

Literature Report

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Self-assembled amphiphilic fluorescent probe: detecting pH-fluctuations within cancer cells and tumour tissues†

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Jonathan L. Sessler 美国德克萨斯大学奥斯汀分校

Introduction



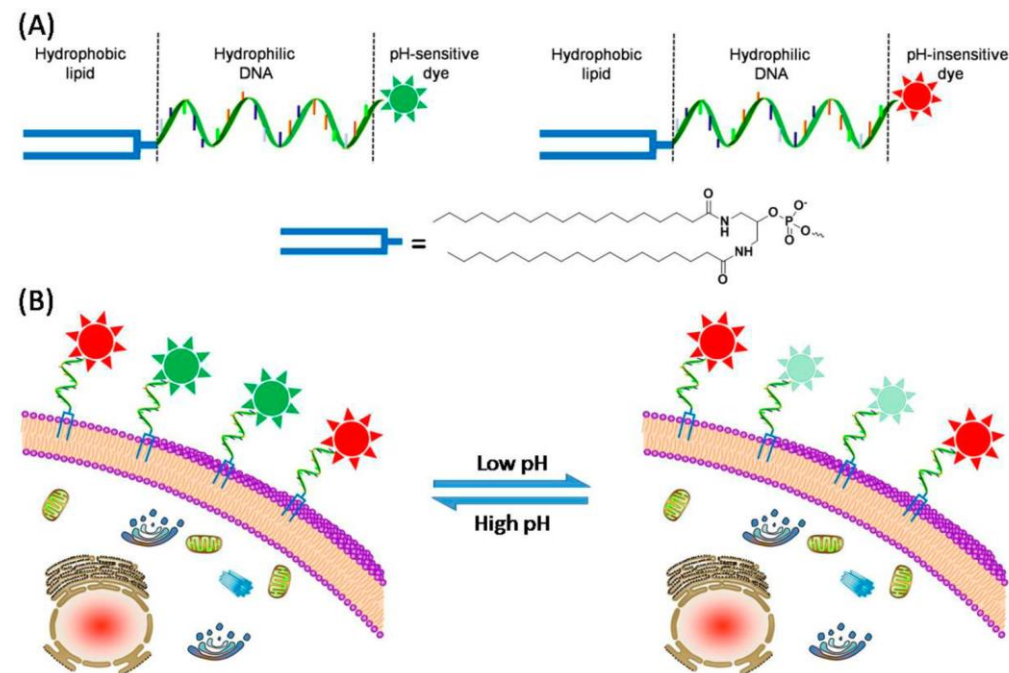
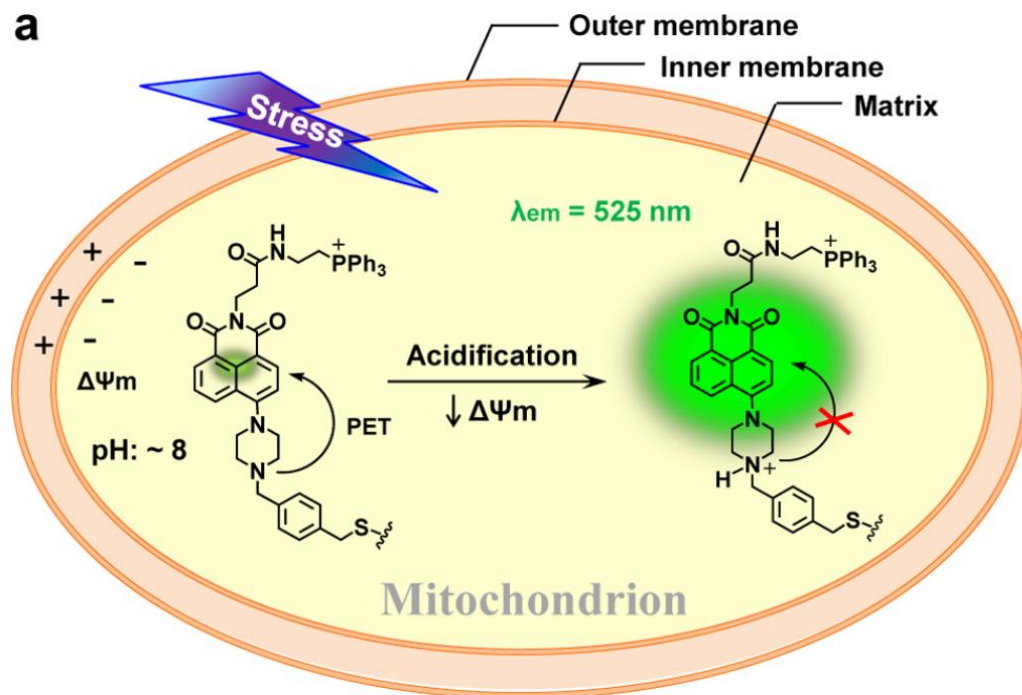
小分子荧光探针类
监测细胞pH

小分子荧光探针

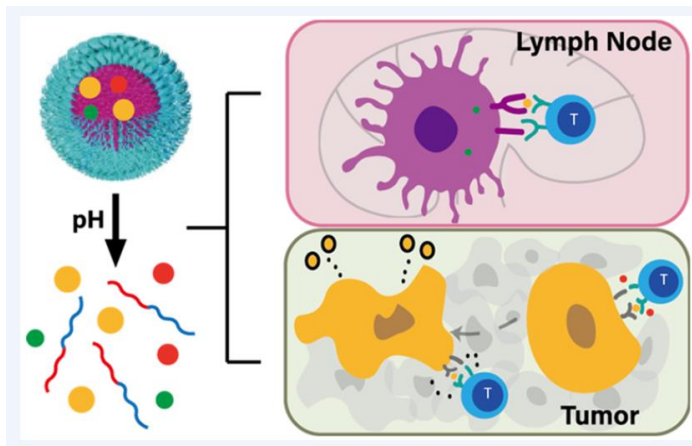
磷脂结合荧光分子

DNA结合荧光分子

肽结合荧光分子

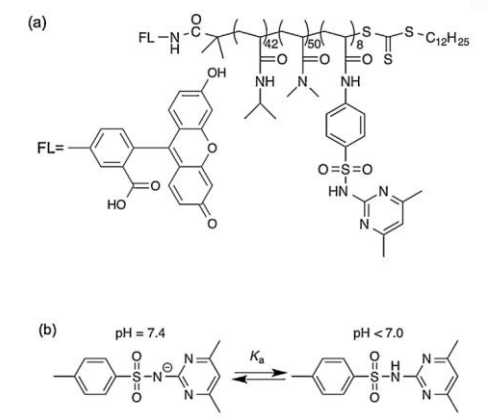
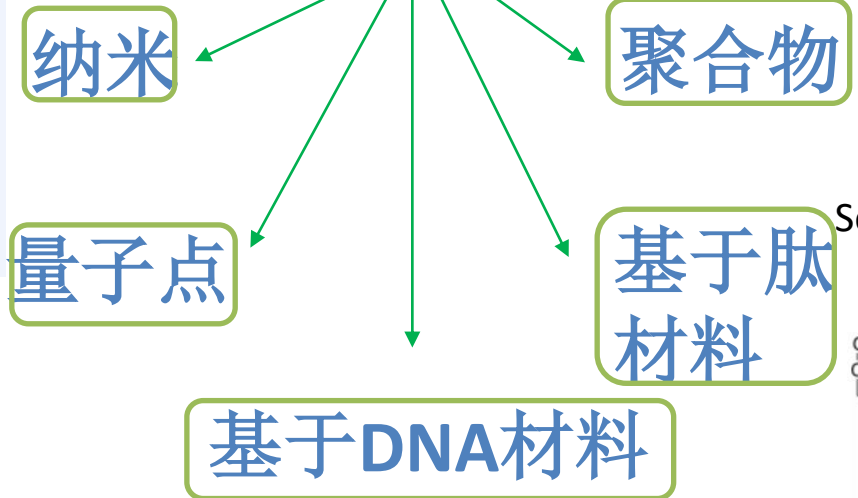


Introduction

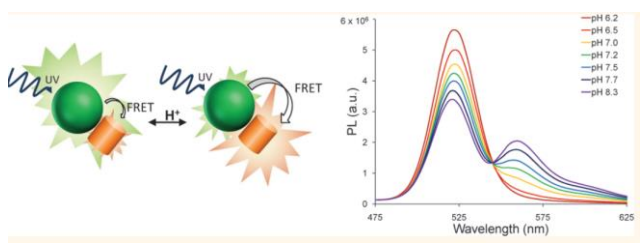


Acc. Chem. Res. 2020, 53, 2546–2557

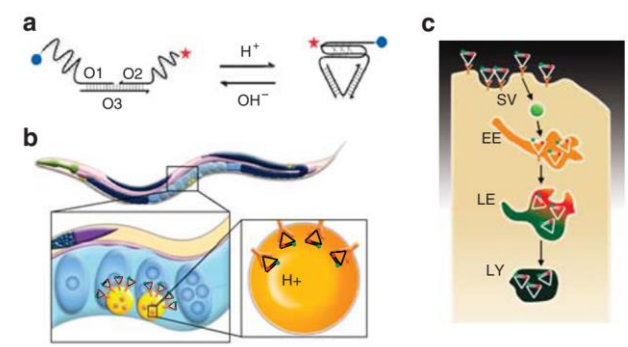
材料类监测 细胞pH



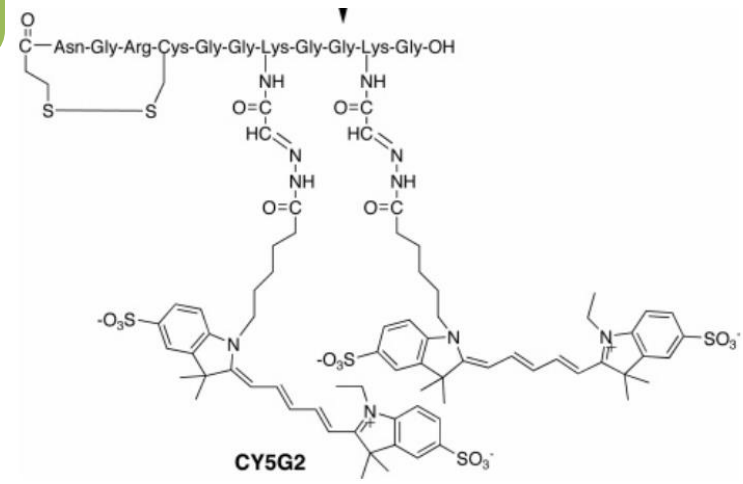
Sens. Actuators, B, 2015, 207, 724–731



ACS Nano, 2012, 6, 2917–2924.

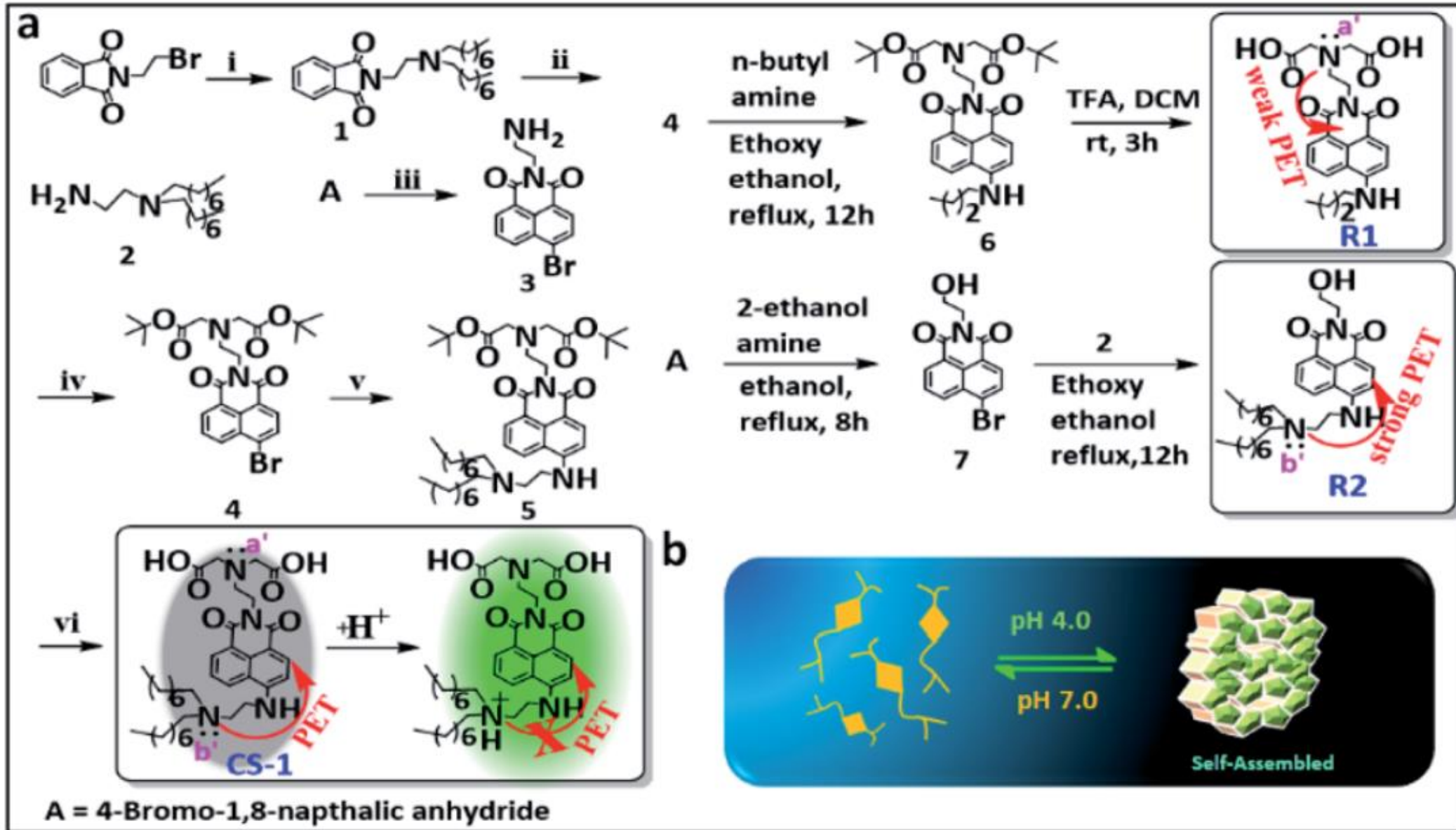


Nat. Commun., 2011, 2, 340.

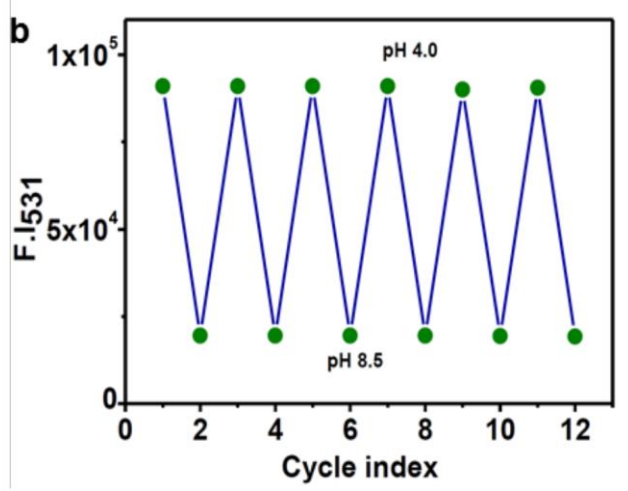
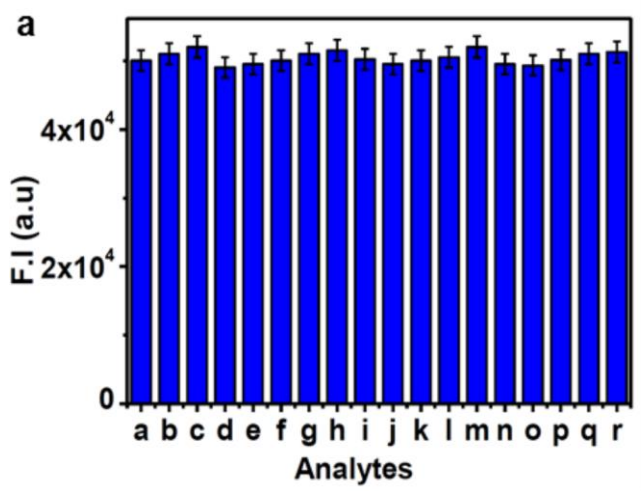
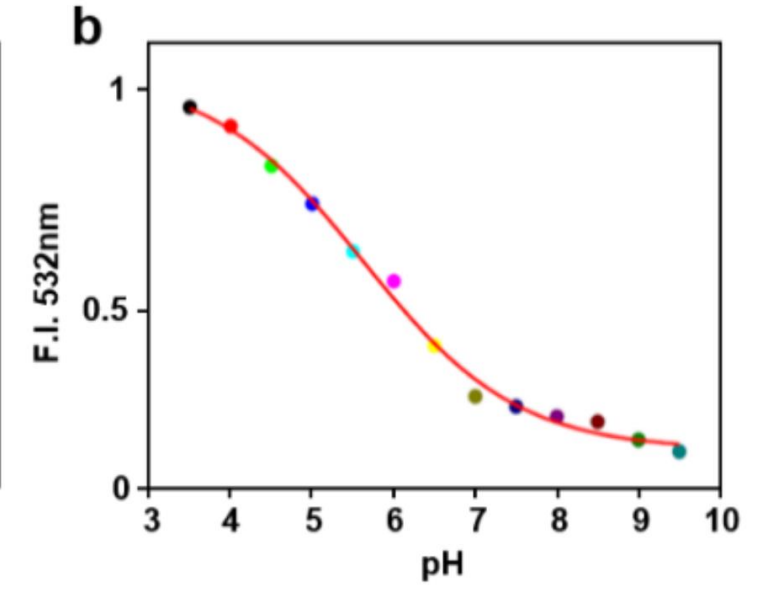
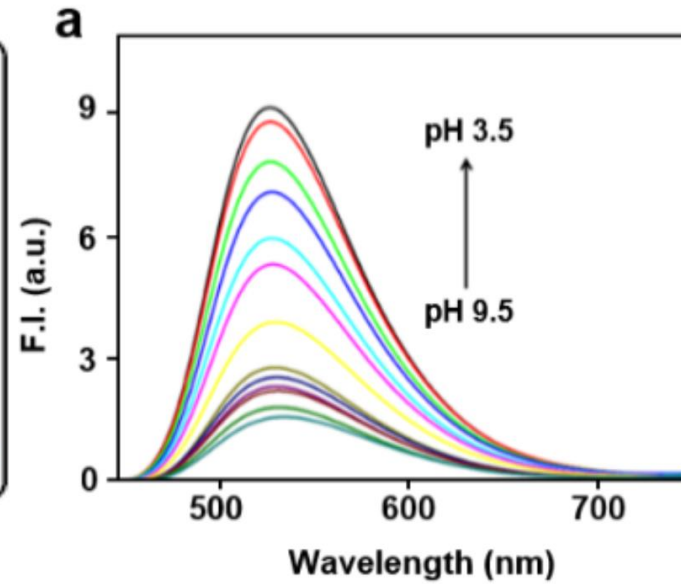
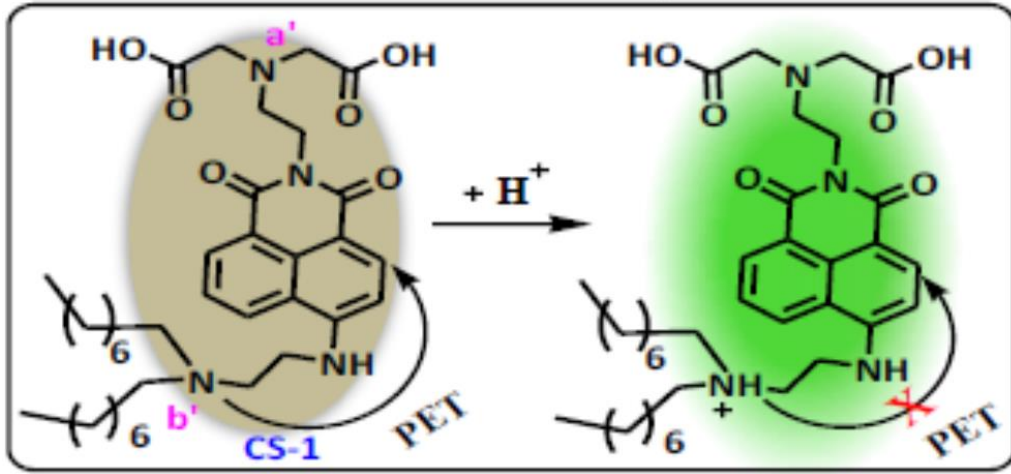


Bioconjugate Chem., 2006, 17, 255–257.

Result and Discussion



CS-1分子



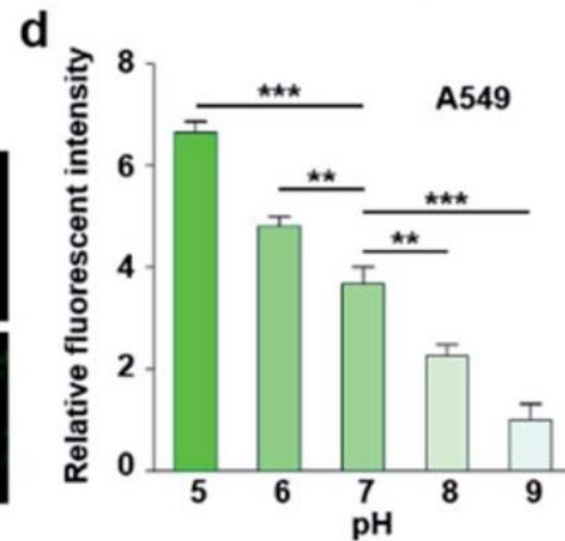
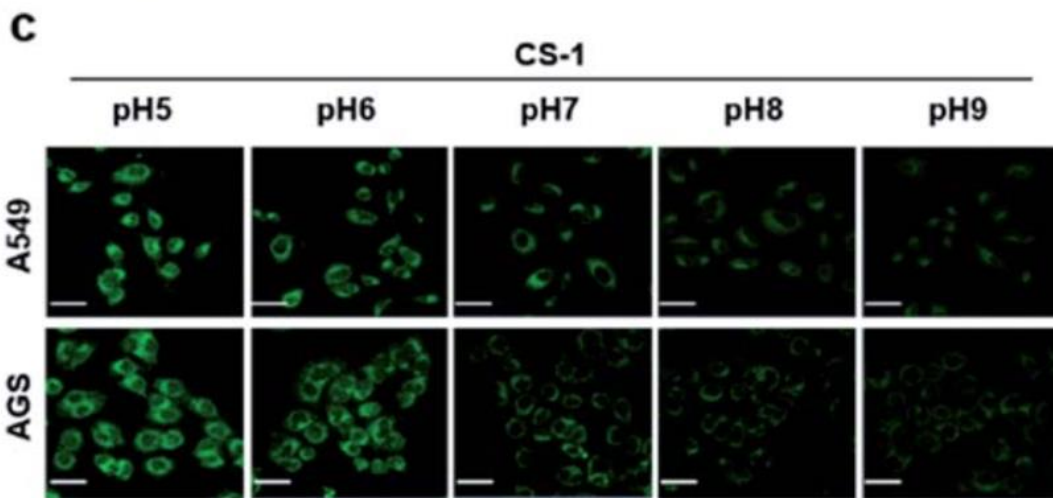
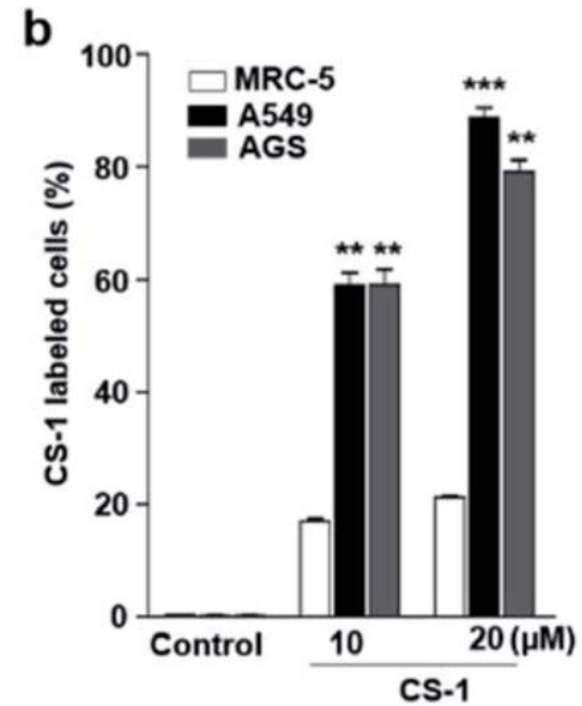
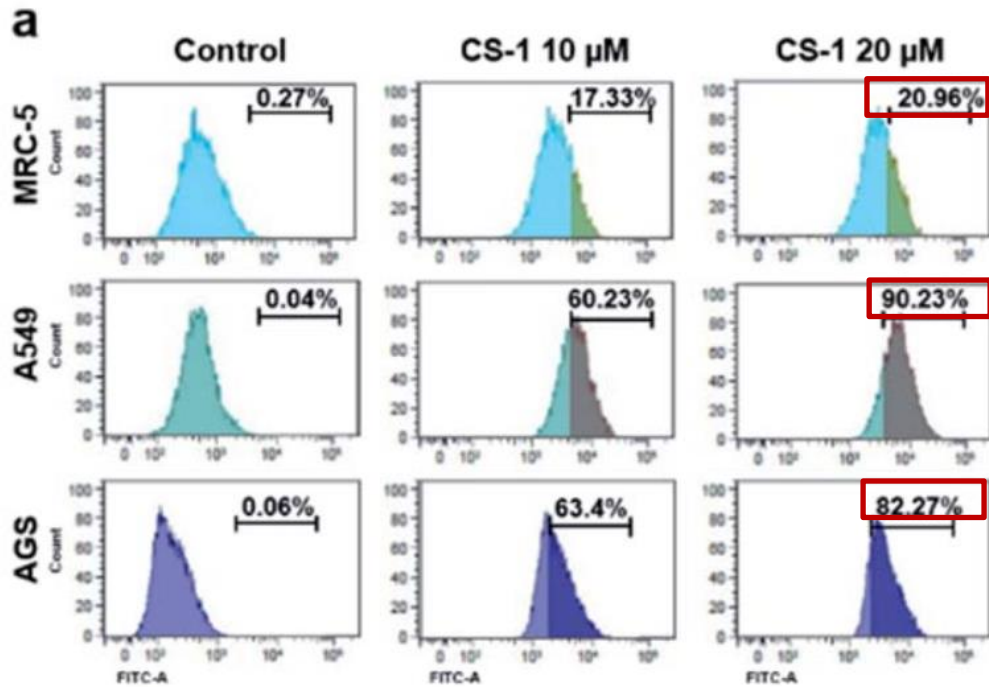
PBS buffer; pH 6.0 : a) GSH , b) Li^+ , c) Na^+ , d) K^+ , e) Mg^{2+} , f) Ca^{2+} , g) Fe^{2+} , h) Fe^{3+} , i) Cu^{2+} , j) Zn^{2+} , k) Cl^- , l) Br^- , m) HCO_3^- , n) NO_2^- , o) NO_3^- , p) AcO^- , q) SO_4^{2-} , r) H_2O_2 .

细胞标记和细胞内定位研究



流式细胞仪

癌细胞正常
细胞标记率

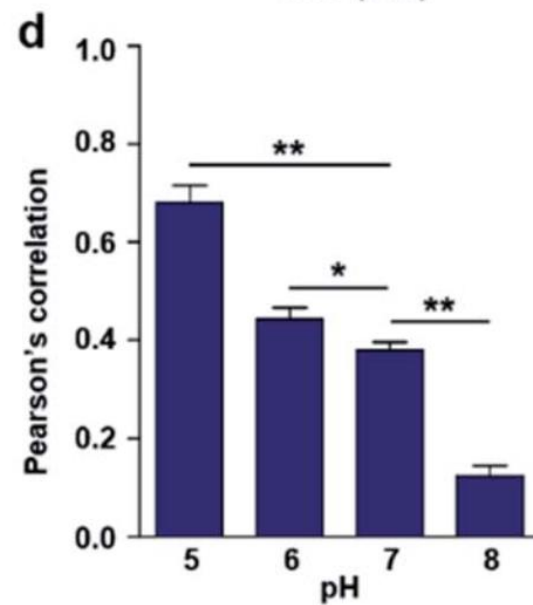
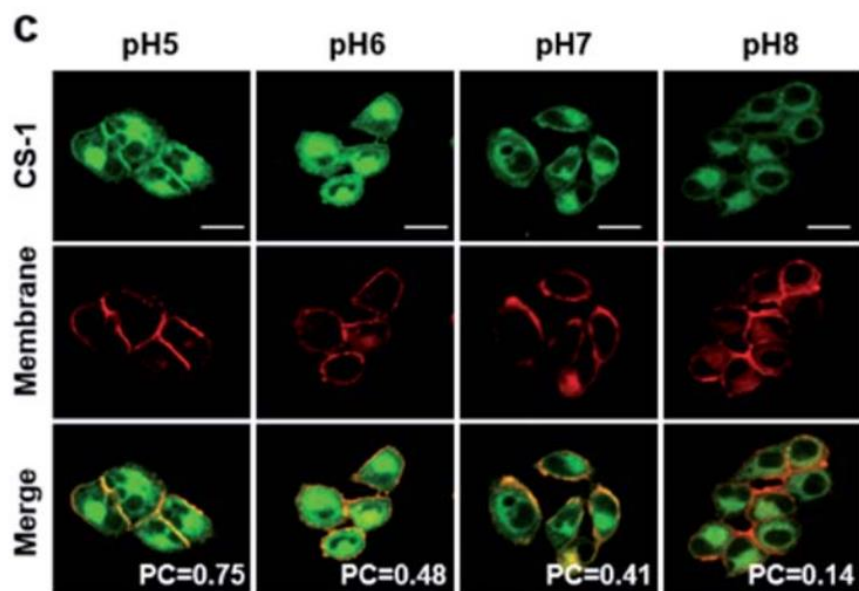
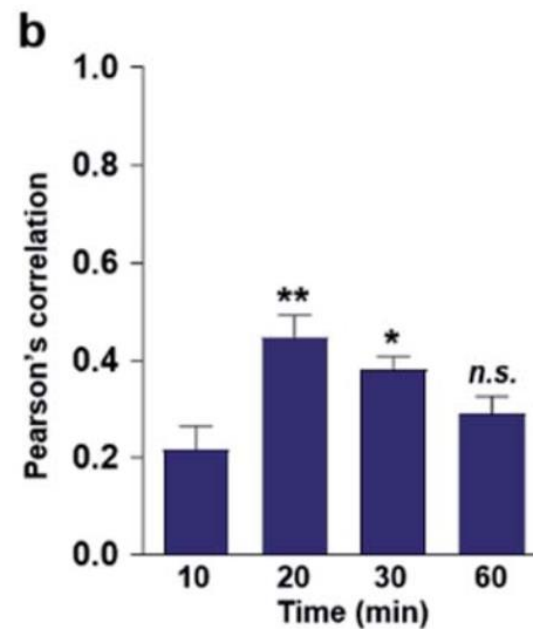
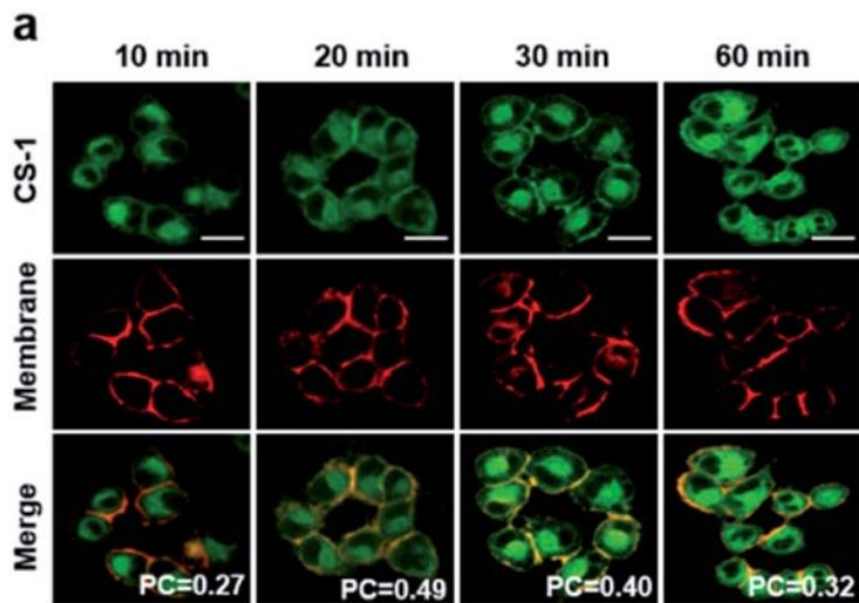


pH与荧光

CS-1标记A549质膜



A549 细胞
pH \approx 7



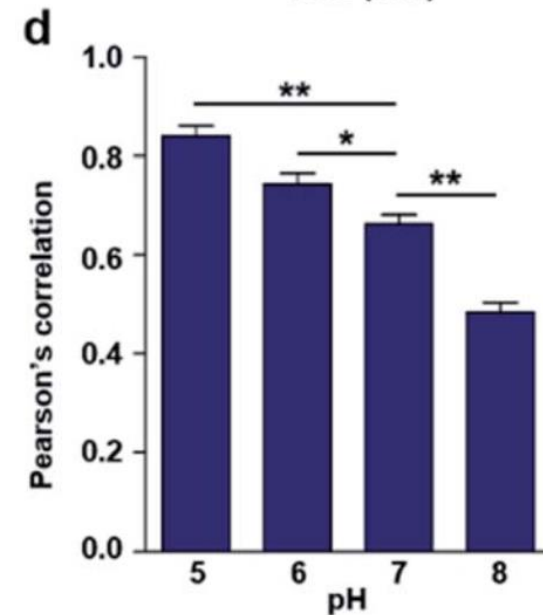
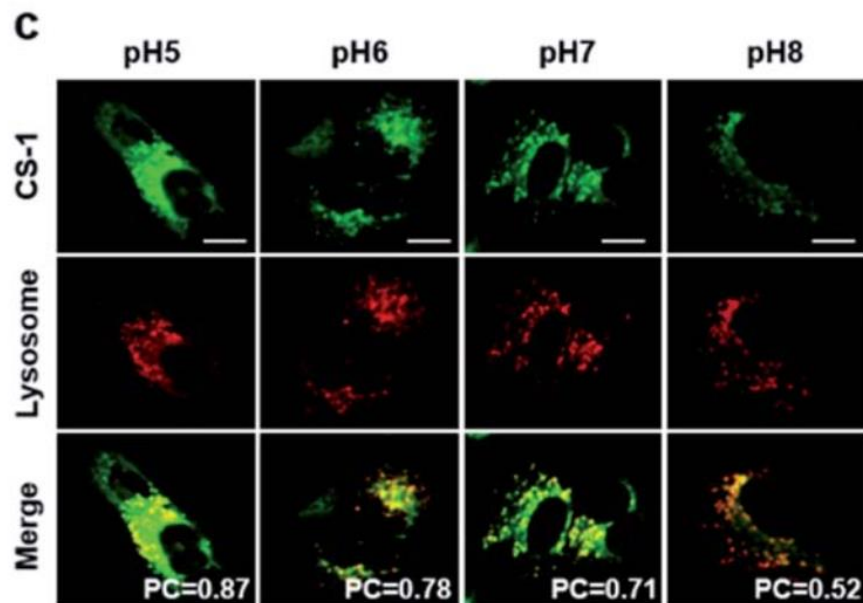
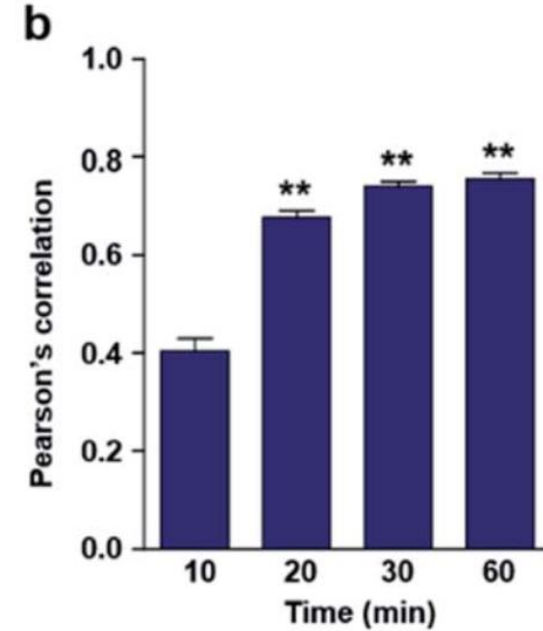
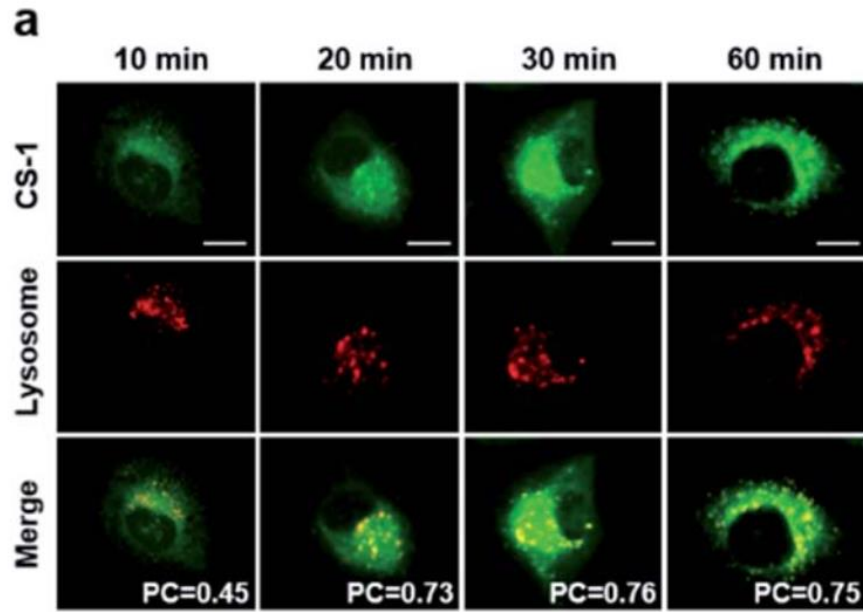
与文献癌细胞
质膜pH6.0 - 6.8
之间一致

CS-1标记A549溶酶体



A549 细胞
pH \approx 7.4

LysoTracker[®]
Red DND-99



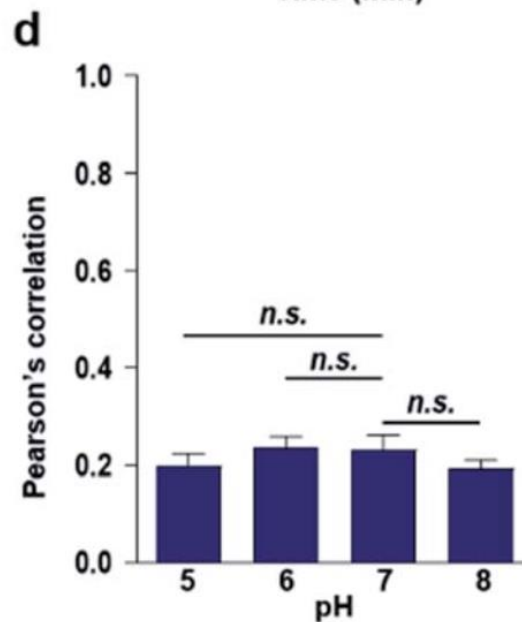
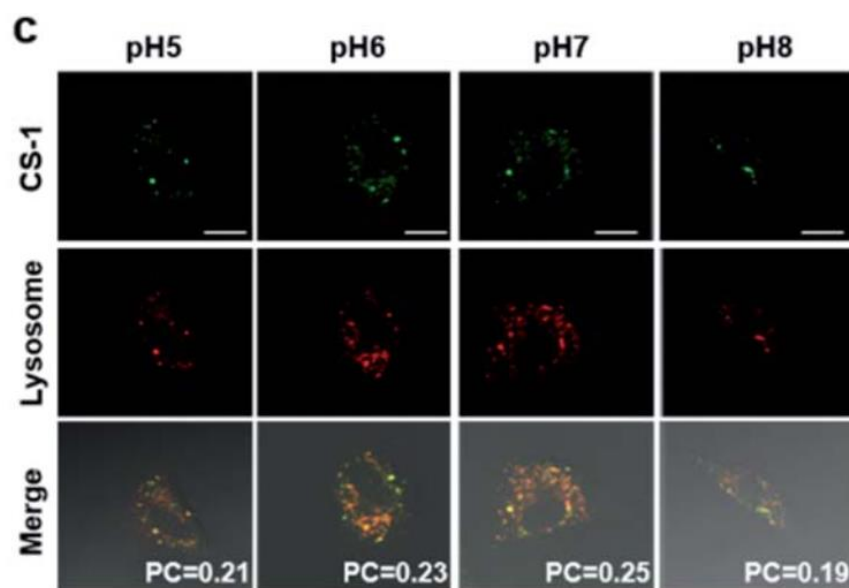
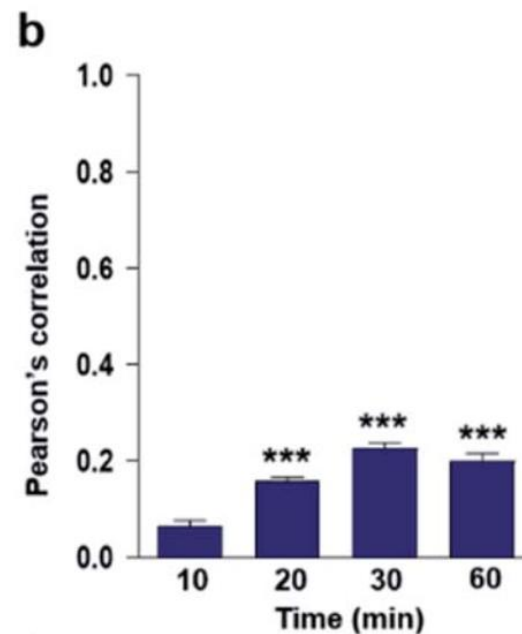
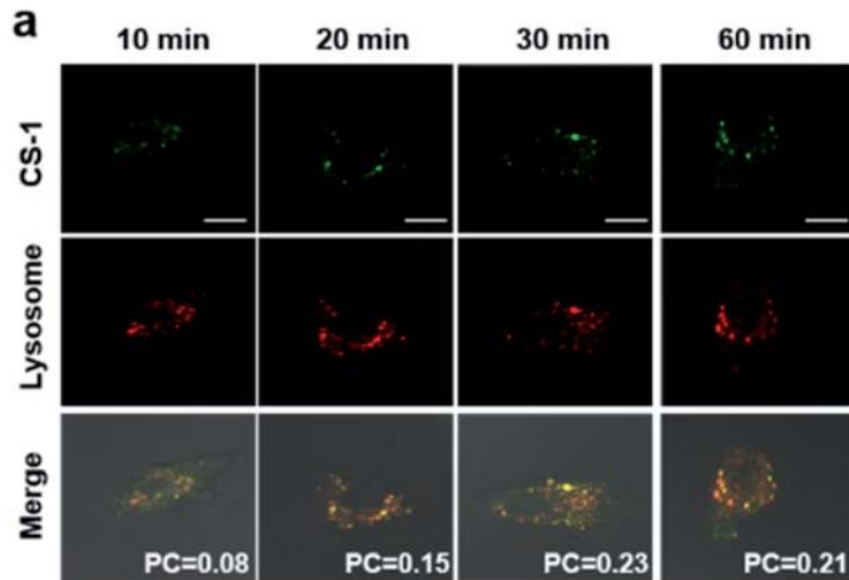
CS-1标记MRC-5溶酶体



MRC-5 细胞
pH \approx 7

PC随时间增加
而增加

没有太大变化

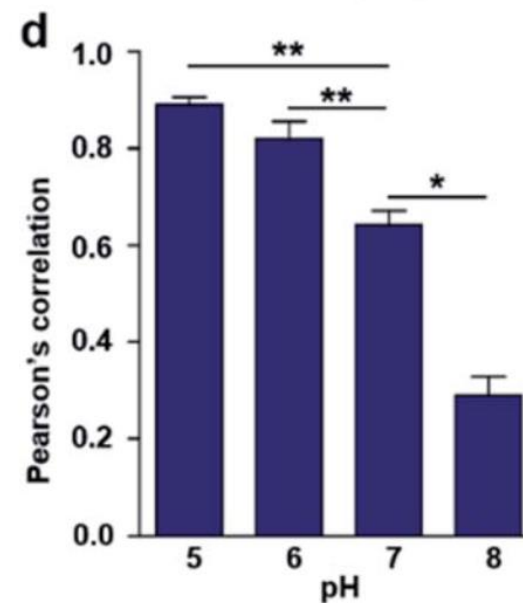
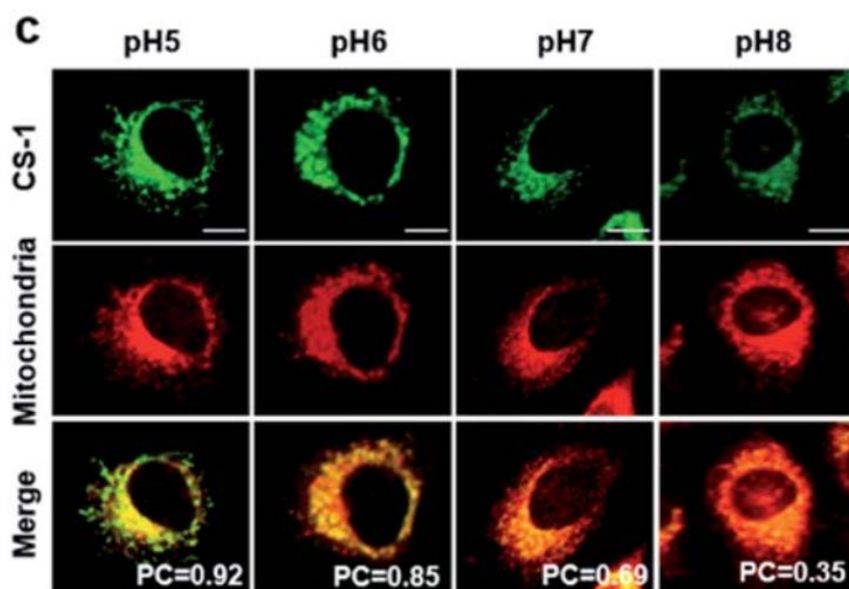
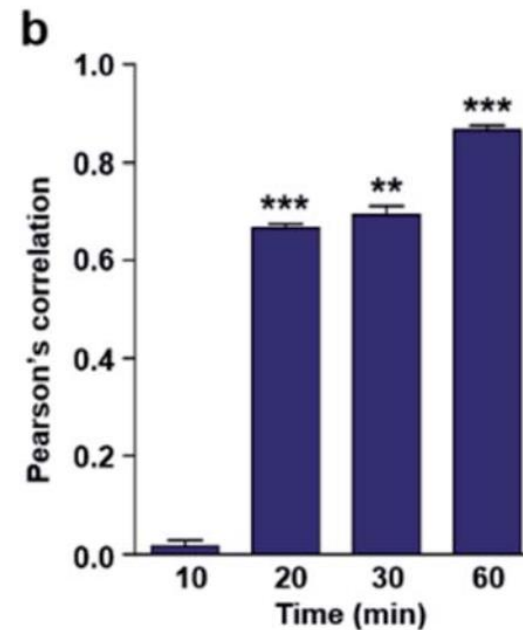
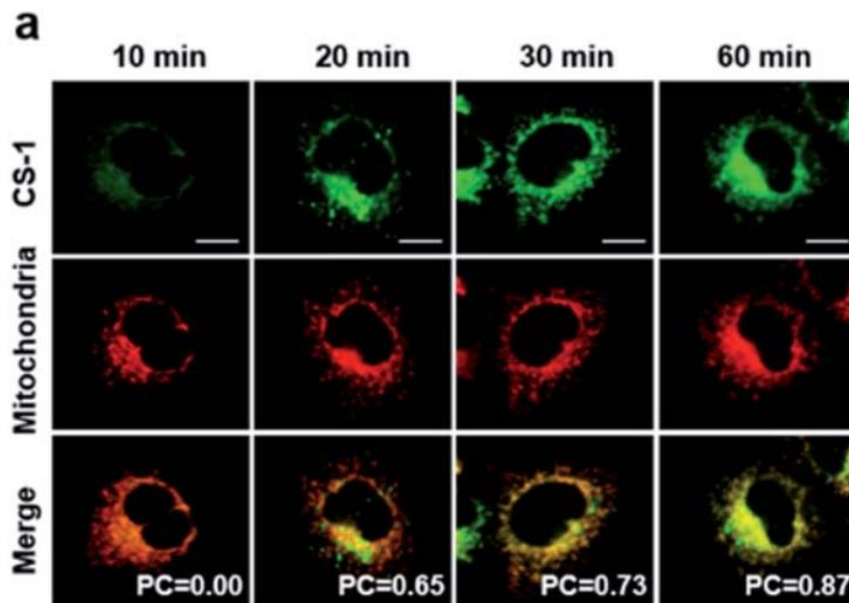


CS-1标记A549线粒体



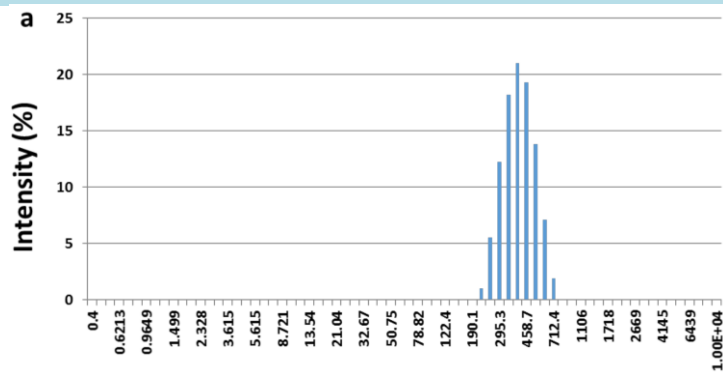
A549 细胞
pH \approx 7.4

MitoTracker®

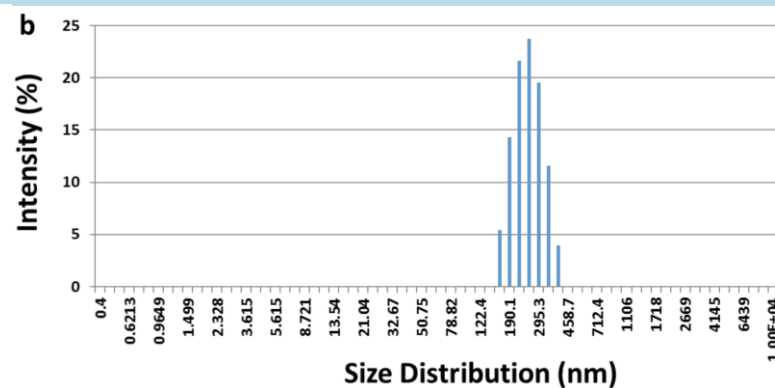


线粒体pH值为=5

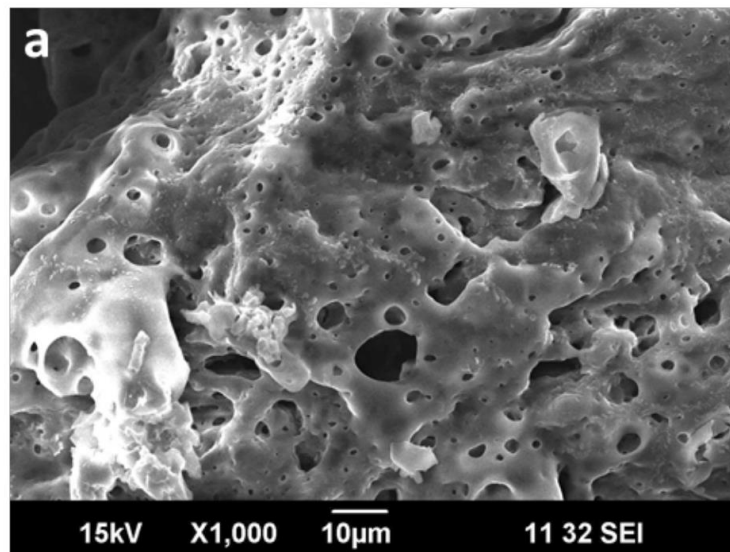
DLS, SEM



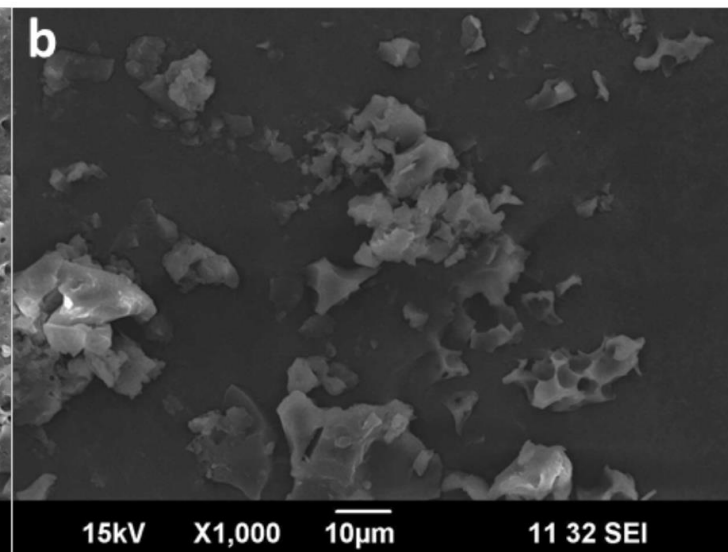
pH 4.5
420 nm



pH 7.4
260 nm



层状自聚合薄片

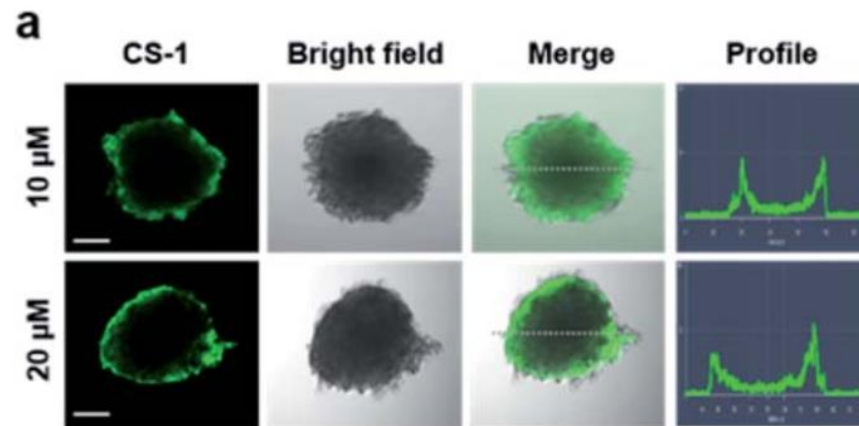


离散小颗粒

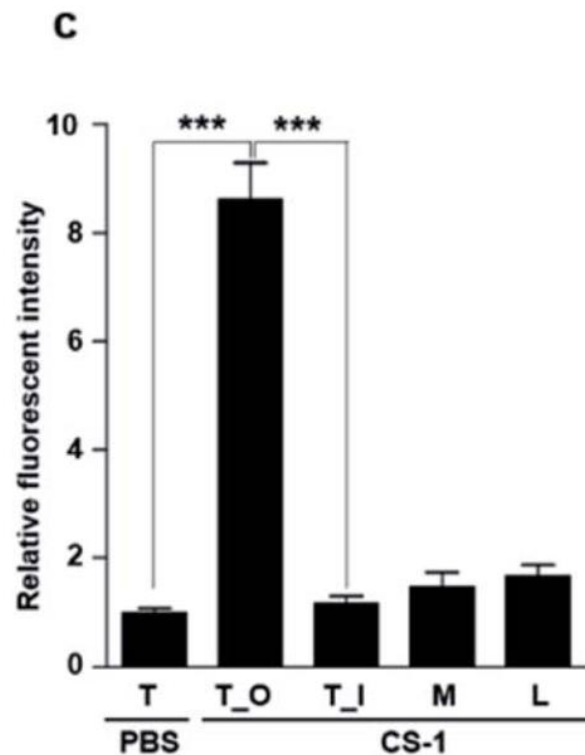
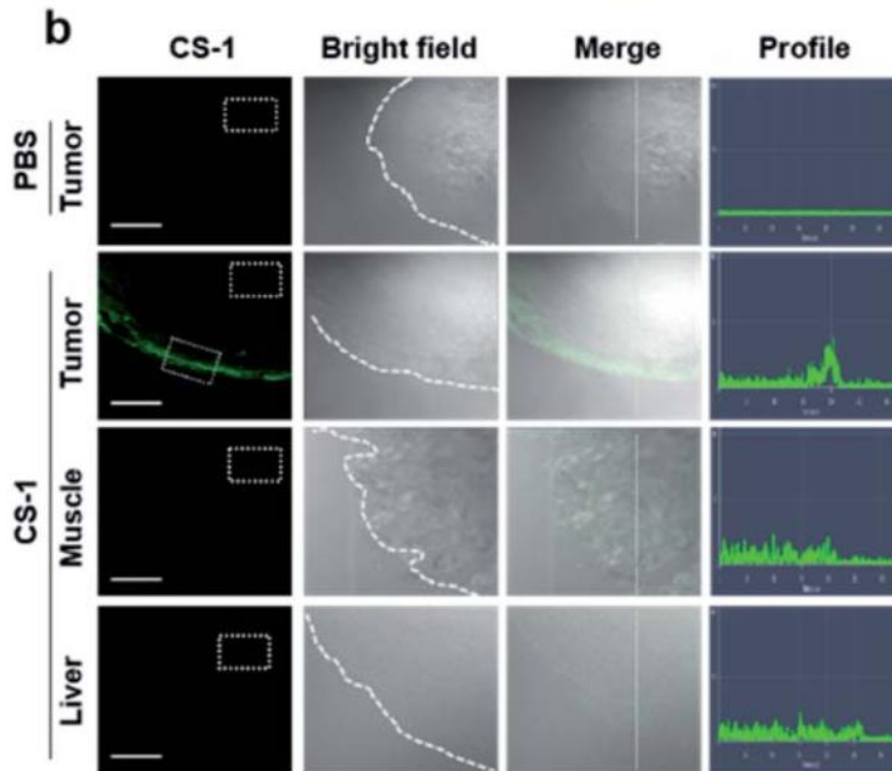
肿瘤模型研究和体内肿瘤标记



A549球体癌细胞



携带A549的小鼠





Thank you!