2$ (50 µM) measured with 1 minute intervals for 1 hour (Cu:L = 1:1 molar ratio, $[\text{Cu(II)}] = 50$ µM).
Fig. S4 EPR spectra (common intensity scale) of DMPO spin adducts formed during reaction of 50 μM of 1Cu (A) and 2Cu (B) with H₂O₂. EPR spectra for controls were recorded in the absence of the copper compounds.
**Fig. S5** Reduction of fluorescence intensity of CT26 cells incubated with 1Cu at increasing incubation time observed using cyto-ID hypoxia/oxidative stress detection kit. Concentration of 1Cu from 0.001 mM to 1 mM.

**Fig. S6** Reduction of fluorescence intensity of CT26 cells incubated with 2Cu at increasing incubation time observed using cyto-ID hypoxia/oxidative stress detection kit. Concentration of 2Cu from 0.001 mM to 1 mM.
Fig. S7 MDA concentration in CT26 cells treated with 1Cu of 0.001, 0.005, 0.01, 0.05, 0.1 and 1 mM after 5min, 1, 6, 12 and 24h incubation with the complex.

Fig. S8 MDA concentration in CT26 cells treated with 2Cu of 0.001, 0.005, 0.01, 0.05, 0.1 and 1 mM after 5min, 1, 6, 12 and 24h incubation with the complex.