常用细胞成像分析模块

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MetaXpress Image Analysis Toolbox

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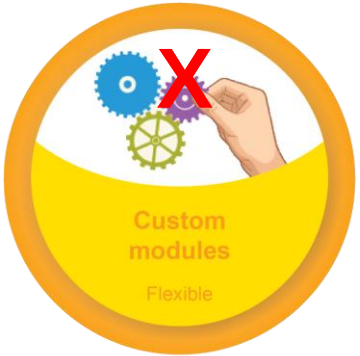
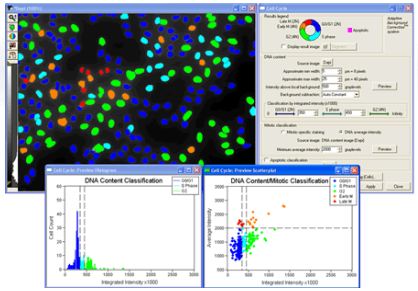
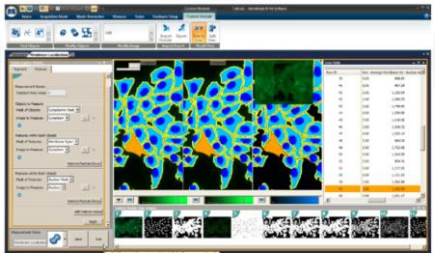
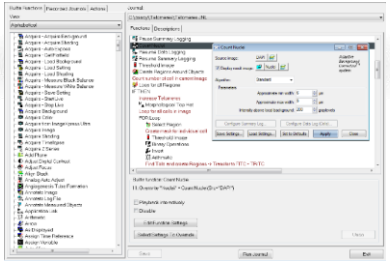
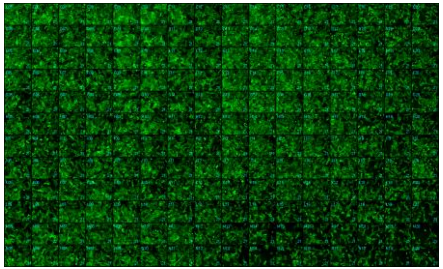




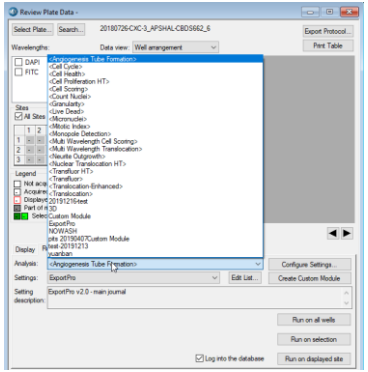


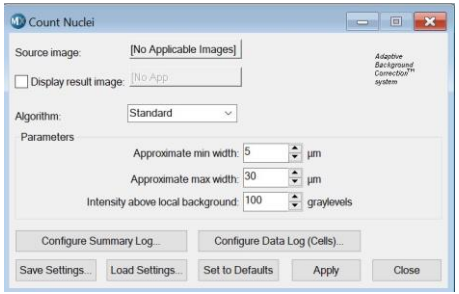


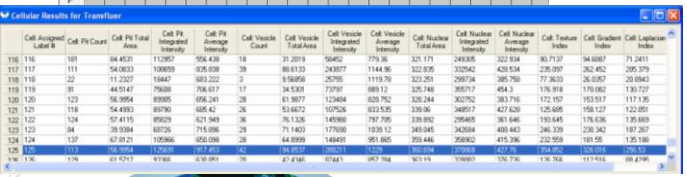
Analysis continuum with increasing flexibility and complexity



从批量拍摄到批量分析



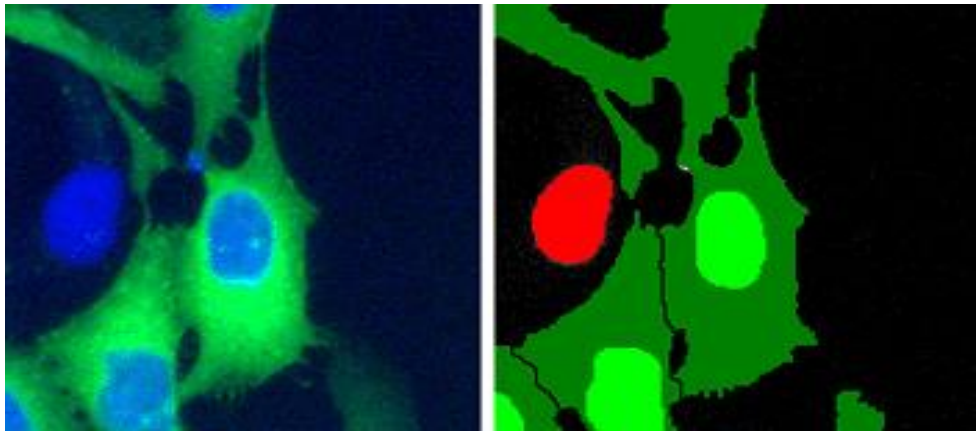




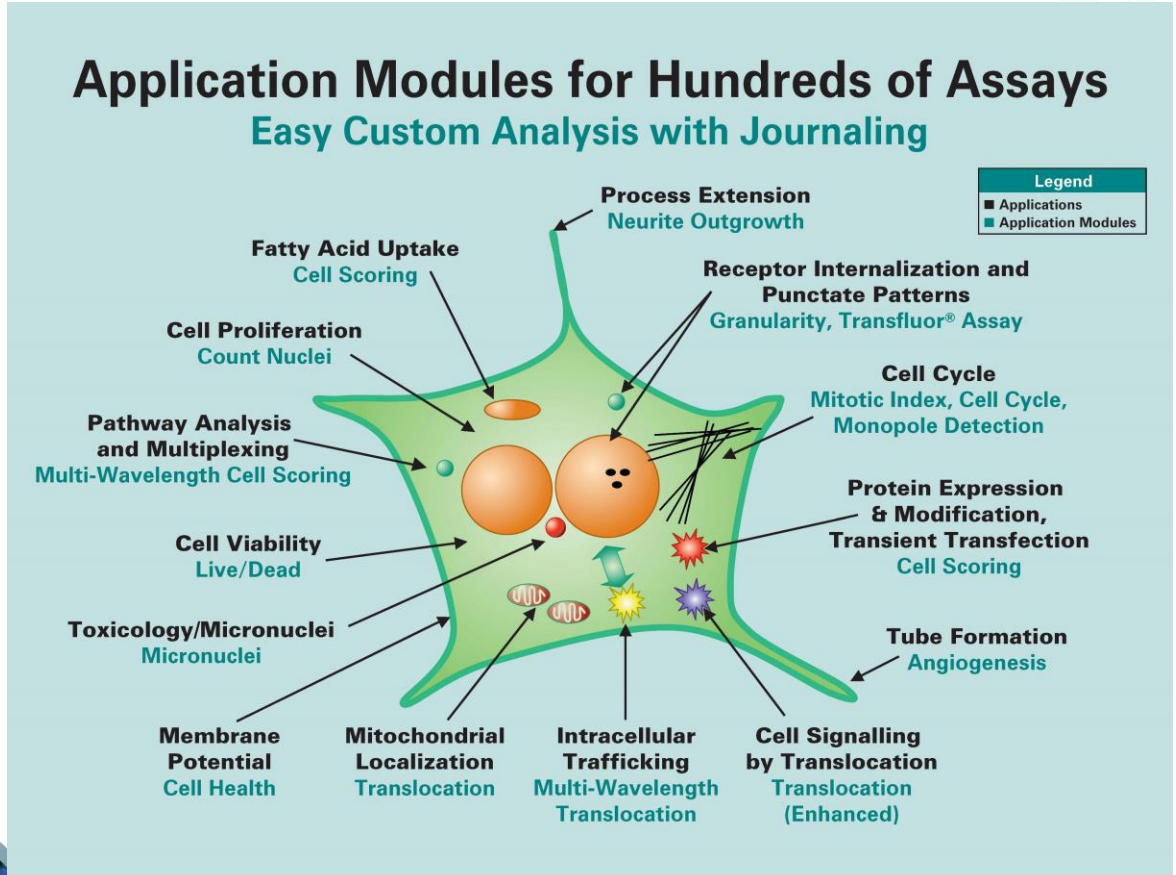
成熟模块英文名称	中文名称
Angiogenesis Tube Formation	血管生成
Cell Cycle Application Module	细胞周期
Cell Proliferation HT	细胞增殖
Cell Health	细胞健康（凋亡和坏死）
Cell Scoring	
Multi Wavelength Cell Scoring	细胞分类及多波长细胞分类
Count Nuclei	核计数（细胞计数）
Granularity	颗粒度分析
Live/Dead	细胞死活
Micronuclei	微核
Mitotic Index	有丝分裂分析
Monopole Detection	单极纺锤体分析
Multi Wavelength Translocation	蛋白转位
Translocation	
Translocation-Enhanced	
Nuclear Translocation HT	核转位分析
Neurite Outgrowth	神经生长
Transfluor	受体内吞

MetaXpress 分析模块

- 无人值守的自动化分析
- 图像分割、特征检测和计算测量
- Site-by-site and cell-by-cell data
- 可自定义分析方法

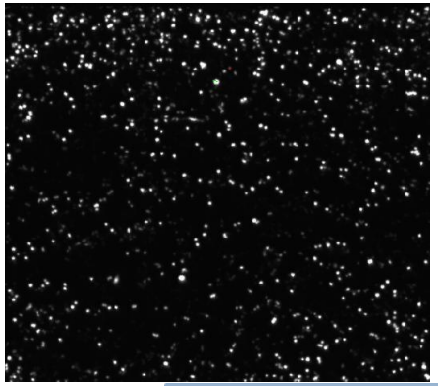


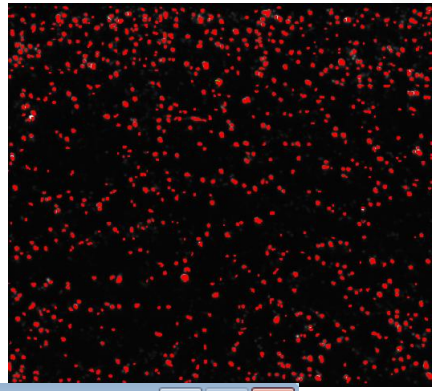
针对细胞生物学的分析模块

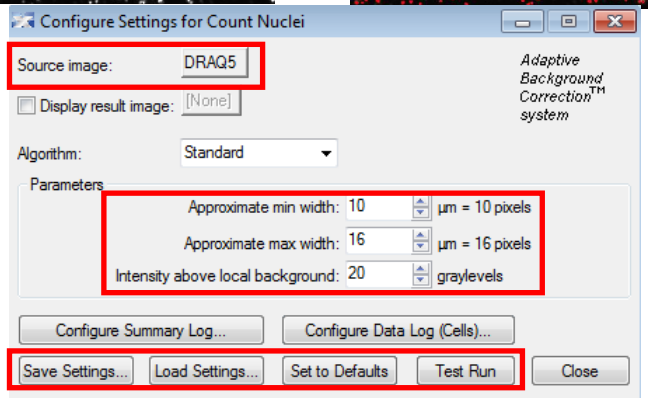


MetaXpress 分析模块

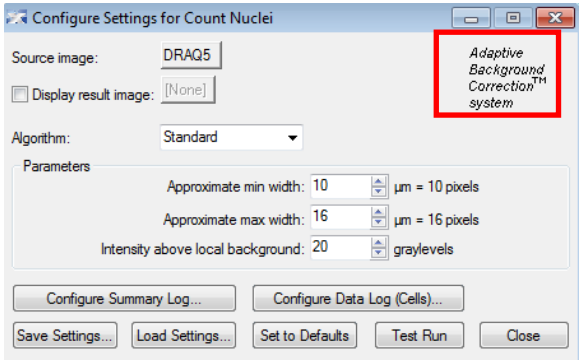
- 所有模块均具有相同的基本设置
- 图像识别参数设置简洁
  - 选择波长
  - 设置目标的大小范围
  - 设置目标高于周围背景的信号强度
  - 测试和保存设置
- 模块会自动分割接触的细胞





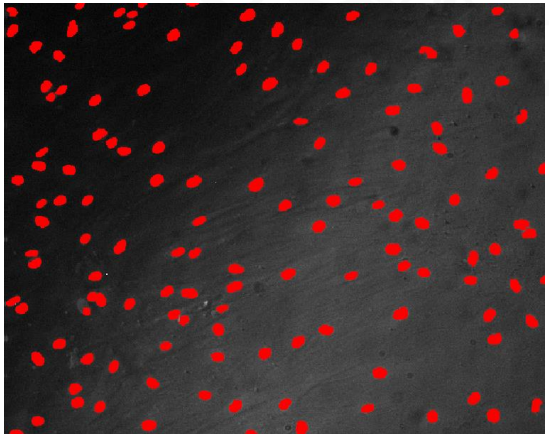


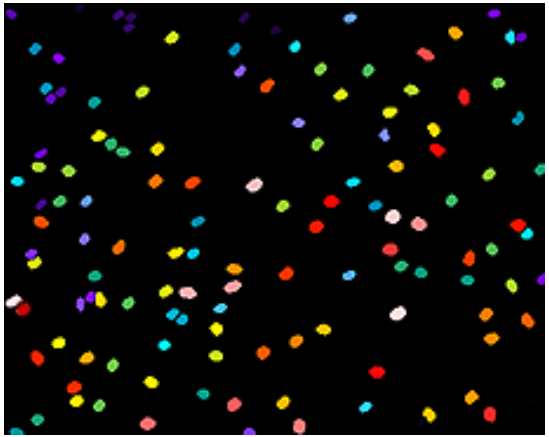
自适应背景校正 Adaptive Background Correction



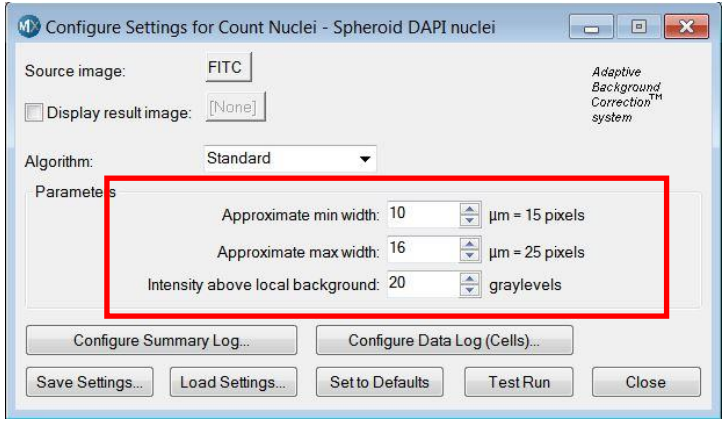
Built in background management

- ***Adaptive Background Correction*** is automatically performed by each application module
- **Detection even in noisy** and poorly stained images
- **Splits touching cells**
- **Consistent** performance across multiple plates

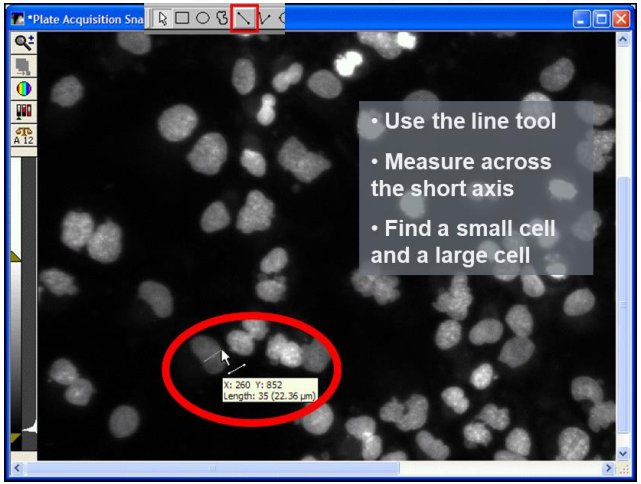




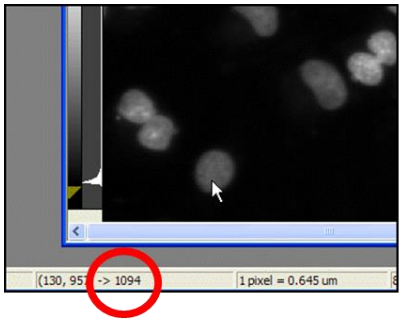
基本设置

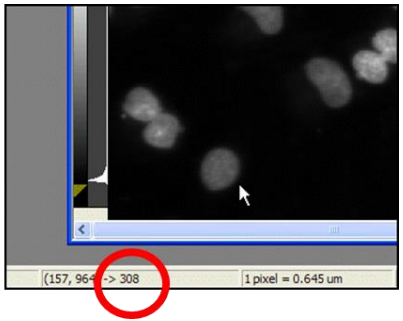


➢ Measuring width



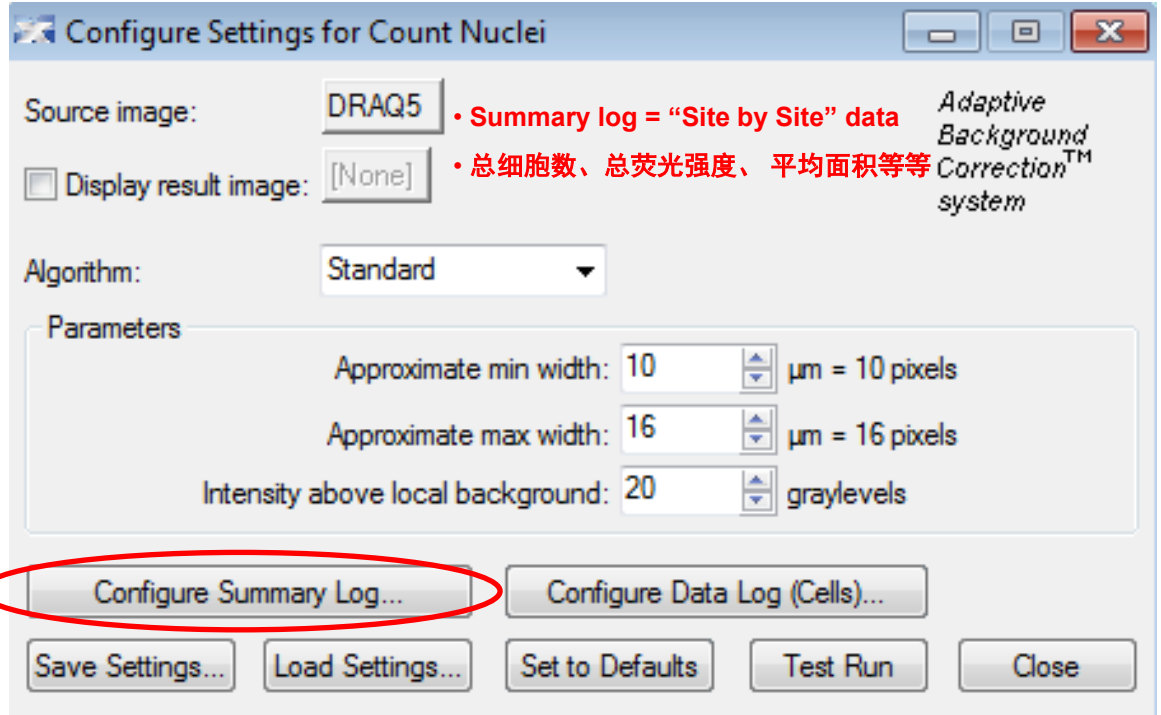
➢ Measuring Intensity above Local Background





1. Find a dim cell
2. Measure intensity just inside and outside the cell
3. Subtract to find the difference (1094 – 308 = 786)
4. “Pad” the value by about 100 gray values (786 – 100 = 686).

选择测量的数据



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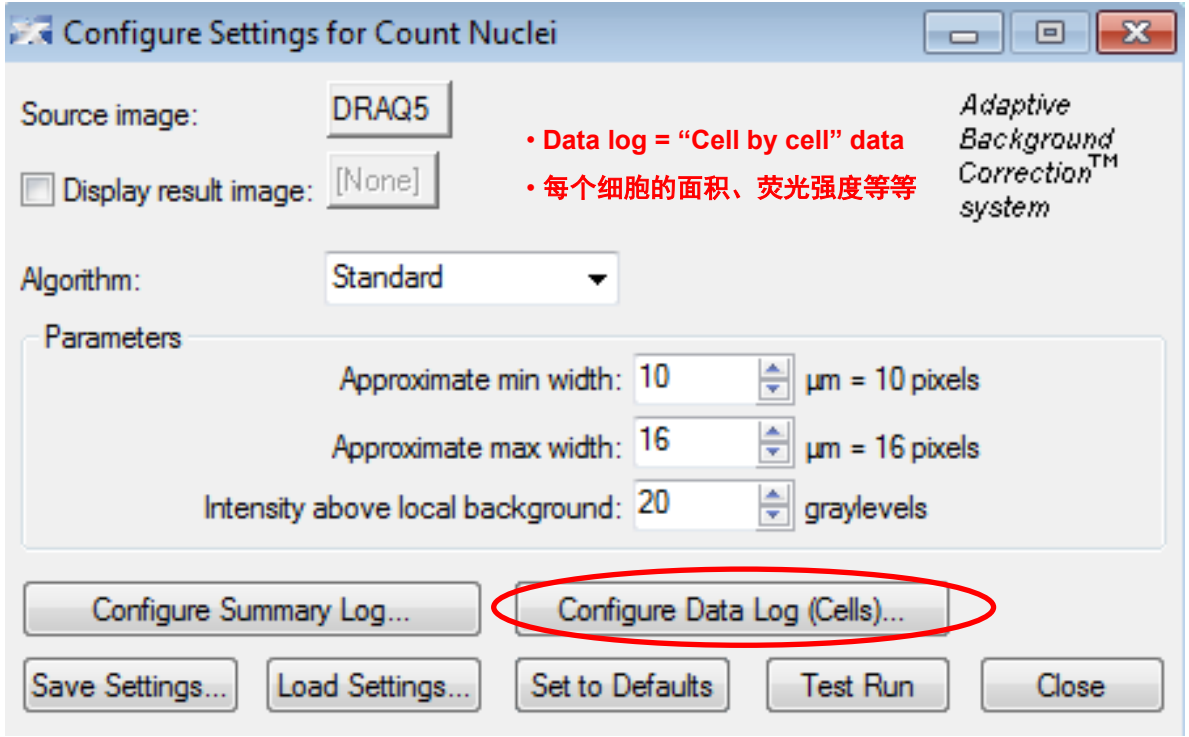
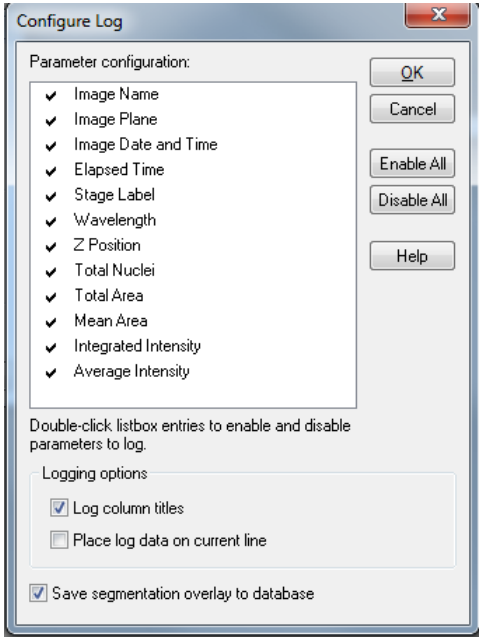
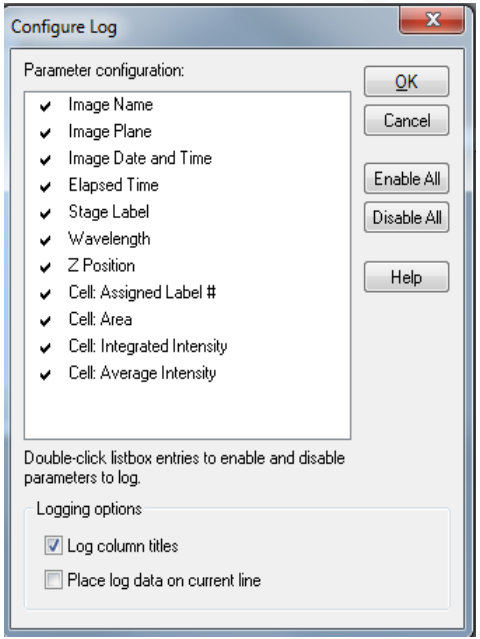


选择测量的数据



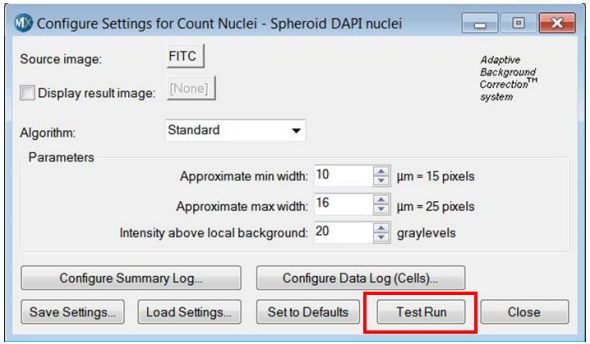
Configure Summary Log

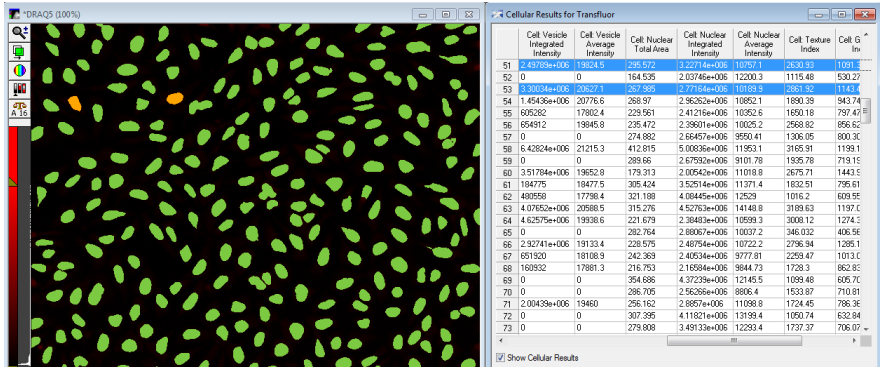


Configure Data Log(Cells)

分析模块 –交互式反馈

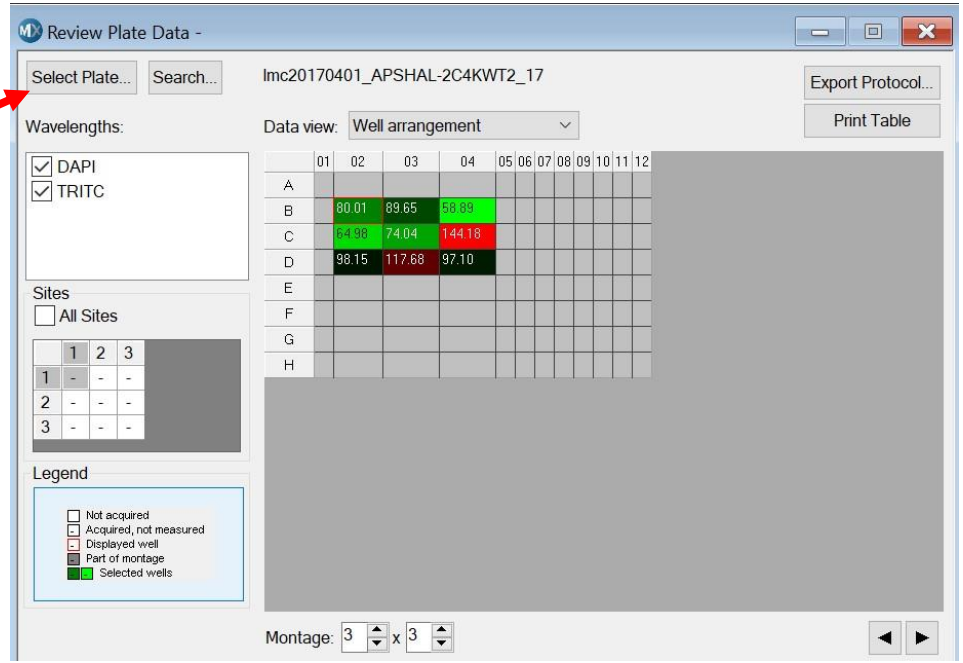
- 测试参数的分割效果
  - Test Run
  - Preview
- 优化图像分割参数
  - 一次只更改一个参数
  - 最小宽度对分割结果的影响最大



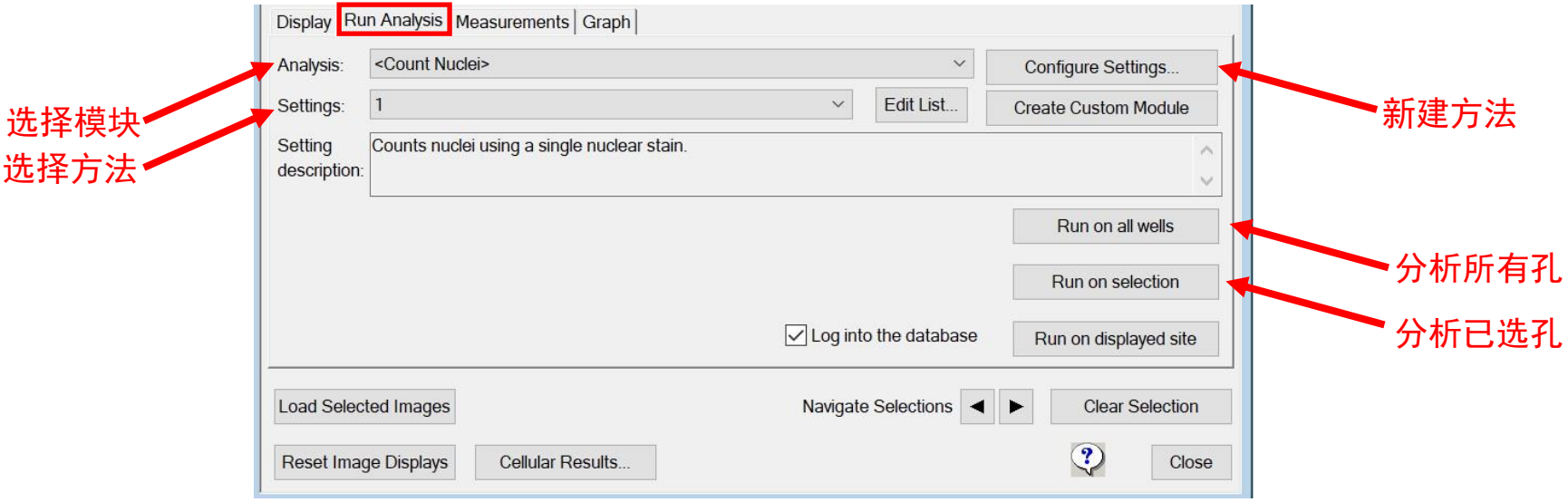


选择待查看或分析的图像

选择孔板

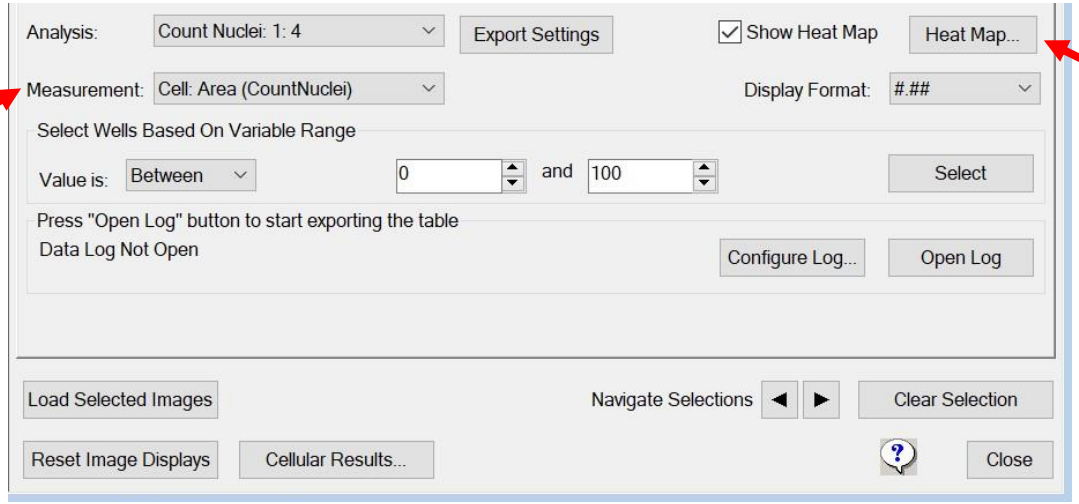


选择分析模块和已设置的方法



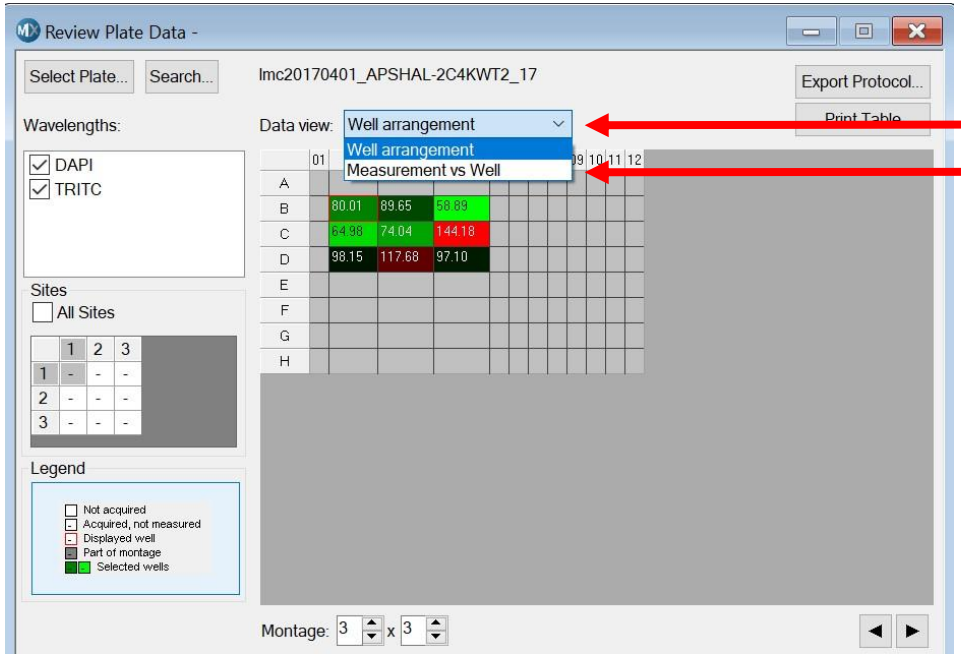
选择分析模块和已设置的方法

选择显示的数据



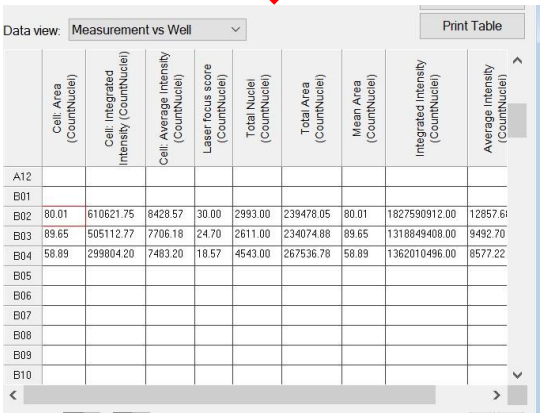
选择显示热图

选择数据查看方式

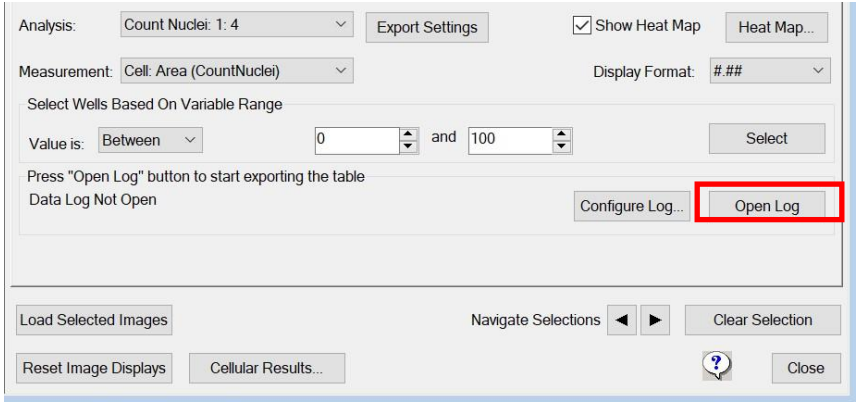


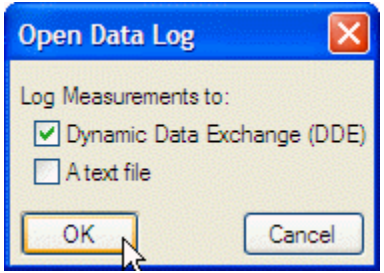
单数据查看

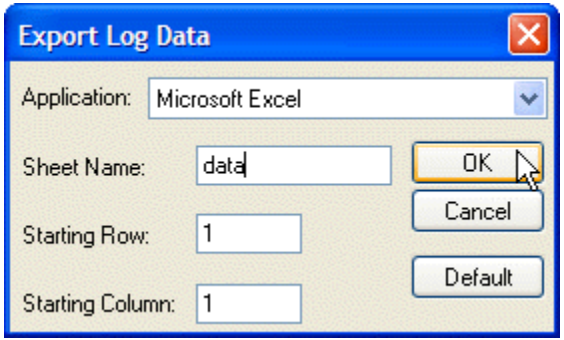
全数据查看



数据导出

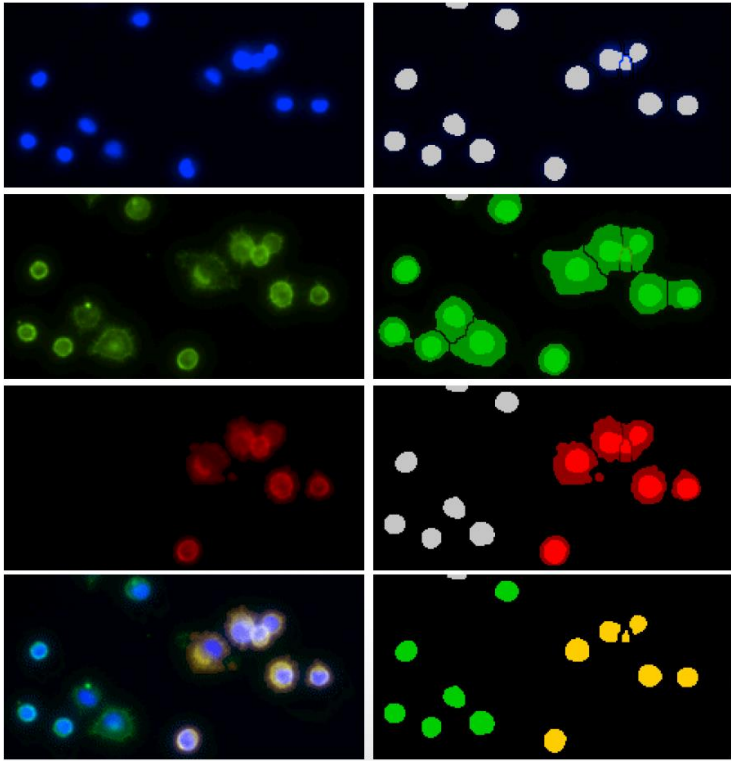






Multi Wavelength Cell Scoring
多波长细胞分类

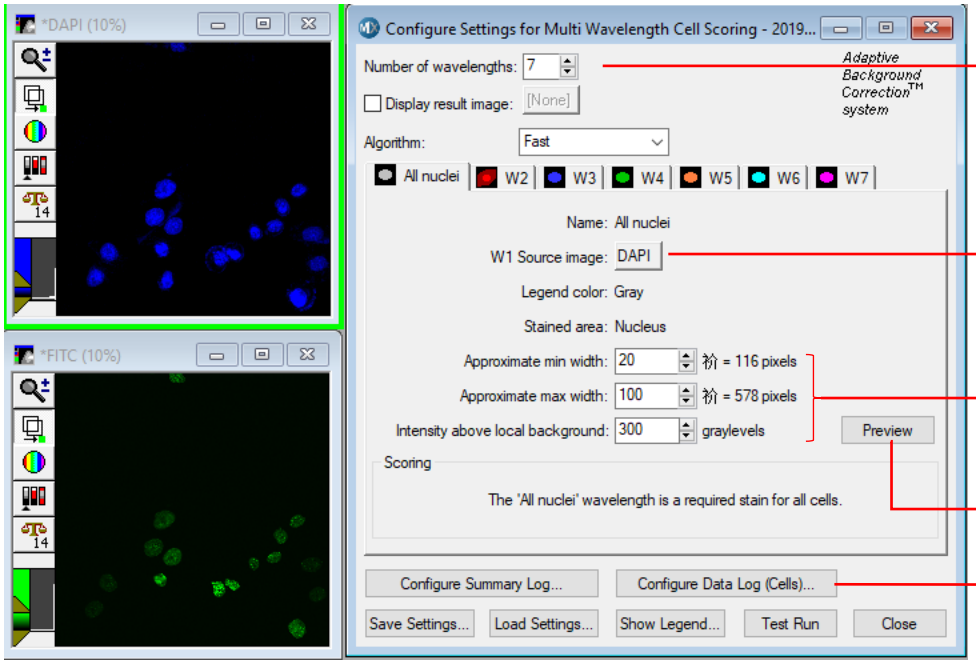
应用模块-多波长细胞分类



“对细胞图像中各个染料通道的信号进行识别和计算，通过不同通道信号组合来进行多参数的细胞分析”

- The MWCS module can be used to analyze cells imaged in 1-7 wavelengths
- The first wavelength should always be a stain for all nuclei (e.g. DAPI, Hoechst, or DRAQ5)
- With just 1 wavelength, it can be used for basic cell counting
- With 2 or more wavelengths, it will score cells as positive or negative for each wavelength and assign it a “profile” of its score in each wavelength

应用模块-多波长细胞分类



最多支持7个通道

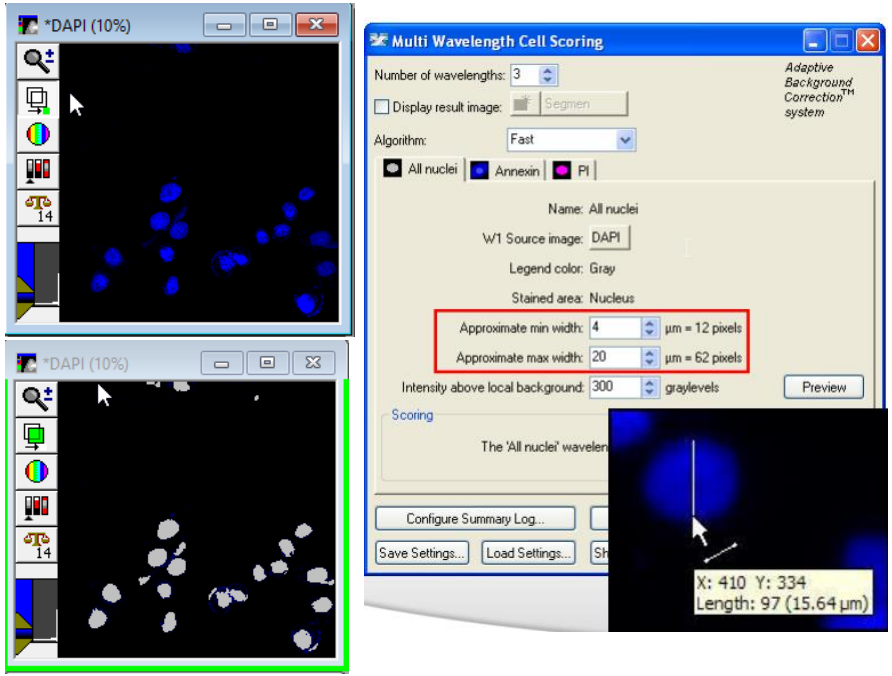
选择对应的图像

图像识别的参数

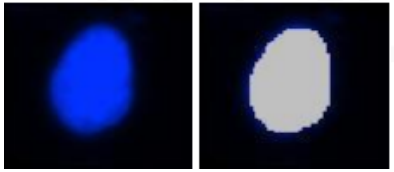
图像识别测试按钮

选择需要计算的数据

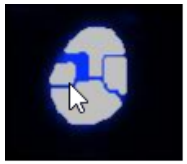
应用模块-多波长细胞分类



参数设置适合



Min width 设置数值过小



分裂细胞核

Min width 设置数值过大

漏掉小细胞核

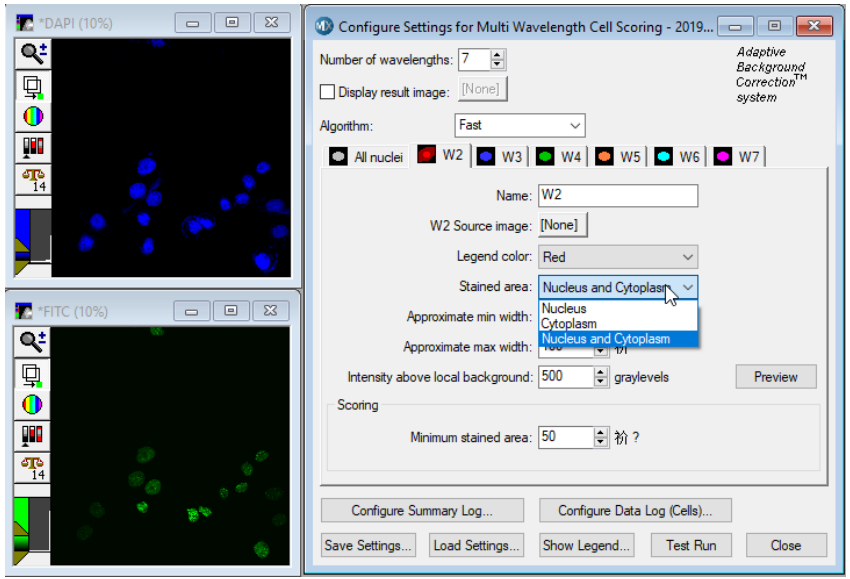
Max width 设置数值过小

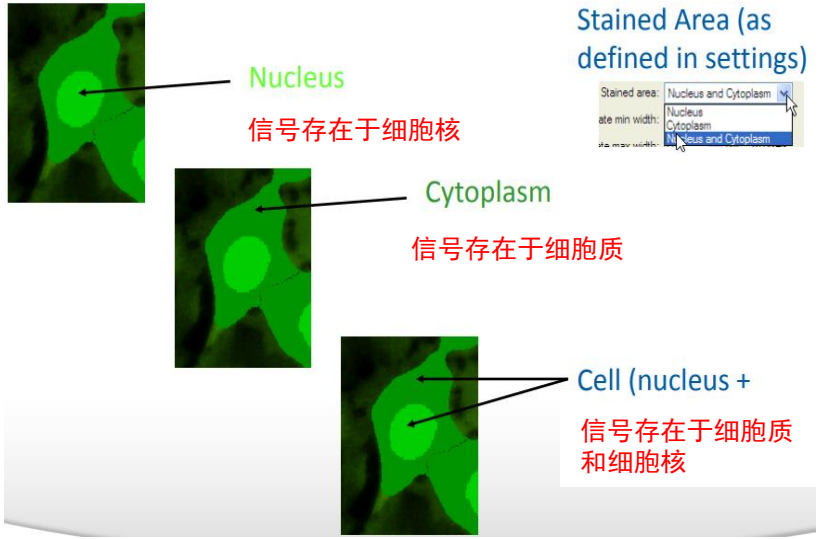
缩小核边界

Max width 设置数值过大

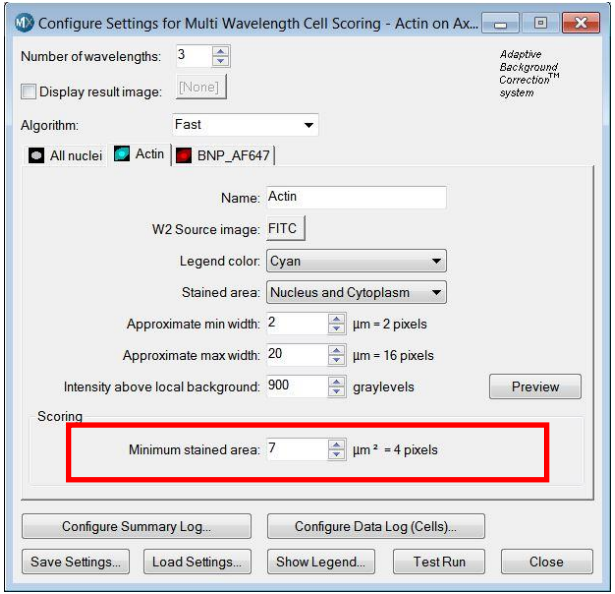
可能将多核合并

应用模块-多波长细胞分类





应用模块-多波长细胞分类



Wavelength 2 (W2)

- **Minimum stained area**
- 最小染色面积是区分阳性细胞和阴性细胞的附加标准
- 若判定为阳性，则细胞的染色面积要达到或者比这个数值大
- 这有助于消除假阳性(具有一小块非常明亮的碎片的细胞)
- 可以使用圆形或其他区域选择工具，对图像中一个小的细胞面积进行测量

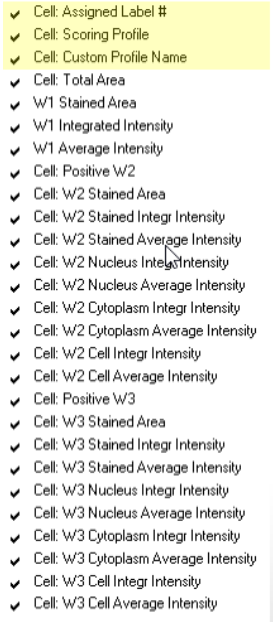
应用模块-多波长细胞分类

细胞总数量和平均面积

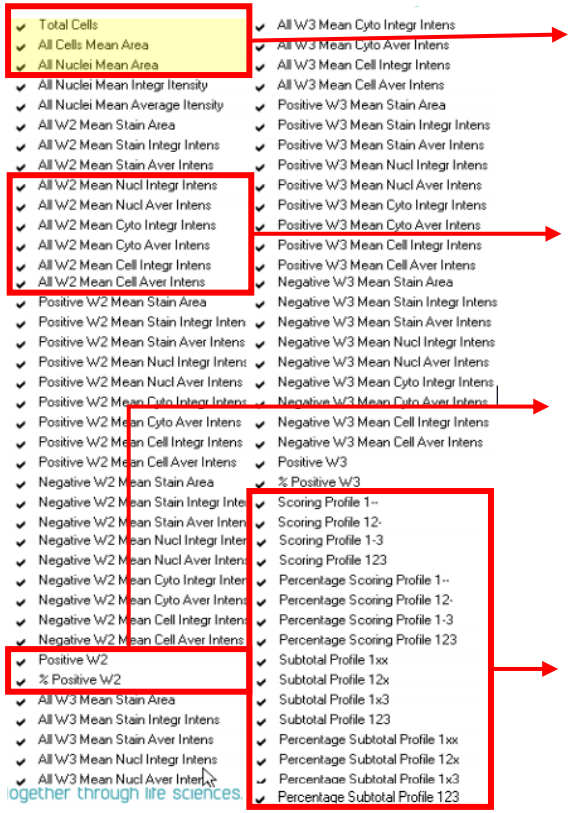
W2 通道分别在核区、细胞质和全细胞的荧光强度

W2 通道阳性条件下的细胞数量百分比

各通道间的逻辑组合分析



应用模块-多波长细胞分类



细胞总数量和平均面积

W2 通道分别在核区、细胞质和全细胞的荧光强度

W2 通道阳性条件下的细胞数量百分比

各通道间的逻辑组合分析

名词解释：

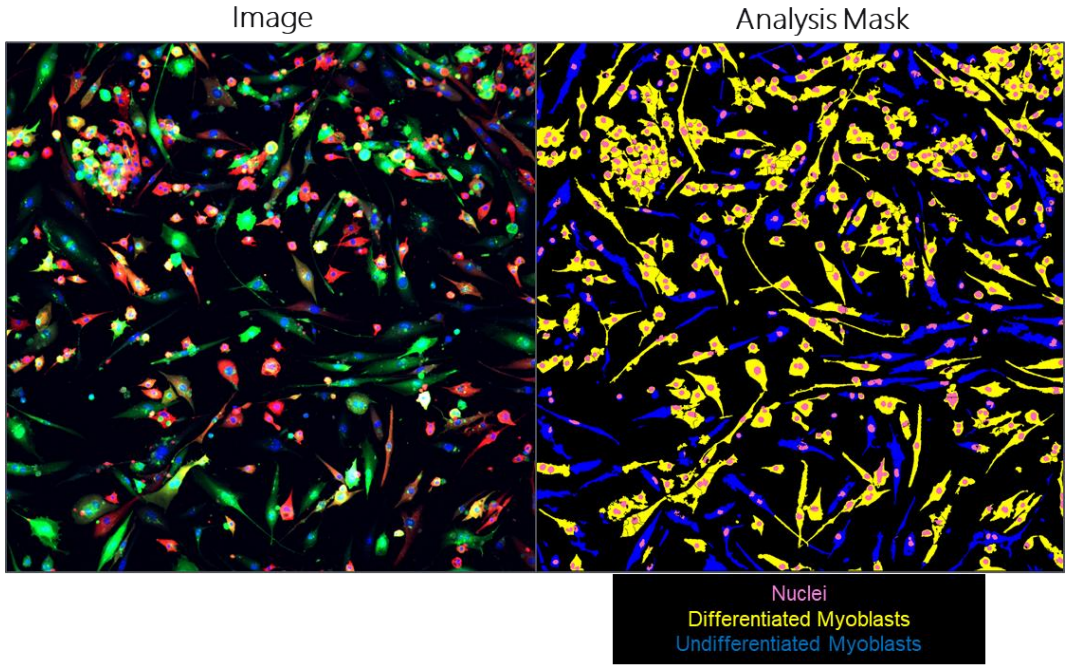
Average：平均每个像素点
Integr：总体
Mean：平均每个细胞
nuci：核区的
Cyto：细胞质的
Cell：全细胞的
1-3：1和3通道阳性且2通道阴性的细胞数或百分比
1x3：1和3通道阳性且2通道既可为阳性又可为阴性的细胞数或百分比

Multi Wavelength Cell Scoring
多波长细胞分类

应用实例

应用模块-多波长细胞分类

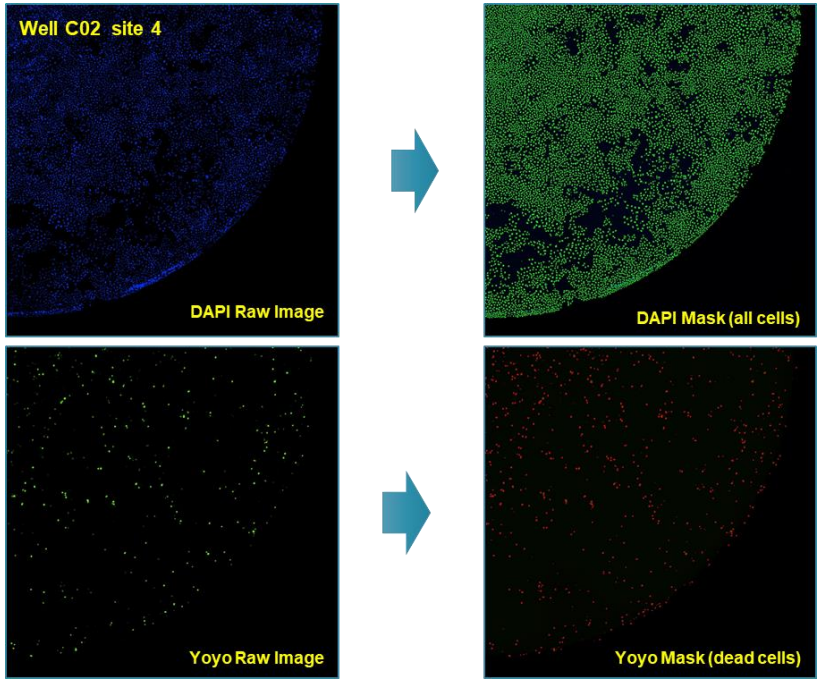
成肌细胞分化



成肌细胞 C2C12 是在成人骨骼肌组织中发现的，是创伤重建肌肉组织的前体细胞，具有很好的分化能力，C2C12 成肌细胞经常被用来在体外系统研究肌肉的发育和分化

应用模块-多波长细胞分类

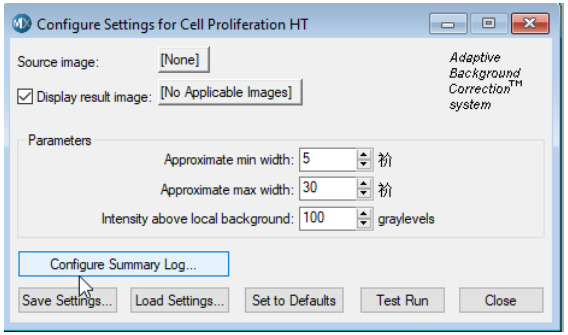
细胞死活



- 乳腺癌细胞
- 4X Plan Apo
- 96 well plate
- 染料:
  - Hoechst (nuclei)
  - Yoyo-1 (dead cells)

细胞增殖、细胞计数、细胞死活、细胞健康分析模块

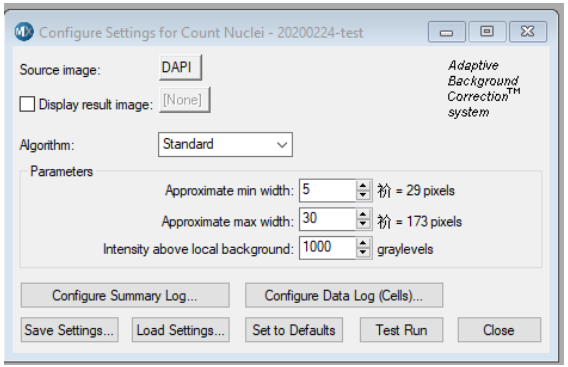
细胞增殖分析模块



Configure Summary Log

Total Nuclei

细胞计数分析模块



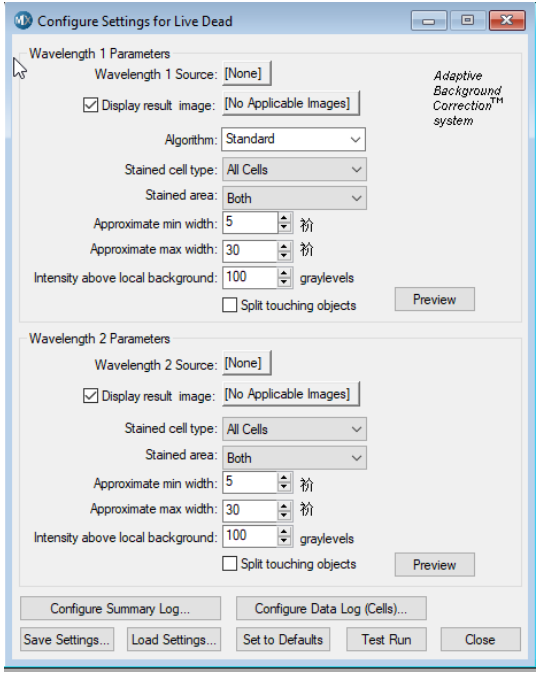
Configure Summary Log

Total Nuclei
Total Area
Mean Area
Integrated Intensity
Average Intensity

Configure Data Log(Cells)

Cell: Area
Cell: Integrated Intensity
Cell: Average Intensity

细胞死活分析模块



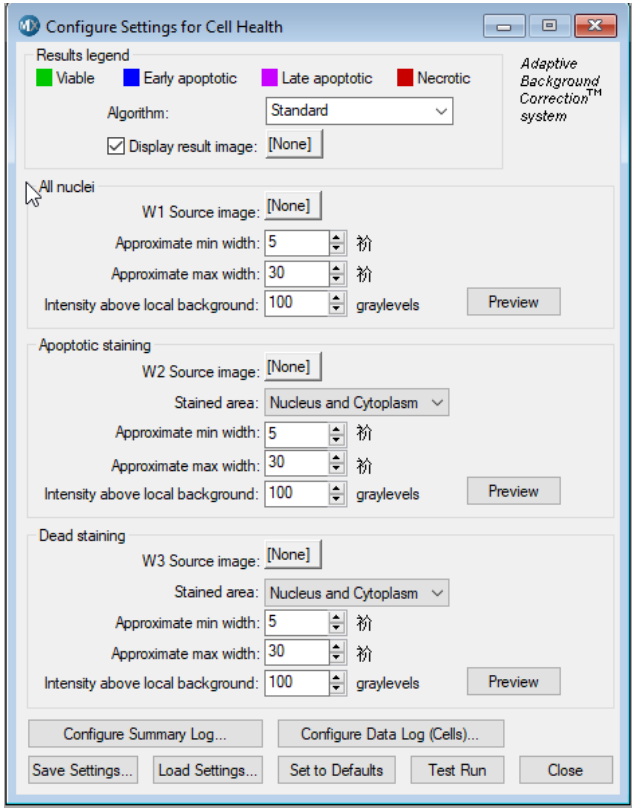
Configure Summary Log

- Total Cells
- Live Cells
- Dead Cells
- % Live Cells
- % Dead Cells
- W1 Total Area
- W1 Area Per Cell
- W1 Integrated Intensity
- W1 Average Intensity
- W2 Total Area
- W2 Area Per Cell
- W2 Integrated Intensity
- W2 Average Intensity

Configure Data Log(Cells)

- Cell: Live Classification
- Cell: W1 Total Area
- Cell: W1 Integrated Intensity
- Cell: W1 Average Intensity
- Cell: W2 Total Area
- Cell: W2 Integrated Intensity
- Cell: W2 Average Intensity

细胞健康分析模块



Configure Summary Log

- Total Cells
- Viable Cells
- Early Apoptotic Cells
- Late Apoptotic Cells
- Necrotic Cells
- % Viable Cells
- % Early Apoptotic Cells
- % Late Apoptotic Cells
- % Necrotic Cells
- All Cells Total Area
- All Cells Mean Area
- All Cells W1 Integrated Intensity
- All Cells W1 Average Intensity
- All Cells W2 Integrated Intensity
- All Cells W2 Average Intensity
- All Cells W3 Integrated Intensity
- All Cells W3 Average Intensity

Configure Data Log(Cells)

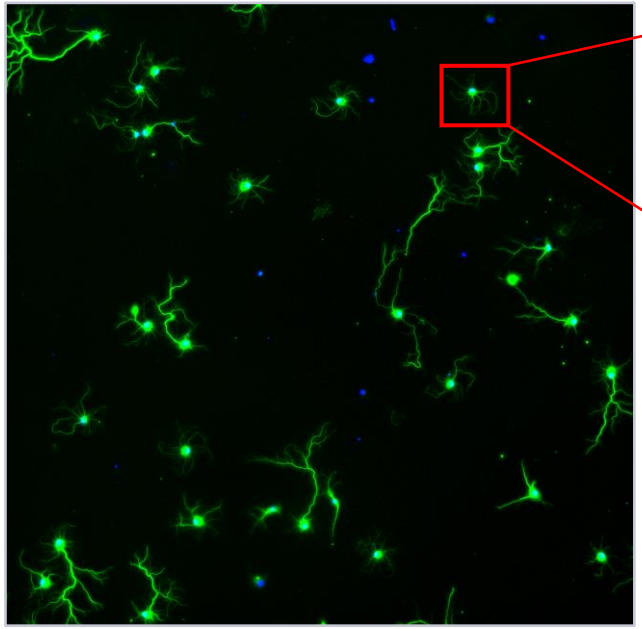
- Cell: Health Classification
- Cell: Nuclear Area
- Cell: W1 Integrated Intensity
- Cell: W1 Average Intensity
- Cell: W2 Integrated Intensity
- Cell: W2 Average Intensity
- Cell: W3 Integrated Intensity
- Cell: W3 Average Intensity

Neurite Outgrowth
神经生长分析模块

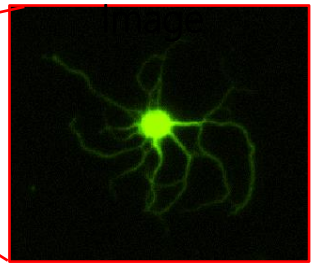
应用模块-神经生长模块

“通过对胞体数量、突出长度和分支多少等参数的综合分析，评估神经生长的状态”

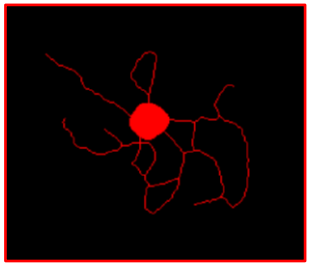
Neurite Image



Zoom



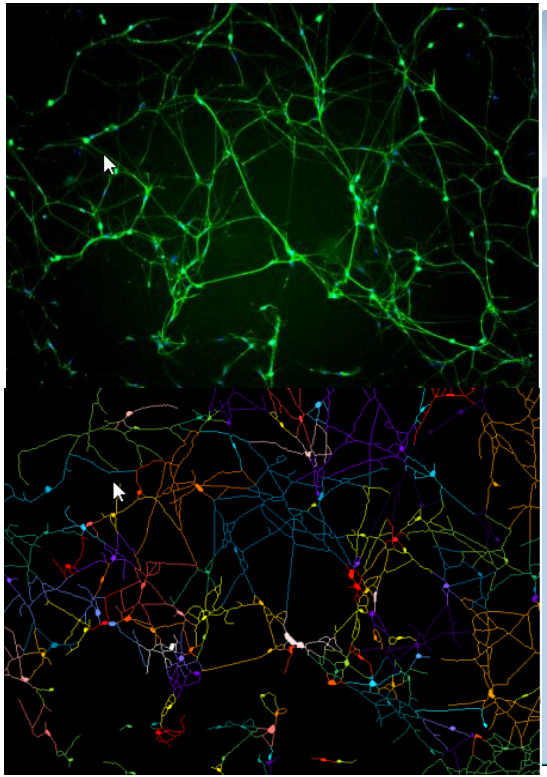
Raw

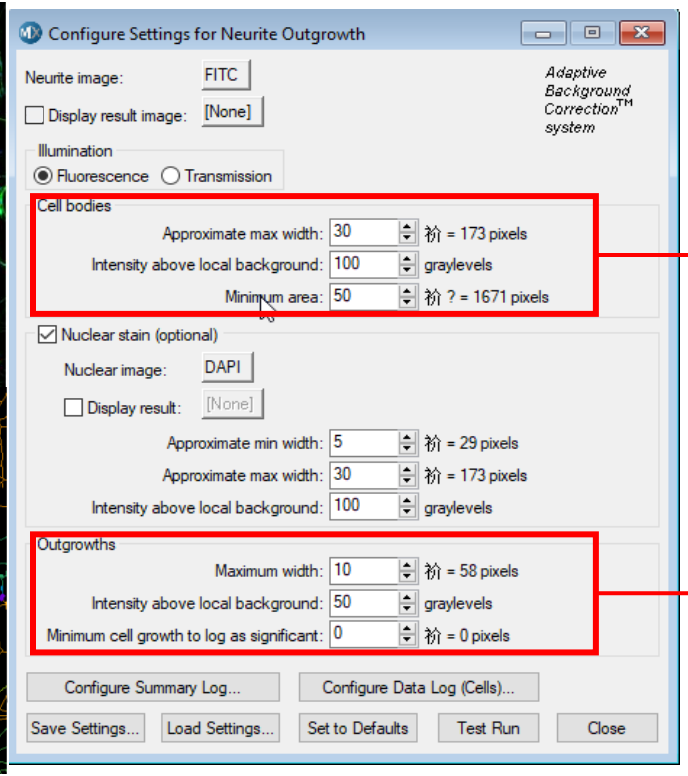


Mask

- ✓ 识别和测量连接到细胞体的processes
- ✓ 可选择使用核染料协助细胞体的识别
- ✓ 细胞体/突起可以是荧光，也可以是透射光图像

应用模块-神经生长模块



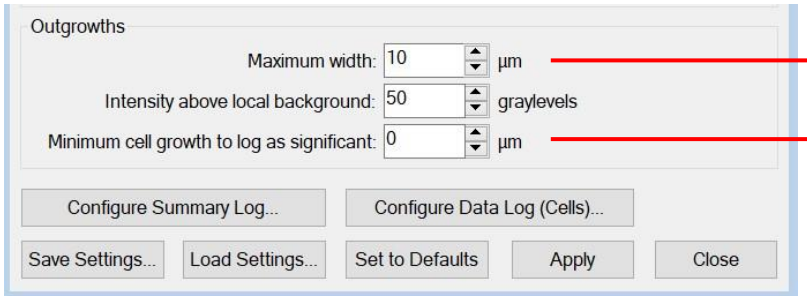


识别细胞胞体

- 如果设置太大，则可能会将细胞体簇连接在一起
- 如果设置太小，较厚的突起或分支点可能会被识别为细胞体

识别突起

应用模块-神经生长模块



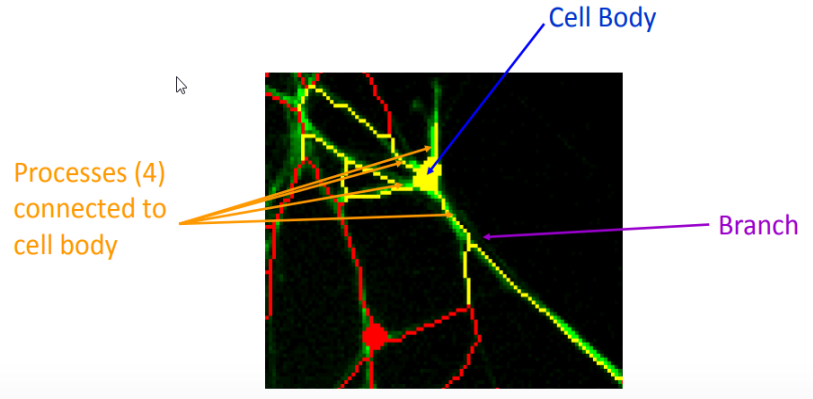
区分突起起始部分和胞体、分支点，故选择生长较粗的部位设置参数

用于评价细胞阳性或阴性生长，不会影响神经突起的识别，可用测量工具测量长度，此参数可按自己的实验判断标准设置

应用模块-神经生长模块

Configure Summary Log

Number of Cells
Total Outgrowth
Mean Outgrowth Per Cell → 生长总长度和平均长度，单位 mm
Total Processes
Mean Processes Per Cell → Process 数量
Total Branches
Mean Branches Per Cell → Branch 数量
Total Cell Body Area
Mean Cell Body Area
Straightness → 直线率，点与点直线距离除以实际曲线长度，0到1之间
Cells Significant Growth → 阳性生长的细胞数量，由参数设置决定
%Cells Significant Growth
Mean Outgrowth Average Intensity → 所有神经生长的平均像素强度



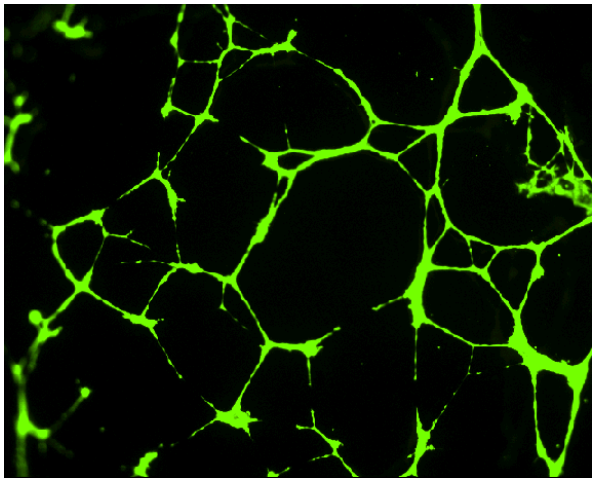
Configure Data Log(Cells)

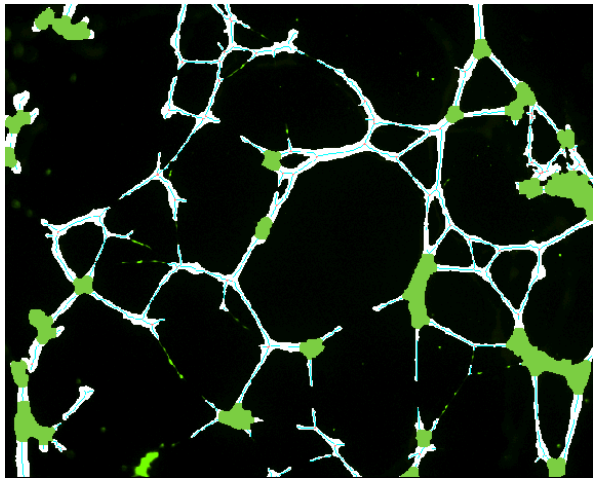
Cell: Total Outgrowth → 单位 um
Cell: Processes
Cell: Mean Process Length → Process 总长度除以其数量
Cell: Median Process Length
Cell: Max Process Length
Cell: Branches
Cell: Straightness
Cell: Cell Body Area
Cell: Mean Outgrowth Intensity → 神经生长的平均像素强度

Angiogenesis Tube Formation
血管生成分析模块

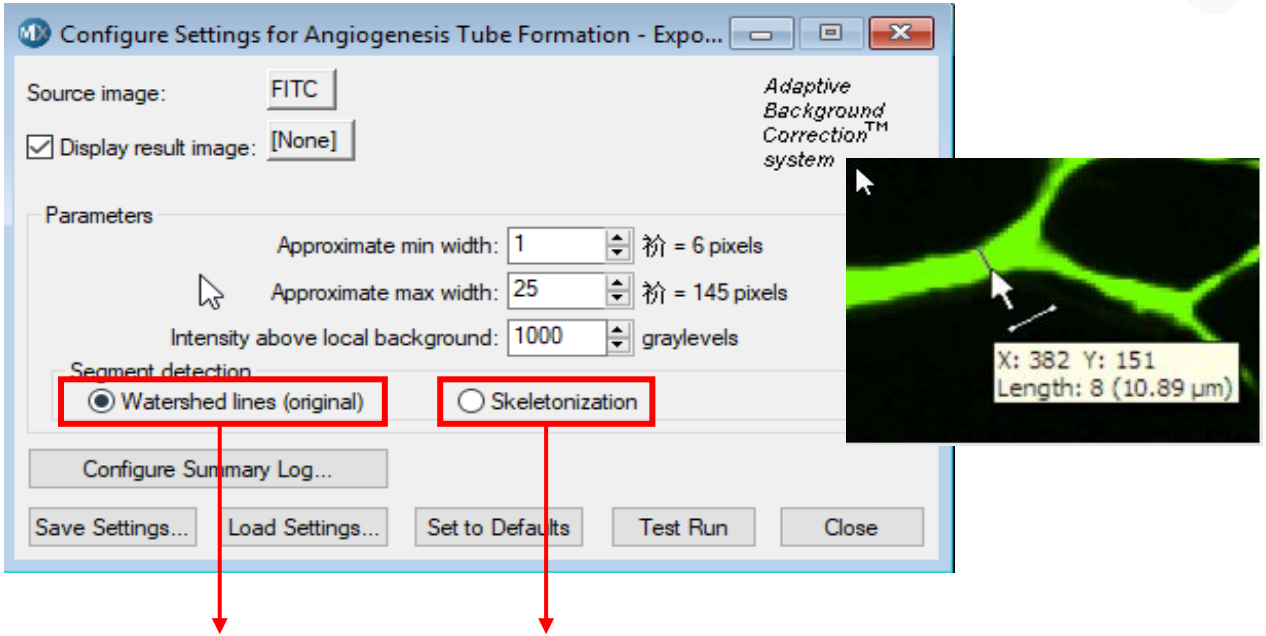
应用模块-血管生成模块

- 在单个波长下，识别和测量管（细长物体）和节点（管之间的连接点）
- 除了进行管形成测定外，还可用于测量神经突生长（如胞体模糊或在FOV以外的情况）





应用模块-血管生成模块



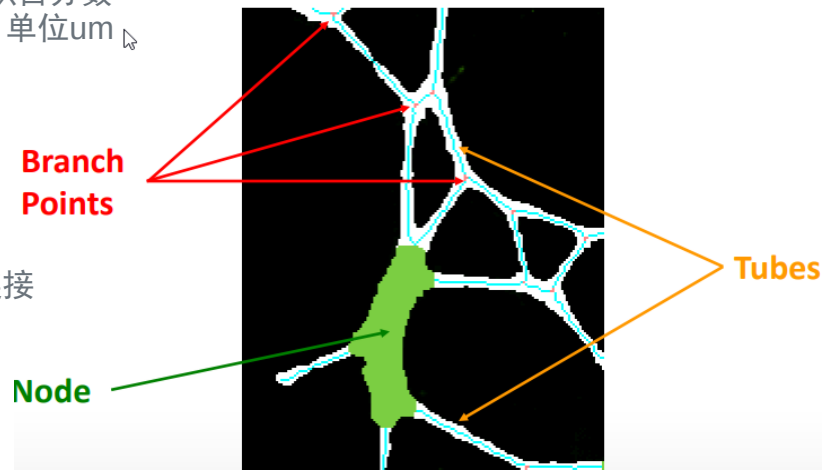
更早期的传统分割方法

使用一种新的分割方法，可以为一些具有较厚和较稀疏的血管提供更精确的分割识别

应用模块-血管生成模块

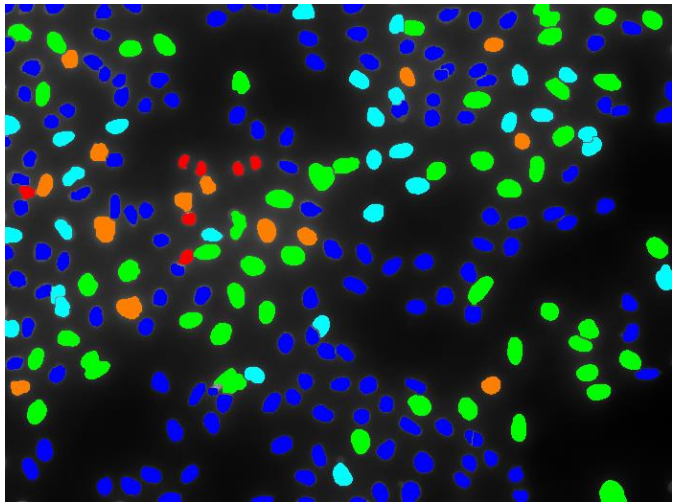
Configure Summary Log

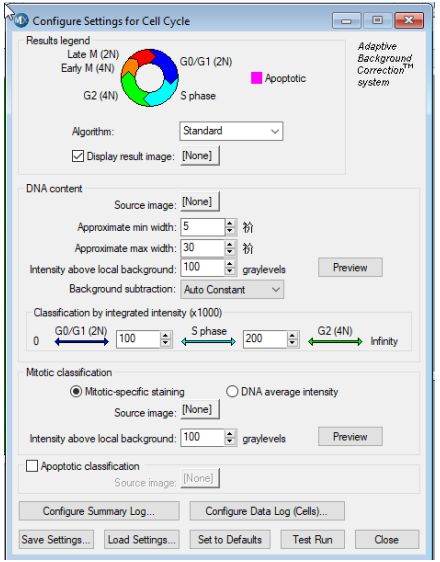
Total Tube Length → 血管总长度(不包括nodes)，单位um
Mean Tube Length → 血管总长度除以segments数量
Total Tube Area
Mean Tube Area
Tube % Area Covered → 血管总面积(不包括nodes)除以图像总面积百分数
Average Tube Thickness → 血管总面积除以总长度(不包括nodes)，单位um
Segments → 血管分段数量
Branch Points
Nodes
Total Node Area
Mean Node Area → Node的总面积除以node的数量
Node % Area Covered
Connected Sets → 独立血管的数量，血管与血管之间没有连接
Tube Length Per Set



Cell Cycle
细胞周期分析模块

应用模块-细胞周期

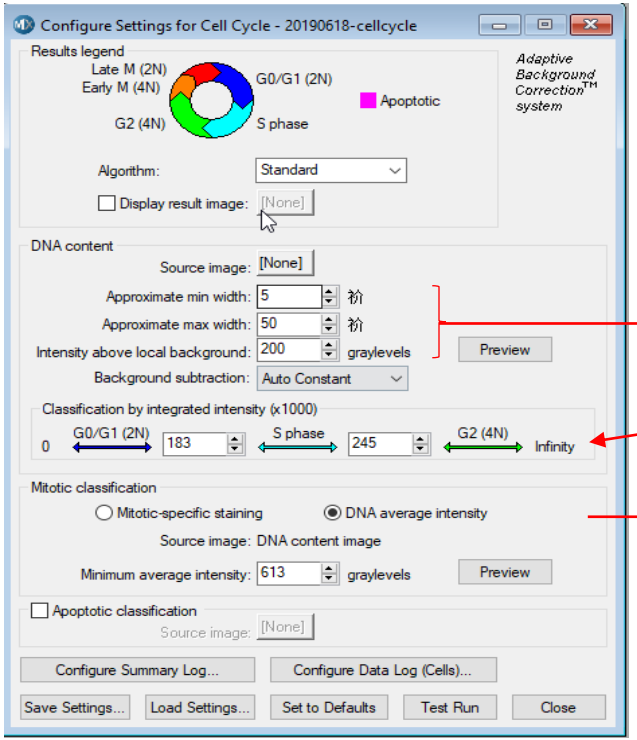


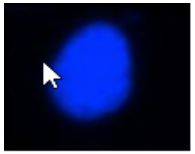


- ✓ G0 / G1
- ✓ S
- ✓ G2
- ✓ Early M
- ✓ Late M

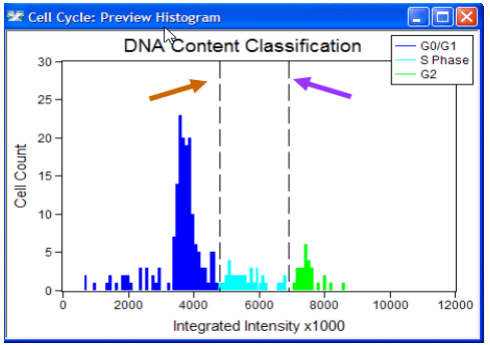
检测细胞周期和细胞凋亡状态是肿瘤学研究和肿瘤药物筛选中的重要方法。传统方法如流式细胞仪，存在需要大量细胞，且分辨率低，仅为5um左右，信息量小，无法数据回溯等问题。ImageXpress系统使用灵活，能够提供每个细胞的多参数分析结果，并能报告不同亚细胞群的分布情况，并能同时分析细胞的凋亡状态，综合分析细胞周期相关蛋白，获得更多信息。

应用模块-细胞周期



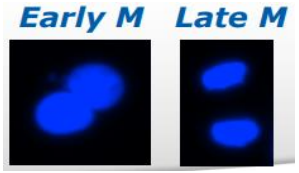


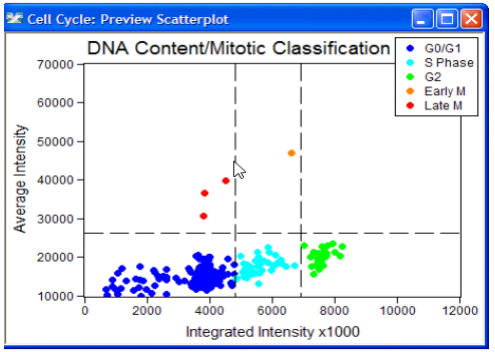
识别所有核染信号



通过拉动双条竖线来分出G0及G2期区间

通过平均像素点荧光强度区分分裂早期和晚期

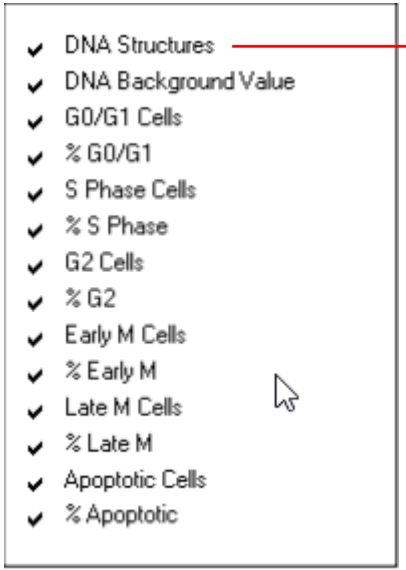




通过拉动单条横线来分出EM及LM期区间

应用模块-细胞周期

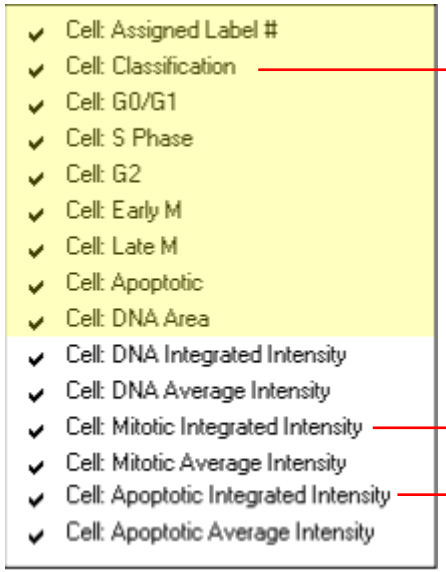
Configure summary log



细胞核总数

每个时期细胞总数和占比

Configure data log (Cells)



细胞周期分类

有丝分裂特异染色的总强度
只在此选项使用时出现

凋亡特异染色的总强度
只在此选项使用时出现

单个细胞数据

Granularity
颗粒度分析

应用模块-颗粒度分析

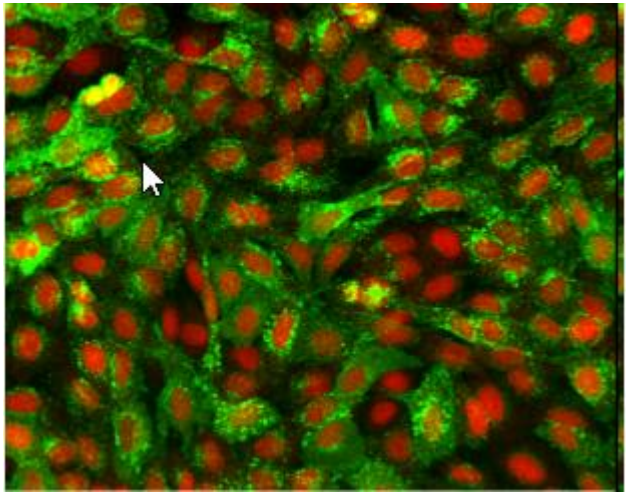
› Methods Enzymol, 587, 71-86 2017

High-Throughput Quantification of GFP-LC3 $^{+}$ Dots by Automated Fluorescence Microscopy

J M Bravo-San Pedro [1], F Pietrocola [2], V Sica [3], V Izzo [2], A Sauvat [4], O Kepp [4], M C Maiuri [2], G Kroemer [5], L Galluzzi [6]

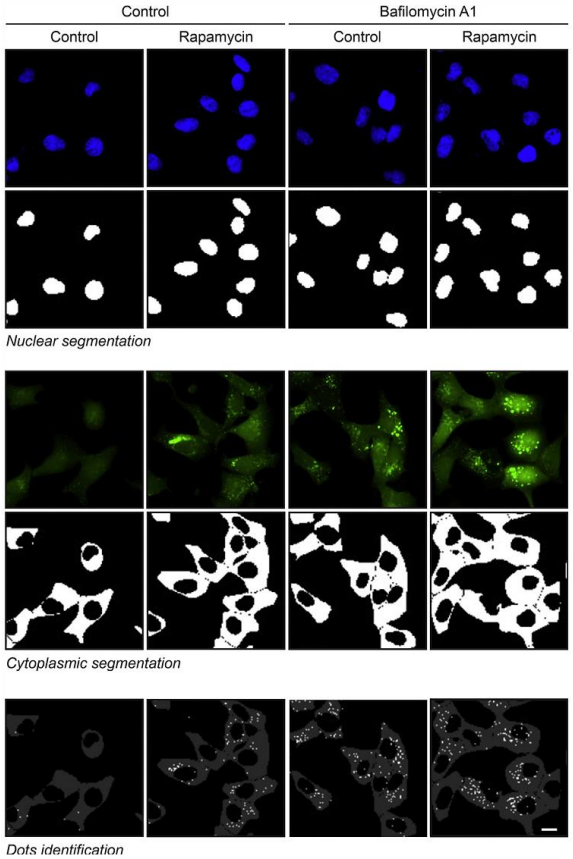
Affiliations + expand

PMID: 28253977 DOI: 10.1016/bs.mie.2016.10.022



“对细胞图像中染料信号的集聚体进行识别，分析数量和强度，指示细胞内微结构和蛋白集聚等”

应用模块-颗粒度分析

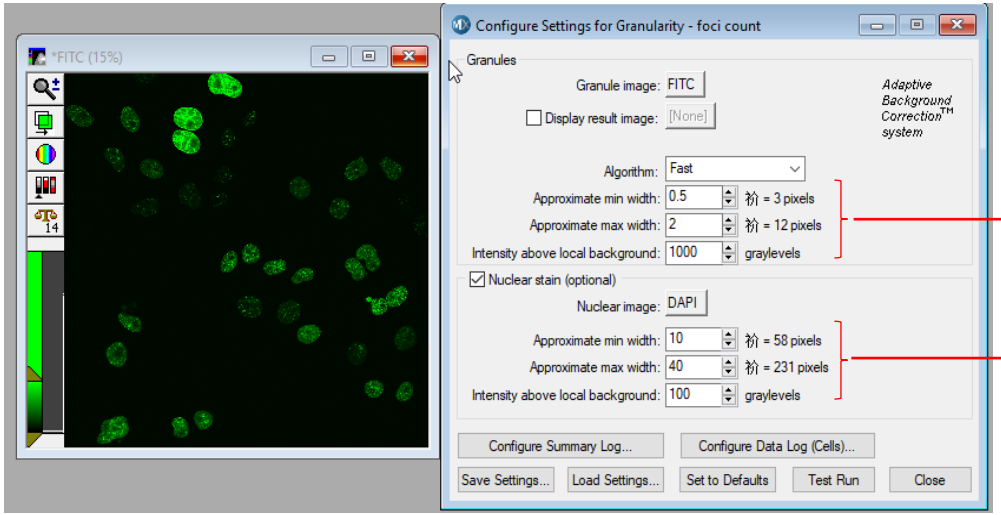


自噬诱导剂或抑制剂的筛选

巨自噬是自噬的一种特殊过程，其涉及一个双膜微结构–自噬体。通过使用 GFP 标记的 LC3 蛋白来监测细胞内的自噬体。在自然条件下，GFP-LC3 在细胞质和细胞核上表现出弥散的绿色荧光。当响应于促进巨自噬的刺激时，GFP-LC3 信号会以点状的形式主要集中在细胞质中

使用 ImageXpress Micro 成像系统，并使用 Granularity 模块对转染 GFP-LC3 的人脑神经胶质瘤 H4 细胞进行建模

应用模块-颗粒度分析



点状信号的识别

细胞核识别（可选）

应用模块-颗粒度分析

Configure summary log

- ✔ Granules
- ✔ Granules Per Cell
- ✔ Total Granule Area
- ✔ Mean Granule Area → 平均每个细胞的颗粒面积(所有细胞总颗粒面积除以总细胞核数量)
- ✔ Integrated Granule Intensity
- ✔ Average Granule Intensity → 平均每个细胞的颗粒强度(所有细胞总颗粒强度除以总细胞核数量)
- ✔ Nuclei
- ✔ Total Nuclear Area
- ✔ Mean Nuclear Area
- ✔ Integrated Nuclear Intensity
- ✔ Average Nuclear Intensity → 平均每个细胞的细胞核强度(所有细胞核染色区域的强度除以总细胞核数量)

Configure data log

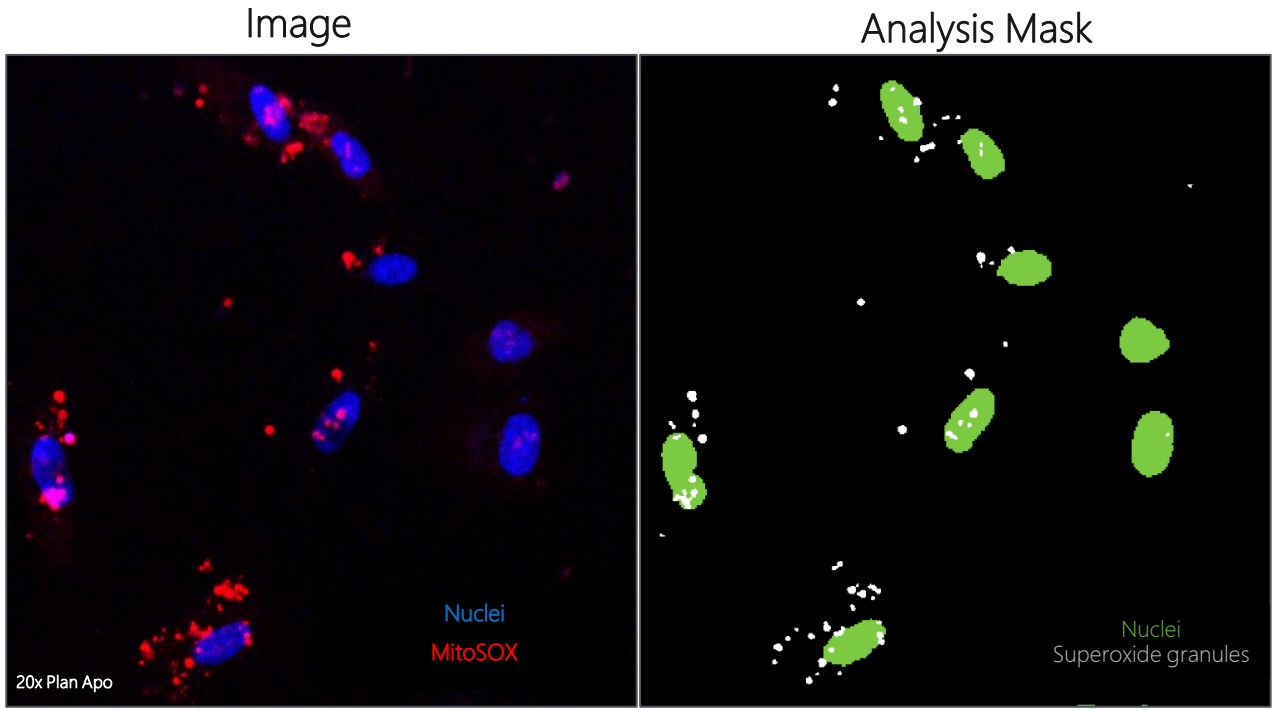
- ✔ Cell: Assigned Label #
- ✔ Cell: Granule Count
- ✔ Cell: Granule Total Area
- ✔ Cell: Granule Integrated Intensity
- ✔ Cell: Granule Average Intensity → 平均每个颗粒的强度(指定细胞的总颗粒强度除以这个细胞的颗粒数量)
- ✔ Cell: Nuclear Total Area
- ✔ Cell: Nuclear Integrated Intensity
- ✔ Cell: Nuclear Average Intensity → 细胞核染色区域的平均像素强度

Granularity 颗粒度分析

应用实例

应用模块-颗粒度分析

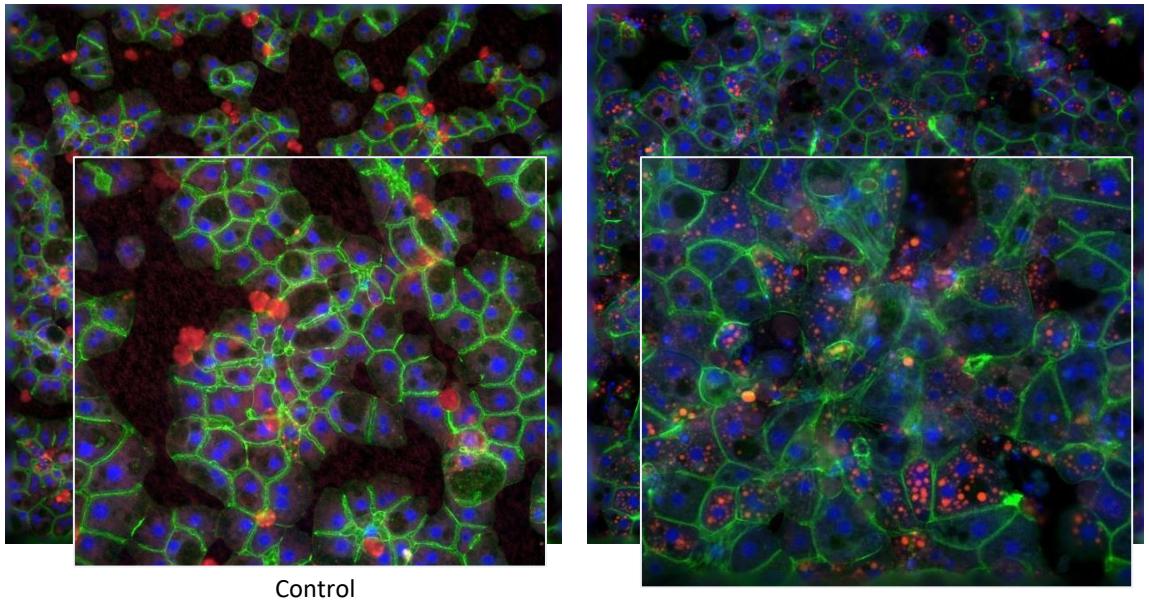
线粒体损伤



MitoSOX 染料可标记线粒体并能被超氧化物氧化产生红色荧光

应用模块-颗粒度分析

测量脂滴



Control

Drug Treated

Blue = topro (false color)
Green = E-cadherin
Red = lipid staining

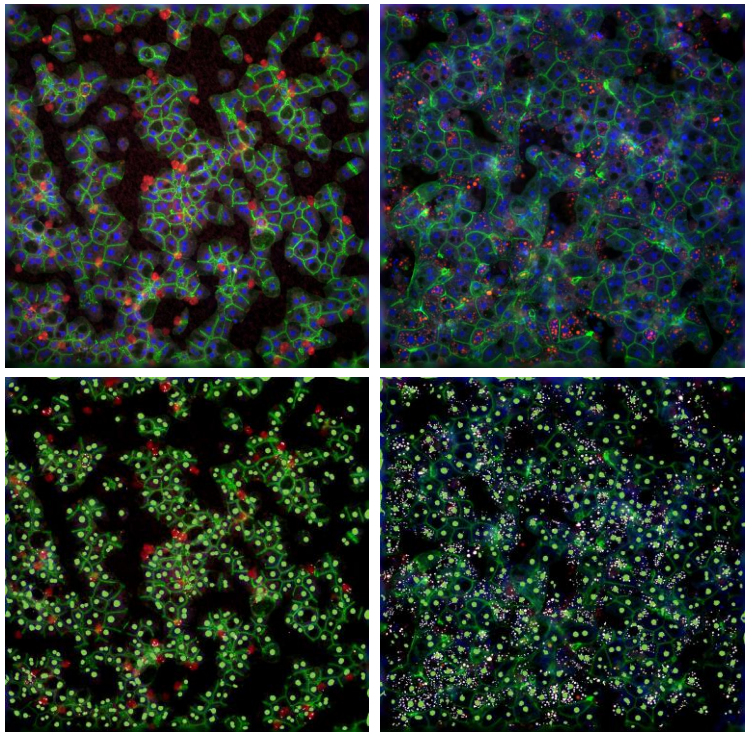
人肝细胞中的脂滴测量

应用模块-颗粒度分析

测量脂滴

Image

Mask



Control
Granules = 252

Drug Treated
Granules = 3659

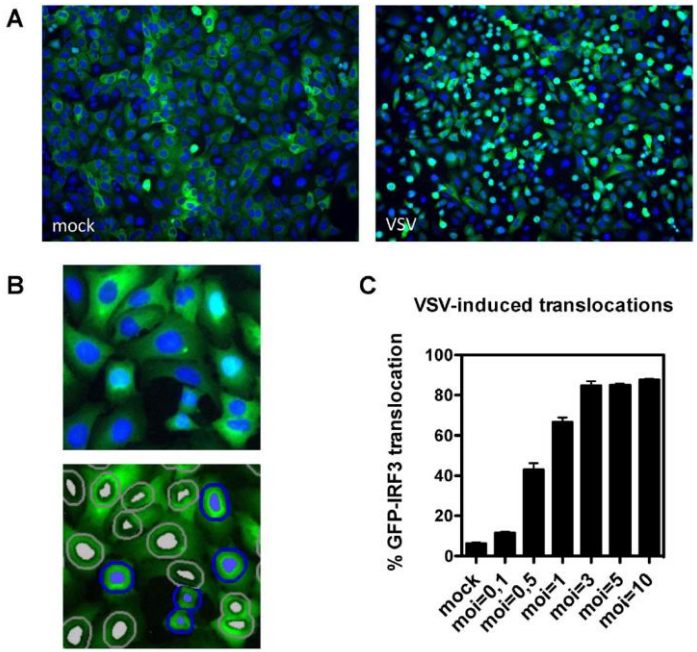
Analysis using Granularity application module

Translocation
转位分析(蛋白转位、核转位)

应用模块-转位分析

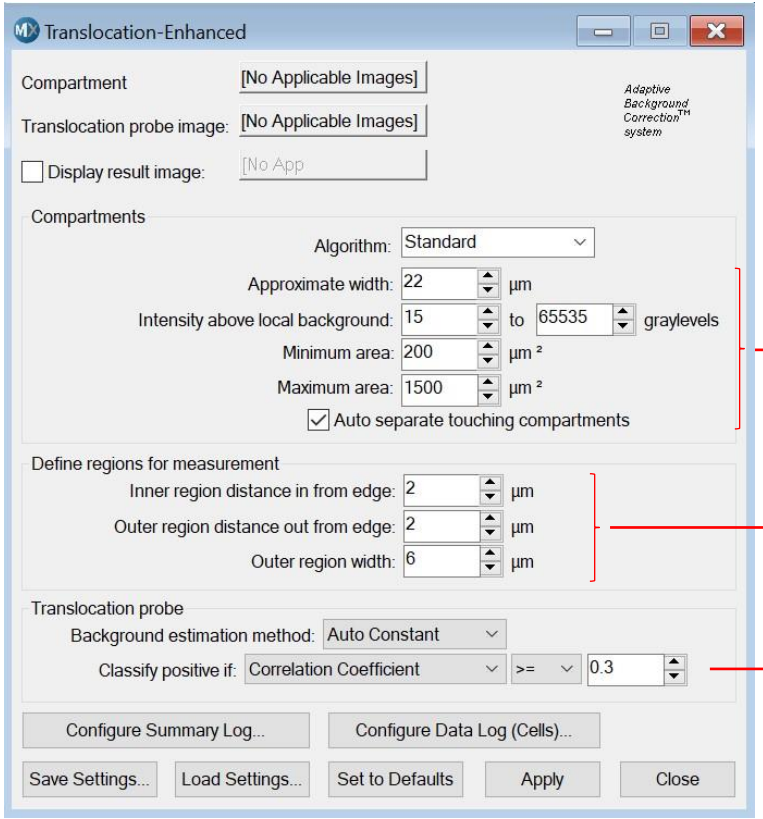
A method for the detection of virus infectivity in single cells and real time: Towards an automated fluorescence neutralization test

Marylene Maistriau[a], Tea Carletti[a], Mohammad Khalid Zakaria[a], Luca Braga[b], Valentina Faoro[a], Vasileios Vasileiadis[a], Alessandro Marcello[a,*,1]



A：U2OS_GFP-IRF3 细胞感染水疱性口炎病毒8h，在96孔板中使用高内涵进行 GFP 荧光核转位成像，细胞核用 Hoechst 33342 标记，统计发生核转位的细胞比例；B：采用多波长核转位分析模块识别分析发生核转位的细胞；C：在不同病毒感染浓度下的核转位率

应用模块-转位分析

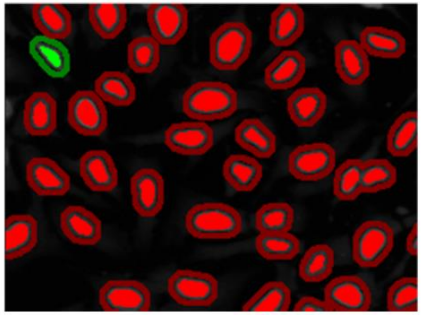


识别细胞核区域

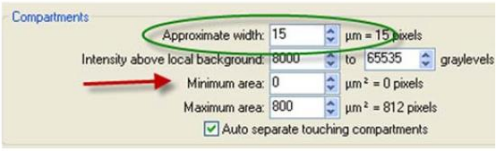
识别测量区域：
转位区域识别

阳性细胞判定条件

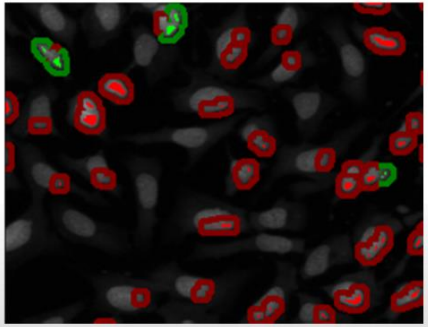
应用模块-转位分析



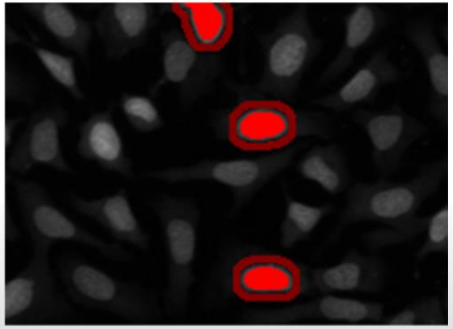
Set correctly



Note: The Minimum and Maximum area will have an impact as well!



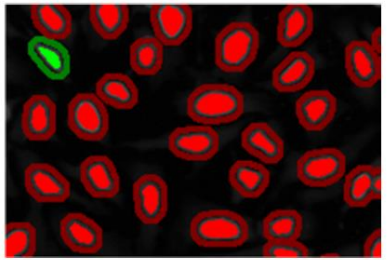
Set too low

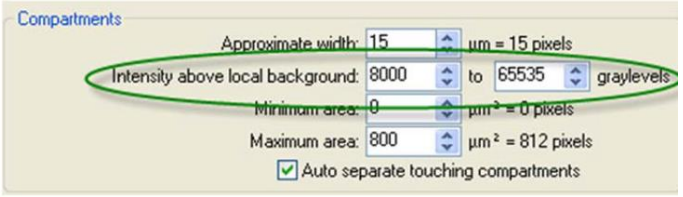


Set too large

应用模块-转位分析

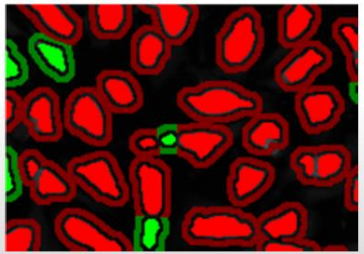
- Set correctly



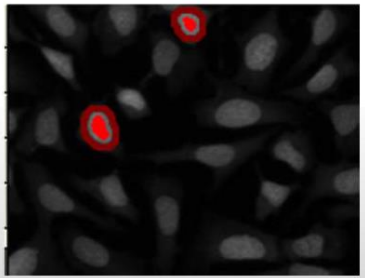


最低亮度值的注意事项

- Set too low → Compartments are too large

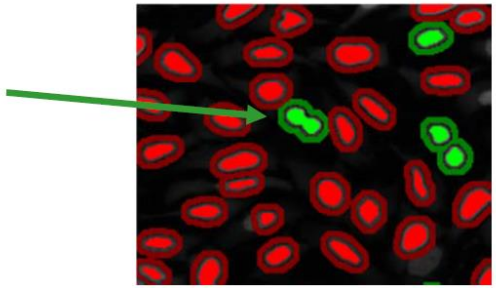


- Set too high → Compartments are not being detected

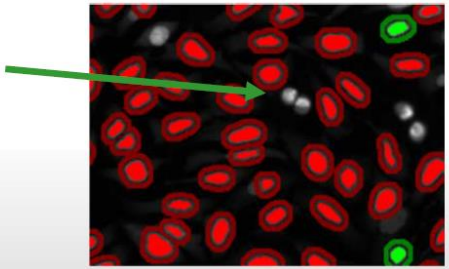


应用模块-转位分析

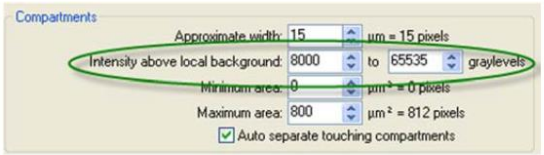
- All cells/ compartment detected



- Bright cells are being ignored

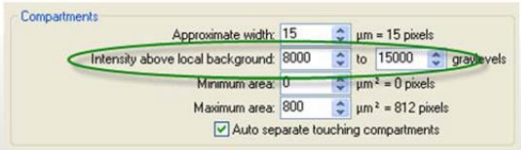


- Max intensity set to 65535 (bit dept of image
- All nucleus detected



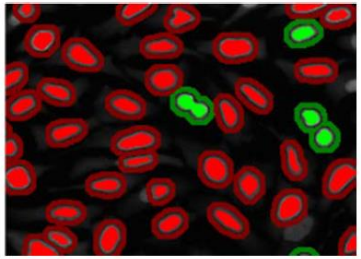
最高亮度值的注意事项

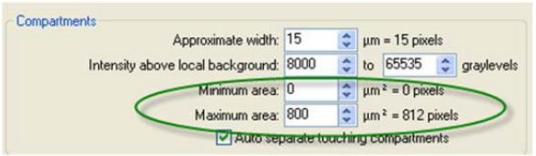
- Max intensity set lower then the bright (mitotic) cells
- Only “normal” cells detected



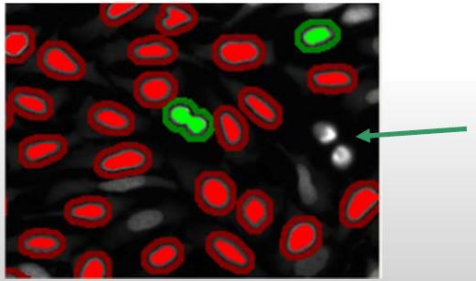
应用模块-转位分析

- Min= 0, Max=800
- Detect all compartment/ cells

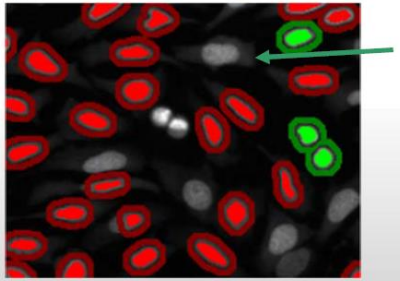




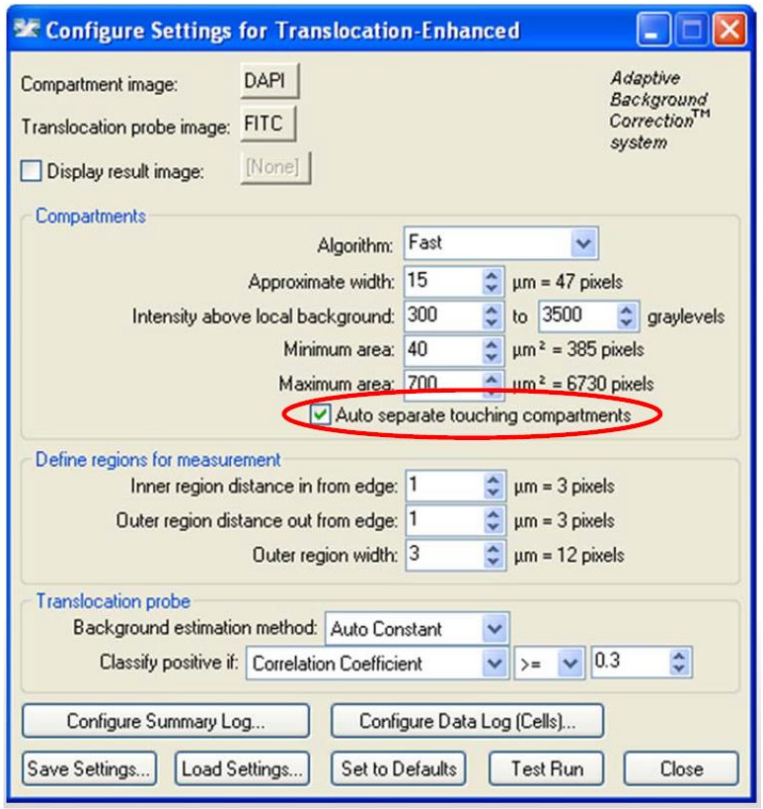
- Min= 150, Max=800
- Ignores small compartments/ cells

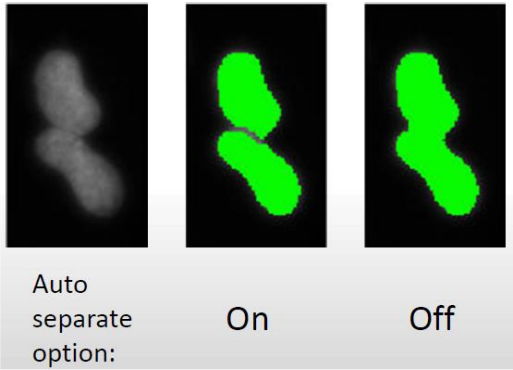


- Min= 0, Max=250
- Ignores large compartments/ cells

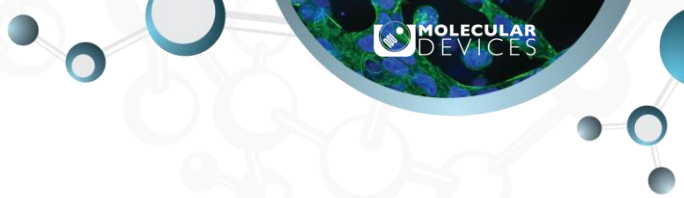


应用模块-转位分析





应用模块-转位分析

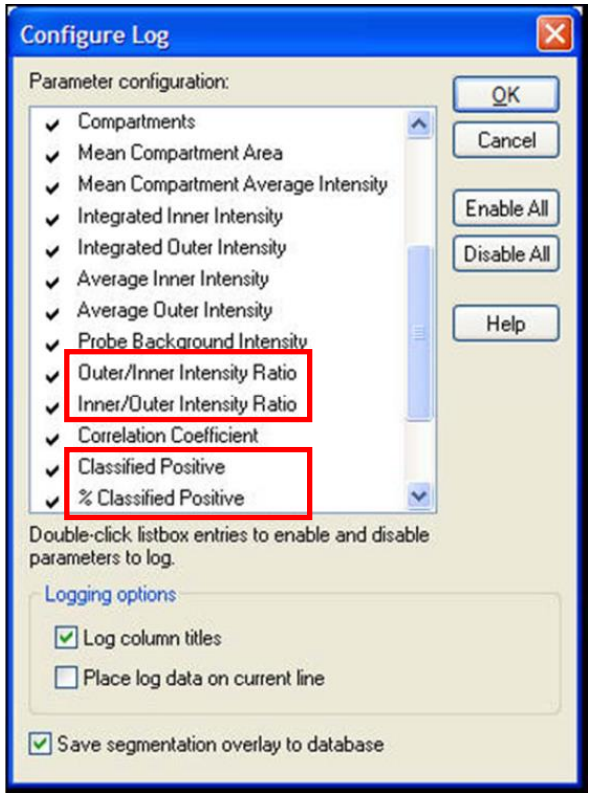


部分参数的常用设置

1. Intensity above local background.
   - Set max to max bit dept of the image
   - 4095 for 12 bit image (ImageXpress Micro, Discovery-1)
   - 63535 for 16 bit image (ImageXpress Ultra, ImageXpress Micro XL, mageXpress 5000A)
2. Area
   - Minimum: play with the value to get the same number of compartments/ cells
3. Auto separate toughing compartments
   - Selected
4. Inner and outer distance from Edge
   - Enter values that represent 1 pixel
5. Outer region width
   - Enter a value that represent: 1/3 of the appropriate width for the compartment and subtract 1 pixel.
   - For instance is the width is 15 pixels, then enter 4 ((15/3) -1)
6. Background estimation method:
   - Select Auto Constant
7. Classify positives
   - Select Correlation Coefficient
   - Select >=

应用模块-转位分析

Configure summary log



Outer/Inner Intensity Ratio：所有外部区域探针的平均像素强度(减去背景)除以所有内部区域探针的平均像素强度(减去背景)

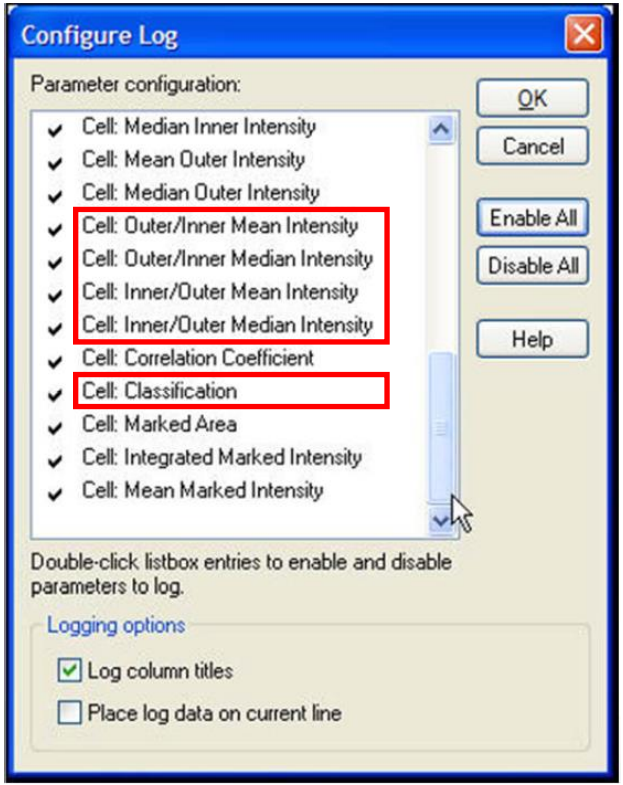
Inner/Outer Intensity Ratio：所有内部区域探针的平均像素强度(减去背景)除以所有外部区域探针的平均像素强度(减去背景)

Classified Positive：转位阳性分类的细胞总数

% Classified Positive：转位阳性分类的细胞总数占所有细胞总数的百分比

应用模块-转位分析

Configure data log (Cells)



Cell: Outer/Inner Mean Intensity：外部区域探针的平均像素强度(减去背景)除以内部区域探针的平均像素强度(减去背景)

Cell: Outer/Inner Median Intensity：外部区域的探针像素强度中值(减去背景)除以内部区域的探针像素强度中值(减去背景)

Cell: Inner/Outer Mean Intensity：内部区域探针的平均像素强度(减去背景)除以外部区域探针的平均像素强度(减去背景)

Cell: Inner/Outer Median Intensity：内部区域的探针像素强度中值(减去背景)除以外部区域的探针像素强度中值(减去背景)

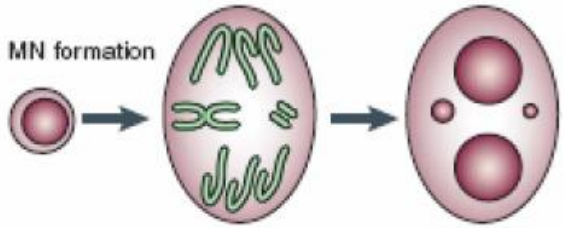
Cell: Classification：1为阳性转位分类(核染色)，0为阴性转位分类(胞浆染色)

Micronuclei
微核分析模块

应用模块-微核分析

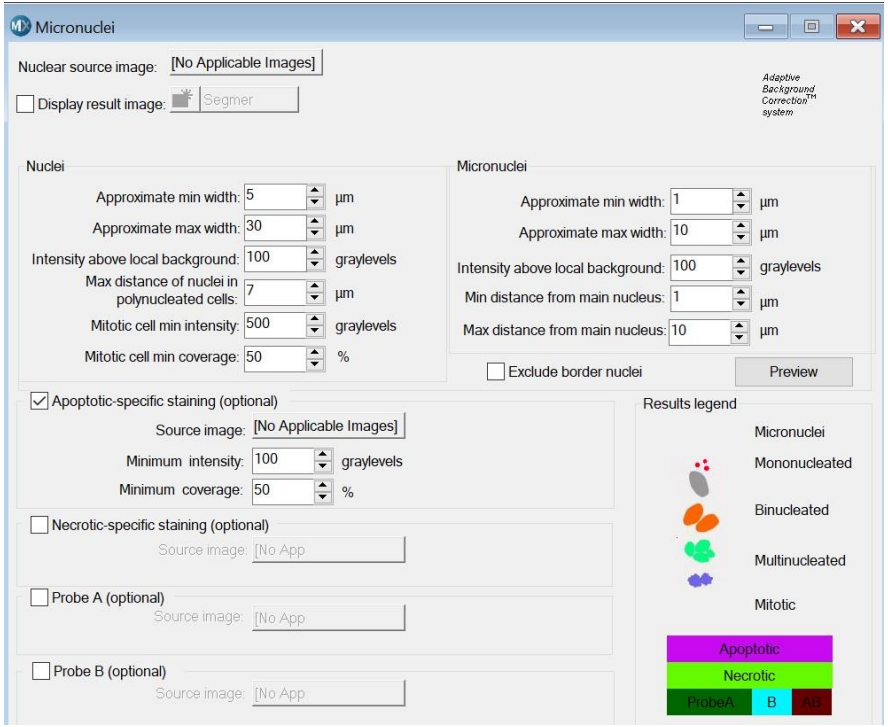
荧光微核

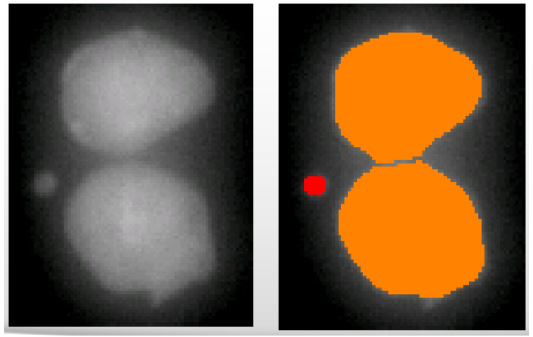
微核是细胞分裂过程中分裂过程落后的染色体或整个染色体形成的小细胞核。在细胞毒性物质，尤其是染色体毒性物质作用下，细胞分裂过程中通常会产生微核，因此，细胞微核能够反映出化合物的染色体毒性，检测细胞内微核能够定量检测化合物的染色体毒性。



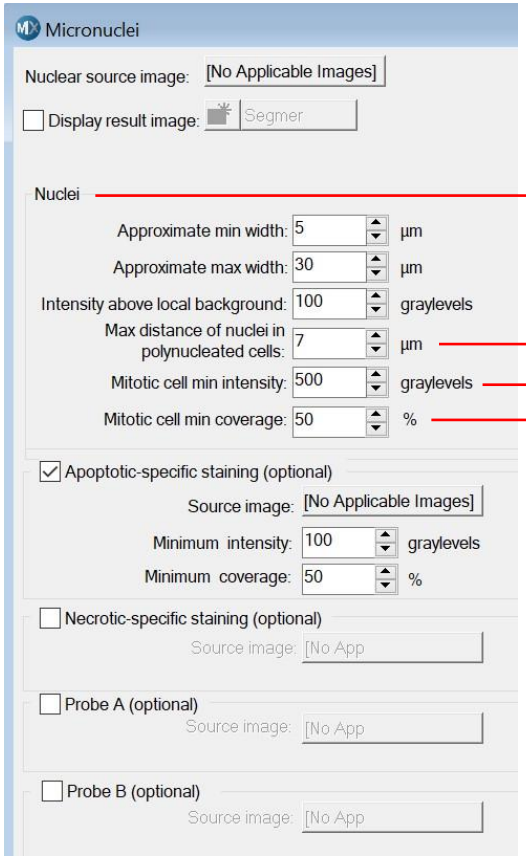
Micronuclei是一个功能强大的软件功能，其样品准备简单，只需使用核荧光标记物（DAPI、Hochest、吖啶橙等）标记细胞，即可进行细胞荧光微核的检测。同时结合其他特异荧光标记物（如凋亡、坏死等，可使用4种），**该分析方法完全符合CBMN的要求，在荧光微核检测同时，检测出单核细胞、双核细胞、多核细胞、有丝分裂细胞、凋亡细胞、坏死细胞、特异性荧光标记细胞等多种细**

应用模块-微核分析





应用模块-微核分析

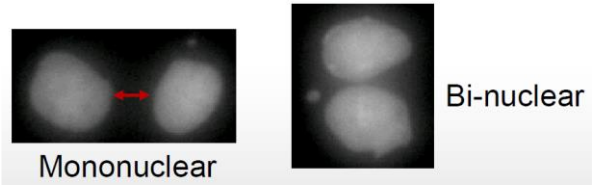


这一部分参数是对细胞核的识别

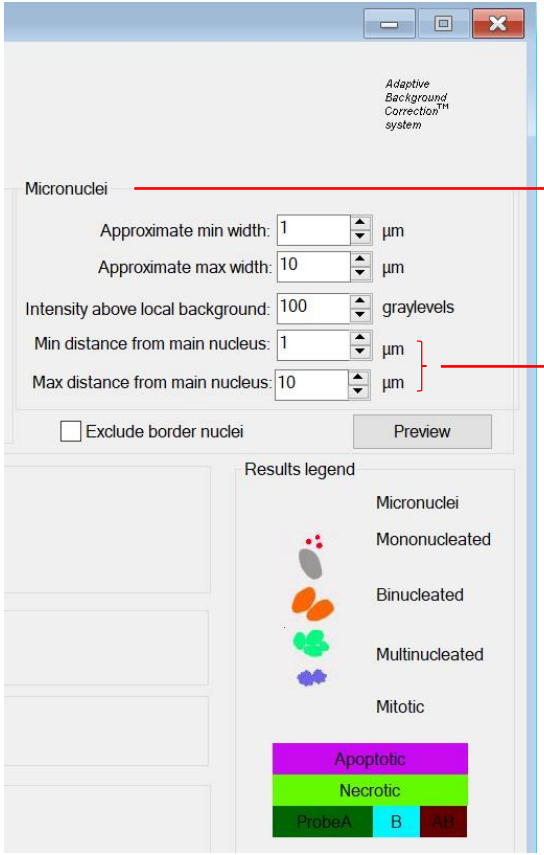
定义多核细胞中核与核之间的最大边界距离，在这个距离内的所有核将被认为是同一个细胞的

视野内最暗淡的有丝分裂细胞核的强度

细胞核的强度值等于或大于指定的有丝分裂细胞的最小强度值，有助于确保细胞核中有小亮点的细胞不属于有丝分裂

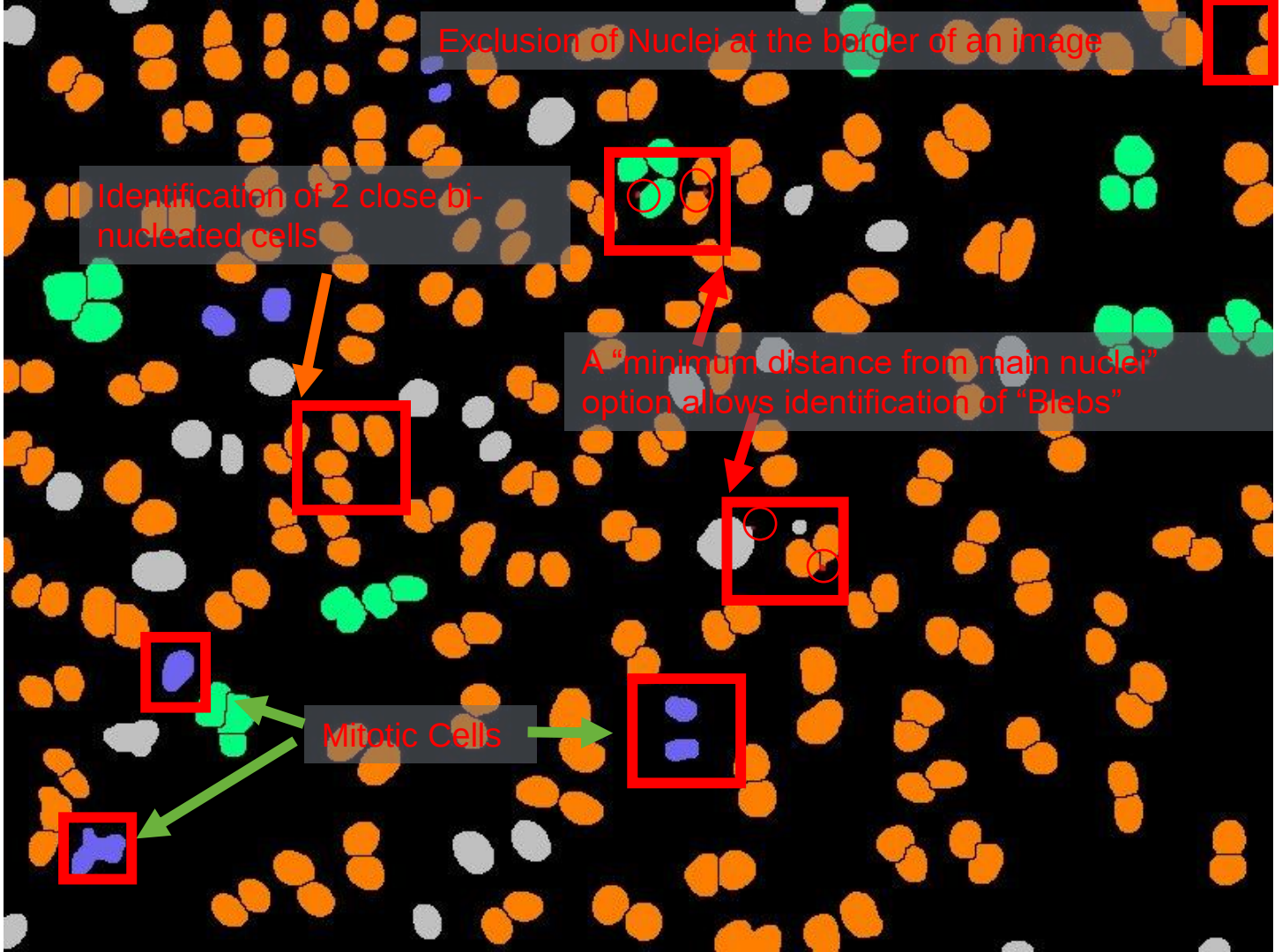


应用模块-微核分析



这一部分参数是对微核的识别

微核与细胞核的最小和最大距离（任何距离主核小于最小距离或大于最大距离的核结构都被排除在分析之外）


Exclusion of Nuclei at the border of an image
Identification of 2 close bi-nucleated cells
A “minimum distance from main nuclei” option allows identification of “Blebs”
Mitotic Cells

应用模块-微核分析

Configure summary log

Total Micronuclei	Total number of micronuclei for interphase cells
Micro-nucleated Cells	Total number of interphase cells with micronuclei
Cells with one micronucleus	Total number of interphase cells with one micronucleus
Cells with multi micronuclei	Total number of interphase cells with multi micronuclei
Micro and Mono-nucleated Cells	Total number of mono-nucleated cells with one or more micronuclei
Micro and Bi-nucleated Cells	Total number of bi-nucleated cells with one or more micronuclei
Micro and Multi-nucleated Cells	Total number of multi-nucleated cells with one or more micronuclei
Micro and ProbeA-positive Cells	Total number of ProbeA-positive cells with one or more micronuclei
Micro and ProbeB-positive Cells	Total number of ProbeB-positive cells with one or more micronuclei
Micro and ProbeAB-positive Cells	Total number of ProbeAB-positive cells with one or more micronuclei
% Healthy Cells	Healthy cells divided by total cells
% Mono-nucleated Cells	Mono-nucleated cells divided by total cells
% Bi-nucleated Cells	Bi-nucleated cells divided by total cells
% Multi-nucleated Cells	Multi-nucleated cells divided by total cells
% Micro-nucleated Cells	Micro-nucleated cells divided by total cells
% Cells with one micronucleus	Micro-nucleated cells with one micronucleus divided by total cells
% Cells with multi micronuclei	Micro-nucleated cells with multi micronuclei divided by total cells

总共68个计算数据

应用模块-微核分析

Configure data log (Cells)

Cell: Necrotic	1 if necrotic, 0 if not
Cell: Mononucleated	1 if mononucleated, 0 if not
Cell: Binucleated	1 if binucleated, 0 if not
Cell: Multinucleated	1 if multinucleated (more than 2 nuclei), 0 if not
Cell: ProbeA Positive	1 if ProbeA positive, 0 if not
Cell: ProbeB Positive	1 if ProbeB positive, 0 if not
Cell: Number of Micronuclei	Number of micronuclei in this cell
Cell: DNA Area	Area (in calibrated units of measure) identified as nuclear or micronuclear
Cell: DNA Integrated Intensity	Integrated intensity over all pixels identified as nuclear or micronuclear
Cell: DNA Average Intensity	Integrated intensity over all pixels identified as nuclear or micronuclear divided by nu… corresponding pixels
Cell: Nuclear Area	Area (in calibrated units of measure) identified as main nuclear (includes bi- and m…
Cell: Nuclear Integrated Intensity	Integrated intensity over all pixels identified as main nuclear
Cell: Nuclear Average Intensity	Integrated intensity over all pixels identified as main nuclear divided by number of c…
Cell: Apoptotic Integrated Intensity	Integrated intensity over all pixels identified as main nuclear in an apoptotic cell

总共30个计算数据

Q&A

Science, for me, gives a partial explanation for life. In so far as it goes, it is based on fact, experience and experiment.

— Rosalind Franklin

MOLECULAR DEVICES

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