

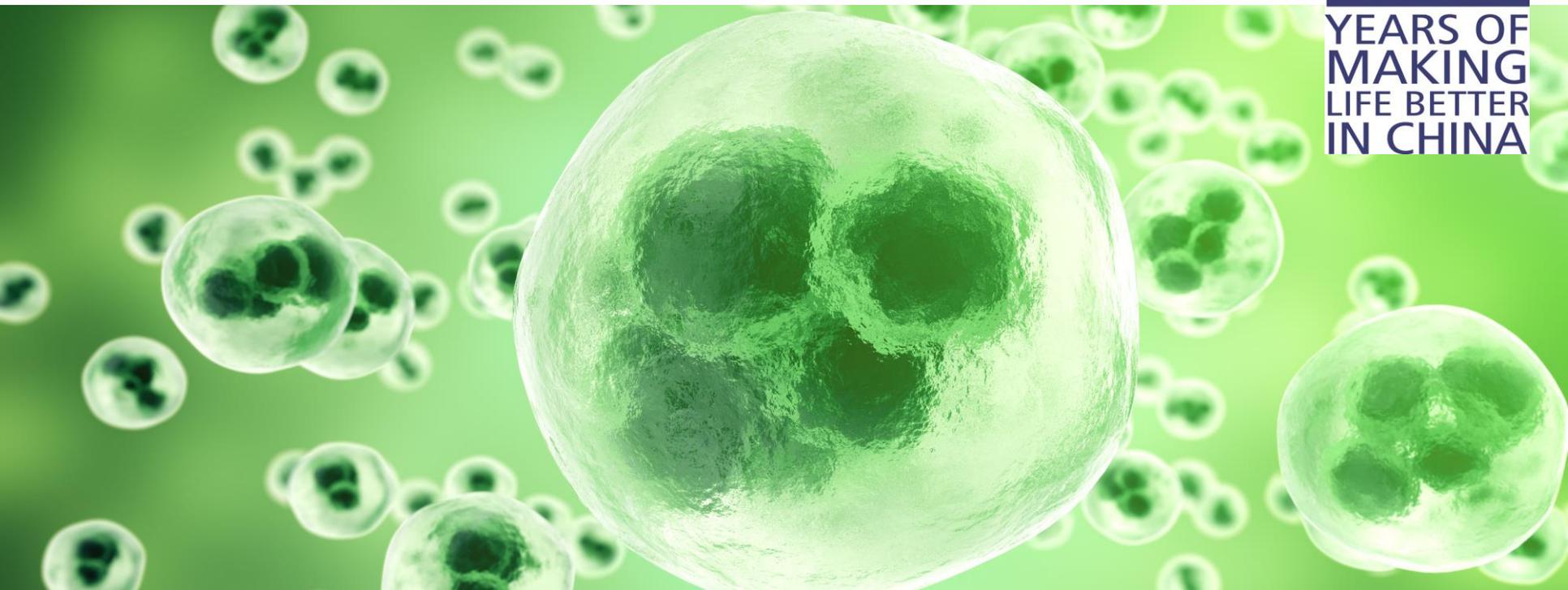
单细胞水平金属组学解决方案

——单细胞水平探寻金属元素的药理毒理学意义

Amy Zhang, Market Development Manager, LST


PerkinElmer[®]
For the Better

40
YEARS OF
MAKING
LIFE BETTER
IN CHINA



Innovating for a Healthier World



诊断



探索

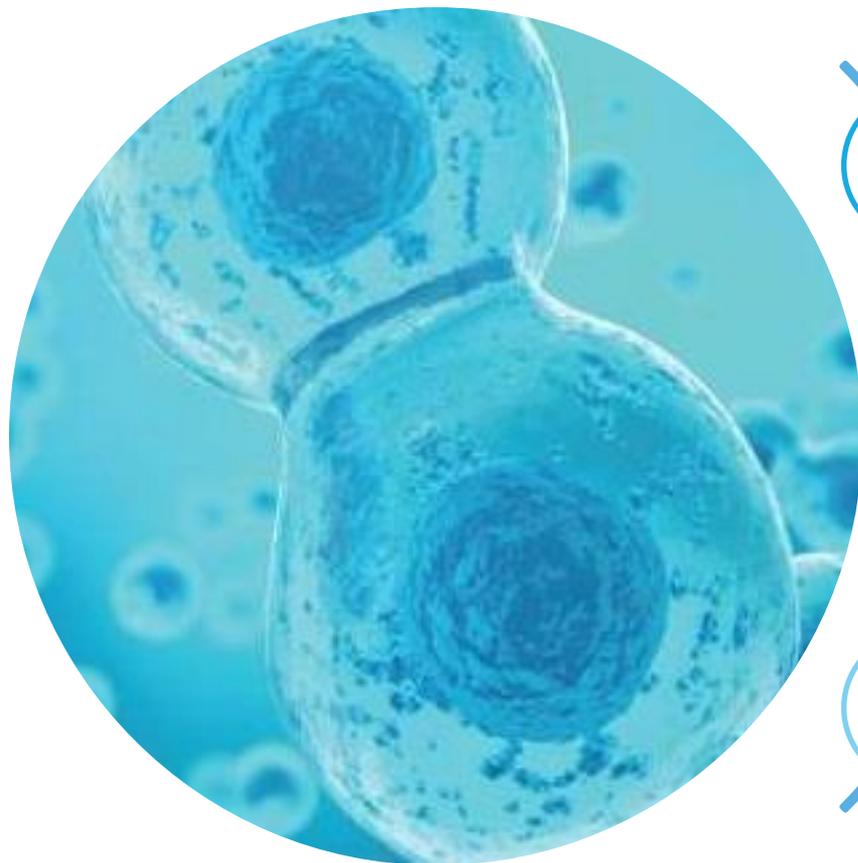


监测



分析

金属元素. 单细胞. 药理毒理



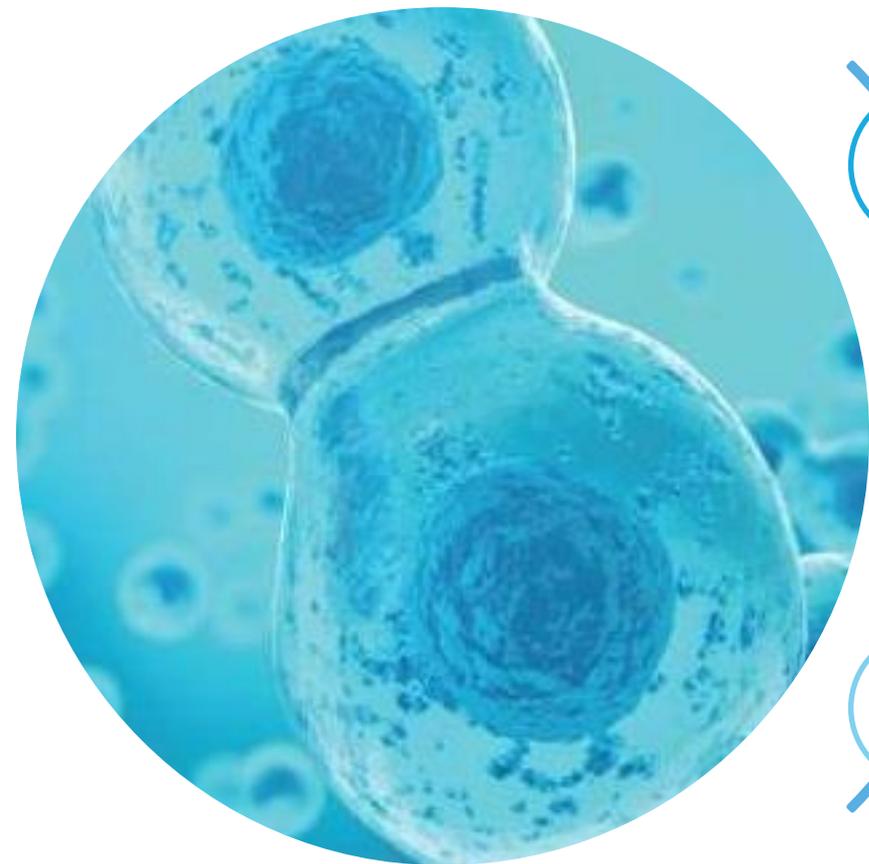
顺铂类化疗药物机制

纳米金载体联合治疗

细菌免疫防御机制研究

环境监测毒理学分析

金属元素. 单细胞. 药理毒理



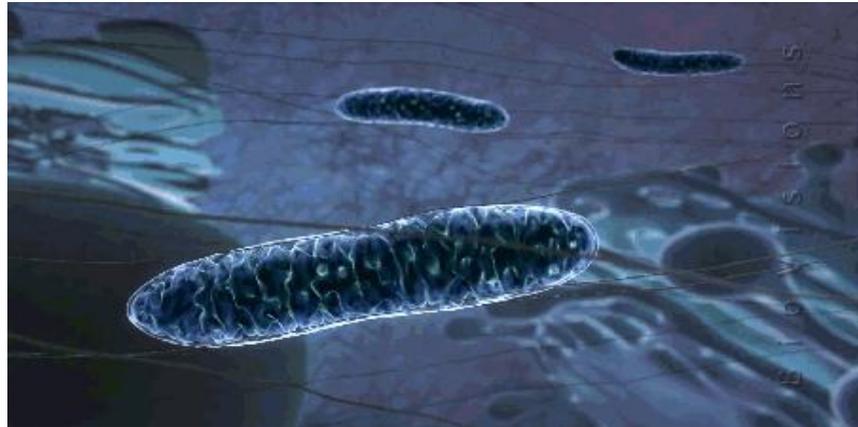
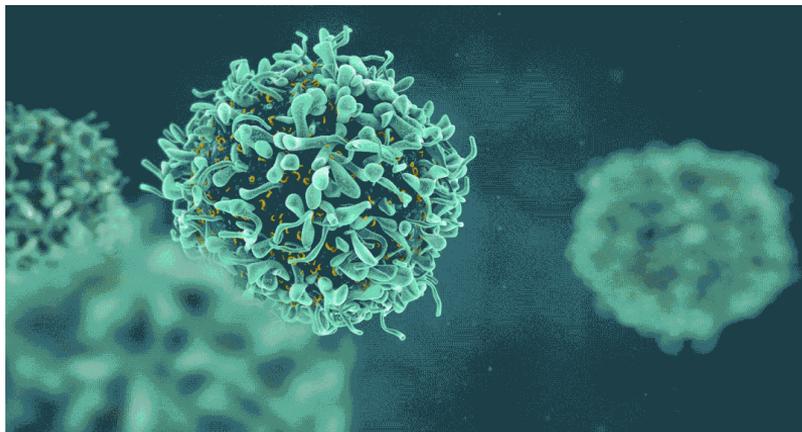
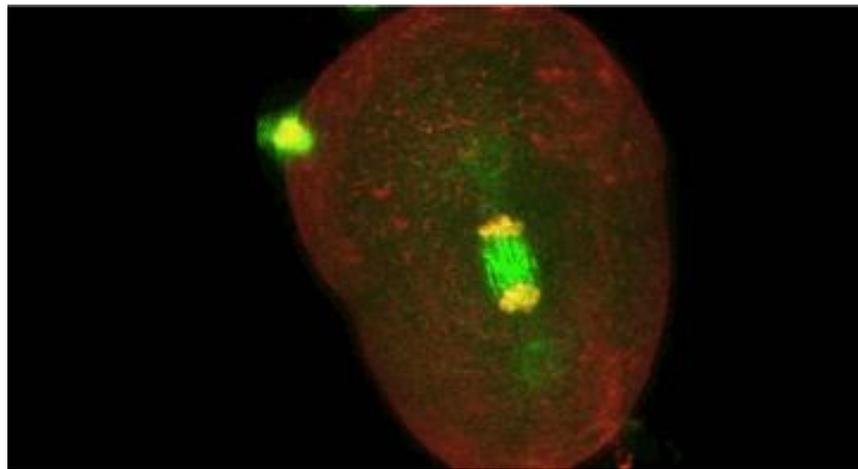
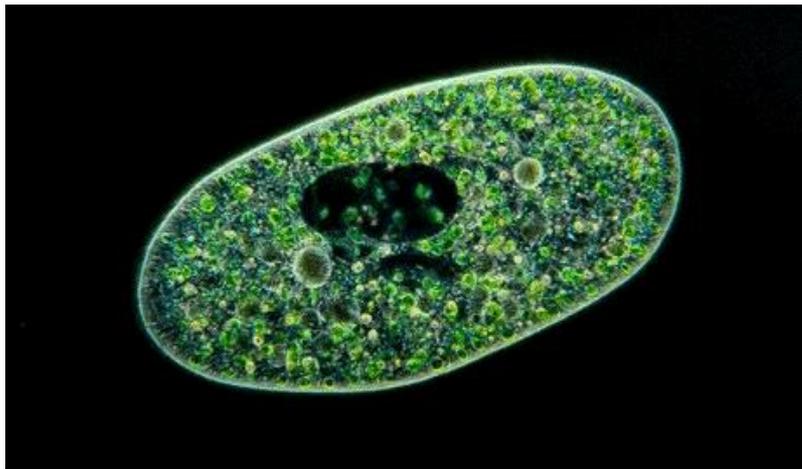
顺铂类化疗药物机制

纳米金载体联合治疗

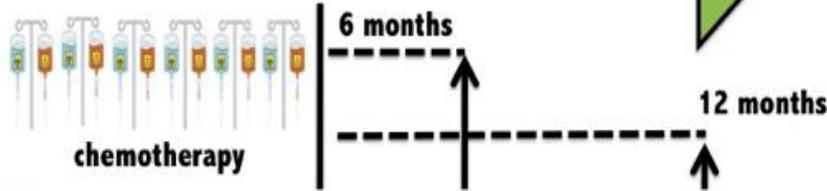
细菌免疫防御机制研究

环境监测毒理学分析

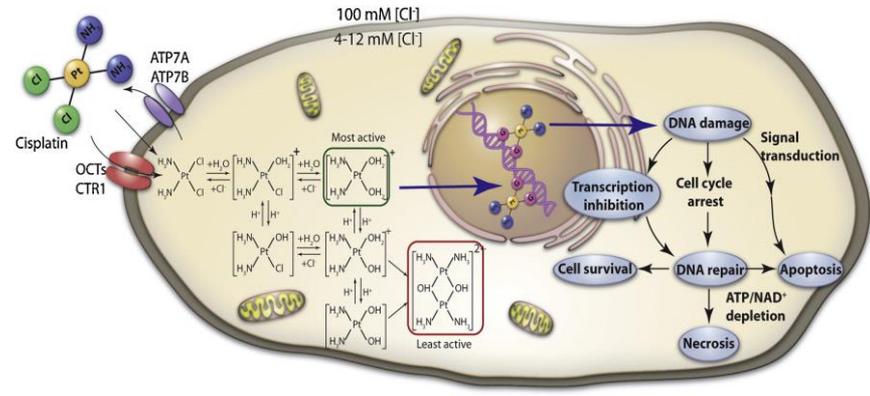
单细胞
细胞群
异质性
亚细胞



铂类化疗药物耐药机制



Platinum sensitivity classification	Refractory	Resistant	Partially sensitive	Sensitive
Probability of second platinum response	0%	< 10%	30%	> 50%



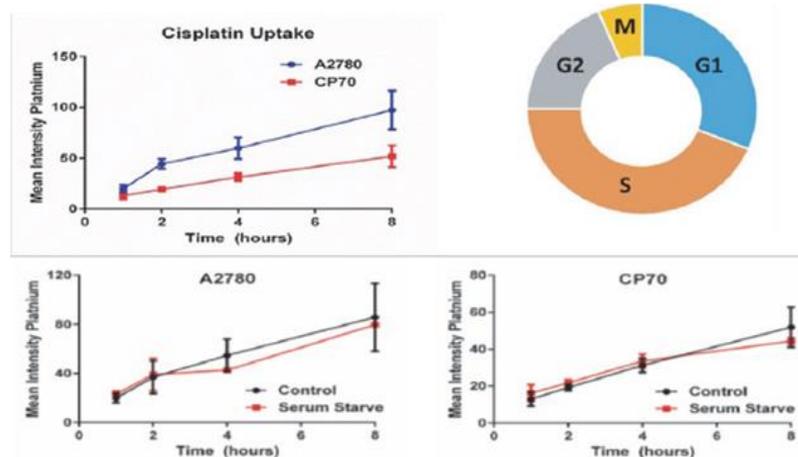
细胞DNA 修复加速？

药物胞浆失活加速？

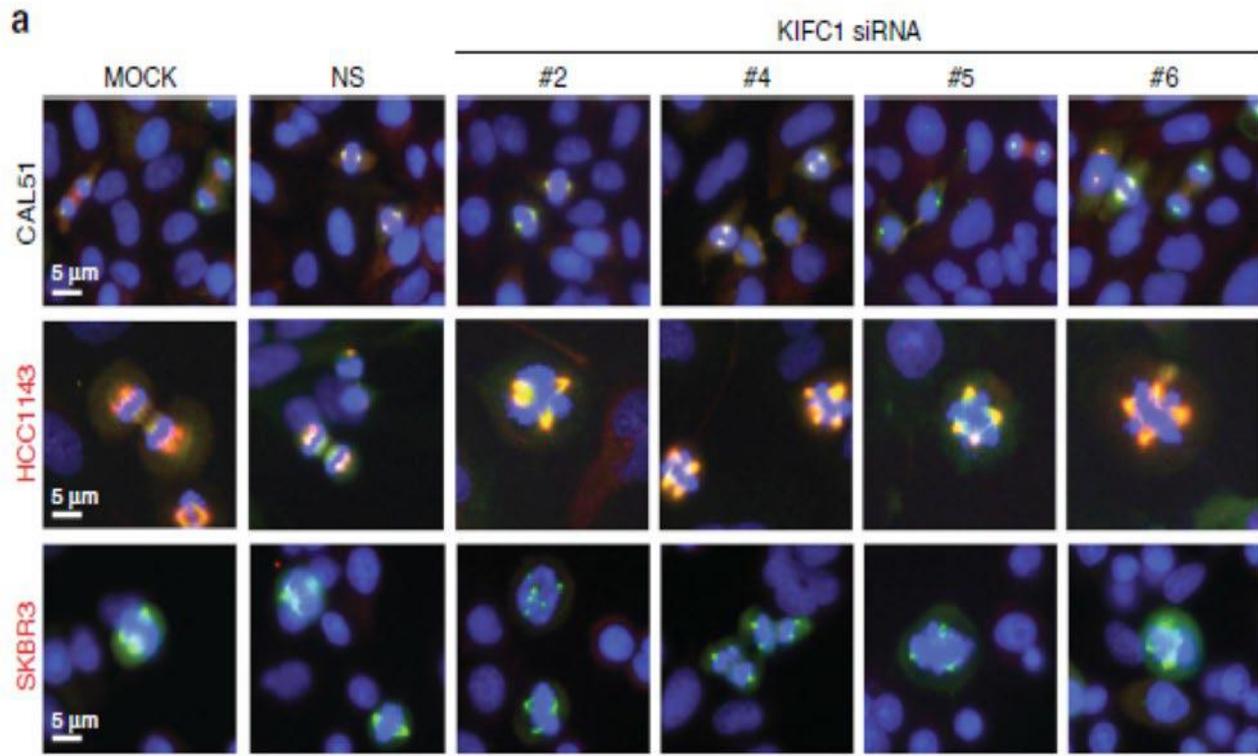
药物摄入能力降低？

药物转运能力加速？

单细胞 ICP-MS研究顺铂药物细胞周期依赖性

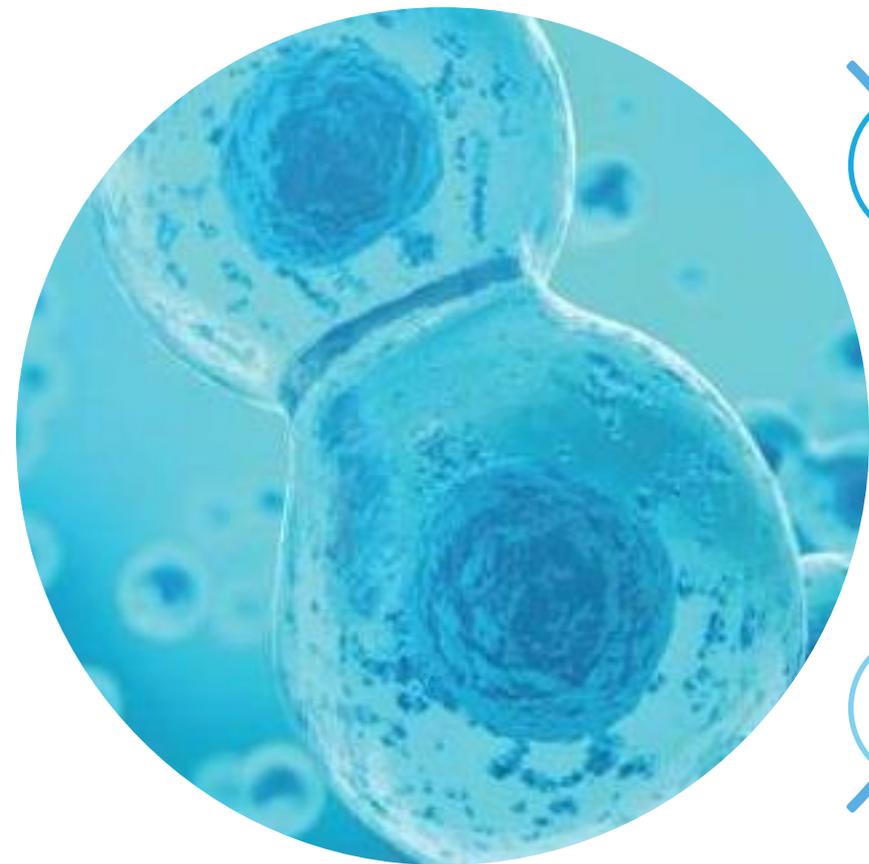


Cell lines with centrosome amplification undergo multipolar mitoses



Cell Line	CA Score
HMEC	0–2%
CAL51	0–2%
HCC38	0–2%
CAMA1	0–2%
SUM149	3–7%
BT20	18–22%
MDA-MB-231	18–22%
HCC1143	22–24%
MCF7	25–30%
HCC1954	40–43%
SKBR3	55–60%

金属元素. 单细胞. 药理毒理



顺铂类化疗药物机制

纳米金载体联合治疗

细菌免疫防御机制研究

环境监测毒理学分析

纳米药物联合治疗解决方案



Sensitization of ovarian cancer cells to cisplatin by gold nanoparticles

Xunhao Xiong^{1,*}, Rochelle R. Arvizo^{2,*}, Sounik Saha¹, David J. Robertson³, Scott McMeekin^{4,5}, Resham Bhattacharya^{4,5} and Priyabrata Mukherjee⁵

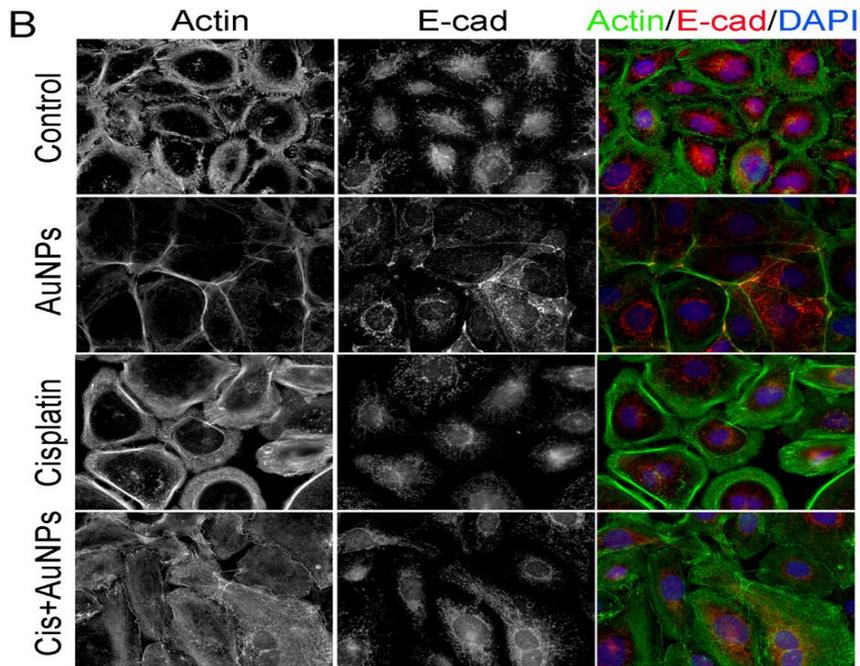
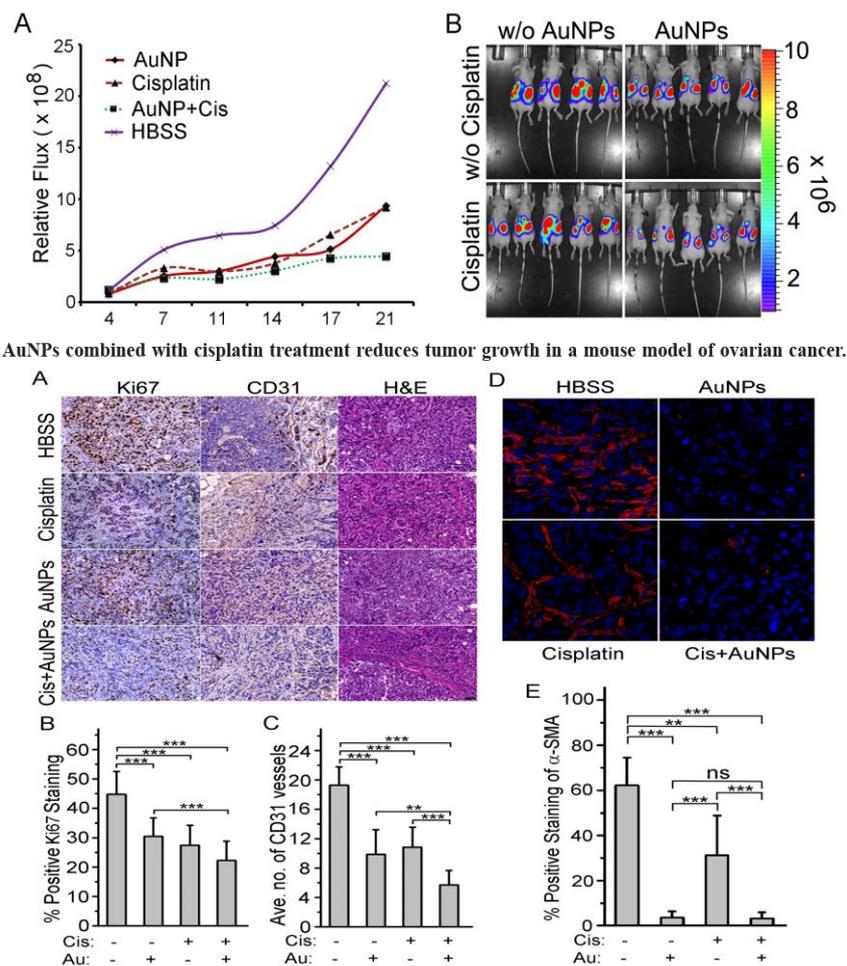


Figure 2: AuNP reverses cisplatin-induced EMT.



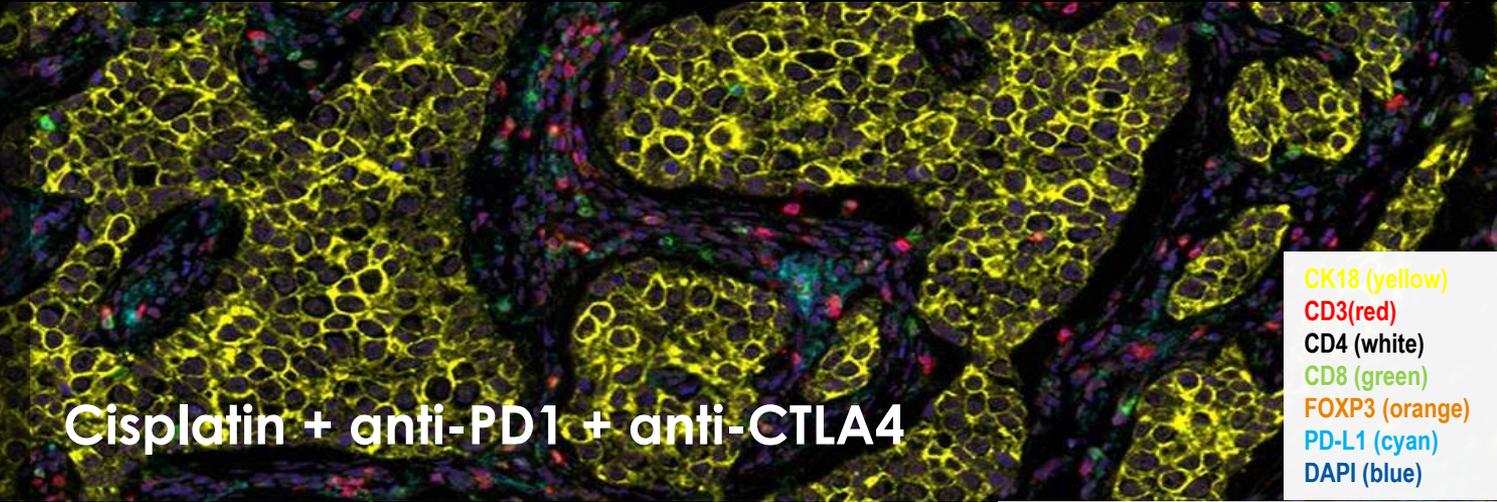
AuNP treatment inhibits tumor cells proliferation, blood vessels formation and EMT *in vivo*.

Science Translational Medicine

Cover story: Bringing out the neoantigens

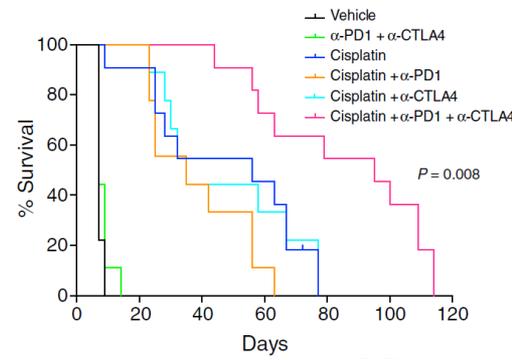
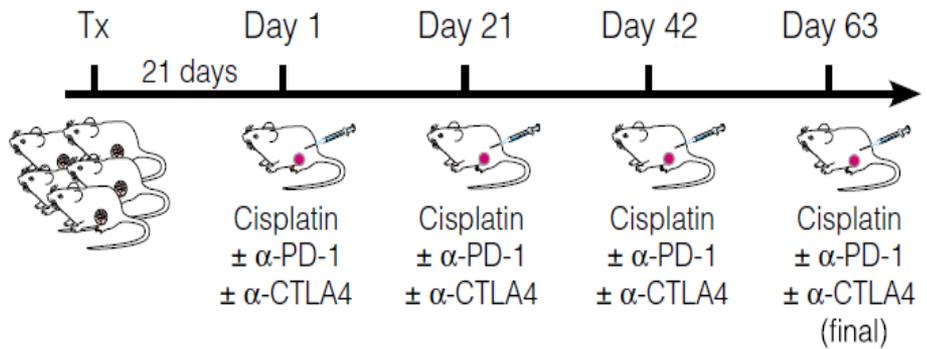
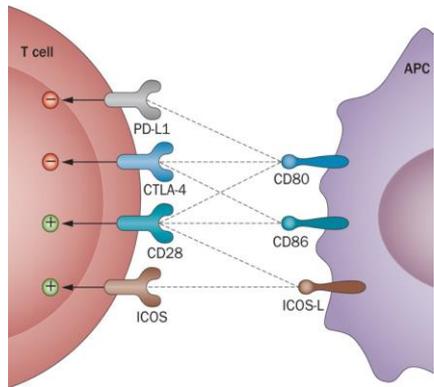
BRCA1-mutated breast tumors may be particularly vulnerable to dual checkpoint inhibition

Nolan et al./*Science Translational Medicine*; H.M. Halse

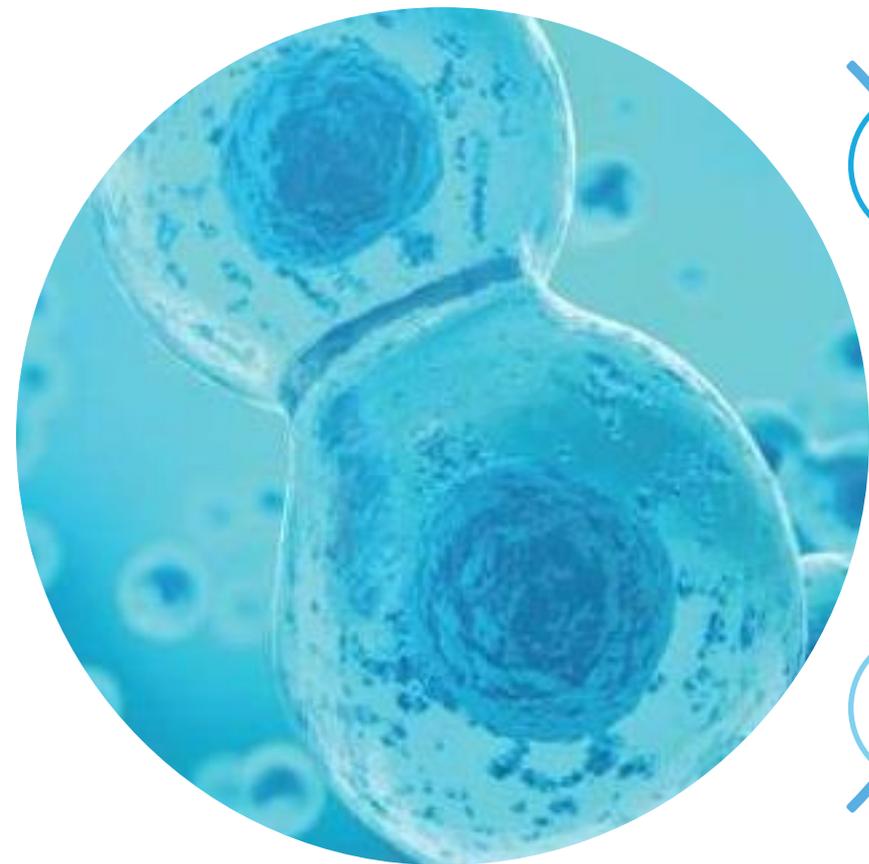


Cisplatin + anti-PD1 + anti-CTLA4

- CK18 (yellow)
- CD3 (red)
- CD4 (white)
- CD8 (green)
- FOXP3 (orange)
- PD-L1 (cyan)
- DAPI (blue)



金属元素. 单细胞. 药理毒理



顺铂类化疗药物机制

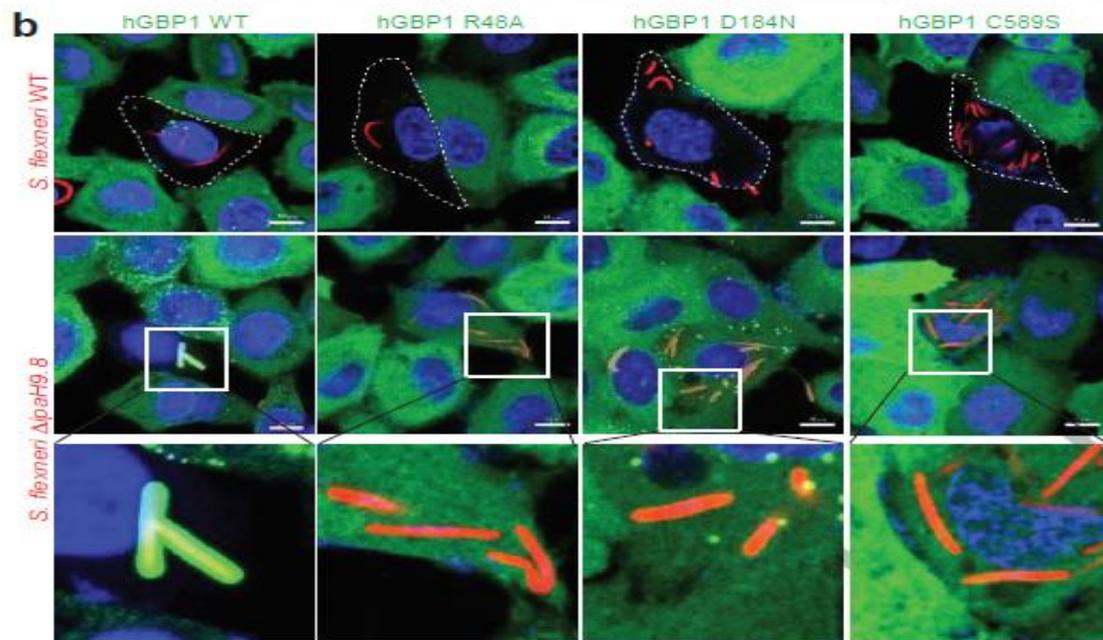
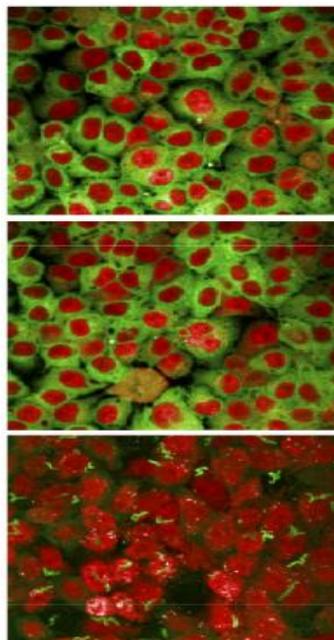
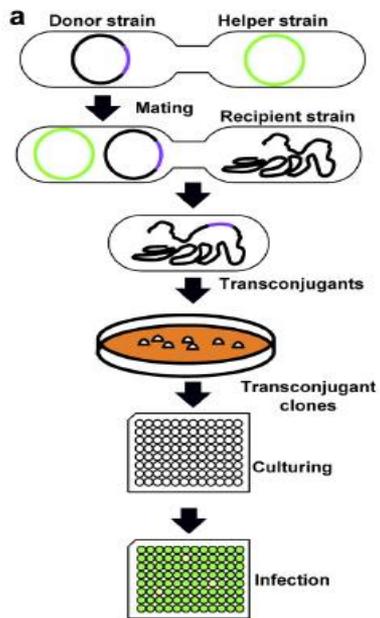
纳米金载体联合治疗

细菌免疫防御机制研究

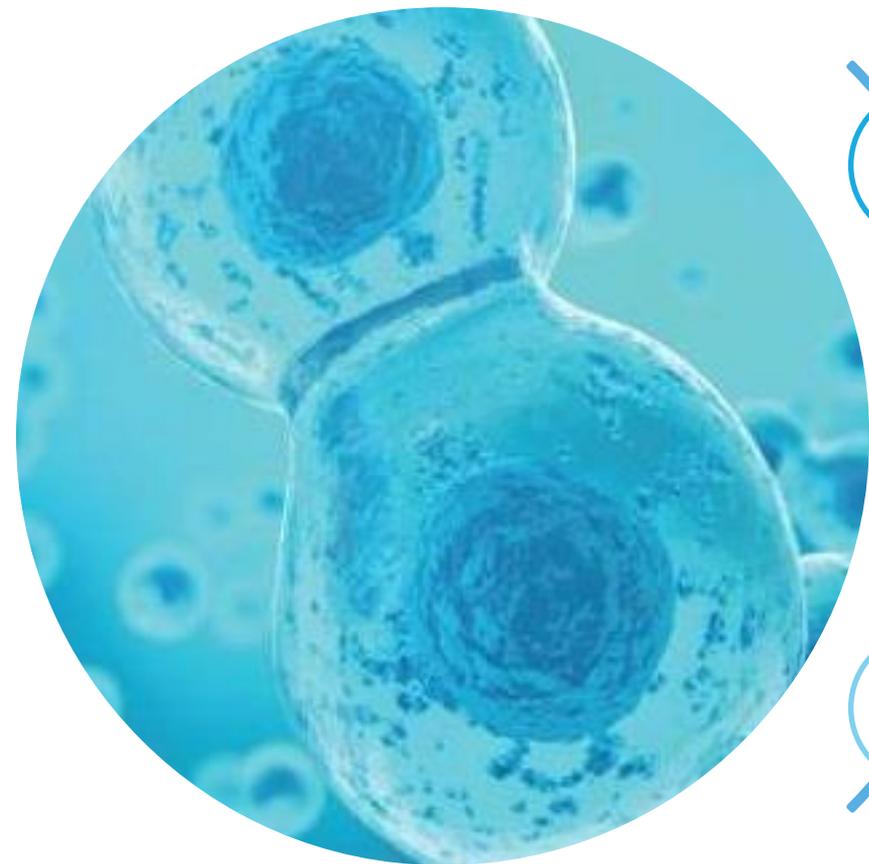
环境监测毒理学分析

“With the UltraVIEW VoX system and the new Opera system, we can now directly visualize and discover many new cellular and molecular processes involved in the interplay between bacterial pathogens and host mammalian cells. The new technology platform provided by these instruments will also allow us to further identify new genes and define new mechanisms that are critical for bacterial virulence and/or host defence responses” .

- Dr. Feng Shao, NIBS, Beijing, China



金属元素. 单细胞. 药理毒理



顺铂类化疗药物机制

纳米金载体联合治疗

细菌免疫防御机制研究

环境监测毒理学分析

环境监测毒理学分析

环境污染物分析

无机污染物

- 大气颗粒物中有毒元素分析
- 饮用水中As、Hg、Cd等分析
- 土壤及固体废弃物中重金属分析



PinAAcle AA



FIMS



Ario™ 200



NexdON™ 2000 ICP-MS

有机污染物

- 大气中苯系物 (MAHs) 分析
- 水中持久性污染物 (POPs) 和环境激素类物质分析
- 水中杀虫剂、除草剂分析



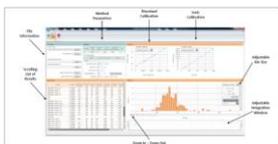
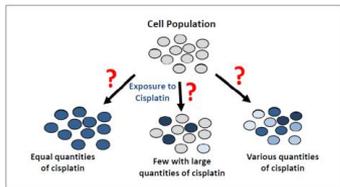
Clarus SQ8 GC/MS



QSignal™ LC/MS/MS

环境中纳米颗粒分析——单颗粒/单细胞 ICP-MS

- 单细胞中纳米颗粒定量
- 单细胞中粒径分布表征



生物安全性及毒性评价

致病机制

- 基因畸变
- 代谢毒性
- 免疫毒性
- 生殖毒性

功能研究

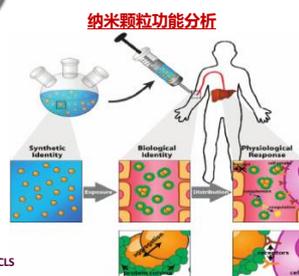
- 体外检测
- 细胞成像
- 活体成像
- 组织成像



MMD EnSight



细胞毒性
氧化应激
激素/细胞因子
信号通路



纳米颗粒功能分析



IVIS Spectrum CT



动物整体毒性
生物相容性
新型探针开发
纳米给药系统



HCS Operetta CLS

微核检测
转位分析
线粒体功能
细胞形态学

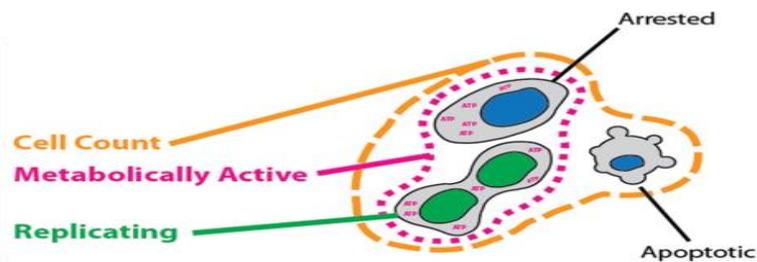
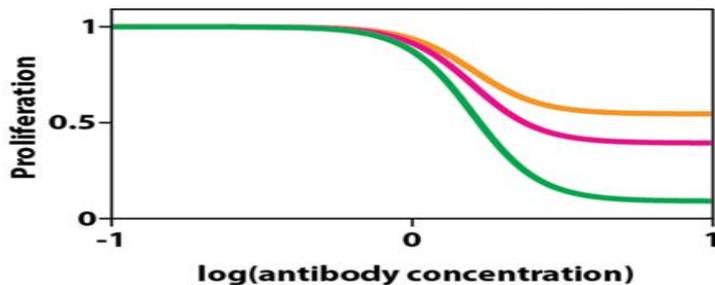


Vectra Polarix



原位组织病理
肿瘤微环境
免疫标志物
组织共定位

细胞增殖 细胞毒性 细胞死亡



检测技术	主要实验方法	灵敏度	背景噪声	特异性	实验周期
光吸收	MTT类检测 (490 nm) CCK8 (WST-8) 检测 (450 nm) LDH检测 (500 nm) SRB检测 (540 nm)	低	中	中等	1-2小时
荧光强度	阿尔玛蓝 (Alamar Blue) (530/590 nm) Calcein-AM (活细胞荧光染料)	中等	高	中等	>2小时
化学发光法	ATP检测法ATPLite 细胞色素P450酶活检测	高	低	高	< 20分钟
时间分辨荧光	DNA片段化检测 (DELFI DNA fragmentation) DNA复制检测 (DELFI BrdU Proliferation) 细胞膜通透性检测 (DELFI BATDA Cytotoxicity)	高	低	高	1-2小时
Alpha检测	Caspase 等特异性凋亡Marker	高	低	高	1-2 小时
细胞荧光成像	通过明场或者细胞特异性染料染色 如Annexin V等特异性凋亡Marker	高	中	高	>2小时



VICTOR™
Nivo



EnVision®



EnSight™

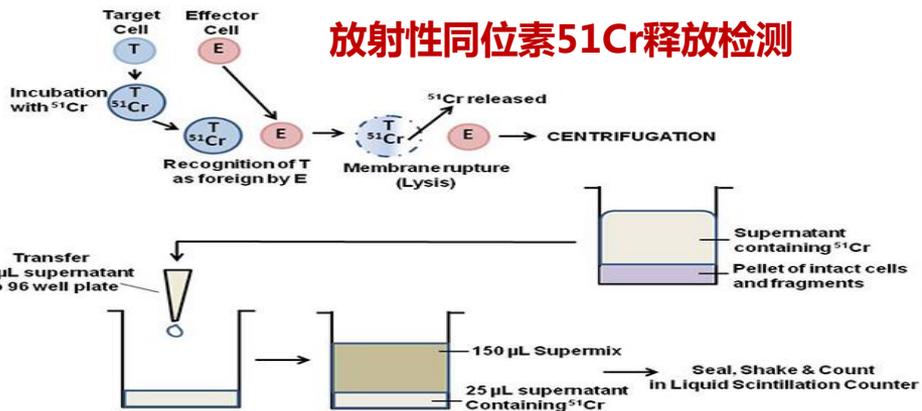


Operetta® CLS

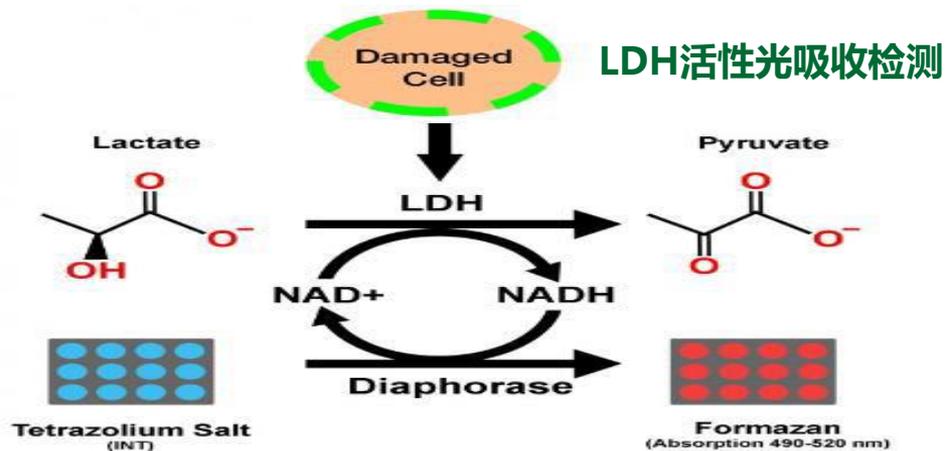
多功能酶标仪 & 高内涵成像系统

免疫细胞肿瘤杀伤活性体外评价

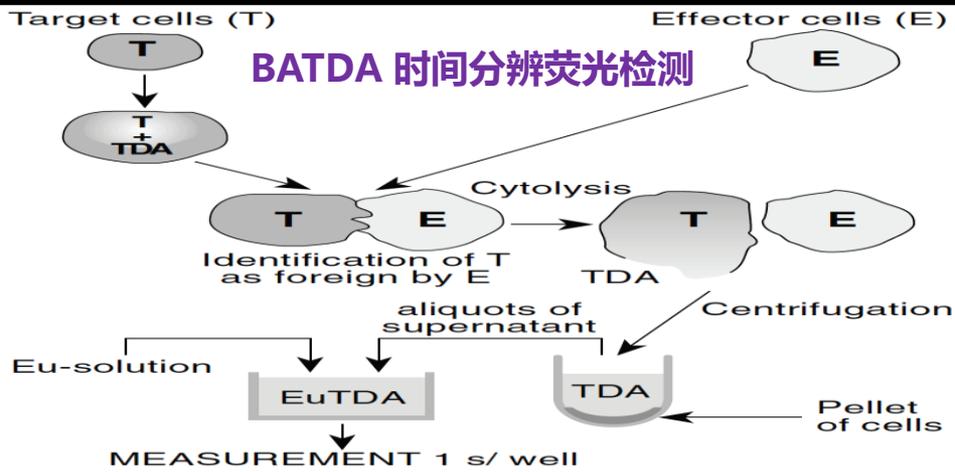
放射性同位素⁵¹Cr释放检测



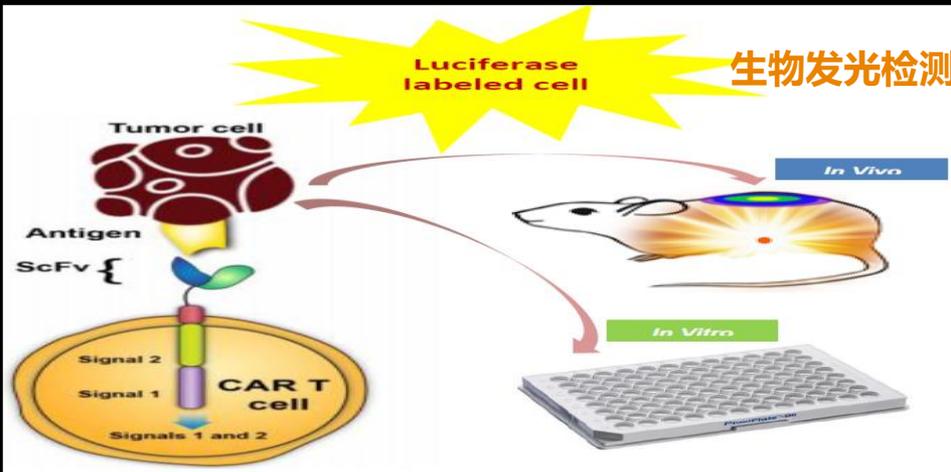
LDH活性光吸收检测

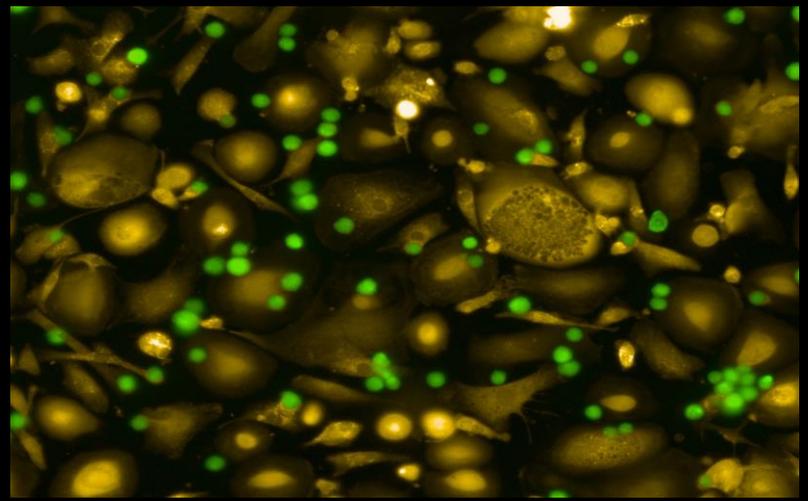
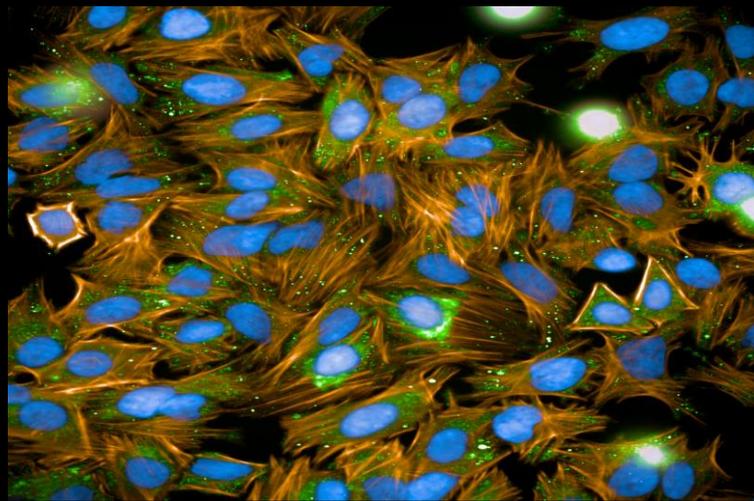


BATDA 时间分辨荧光检测

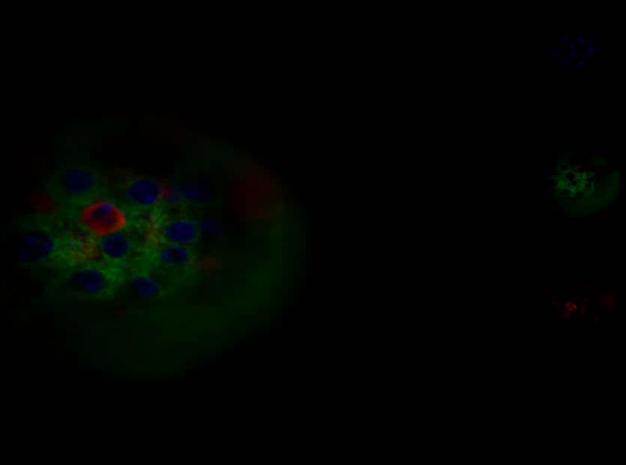
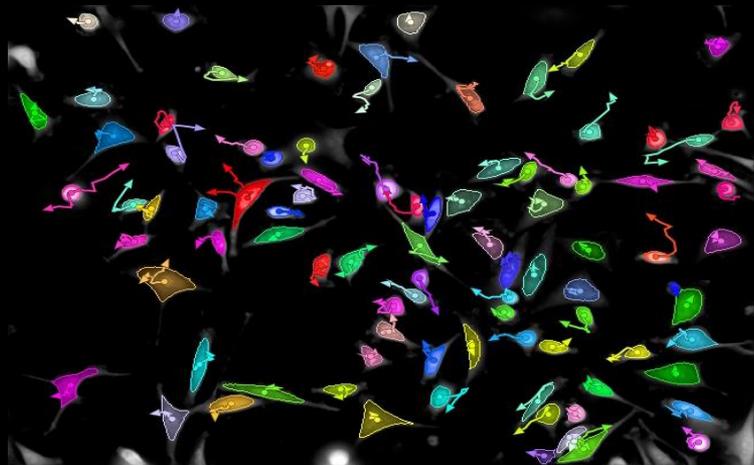


生物发光检测





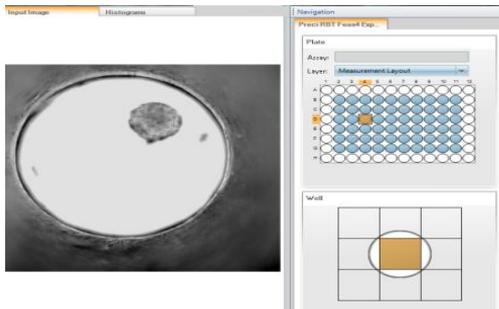
Composite
0.000s
Z = 1.00



3D Spheroid Cell Culture and Analysis



InSphero GravityPLUS
Hanging-Drop System



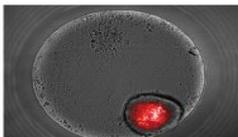
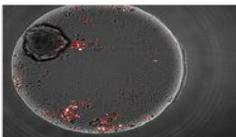
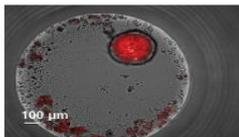
From HTS
To HCS



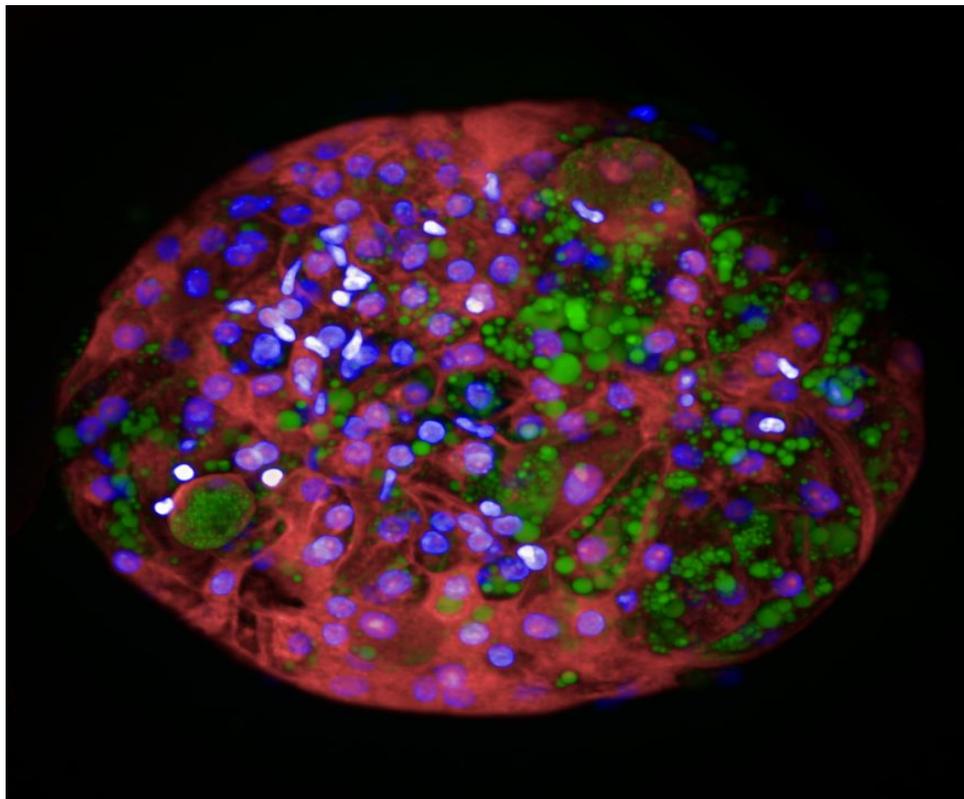
ProSense 680

MMPSense 680

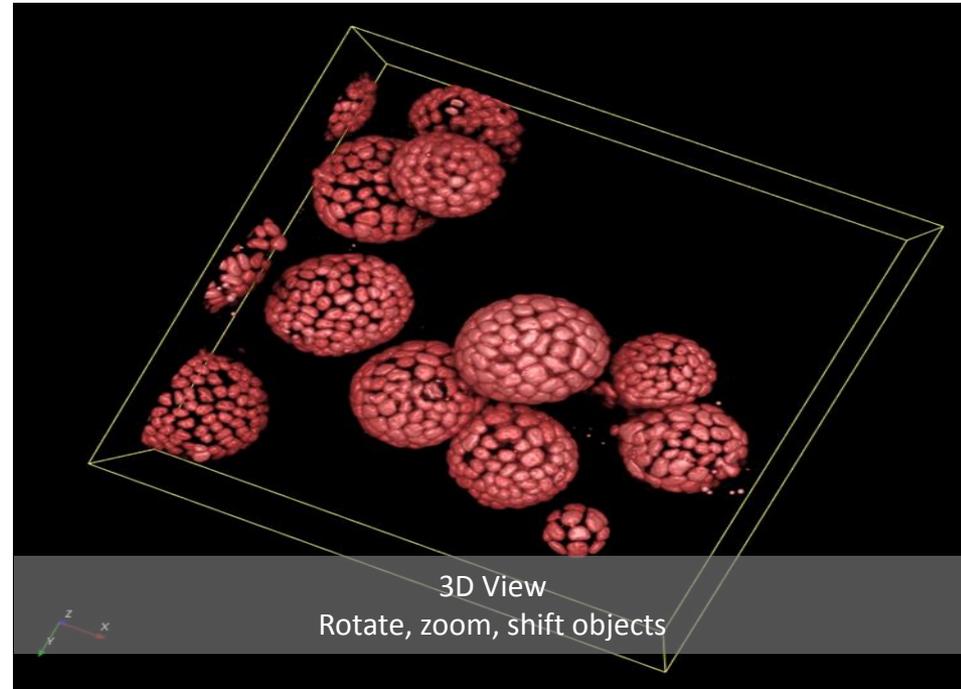
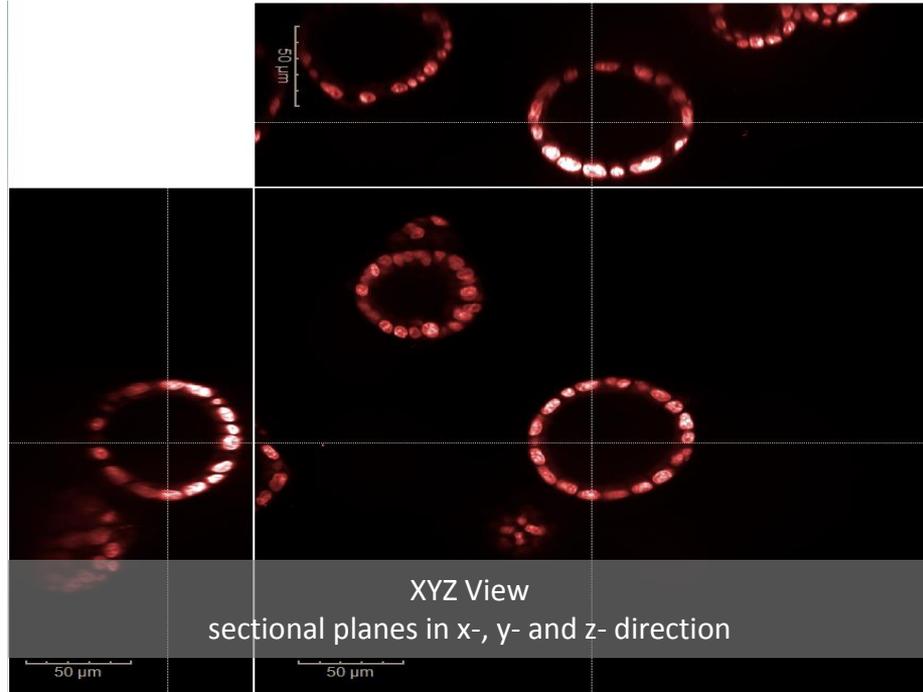
HypoxiSense 680



Overlay of brightfield and fluorescence images of 3D InSight™ Human Tumor Microtissues stained with ProSense 680, MMPSense 680, and HypoxiSense 680 results in characteristic staining patterns.⁷



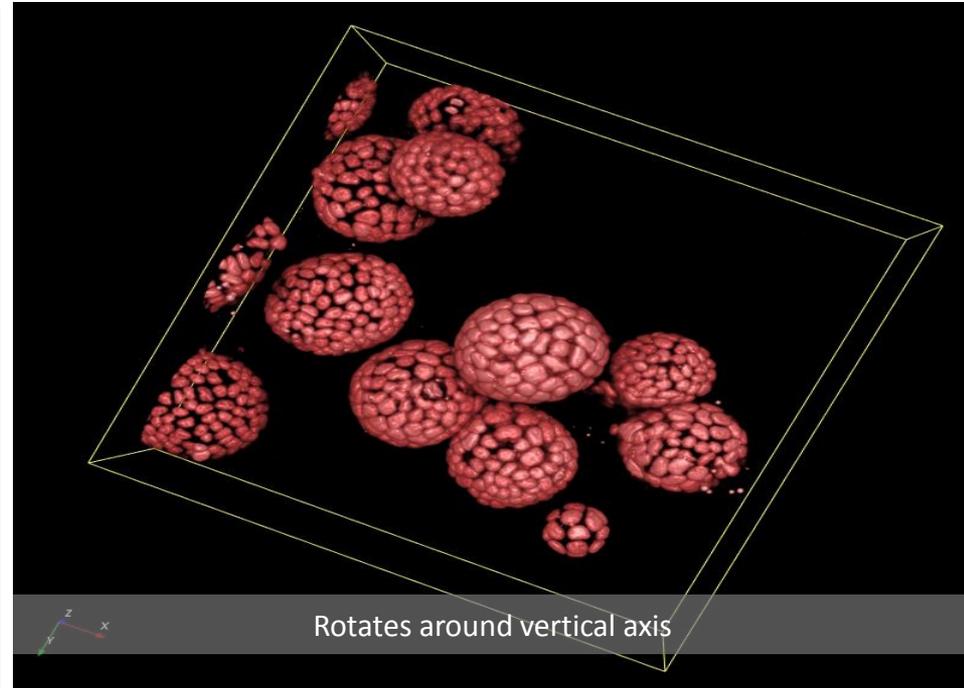
Multiple ways for 3D visualization



Movie export

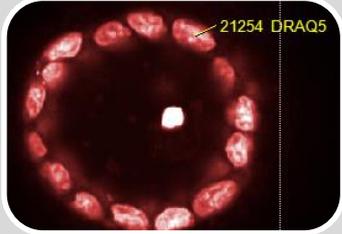
Plane movie

3D movie

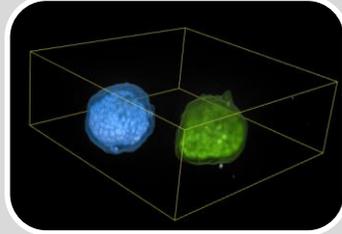


Various formats - avi, mp4, mpeg4, png series

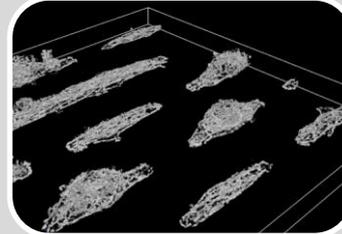
3D Image Analysis – made easy



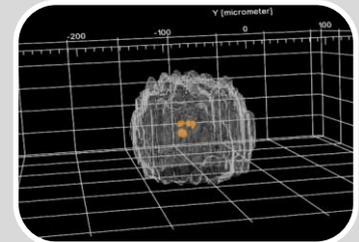
Intensity



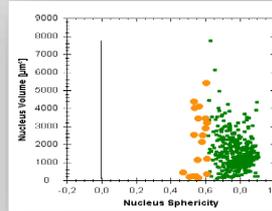
Morphology



Texture



XYZ Position



Select Population

Harmony 3D image analysis tools

3D Image Analysis – made easy

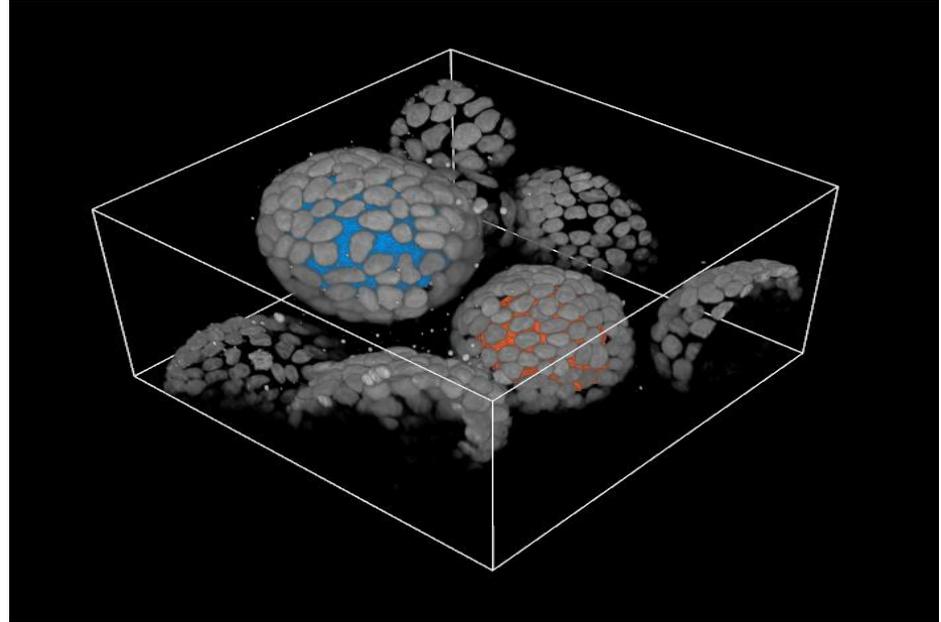
Input image stack

Find Cysts and remove
border objects

Segmentation of single
cells

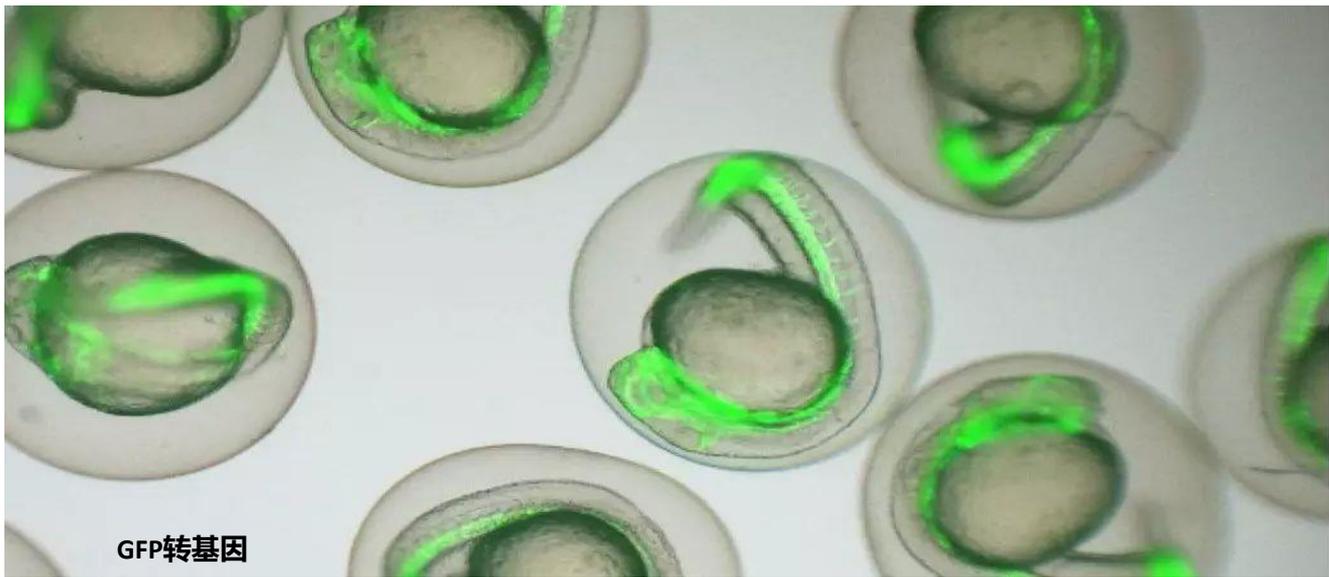
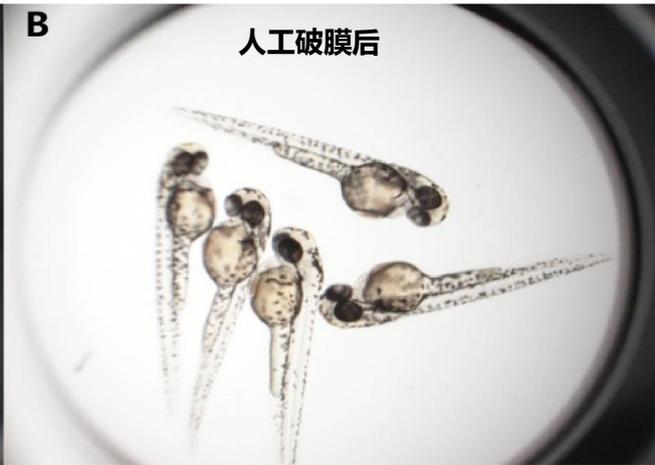
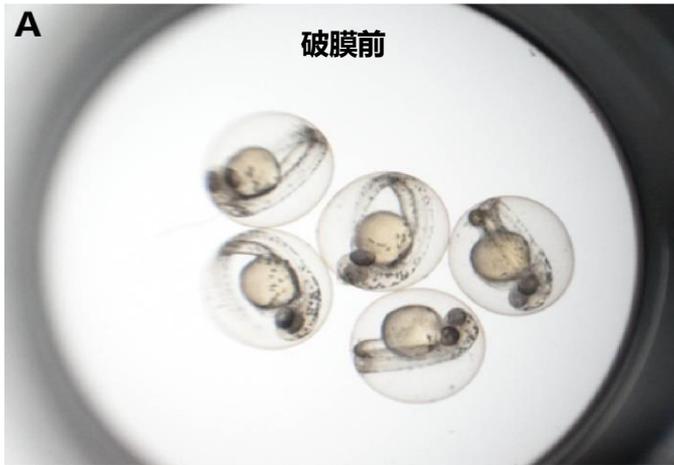
Define hollow space

Calculate specific
properties for evaluation



斑马鱼：养在96孔板里的动物模型

环境检测与化学品风险评估

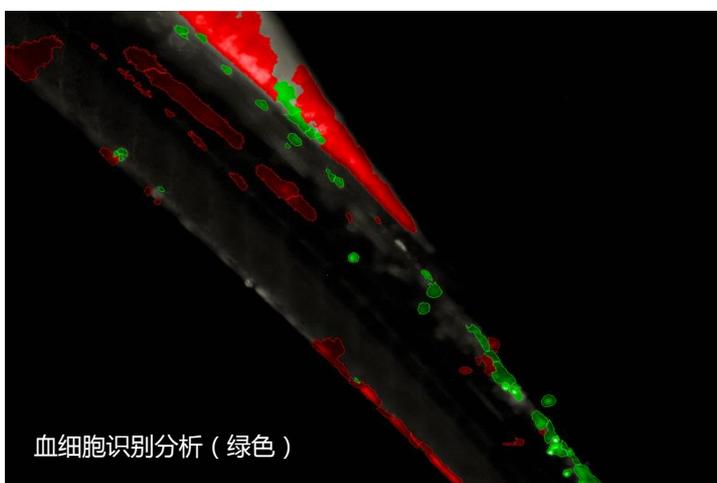
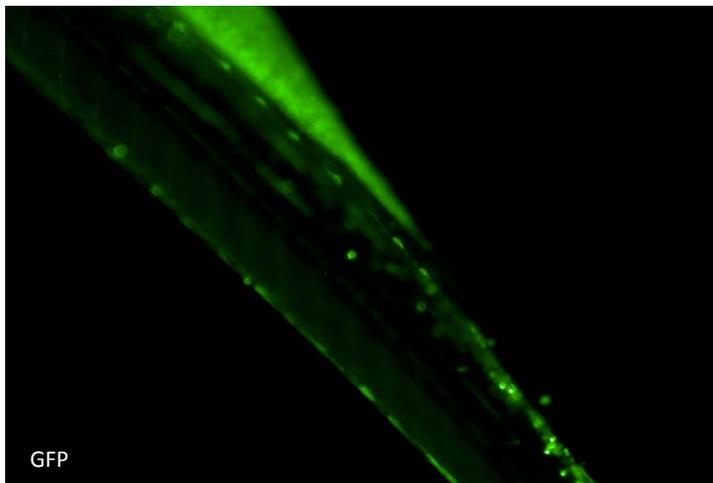
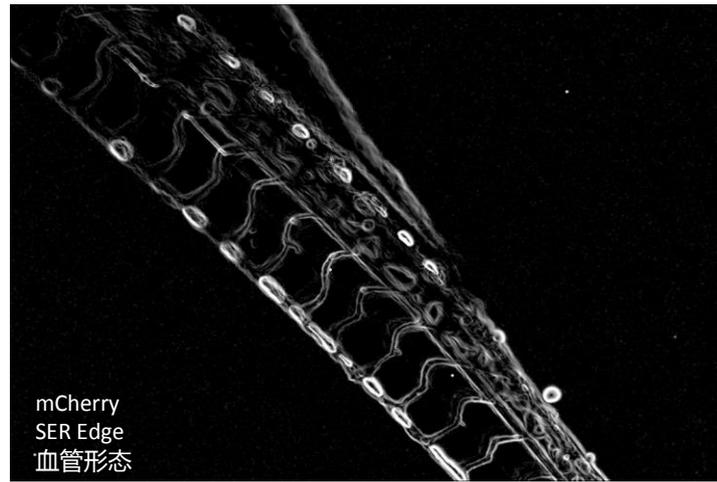
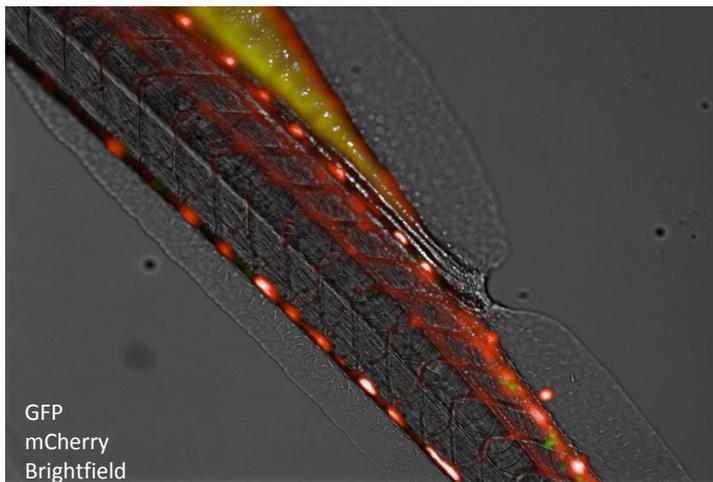


96孔板中天的斑马鱼

受精后天的斑马鱼幼鱼胚胎

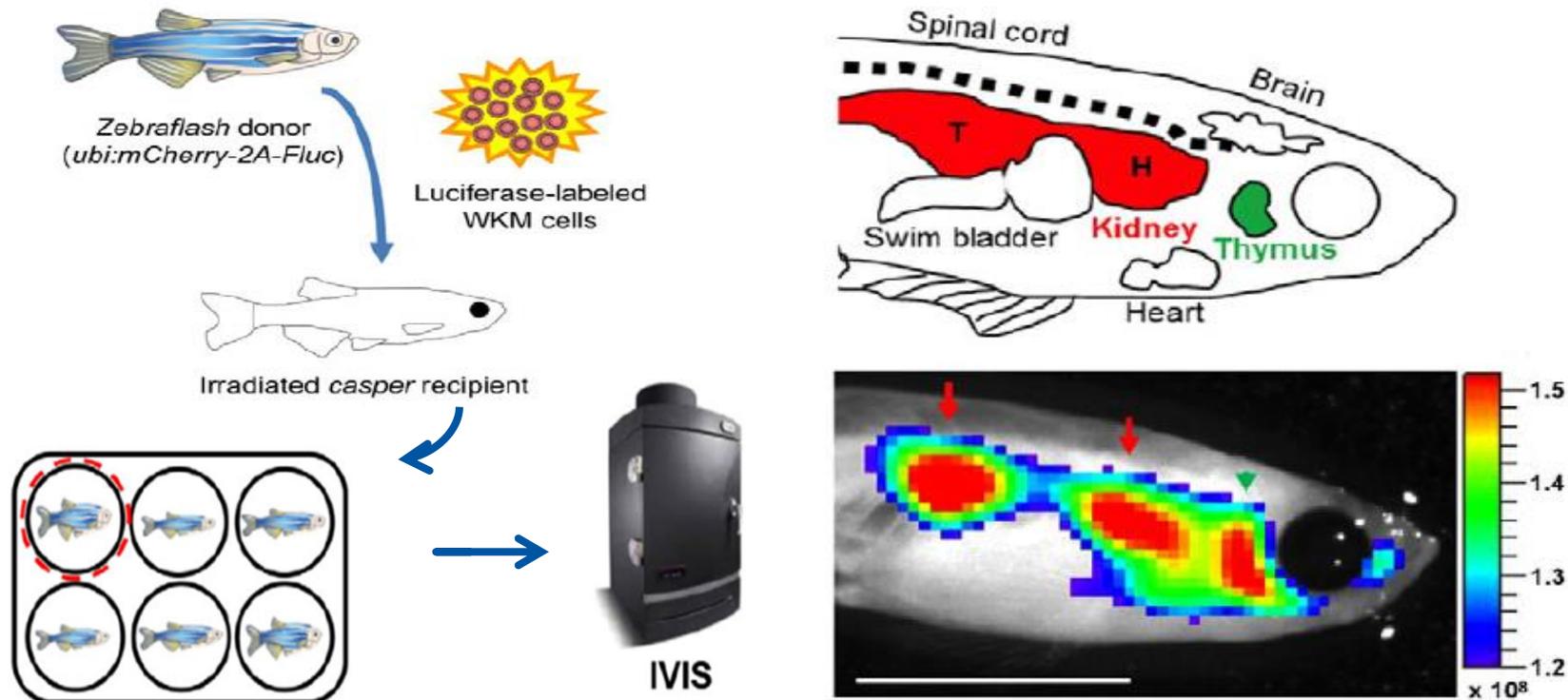
体长不到3mm

斑马鱼血管和血细胞 高内涵显微成像分析



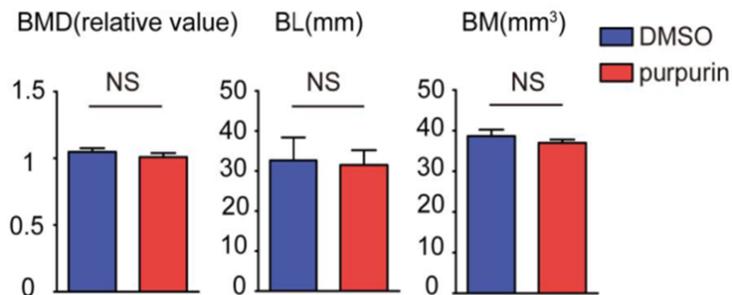
zebraflash transgenic lines for *in vivo* bioluminescence imaging of stem cells and regeneration in adult zebrafish

Chen-Hui Chen¹, Ellen Durand², Jinhu Wang¹, Leonard I. Zon² and Kenneth D. Poss^{1,*}

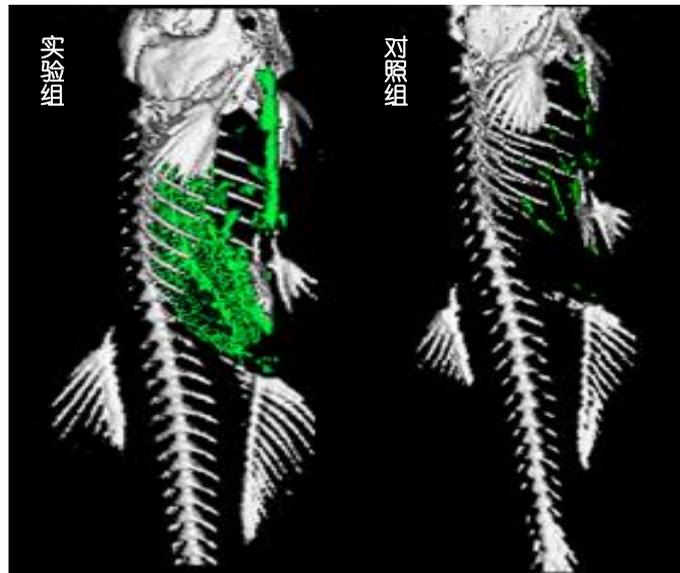


Micro CT 结构成像

斑马鱼骨骼分析



斑马鱼体内脂肪分析



实验组

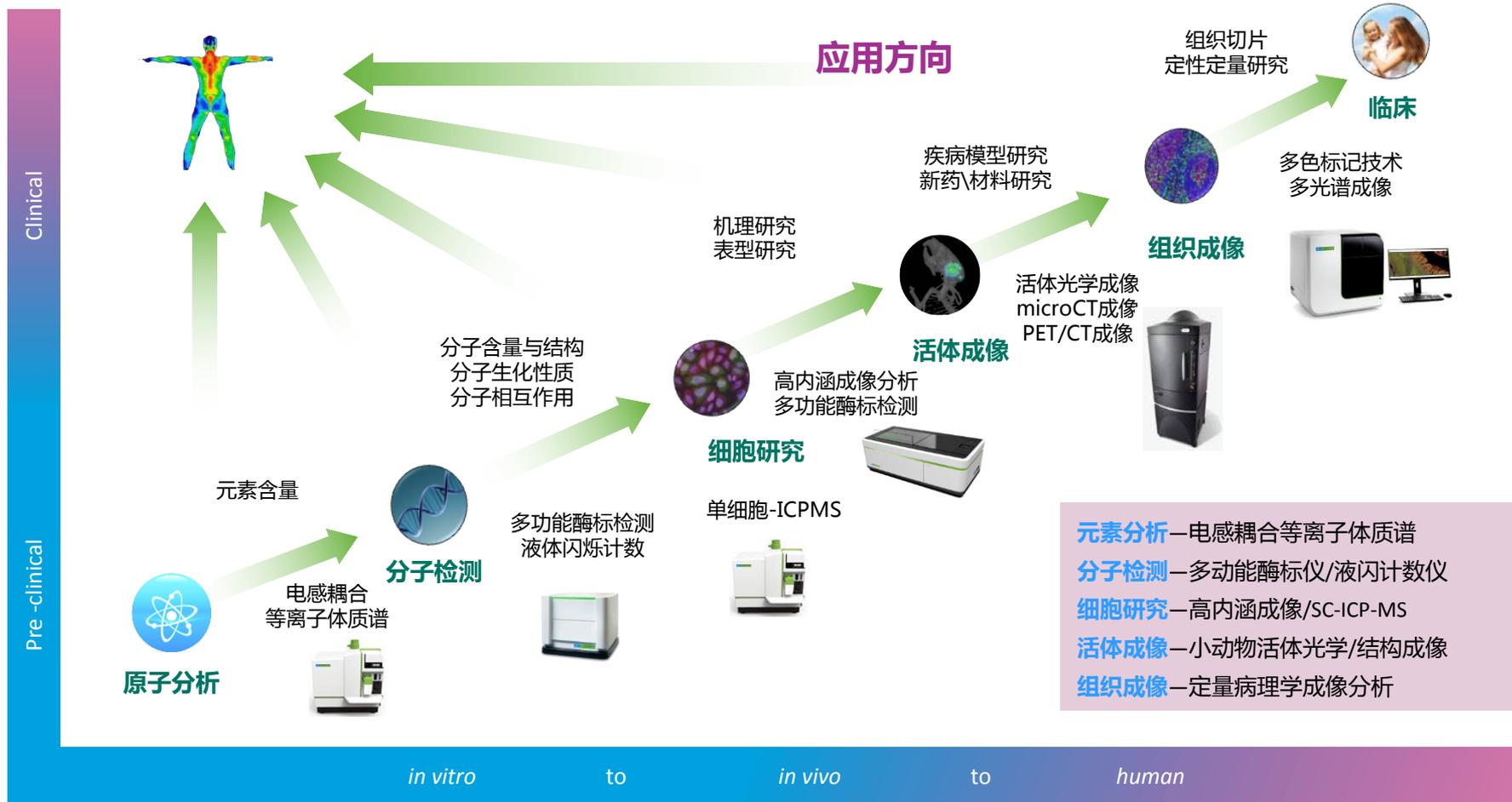
Name	MaxVal	MinVal	Mean	Std.Dev.	Vol_mm3
Object_5_sum	2050	1880	1984.49	46.48	5.64

对照组

Name	MaxVal	MinVal	Mean	Std.Dev.	Vol_mm3
FAT2_sum	2050	1905	2006.71	32.72	0.44

鱼身长: 约4cm 扫描时间: 4min 电压: 80kv 电流100uA 成像视野: 36mm

Discovery and Analytical Solution



午餐会：东晖楼四层韵心厅

PerkinElmer 生命科学

报告题目：高分辨单细胞ICP-MS技术应用

报告人：珀金埃尔默东区产品经理 朱敏

报告题目：高性能ICP-OES介绍与应用

报告人：珀金埃尔默资深产品专家 高光晔

