Literature Report

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Article

Genetically Encoded Sensor Enables Endogenous RNA Imaging with Conformation-Switching Induced Fluorogenic Proteins

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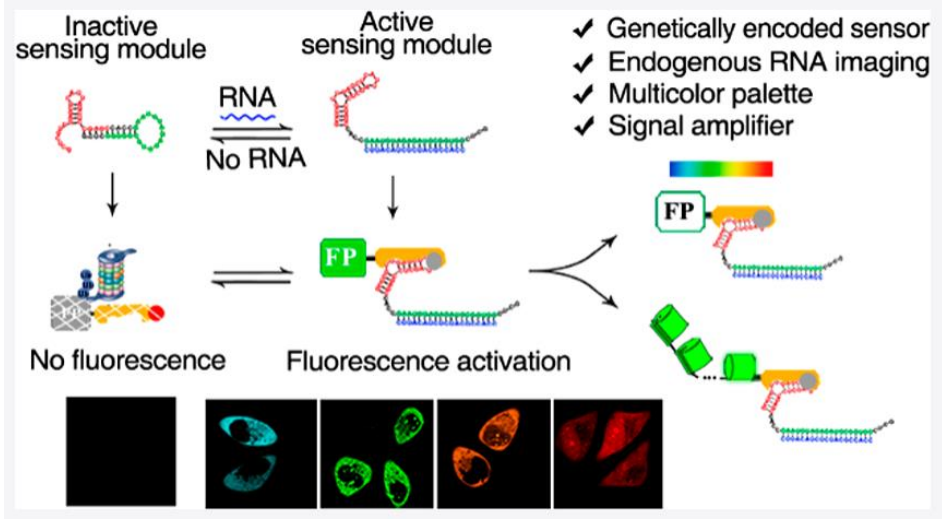

Authors introduce

蒋健晖教授

教育经历：

1996/09 – 1999/06　湖南大学，理学博士
1993/09 – 1996/06　湖南大学，理学硕士
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工作经历：

2019/05 – 至今　　湖南大学，副校长
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2011/01 – 2018/07　湖南大学，化学化工学院 院长
2004/12 – 2018/12　化学生物传感与计量学国家重点实验室，副主任
2003/05 – 至今　　湖南大学，教授
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主要研究方向为**核酸分析化学**、遗传编码分子设计及其生物传感与成像应用。建立化学遗传学方法，发展**RNA荧光激活式化学与蛋白标签新技术**，实现**活细胞内荧光RNA多色单分子成像**；建立类细胞结构的活体核酸输送方法，发展活体内遗传编码成像与基因治疗新技术；发现小分子蛋白识别的末端保护现象，提出末端保护、邻近杂交、隧道电流分析等生物传感新方法，开发循环修复扩增/亚稳定引物扩增等恒温核酸扩增检测技术与传感芯片，相关技术已于湖南融健生物科技公司转化应用。

Background

2014

2. Dian-Ming Zhou, Wen-Fang Du, Qiang Xi, and Jian-Hui Jiang*, A Novel Isothermal Nucleic Acid Amplification Strategy by Cyclic Enzymatic Repairing for Highly Sensitive MicroRNA Detection, Analytical Chemistry, 2014, 86, 6763-6767.

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4. Qing Li, Lin Liu, Jin-Wen Liu, Jian-Hui Jiang*, Ru-Qin Yu, Xia Chu*, Nanomaterial-based fluorescent probes for live-cell imaging, Trends in Analytical Chemistry, 2014, 58, 130-144.

5. Xin-Min Nie, Rong Huang, Cai-Xia Dong, Li-Juan Tang, Rong Gui*, Jian-Hui Jiang*, Plasmonic ELISA for the ultrasensitive detection of Treponema pallidum, Biosensors and Bioelectronics, 2014, 58, 314-319.

6. Qian Wen, Si-Jia Liu, Li-Juan Tang*, Ying Tang, Jian-Hui Jiang*, Gold Nanoparticle Supported Phospholipid Membranes as A Biomimetic Biosensor Platform for Phosphoinositide Signaling Detection, Biosensors and Bioelectronics, 2014, 62, 113-119.

2017

1. Zhan-ming Ying, Zhan Wu, Bin Tu, Weihong Tan, Jian-Hui Jiang*, Genetically-encoded Fluorescent RNA Sensor for Ratiometric Imaging of MicroRNA in Living Tumor Cells, Journal of the American Chemical Society, 2017, 139, 9779-9782.

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Background

2020

2. Long Li, Shujuan Xu, He Yan, Xiaowei Li, Hoda Safari Yazd, Xiang Li, Tong Huang, Cheng Cui*, Jianhui Jiang*, Weihong Tan*, Nucleic Acid Aptamers for Molecular Diagnostics and Therapeutics: Advances and Perspectives, Angewandte Chemie International Edition, 2021, 60, 2221-2231.

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2021

8. Cai-Xia Dou, Chaoyang Liu, Zhan-Ming Ying*, Wanrong Dong*, Fenglin Wang*, Jian-Hui Jiang, Genetically Encoded Dual-Color Light-Up RNA Sensor Enabled Ratiometric Imaging of MicroRNA, Analytical Chemistry, 2021, 93(4): 2534-2540.

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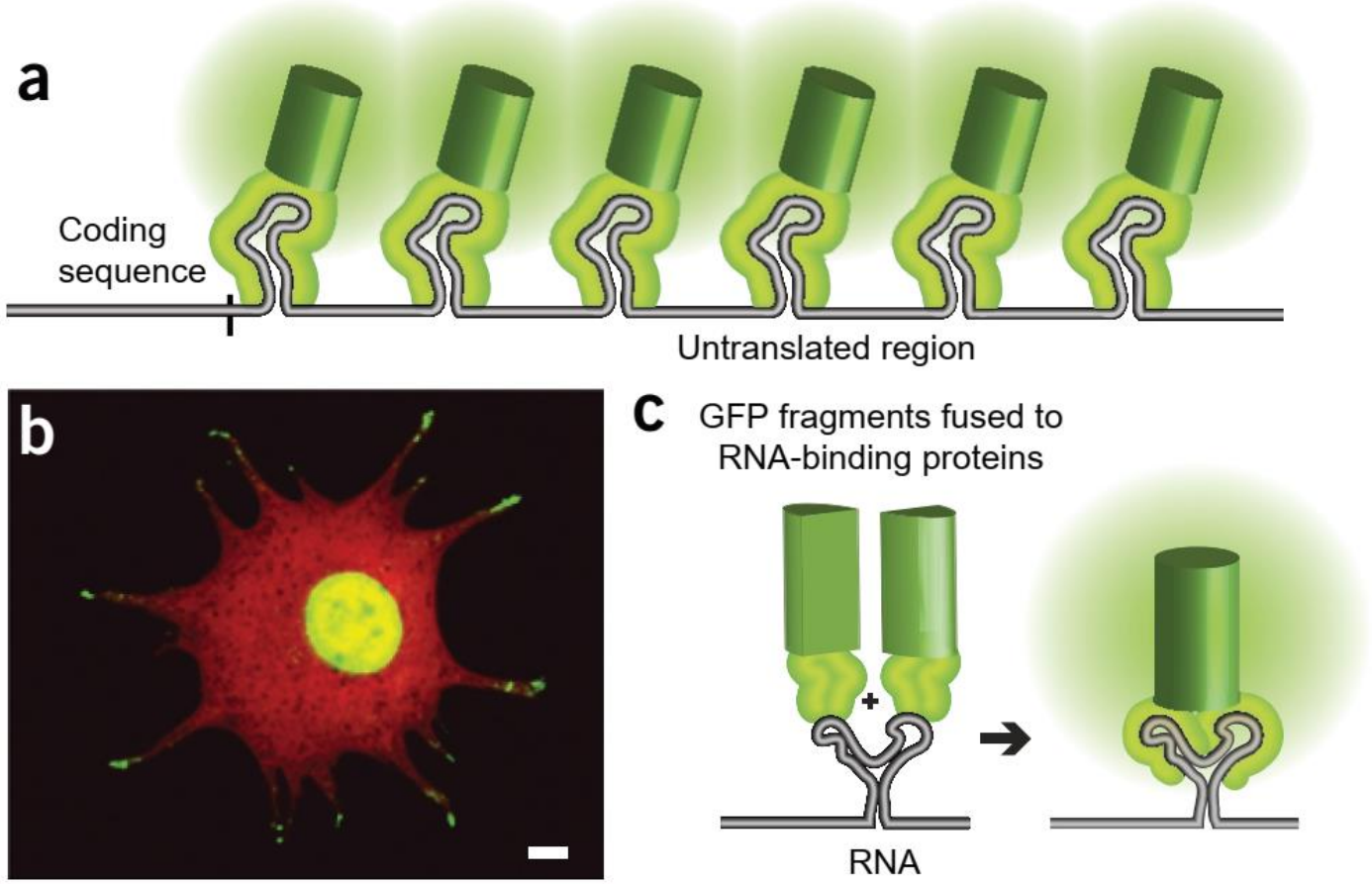
12. Lu-Ying Duan, Jin-Wen Liu*, Ru-Qin Yu, Jian-Hui Jiang*, DNAzyme cascade circuits in highly integrated DNA nanomachines for sensitive microRNAs imaging in living cells, Biosensors & Bioelectronics, 2021, 177: 112976-112976.

Background

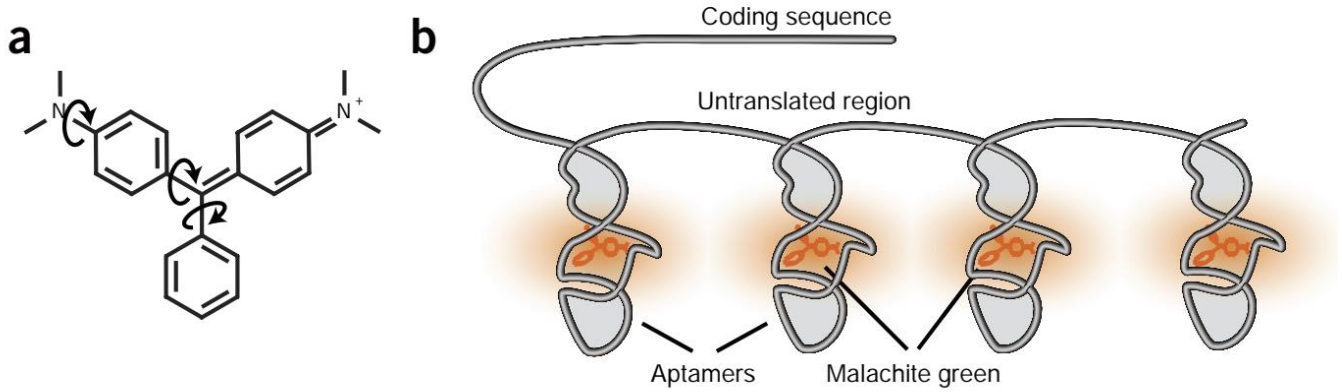
1. RNA结合蛋白

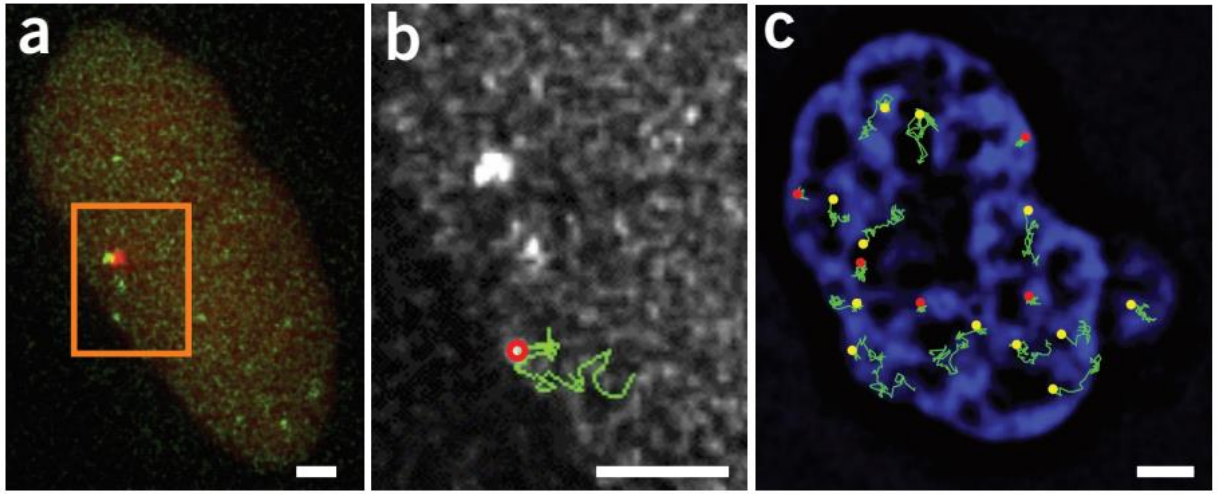


Nature Methods, 2009, 331

Background

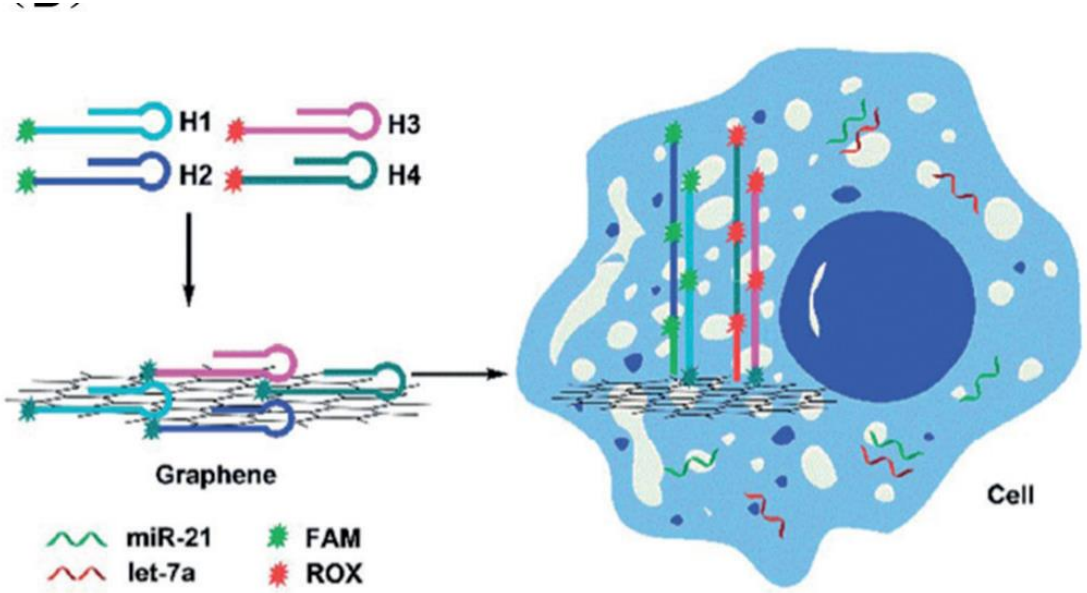
2. 适体标签





Nature Methods, 2009, 331

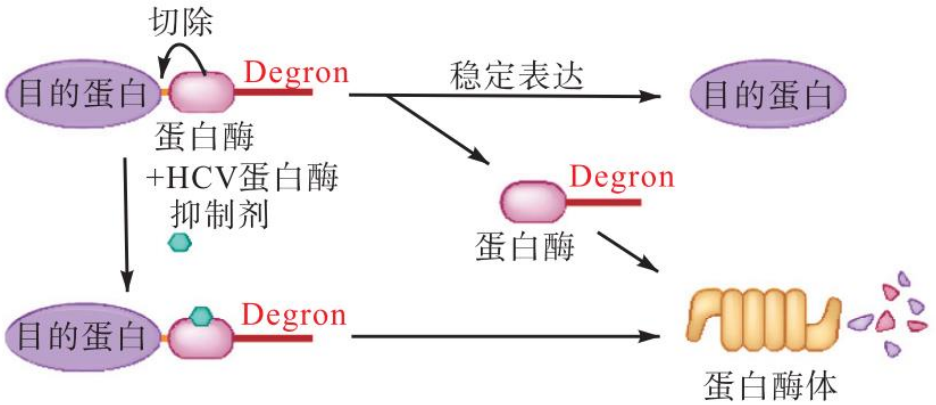
3. 组装杂交



Angew. Chem. Int. Ed. 2019, 58, 11574 – 11585

Background

蛋白降解子 (Degron) 是蛋白质的一部分，Degrons 存在于各种生物体中，从酵母中首次发现,类型不同的 Degrons，并且即使在这些种类中也存在高度的变异性，但是它们在调节蛋白质降解速率方面都是相似的．迄今为止，基于蛋白降解子原理开发的蛋白降解系统依据其诱导方式，大致可分为**小分子诱导**、**温度诱导**、**光诱导**这 3 类蛋白降解子系统。



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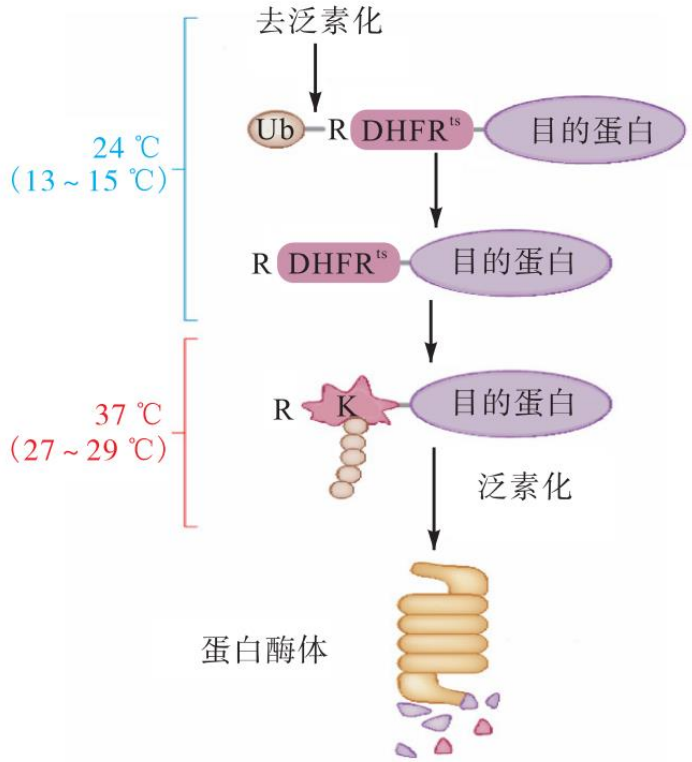
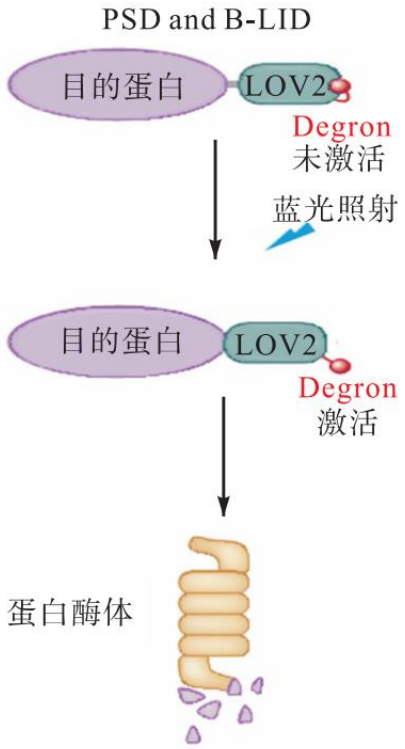


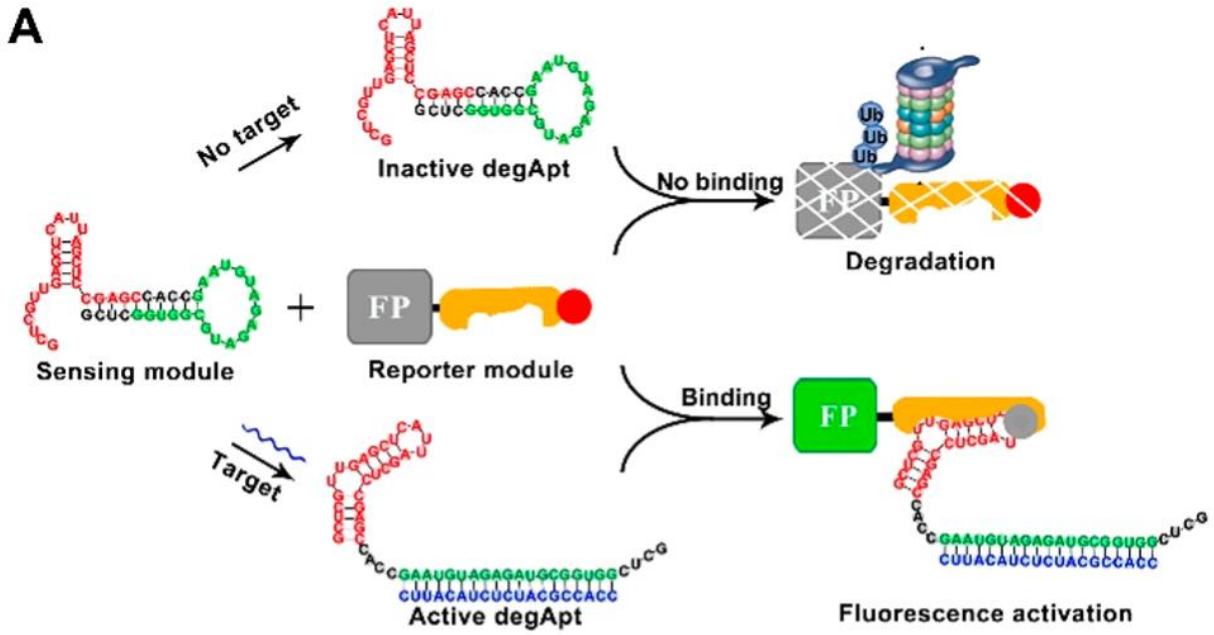
温度诱导



光诱导

Introduction

工作原理：



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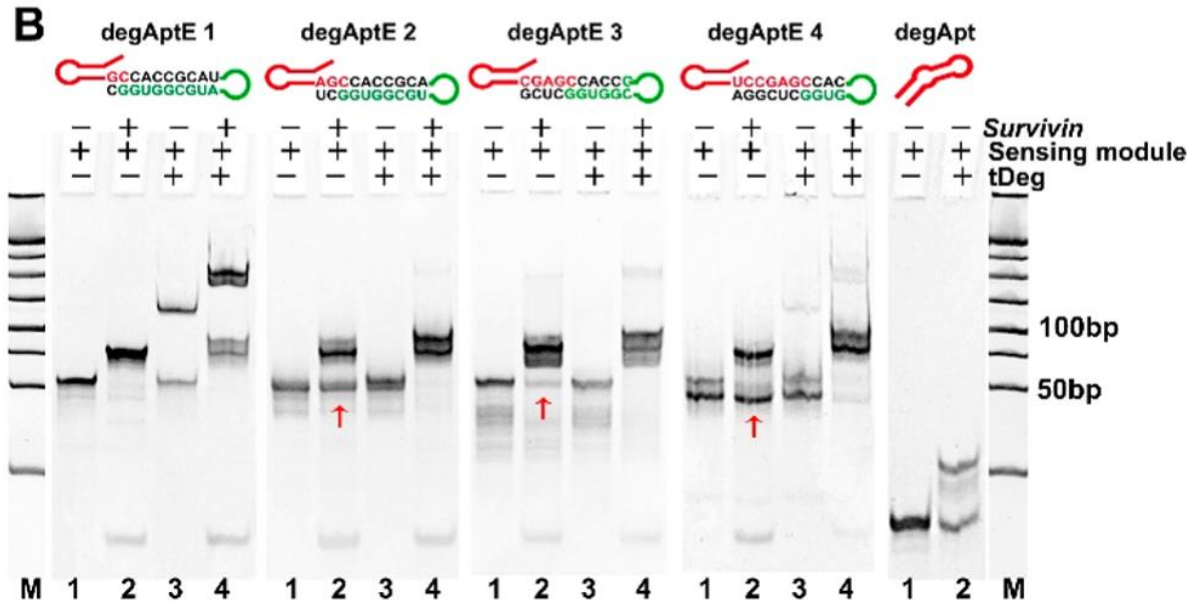
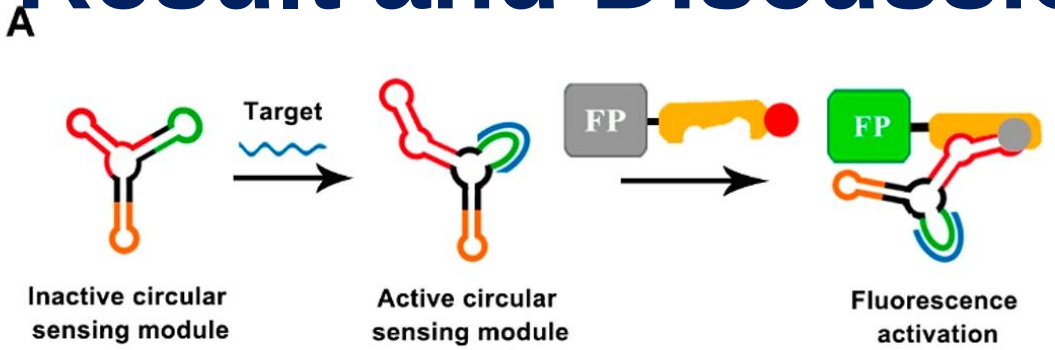
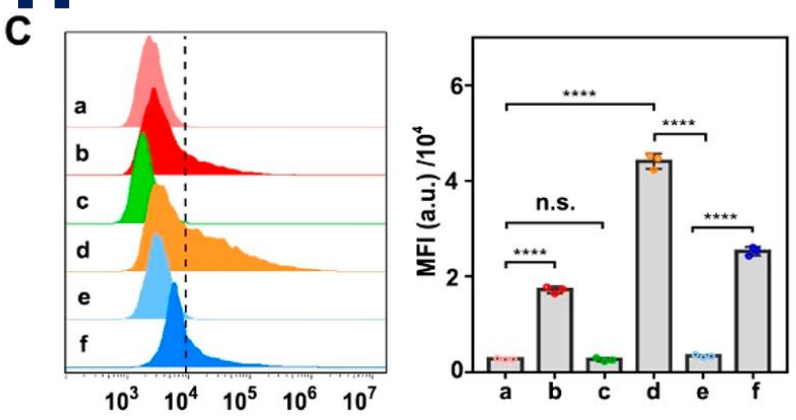
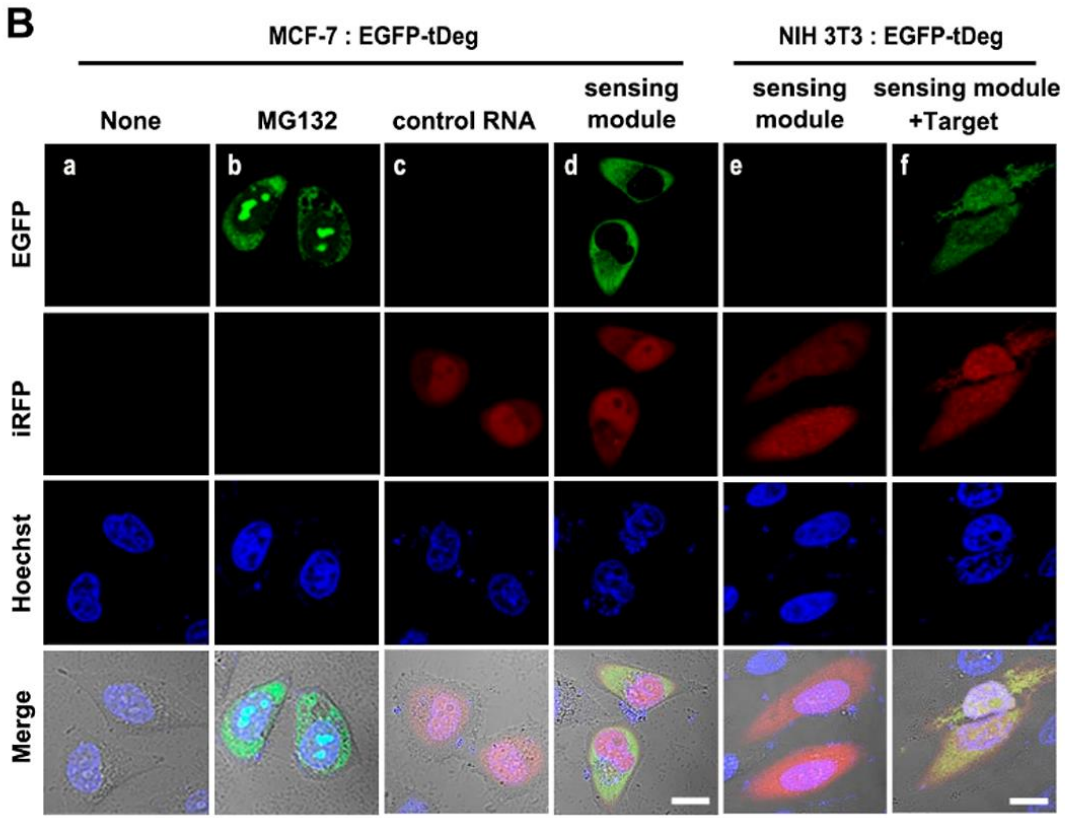
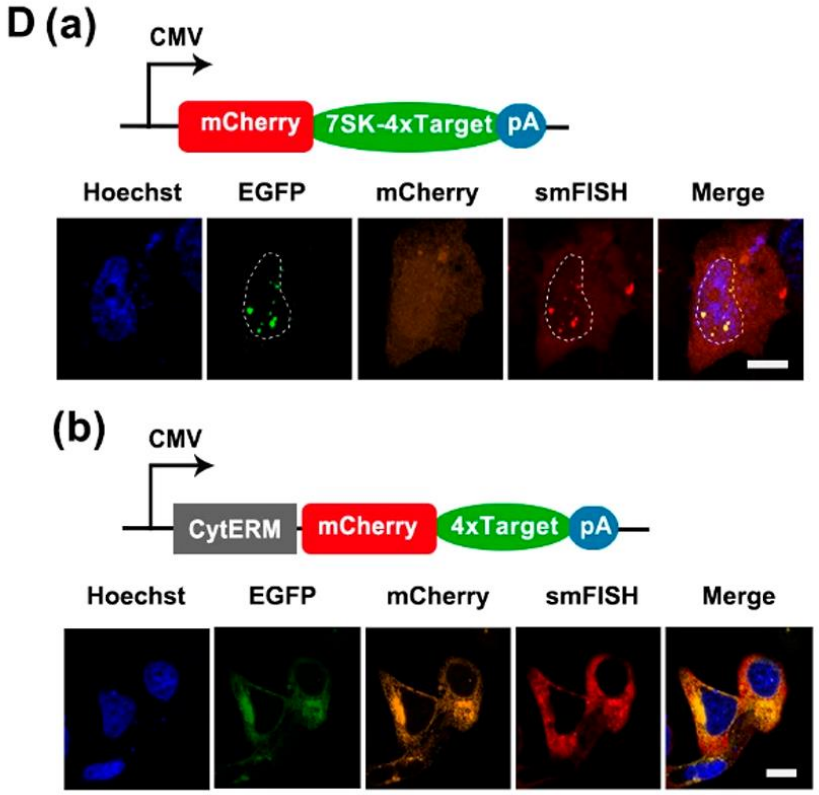


Result and Discussion









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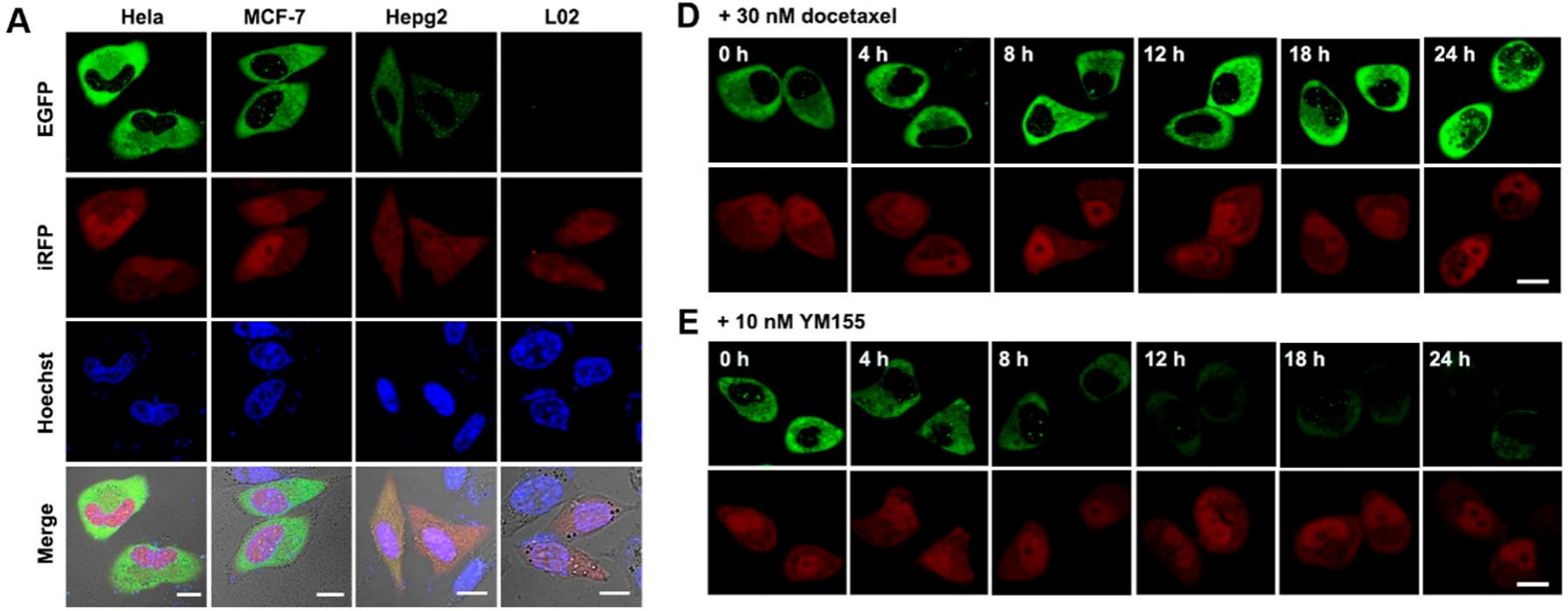

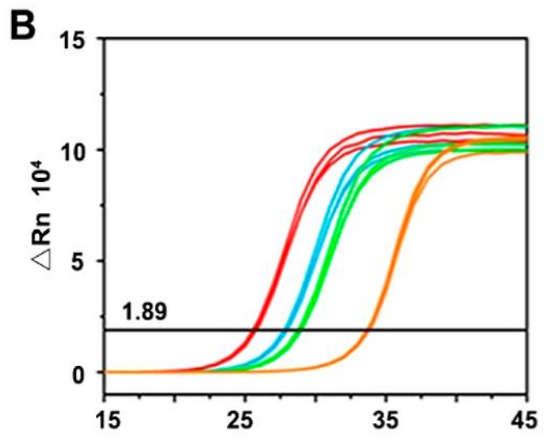

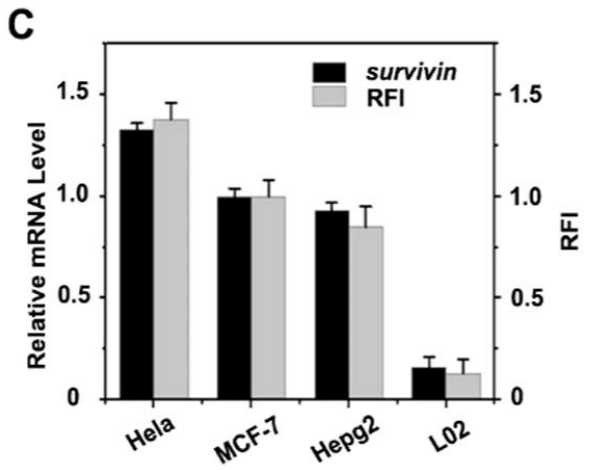

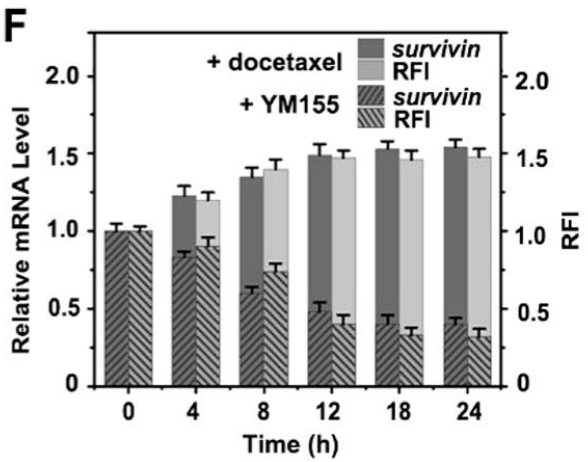

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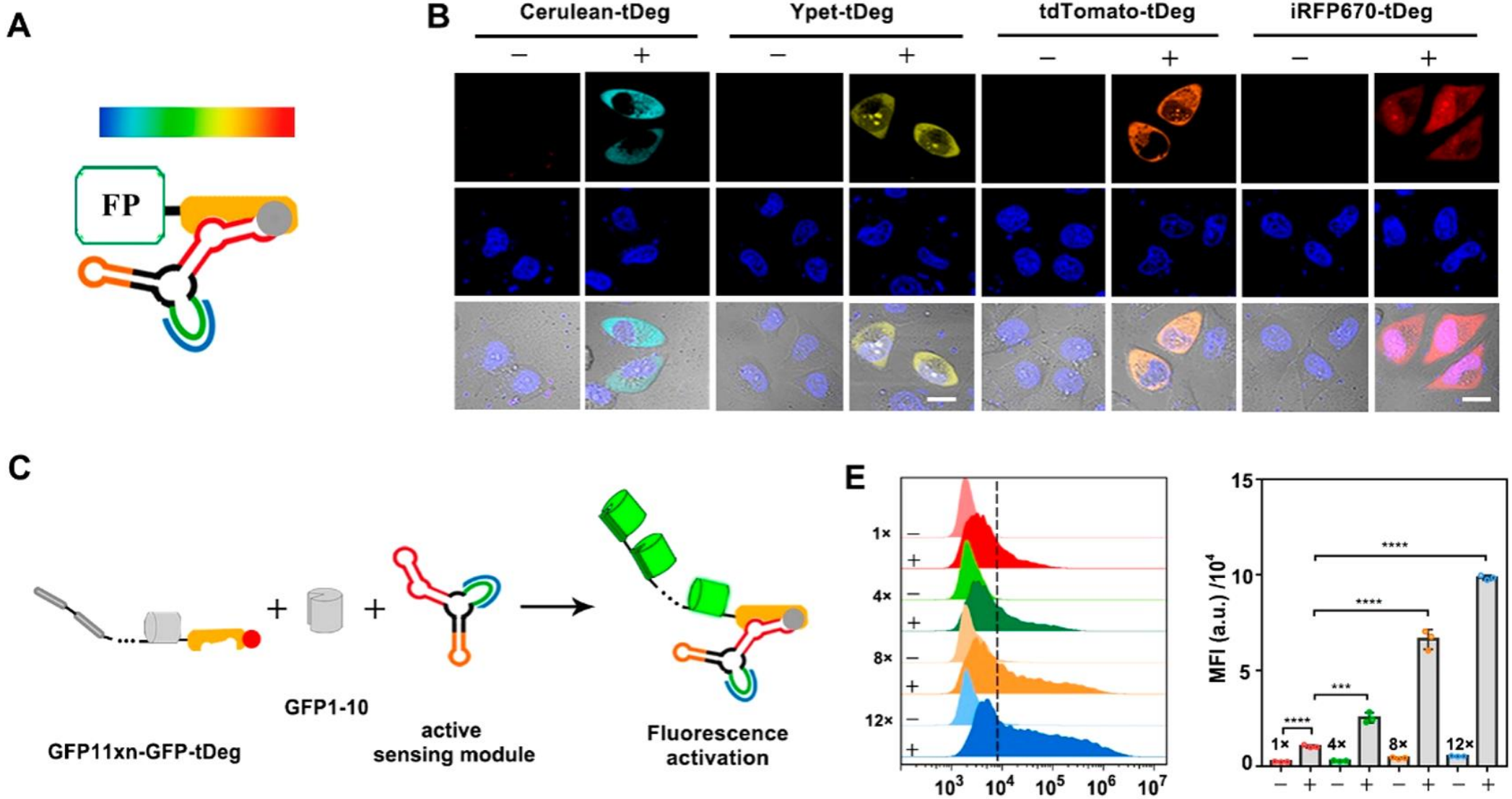
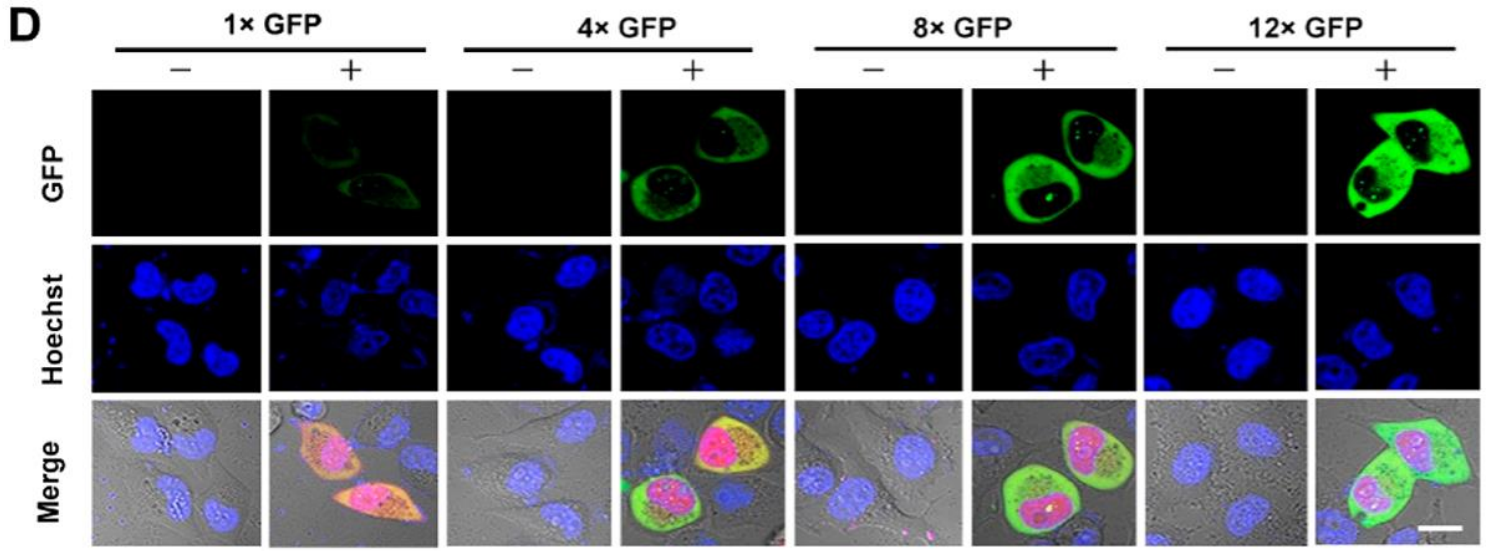
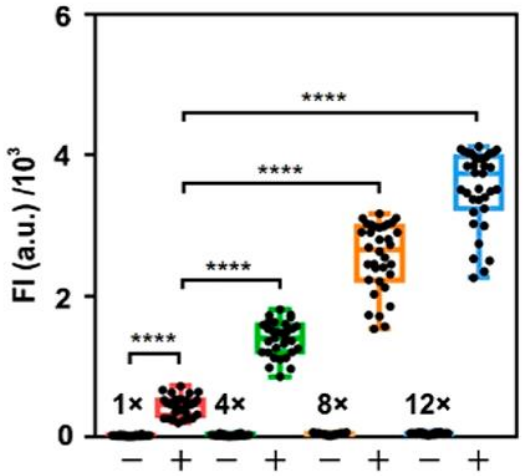
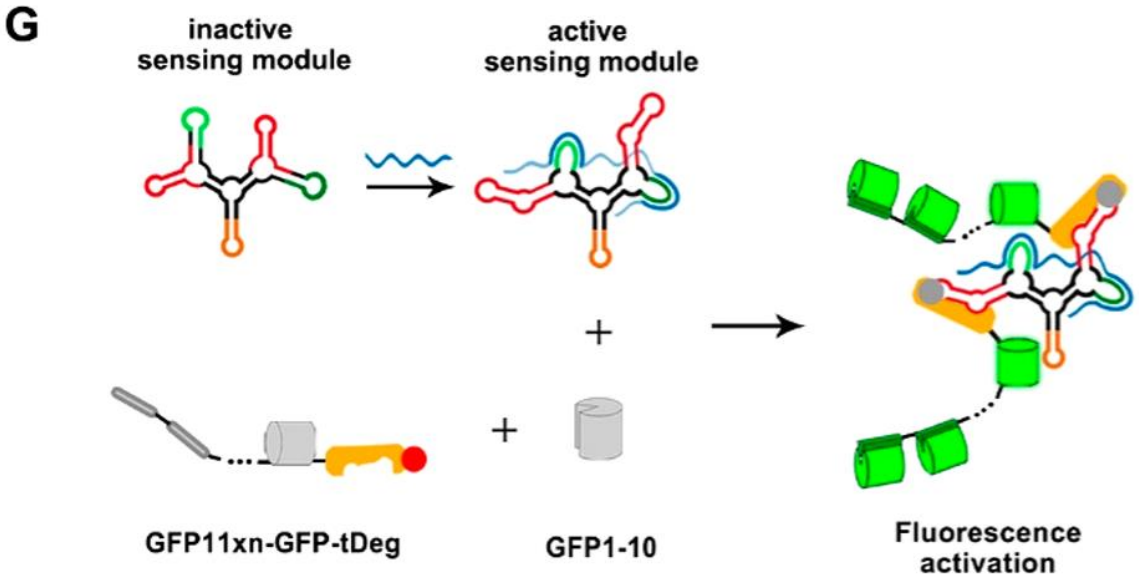
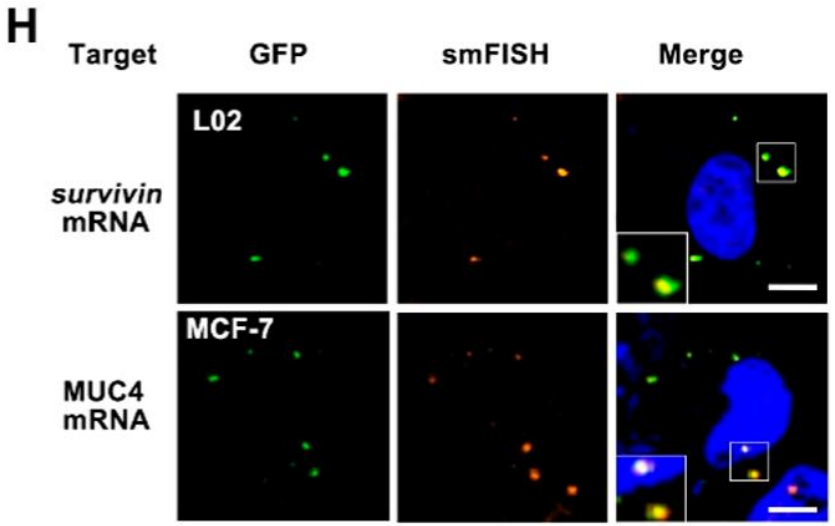


Result and Discussion

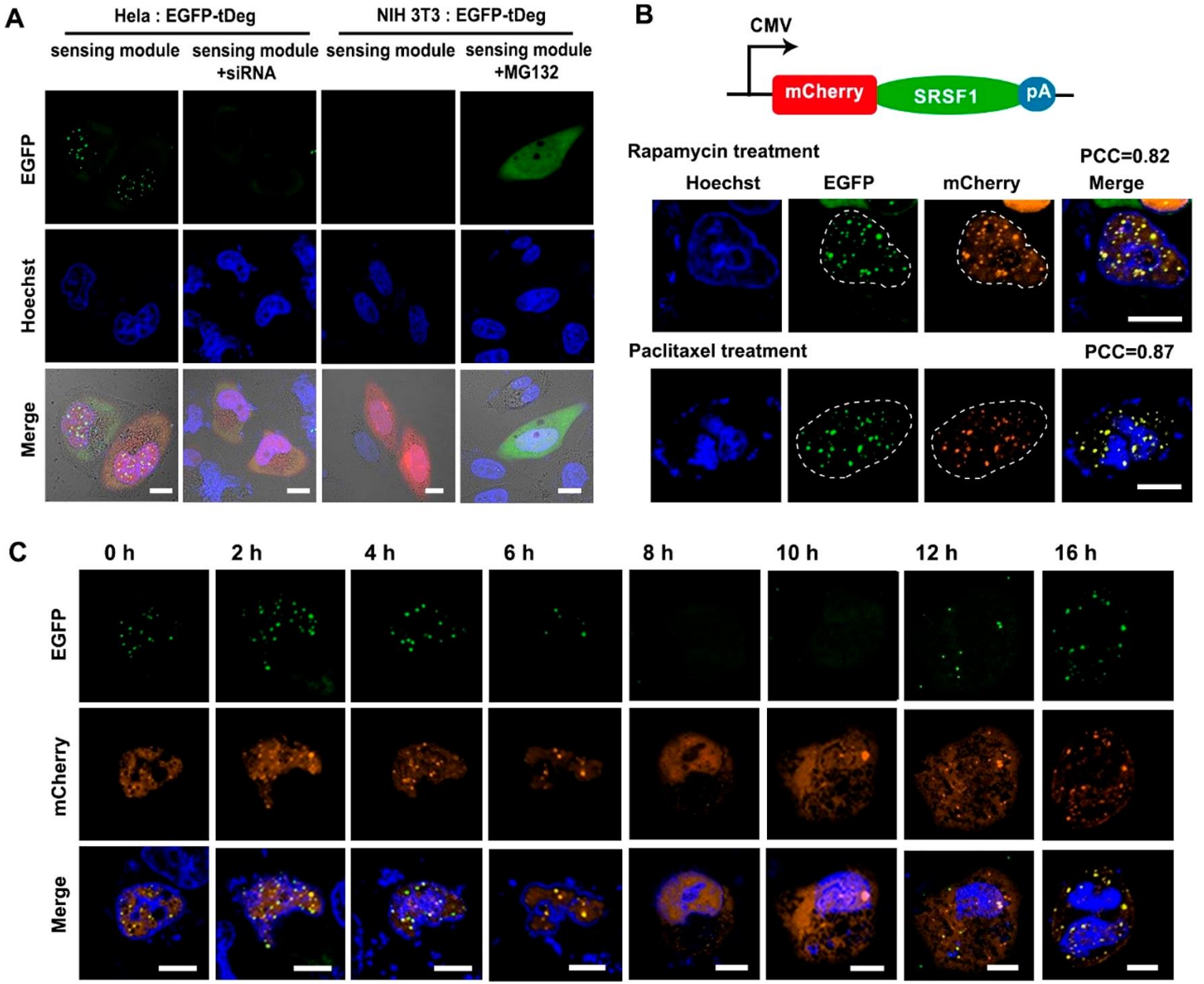






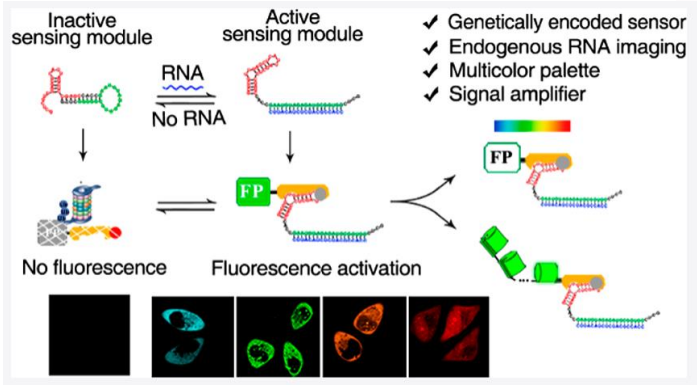


Result and Discussion

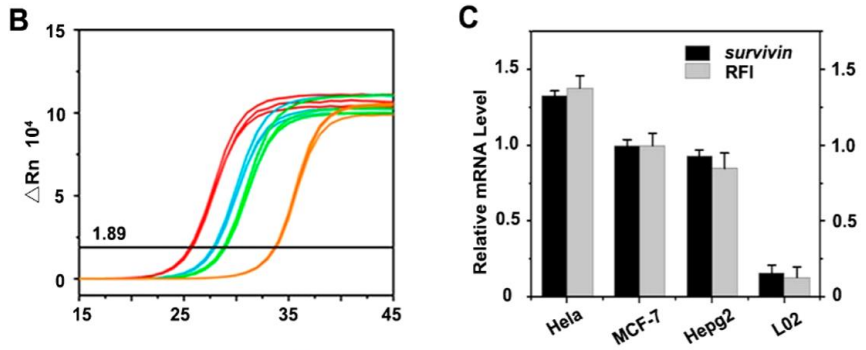


Summary

1. RNA开关荧光蛋白成像策略，为RNA成像提供了一个很好的工具



2. 与荧光定量PCR相对比，发现通过荧光强度可以对活细胞中的RNA定量



3. 荧光蛋白的分解和体内重组增强荧光强度