Supplementary Information

Calreticulin-targeting Trisaccharide Glc-Man-Man Ligand Conjugated with Zinc Chlorophyll Derivative as a Photosensitizer

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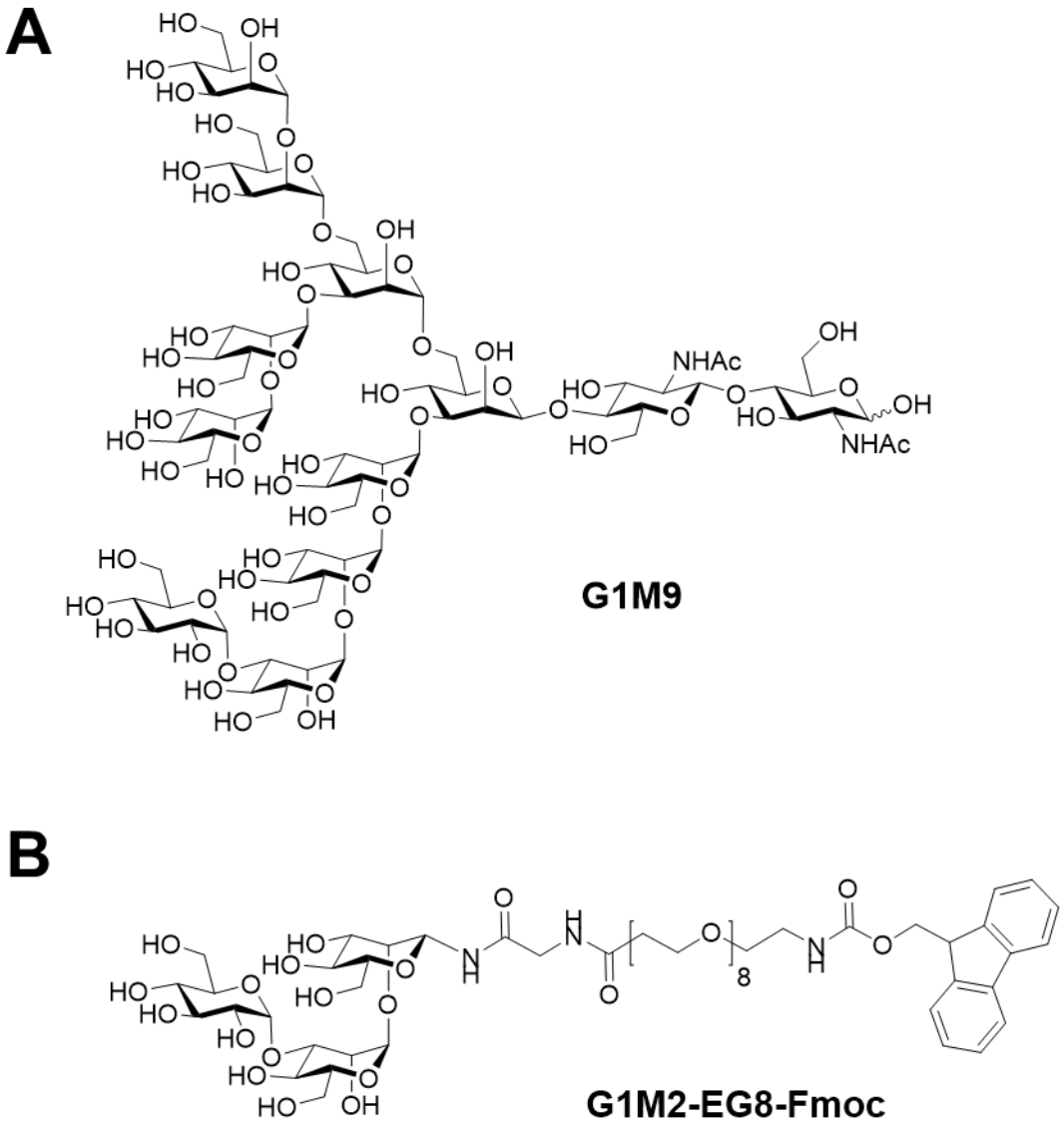
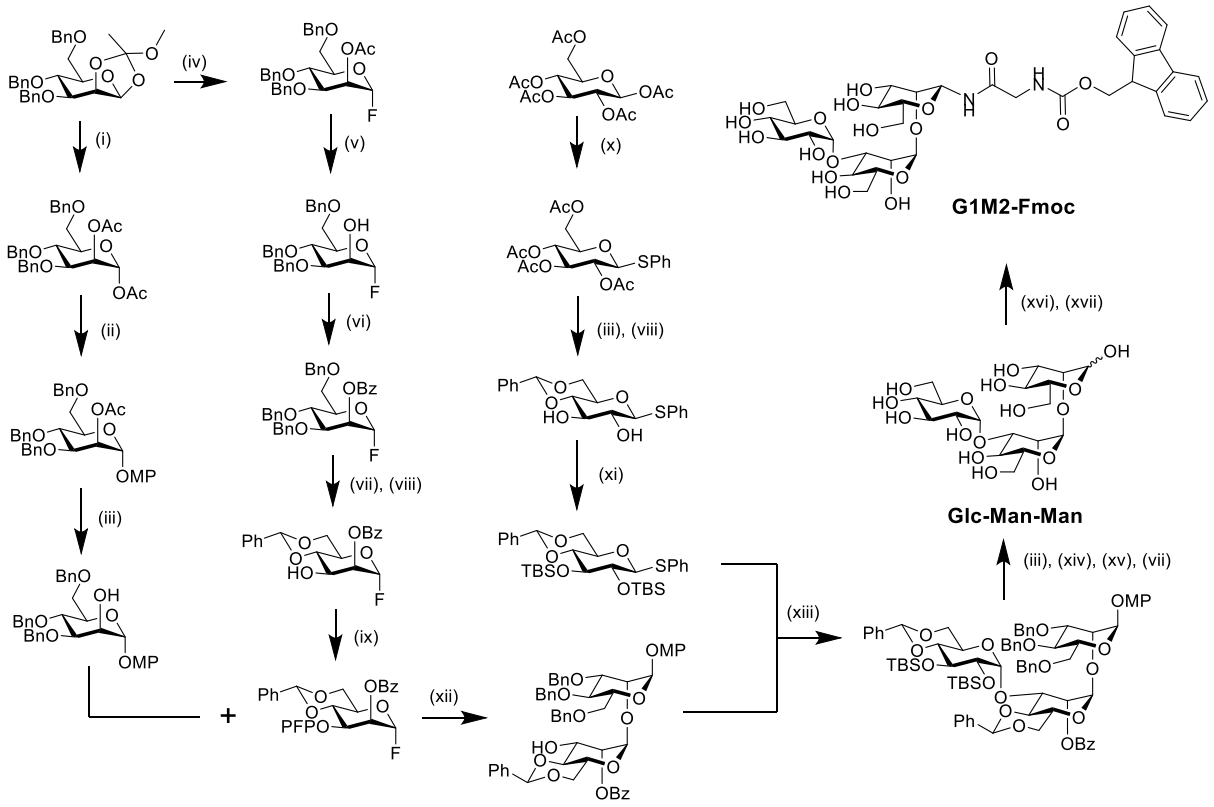


Fig. S1. Chemical structures of (A) **G1M9** and (B) **G1M2-EG8-Fmoc**.



Scheme S1. Synthetic routes of **G1M2-Fmoc**: (i) Ac_2O, 4-(*N*,*N*-dimethylamino)pyridine, AcOH; (ii) 4-methoxyphenol (HOMP), BF_3-Et_2O, dichloromethane (DCM); (iii) NaOMe, MeOH/THF; (iv) (diethylamino)sulfur trifluoride, DCM; (v) propylamine, MeOH/tetrahydrofuran (THF); (vi) BzCl, pyridine; (vii) $Pd(OH)_2$/C, EtOAc or DMF, H_2; (viii) $PhCH(OMe)_2$, (+)-10-camphorsulfonic acid, MeCN; (ix) pentafluoropropionic anhydride (PFP_2O), pyridine; (x) PhSH, BF_3-Et_2O, DCM; (xi) *tert*-butyldimethylsilyl trifluoromethanesulfonate (TBSOTf), 2,6-lutidine; (xii) AgOTf, bis(cyclopentadienyl)hafnium dichloride, DCM → Et_3N; (xiii) MeOTf, DCM; (xiv) tetrabutylammonium fluoride, THF; (xv) ceric ammonium nitrate, MeCN/H_2O; (xvi) NH_4HCO_3/H_2O; (xvii) Fmoc-Gly-Cl, $NaHCO_3$, dioxane/H_2O.

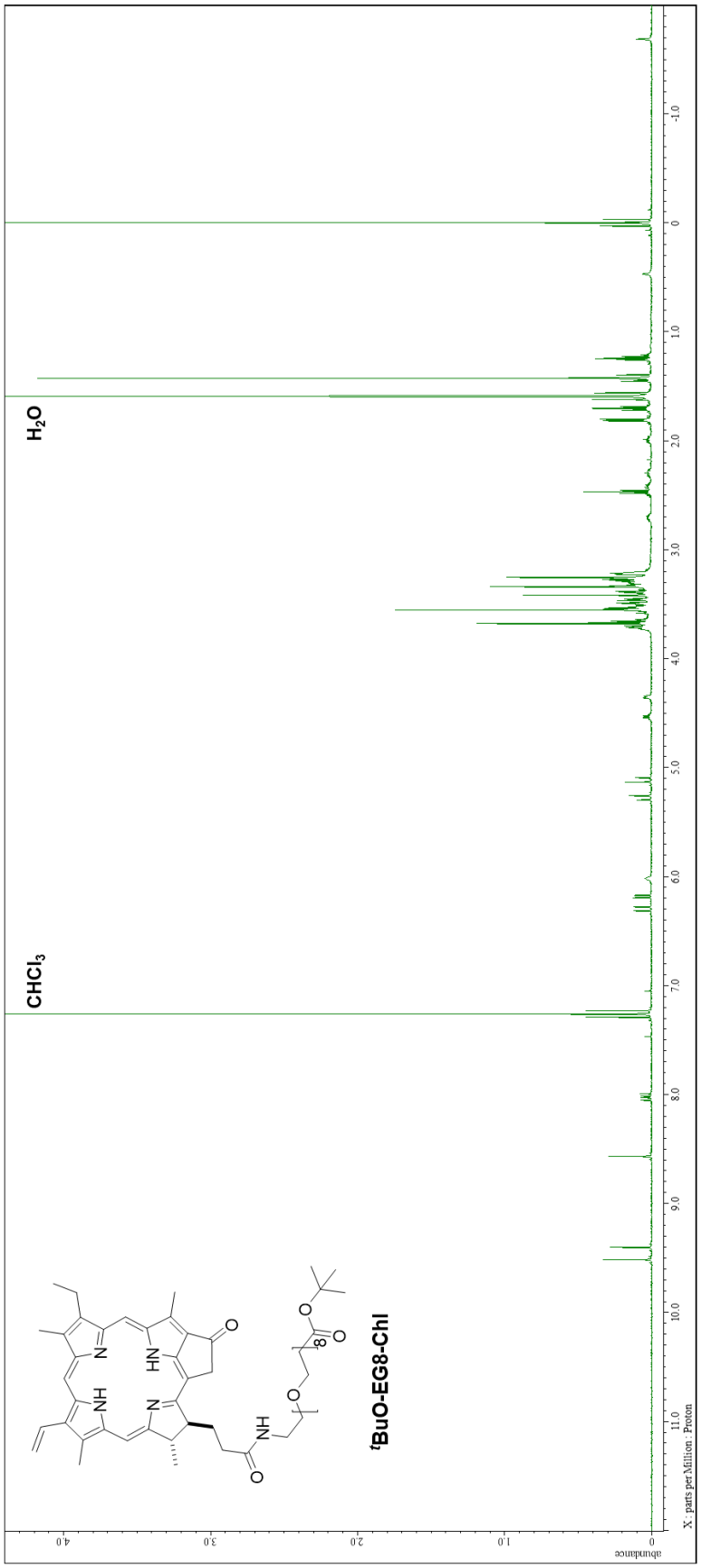


Fig. S2. ^{1}H NMR spectrum of **^{t}BuO-EG8-Chl** in $CDCl_3$.

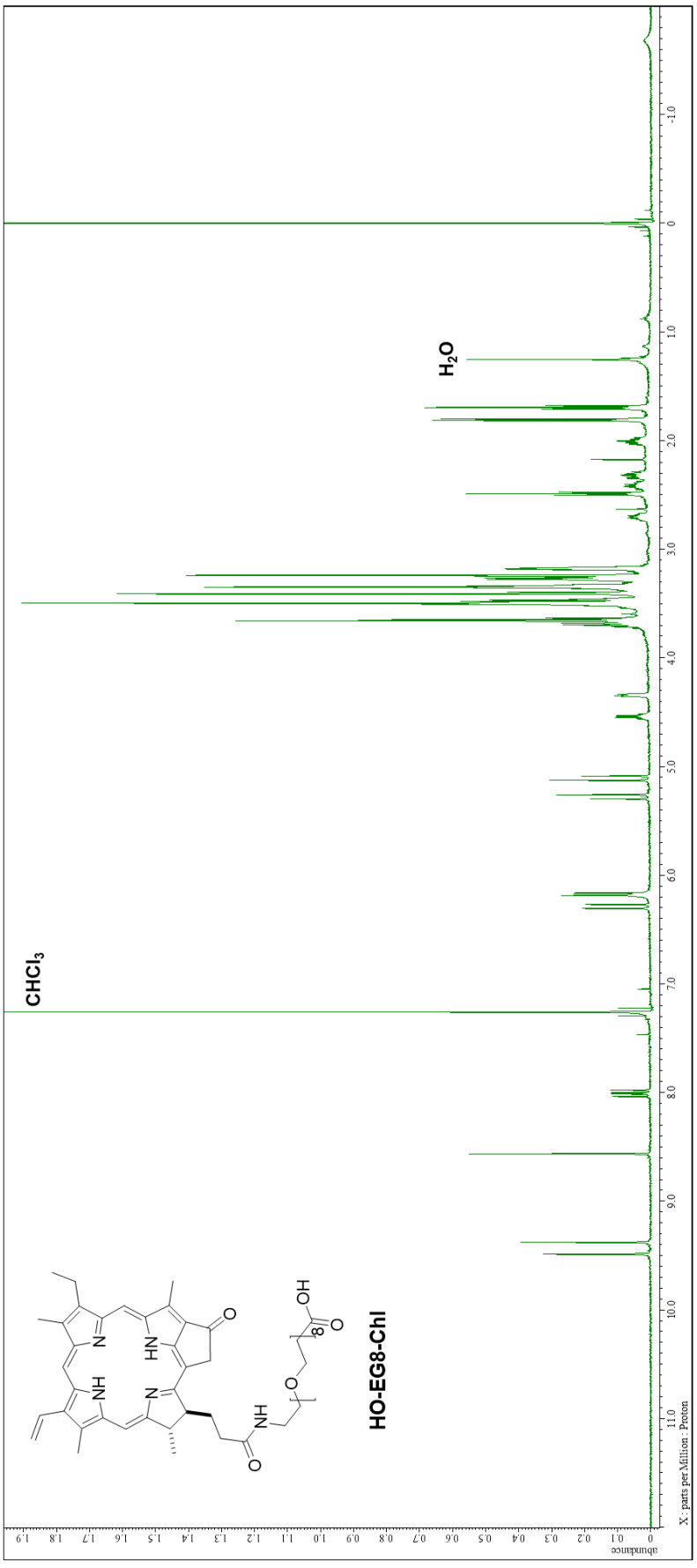


Fig. S3. ^{1}H NMR spectrum of **HO-EG8-Chl** in $CDCl_3$.

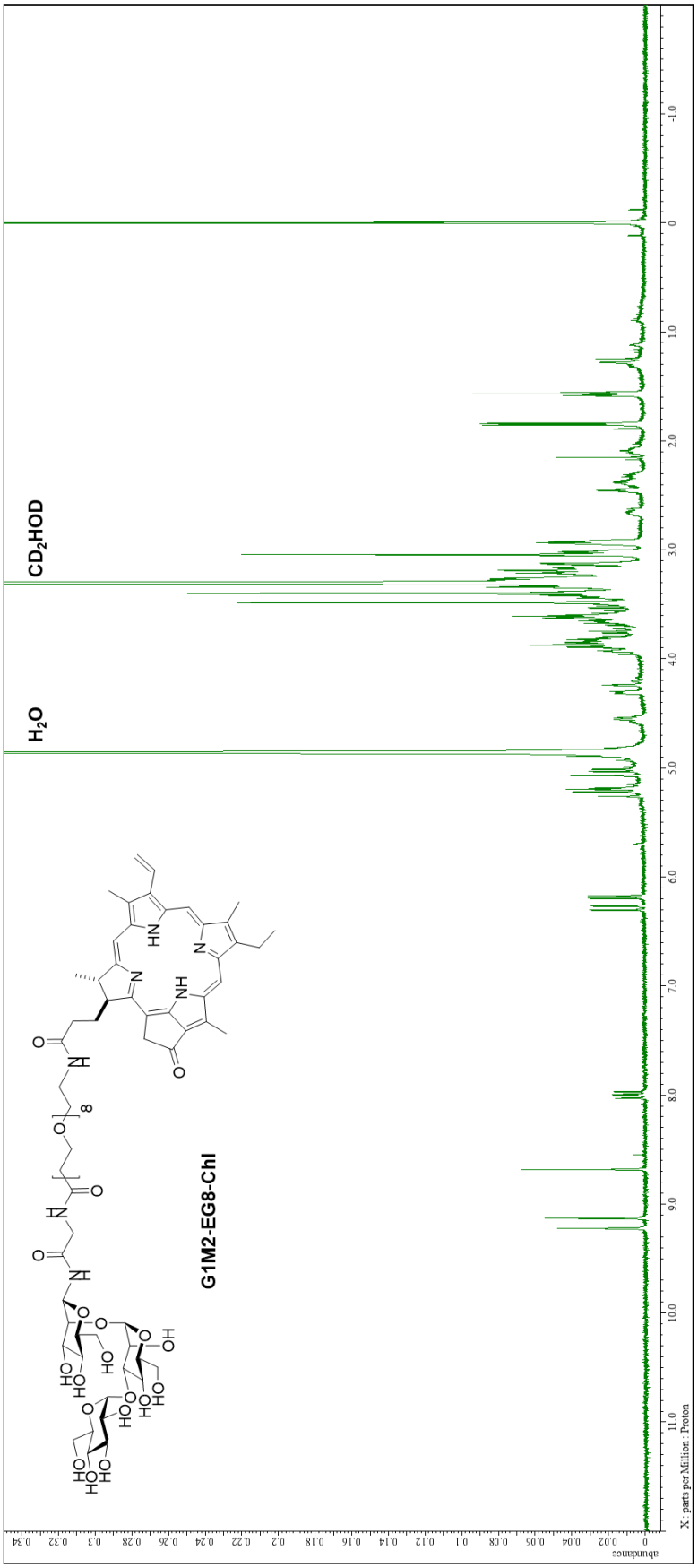


Fig. S4. ^{1}H NMR spectrum of **G1M2-EG8-Chl** in methanol-d_4.

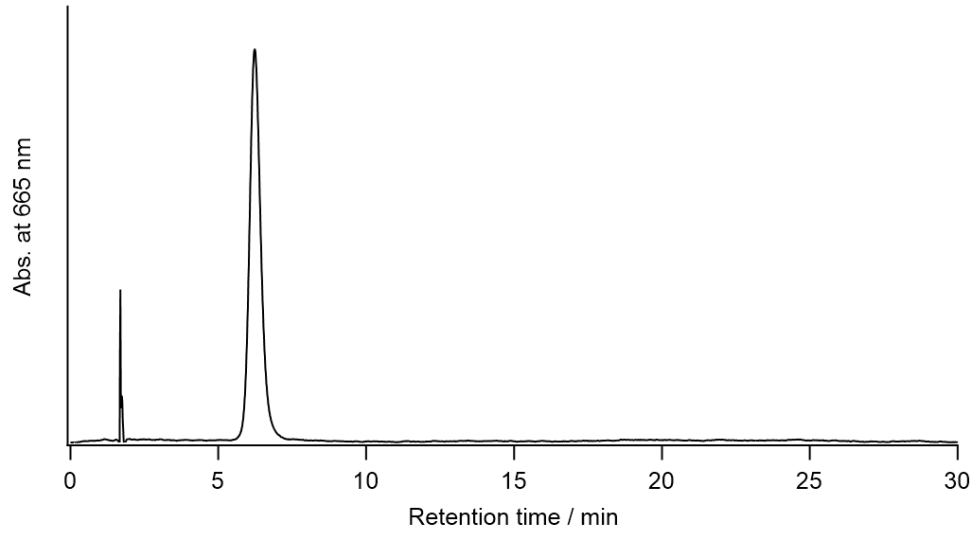


Fig. S5. HPLC elution profile of **G1M2-EG8-ZnChl**: Cosmosil 5C_{18}-AR-II, 6.0 ϕ × 250 mm (Nacalai Tesque); EtOH/H_2O = 85/15; 1.0 mL/min; 30 °C.

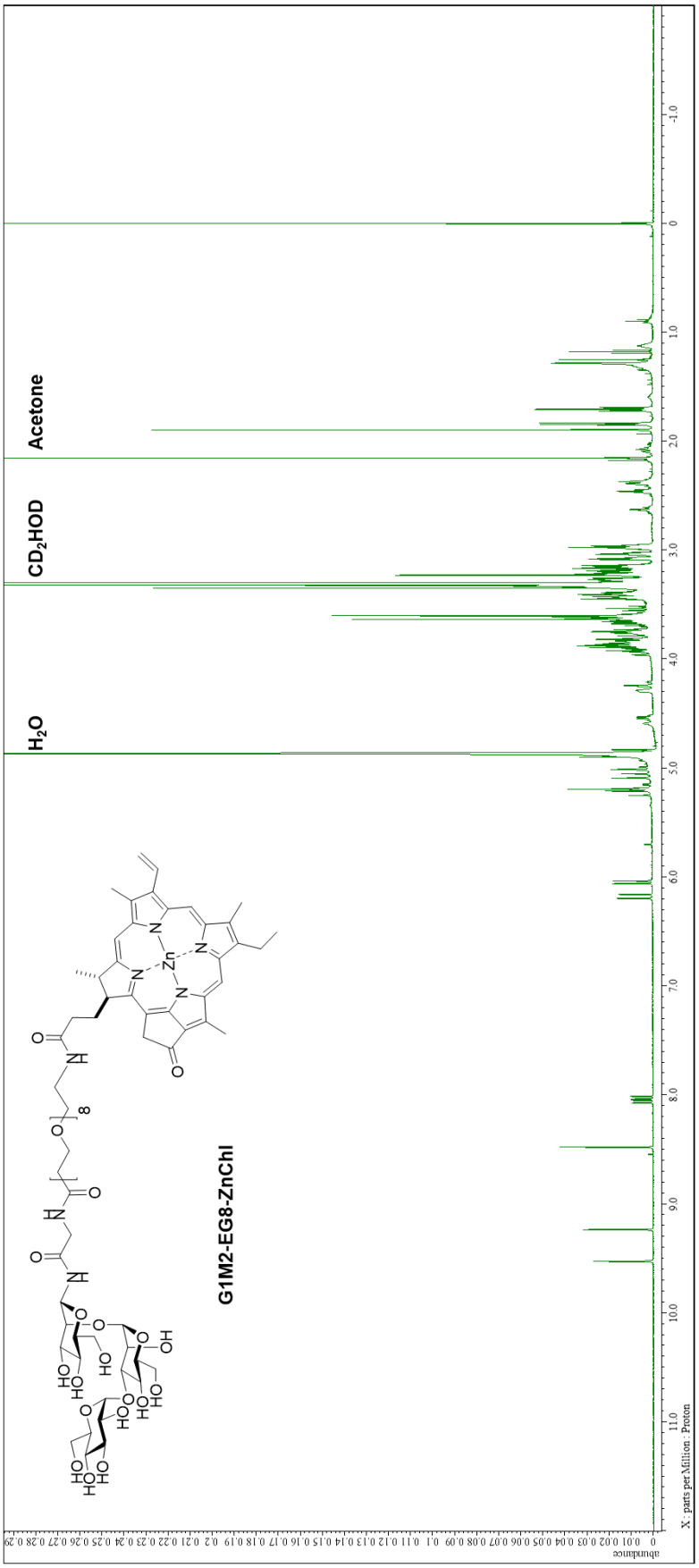


Fig. S6. ^{1}H NMR spectrum of **G1M2-EG8-ZnChl** in methanol-d_4.

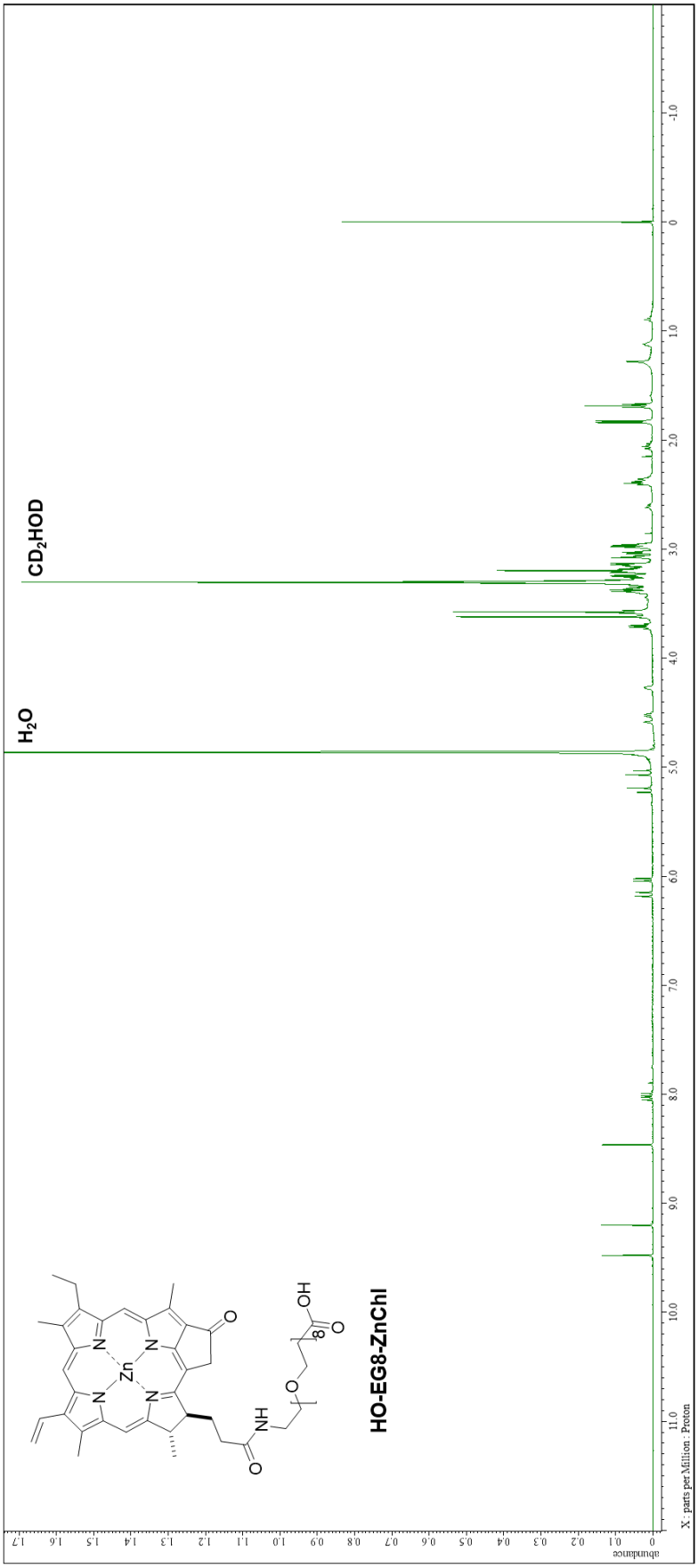
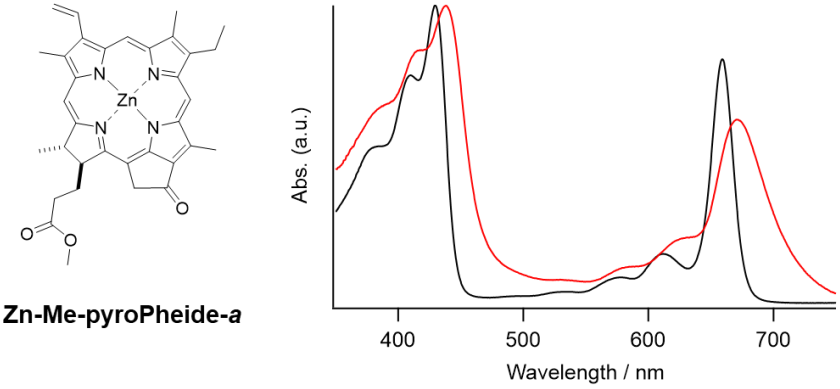


Fig. S7. ^{1}H NMR spectrum of **HO-EG8-ZnChl** in methanol-d_4.



Zn-Me-pyroPheide-*a*

	λ_{max} (Ethanol) / nm		λ_{max} (MOPS buffer)[a] / nm	
	Soret	**Qy**	**Soret**	**Qy**
Zn-Me-pyroPheide-*a*	**430**	**659**	**438[b]**	**672[b]**
G1M2-EG8-ZnChl	**430**	**659**	**434**	**666**

[a] 10 mM MOPS buffer (pH 7.4) containing 5 mM $CaCl_2$, 150 mM NaCl and 4% (*v*/*v*) DMSO.

[b] Aggregation.

Fig. S8. UV–vis absorption spectra of **Zn-Me-pyroPheide-*a*** in ethanol (black line) and an aqueous 10 mM MOPS buffer (pH 7.4) containing 5 mM $CaCl_2$, 150 mM NaCl and 4% (*v*/*v*) DMSO (red line). The aggregation is suggested by the broadening and bathochromic shift (toward longer wavelengths) of Qy band.

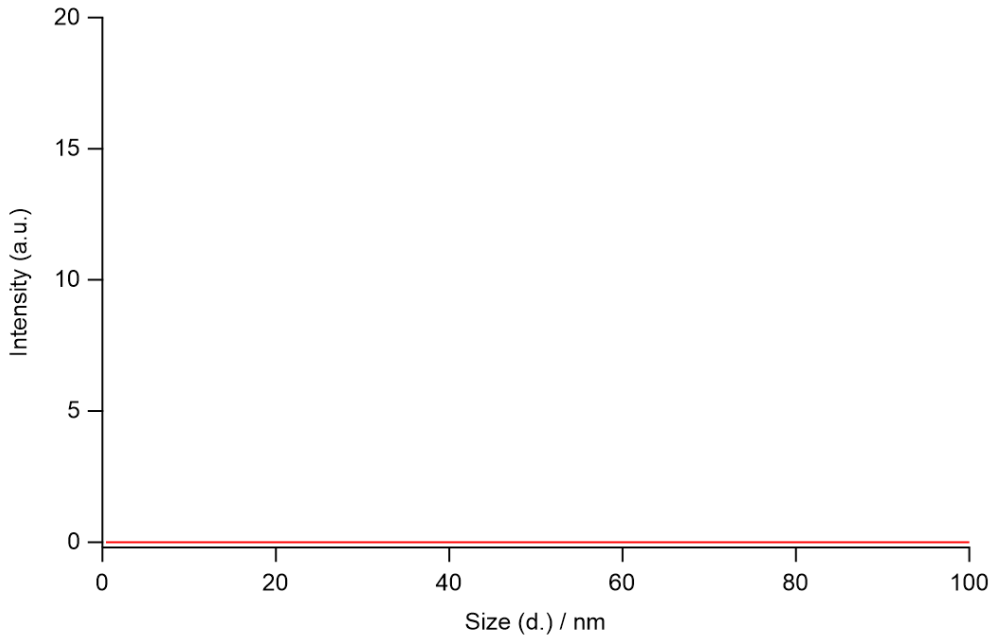


Fig. S9. Size distribution of 10 μM **G1M2-EG8-ZnChl** in 10 mM MOPS buffer (pH 7.4) containing 5 mM $CaCl_2$ and 150 mM NaCl by DLS analysis at 25 °C.

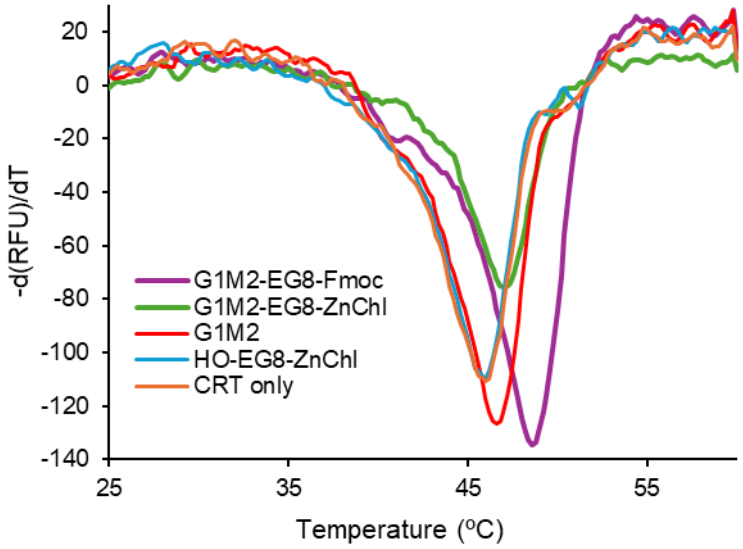


Fig. S10. Thermal shift assay of human calreticulin (hCRT) with ligands (**G1M2-EG8-Fmoc**, **G1M2-EG8-Fmoc**, **G1M2**, or **HO-EG8-ZnChl**). Melt peaks of hCRT in the absence or presence of ligands.

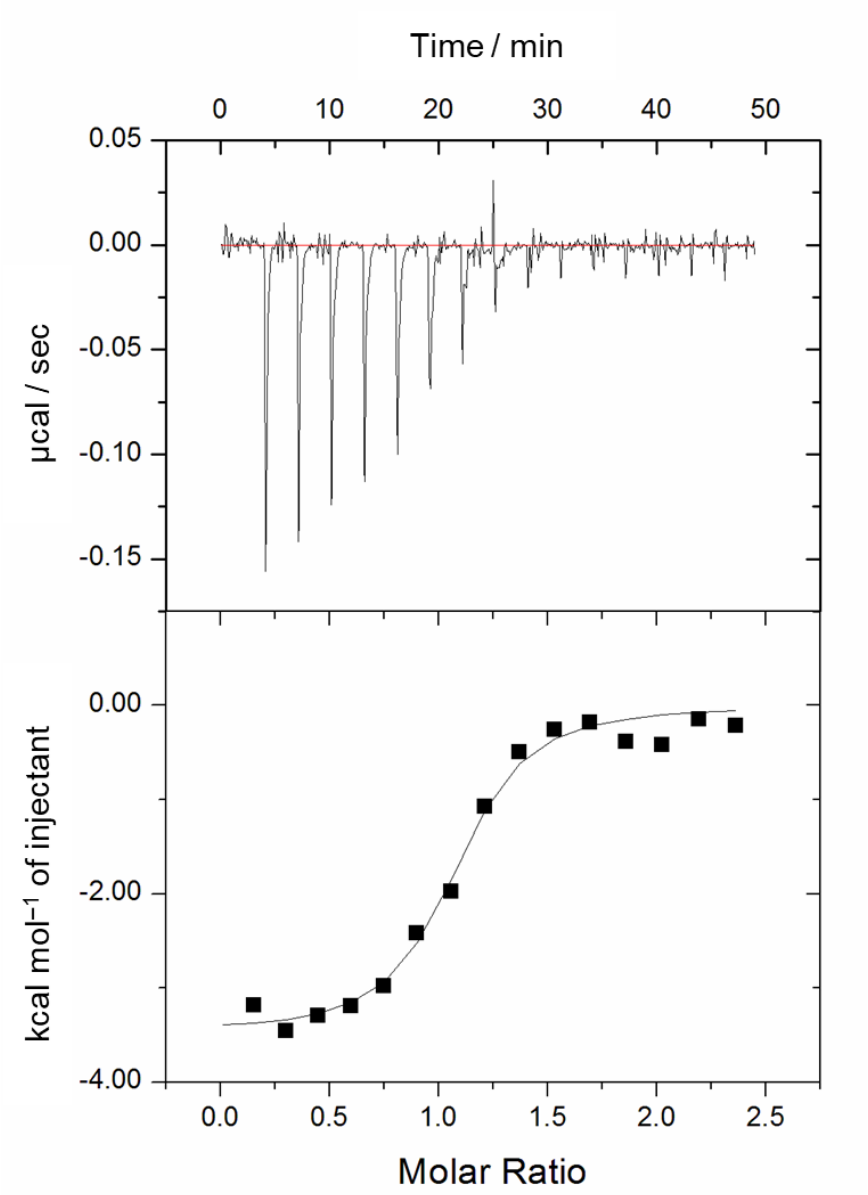


Fig. S11. Thermogram and titration plots of hCRT in the presence of **G1M2-EG8-ZnChl** with hCRT. The binding parameters (n, K_b, ΔH and ΔS) were obtained by fitting the curves using Origin software.