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# Creating upconverting liposomes sensitive to $Ca^{2+}$

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Endothelial dysfunction (ED) is a strong predictor of atherosclerosis. To prevent disease development new method of ED detection should be created. Diagnostics of the dysfunction in one sample requires two parameters sensitive system (Logic Gate). For ED nitric oxide (NO) and calcium cations were chosen as interdependent parameters for ED detection. In this study, we are focusing on $Ca^{2+}$ sensing for *in vivo* applications.
*In vivo* sensing is characterized by tough challenges such as the presence of competitive analytes, low signal-to-noise ratio, low light penetration depth, toxicity, among others. Some of these issues may be overcome by combining triplet-triplet annihilation upconversion (TTA-UC) and photo-induced electron transfer (PET) quenching.
Here we present the synthesis and proof-of-concept tests of upconverting liposomes sensitive to $Ca^{2+}$. Liposomes containing PdTPTBPP as photosensitizer and an annihilator with calcium ions-chelating properties showed an increase of upconverted emission in presence of $Ca^{2+}$.

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