

**细胞爬片 SABER-荧光原位杂交 (TSA) 实验报告****1.实验器材及试剂****1.1.实验器材**

名称	厂家	型号
盖玻片	江苏世泰实验器材有限公司	10212432C
无酶离心管	WANWU	EP-150-M
摇床(钟摆式)	WANWU	TSY-B
涡旋混匀器	WANWU	MX-F
移液枪	Dragon	KE0003087/KA0056573
Gene tech pen	Gene tech	GT1001
冰箱	青岛海尔股份有限公司	BCD-192TGN
正置荧光显微镜	日本尼康	NIKON ECLIPSE CI
成像系统	日本尼康	NIKON DS-U3
恒温箱	LABOTERY	GSP-70
高压灭菌锅	松下健康医疗	MLS-3751L-PC

**1.2.主要实验试剂**

试剂	厂家	货号	稀释比
DEPC	Amresco	E174	
4%多聚甲醛 (DEPC 水)	WANWU	G1113	
无水乙醇	国药集团化学试剂有限公司	100092683	
PBS 缓冲液 (DEPC)	WANWU	G0020	
20×SSC 洗脱液	WANWU	G3016-4	
BSA	WANWU	G5001	
蛋白酶 K	WANWU	G1205	
DAPI	WANWU	G1012	
抗荧光淬灭封片剂	WANWU	G1401	
杂交缓冲液	WANWU	G3016-3	
anti-DIG-HRP	Jackson	200-032-156	
FITC-TSA	WANWU		

**2.细胞爬片地高辛荧光原位杂交实验步骤**

**2.1.细胞爬片固定:** 细胞爬片置于 4%多聚甲醛 (DEPC) 固定 20min, 于 PBS (PH7.4) 中在脱色摇床上晃动洗涤 3 次, 每次 5min。

**2.2.消化:** 基因笔画圈, 根据不同组织不同指标特性, 滴加蛋白酶 K (20ug/ml) 消化 8min。  
纯水冲洗后 PBS 洗 3 次×5min。.

**2.3.预杂交:** 滴加预杂交液 37°恒温箱 1h。

**2.4.杂交:** 倾去预杂交液, 滴加杂交液 (含探针 circ0003856 浓度     ),     度杂交过夜。

**2.5.杂交后洗涤:** 洗去杂交液, 2×SSC, 37°C 洗 10min, 1×SSC, 37°C 洗 2×5min, 0.5×SSC 37°洗 10min。若非特异杂交体较多, 可以增加甲酰胺洗涤

**2.6.二标孵育:** 滴加含二标探针杂交液, 稀释比 1: 400.42° 孵育 3h。后 2×SSC, 37°C 洗 10min, 1×SSC, 37°C 洗 2×5min, 0.5×SSC 37°洗 10min。

**2.7.滴加封闭液:** 滴加封闭血清 正常兔血清。室温 30min。

**2.8.滴加鼠抗地高辛标记过氧化物酶 (anti-DIG-HRP):** 倾去封闭液, 滴加 anti-DIG-HRP。37°C 孵育 50min, 后 PBS 洗 3 次×5min。

**2.9.滴加 FITC-TSA:** 滴加 FITC-TSA 试剂, 避光室温反应 5min。后 PBS 洗 3 次×5min。

**2.10.DAPI 复染核:** 切片滴加 DAPI 染液, 避光孵育 8min, 冲洗后滴加抗荧光淬灭封片剂封片。

**2.11.镜检拍照:** 切片于尼康正置荧光显微镜下观察并采集图像。(紫外激发波长 330-380nm, 发射波长 420nm,发蓝光; FAM(488)绿光激发波长 465-495nm, 发射波长 515-555 nm, 发绿光; CY3 红光激发波长 510-560, 发射波长 590nm, 发红光。)

### 3.细胞爬片地高辛荧光原位杂交实验结果判读

DAPI 染出来的细胞核在紫外的激发下为蓝色, 阳性表达为相应荧光素 (488) 标记的绿色。mRNA 原位杂交显示结果理论为胞浆阳性, 少数核阳性属正常。micRNA 与 lncRNA 不同指标表达定位不同。根据表达量不同荧光亮度有强弱。

**注:** 上述涉及到的所有试剂, 仪器等在 RNA 原位杂交实验时都需使用 DEPC 处理后的 Rnase free 环境。

#### 附表 1 探针信息

##### circ0003856 probe:

**5'-TGATAATATTGATTACTTTTTGTTGAAAGAACAT**

(ttt CATCATCAT ACATCATCAT) <sub>30</sub> -3'

二标探针:

**5' -DIG-tt ATGATGATGT ATGATGATGT -3'**

## Cell climbing –DIG -TSA -ISH protocol

### 1. Apparatus and reagents

#### 1.1 Apparatus

Name	Producer	Model
Coverslip	Citotest	10212432C
Enzyme-free centrifuge tube	WANWU	EP-150-M
Shaker	WANWU	TSY-B
Vortex	WANWU	MX-F
Pipettor	Dragon	KE0003087/KA0056573
Liquid blocker pen	Gene tech	GT1001
Refrigerator	HAIER	BCD-192TGN
Microscopy	Nikon	NIKON ECLIPSE CI
Imaging system	Nikon	NIKON DS-U3
Incubator	LABOTERY	GSP-70
Autoclave	PANASONIC	MLS-3751L-PC

#### 1.2 Major reagents

reagent	manufacturer	article number
DEPC	Amresco	E174
4% of paraformaldehyde (DEPC water)	WANWU	G1113
Ethanol	SCRC	100092683
PBS solution (DEPC)	WANWU	G0020
20×SSC solution	WANWU	G3016-4
BSA	WANWU	G5001
Proteinase K	WANWU	G1205
DAPI	WANWU	G1012
Anti-fluorescence quenching sealing tablets	WANWU	G1401

---

hybridization buffer	WANWU	G3016-3
anti-DIG-HRP	Jackson	G3016-3
FITC-TSA	WANWU	200-032-156

---

## 2. The steps of the experiment

2.1. **Cell climbing fixation:** Cell climbing was fixed in 4% paraformaldehyde (DEPC) for 20 min, washed 3 times with PBS (pH 7.4) on a decolorizing shaker for 5 min each time.

2.2. **Digestion:** Mark the objective tissue with liquid blocker pen, according to the characteristics of different tissues and different indicators, Add proteinase K (20 ug/ml) to cover tissues and incubate at 37°C for \_\_\_\_\_ minutes. Washed with sterilized water, then washed three times with PBS, 5 min each time

2.3. **Prehybridization:** Add hybridization buffer onto specimen and incubate at 37°C for 1h.

2.4. **Hybridization:** Remove the pre-hybridization solution, add the \_\_\_\_\_ probe hybridization solution with concentration of \_\_\_\_\_, and incubate the section in a humidity chamber and hybridize overnight at \_\_\_\_\_°C.

2.5. **Washing:** Remove the hybridization solution. Wash sections with 2×SSC for 5 min at 37°C, wash sections in 1×SSC two times for 5 min each at 37°C, and wash in 0.5×SSC for 10 min at room temperature. Formamide washing can be added if there are more non-specific hybrids.

2.6. **Blocking:** add blocking solution (Rabbit serum) to the section and incubate at room temperature for 30 min.

2.7. Add the mouse anti-digoxigenin-labeled peroxidase (anti-DIG-HRP): remove the blocking solution and add anti-DIG-HRP. Incubate at 37 °C for 40 min, then Wash sections in PBS four times for 5 min each.

2.8 **TSA developing:** Dry sections slightly, add fresh prepared TSA chromogenic reagent to marked tissue. Reaction in dark for 5 min at room temperature. Then wash sections in TBST three times for 10 min each and use PBS wash for 5 min.

2.9. **Stain cell nuclei (counter stain):** Incubate with DAPI for 8min in the dark, and then mounting.

2.10 **Microscopic examination and photography:** To take photos with positive fluorescence microscope. DAPI glows blue by UV excitation wavelength 330-380 nm and emission wavelength 420 nm; FAM glows green by excitation wavelength 465-495 nm and emission wavelength 515-555 nm; CY3 glows red by excitation wavelength 510-560 nm and emission wavelength 590 nm.

## 3. Interpretation of the results

The nuclear stained by DAPI were blue under ultraviolet excitation, and the positive expression was a kind of fluorescence labeled by corresponding luciferin. FAM (488) appears green, cy3 appears red. The results of mRNA in situ hybridization were cytoplasmic positive and a

---

few nuclear positive were normal. MicRNA and lncRNA were expressed differently. According to the expression, Different fluorescence brightness is strong or weak.

Note: All reagents, instrument need RNase free.

**Attached table 1 probe information.**