

Literature Report

Reporter: Chunyu Yan

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A Small Molecule Fluorogenic Probe for the Detection of Sphingosine in Living Cells

Andrew K. Rudd, Neel Mittal, Esther W. Lim, Christian M. Metallo, and Neal K. Devaraj*

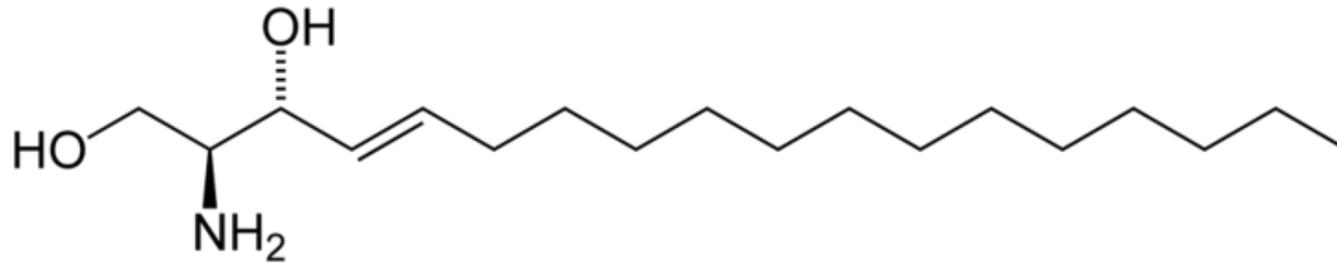
Corresponding Author

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Introduction



鞘氨醇 (Sphingosine)，又称神经鞘氨醇，学名2-氨基-4-十八烯-1,3-二醇，是一种含有不饱和烃基链的十八碳氨基醇。鞘氨醇属于**鞘脂类**，为细胞膜组成的成分之一。



研究意义：单链鞘磷脂是一种重要的结构性脂质和信号分子。**鞘氨醇代谢异常**可在多种疾病中观察到，包括癌症、糖尿病和阿尔茨海默氏症。

研究现状：尽管它具有生物学上的重要性，但目前缺乏检测活细胞中鞘氨醇代谢的工具。这可能是由于**缺乏和活细胞相容性亲的疏水性的脂类高选择性探针**。

结果：该探针对鞘氨醇表现出剂量依赖的反应，并能够检测内源性鞘氨醇库。

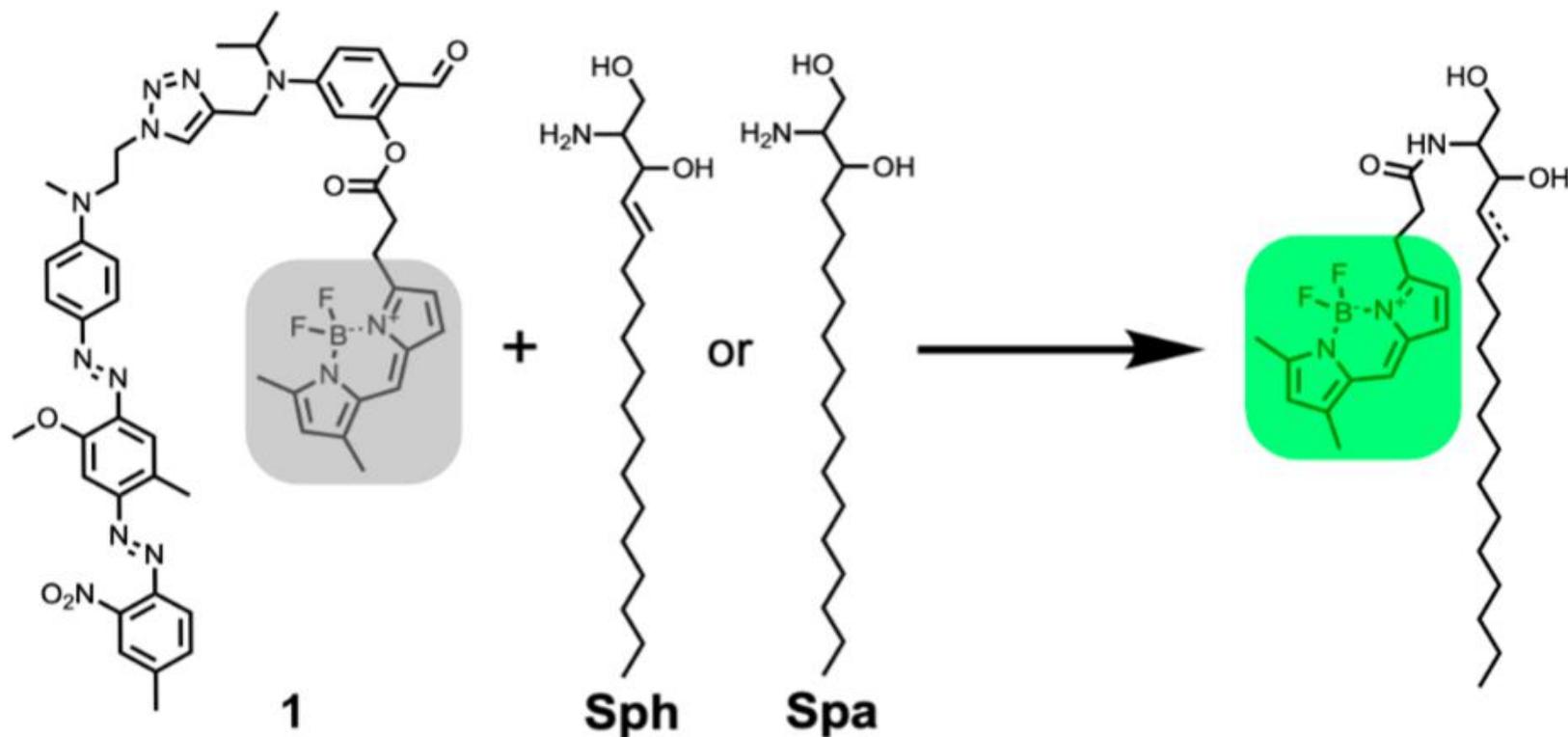
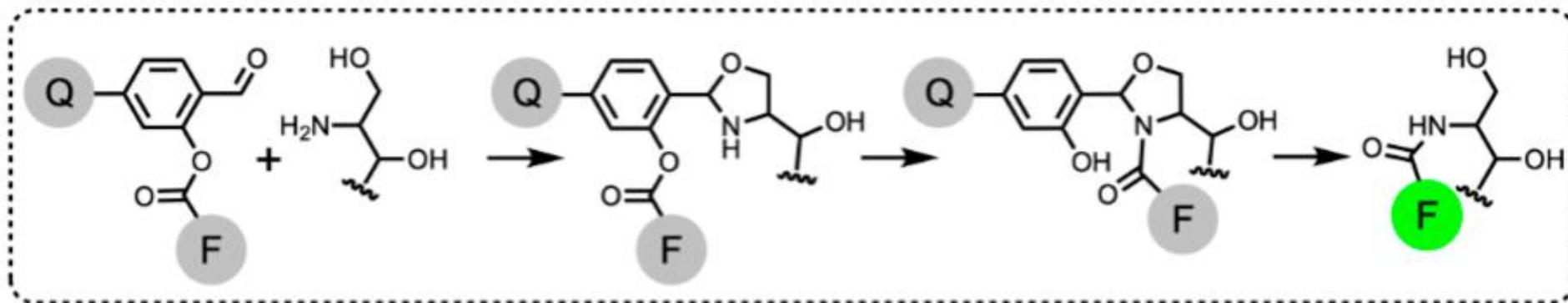
成功地检测到Niemann PickC1型 (NPC1)患者细胞中鞘氨醇的积累。这是一种脂质运输障碍疾病，鞘氨醇的增加介导了发病。



Introduction



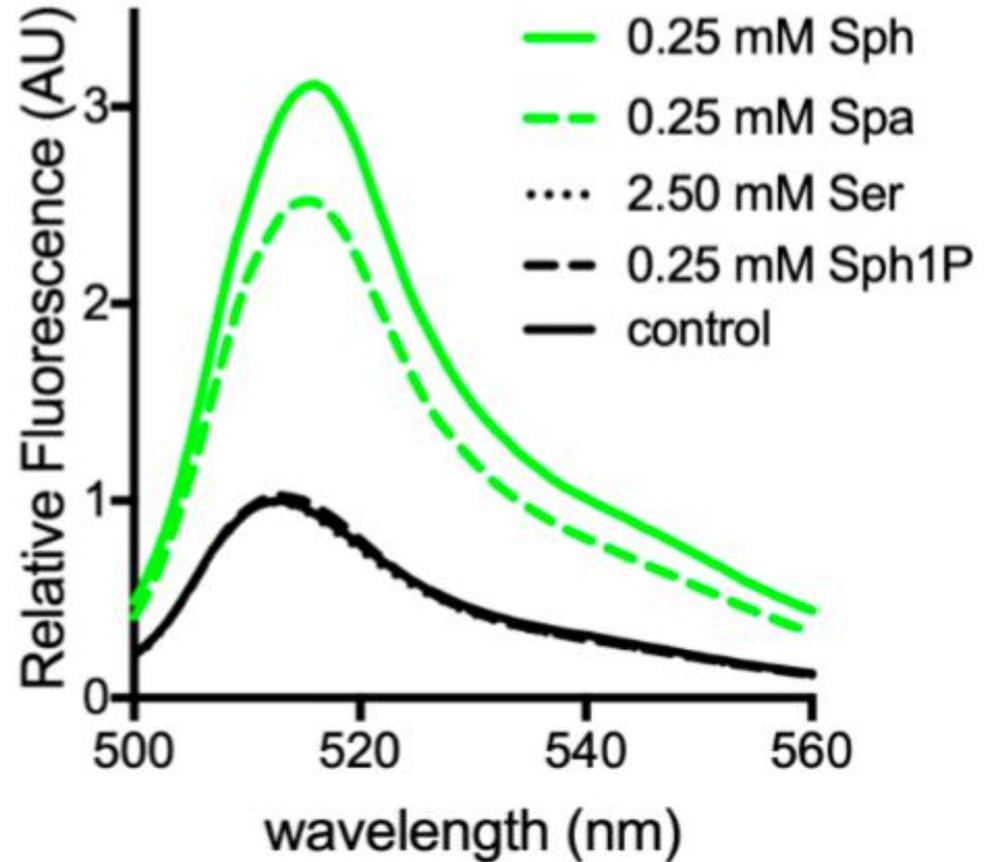
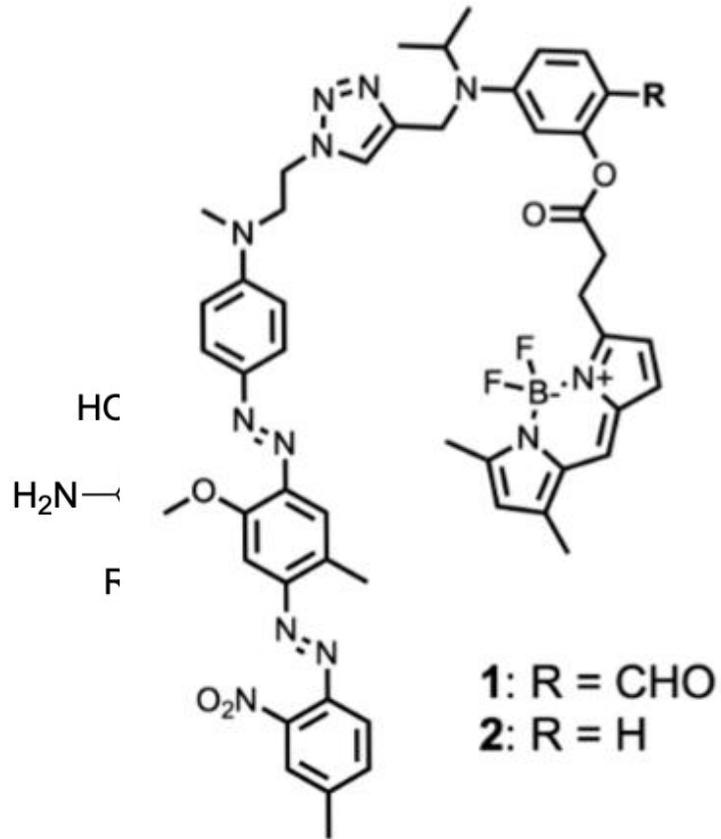
原理：



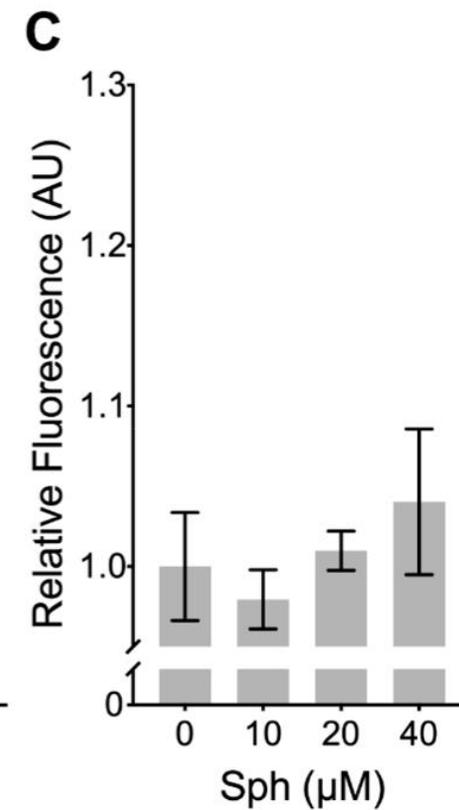
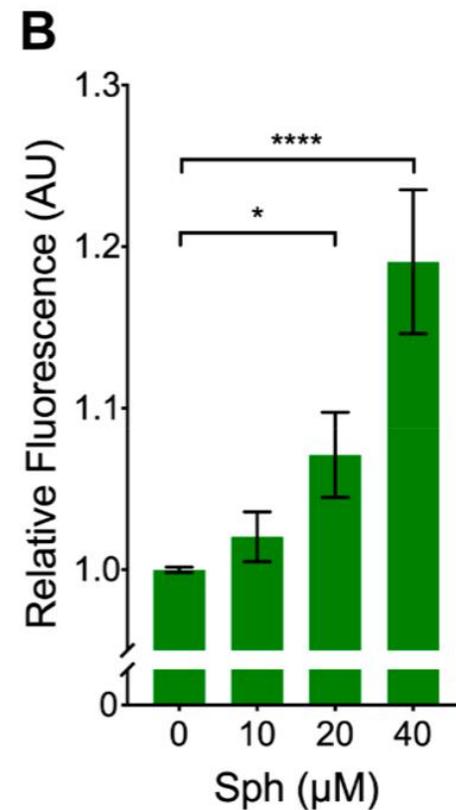
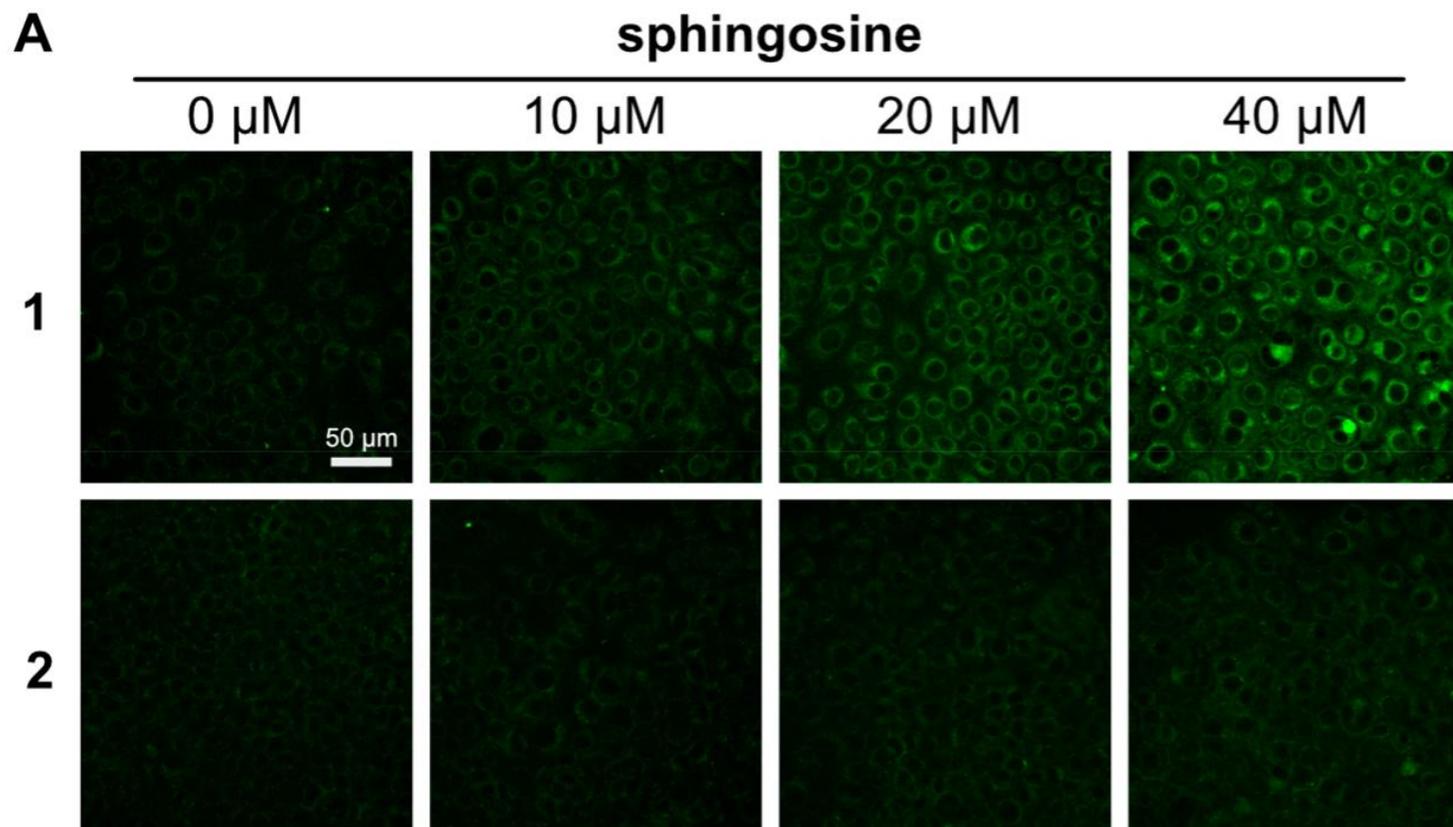
Introduction



Synthesis of Bodipy FL-Sph 3 and Bodipy FL-Spa 4

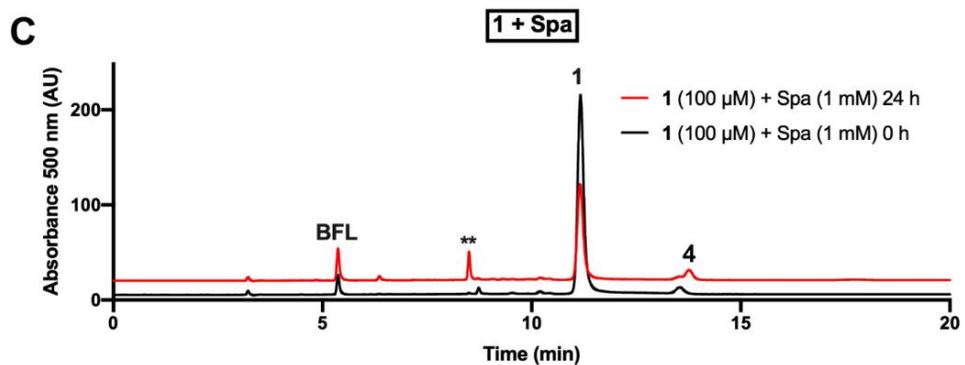
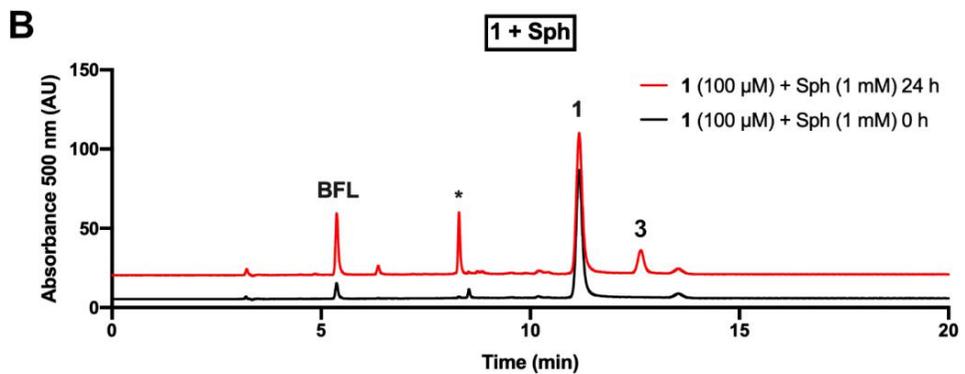
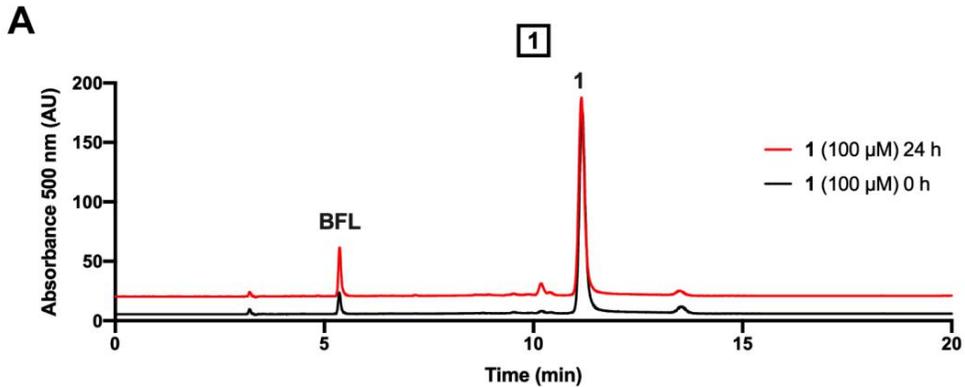


Problem and Solution

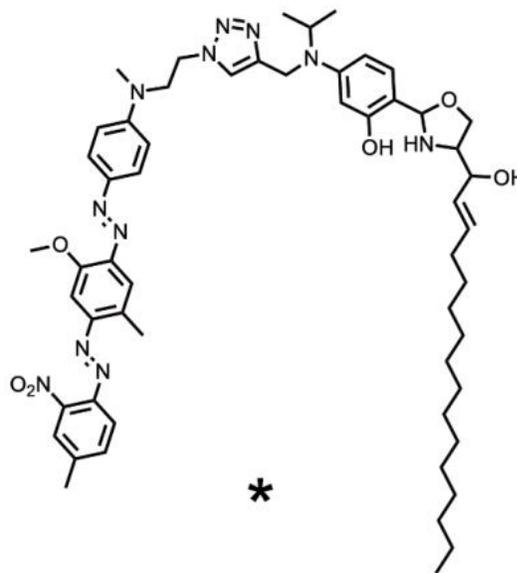


在磷脂膜存在的情况下，水杨醛修饰的脂类只对既亲脂又含有1,2-氨基醇功能的分子发生反应

Problem and Solution

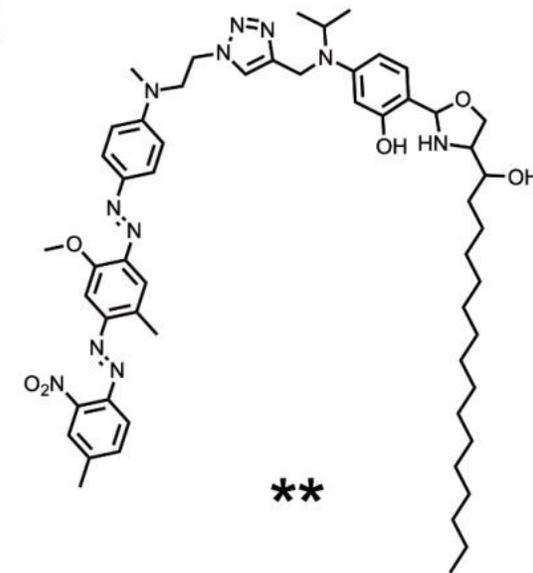


D



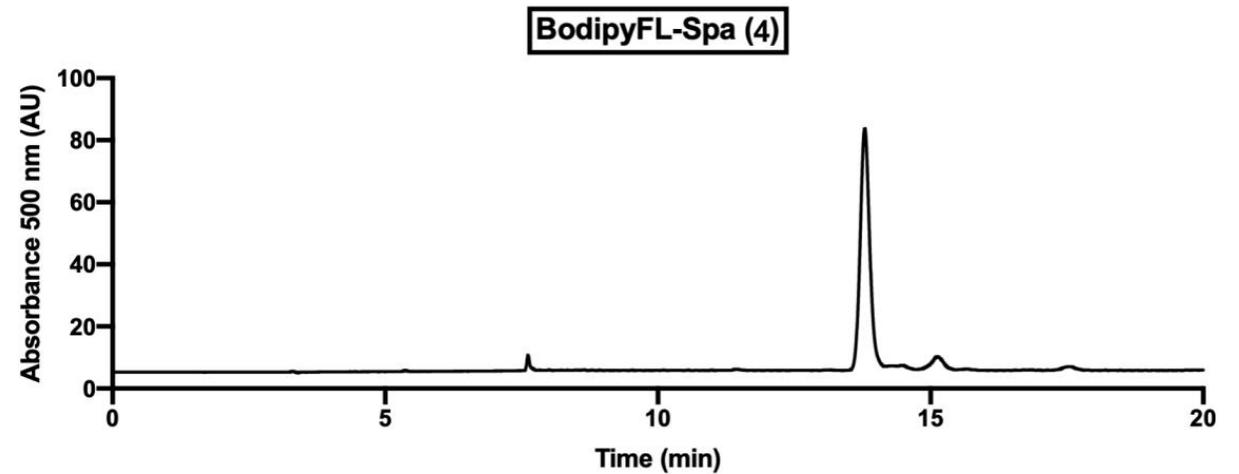
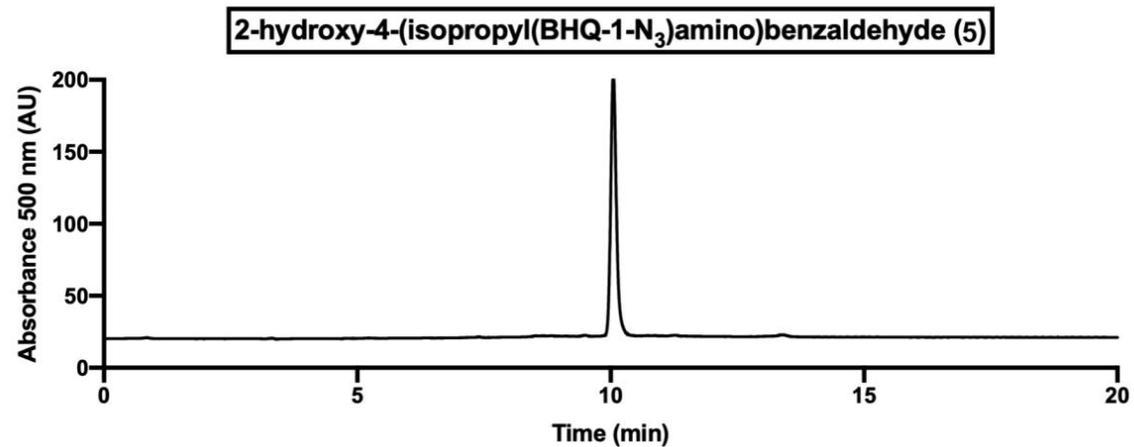
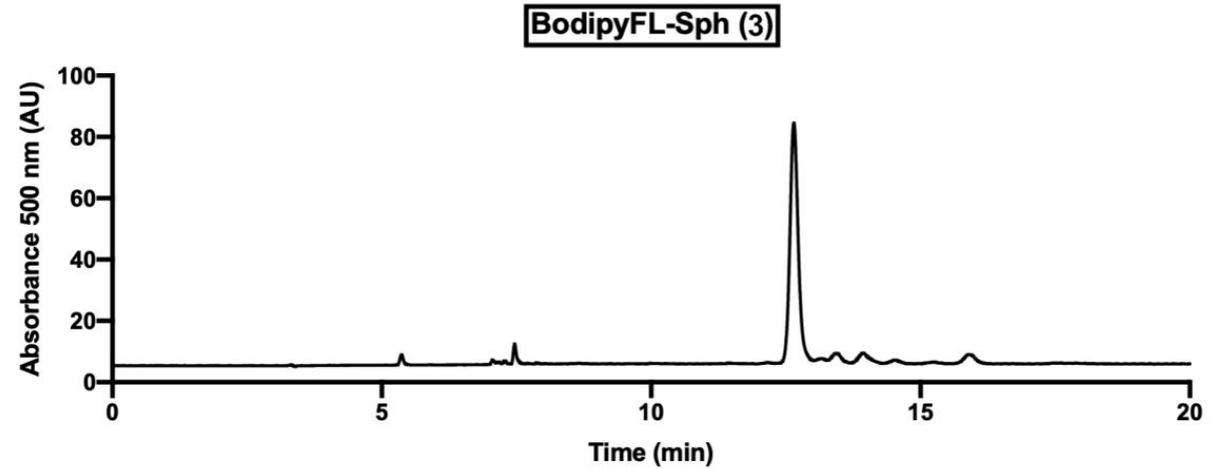
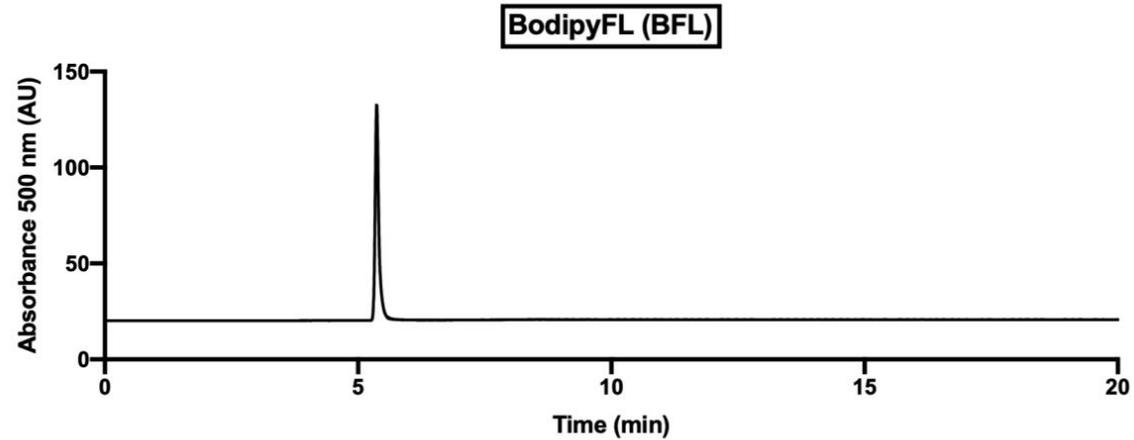
Elution Time: 8.3 min
MS (ESI) calculated $[M+H]^+$: 986.60,
observed: 986.53

E



Elution Time: 8.5 min
MS (ESI) calculated $[M+H]^+$: 988.61,
observed: 988.51

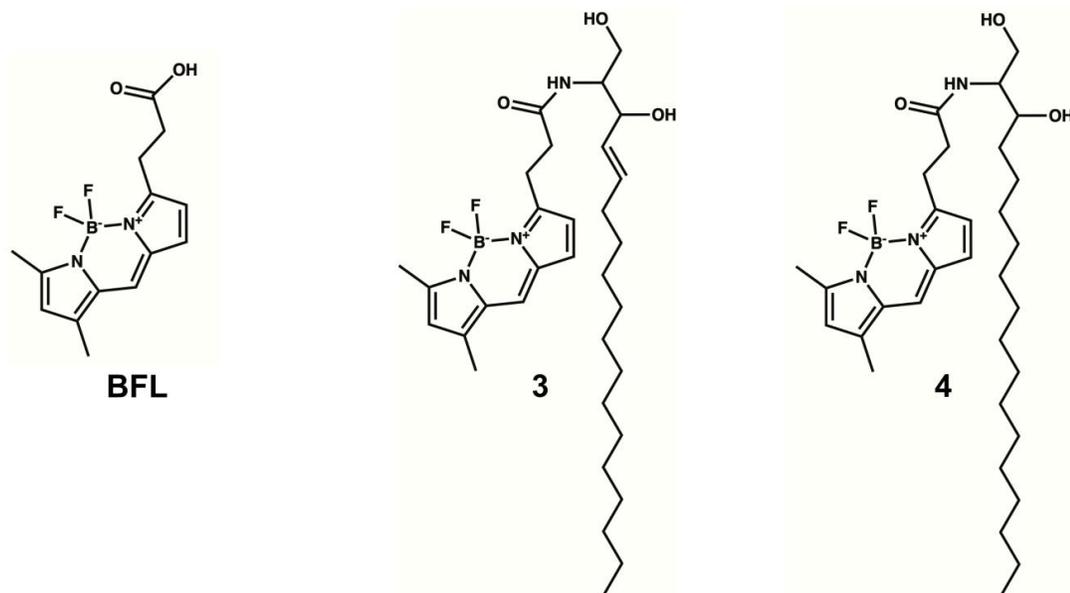
Problem and Solution



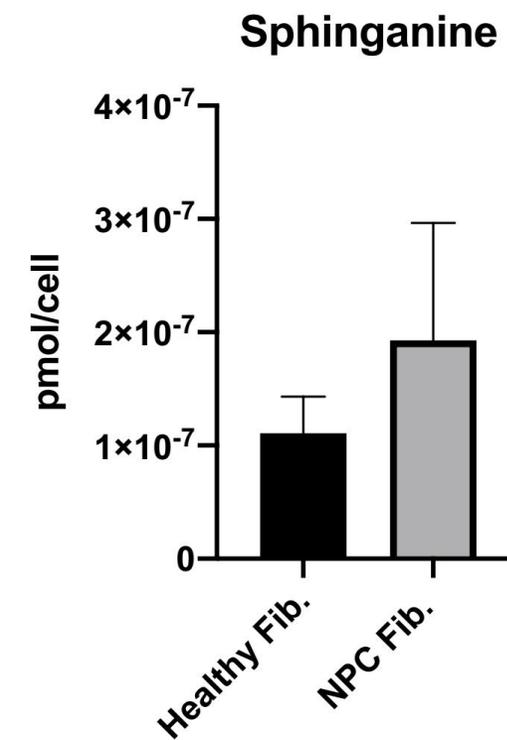
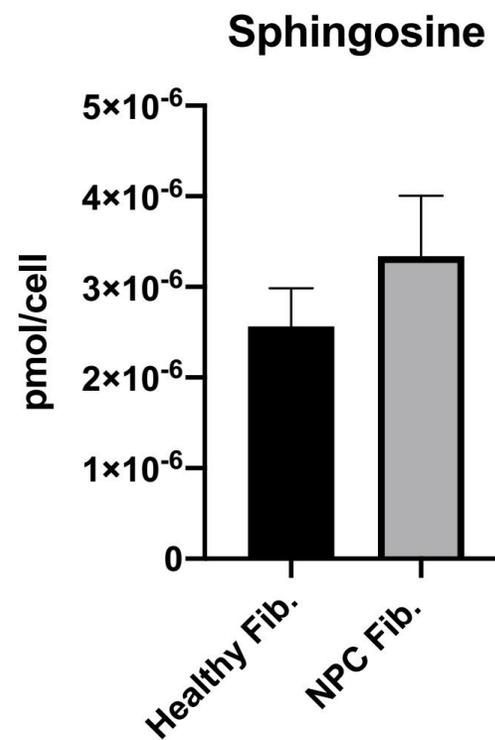
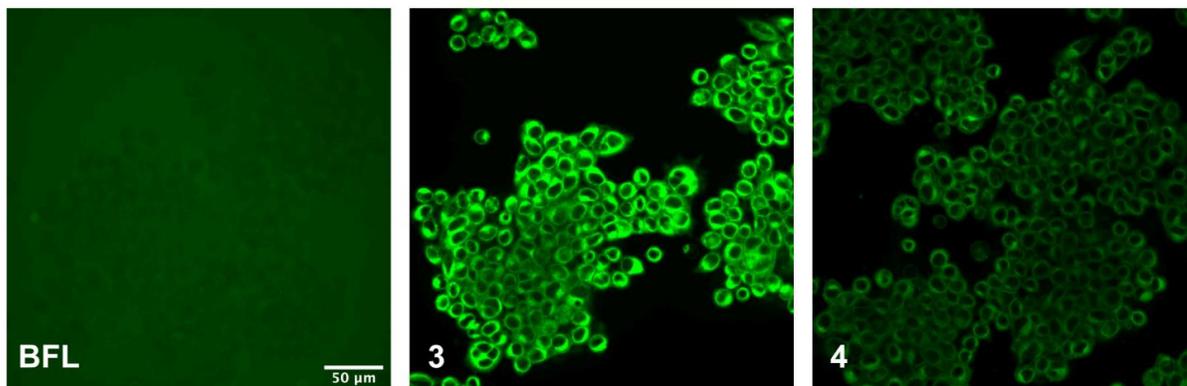
Problem and Solution



A

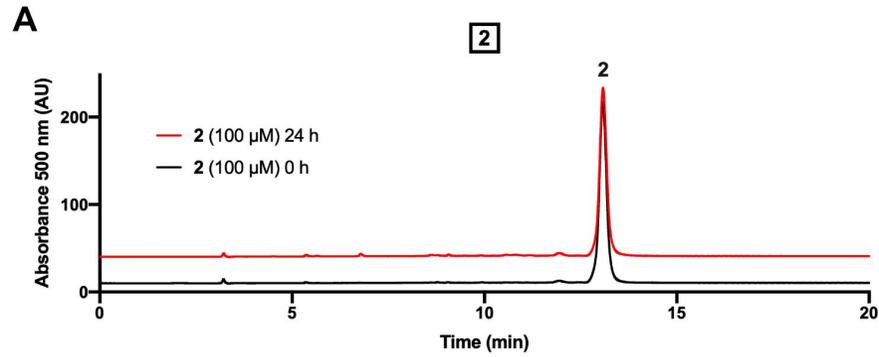


B





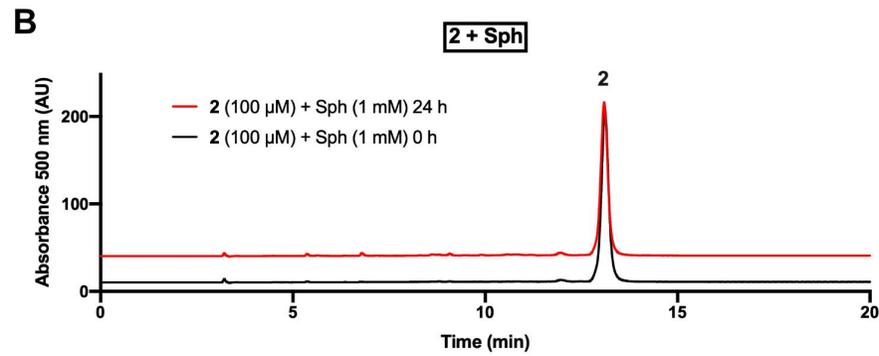
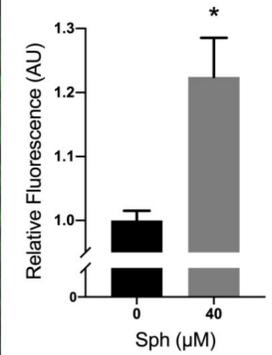
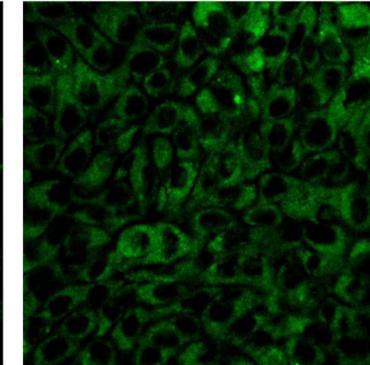
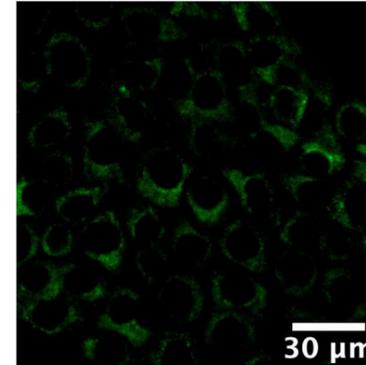
Result and Discussion



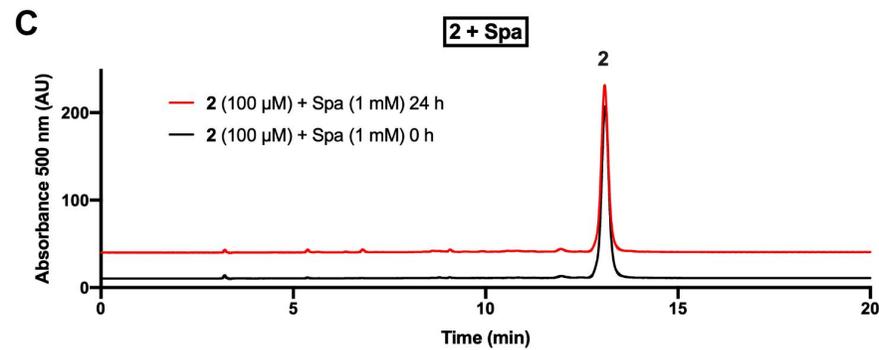
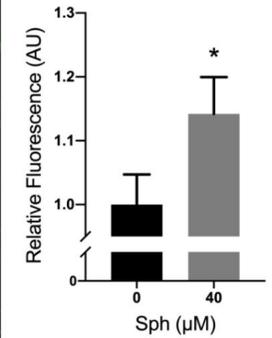
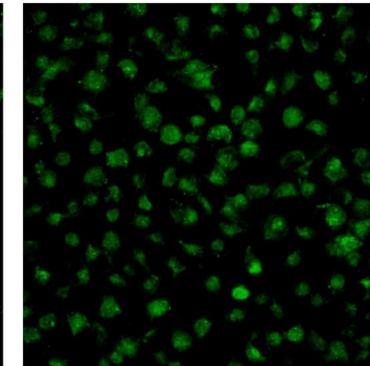
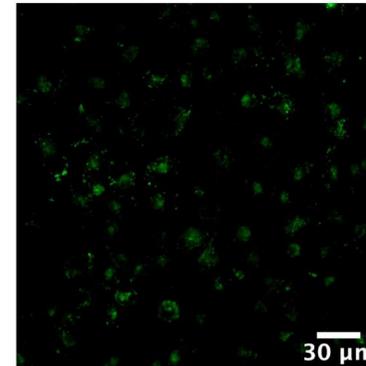
BxPC-3

0 μ M sph

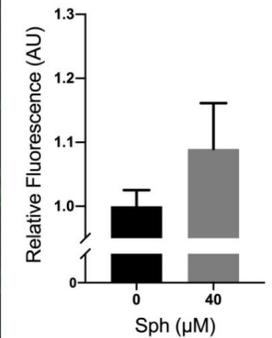
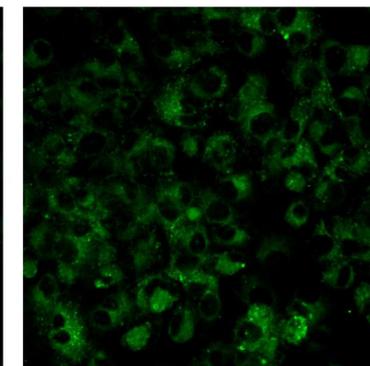
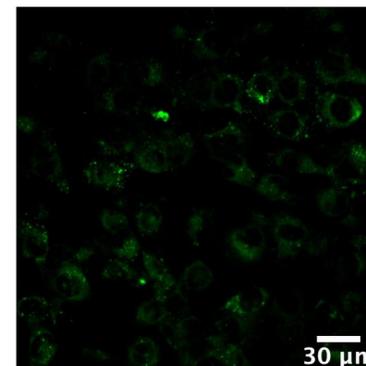
40 μ M sph



MIA PaCa-2

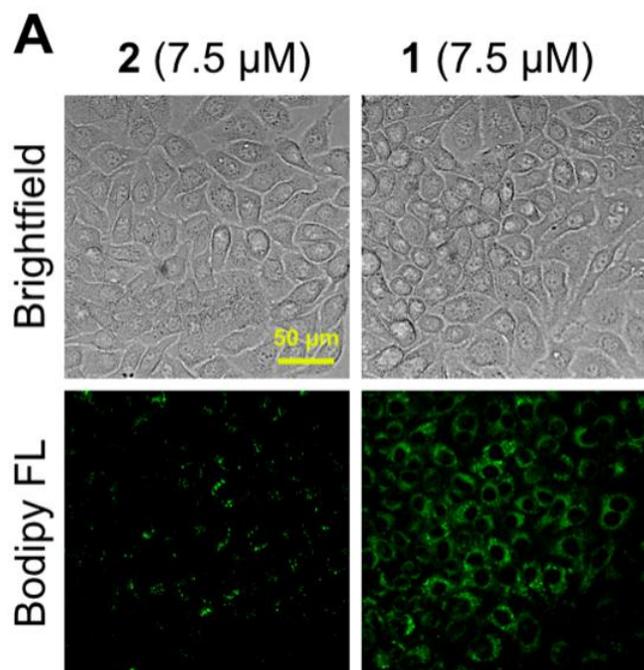


T24

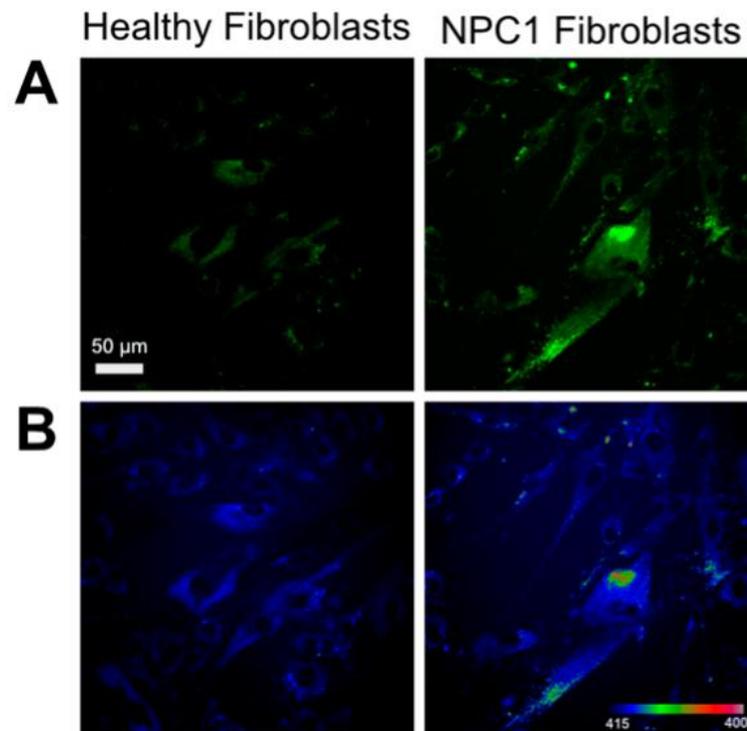
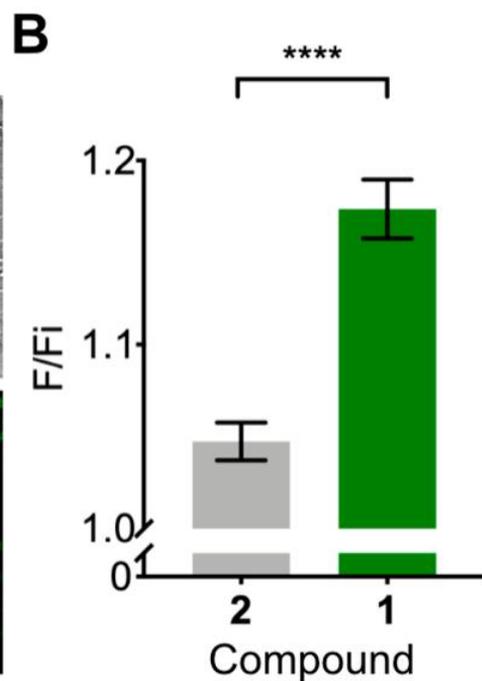


U

Problem and Solution



Hela细胞



NPC1患者纤维细胞

