Electronic Supplementary Information for:

Selective recognition of anionic cell membranes using targeted liposomes coated with zinc(II)-bis(dipicolylamine) affinity units

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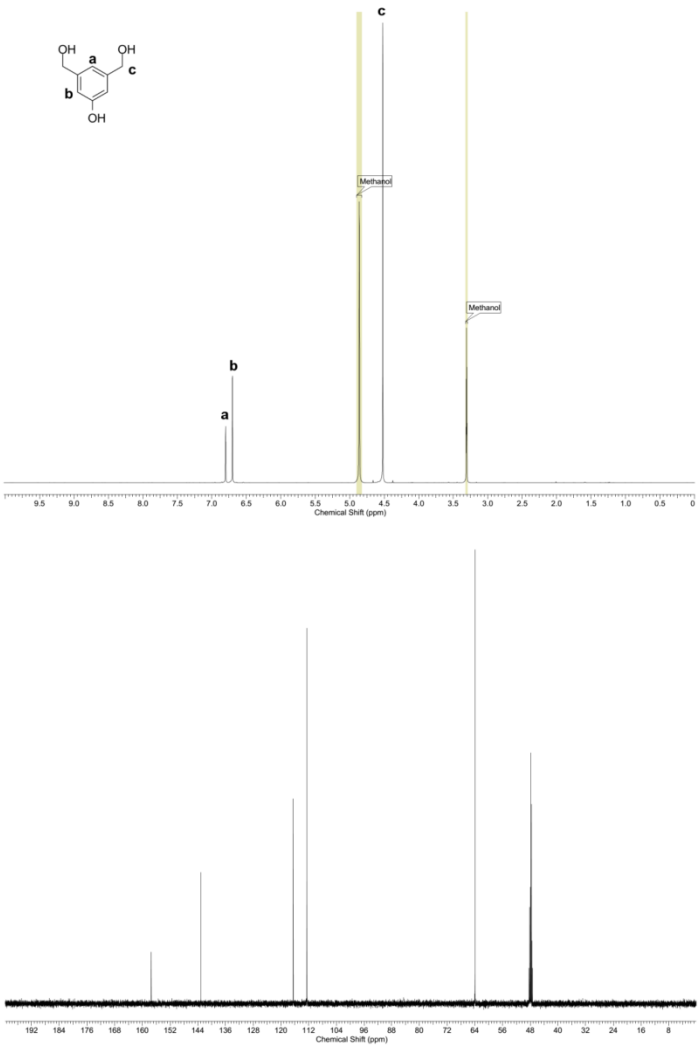
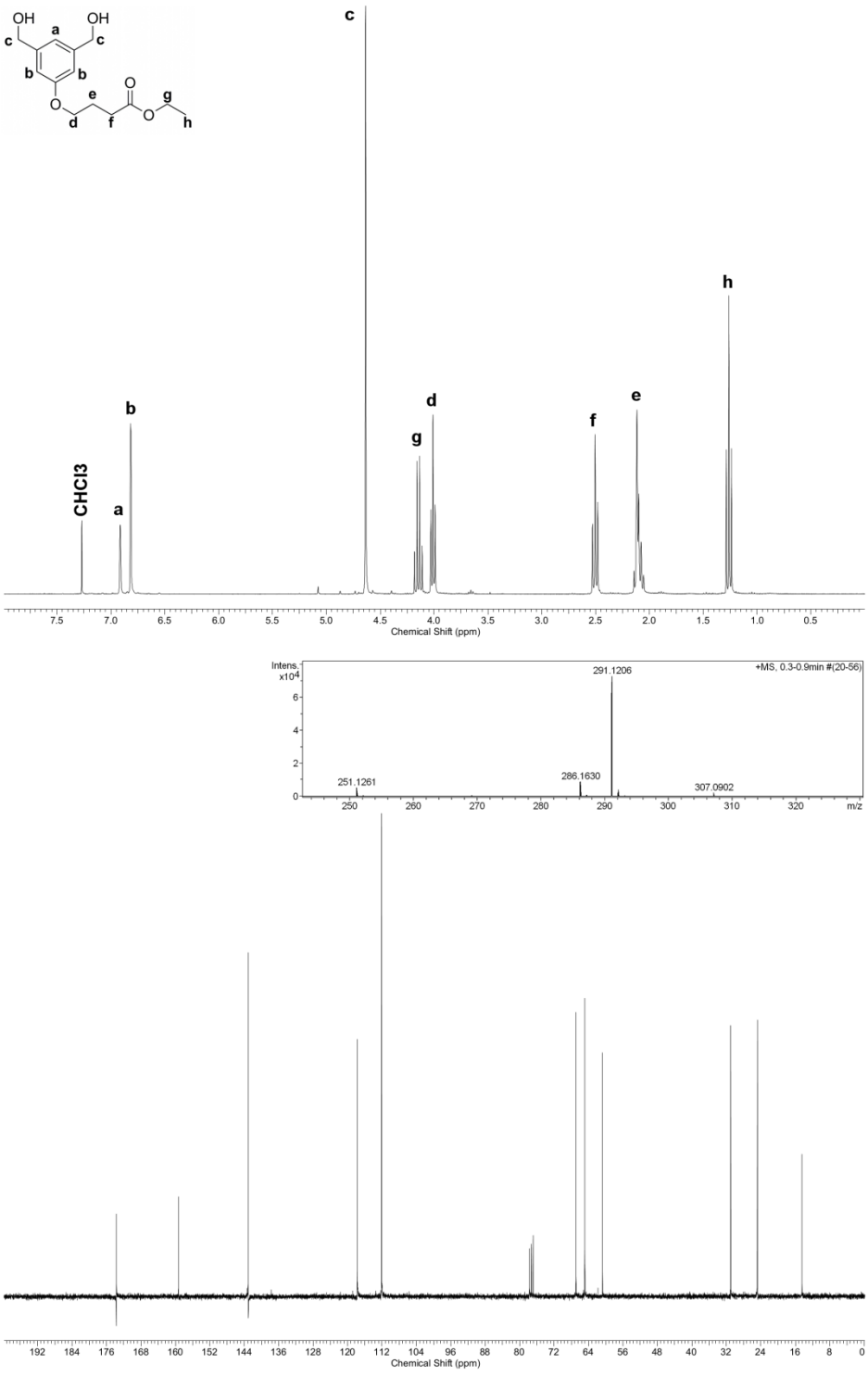
1. Spectroscopic Data for Prepared Compounds

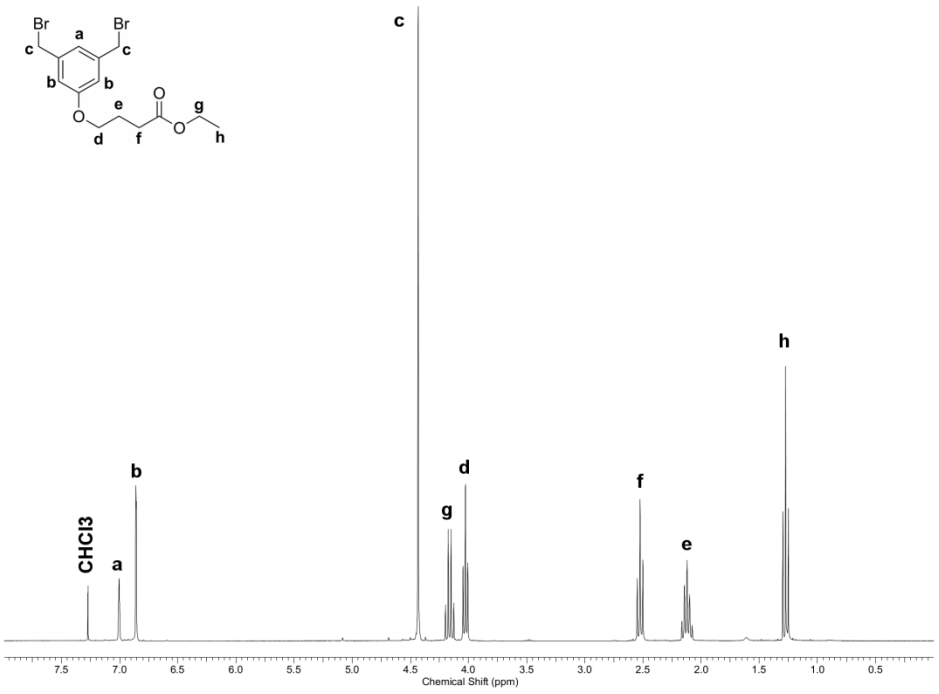
1.1. (5-hydroxy-1,3-phenylene)dimethanol (2)

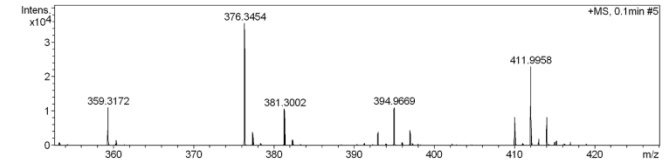


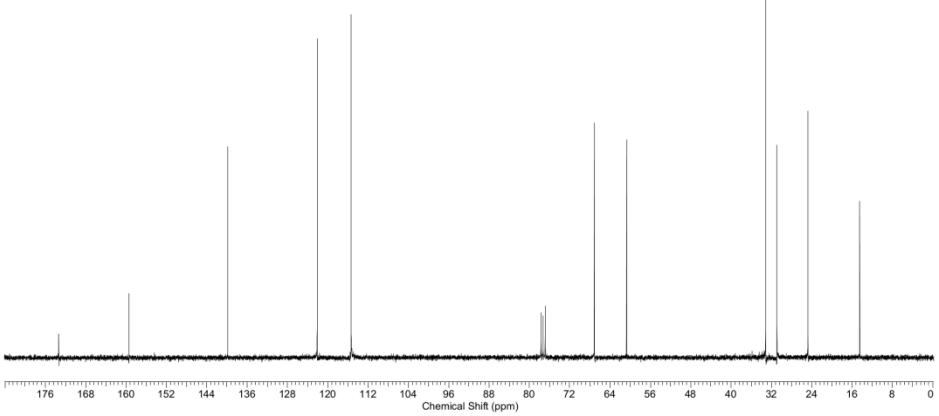
1.2. Ethyl 4-(3,5-bis(hydroxymethyl)phenoxy)butanoate (3)



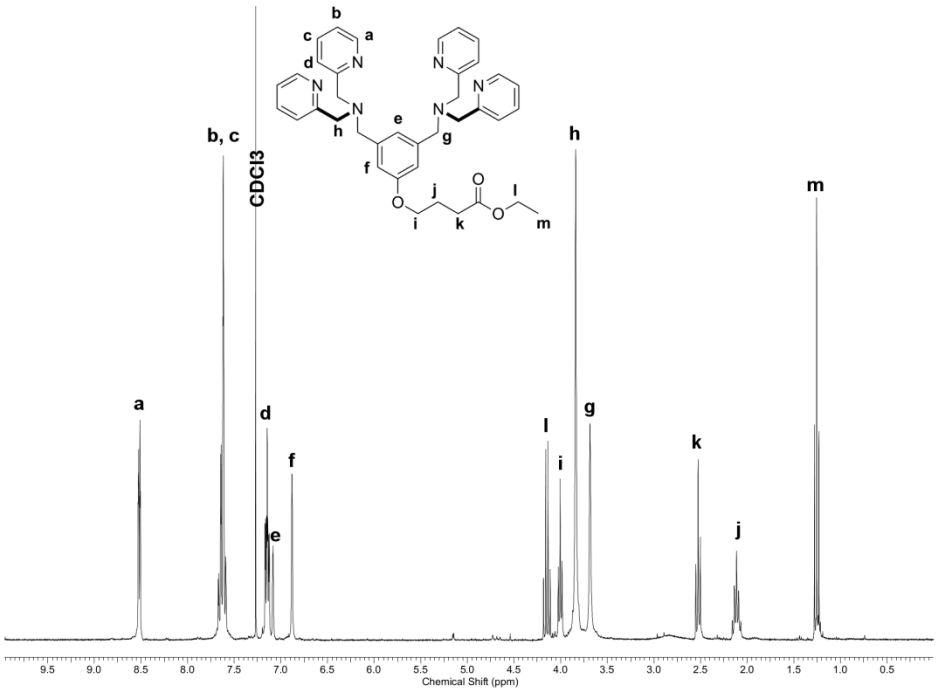
1. 3. Ethyl 4-(3,5-Bis(bromomethyl)phenoxy)butanoate (4)

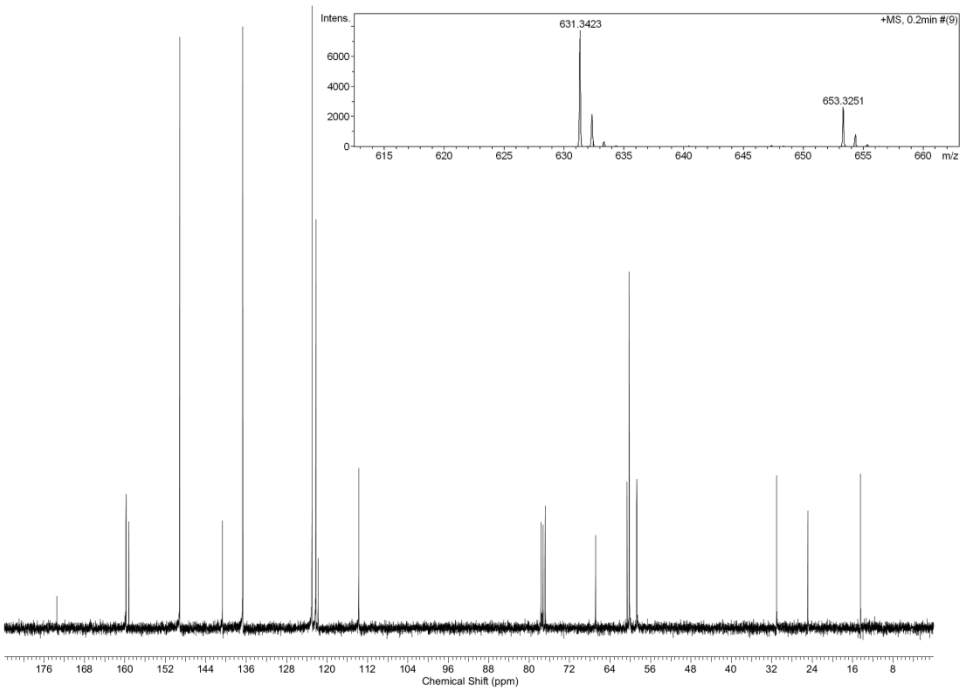




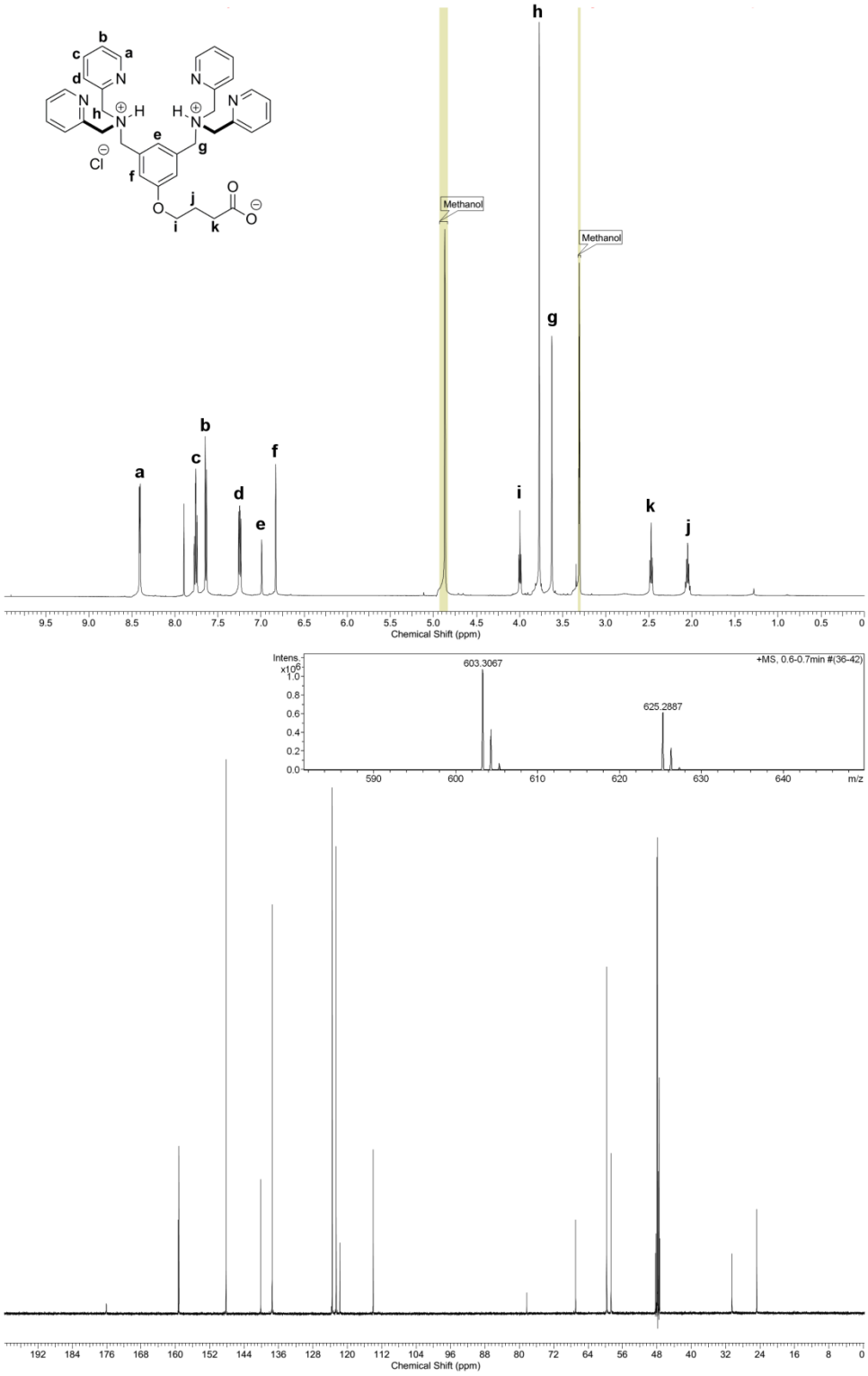


1.4. Ethyl 4-(3,5-Bis((bis(pyridin-2-ylmethyl)amino)methyl)phenoxy)butanoate (5)

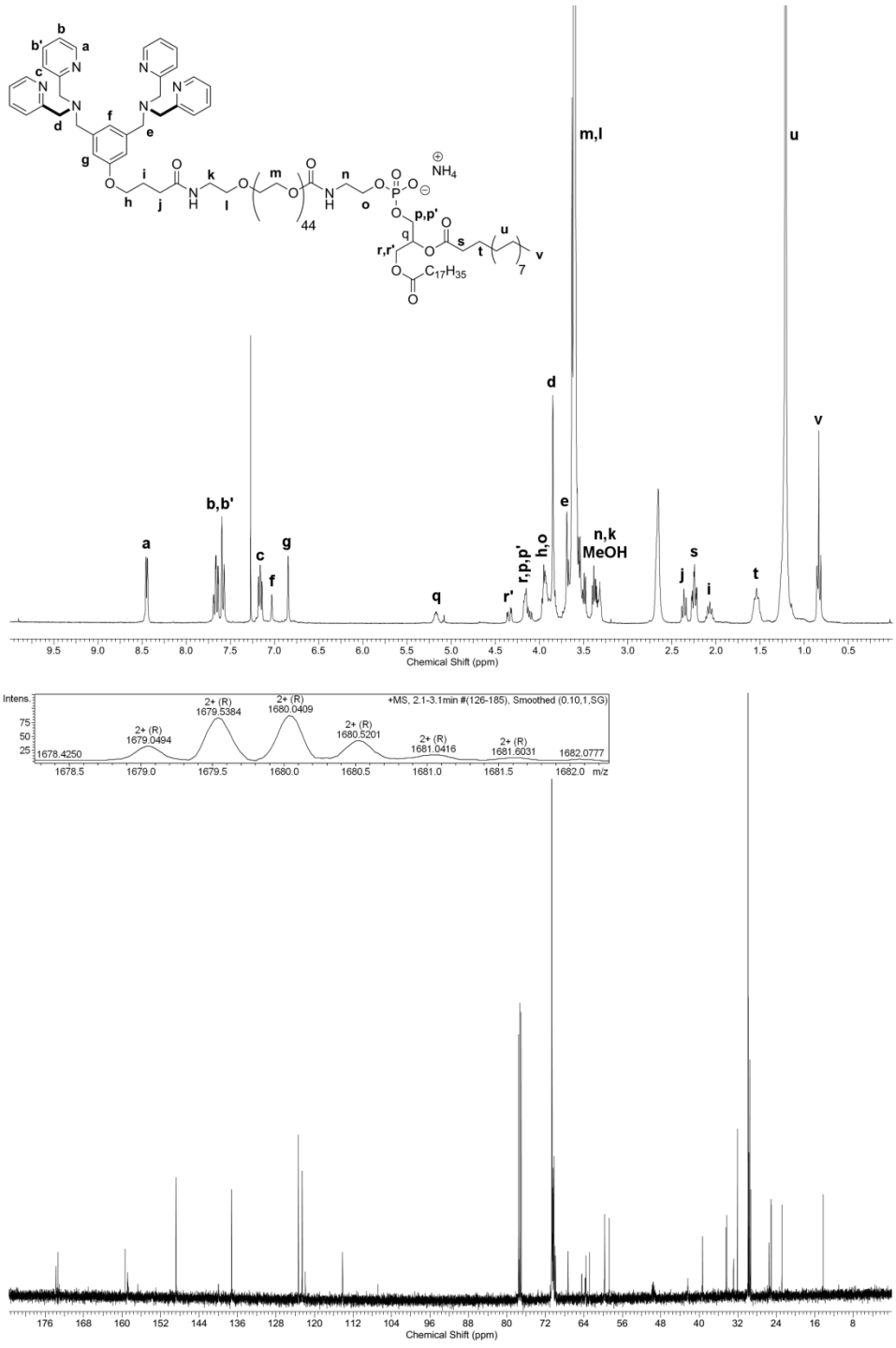


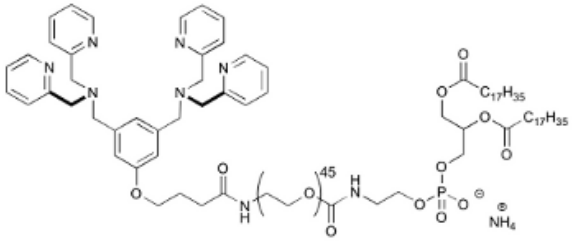


1.5. 4-(3,5-Bis((bis(pyridin-2-ylmethyl)ammonio)methyl)phenoxy)butanoate chloride (6)

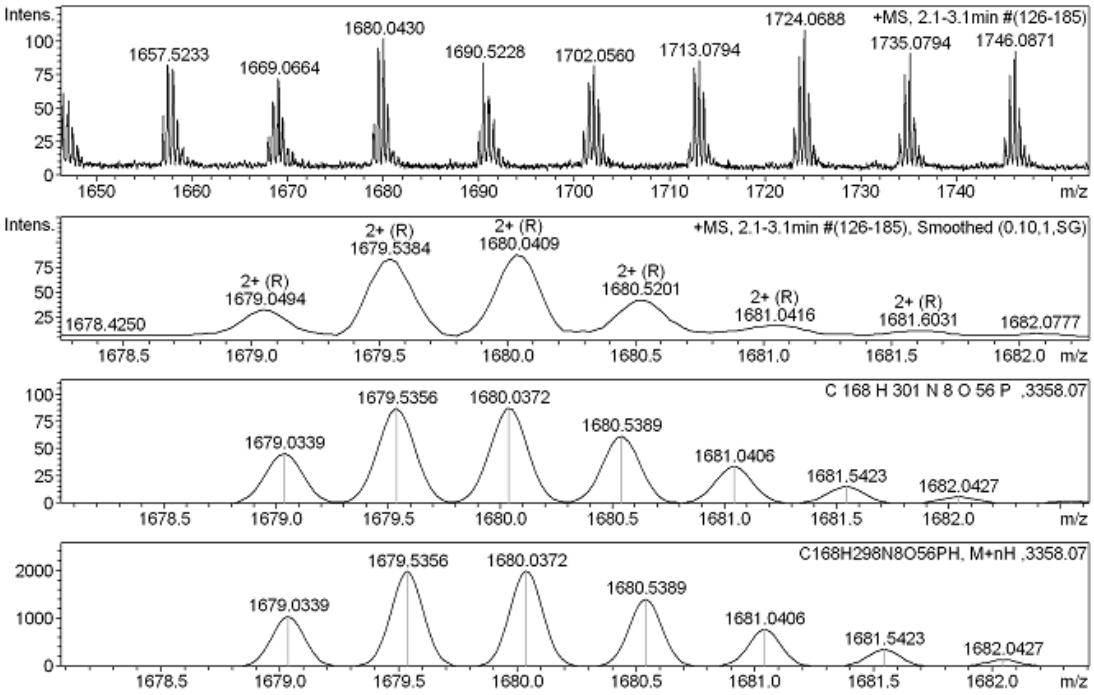


1.6. BDPA-PEG$_{2000}$-DSPE (7):





7


Intens.
+MS, 2.1-3.1min #(126-185)
1657.5233
1669.0664
1680.0430
1690.5228
1702.0560
1713.0794
1724.0688
1735.0794
1746.0871
+MS, 2.1-3.1min #(126-185), Smoothed (0.10,1,SG)
2+ (R) 1679.5384
2+ (R) 1680.0409
2+ (R) 1679.0494
2+ (R) 1680.5201
2+ (R) 1681.0416
2+ (R) 1681.6031
1678.4250
1682.0777
m/z
C 168 H 301 N 8 O 56 P ,3358.07
1679.5356
1680.0372
1679.0339
1680.5389
1681.0406
1681.5423
1682.0427
C168H298N8O56PH, M+nH ,3358.07
1679.5356
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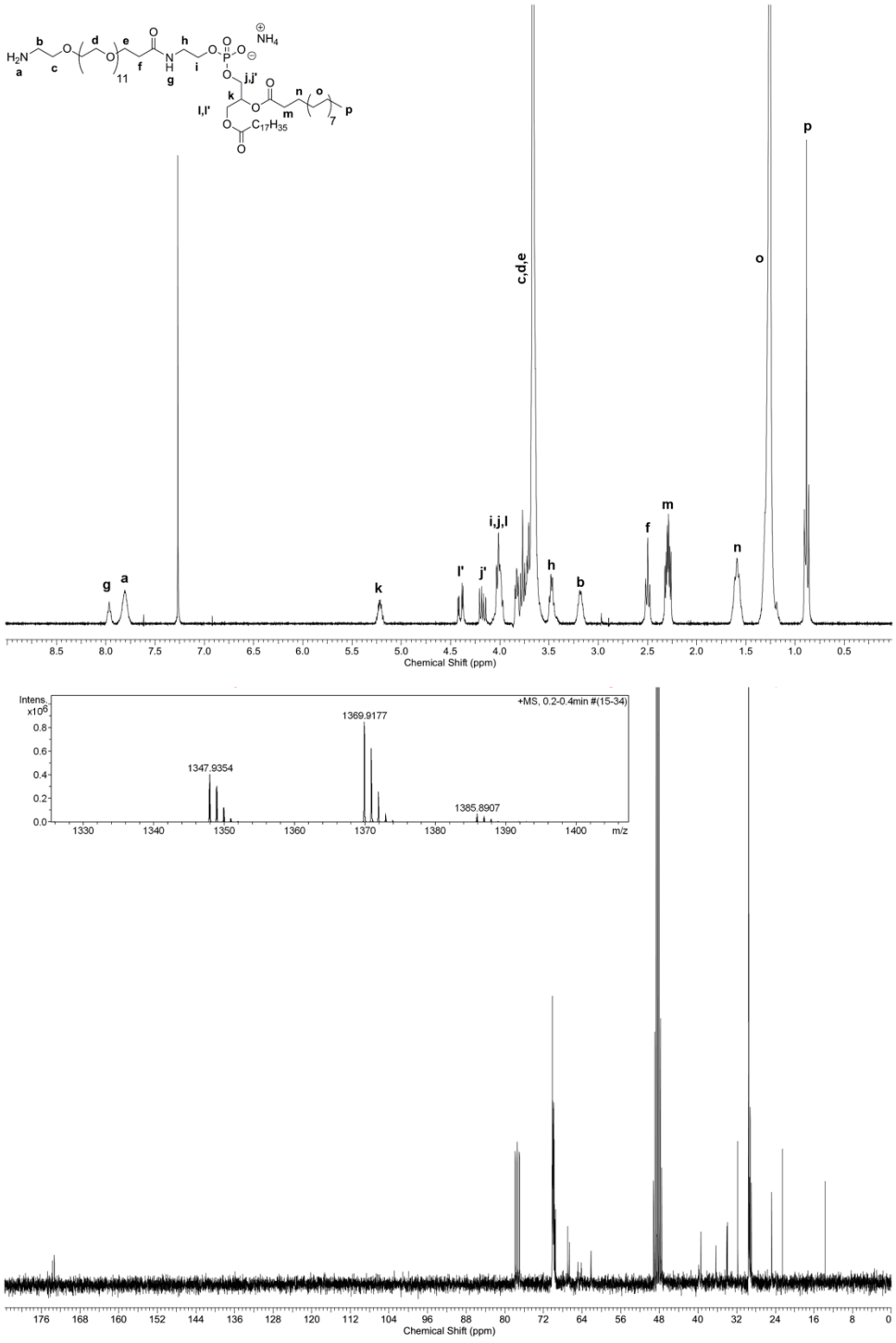
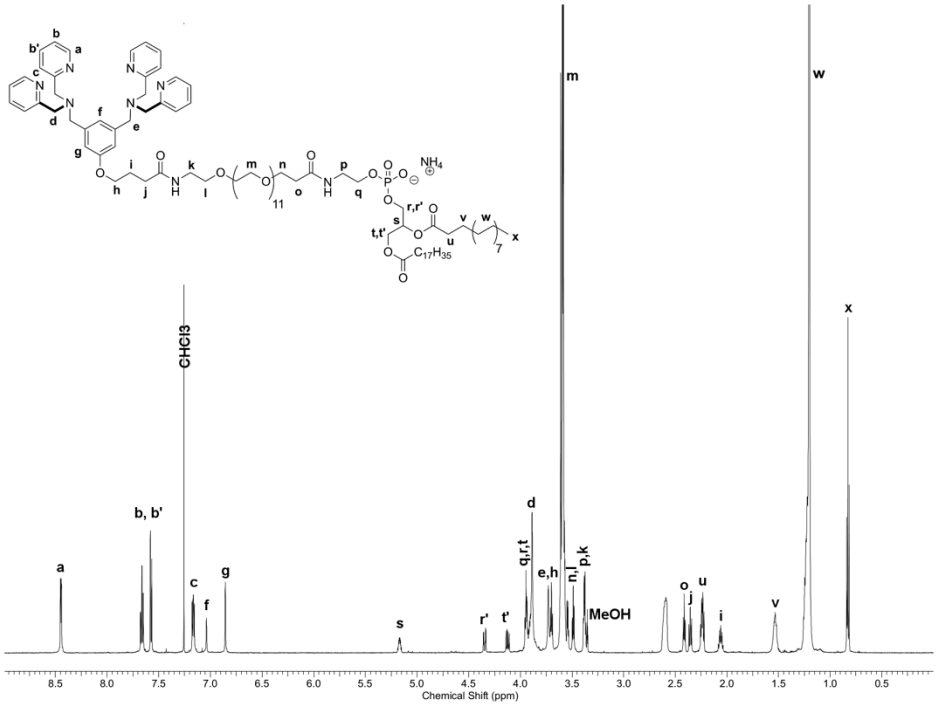
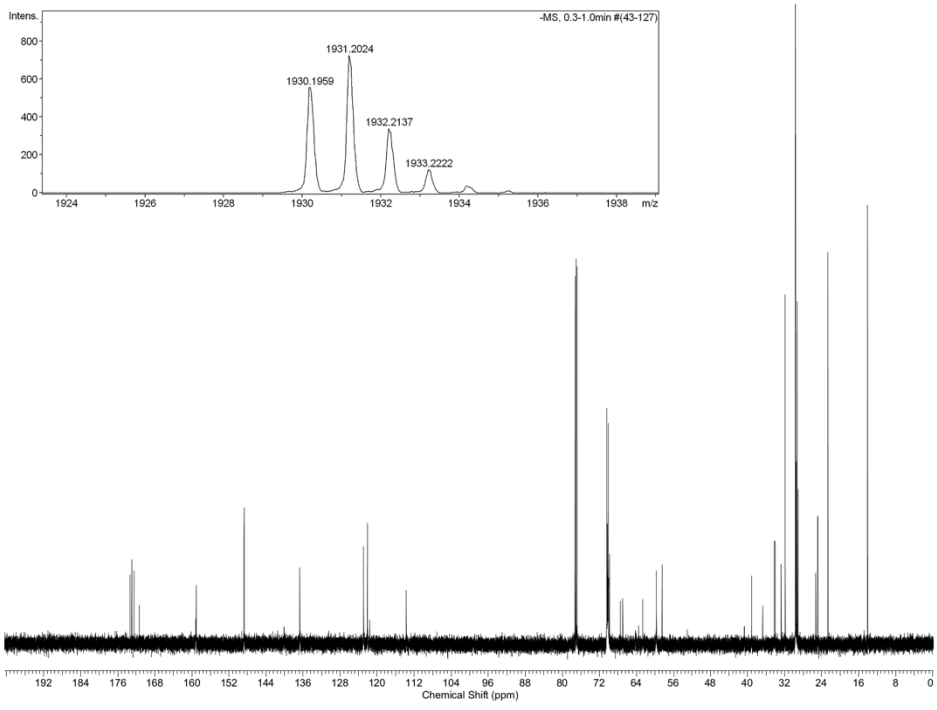
1679.0339
1680.5389
1681.0406
1681.5423
1682.0427

1.8. NH_2-PEG_{500}-DSPE (9):



1.10. BDPA-PEG$_{500}$-DSPE (10):





2. DLS Intensity PSD Plots

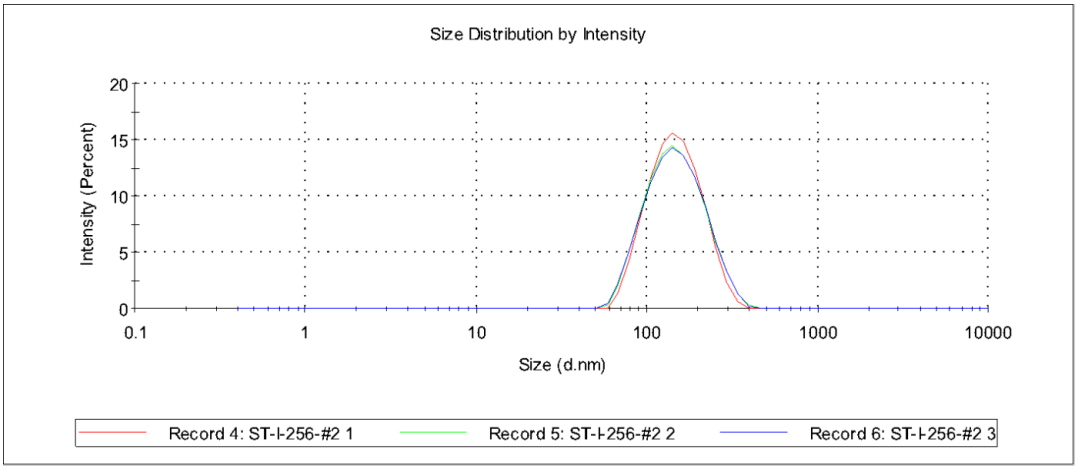


Figure ESI-1: Intensity PSD plot for Zn_2BDPA-PEG_{2000}-DSPE:Chol:POPC (2.5:30:67.5 mol:mol:mol) liposomes. Measurements done in triplicate.

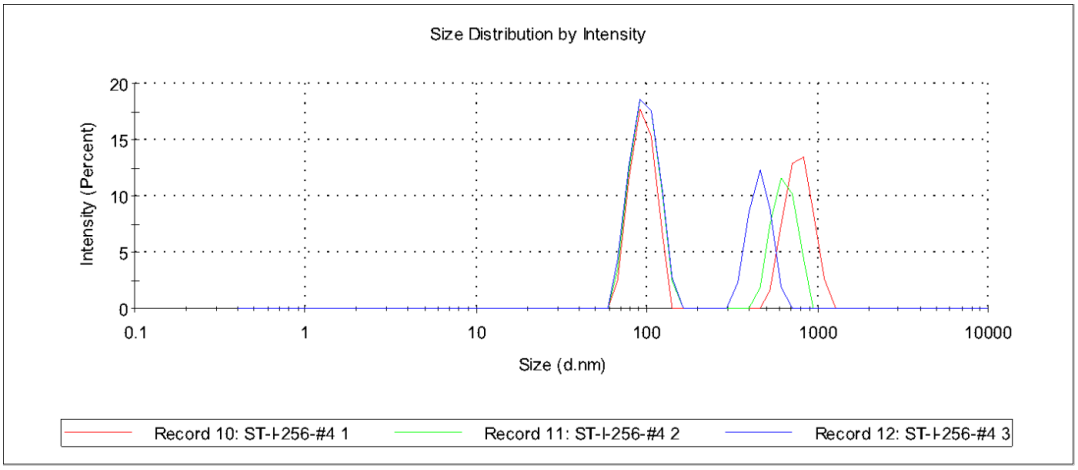


Figure ESI-2: Intensity PSD plot for Zn_2BDPA-PEG_{500}-DSPE:Chol:POPC (2.5:30:67.5 mol:mol:mol) liposomes. Measurements done in triplicate.

3. Supplemental Photographs of Cuvette Experiments

Figure ESI-3: Photograph for: **A**: 250 µl Zn_2BDPA-PEG_{2000}-DSPE:Cholesterol:POPC (2.5:30:67.5) liposome stock dispersion + 750 µl HEPES buffer; **K**: 250 µl DPPG:Cholesterol:POPC (10:30:60) liposome stock dispersion + 730 µl HEPES buffer + 20 µl 10 mM $Zn(NO_3)_2$ in HEPES; **L**: 250 µl Zn_2BDPA-PEG_{2000}-DSPE:Cholesterol:POPC (2.5:30:67.5) liposome stock dispersion + 250 µl DPPG:Cholesterol:POPC (10:30:60) liposome stock dispersion + 500 µl HEPES buffer.

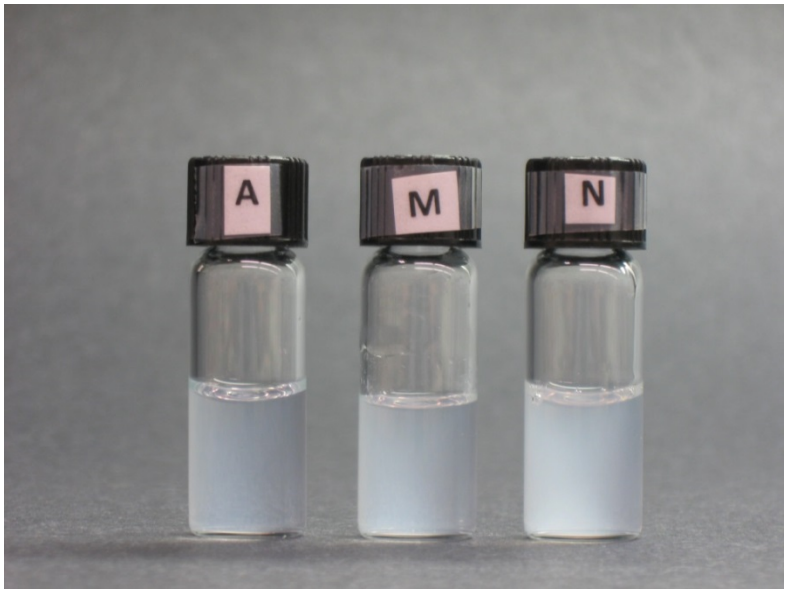


Figure ESI-4: Photograph for: **A**: 250 µl Zn_2BDPA-PEG_{2000}-DSPE:Cholesterol:POPC (2.5:30:67.5) liposome stock dispersion + 750 µl HEPES buffer; **M**: 250 µl Cholesterol:POPC (30:70) liposome stock dispersion + 730 µl HEPES buffer + 20 µl 10 mM $Zn(NO_3)_2$ in HEPES; **N:** 250 µl Zn_2BDPA-PEG_{2000}-DSPE:Cholesterol:POPC (2.5:30:67.5) liposome stock dispersion + 250 µl Cholesterol:POPC (30:70) liposome stock dispersion + 500 µl HEPES buffer.

Figure ESI-4: Photograph for: **A**: 250 µl Zn_2BDPA-PEG_{2000}-DSPE:Cholesterol:POPC (2.5:30:67.5) liposome stock dispersion + 750 µl HEPES buffer; **L**: 250 µl Zn_2BDPA-PEG_{2000}-DSPE:Cholesterol:POPC (2.5:30:67.5) liposome stock dispersion + 250 µl DPPG:Cholesterol:POPC (10:30:60) liposome stock dispersion + 500 µl HEPES buffer; **N:** 250 µl Zn_2BDPA-PEG_{2000}-DSPE:Cholesterol:POPC (2.5:30:67.5) liposome stock dispersion + 250 µl Cholesterol:POPC (30:70) liposome stock dispersion + 500 µl HEPES buffer.

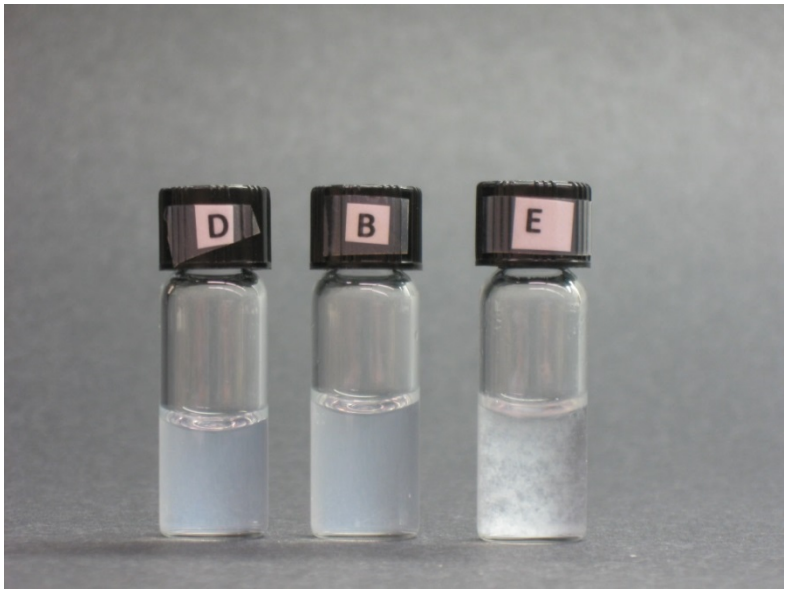
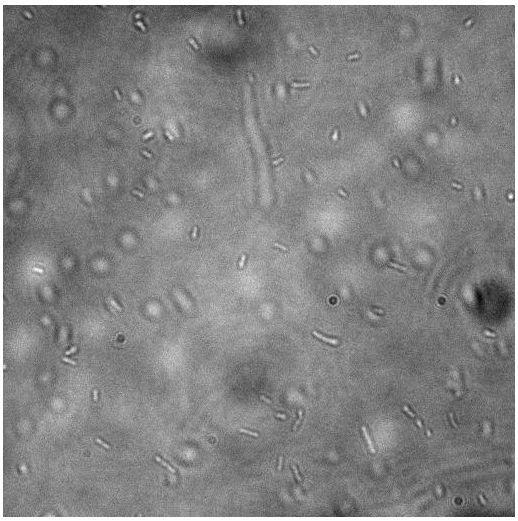
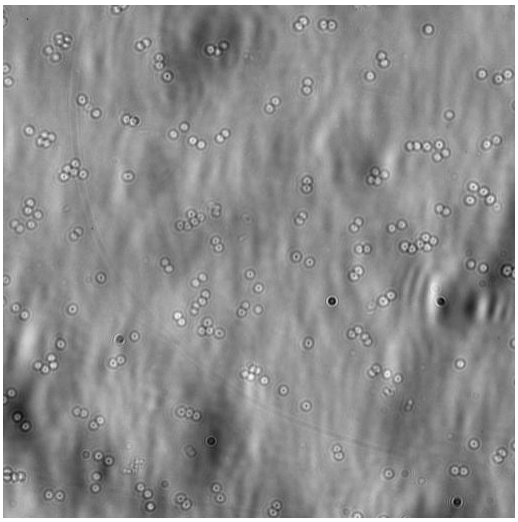


Figure ESI-5: Photograph for: **D**: 250 µl Zn_2BDPA-PEG_{2000}-DSPE:mPEG_{2000}-DSPE:Cholesterol:POPC (2.5:7.5:30:60) liposome stock dispersion + 750 µl HEPES buffer; **B**: 250 µl POPS:Cholesterol:POPC (10:30:60) liposome stock dispersion + 750 µl HEPES buffer; **E**: 250 µl Zn_2BDPA-PEG_{2000}-DSPE:mPEG_{2000}-DSPE:Cholesterol:POPC (2.5:7.5:30:60) liposome stock dispersion + 250 µl POPS:Cholesterol:POPC (10:30:60) liposome stock dispersion + 500 µl HEPES buffer



E. Coli UTI89



S. Aureus Xen 29

Figure ESI-6: Representative fluorescence microscopy images of bacteria after treatment with fluorescent untargeted liposomes. No fluorescence staining of bacterial cells was observed.

4. Human Cell Toxicity

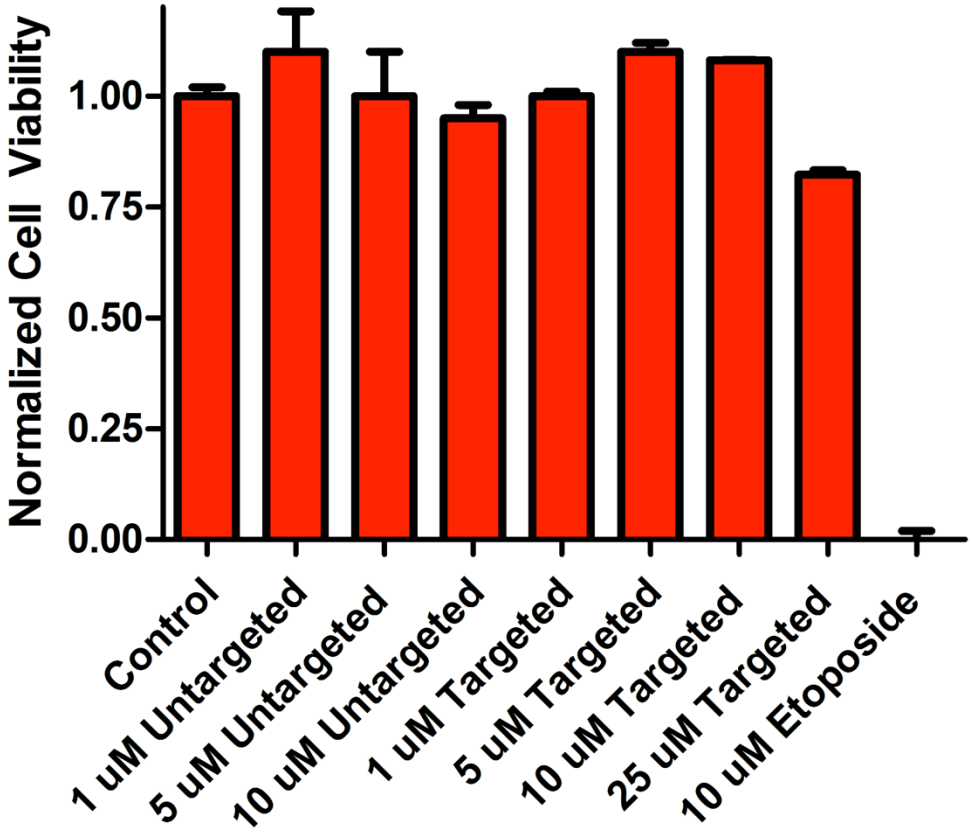


Figure ESI-7: MTT cell vitality assay. MDA-MB-231 human breast cancer cells were treated with untargeted liposomes (Cholesterol:POPC, 30:70) and Zn_2BDPA coated liposomes (Zn_2BDPA-PEG_{2000}-DSPE: Cholesterol:POPC, 2:30:68) and incubated for 18 h at 37 °C.