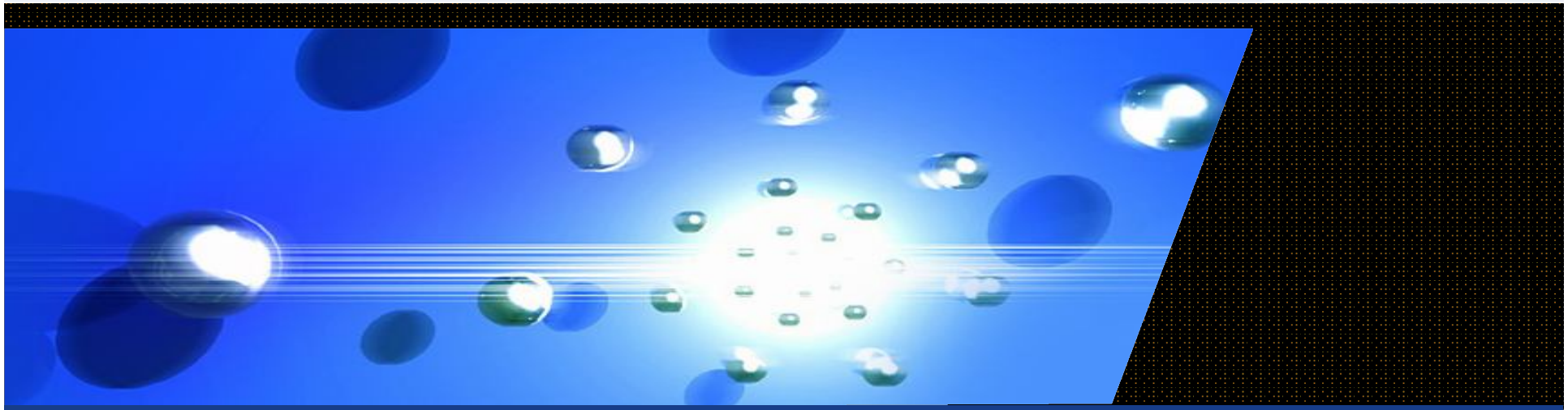
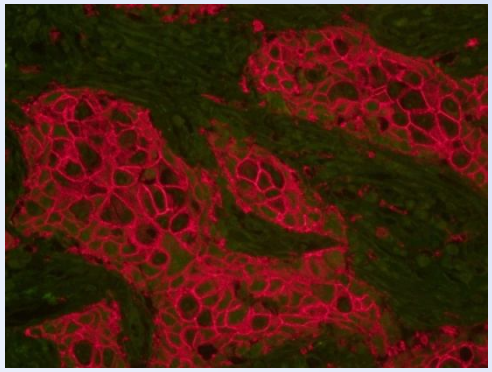
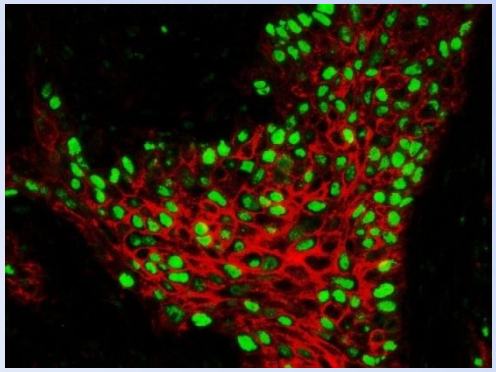
武汉珈源量子点公司 Jiayuan Quantum Dots



量子点免疫荧光试剂盒（QDots-IF™）





生物医学事业部

http://www.qds.net.cn

Version 1, 2011.09

内容提要

珈源量子点介绍

试剂盒简介

- 量子点免疫荧光单染试剂盒
- 量子点免疫荧光双染试剂盒
- 量子点荧光原位杂交试剂盒

应用举例

量子点——理想的荧光标记试剂

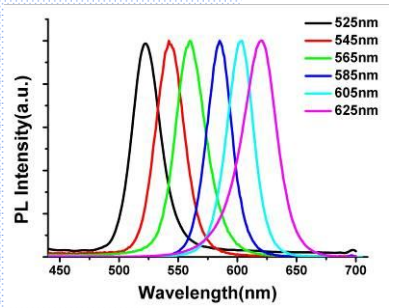
量子点（Quantum Dots）又称**半导体纳米晶**，是一类由Ⅱ-Ⅵ族和Ⅲ-Ⅴ族元素组成的纳米颗粒。生物标记中常见的CdSe量子点粒径在1.8nm-7.0nm变化时，其发射荧光可覆盖整个可见光区。

荧光发射波长可控、发射峰狭窄对称

激发谱宽而连续，消光系数大、荧光强度高

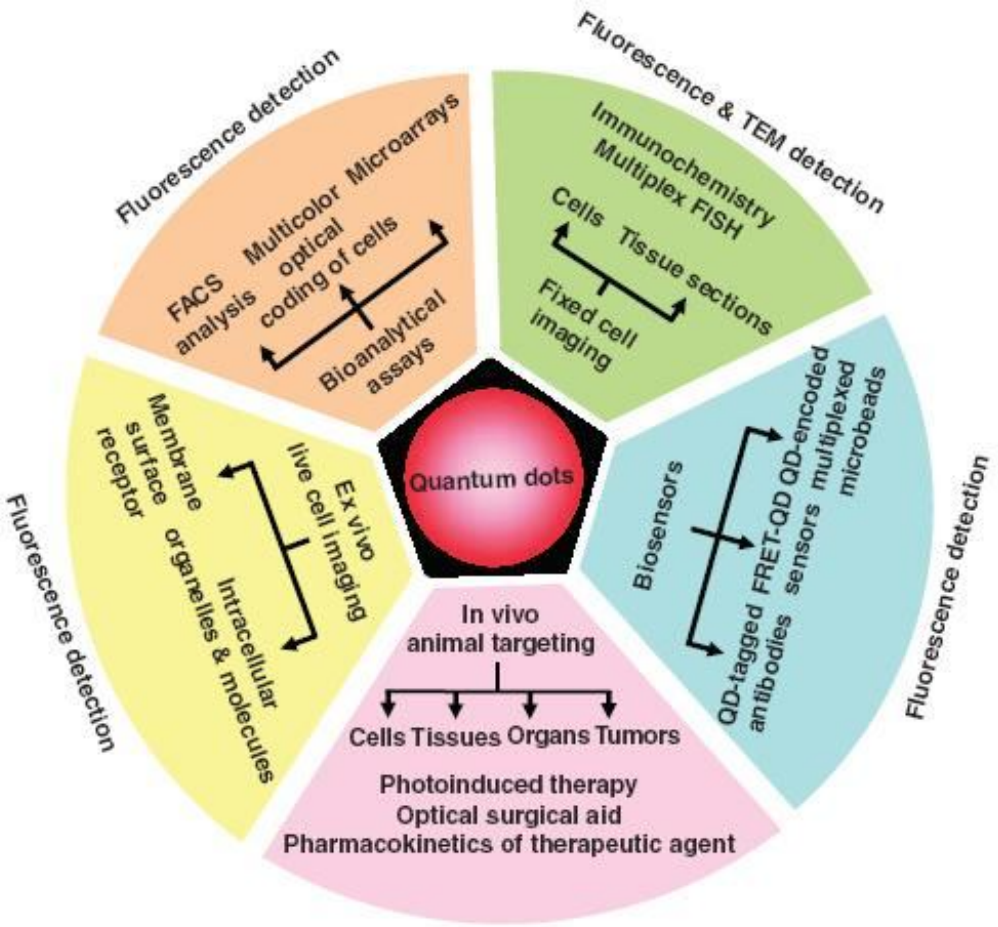
光稳定性好、易与生物分子偶联

多色标记成像、长时动态监测



量子点在生物医学上的应用

- 蛋白印迹
- 免疫荧光
- 活细胞示踪
- 活体成像
- 病原微生物检测
- 生物传感器

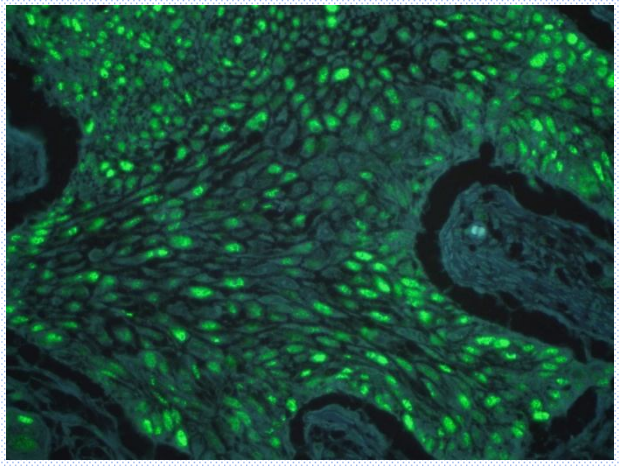
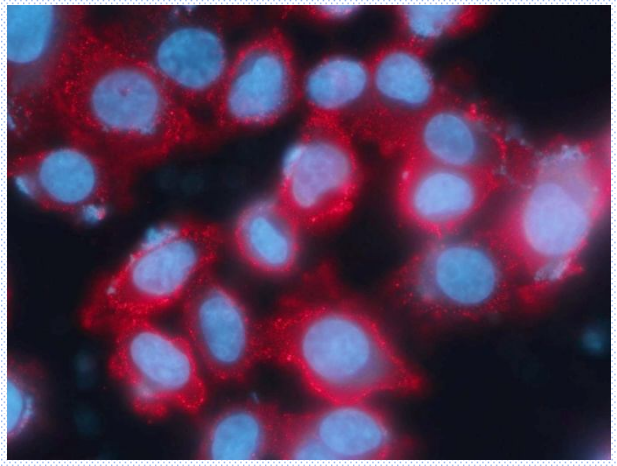
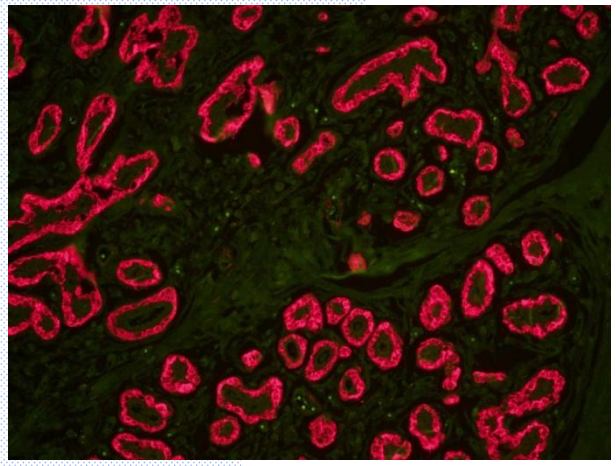


Applications of quantum dots as multimodal contrast agents in bioimaging.

SCIENCE, 2005, 538

量子点免疫荧光单染系列试剂盒

产品编号	产品名称	荧光最大发射波长	激发波长
QK525M	量子点超敏荧光试剂盒（QDs-G/M IgG）-525	525nm	≤485，紫外
QK525R	量子点超敏荧光试剂盒（QDs-G/R IgG）-525	525nm	≤485，紫外
QK605M	量子点超敏荧光试剂盒（QDs-G/M IgG）-605	605nm	≤565，蓝光
QK605R	量子点超敏荧光试剂盒（QDs-G/R IgG）-605	605nm	≤565，蓝光
QK525S	量子点超敏荧光试剂盒（QDs-SA）-525	525nm	≤485，紫外
QK605S	量子点超敏荧光试剂盒（QDs-SA）-605	605nm	≤565，蓝光

量子点单染试剂盒组成成分

◆ **Cat. QK525M QK605M QK525R QK605R**

试剂A　Tween 20

试剂B　缓冲液：2% BSA（用于封闭和稀释试剂）

试剂C　**QDs-IgG复合物（1μM）**

试剂D　通透液：0.1% Triton-X 100

试剂E　缓冲甘油封固剂

◆**Cat. QK525S QK605S**

试剂A　Tween 20

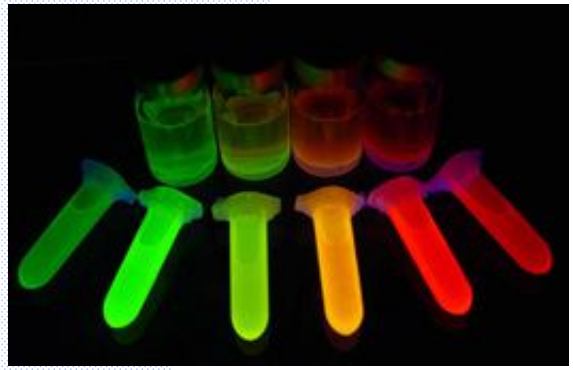
试剂B　缓冲液：2% BSA（用于封闭和稀释试剂）

试剂C　生物素化二抗（进口分装）

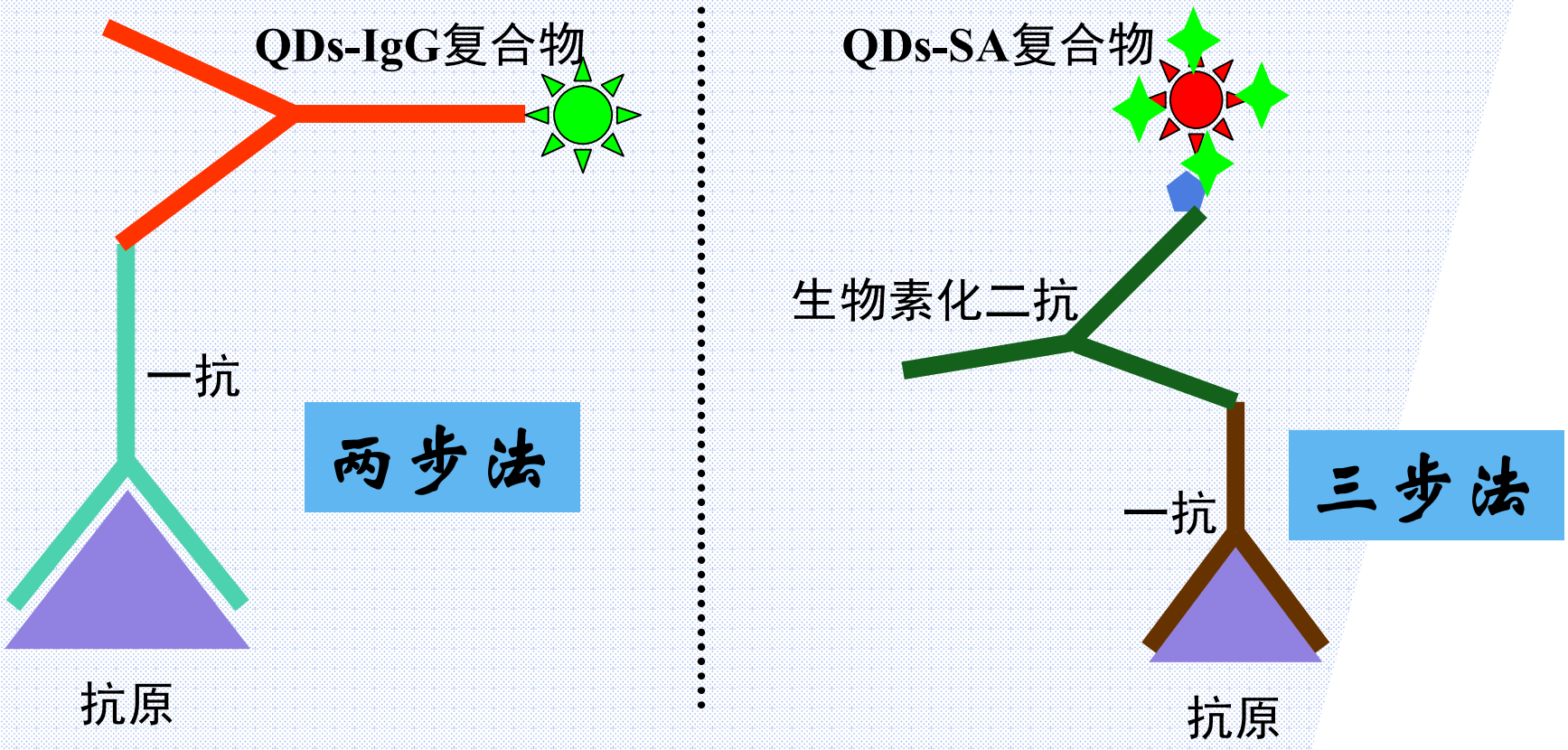
试剂D　**QDs-SA复合物（1μM）**

试剂E　通透液：0.1% Triton-X 100

试剂F　缓冲甘油封固剂



原理及适用范围

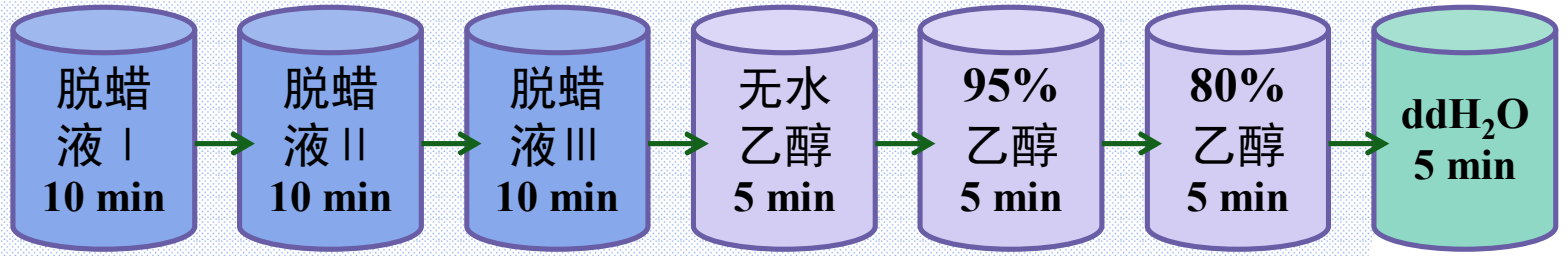


适用范围：冰冻切片、石蜡包埋组织切片、固定细胞、活细胞等

操作流程

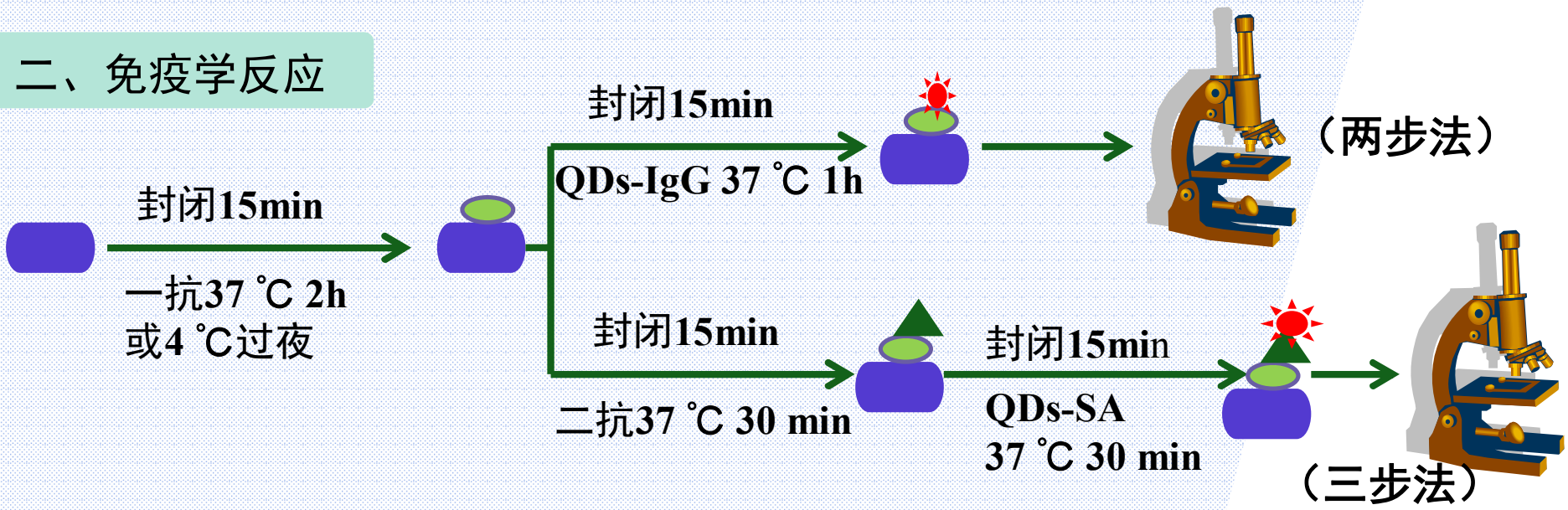
一、组织预处理

1. 脱蜡入水



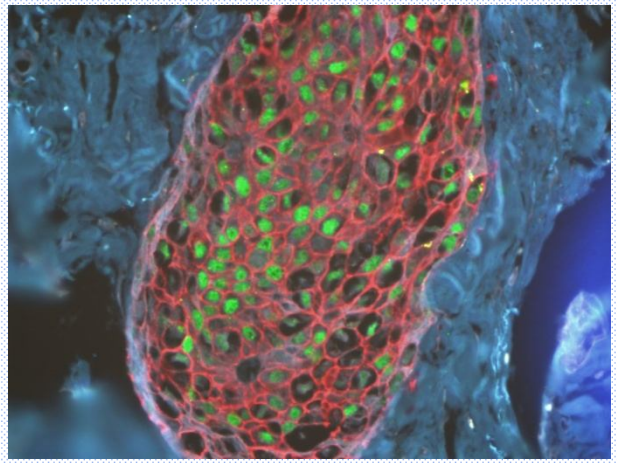
2. 抗原修复：微波或高压

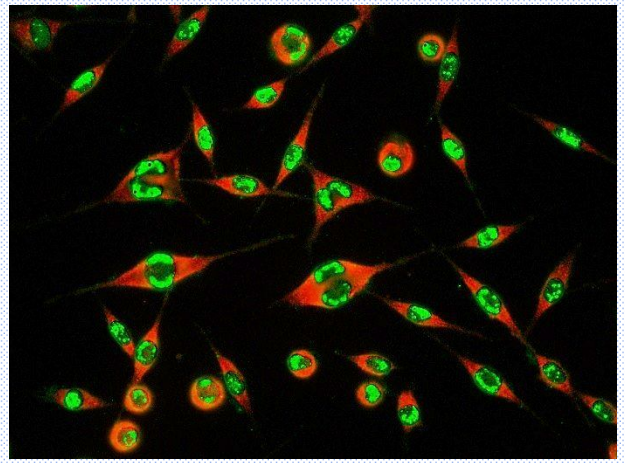
二、免疫学反应

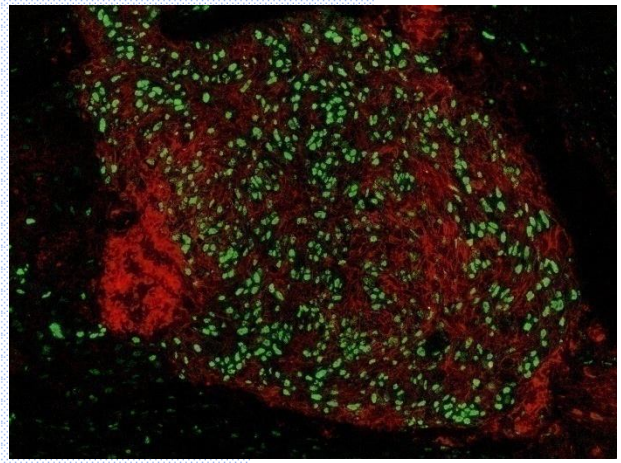


量子点免疫荧光双染系列试剂盒

货　号	名　称	荧光最大发射波长	激发波长
QK525MD	量子点双染荧光试剂盒（605SA+ 525-G/M IgG）	—	≤485，紫外
QK605MD	量子点双染荧光试剂盒（525SA+ 605-G/M IgG）	—	≤485，紫外
QK525RD	量子点双染荧光试剂盒（605SA+ 525-G/R IgG）	—	≤485，紫外
QK605RD	量子点双染荧光试剂盒（525SA+ 605-G/R IgG）	—	≤485，紫外







量子点双染试剂盒

组成成分

试剂A　Tween 20

试剂B　缓冲液：2% BSA（用于封闭和稀释试剂）

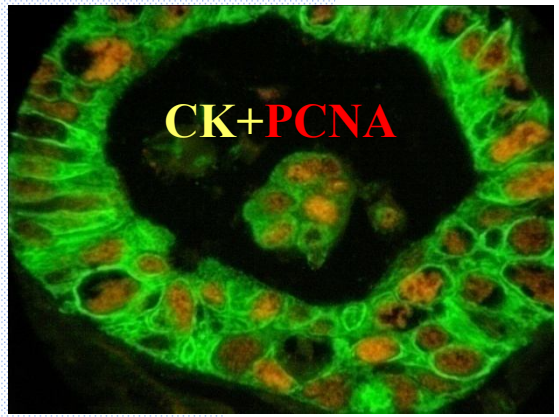
试剂C　生物素化二抗（进口分装）

试剂D　QDs-SA复合物（1μM）

试剂E　QDs-IgG复合物（1μM）

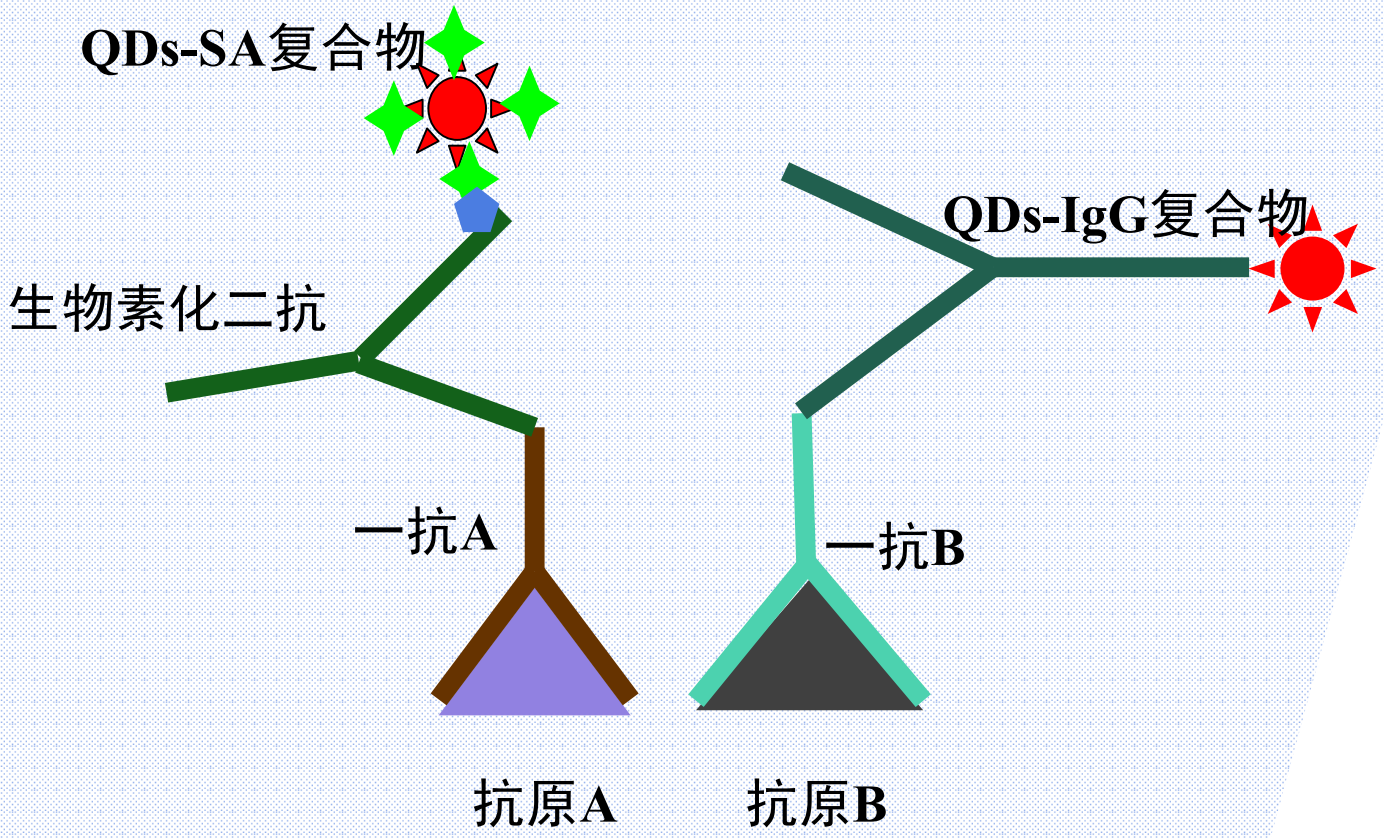
试剂F　通透液：0.1% Triton-X 100

试剂G　缓冲甘油封固剂



★要求两种一抗来自不同种属

原理及适用范围



一抗要求：一抗源自不同种属

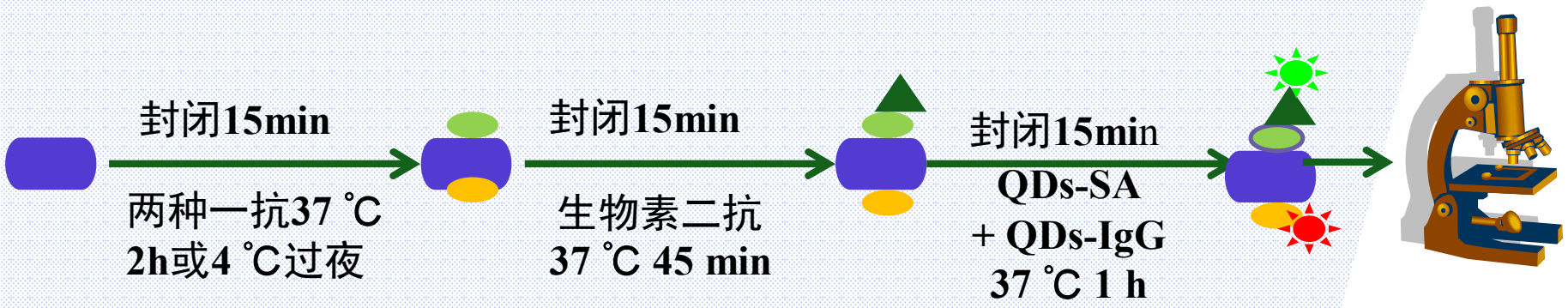
适用范围：冰冻切片、石蜡包埋组织切片、固定细胞、活细胞等

操作流程

一、组织预处理

同量子点免疫荧光单染

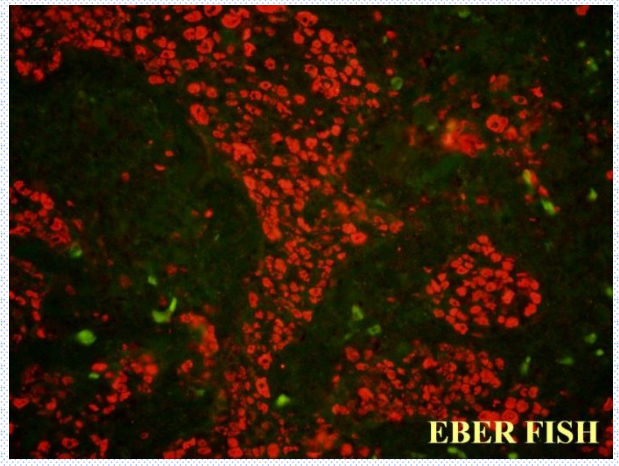
二、免疫学反应

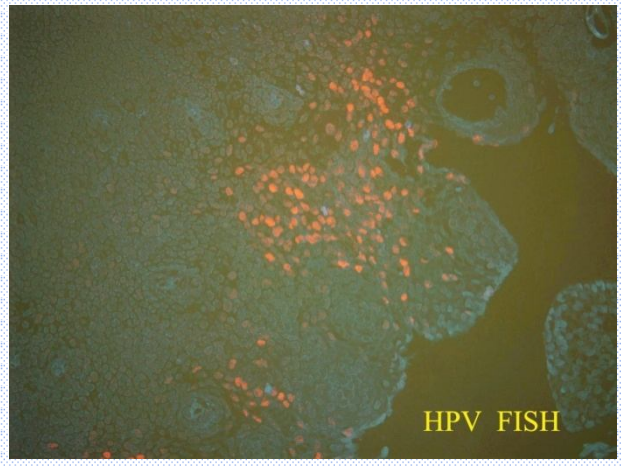


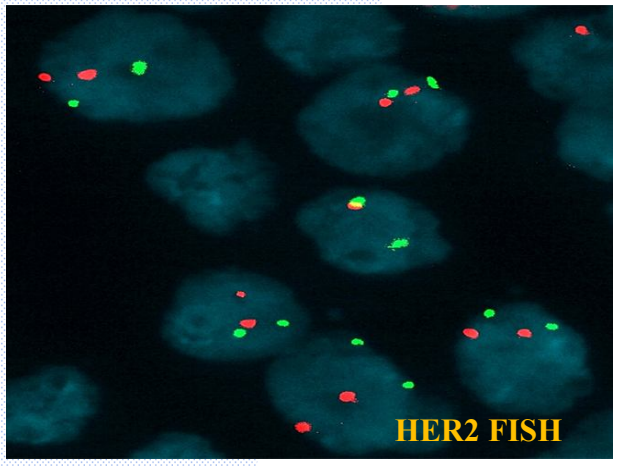
注：两种一抗同时孵育，例如抗体A和B均为浓缩型，稀释比例均为1:100，则在100 μL稀释液中加入1 μL抗体A和1 μL抗体B，混匀后即可滴加于组织上。两种量子点配制方法同此。

量子点荧光原位杂交试剂盒

货　号	名　称	荧光最大发射波长	激发波长
QK525FB	量子点荧光原位杂交试剂盒（QDs-FISH）-525	525	≤485，紫外
QK605FB	量子点荧光原位杂交试剂盒（QDs-FISH）-605	605	≤565，紫外
QK525FD	量子点荧光原位杂交试剂盒（QDs-FISH）-525	525	≤485，紫外
QK605FD	量子点荧光原位杂交试剂盒（QDs-FISH）-605	605	≤565，紫外







量子点荧光原位杂交试剂盒组成成分

◆Cat. QK525FB QK605FB

试剂A Tween 20

试剂B 缓冲液： 2% BSA
（用于封闭和稀释试剂）

试剂C 胃蛋白酶

试剂D 杂交后洗液

试剂E **QDs-IgG复合物（1μM）**

试剂F 缓冲甘油封固剂

◆ Cat. QK525FD QK605FD

试剂A Tween 20

试剂B 缓冲液： 2% BSA
（用于封闭和稀释试剂）

试剂C 胃蛋白酶

试剂D 杂交后洗液

试剂E 小鼠抗DIG

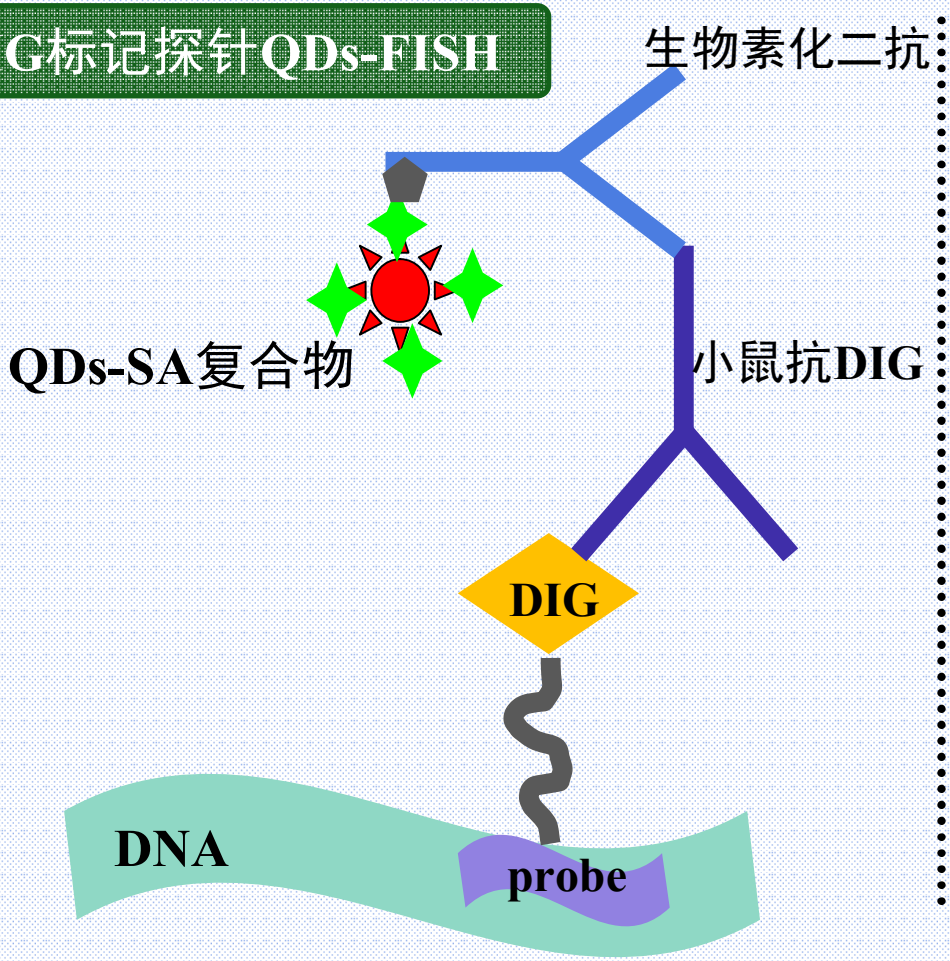
试剂F 生物素化二抗（进口分装）

试剂G **QDs-SA复合物（1μM）**

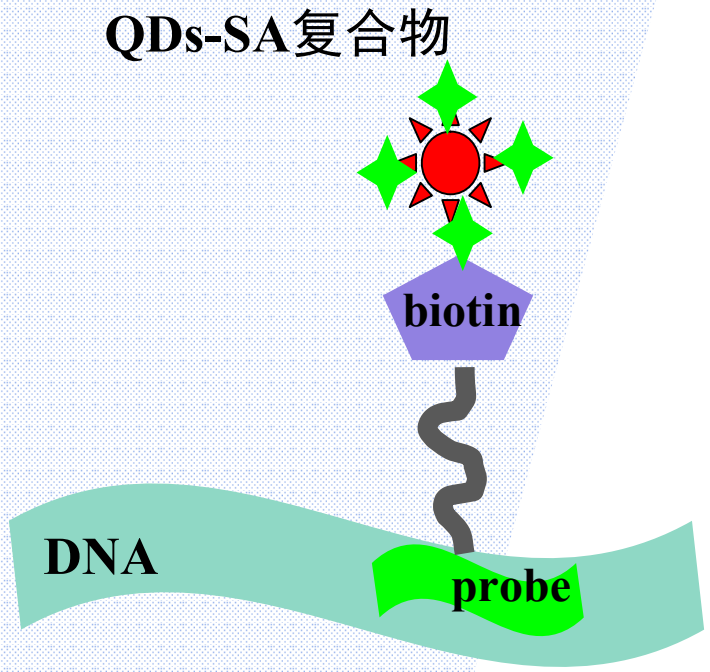
试剂H 缓冲甘油封固剂

原理及适用范围

DIG标记探针QDs-FISH



biotin标记探针QDs-FISH



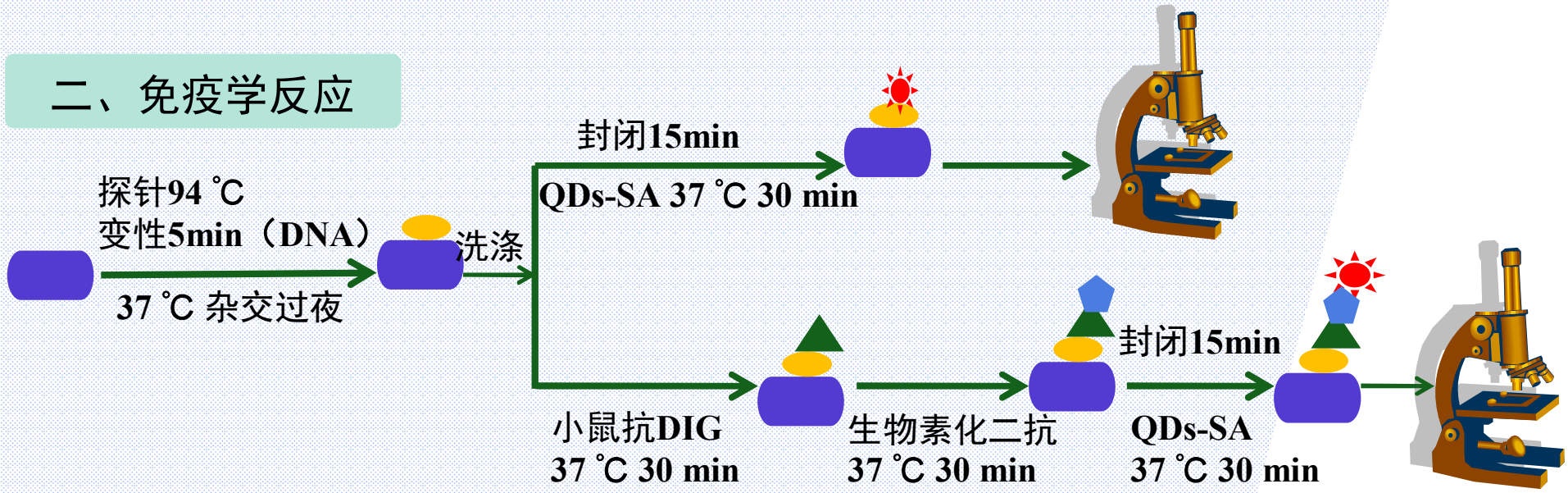
适用范围：冰冻切片、石蜡包埋组织切片、细胞等

操作流程

一、组织预处理

脱蜡入水 → 热处理（微波） → 酶消化（ 37 ℃ 5~10 min ） → 梯度酒精脱水

二、免疫学反应

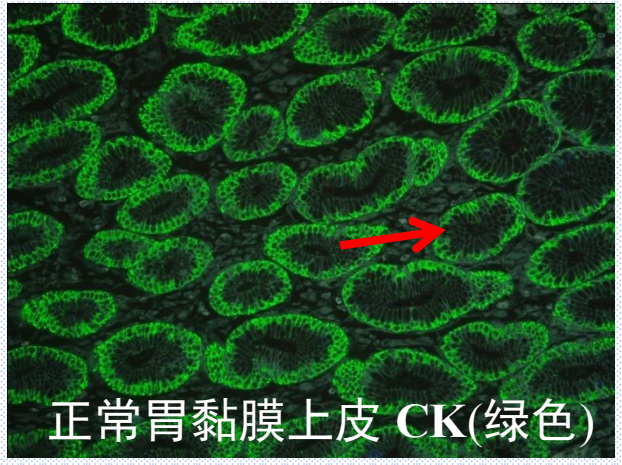


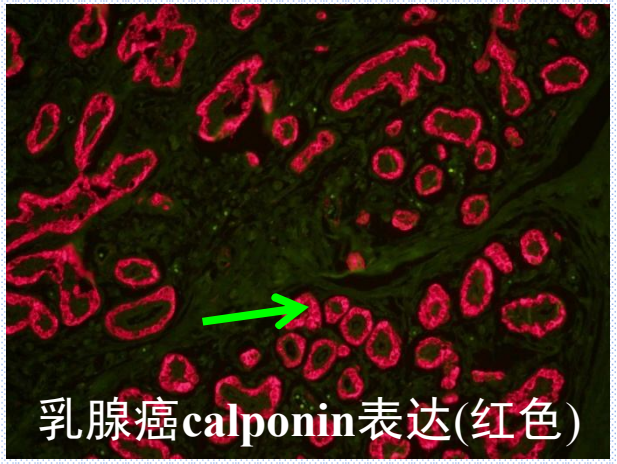
量子点作为免疫荧光染料的优势

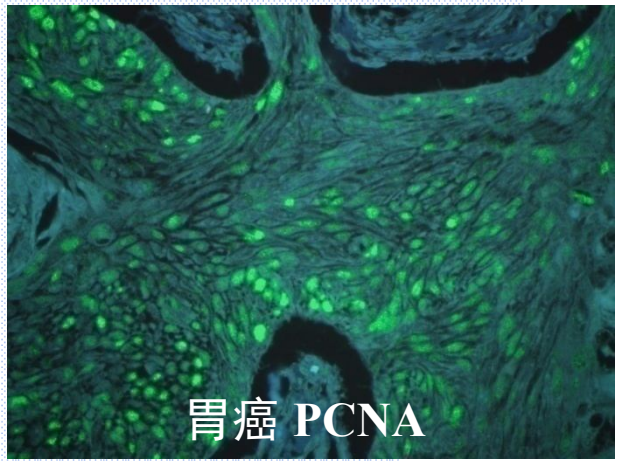
- 适用范围广：石蜡包埋组织切片 新鲜组织 活细胞 固定细胞
- 灵敏度高，可检测低丰度抗原表达
- 特异性强，定位准确
- 信噪比高，可实现阳性信号与组织自发背景荧光完全区分
- 荧光稳定性好，无需避光操作--操作便利
- 可实现定量检测--量子点荧光定量免疫组织化学技术
- 可实现结果长期保存
- 可实现多种颜色一次同时成像
- 可实现抗原表达共定位分析（结合多光谱）

量子点免疫荧光适用范围广

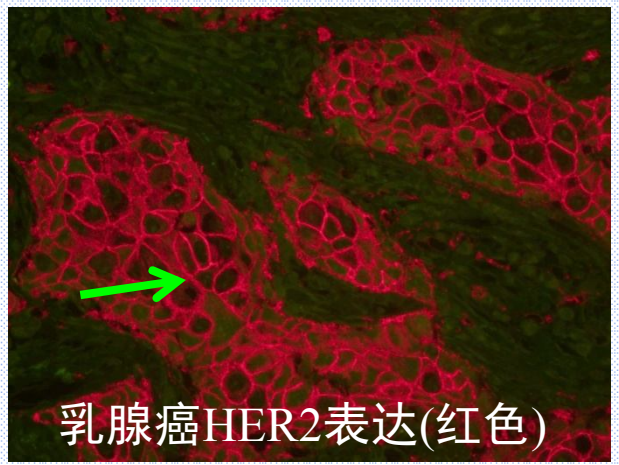
石蜡包埋组织切片

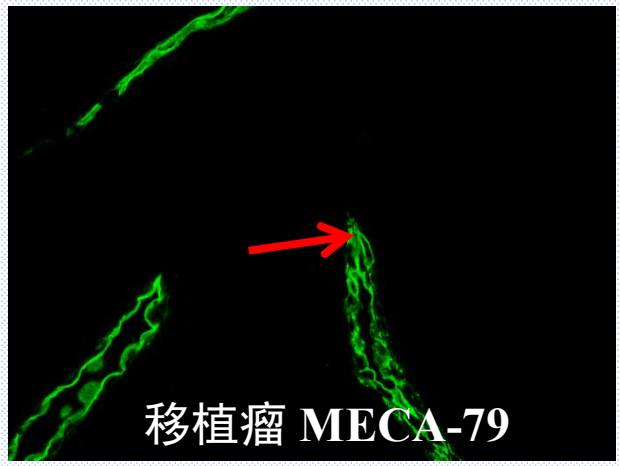

正常胃黏膜上皮 CK(绿色)

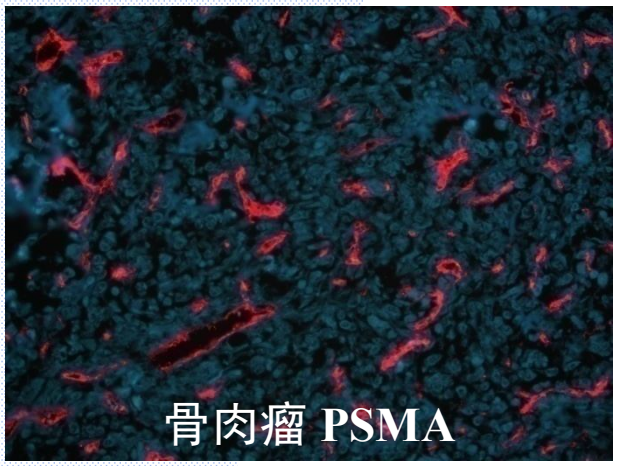

乳腺癌calponin表达(红色)


胃癌 PCNA

冰冻组织切片

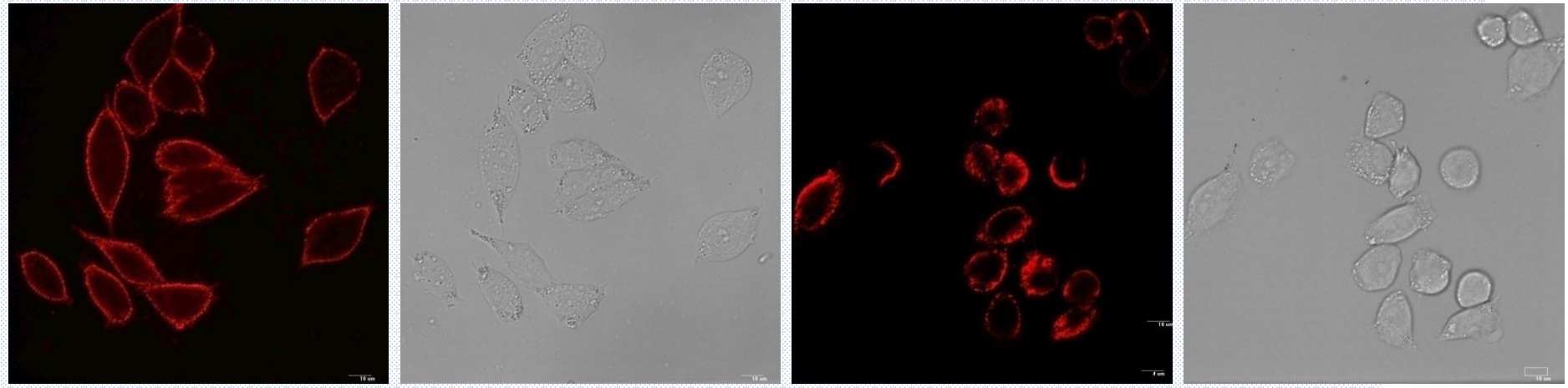

乳腺癌HER2表达(红色)


移植瘤 MECA-79

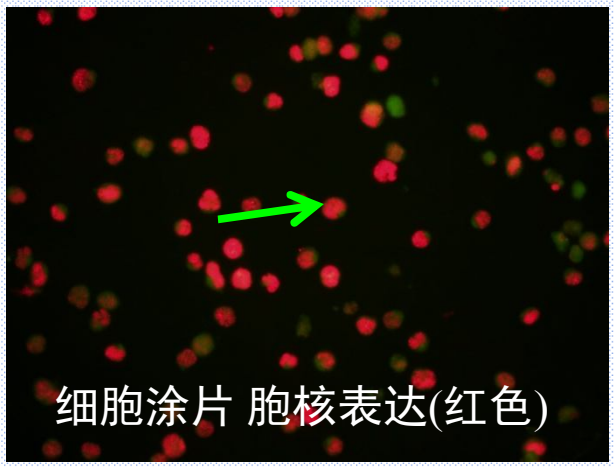

骨肉瘤 PSMA

量子点免疫荧光适用范围广

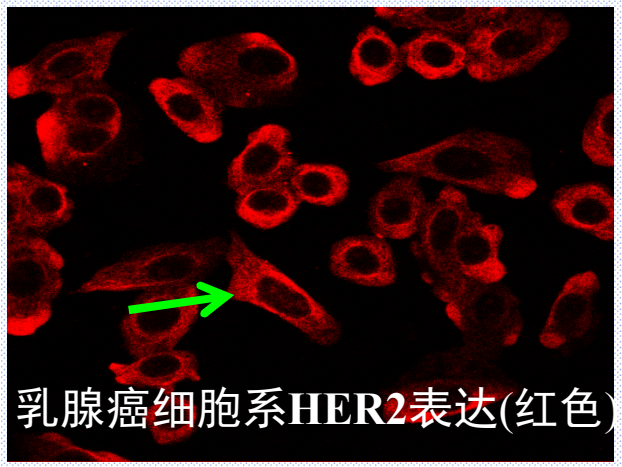
活细胞（黑色素瘤细胞CD146检测结果）



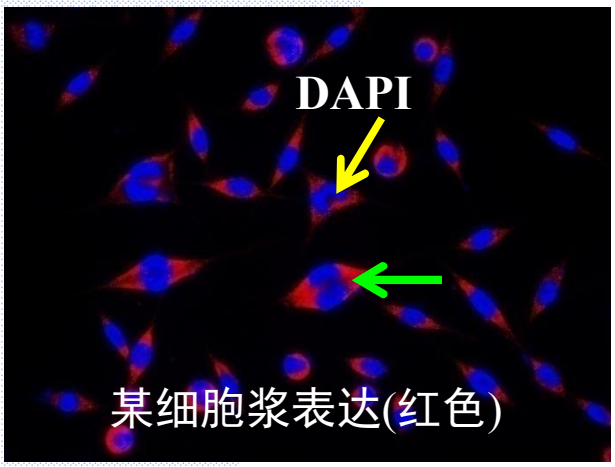
固定细胞



细胞涂片 胞核表达(红色)



乳腺癌细胞系HER2表达(红色)



某细胞浆表达(红色)

量子点免疫荧光灵敏度高

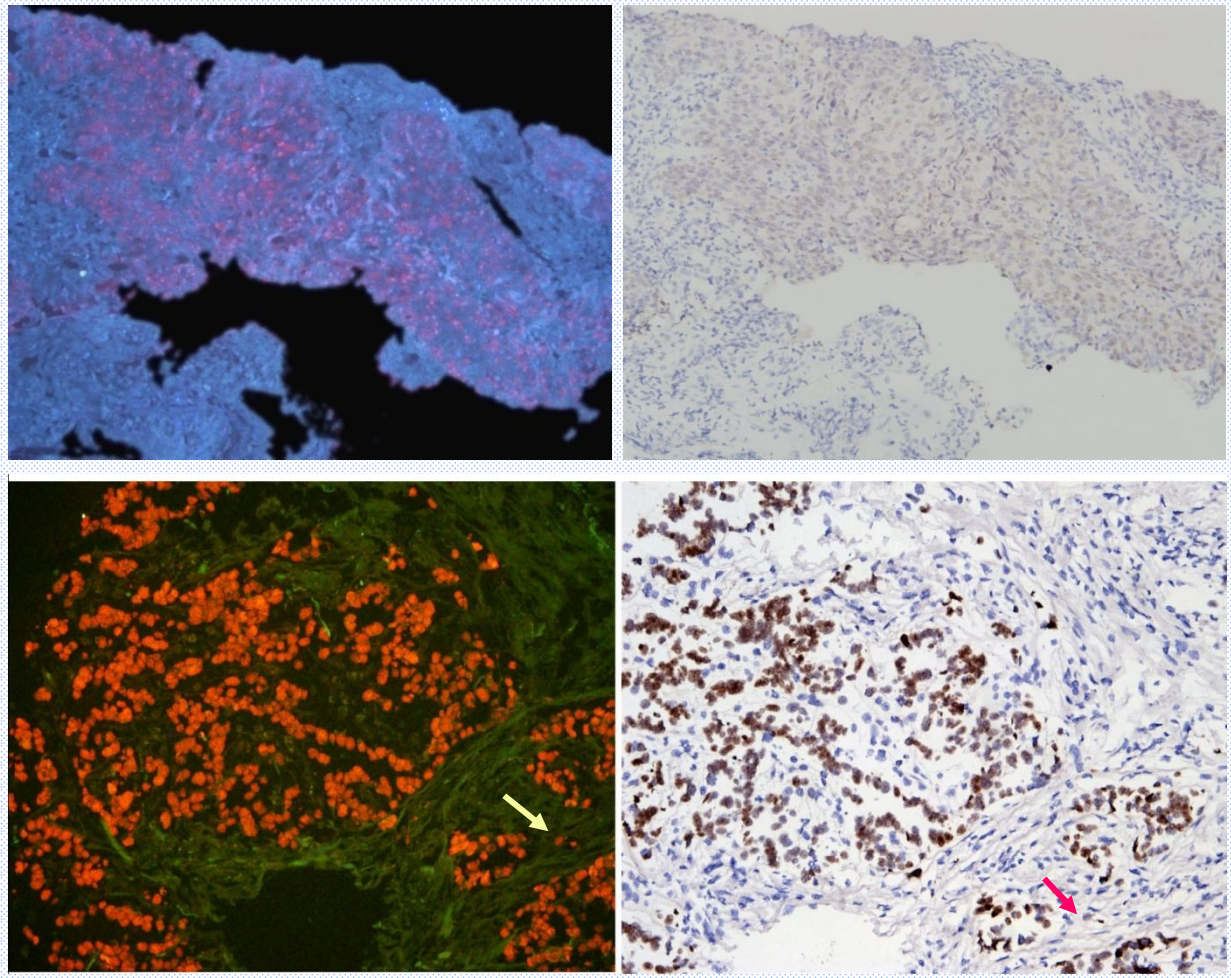


Figure1. EBER FISH在胃癌组织中的应用，并与CISH方法平行对比。

本公司产品与传统的方法相比具有相同的特异性，较高的灵敏性（箭头所示）。

Experimental and Molecular Pathology , *2010*, 89 , 367-371.

J Nanosci Nanotechno, *2011* .

量子点免疫荧光特异性强、定位准确

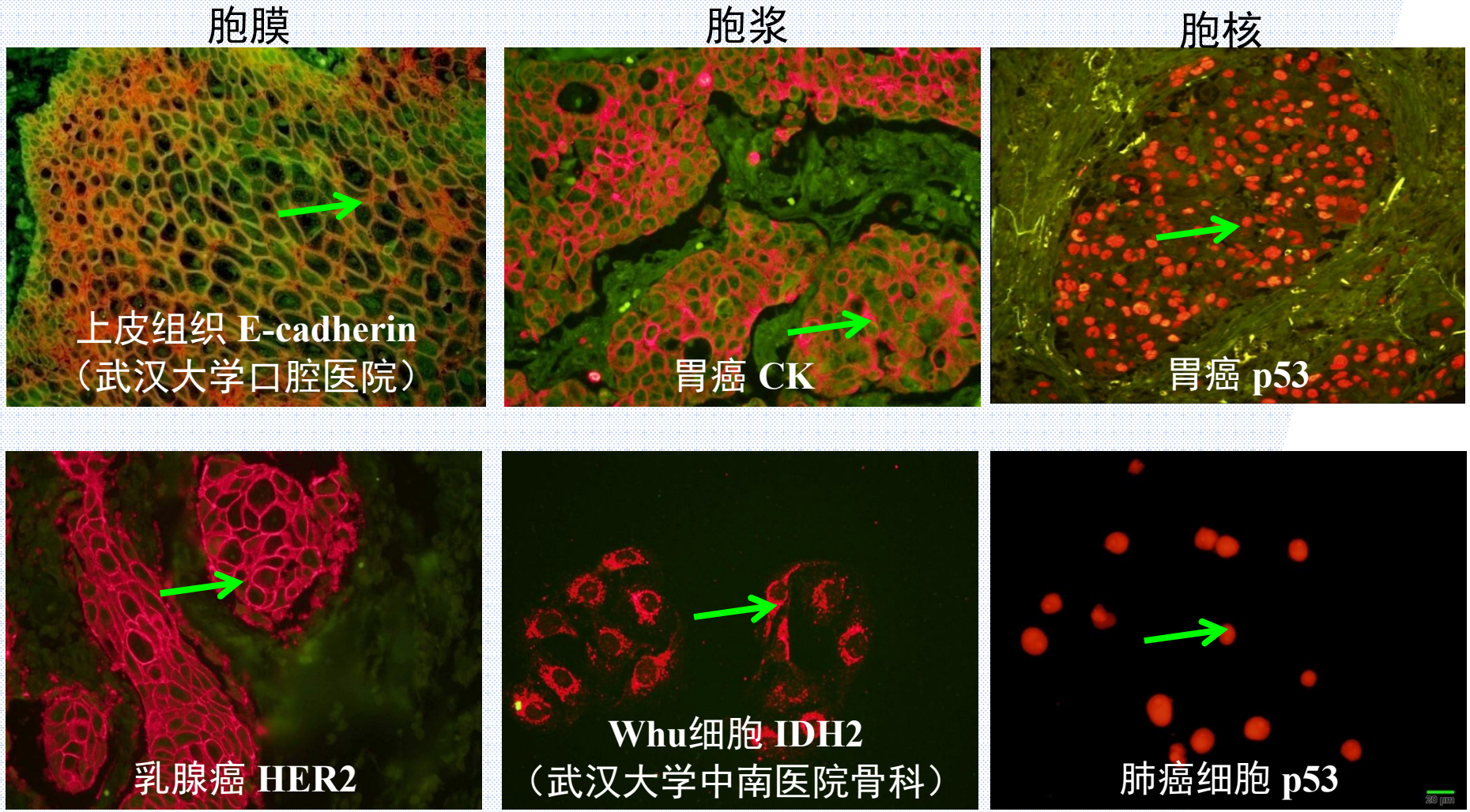


Figure 2. 量子点免疫荧光检测不同定位抗原的表达

量子点免疫荧光特异性强、定位准确

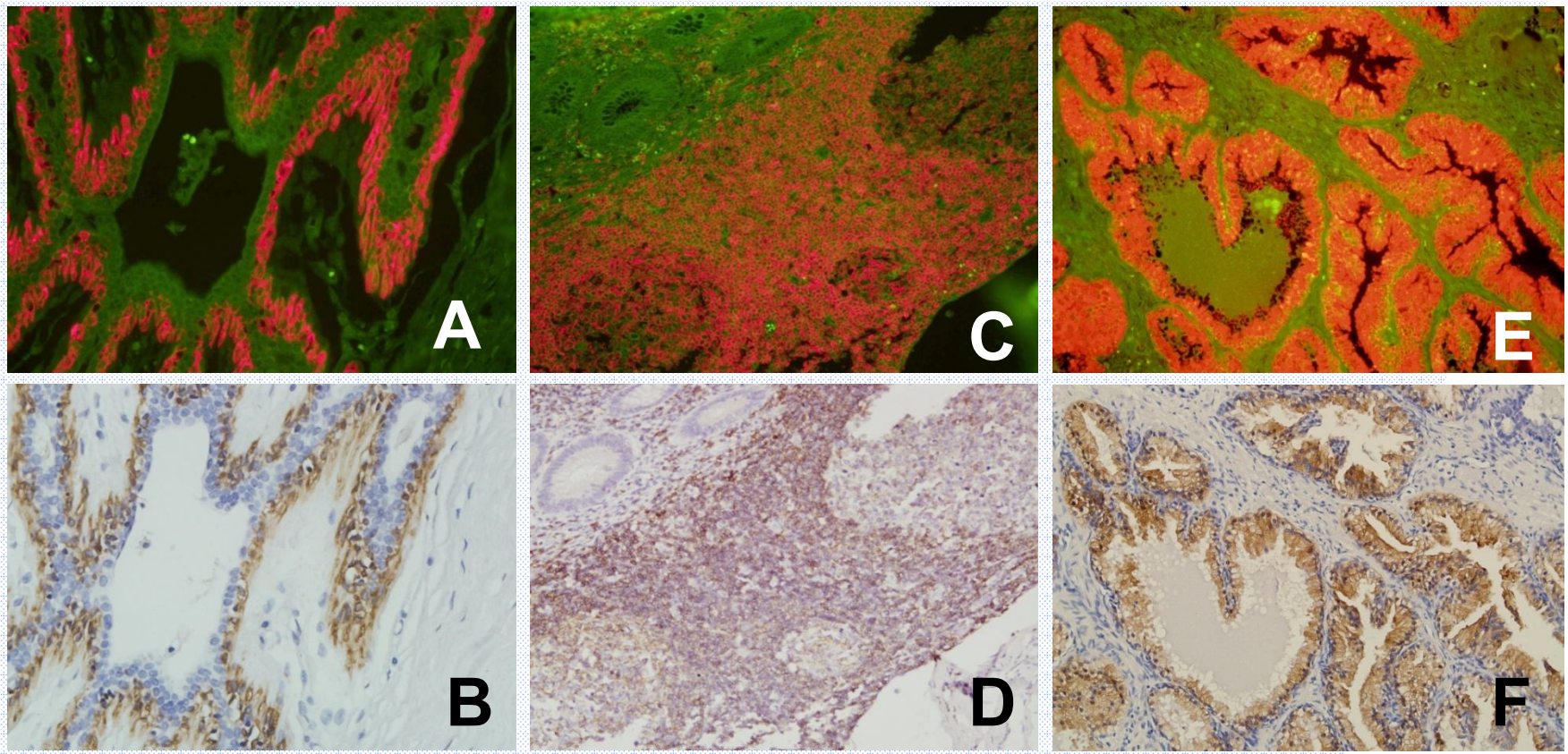
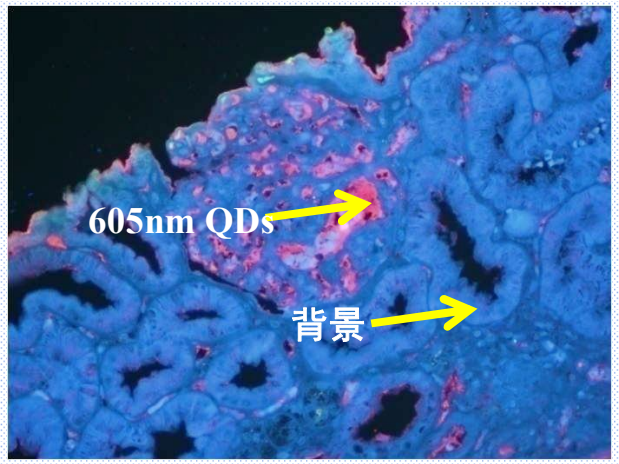


Figure 3. 量子点免疫荧光与传统免疫组化对比

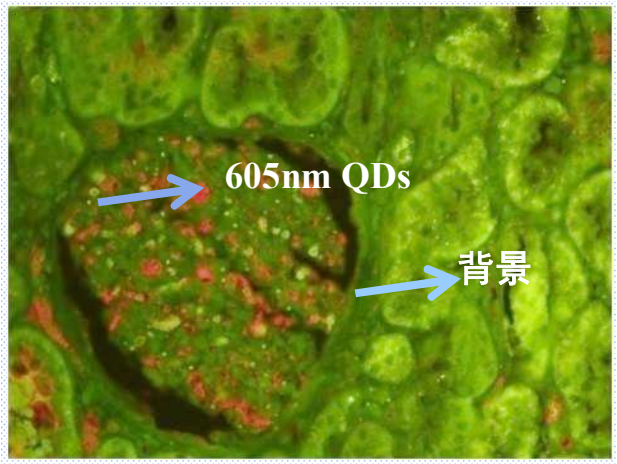
AB: 乳腺癌 Calponin；CD: 阑尾 LCA；EF: 前列腺增生 PSA

ACE: 量子点免疫荧光结果；BDF: 传统免疫组化结果

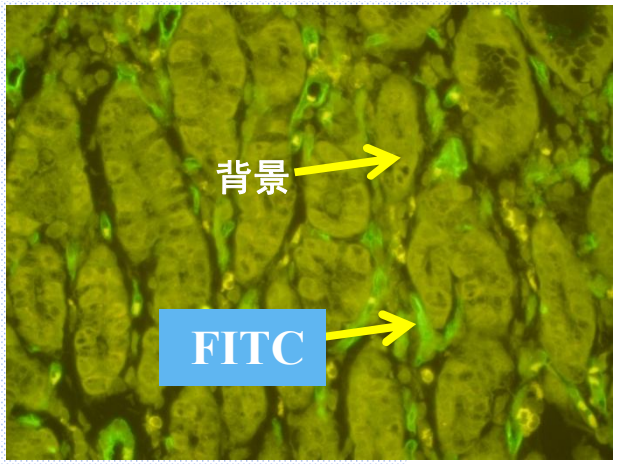
量子点免疫荧光信噪比高



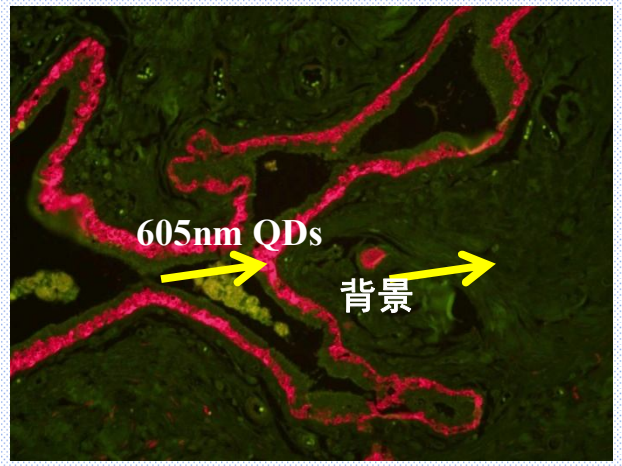
肾脏 IgA，紫外光激发



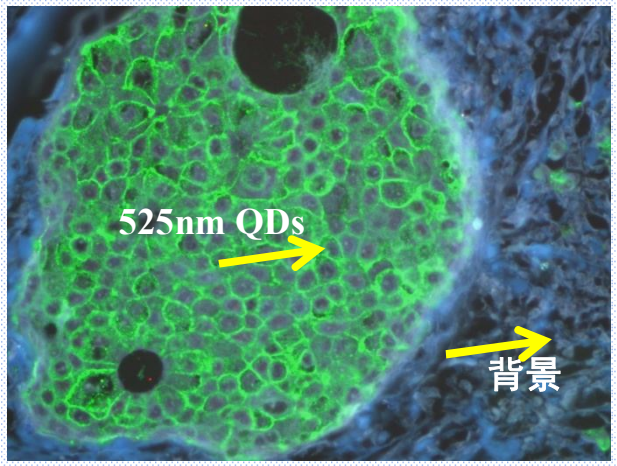
肾脏 IgA，蓝光激发



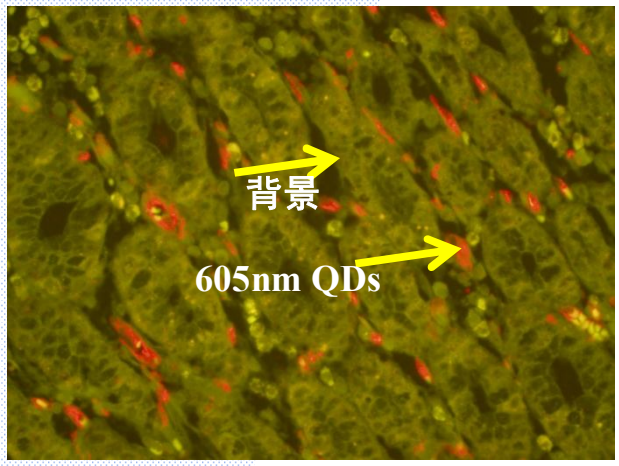
胃腺癌 caveolin1，蓝光激发



正常乳腺 calponin，紫外光激发
红色：605nm QDs；绿色：背景

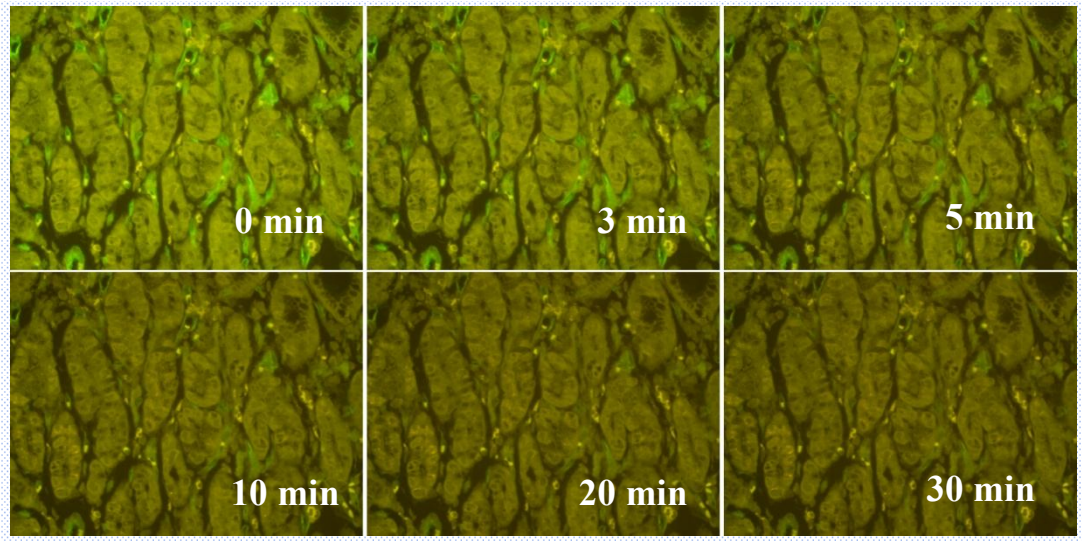


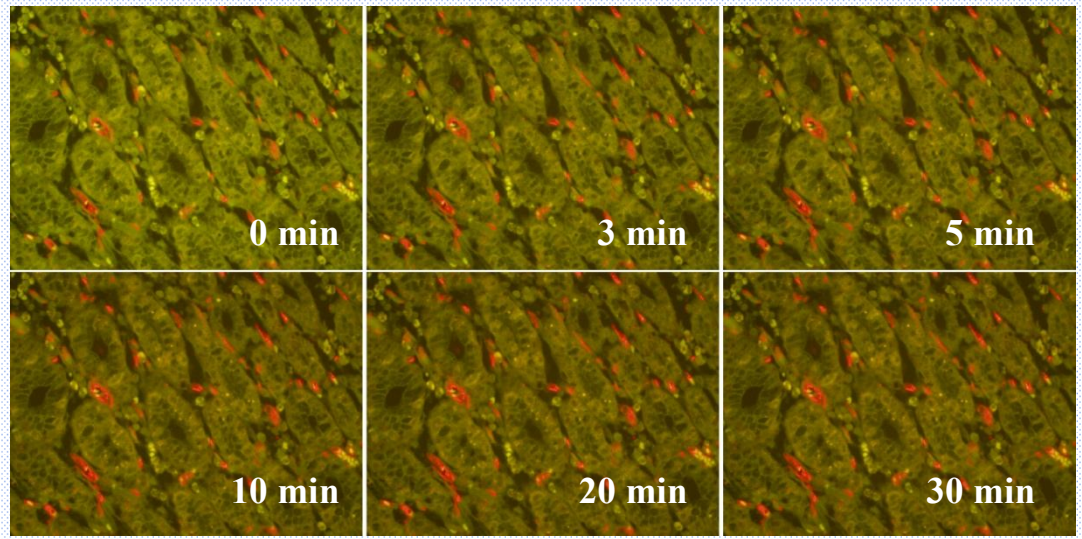
乳腺癌 HER2，紫外光激发
绿色：525nm QDs；蓝色：背景



胃腺癌 caveolin1，蓝光激发

量子点免疫荧光稳定性好





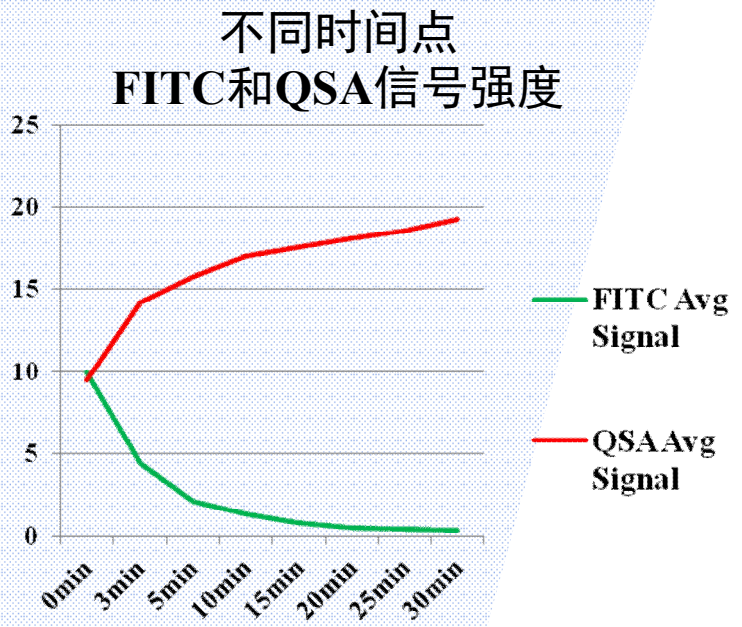
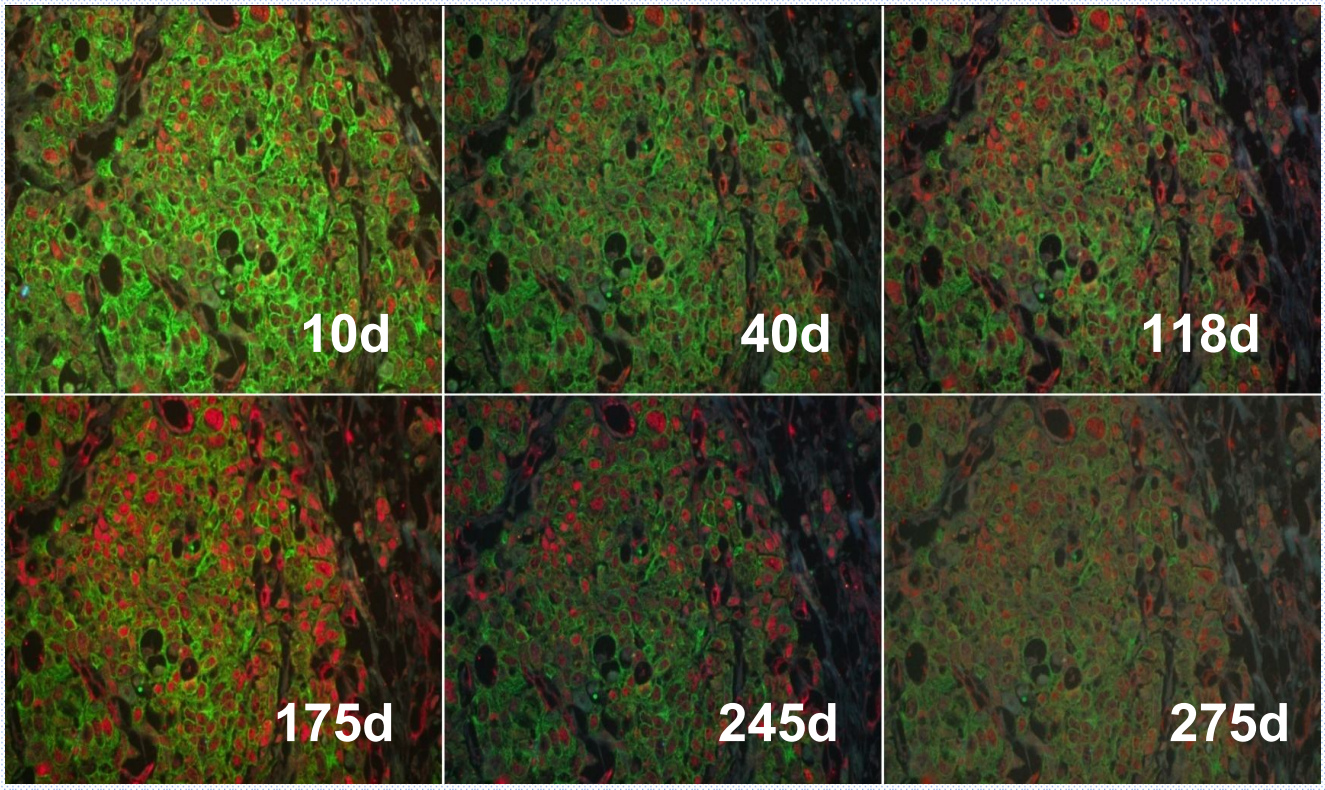


Figure 4. 胃癌组织切片caveolin1 FITC免疫荧光和量子免疫荧光不同时间点对比

Olympus BX51, DP72, ×400

分析软件：CRi多光谱成像系统

量子点免疫荧光结果可长期保存



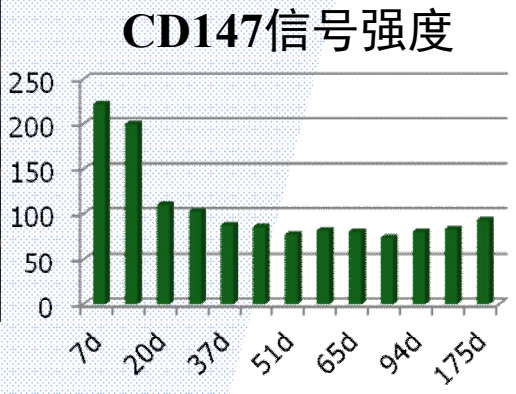
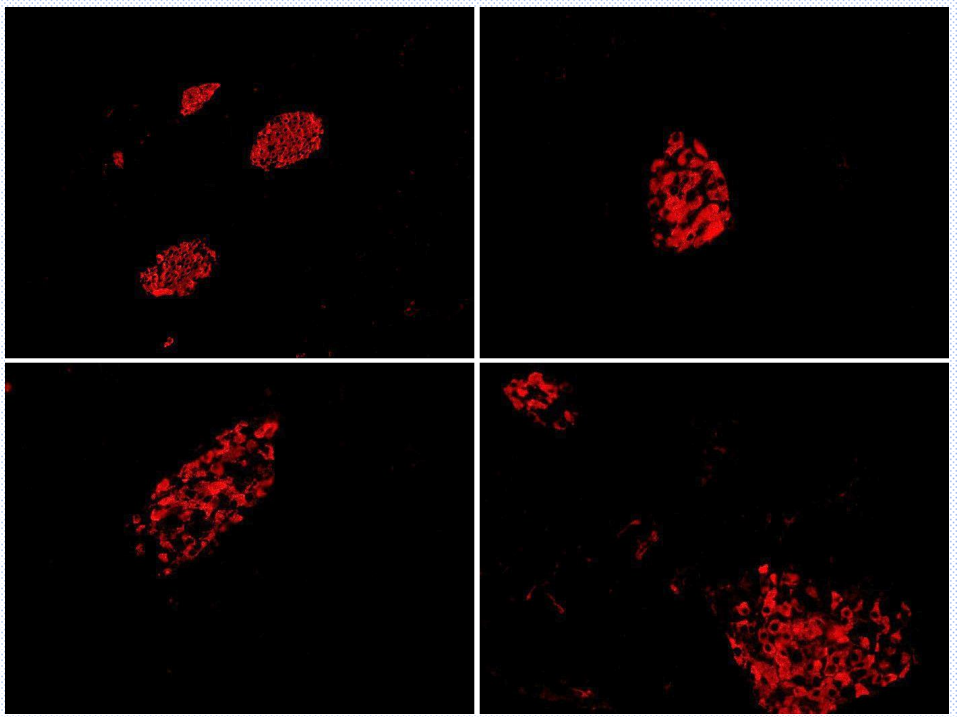


Figure 5. 胃癌组织切片CD147和p53双标跟踪观察
（Olympus BX51, DP72, ×200）

量子点免疫荧光可实现定量检测



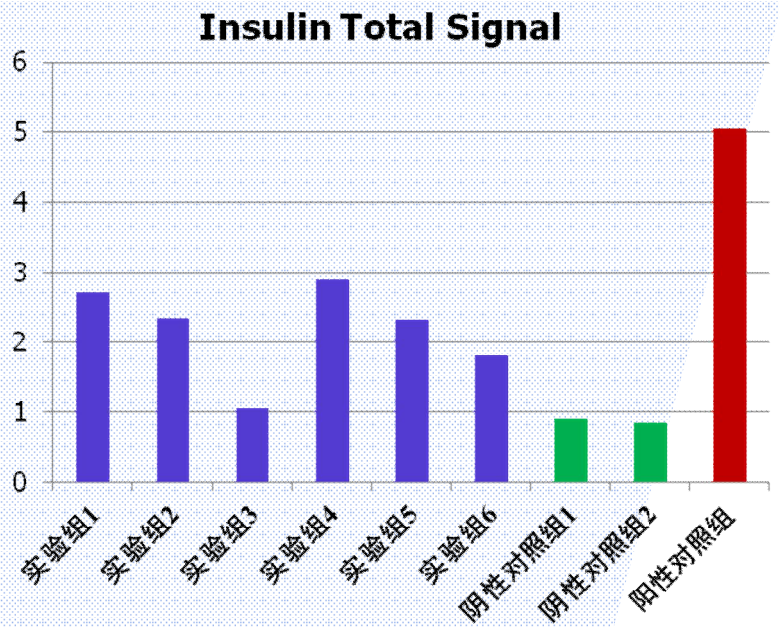
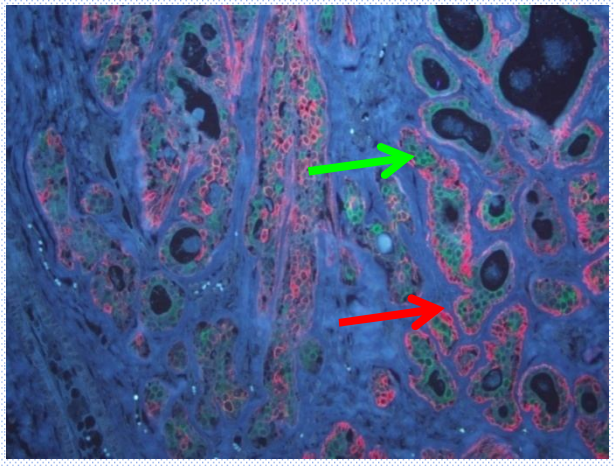


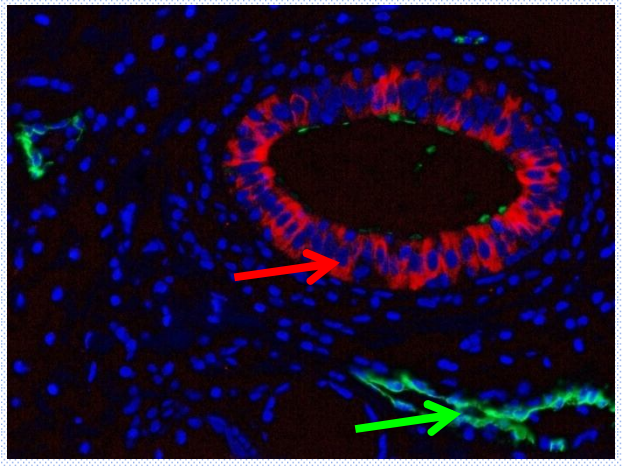
Figure 6. 不同处理组小鼠胰腺组织insulin表达
采集系统：Olympus BX51荧光显微镜
成像及分析系统：CRI公司多光谱成像系统
放大倍数：×200

相关文献：**Biomaterials , *2010*: 1-8.**

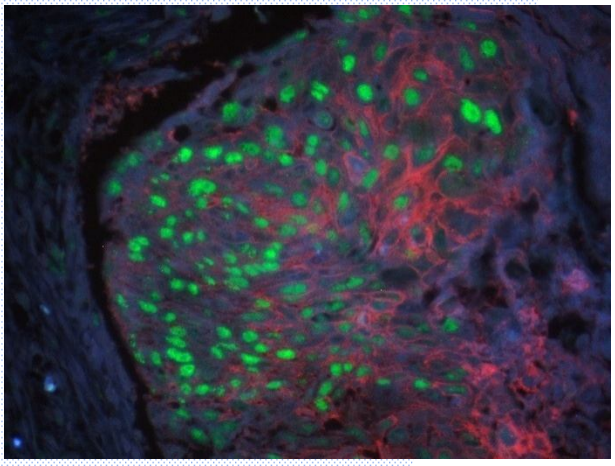
量子点免疫荧光可实现多种颜色同时成像



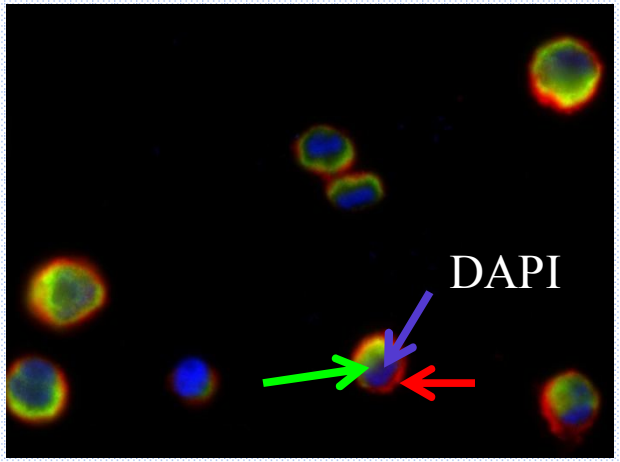
胃癌 CK5&6+CK8&18



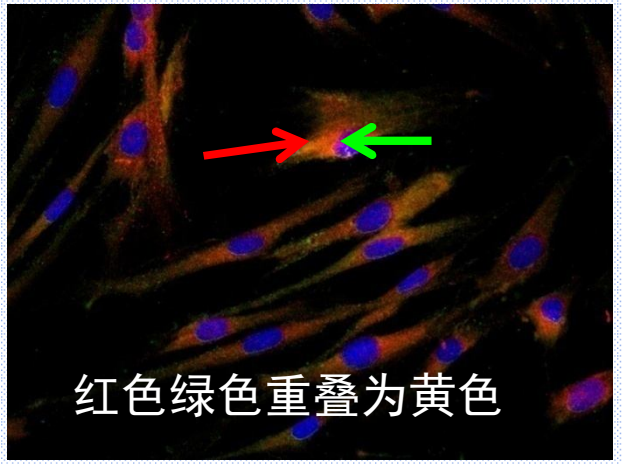
牙齿 CK+MECA-79



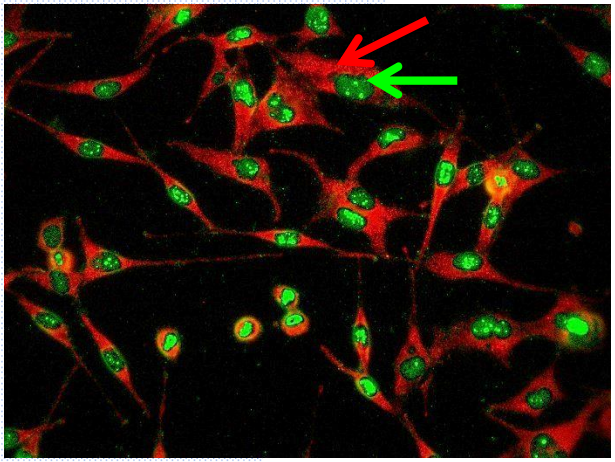
胃癌 CK+PCNA



细胞涂片量子点双标



细胞爬片胞浆双标



细胞爬片胞浆胞核双标

量子点免疫荧光可实现抗原表达共定位分析

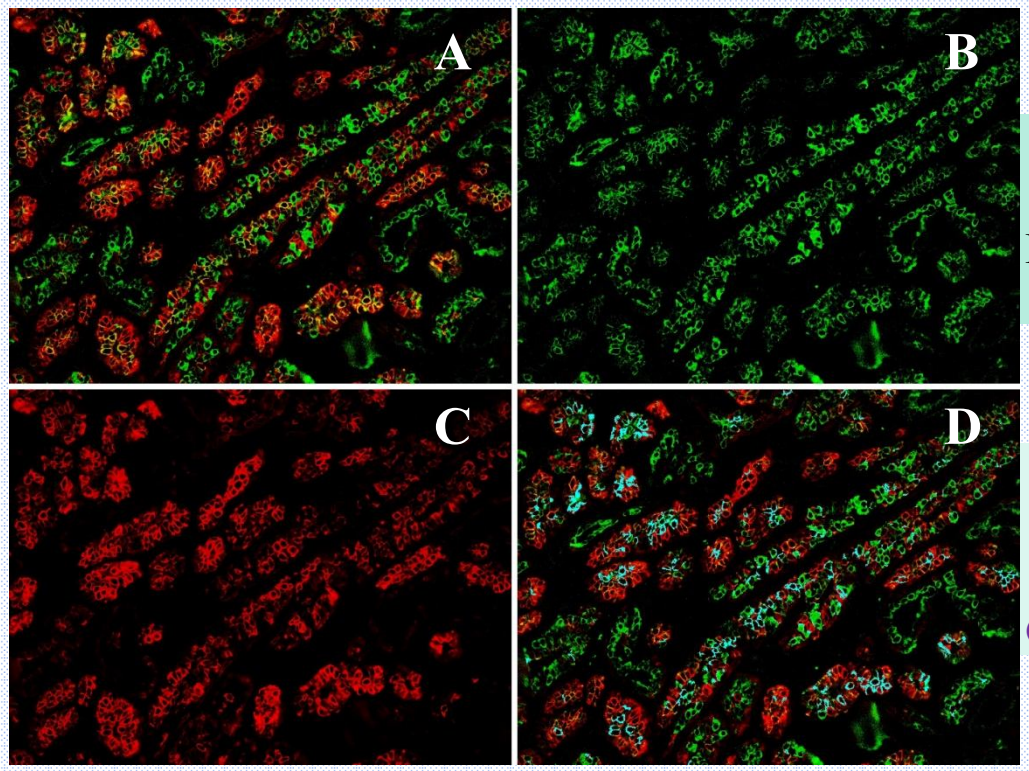


表1：各指标所占百分比及共定位所占百分比

	% Co-loc.	% Area: CK5&6	% Area: CK8&18
Percent (%)	2.03	15.37	6.56

表2：各指标定量结果

	Marker Area	Total Signal	Avg Signal	Standard Deviation
CK5&6	55618	3859.33	17.47	30.03
CK8&18	23733	124.28	0.562	1.4

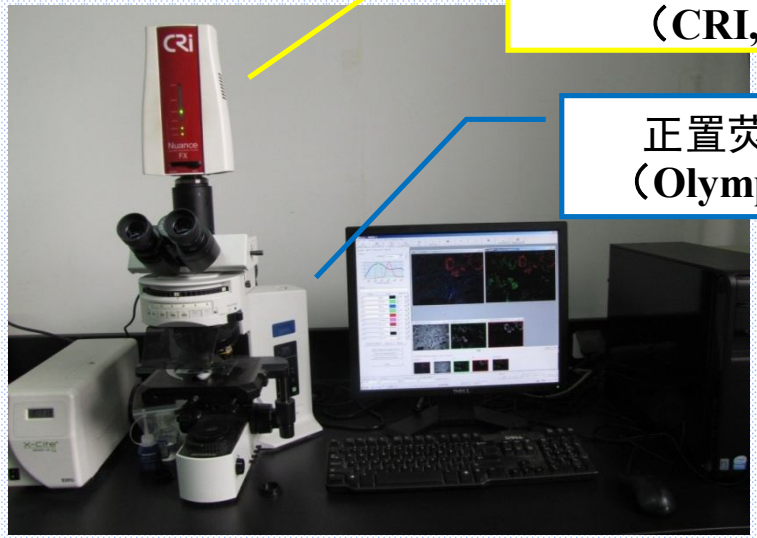
Figure7. 胃癌组织CK5&6和CK8&18双染结果
A: CK5&6 +CK8&18 ；
B: CK5&6；C: CK8&18；D: 共定位图
（红色：605nm QDs；绿色：545nm QDs；
黑色：背景；蓝色：显示两者共表达部位）

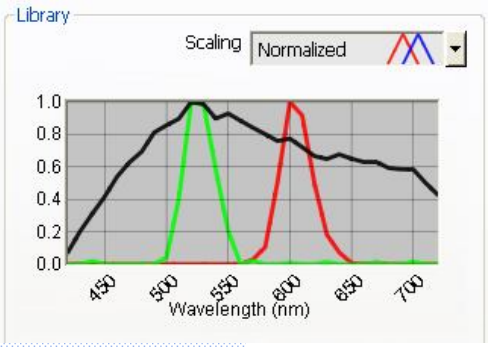
荧光显微镜：Olympus BX51
采集系统：多光谱成像系统
分析系统：多光谱成像系统
放大倍数：×200
激发条件：紫外光

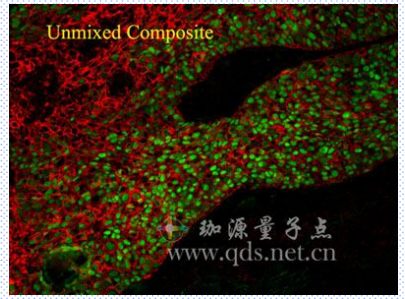
珈源量子点结合多光谱成像系统的实际应用

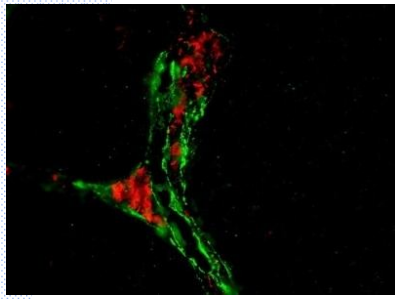
珈源公司多光谱成像系统，可检测**420nm**到**720nm**区间任意波段的荧光信号，结合本公司的量子点荧光标记试剂可实现同一样本中多色荧光的同时成像。

- ▸完全去除自发荧光，提高信噪比；
- ▸可分离多种信号，便于分析多种蛋白表达，尤其是不同蛋白的共定位；
- ▸定量分析（包括不同蛋白表达的信号强度、不同蛋白共定位的百分比等）









胃癌组织切片CD147（胞膜）PCNA（胞核）双标结果

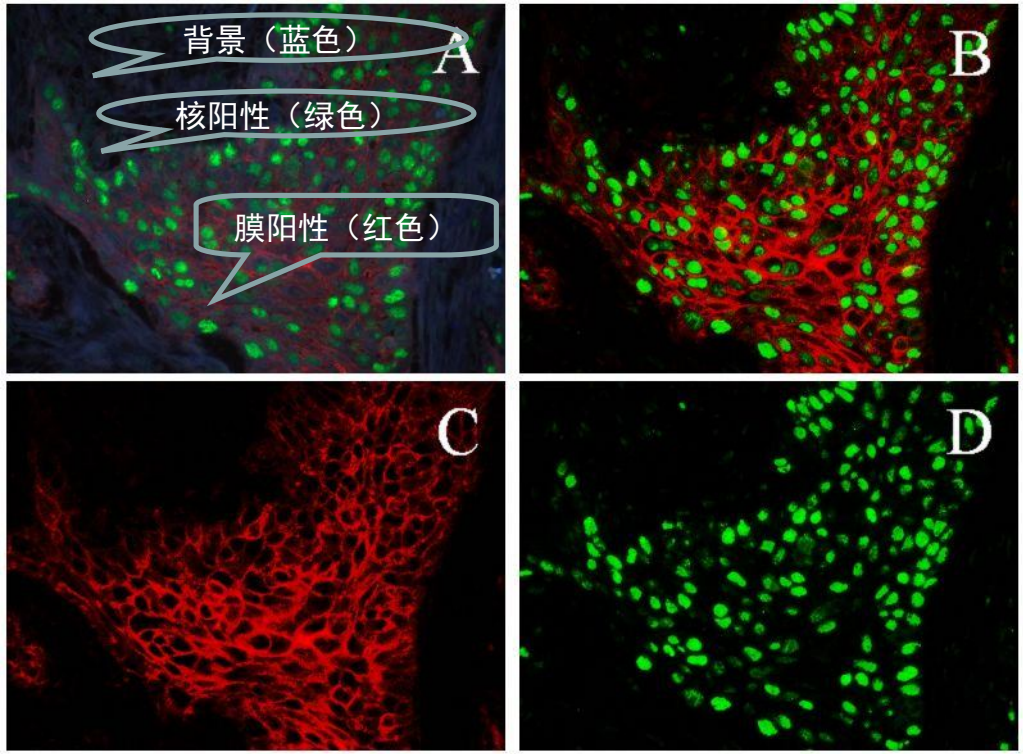


表3：各指标所占百分比及共定位所占百分比

	% Co-loc.	% Area: CD147	% Area: PCNA
Percent (%)	1.84	26.64	11.41

表4：各指标定量结果

	Marker Area	Total Signal	Avg Signal	Standard Deviation
CD147	96402	686489.06	1.9	2.22
PCNA	41301	879382.19	2.43	4.89

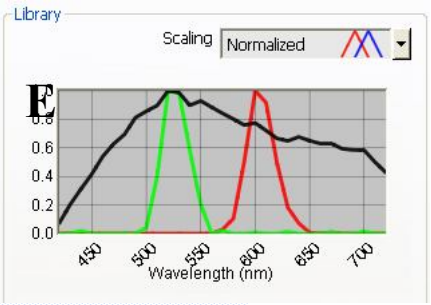


Figure 8. 胃癌组织CD147和PCNA量子点免疫荧光双染结果
A: 原始拍摄图；B: 光谱分离图；
C: 分离CD147 ； D: 分离PCNA； E: 光谱图
（红色： 605nm QDs； 绿色： 545nm QDs； 黑色： 背景）

乳腺癌组织切片HER2（胞膜）CK（胞浆）双标结果

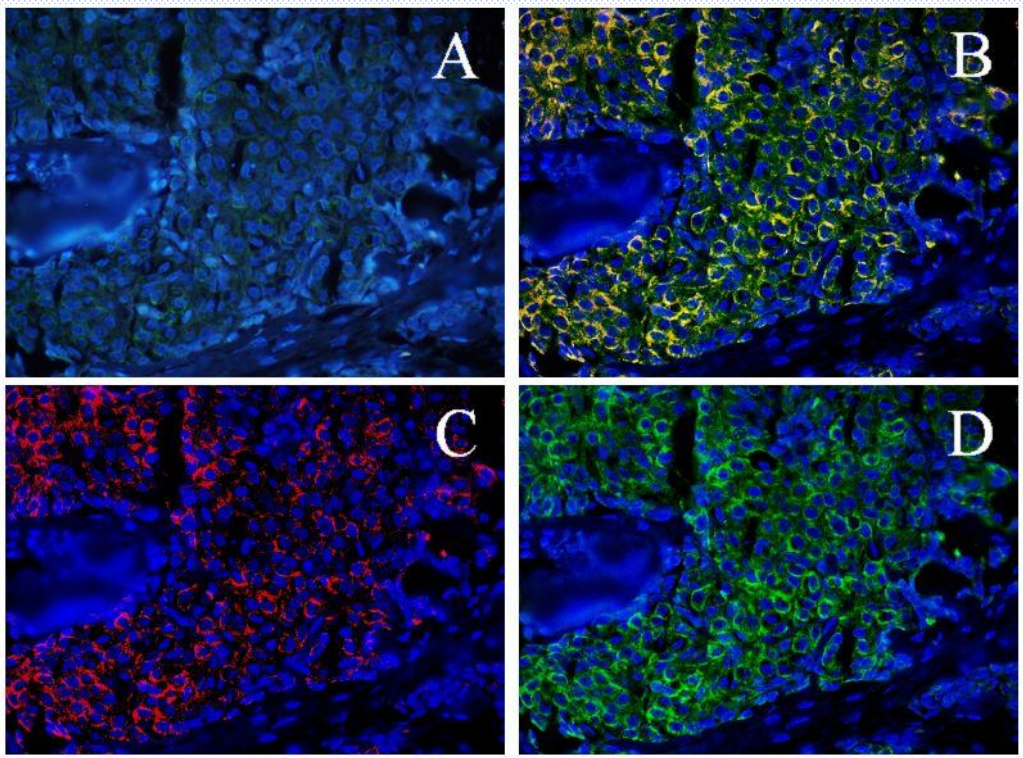


表5：各指标所占百分比及共定位所占百分比

	% Co-loc.	% Area: CK	% Area: HER2
Percent (%)	4.91	4.93	25.77

表6：各指标定量结果

	Marker Area	Total Signal	Avg Signal	Standard Deviation
CK	17850	117615.48	0.325	0.89
HER2	93274	1130477	3.12	3.31
DAPI	106854	4528465.5	12.51	12.26

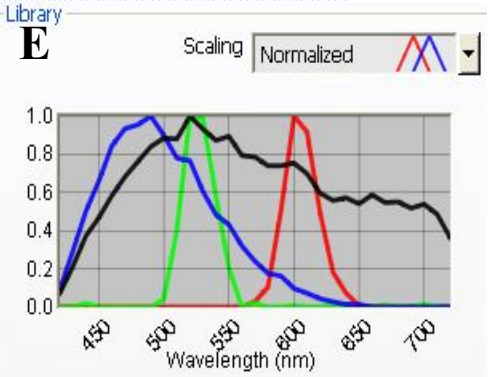


Figure 9. 乳腺癌组织CK和HER2量子点免疫荧光双染结果
A: 原始拍摄图；B: 光谱分离图；
C: 分离CK ； D: 分离HER2； E: 光谱图
（红色： 605nm QDs； 绿色： 545nm QDs；
蓝色： DAPI； 黑色： 背景）

量子点免疫荧光多色标记（胞膜+胞浆+胞核）

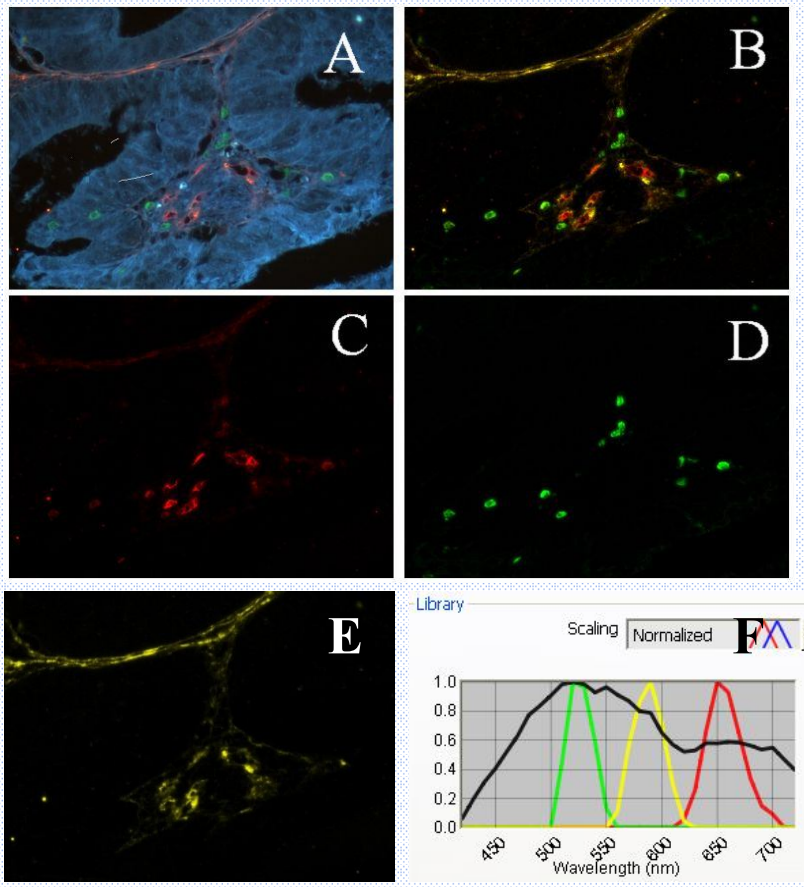


Figure 10. 量子点免疫荧光三标结果
A: 原始拍摄图；**B:** 光谱分离图；**CDE:** 分离单色图；
F: 光谱图
（黑色：背景；红色：**655nmQDs**；
绿色：**525nmQDs**；黄色： **585nmQDs**；）

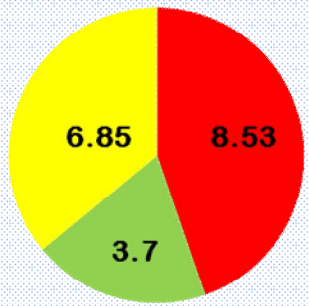
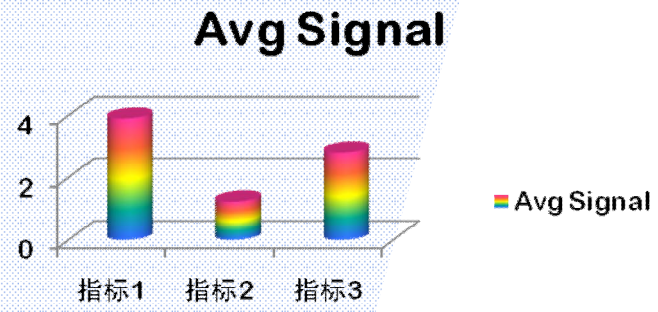


表7：各指标所占百分比及共定位所占百分比

% Co-loc.	% Area: 指标1	% Area: 指标2	% Area: 指标 3
0.1	8.53	3.7	6.85

表8：各指标定量结果

	Marker Area	Total Signal	Avg Signal	Standard Deviation
指标1	30874	1415216.63	3.91	10.63
指标2	13387	448497.56	1.24	4.2
指标3	24786	1020498.19	2.82	7.89



发表文章：. Biomaterials ***2011***, 32 , 2907-2917.（合作单位：中南医院）

使用珈源量子点免疫荧光试剂盒发表的部分文章

1 . Richard J. Quantum Dots Brighten Biological Imaging. Histochemistry and Cytochemistry 45 (2011) 201–237.

2. Chen, C., Li, Y. (2010) The quantitative detection of total HER2 load by quantum dots and the identification of a new subtype of breast cancer with different 5-year prognosis, Biomaterials.

3. Chen, H. L., (2010) Detection of EBV in nasopharyngeal carcinoma by quantum dot fluorescent in situ hybridization, Exp Mol Pathol 89, 367-371.

4. He, Y., Li, Y., (2011) In Situ Spectral Imaging of Marker Proteins in Gastric Cancer with Near-infrared and Visible Quantum Dots Probes, Talanta.

5. Peng, C. W., Li, Y. (2011) Patterns of cancer invasion revealed by QDs-based quantitative multiplexed imaging of tumor microenvironment, Biomaterials.

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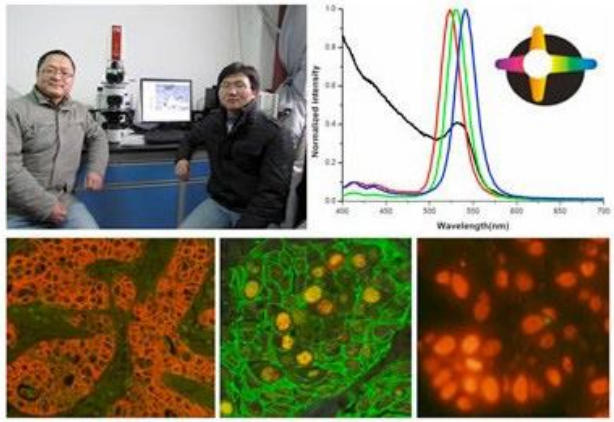
LAB TALK

Mar 16, 2010

Quantum dots highlight tumour heterogeneity

Breast cancer (BC) is the number one cancer killer in women. BC is a heterogeneous tumour, and a good understanding of such heterogeneity is essential in order to optimize the treatment strategy. Quantum dot-based immunofluorescent nanotechnology (QD-IHC) for molecular pathology has potential advantages in delineating the tumour heterogeneity.

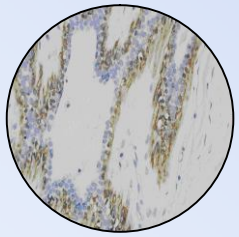
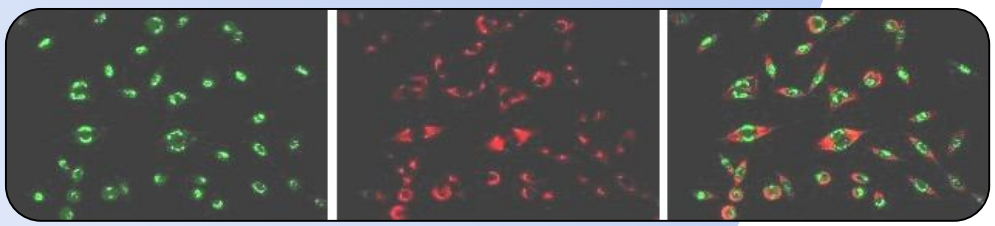
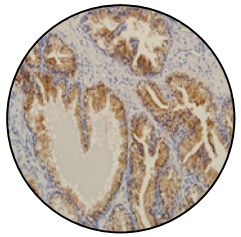
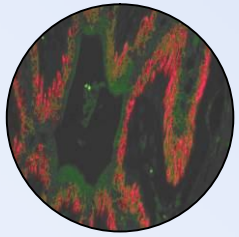
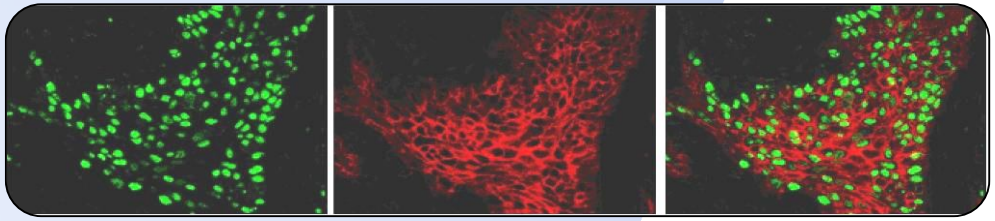
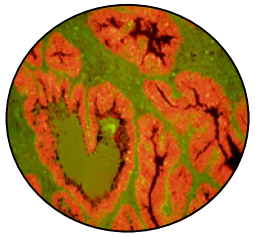


Quantum-dot imaging applied to breast-cancer cells

Researchers at Wuhan University, China, have developed very sensitive and specific QD-IHC technology to image HER2 and

武汉珈源量子点公司 Jiayuan Quantum Dots

Thank You !

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