Agilent Seahorse XFe24 Analyzer

安捷倫海馬生物能量分析儀

應用分享

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Agilent

Trusted Answers

Overview

- 海馬生物能量分析儀的原理與特點
- Seahorse XF 常見的實驗與應用
- Seahorse XF 各領域的應用分享
- Seahorse 實驗流程介紹
- Seahorse 數據分析 - 影像標準化
- Wave 數據分析

安捷倫細胞分析產品

Seahorse XF
海馬生物能量分析儀

xCelligence RTCA
實時細胞行為分析儀

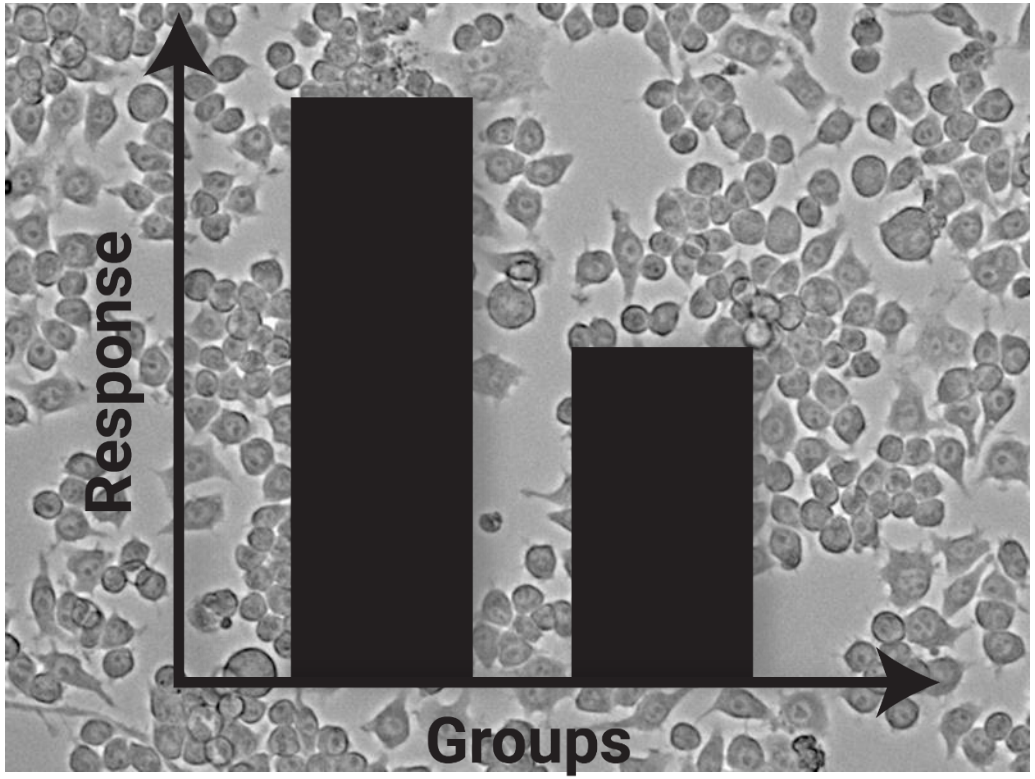
NovoCyte
流式細胞分析儀

BioTek
自動化影像系統與檢測儀

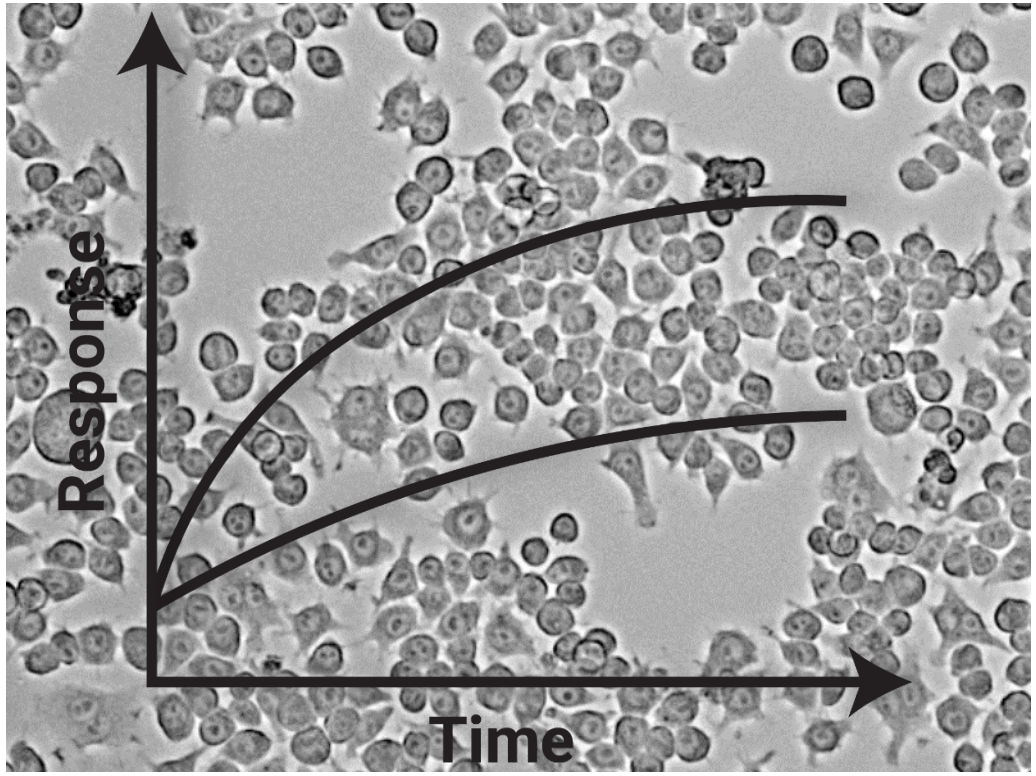
海馬生物能量分析儀的原理與特點

Seahorse XF Technology 實時無標記活細胞能量分析

You can no longer simply determine what cells **are** — you must also reveal what cells **do**



Traditional Endpoint Method
傳統檢測需染色，不連續的觀察



Real-time Seahorse XF Technology
動態、實時、無標記的活細胞分析

Agilent Seahorse XF能量代謝分析技術的特點

即時動態測量

先進的軟體
多參數分析

活細胞分析

無需標記的H^+
& O_2探針

整合4個加藥孔
實時測試藥物反應

經過驗證的即用
型試劑盒&試劑

能量代謝程式是細胞功能與健康的重要指標

Seahorse XF Technology - 研究能量代謝領域的金標準

Powerful predictor of cellular performance in *in vitro* disease models

Established standards for real-time measurement of cellular metabolism

XF kits and reagents simplify workflow

Broad adoption in **basic research**

~7000 publications citing **Seahorse XF** platform

>2000 publications in **Immunology** and **Cancer** research

Expanding accessibility and relevance of bioenergetic measurements

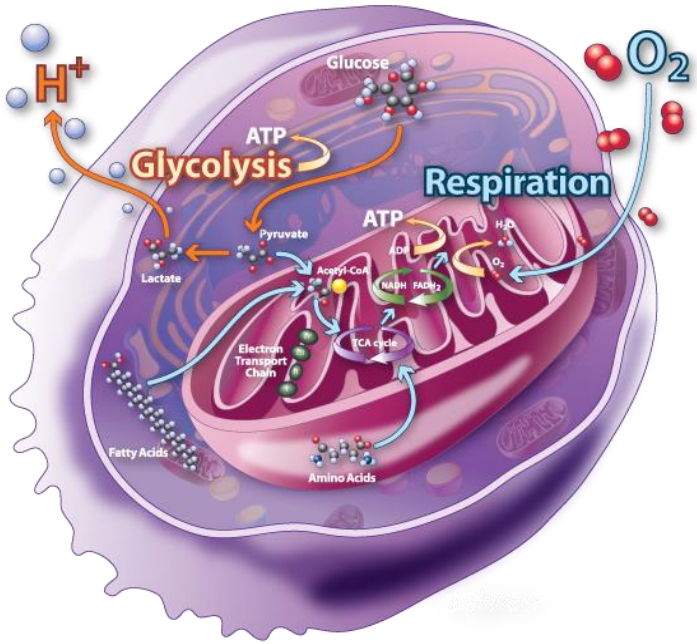
細胞能量產生的兩大途徑

實時分析活細胞能量代謝作用

Glycolysis

[H^+]

Fermentation of
- Glucose



Respiration

[Oxygen]

Oxidation of:
- Glucose
- Fat
- Amino Acids

- Metabolism is measured via the ***rates of change*** in **pH** and **oxygen concentration**
- **Oxygen Consumption Rate (OCR):** Measurement of mitochondrial respiration
- **Extracellular Acidification Rate (ECAR):** Indicator of glycolysis

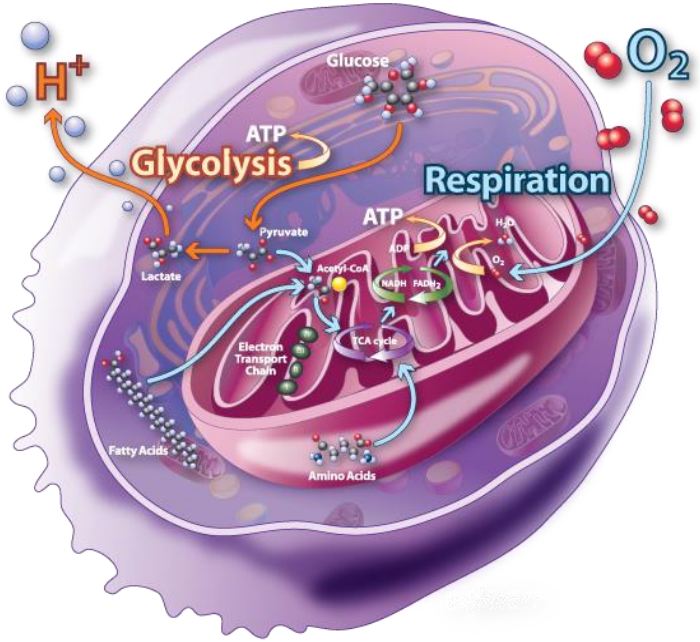
Seahorse XF技術測量細胞的粒線體呼吸與糖解作用

糖解

Anaerobic conversion
of glucose to lactate

ECAR
(mpH/min)
Extra Cellular
Acidification Rate
細胞外酸化速率

PER
(pmol [H^+]/min)
Proton Efflux Rate
質子流出速率



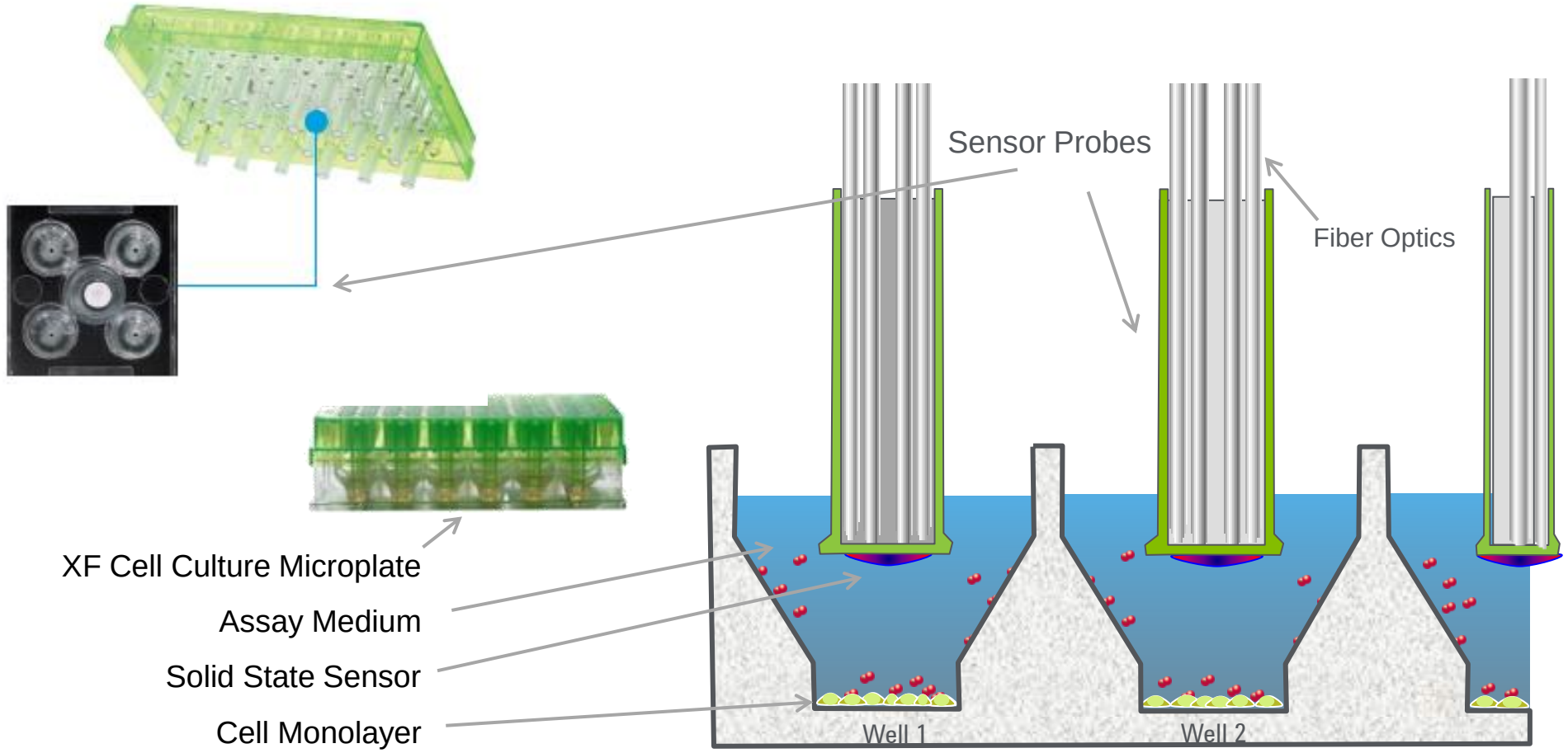
粒線體呼吸

Oxidation of glucose,
fatty acids, amino acids

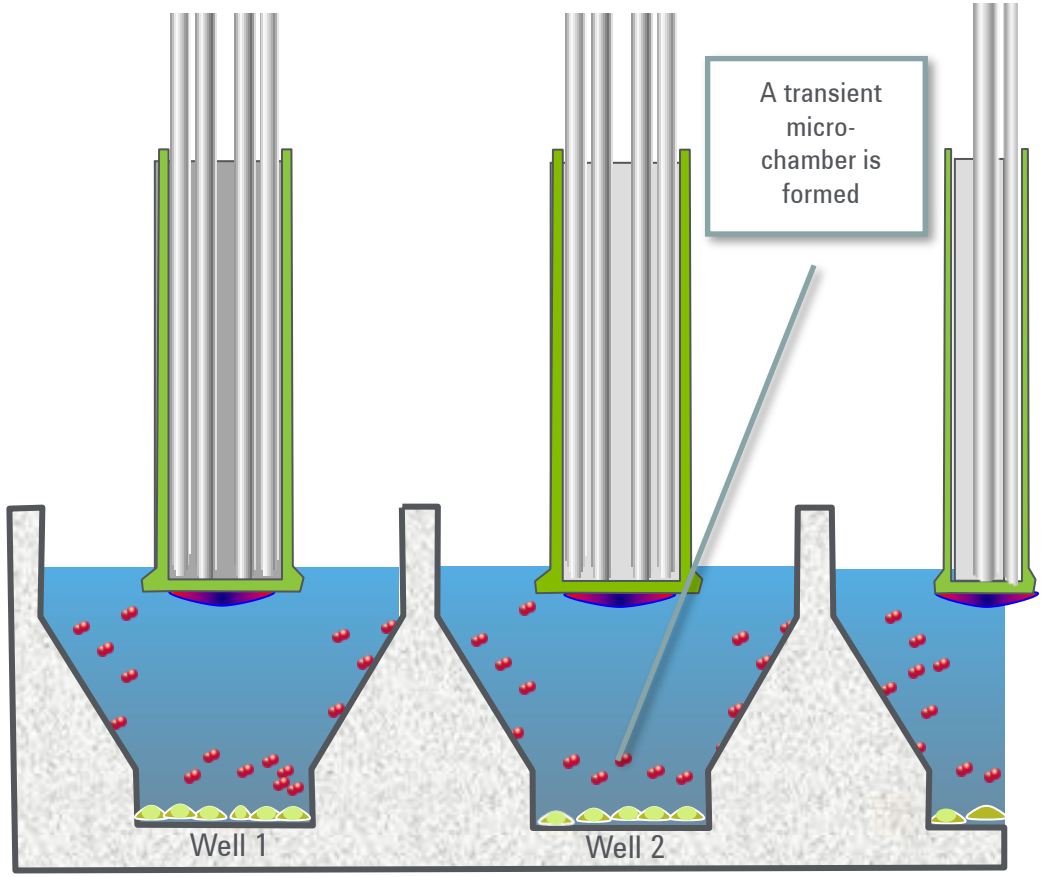
OCR
pmol [O_2]/min

Oxygen Consumption Rate
氧消耗速率

Seahorse XF 實時監測活細胞的能量代謝



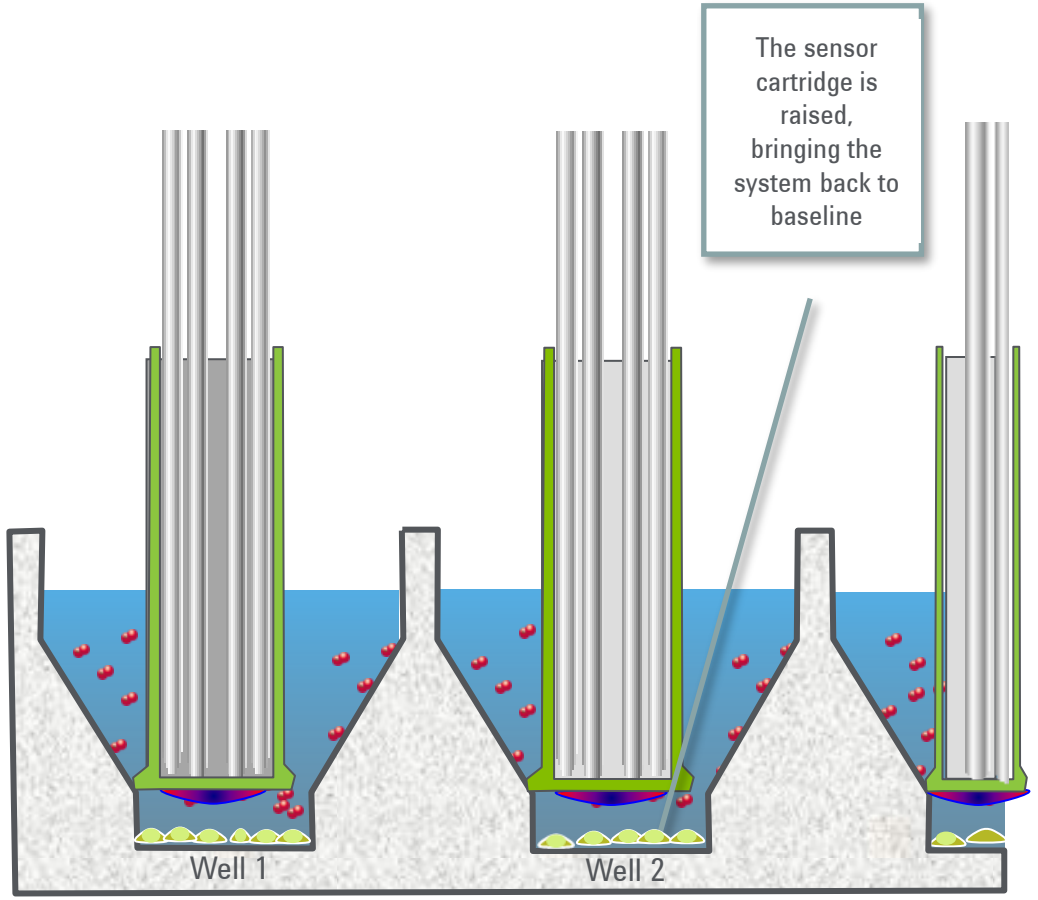
Seahorse XF 實時監測活細胞的能量代謝



瞬時微室的形成，在幾分鐘內快速同步偵測
氧氣消耗速率(OCR)和細胞外酸化速率(ECAR)

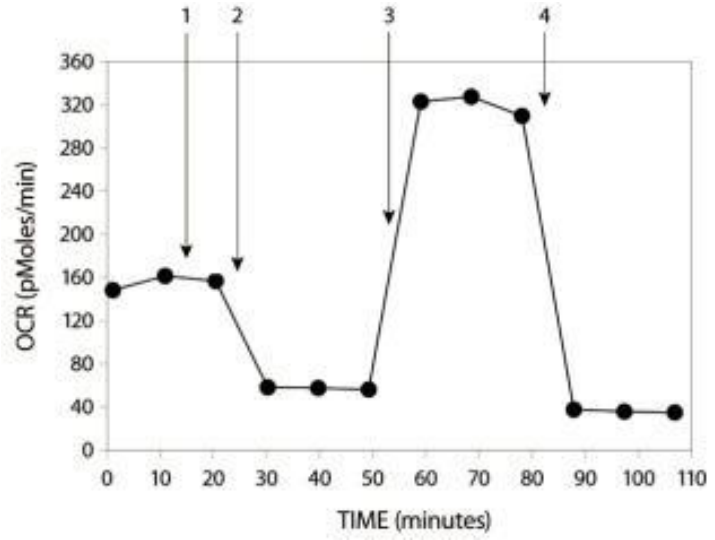
Seahorse XF 實時監測活細胞的能量代謝

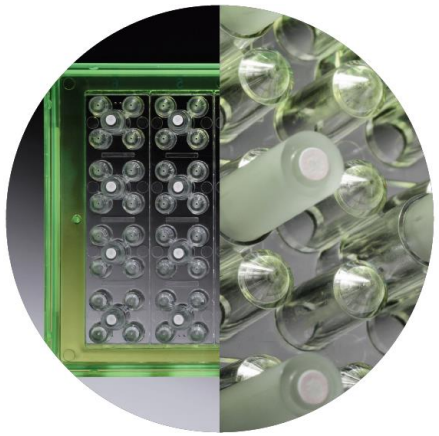
探針再次抬起，
使系統的氧氣和pH值恢復到正常水準

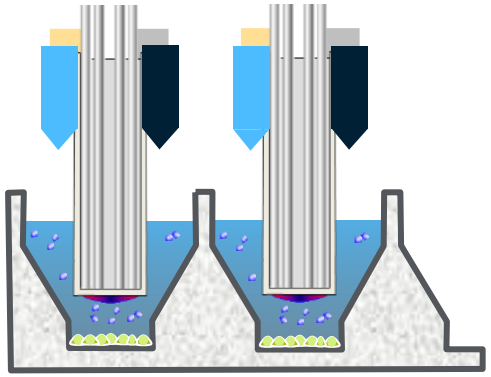


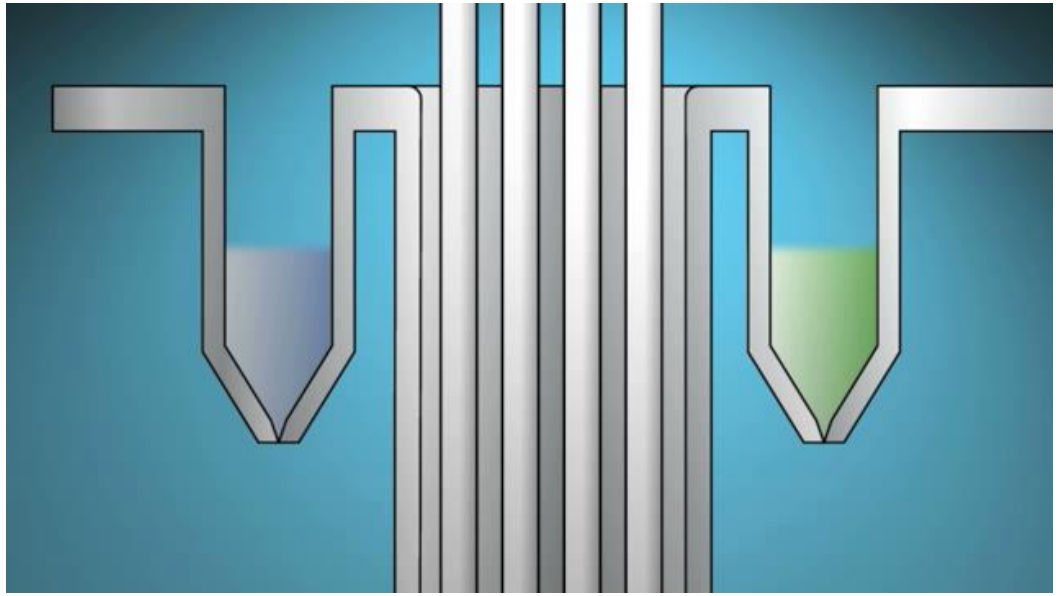
Seahorse XF 自動加藥注射系統

- 加藥孔位在探針盤上，
  每個孔皆含有四個加藥孔
- 利用氣壓將藥物打入細胞孔中
- 設置抑制劑、刺激劑或受質等化合物
- 使用者可自訂欲加入的藥物

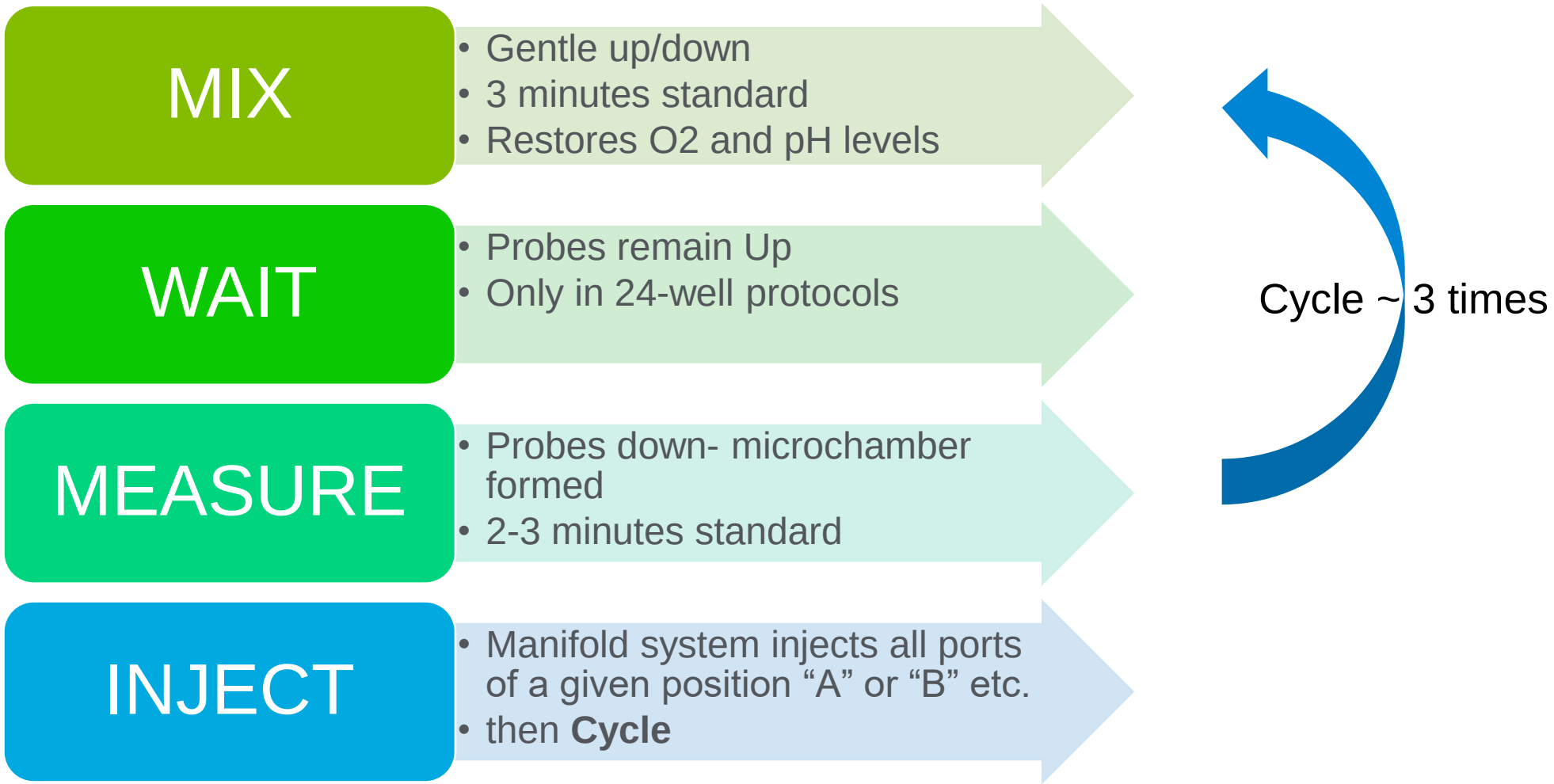




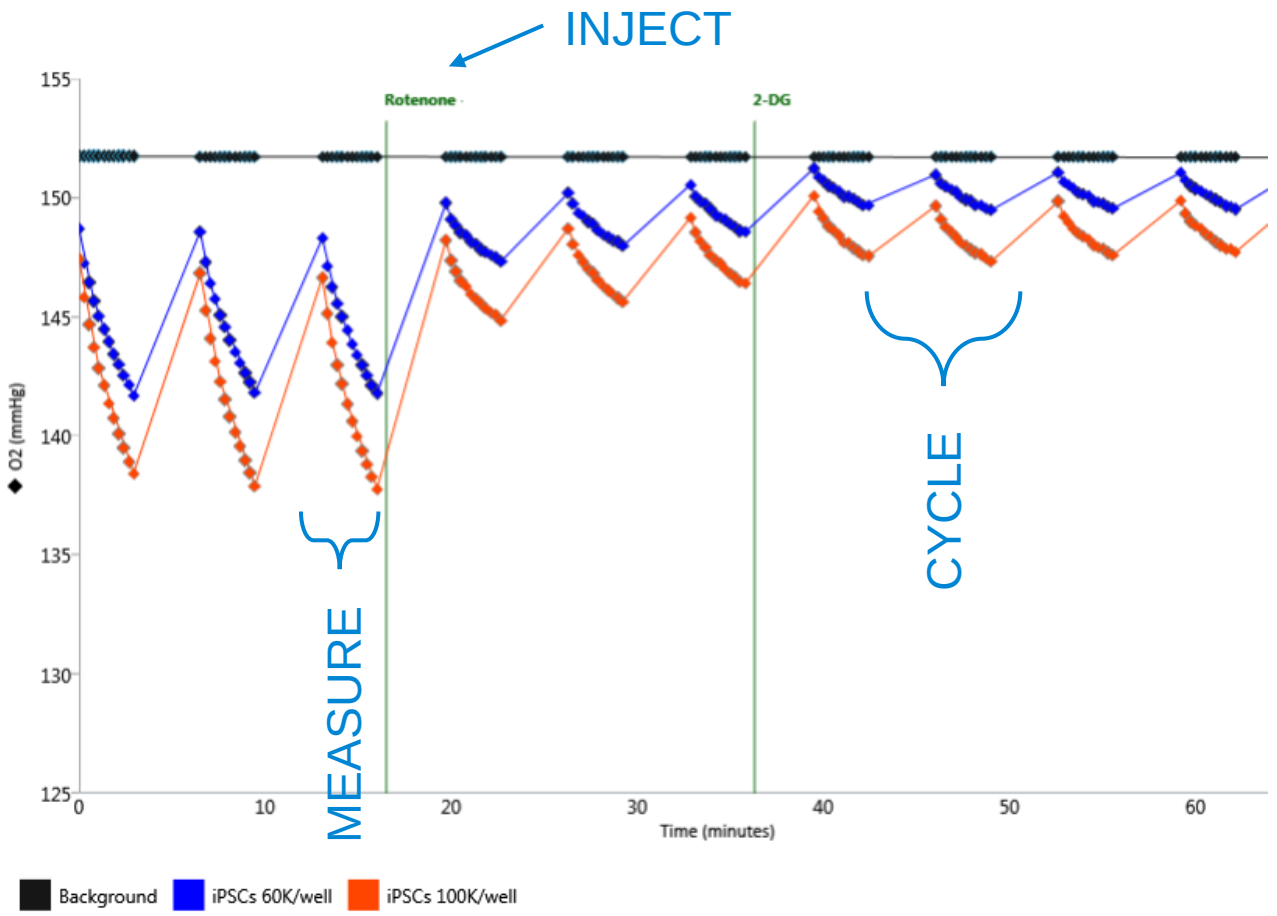




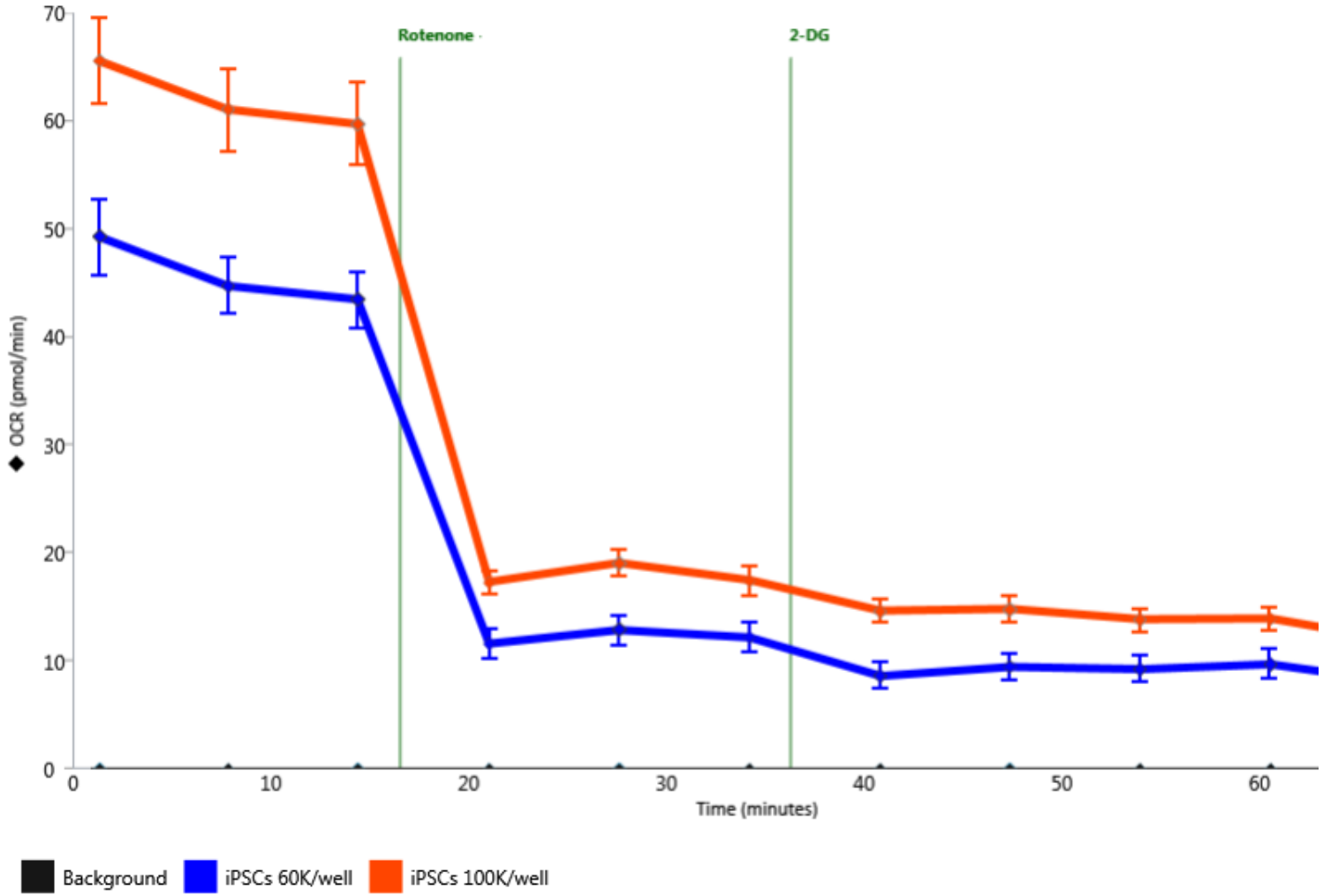
實時監測活細胞的氧化磷酸化與糖解作用



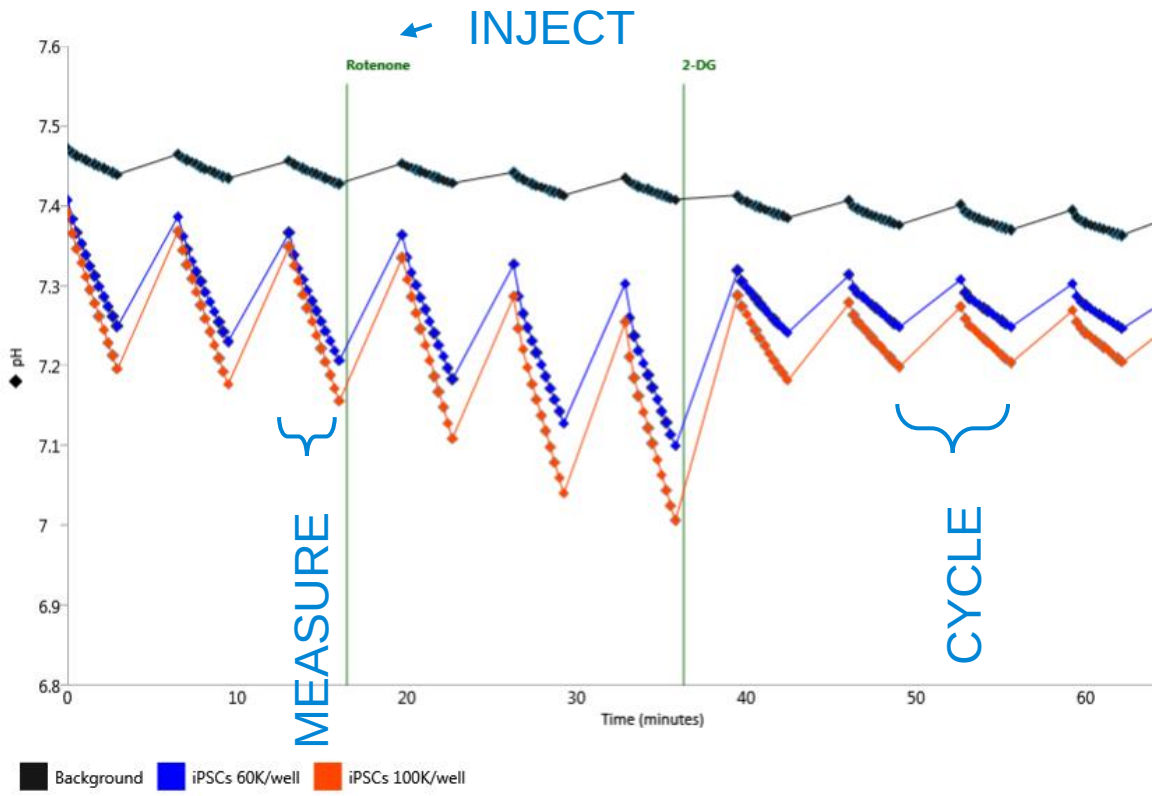
Seahorse檢測氧氣消耗的原始數據 O_2 vs Time ➜ OCR



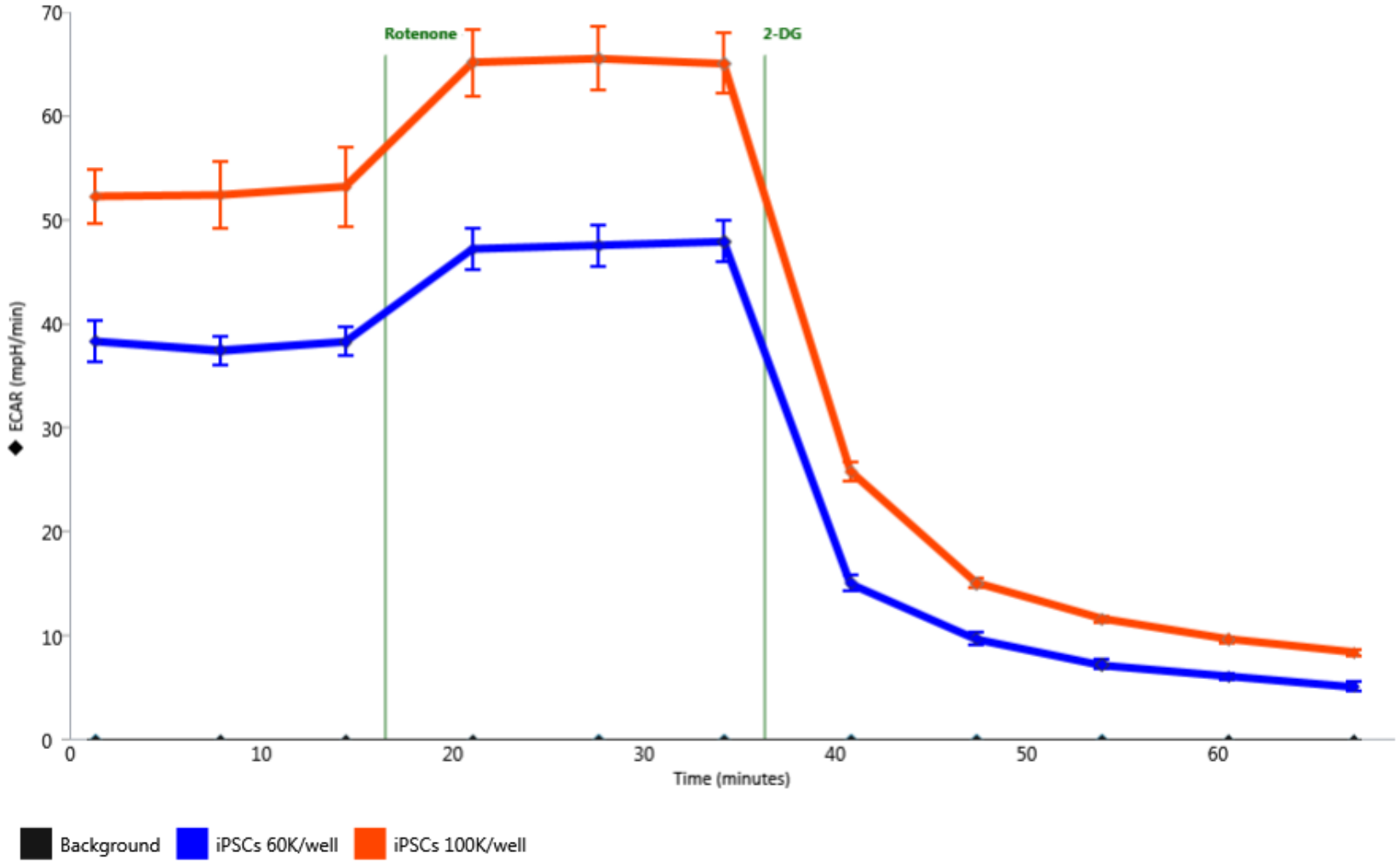
氧氣消耗速率 OCR vs. Time



Seahorse檢測酸鹼值的原始數據 pH vs Time ➜ ECAR

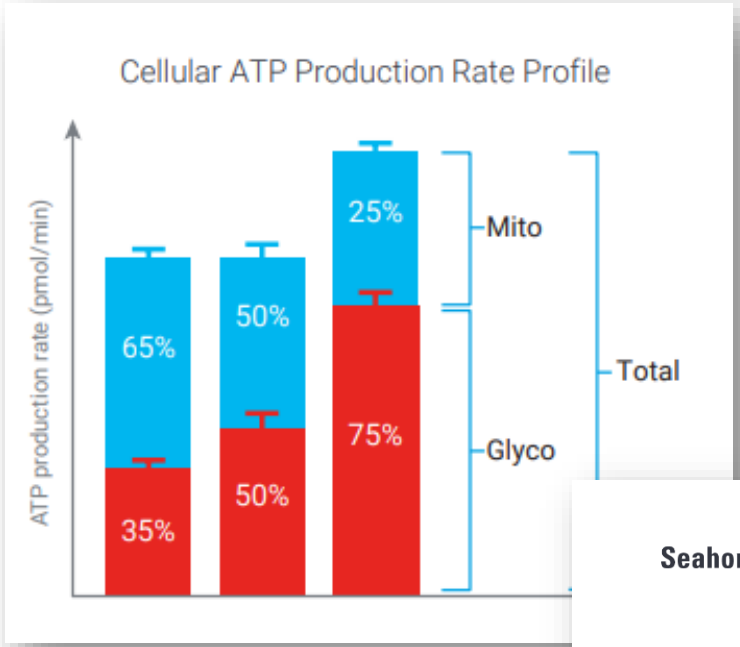


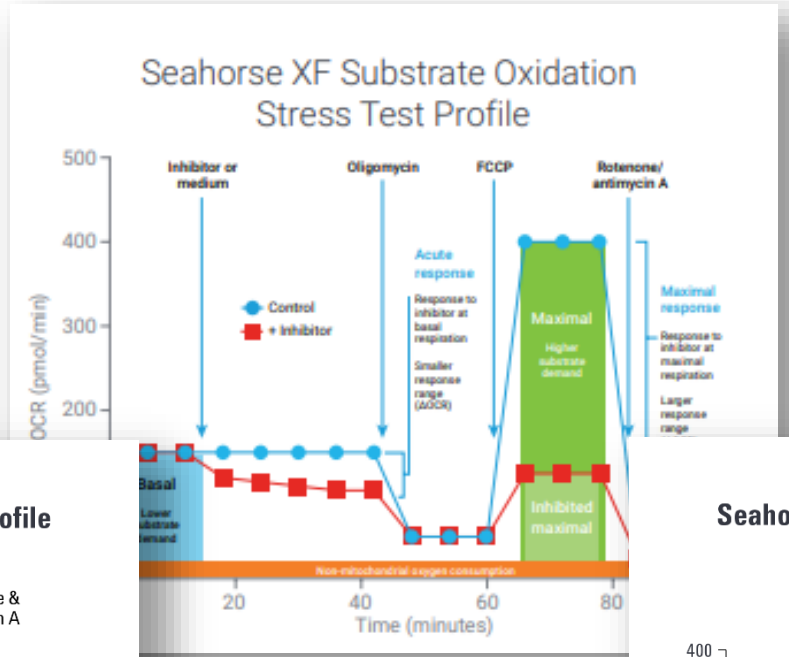
細胞外酸化速率 ECAR vs. Time

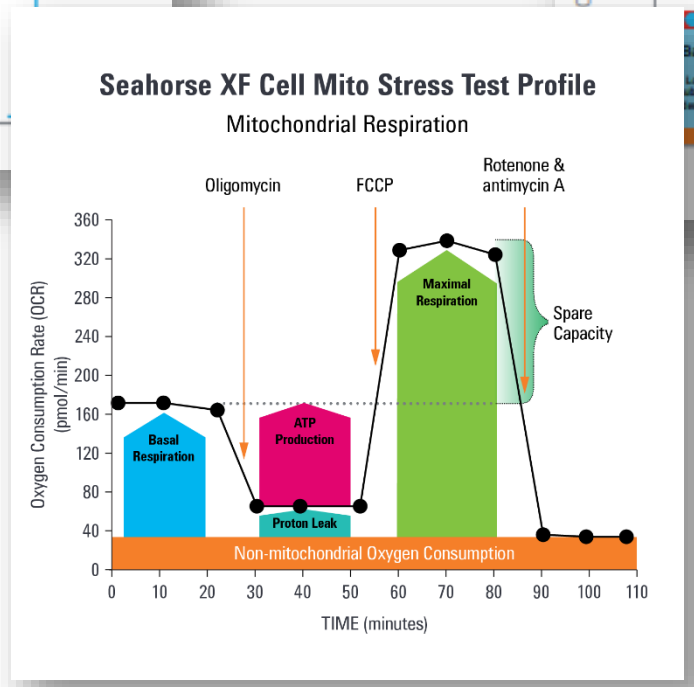


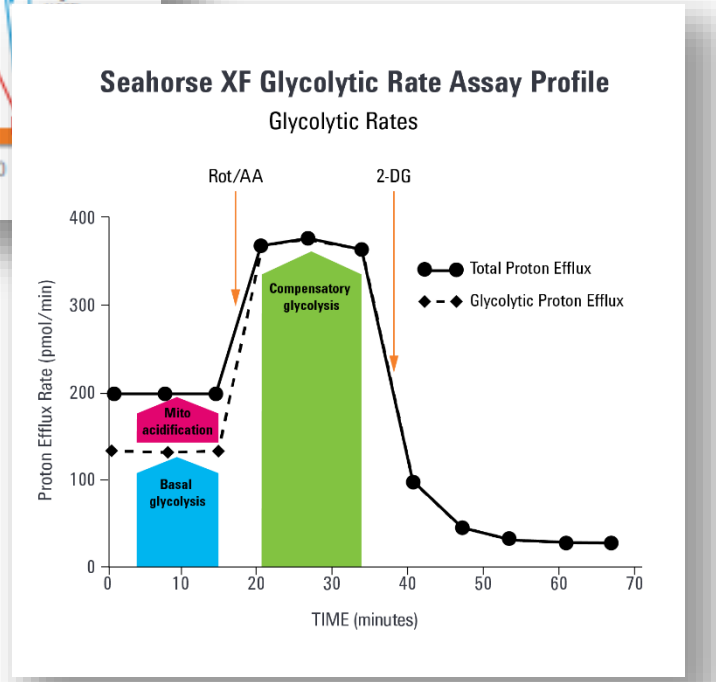
Agilent Seahorse XF 常見的實驗與應用

多種 Seahorse 實驗試劑盒可選

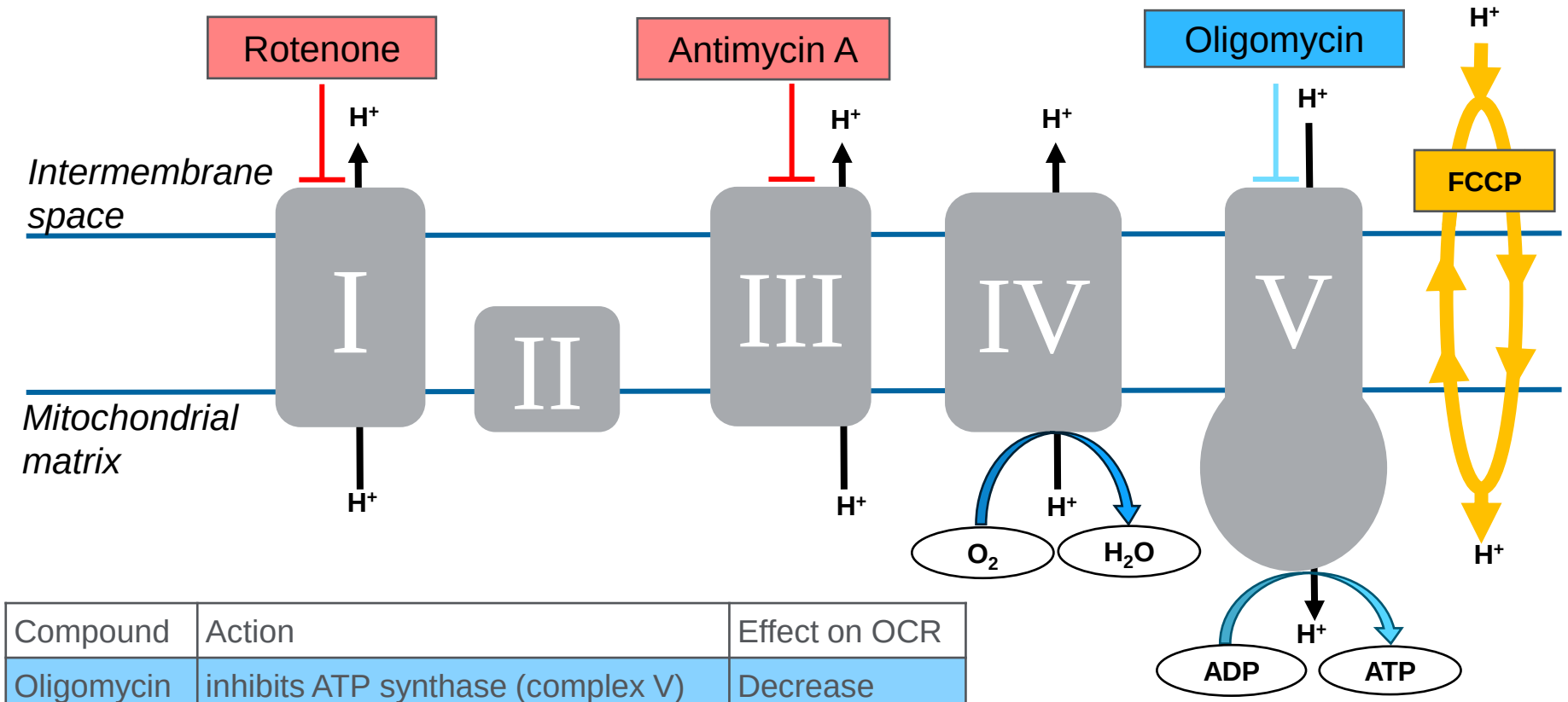








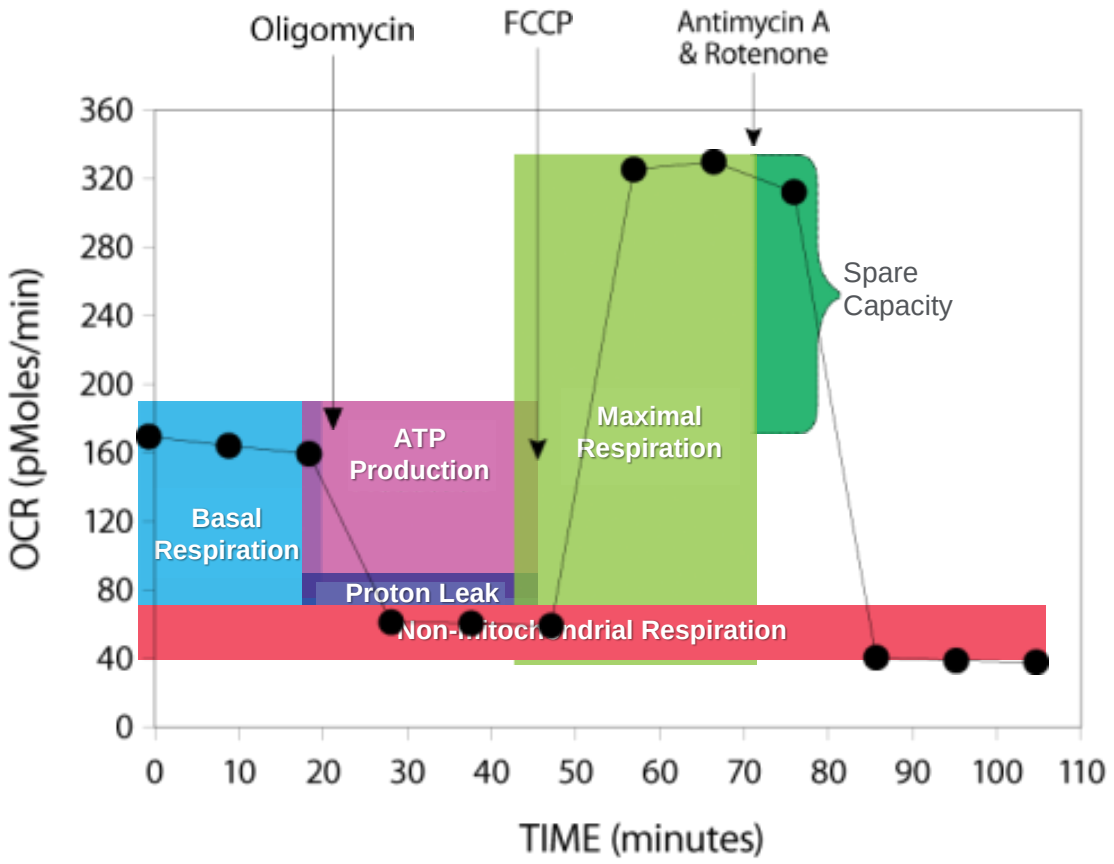
粒線體的電子傳遞鏈



Compound	Action	Effect on OCR
Oligomycin	inhibits ATP synthase (complex V)	Decrease
FCCP	depolarizes mitochondrial inner membrane	Increase
Rotenone	inhibits complex I	Decrease
Antimycin A	inhibits complex III	Decrease

粒線體壓力實驗

評估粒線體的功能

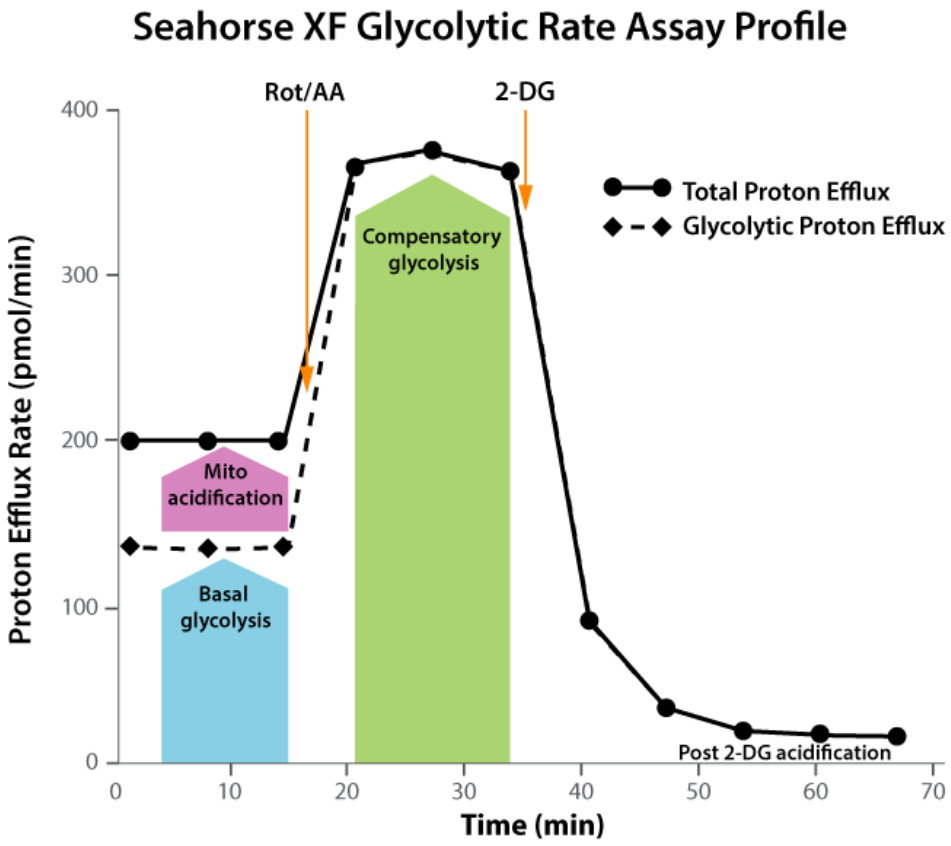


關鍵參數

- ❑ 基礎呼吸值 (Basal Respiration)
- ❑ 跟有氧呼吸有關的ATP產率 (ATP Production)
- ❑ 最大呼吸值 Max Respiration
- ❑ 呼吸儲備值 Spare Capacity
- ❑ 質子滲漏 Proton Leak

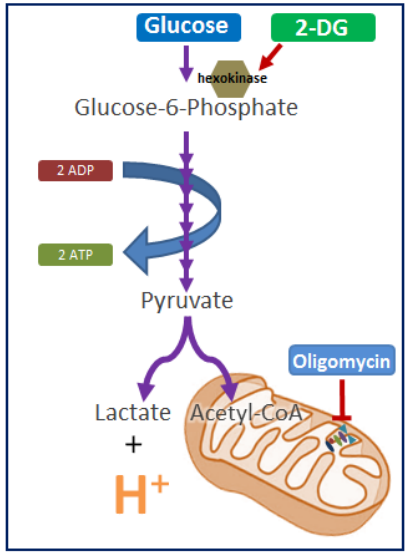
糖解速率測定實驗

測量活細胞的糖解速率

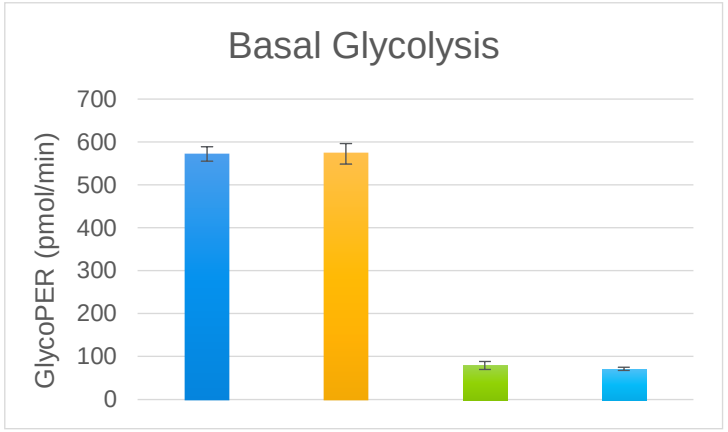


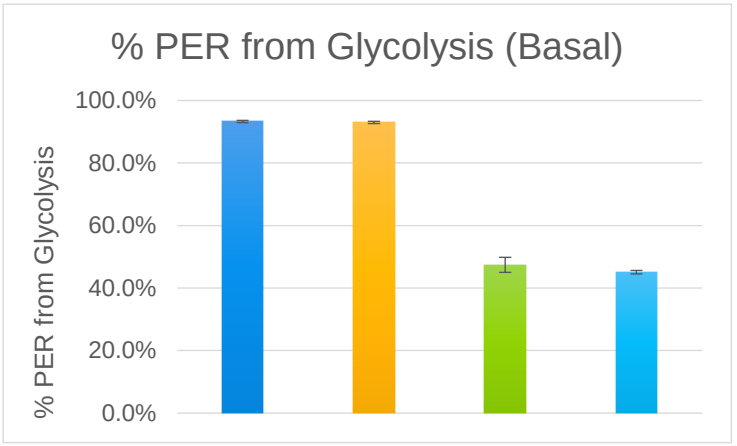
關鍵參數

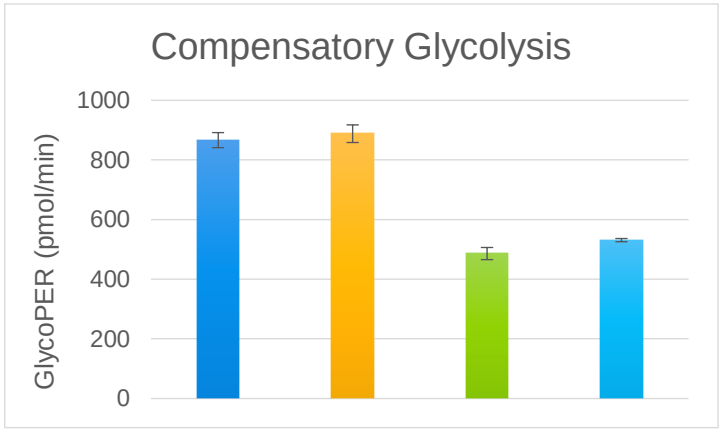
- ❑ 基礎糖解值 (Basal Glycolysis)
- ❑ 補償糖解值 (Compensatory Glycolysis)



糖解速率測定實驗報告



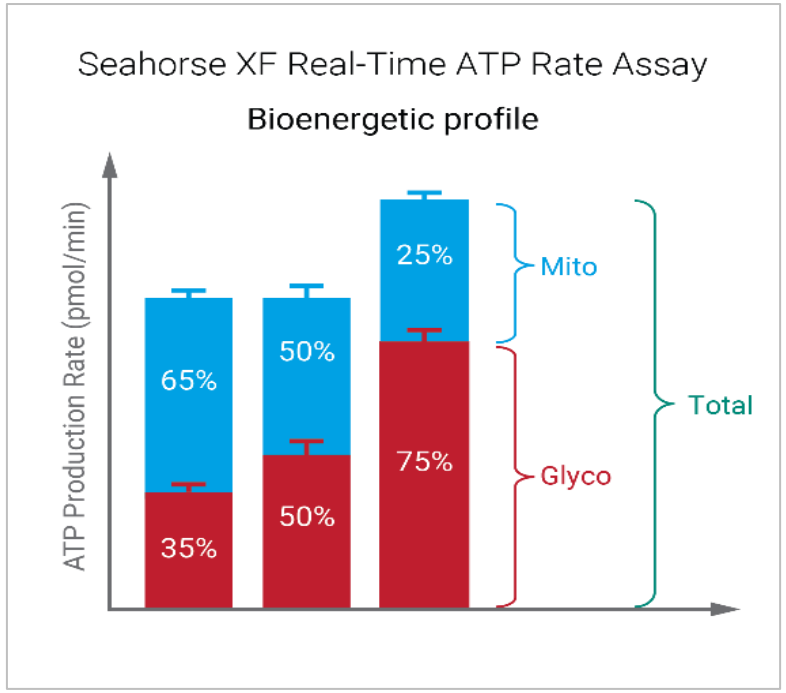


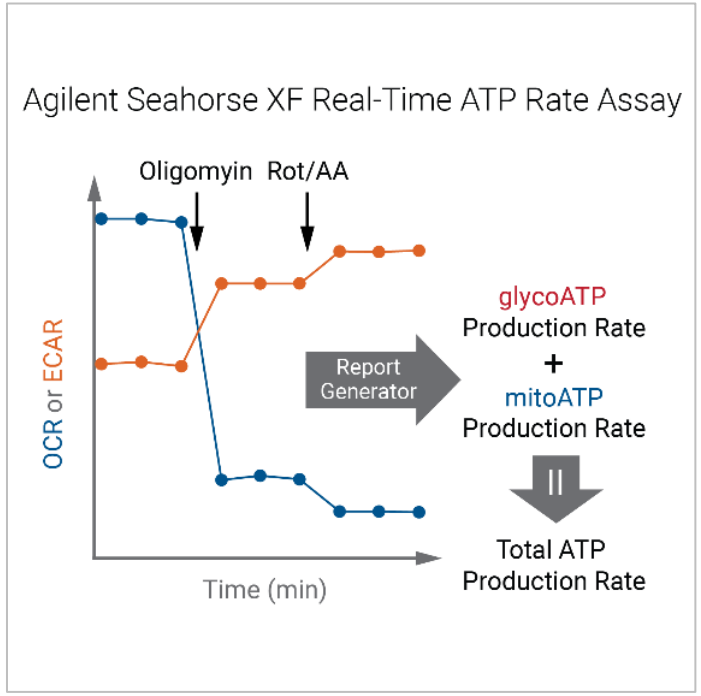


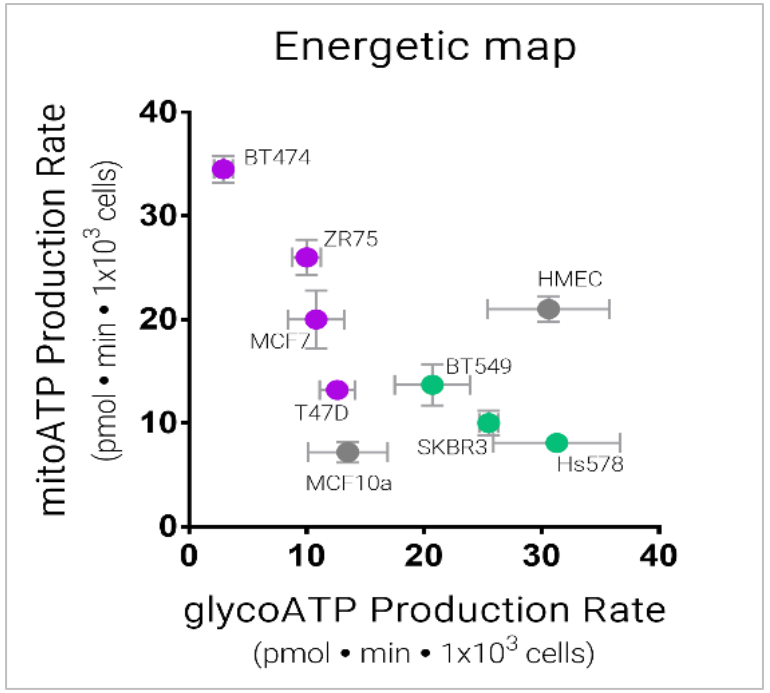
Parameter
Basal Glycolysis (pmol/min)
Basal Proton Efflux Rate (PER) (pmol/min)
% PER from Glycolysis (Basal)
Compensatory Glycolysis (pmol/min)
Basal mitoOCR/glycoPER
Post 2-DG Acidification (pmol/min)

實時 ATP 速率測定實驗

定量分析粒線體呼吸作用與糖解作用的ATP產率







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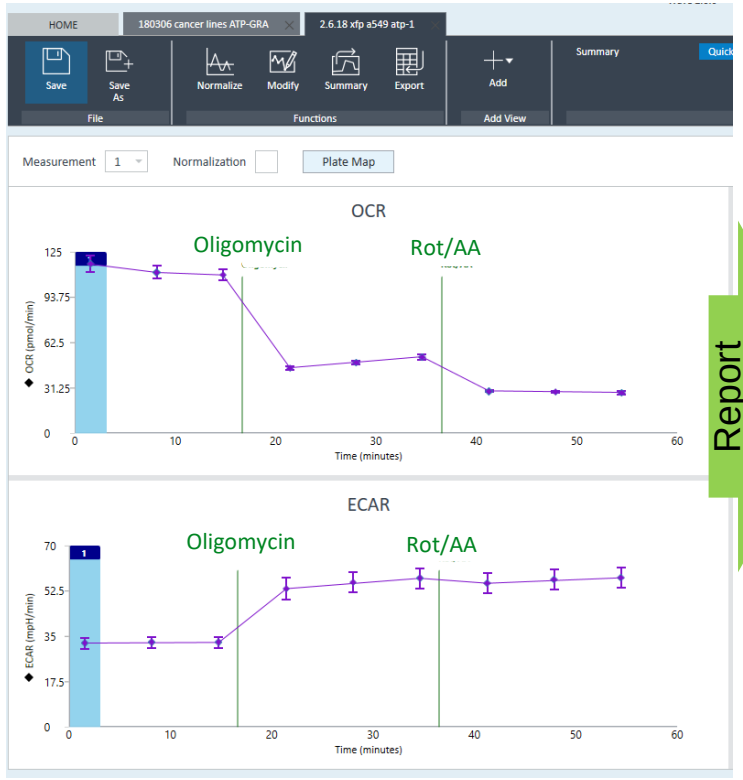
如何獲得ATP產生速率?



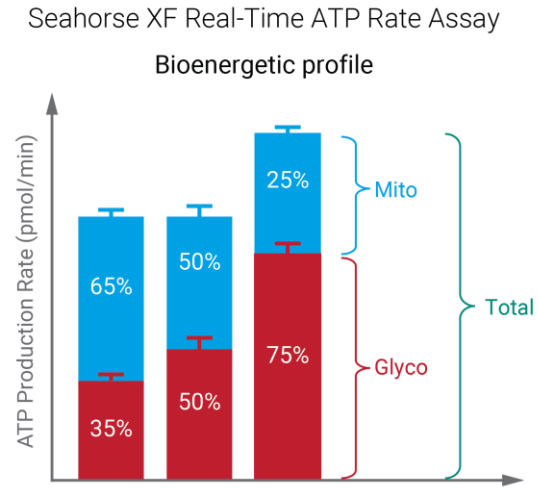
Report Generator

mitoATP Production Rate

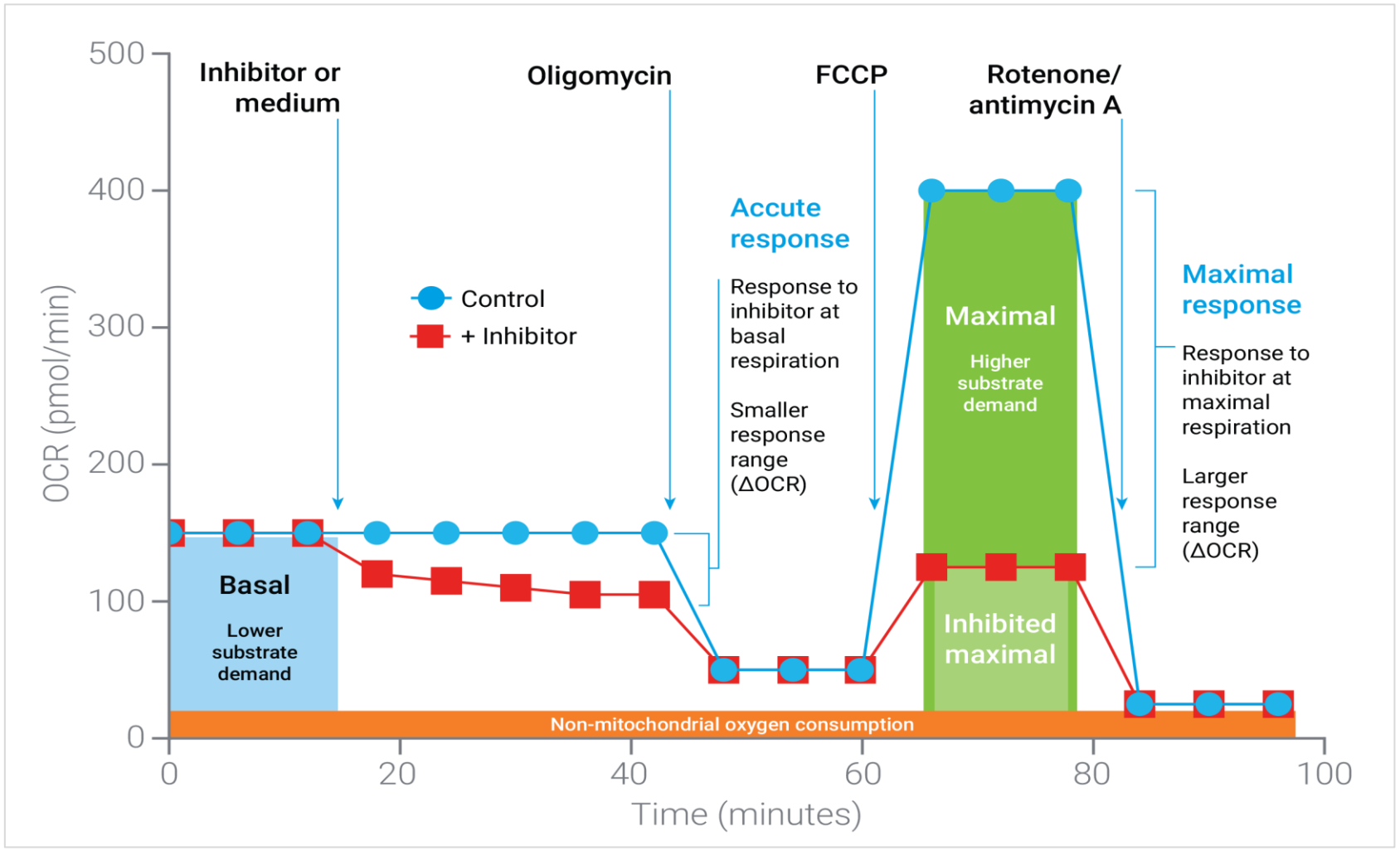
+

glycoATP Production Rate

Total ATP Production Rate



粒線體受質氧化壓力實驗

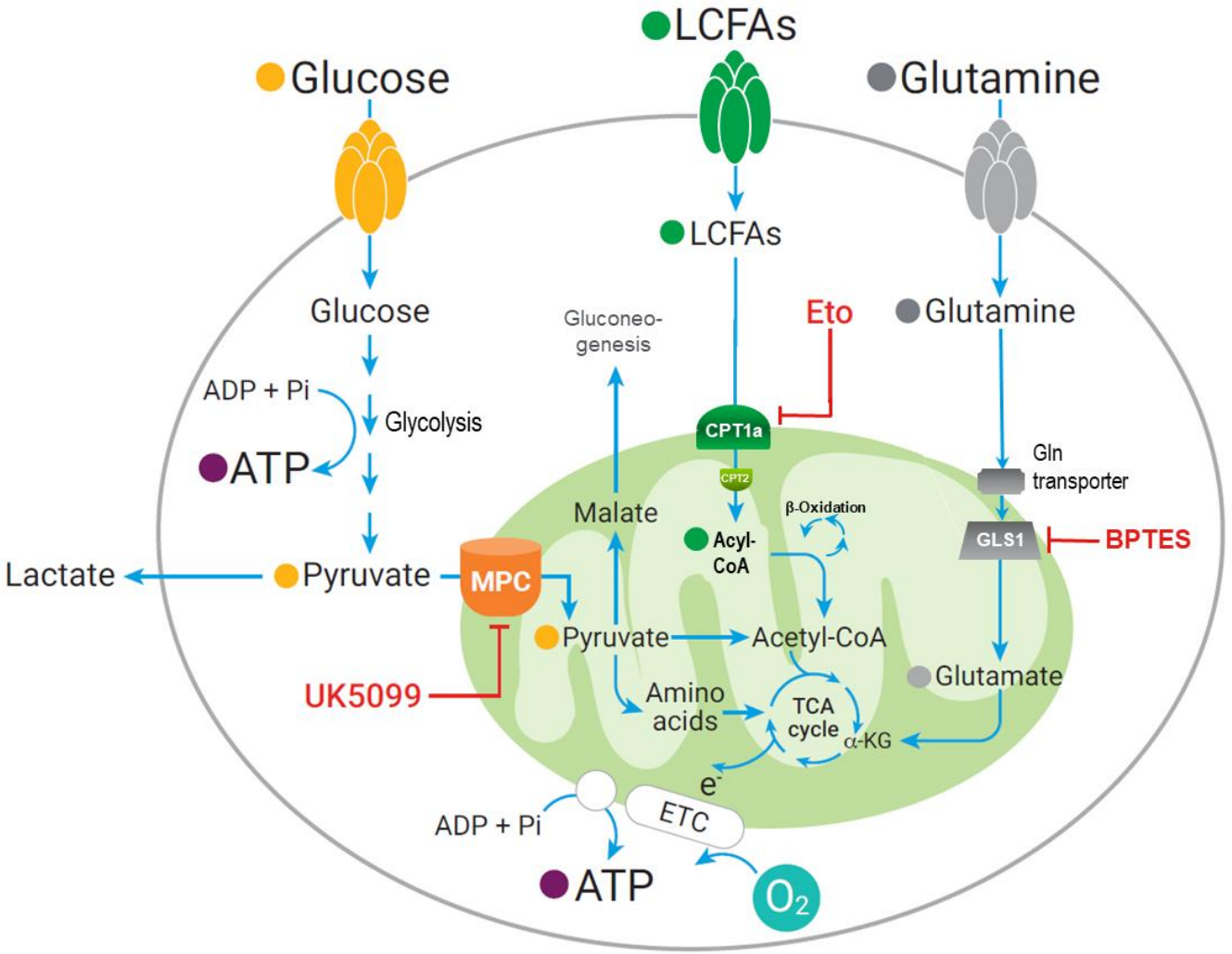


關鍵參數

- ❑ 基礎OCR
- ❑ 急性反應
- ❑ *最大OCR*

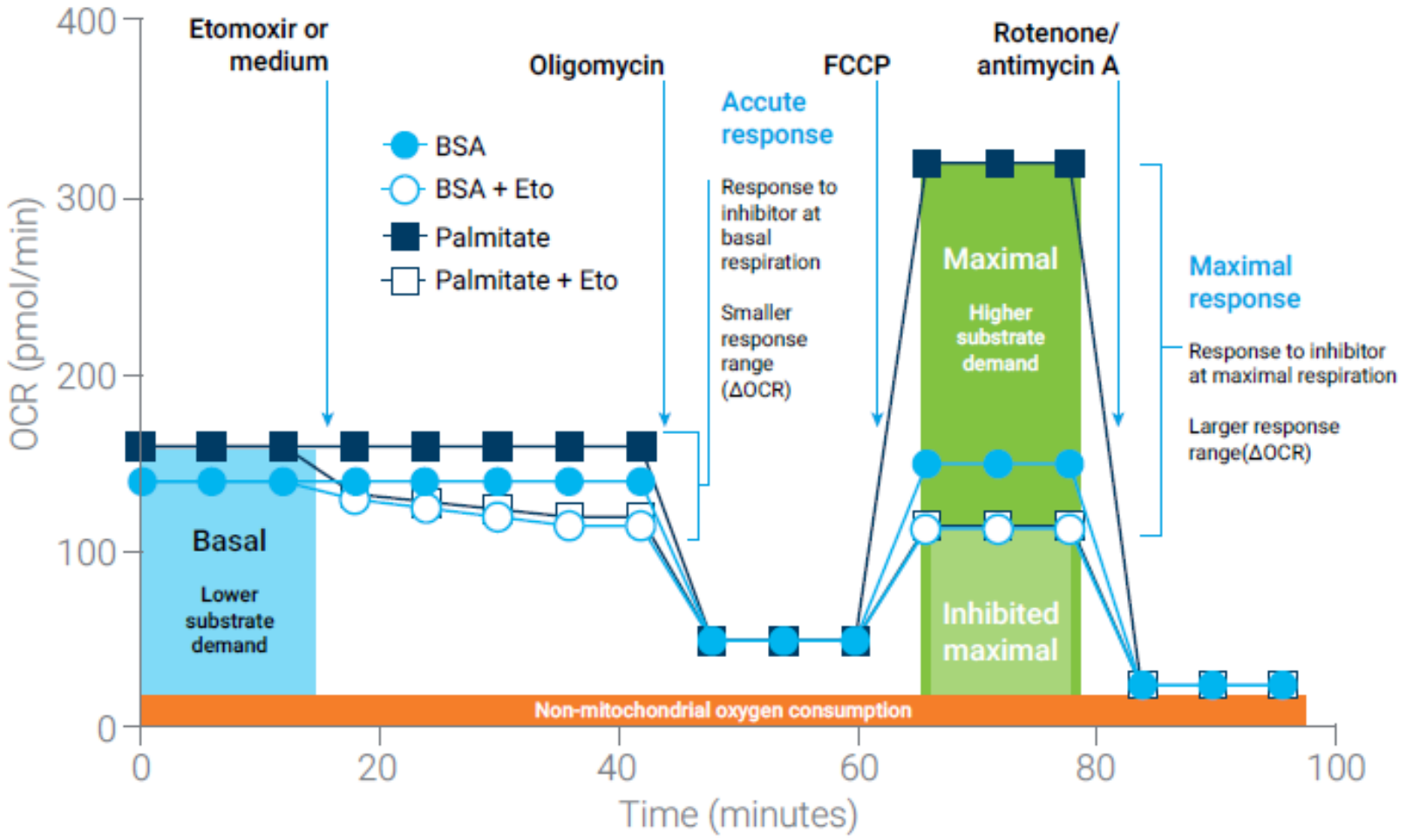
粒線體受質氧化壓力實驗原理

使用受質特異性的抑制劑，評估受質氧化壓力



粒線體棕梠酸氧化壓力實驗

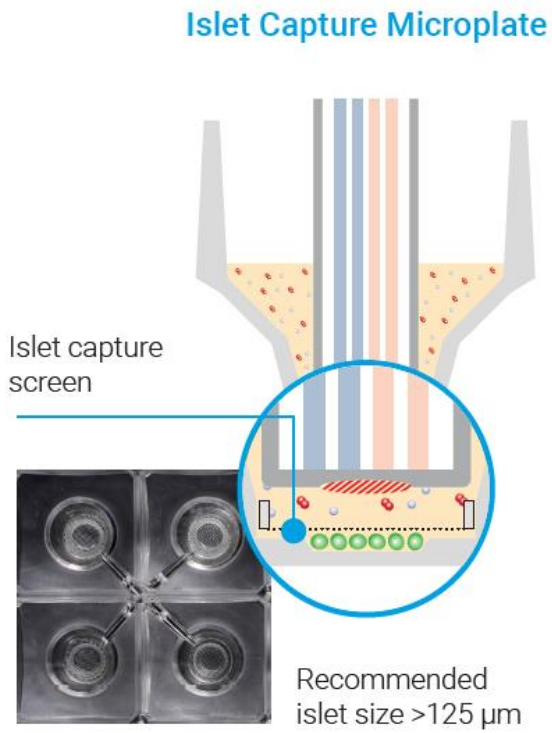
評估外源性脂肪酸依賴性



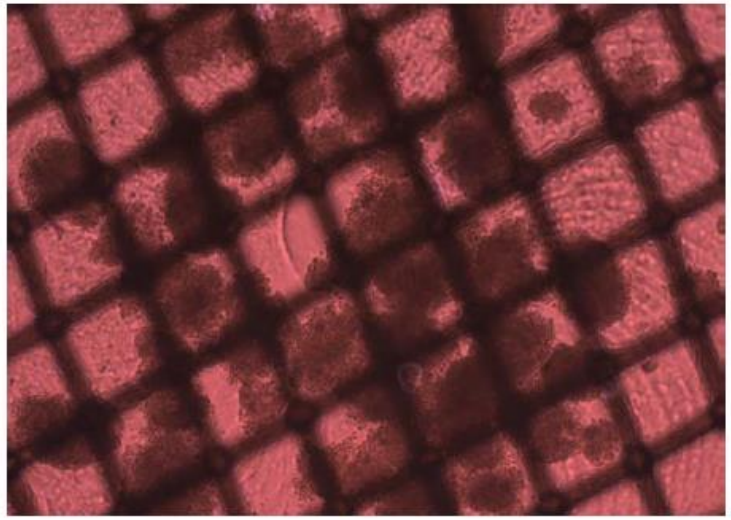
關鍵參數

- ❑ 基礎OCR
- ❑ 急性反應
- ❑ *最大OCR*

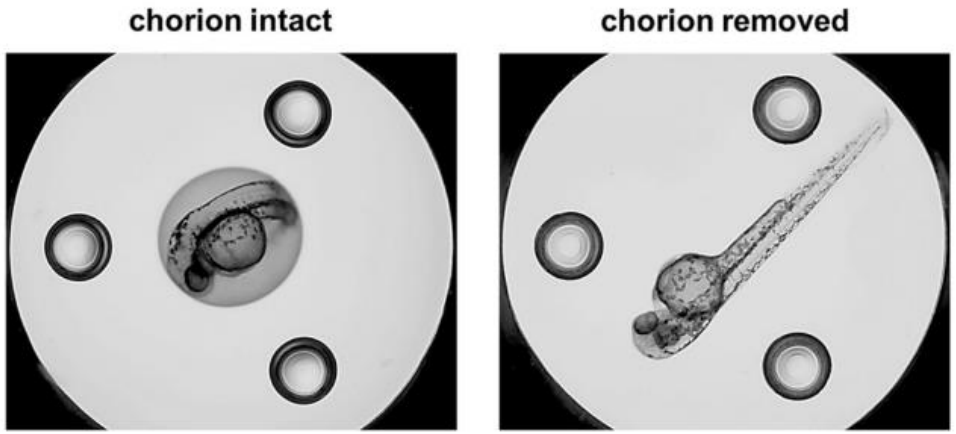
Agilent Seahorse XF24 Islet Capture Microplate

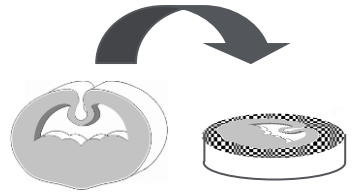


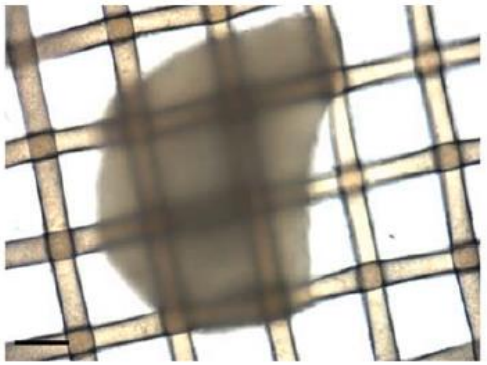
https://www.agilent.com/en/products/cell-analysis/seahorse-xf-consumables/fluxpaks-microplates/seahorse-xf24-islet-capture-microplates



Islets under screen



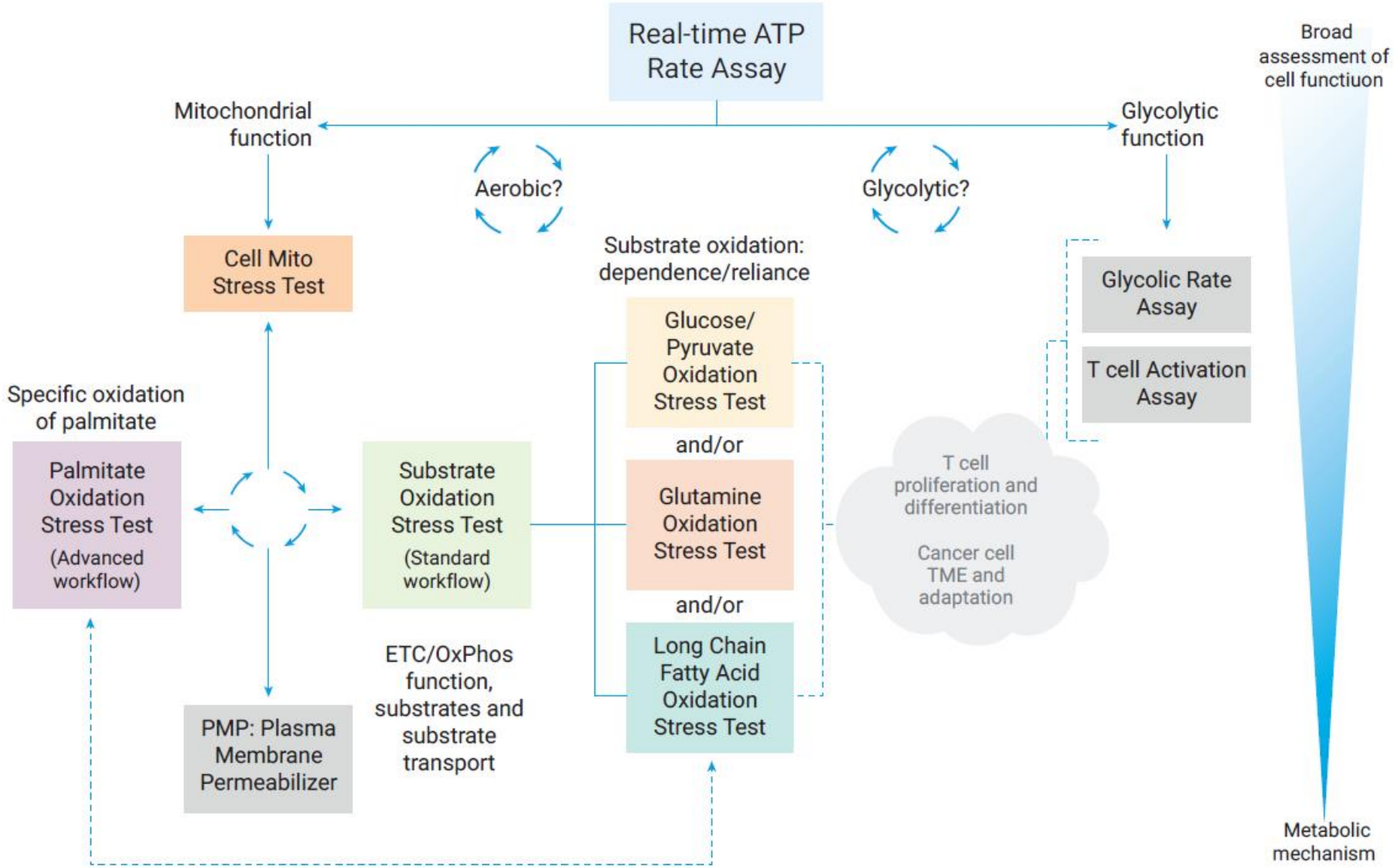




Hippocampus 和 Cortex

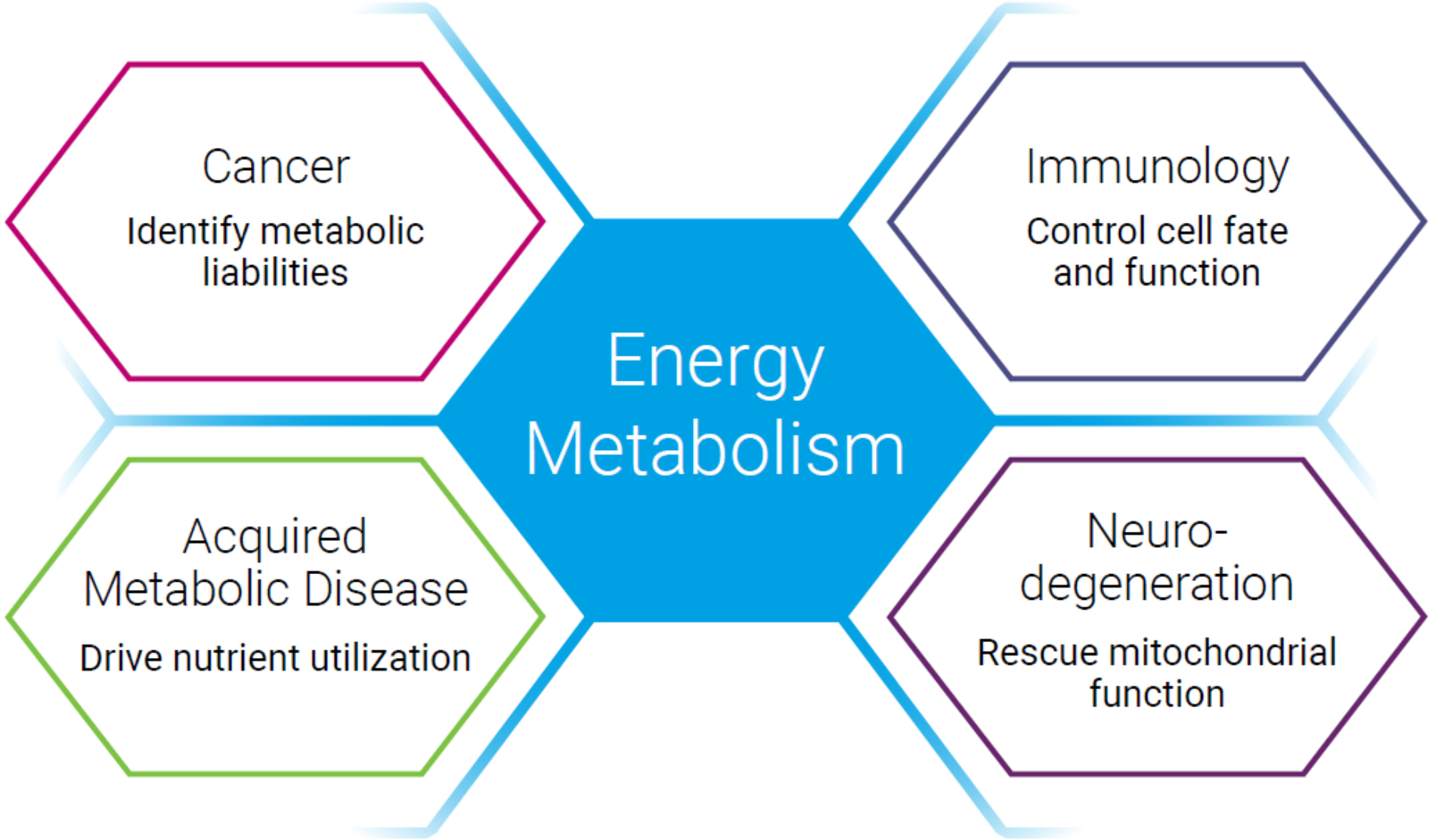
doi: 10.3389/fphys.2021.746367

Seahorse豐富的試劑套組，為您的實驗量身訂作



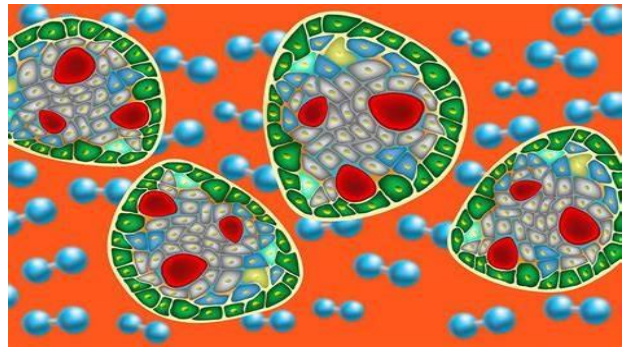
Agilent Seahorse XF 各領域的應用分享

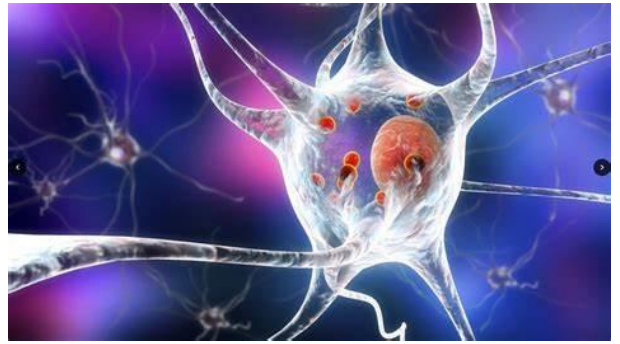
生物能量驅動生理功能

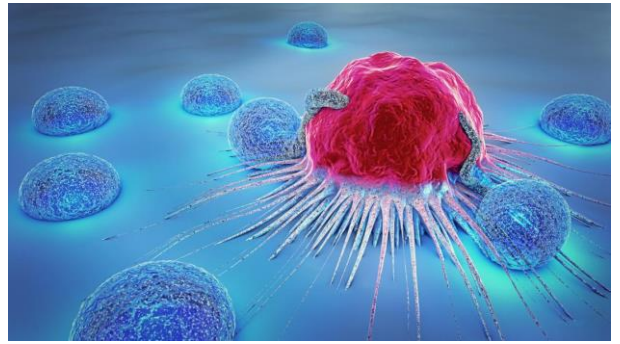

Cancer
Identify metabolic liabilities
Immunology
Control cell fate and function
Energy Metabolism
Acquired Metabolic Disease
Drive nutrient utilization
Neuro-degeneration
Rescue mitochondrial function

應用方向

- 腫瘤研究
- 免疫學
- 幹細胞
- 代謝性疾病
- 心血管疾病
- 神經性疾病
- 粒線體疾病
- 藥物篩選
- 衰老
- 毒理學
- 模式生物

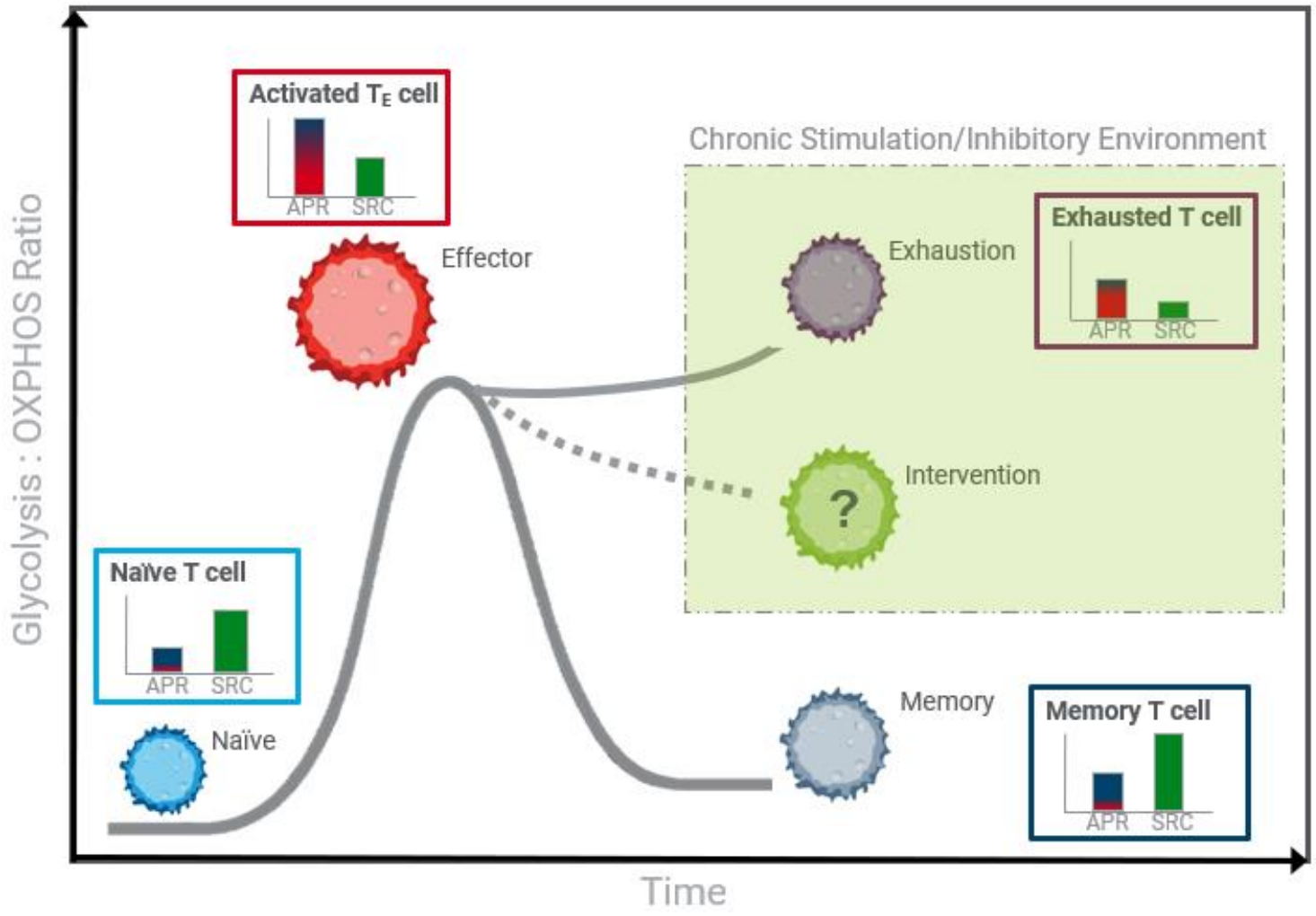






免疫能量代謝研究

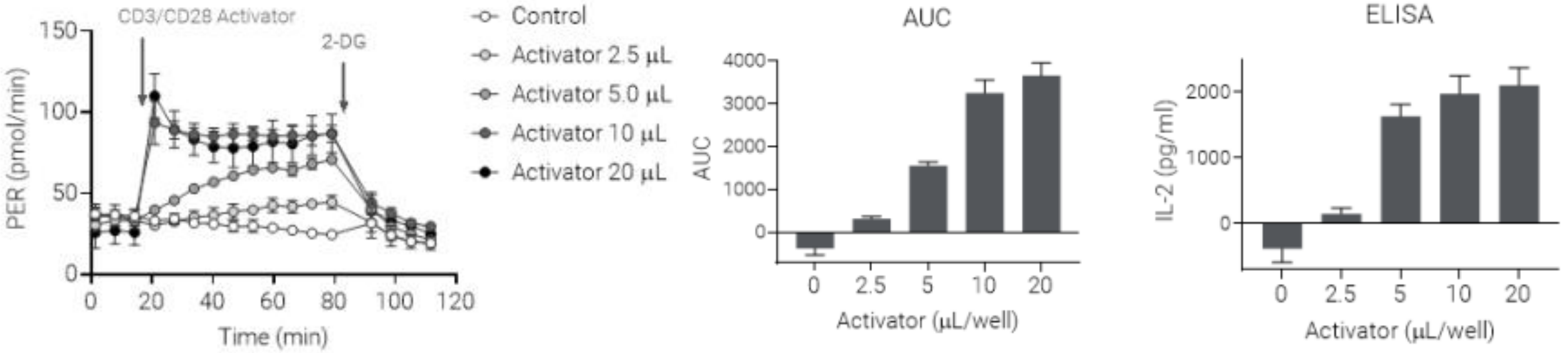
免疫細胞的功能和能量的關聯



糖解作用監測T細胞的刺激

Glucose metabolism as a driver for T cell fate & function

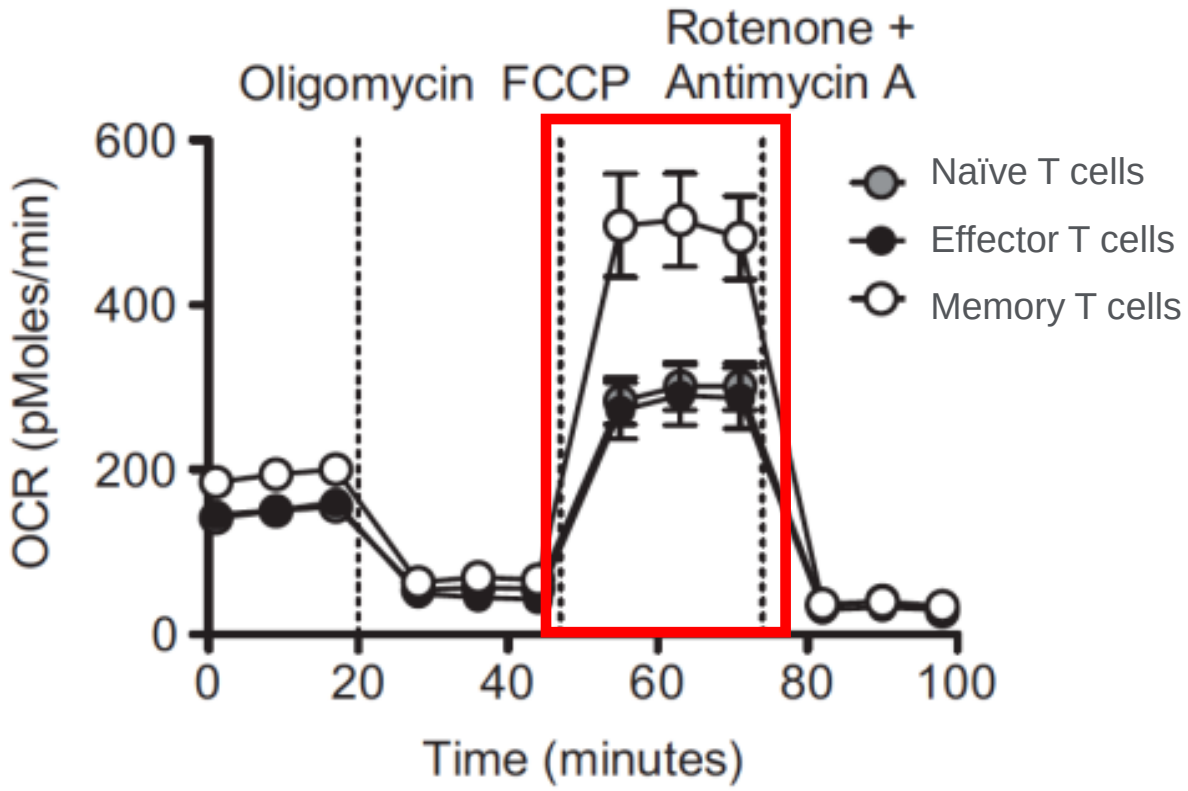
- Naïve T細胞被抗原刺激後，經由代謝重編程，增加糖解作用以滿足 ATP產能需求，幫助T細胞增殖、分化、產生Cytokine等功能。
- 可瞭解不同藥物對T細胞啟動的影響。



Determining the Metabolic Consequences of Pharmacological Modulation of T Cell Activation
Yoonseok Kam, Lisa Winer, George Rogers, James Hynes Cell Analysis Division, Agilent Technologies, MA., USA

記憶型T細胞具備高呼吸儲備值

Cell SciVerse Top 25 Hottest Articles



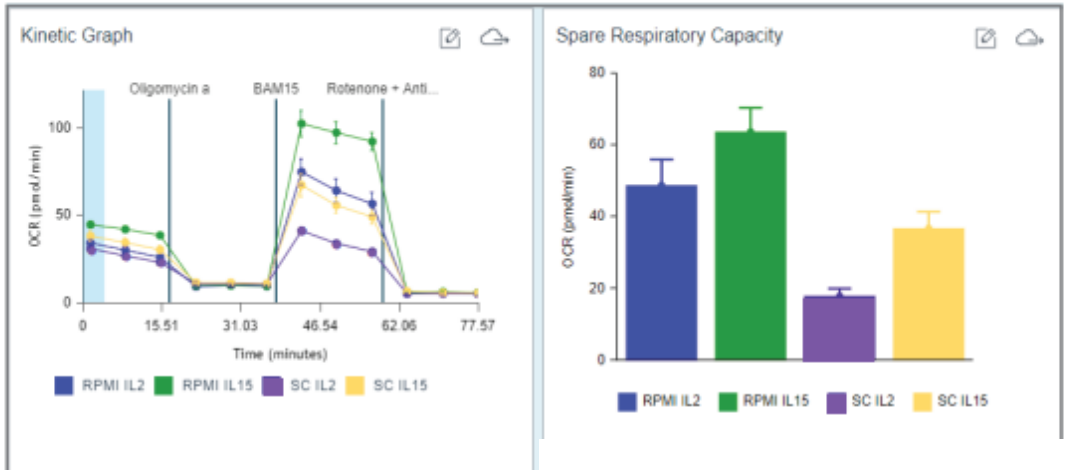
- 記憶型T細胞的呼吸儲備值最高，解釋了記憶型T細胞能於體內存活最久的原因。
- 高呼吸儲備值可幫助記憶型T細胞在面對二次抗原暴露時，快速產生ATP。

Mitochondrial respiratory capacity is a critical regulator of CD8+ T cell memory development
van der Windt, JW, … and Pearce, EL, Washington School of Medicine. *Immunity* 2012 Jan 27

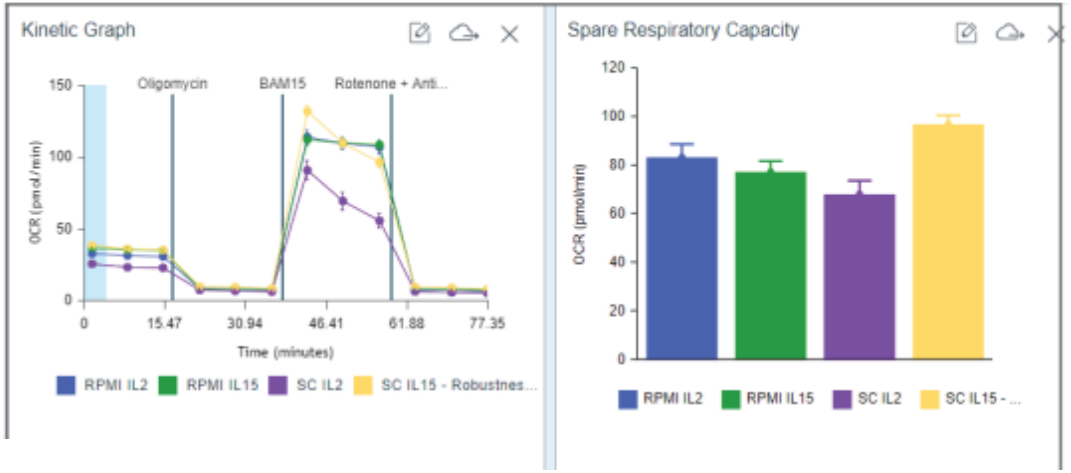
細胞治療產品的持久性

呼吸儲備值高，存活時間越長，抗腫瘤能力越強。

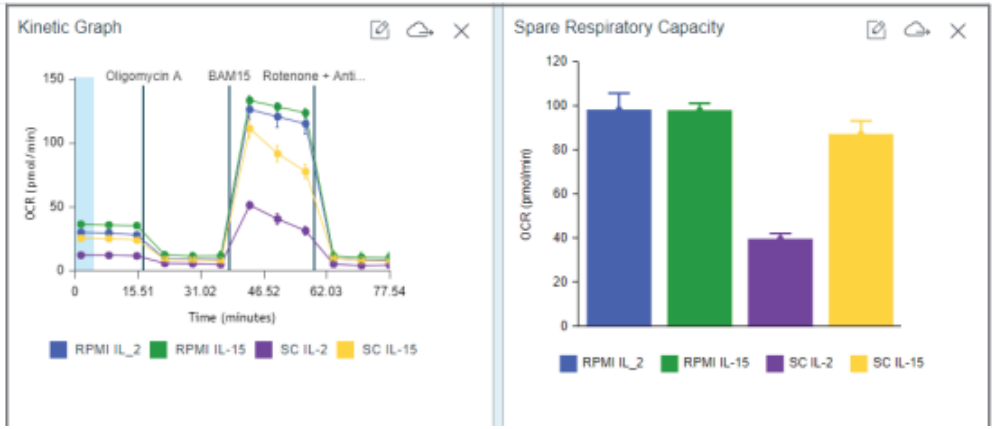
A Day 7



B Day 14



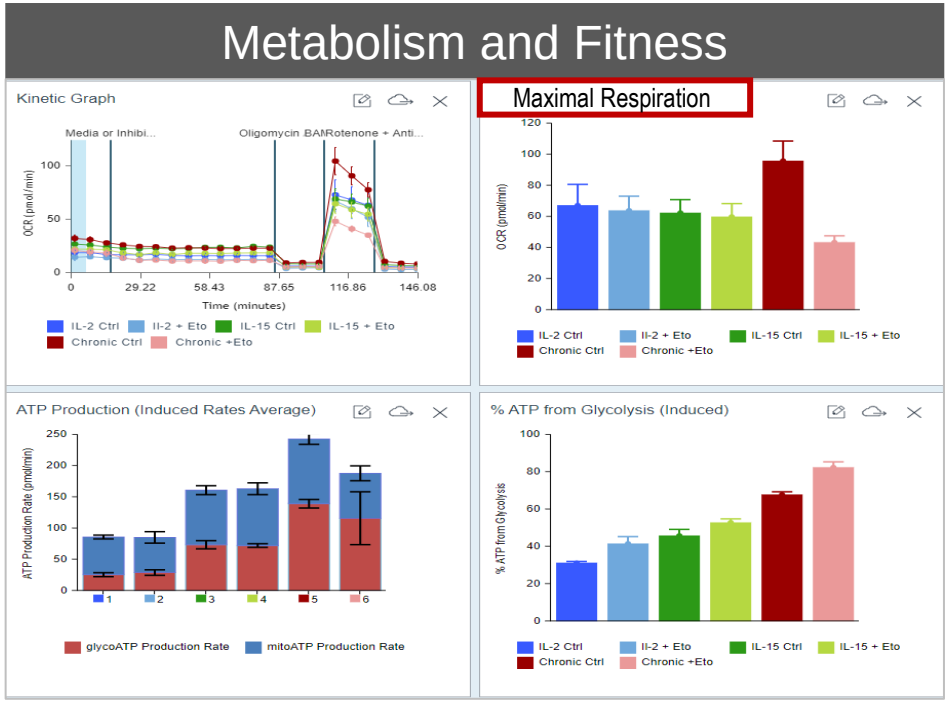
C Day 22

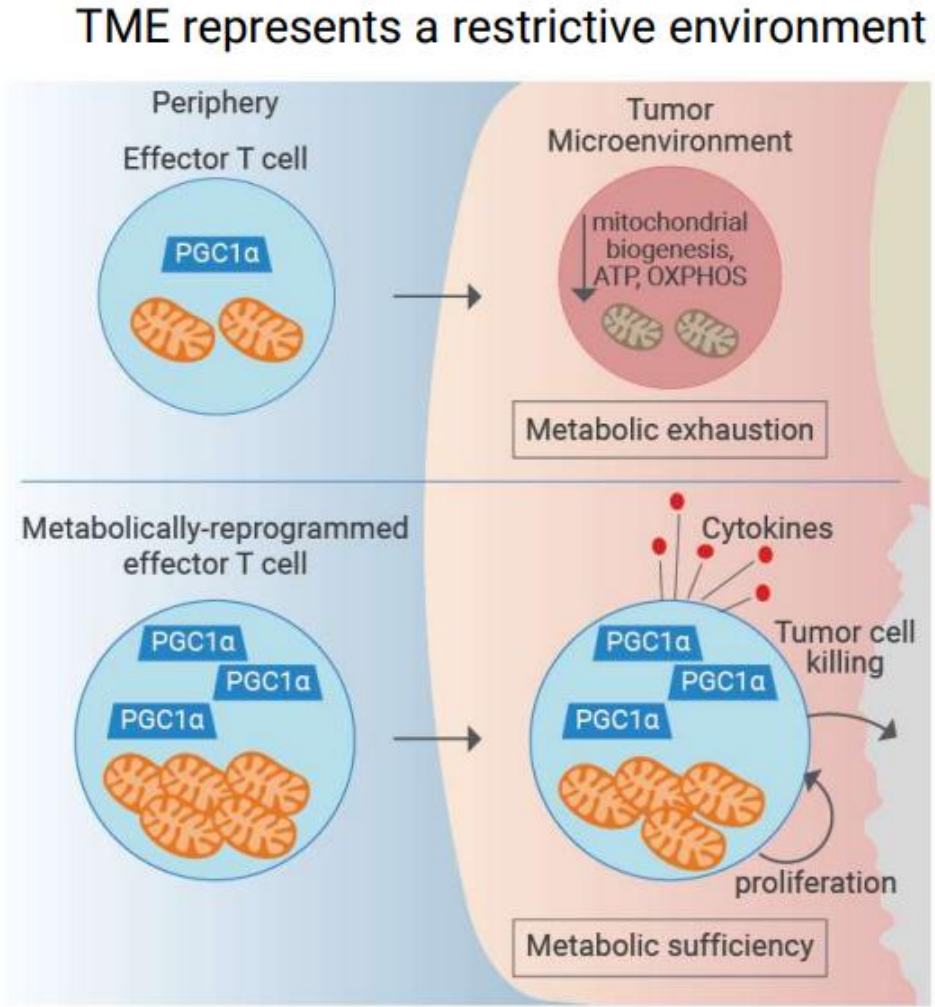


Agilent Application note: Assessing T Cell Bioenergetic Poise and Spare Respiratory Capacity Using Extracellular Flux Analysis

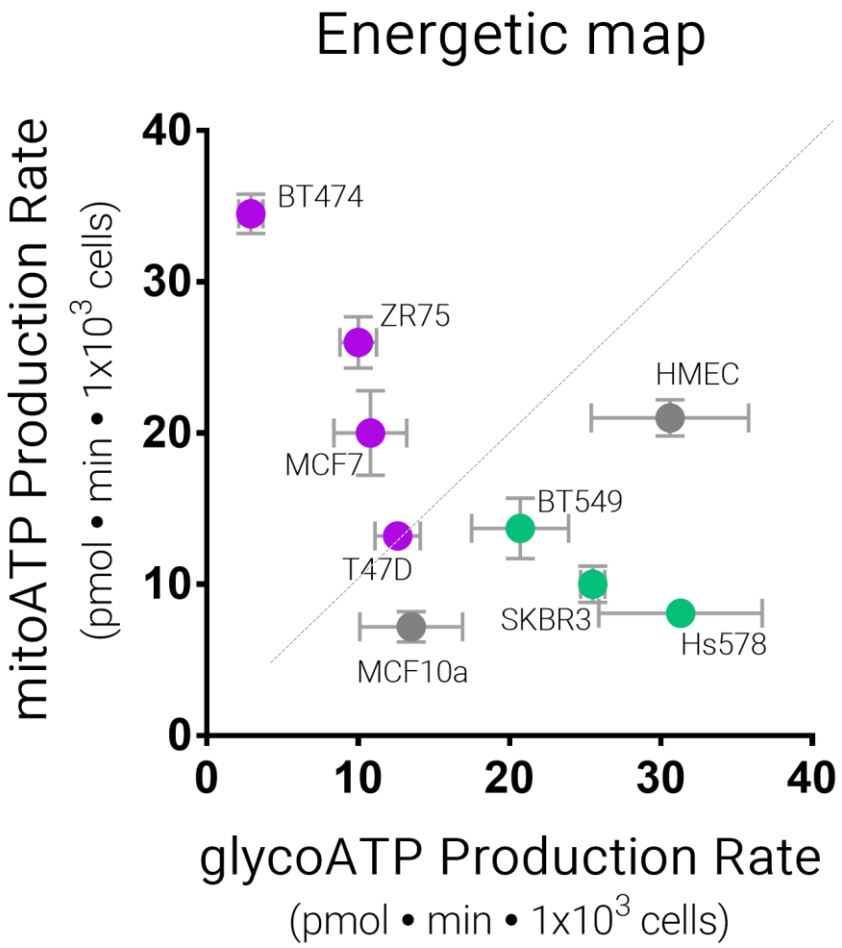
細胞治療產品在腫瘤微環境的適應性

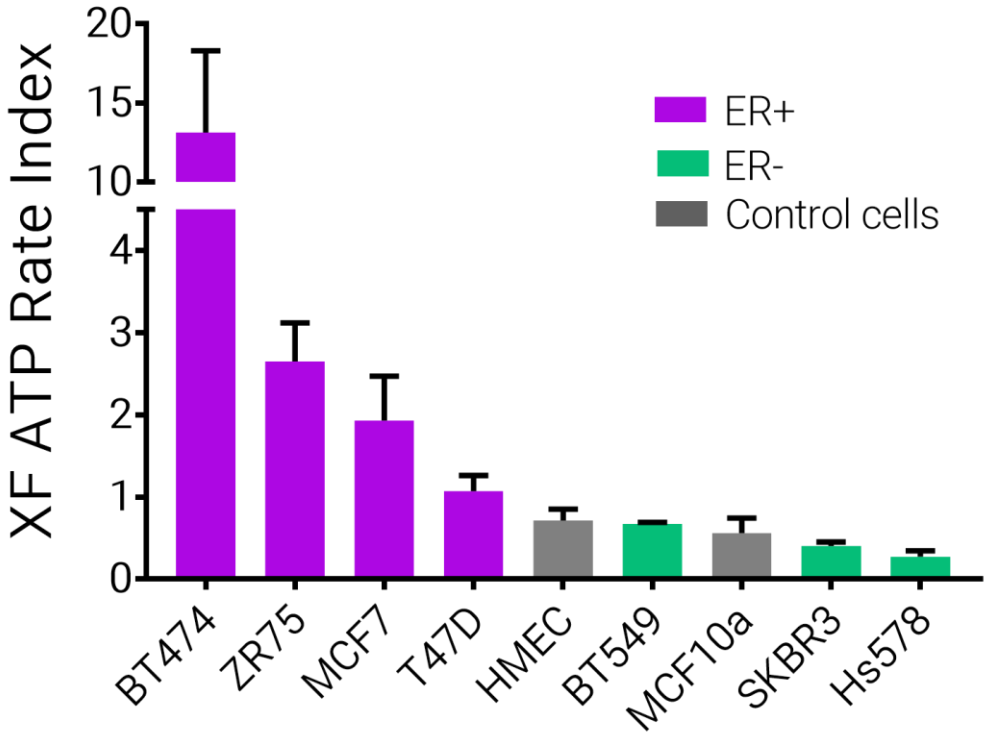
處於營養物質匱乏或腫瘤微環境中，呼吸儲備能力值愈高，維持抗腫瘤的能力越好





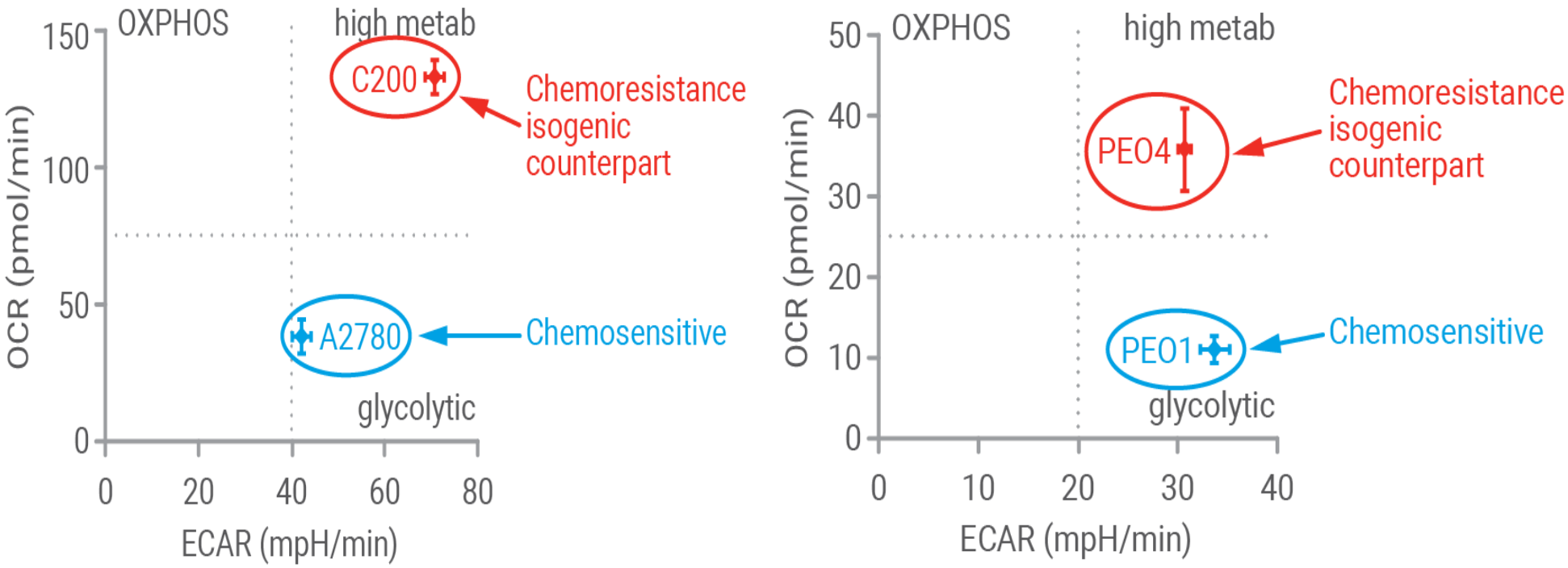
乳癌細胞的能量代謝途徑





Estrogen Receptor + Breast Cancer Cell Lines are More Oxidative than ER- or Control Cell Lines

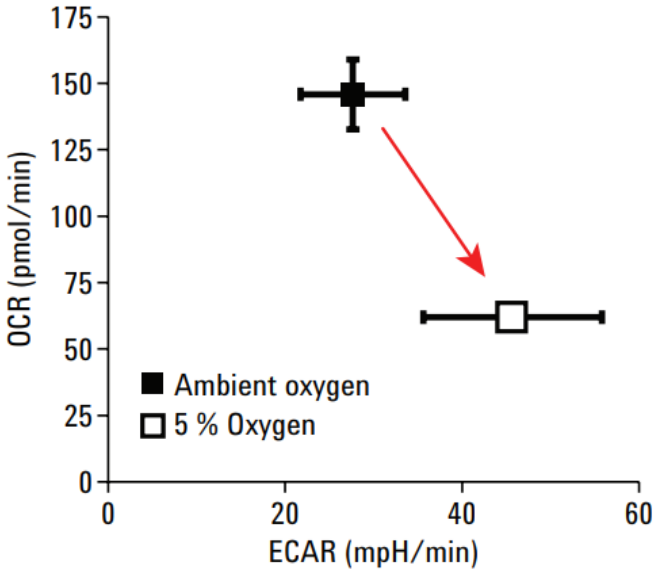
化學抗性腫瘤細胞具代謝靈活性

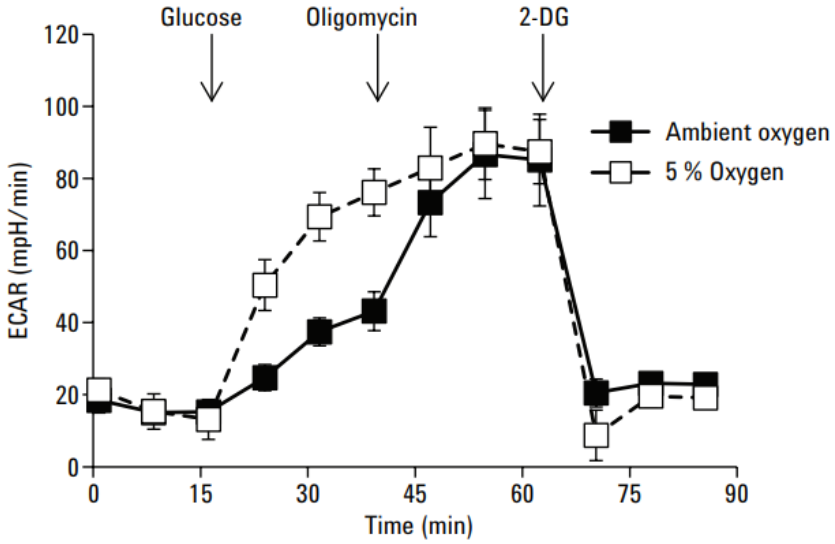


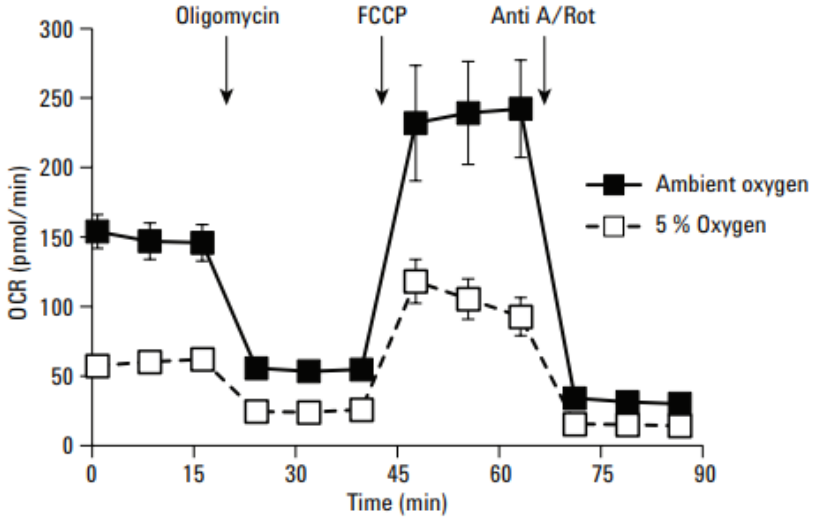
- 具化學抗性的卵巢癌腫瘤細胞C200和PEO4，可改成通過粒線體氧化磷酸化的方式，產生ATP。且在葡萄糖缺乏的情形下，能存活並具適應性。

Dar, S., et al. Bioenergetic Adaptations in Chemoresistant Ovarian Cancer Cells. Sci Rep. 2017. 7 (1): 8760.

低氧狀態改變癌細胞的能量代謝表現型



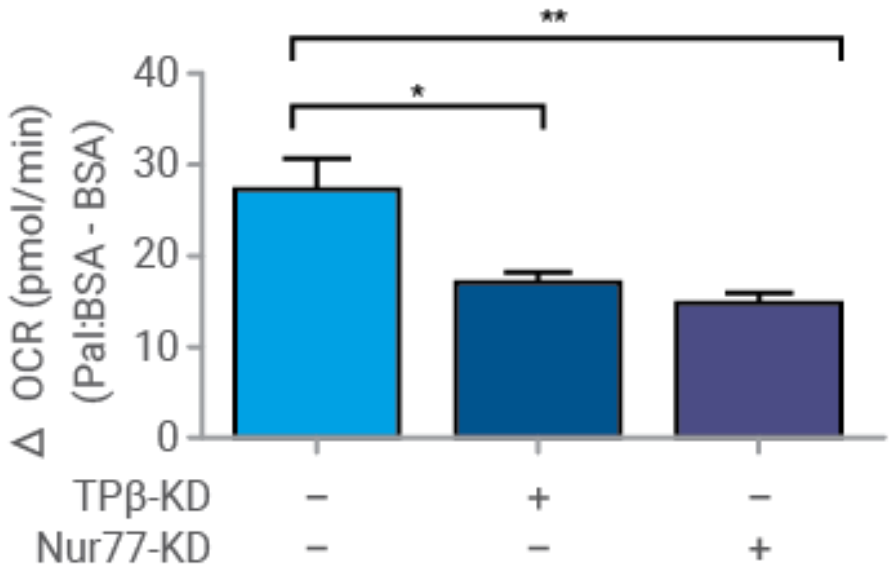




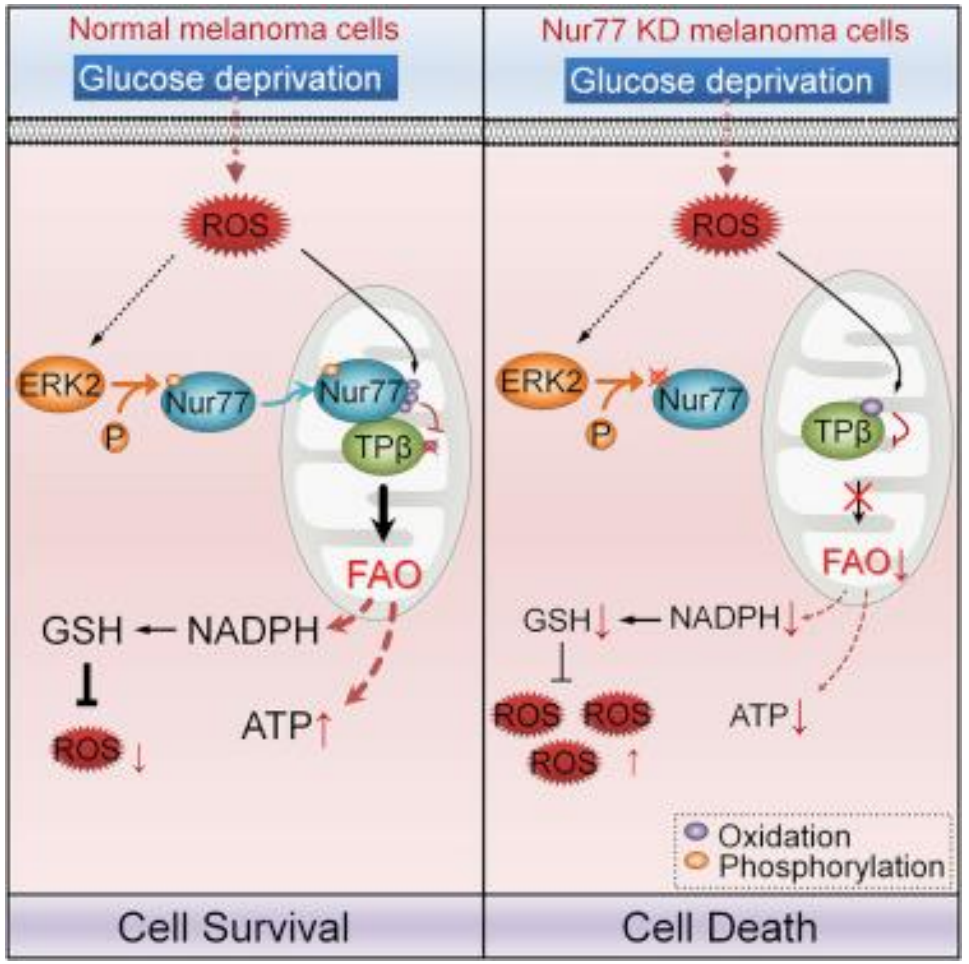
MCF-7 細胞在低氧條件(5% O2)，偏向使用糖解作用生成ATP，氧化磷酸化降低。

Agilent Application note: Identifying Metabolic Phenotype Switches in Cancer Cells Using the Agilent Seahorse XF Analyzer in an Hypoxic Environment

以能量代謝作為靶點的抗腫瘤藥物

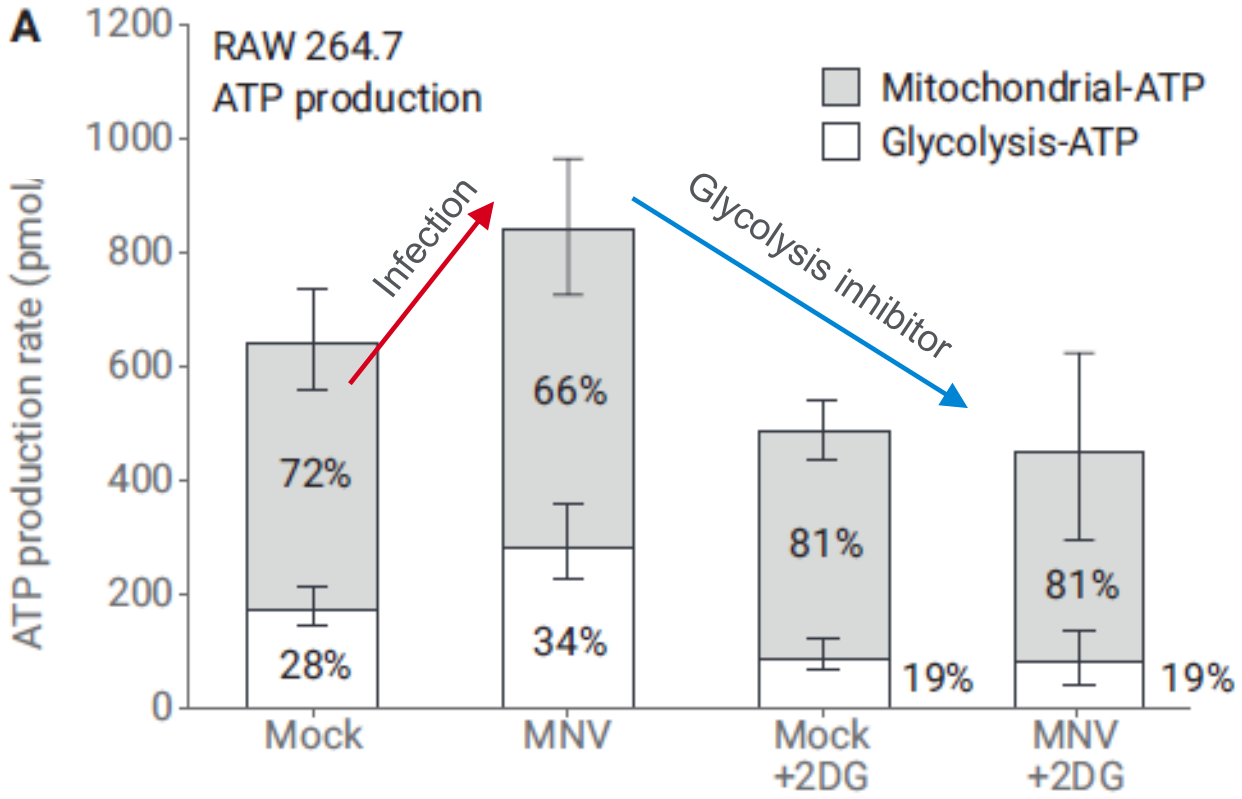


- Nur77 和 TPb，在缺乏葡萄糖的情形下，可幫助細胞改使用脂肪酸進行氧化磷酸化，產生ATP。
- 將Nur77和 TPb基因剃除，使OCR下降。
- Nur77 和 TPb可做為治療黑色素瘤有效的靶點。



Li, X., et al. Nuclear Receptor Nur77 Facilitates Melanoma Cell Survival under Metabolic Stress by Protecting Fatty Acid Oxidation. Mol Cell. 2018. 69 (3):480-492 e7.

諾羅病毒影響宿主能量代謝表徵



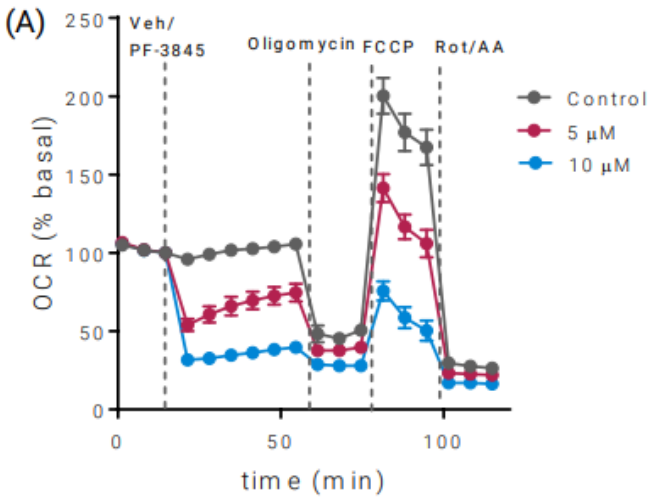
XF real time ATP assay

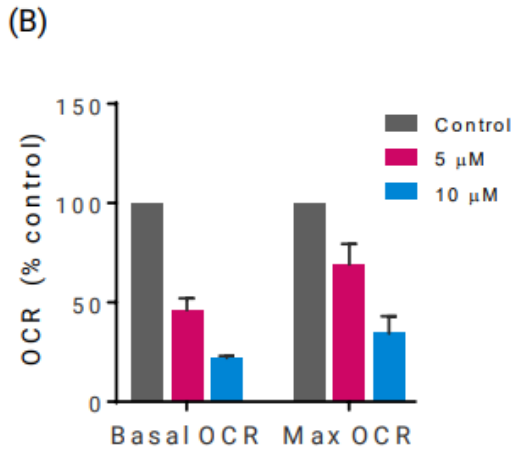
- 病毒依賴宿主進行複製和傳播，會增加宿主的合成代謝能力與ATP產能。
- 感染後，宿主細胞傾向使用糖解作用。
- 加入2-DG，抑制糖解作用，有效使病毒顆粒蛋白減少。

Passalacqua, K. D. *et al.* Glycolysis Is an Intrinsic Factor for Optimal Replication of a Norovirus. mBio., **2019**, *10(2)*.

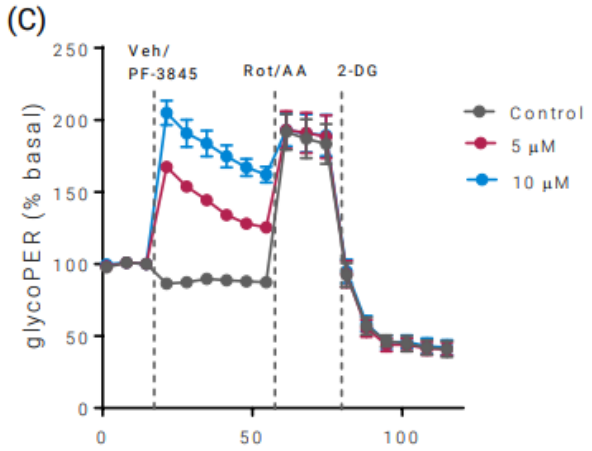
評估藥物對氧化磷酸化與糖解作用的影響

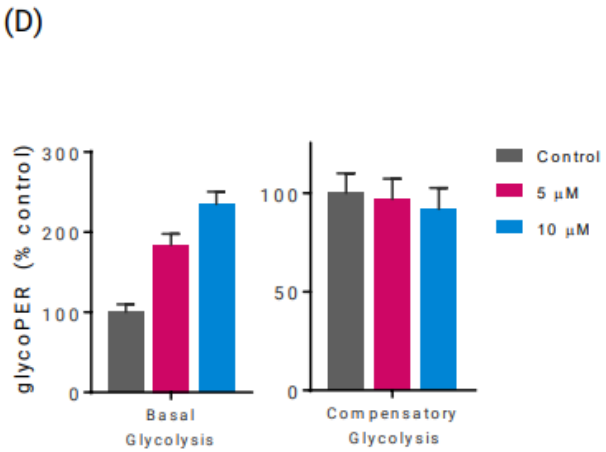
XF Cell Mito Stress Test





XF Glycolytic Rate Assay

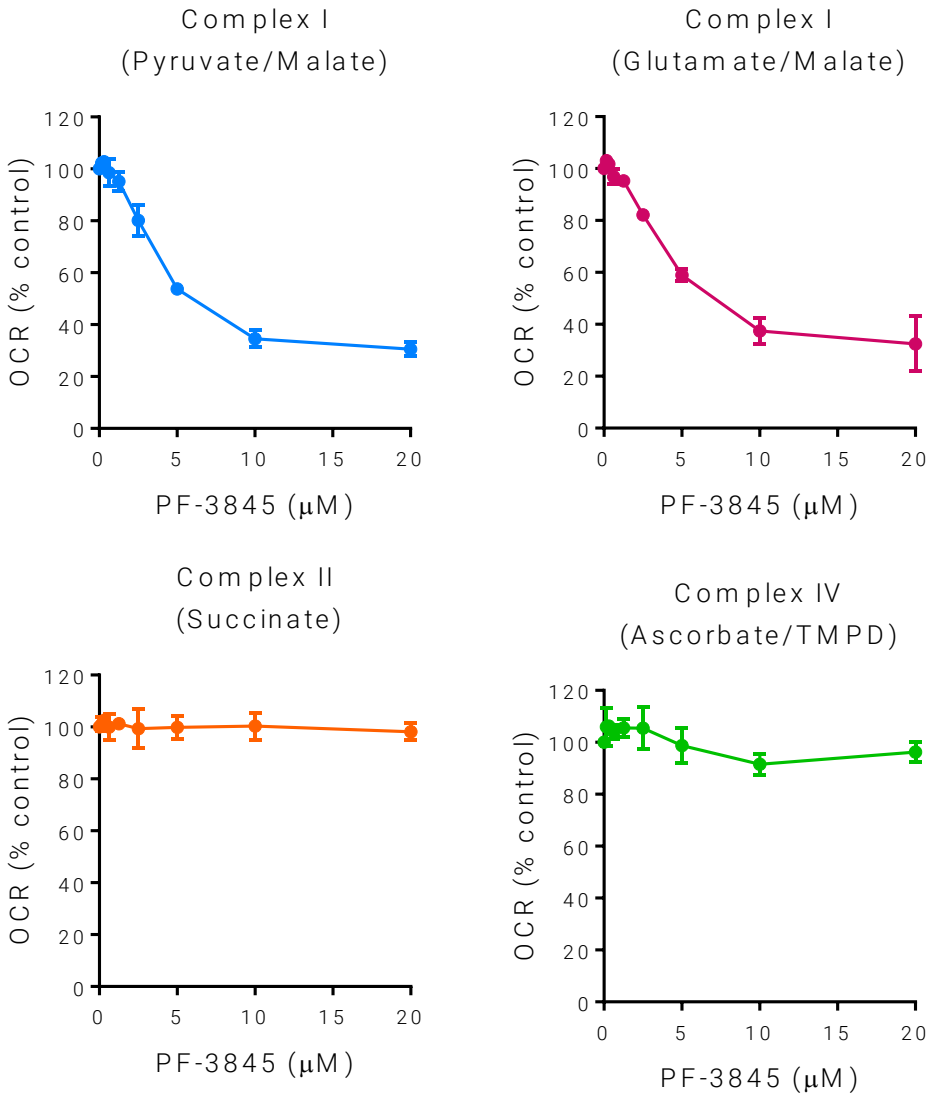




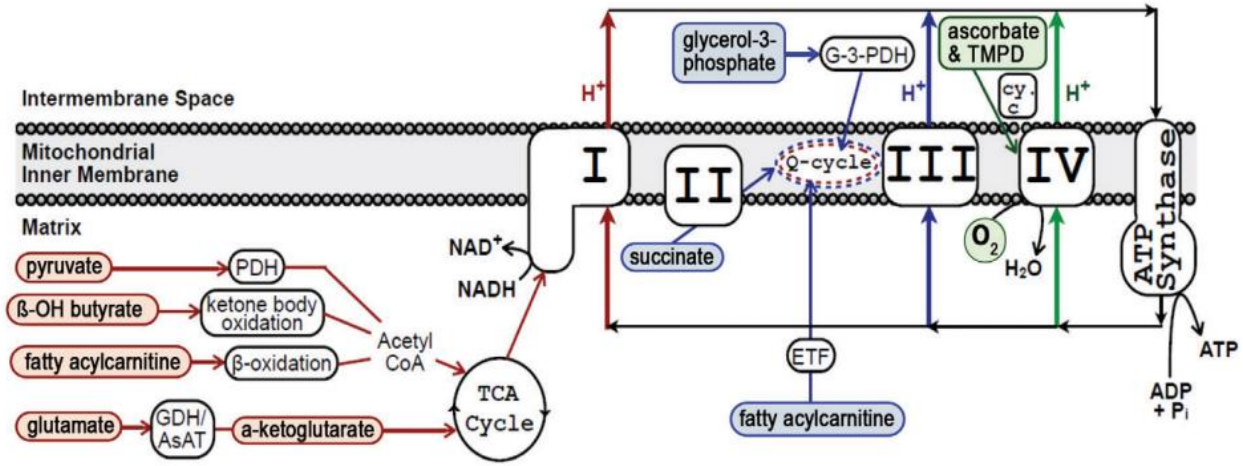
- FFAH inhibitor PF-3845 注入HepG2細胞後，基礎呼吸值與最大呼吸能力值皆下降，且有隨著藥物劑量增加有逐漸下降的趨勢。
- 基礎糖解作用有升高的情形，但代償性糖解能力並無顯著影響。

Determining Mechanisms of Mitochondrial Toxicity using Agilent Seahorse XF Technology
Natalia Romero, Pamela Swain, George W. Rogers and Brian P. Dranka Cell Analysis Division, Agilent Technologies, Lexington, MA – USA

利用細胞膜穿孔劑，了解粒線體毒性作用的機制



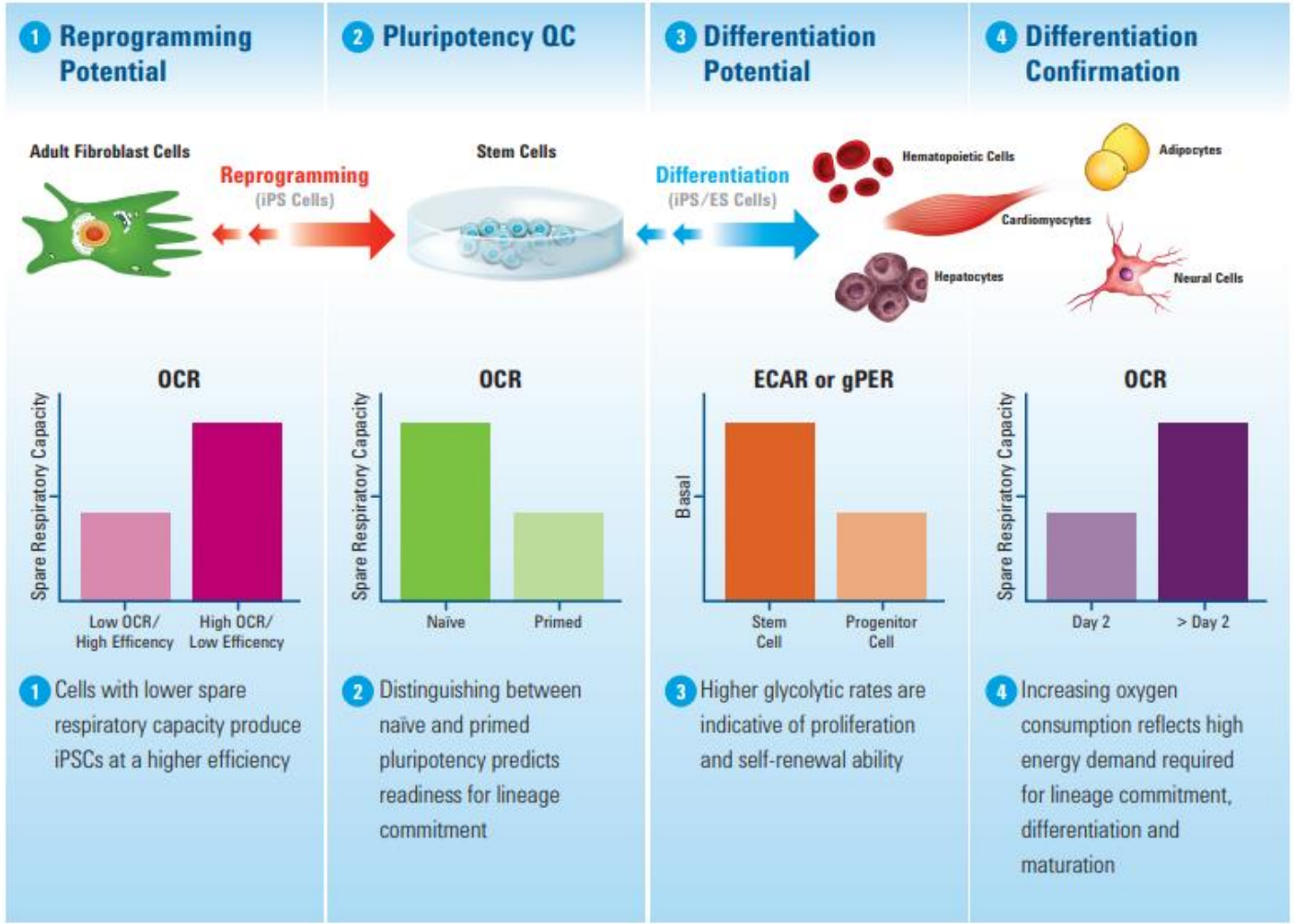
- PF-3845 抑制粒線體 Complex I 的活性，與Substrate無關。
- PF-3845對 Complex II 和 Complex IV 沒有影響。



Determining Mechanisms of Mitochondrial Toxicity using Agilent Seahorse XF Technology

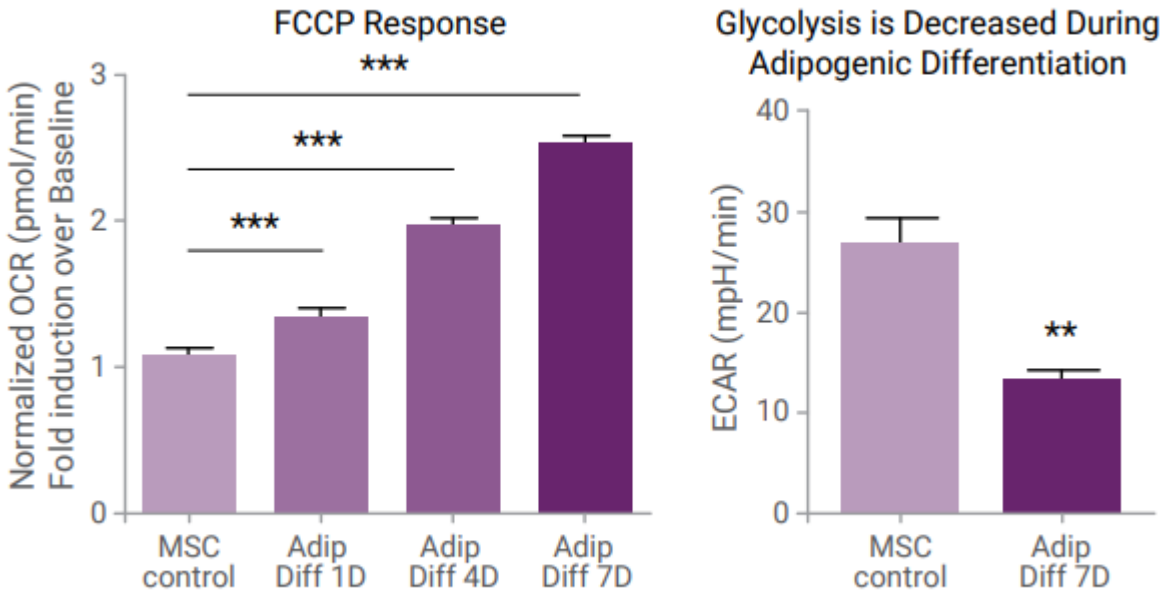
Natalia Romero, Pamela Swain, George W. Rogers and Brian P. Dranka Cell Analysis Division, Agilent Technologies, Lexington, MA – USA

Seahorse XF技術應用於幹細胞研究



- 改善幹細胞的分化和設計
- 鑑定幹細胞多能性和分化轉換
- 預測重編程的效率
- 確定幹細胞分化潛能
- 監測代謝轉換事件
- 測量功能特徵和疾病模型相關性

監測幹細胞分化過程中的代謝轉換事件



– 呼吸儲備值決定細胞分化傾向

– 檢測糖解作用，了解增殖與自我新生的能力

– 通過代謝轉換事件判斷幹細胞的分化傾向與發展

Seahorse 實驗流程介紹

STEP 1：收集實驗材料

Before XF Assay | *Day of* XF Assay | *After* XF Assay

Gather Assay Materials → *Prepare for XF Assay* → *Set Up XF Assay* → *Run XF Assay* → *Analyze XF Assay Results*

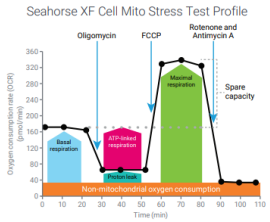
Fluxpak

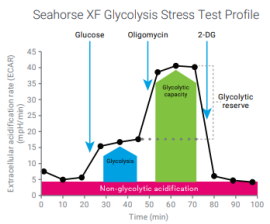

=

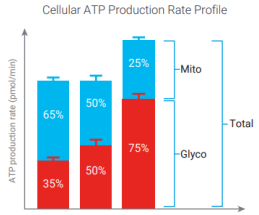
+

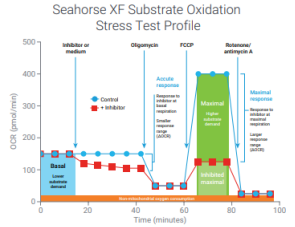
+

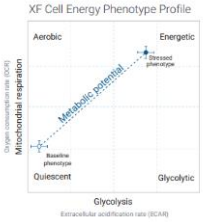

Assay Kits











Assay Medium

Complete XF media typically includes:

Seahorse XF DMEM, pH 7.4

Seahorse XF RPMI, pH 7.4

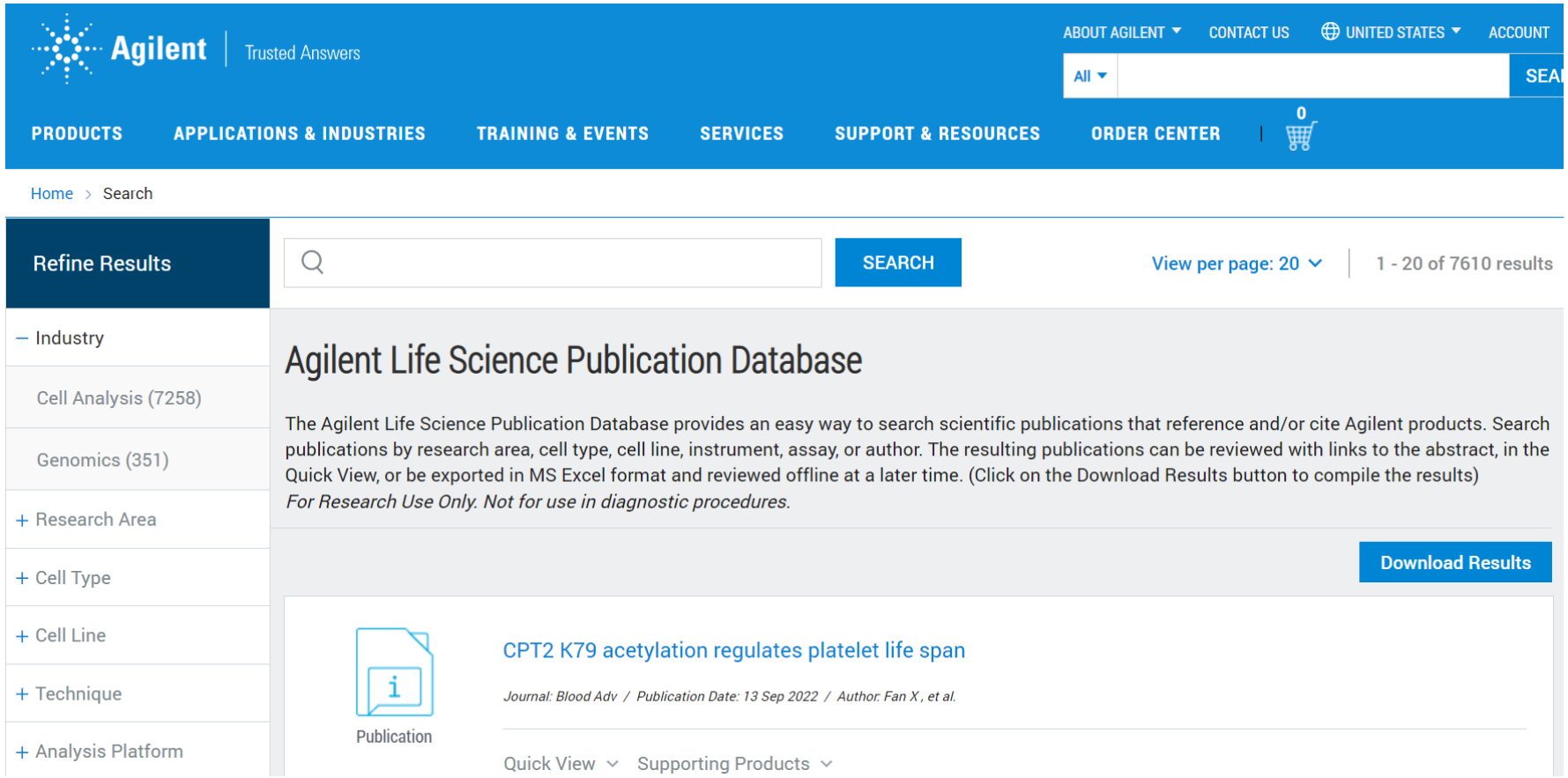
+

- **Seahorse XF Glucose**
- **Seahorse XF Pyruvate**
- **Seahorse XF Glutamine**

STEP 2：瀏覽線上文獻資料庫

Before XF Assay | *Day of* XF Assay | *After* XF Assay

Gather Assay Materials → *Prepare for XF Assay* → *Set Up XF Assay* → *Run XF Assay* → *Analyze XF Assay Results*



https://www.agilent.com/search/?N=4294836537

STEP 2：線上學習中心

How to run an assay

1. Gather materials
2. Prepare for assay
3. Set up assay
4. Run assay
5. Analyze results
6. Beyond the basics

Seahorse XF Assay Learning Center

Select your XF Instrument Type

XFe24

Procedures, techniques & resources for a successful Assay

This learning center is designed to introduce you to the Seahorse XF assay workflow, with a focus on procedures and techniques to ensure optimal XF assay performance and results. As you read through each section, the procedures refer to using the Agilent Seahorse XF Real Time ATP Rate Assay to perform initial cell characterization. The techniques described apply to all Seahorse XF Assays, such as seeding adherent cells, loading injection ports, etc. Only the required consumables will vary according to your XF Analyzer model and XF Assay Kit. Select your XF Analyzer using the drop-down menu, then click a section below to display the relevant content for that step of the XF assay workflow.

https://www.agilent.com/en/product/cell-analysis/how-to-run-an-assay

STEP 3：水化探針與接種貼附型細胞

Before XF Assay | *Day of* XF Assay | *After* XF Assay

Gather Assay Materials → ***Prepare for XF Assay*** → *Set Up XF Assay* → *Run XF Assay* → *Analyze XF Assay Results*

Prepare cells in XF plate

Seed cells and incubate overnight in growth medium

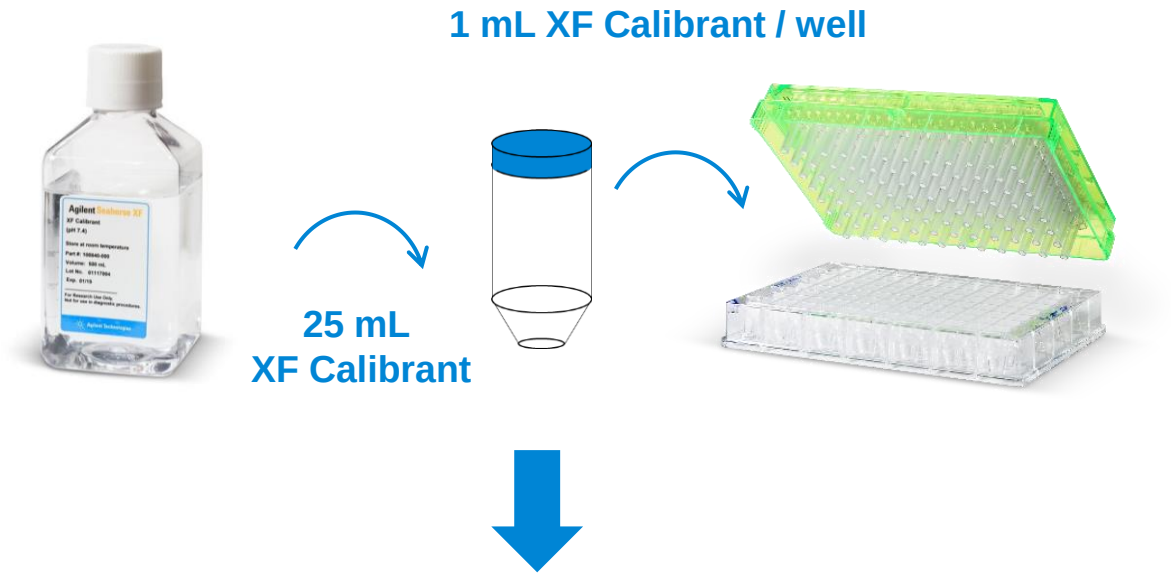
Change medium to assay medium

Prepare sensor cartridge

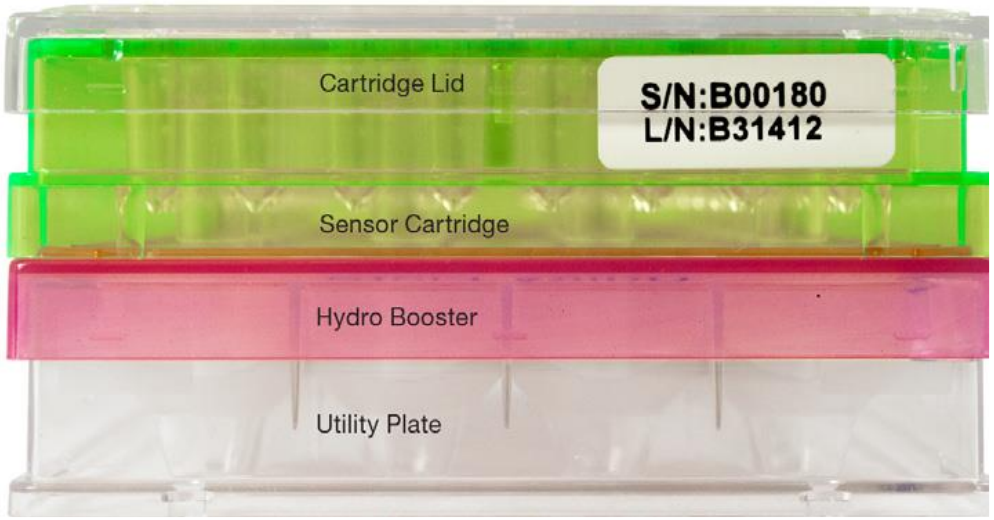
Hydrate sensor cartridge overnight

Add compounds to reagent ports

水化探針



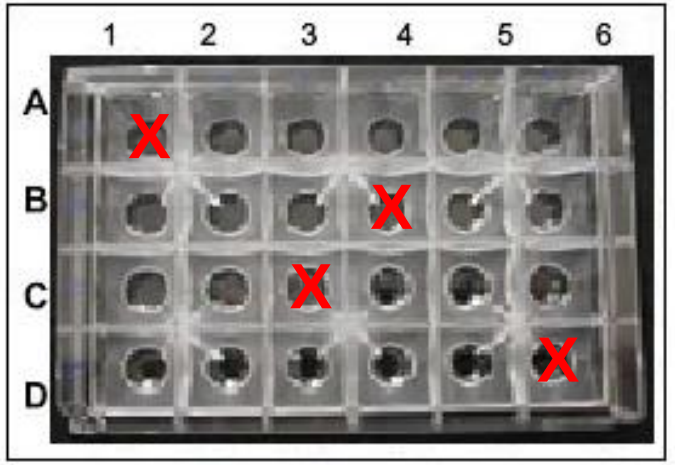
置於37°C，*無* CO_2培養箱
過夜培養XF校準液和XFe24探針盤

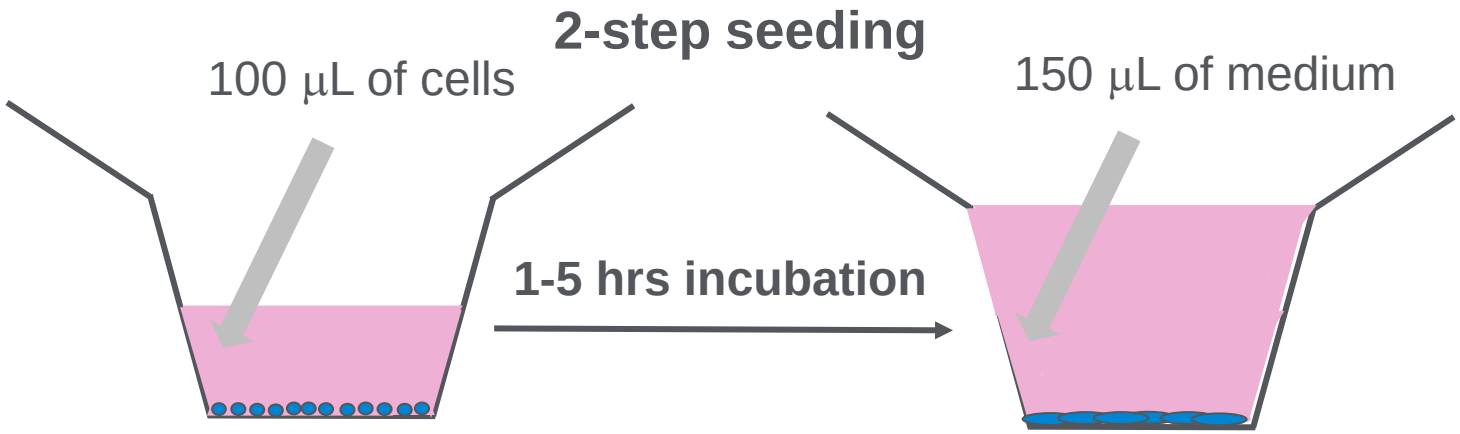


上機前記得把Hydrobooster和蓋子移除

接種貼附型細胞

- 接種 100 µL 細胞懸液
- 室溫靜置一小時
- 放置於培養箱培養1~5小時
- 加入 150 µL 的生長培養基
- 放置於培養箱過夜培養





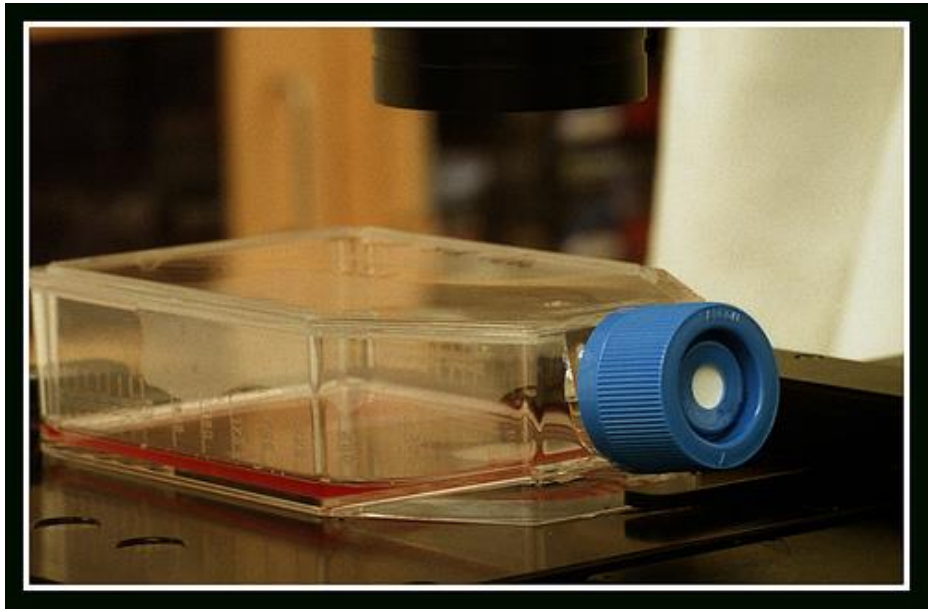
懸浮型細胞略過此步驟

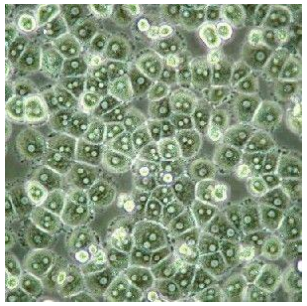
與細胞接種操作相關的影響因素

- 接種密度的一致性
- 細胞狀態與生長過程是否有改變或汙染發生
- 單細胞懸浮液
- 考慮細胞附著程度
- 靜置步驟 - 最小化邊緣效應
- 設置背景孔：加入相同體積的培養基
- 確保細胞生長環境一致：血清批次、試劑的新鮮度與避光等保存條件、培養箱的狀態 (溫度、濕度、CO_2)

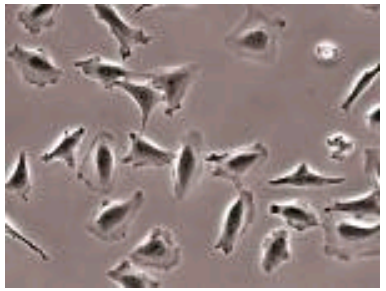
與細胞類型相關的影響因素

- 細胞接種密度：建議10,000-80,000/well
- Confluency：建議50-90% (80-90% 更佳)
- 建議使用年輕的細胞
- 傳代細胞或原代細胞
- 增殖細胞或分化細胞
- 細胞特殊的生理需求（如：原代皮層神經元）

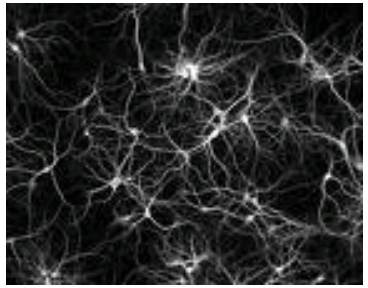




adipocytes



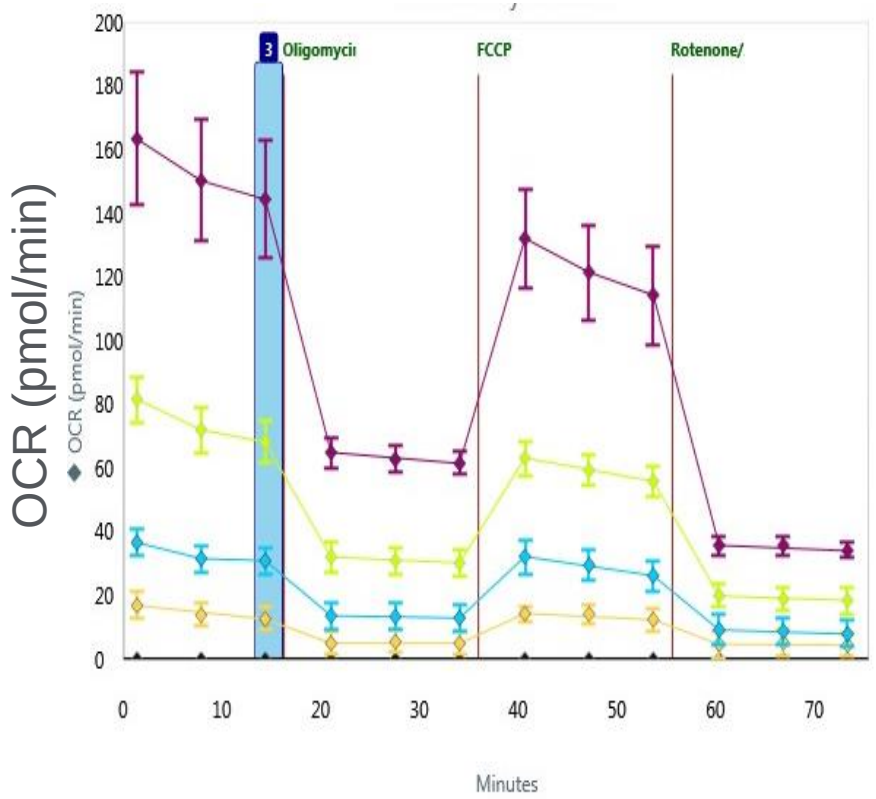
fibroblast



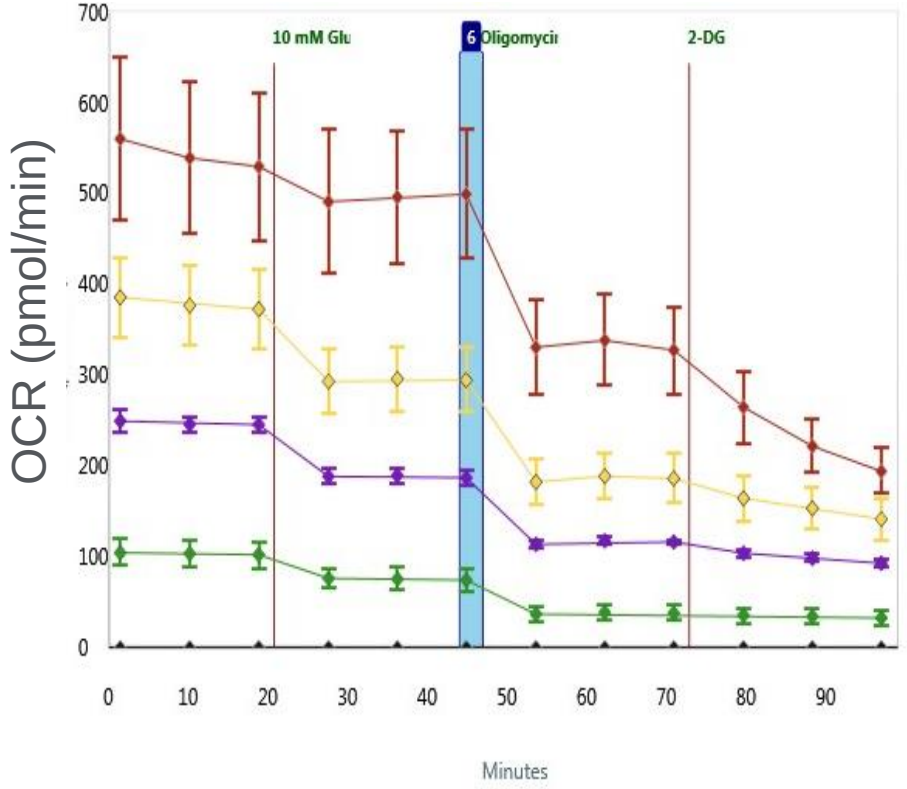
neurons

以基礎OCR值優化細胞接種密度

Cell Mito Stress Test

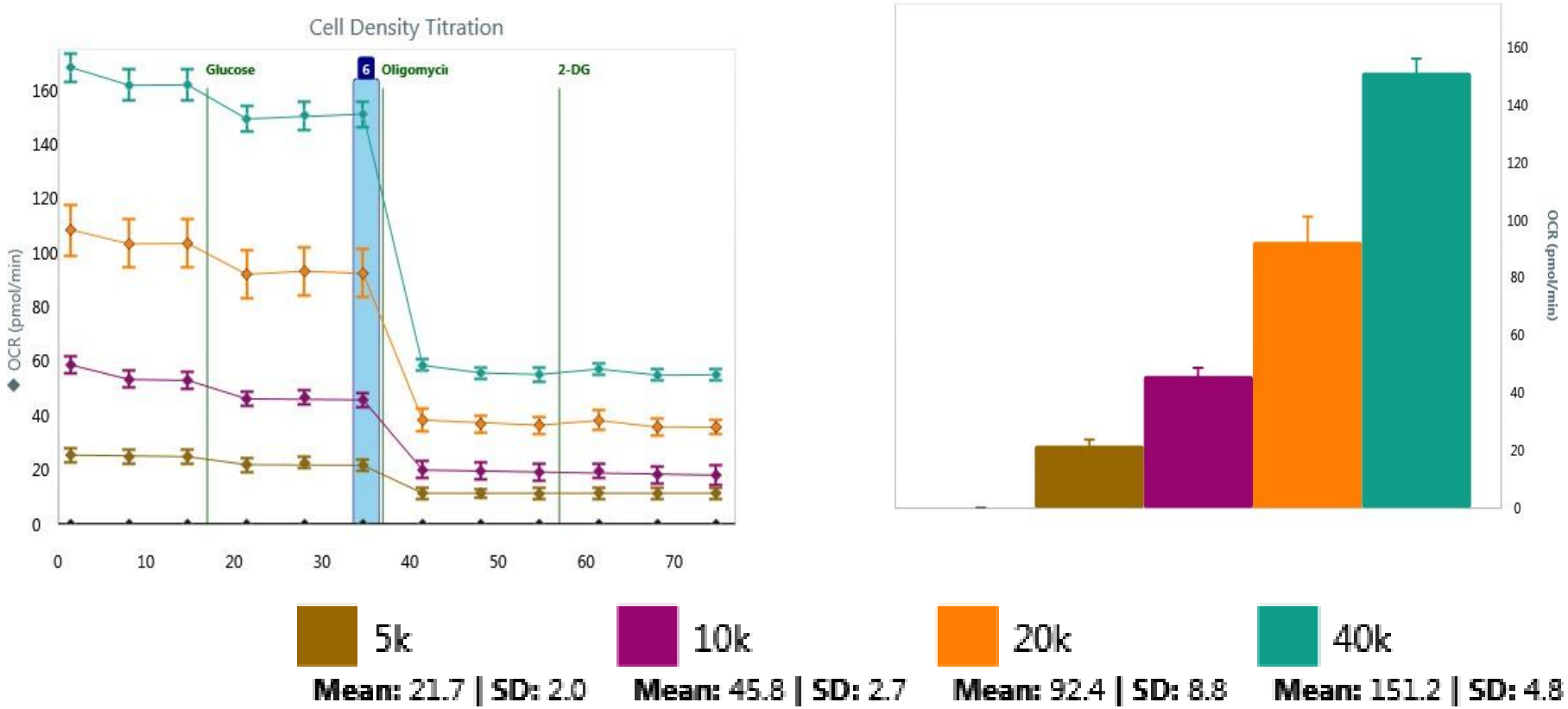


Glycolysis Stress Test



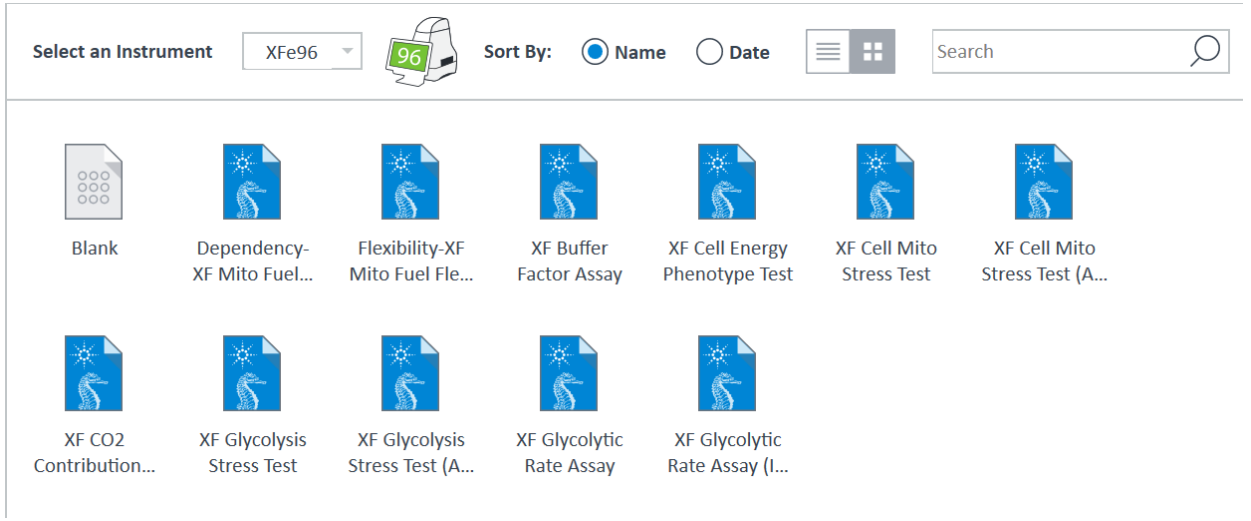
- OCR值訊號建議範圍： 50 – 400 pmol/min

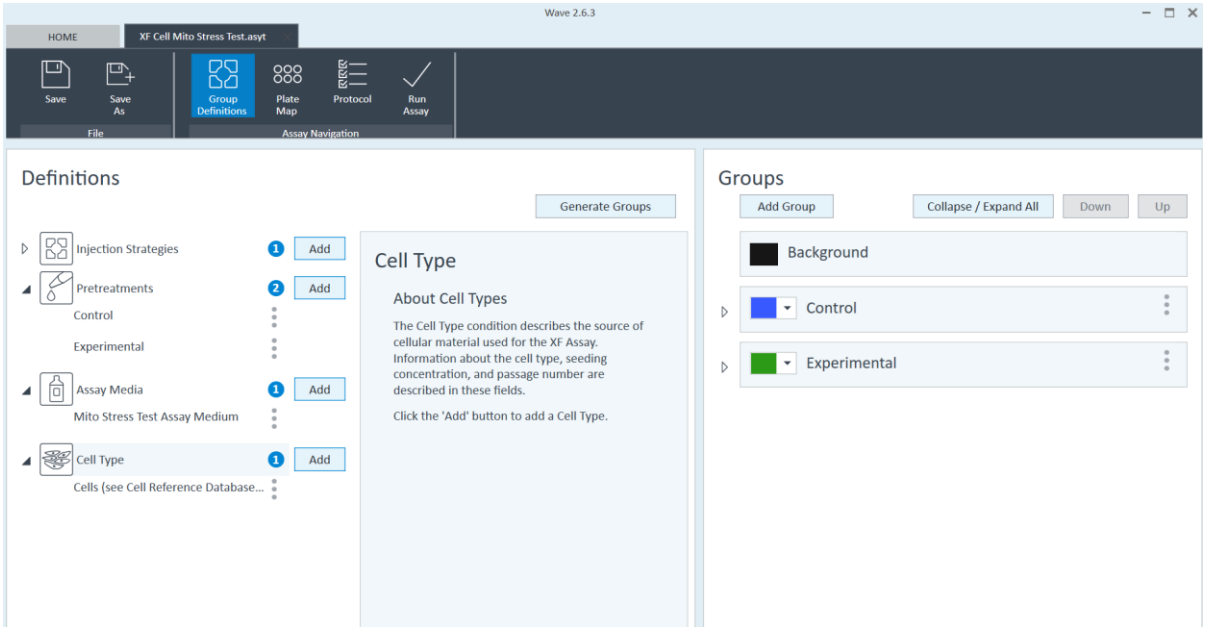
優化細胞接種密度



- OCR值訊號建議範圍： 50 – 400 pmol/min

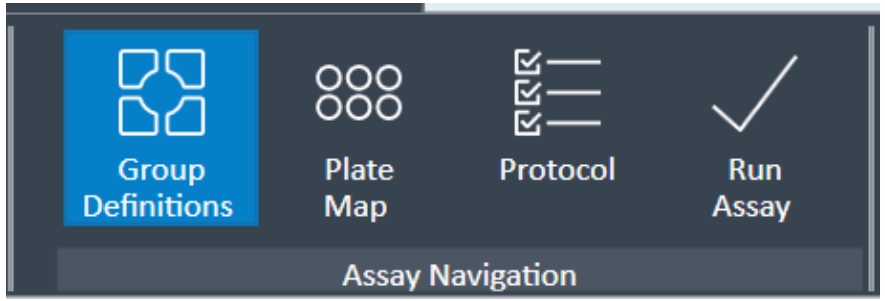
STEP 4：Wave實驗模版設計





STEP 4：Wave實驗模版設計

- Group Definitions 設定組別
  - 注射策略、預處理、培養基、細胞類型
- Plate Map 樣本佈局
- Protocol 實驗模板
- Run Assay 運行實驗



STEP 5: 配置培養基

XF Assay Media

=

XF DMEM, pH 7.4 *or* XF RPMI, pH 7.4

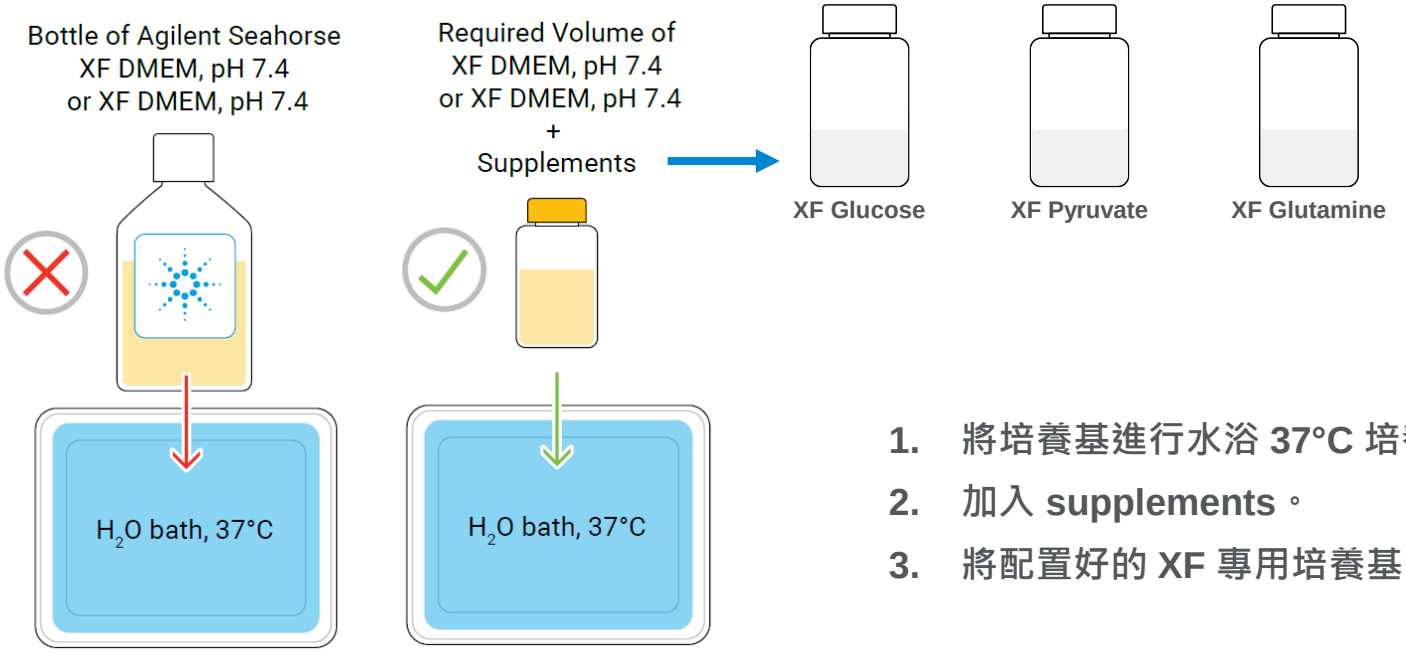
+

Supplements

XF Glucose
XF Pyruvate
XF L-Glutamine

- 檢測液中不可添加血清和碳酸氫鈉。
- 添加的底物種類和濃度取決於XF實驗類型和應用需求。

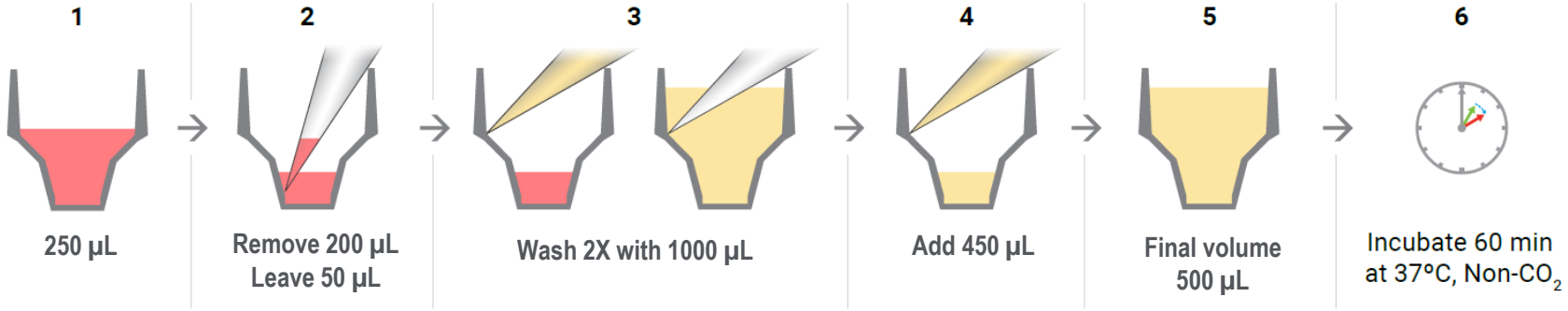
STEP 5: 配置培養基



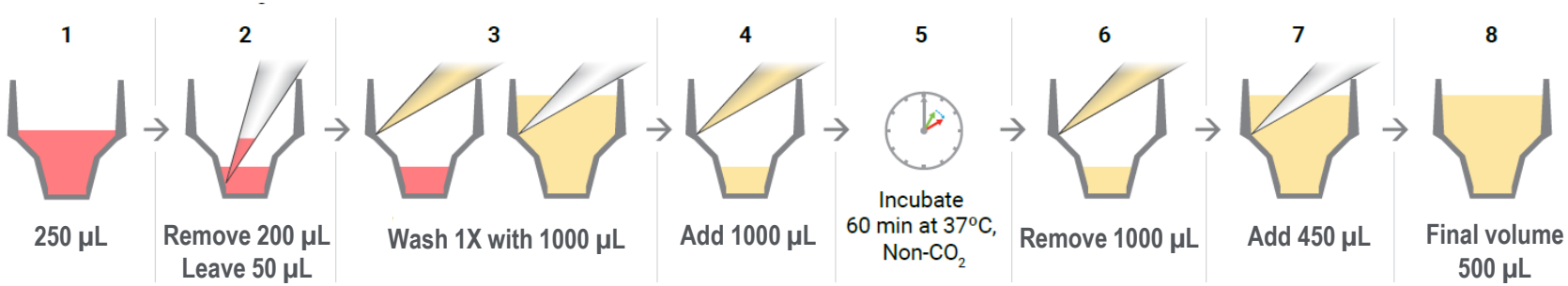
1. 將培養基進行水浴 37°C 培養。
2. 加入 supplements。
3. 將配置好的 XF 專用培養基 37°C 培養直到欲使用時。

STEP 6: 清洗細胞

Standard XF Assay Workflow *(except for XF Real-Time ATP Rate Assay & XF Glycolytic Rate Assay)*

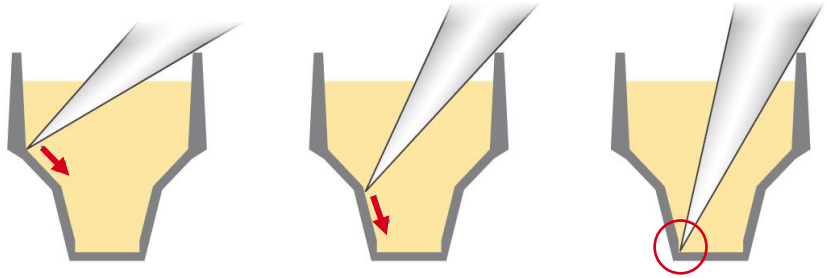


XF Real-Time ATP Rate Assay & XF Glycolytic Rate Assay Workflow

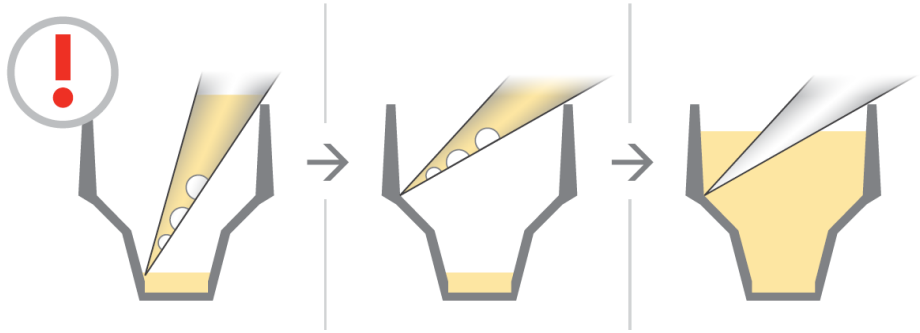


懸浮型細胞略過此步驟

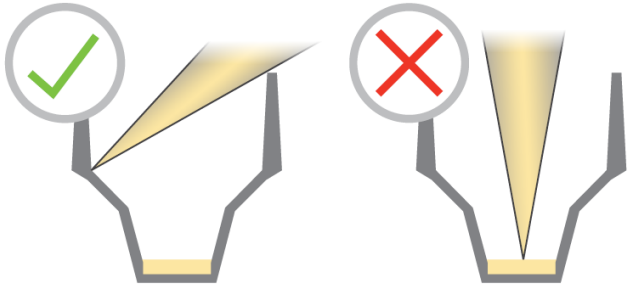
清洗細胞注意事項



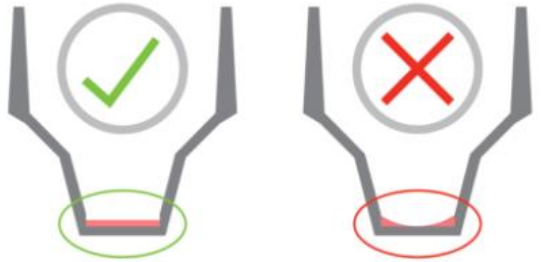
Correct Technique



If bubbles are introduced during the washing/dispensing step



Aspirate and Dispense from the well side, not the center

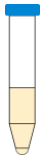


Ensure the cells are never exposed to air

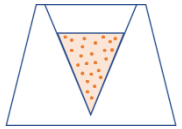
STEP 7: 接種懸浮型細胞

Prepare XF Tissue Culture Plate with 50 µL plate coating (e.g. Poly-D-Lysine, Cell-Tak)

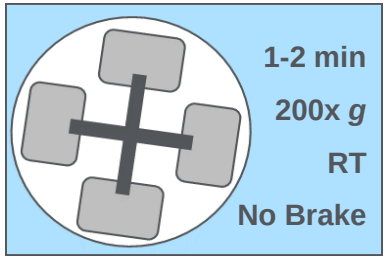
Collect cells and Prepare Cell Suspension



Seed Cells in 100 µL XF Assay Media



Centrifuge XF plate



✓ Confirm Seeding Quality

Incubate 20 min 37°C, no CO_2.

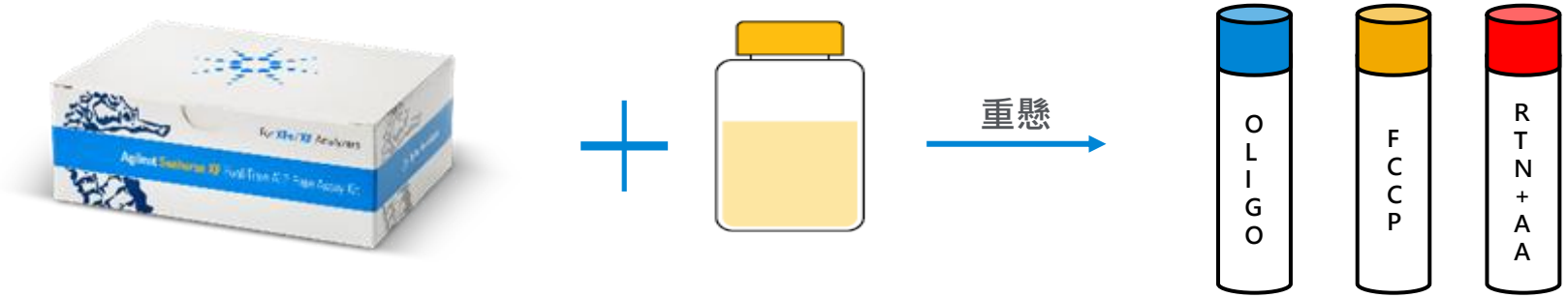
Add 400 µL XF Media

Incubate 20 min 37°C, no CO_2.

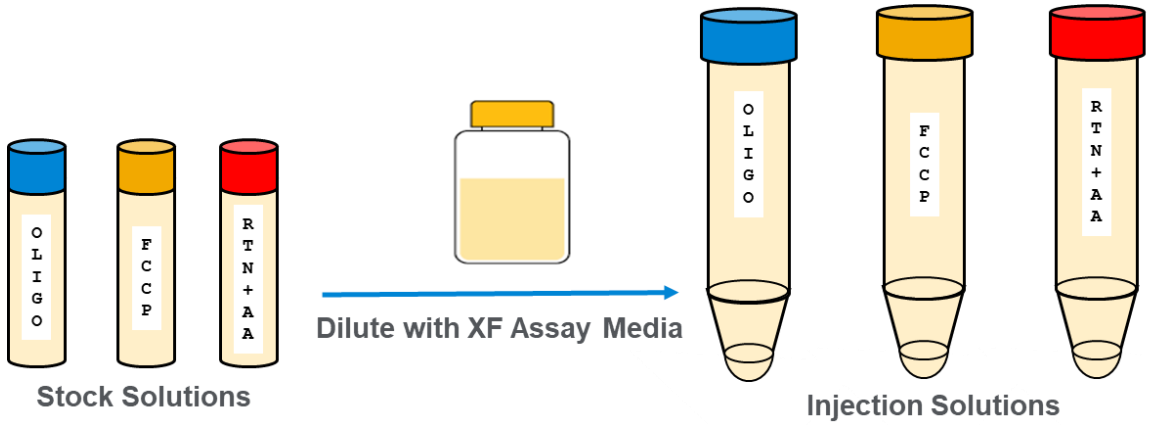
貼附型細胞略過此步驟

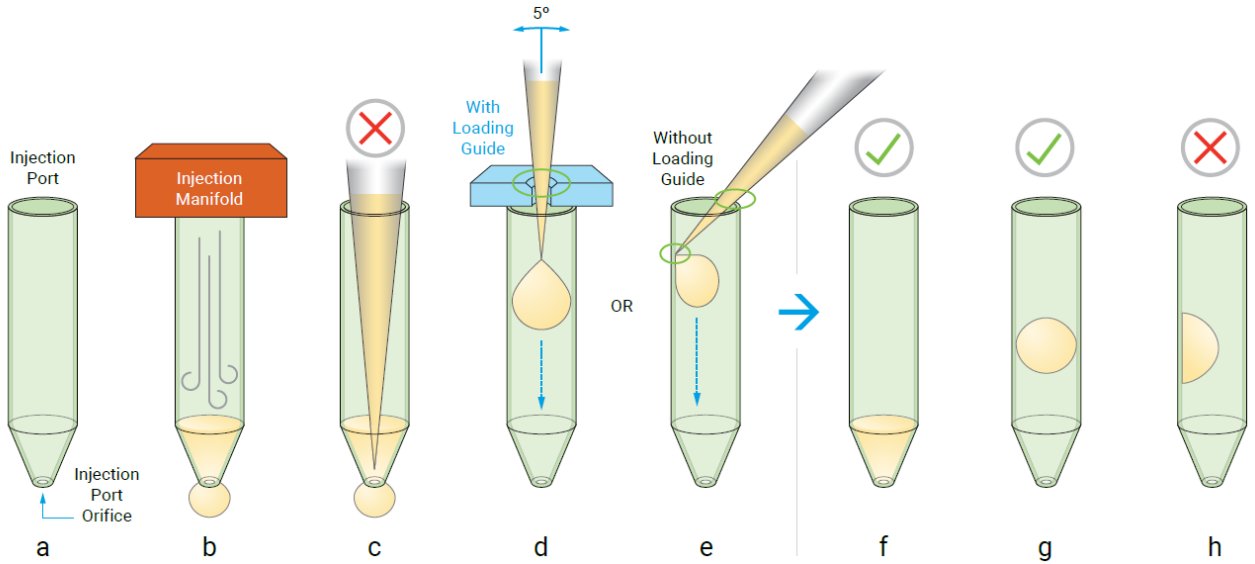
STEP 8: 準備藥物

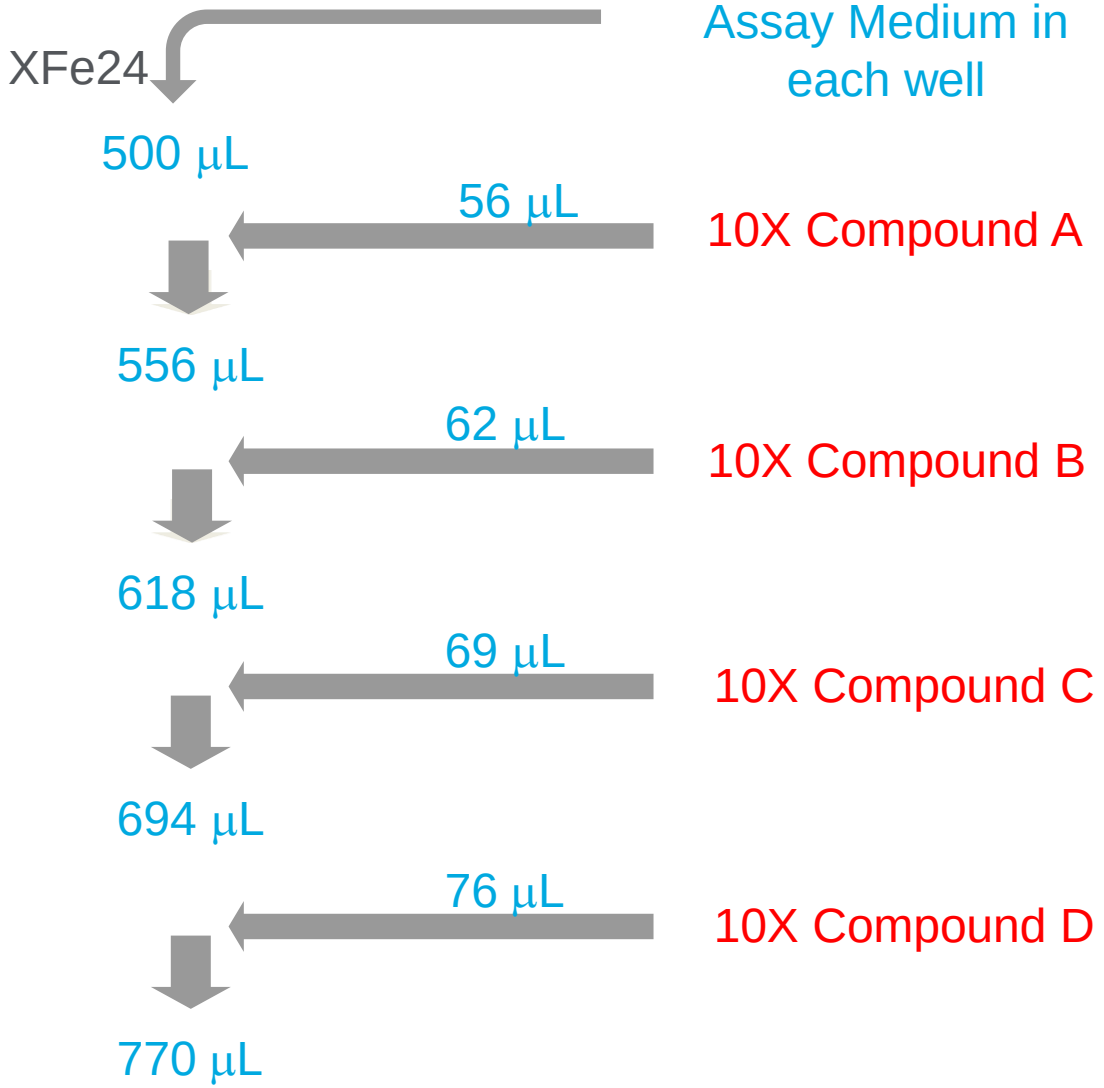
1. 按照說明書配製 Stock solution：



2. 將Stock solution 稀釋成working solution：

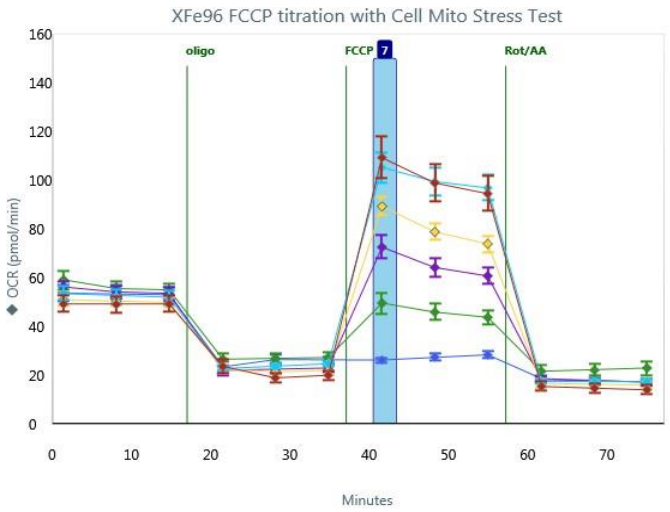


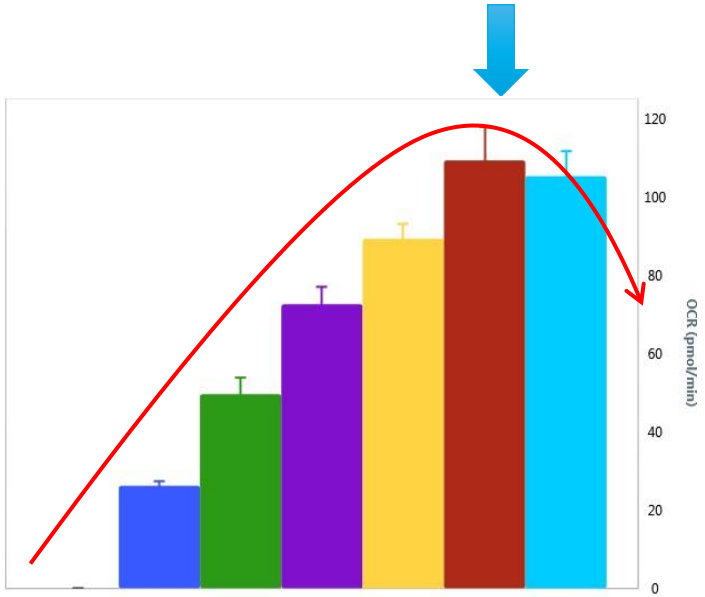

Injection Port
Injection Manifold
Injection Port Orifice
5°
With Loading Guide
Without Loading Guide
OR
a
b
c
d
e
f
g
h


XFe24
Assay Medium in each well
500 µL
56 µL
10X Compound A
556 µL
62 µL
10X Compound B
618 µL
69 µL
10X Compound C
694 µL
76 µL
10X Compound D
770 µL

FCCP藥物濃度優化

- Oligomycin 1.5 µM & Rot/AA 0.5 µM
- FCCP: 0.2-2.0 µM





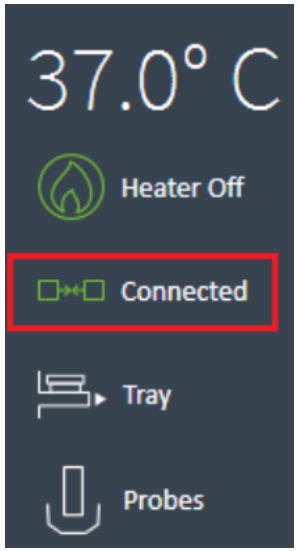
OCR-FCCP務必
滿足正態分佈關係

滿足條件：

- 最低FCCP濃度
- 最大 OCR值

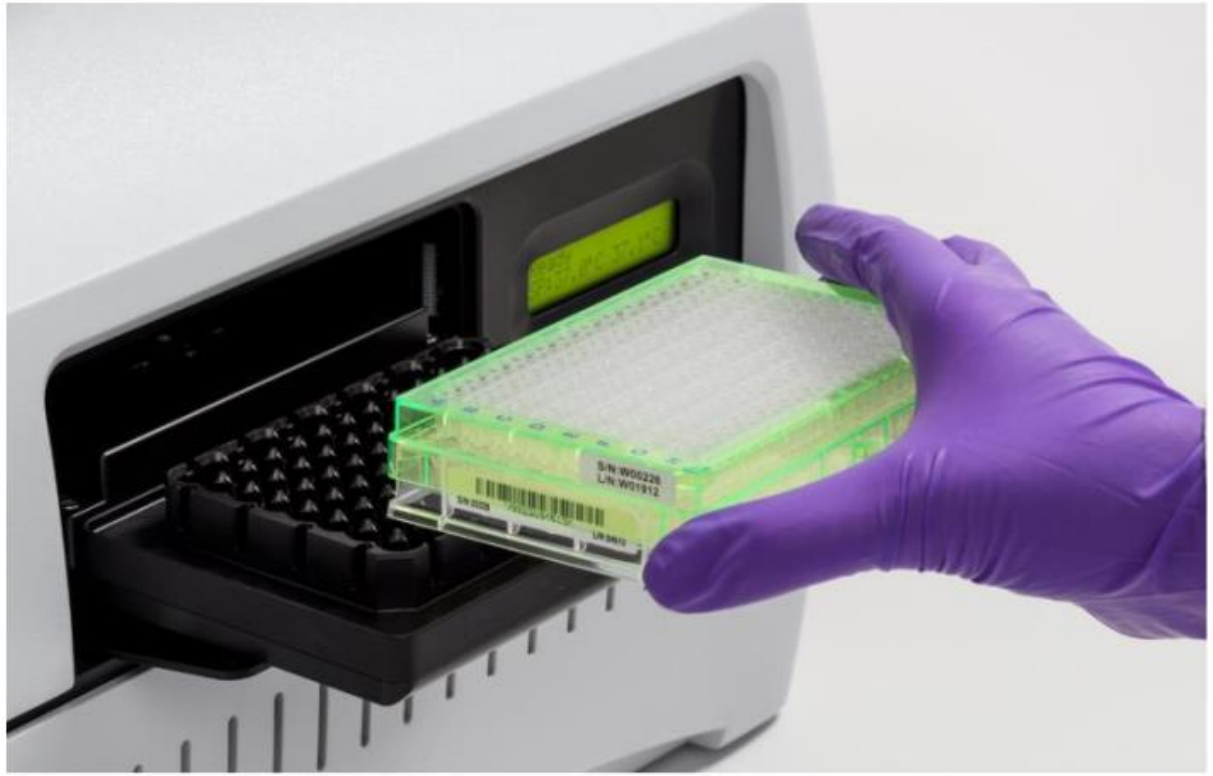
STEP 9: 上機

XFe24



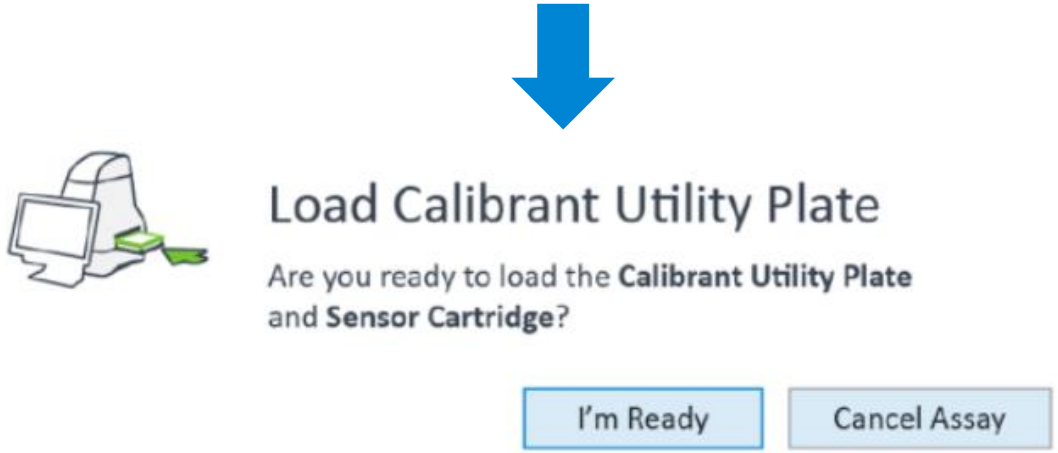
確保Seahorse XF儀器開機，溫度設置並穩定在37°C

STEP 9: 上機



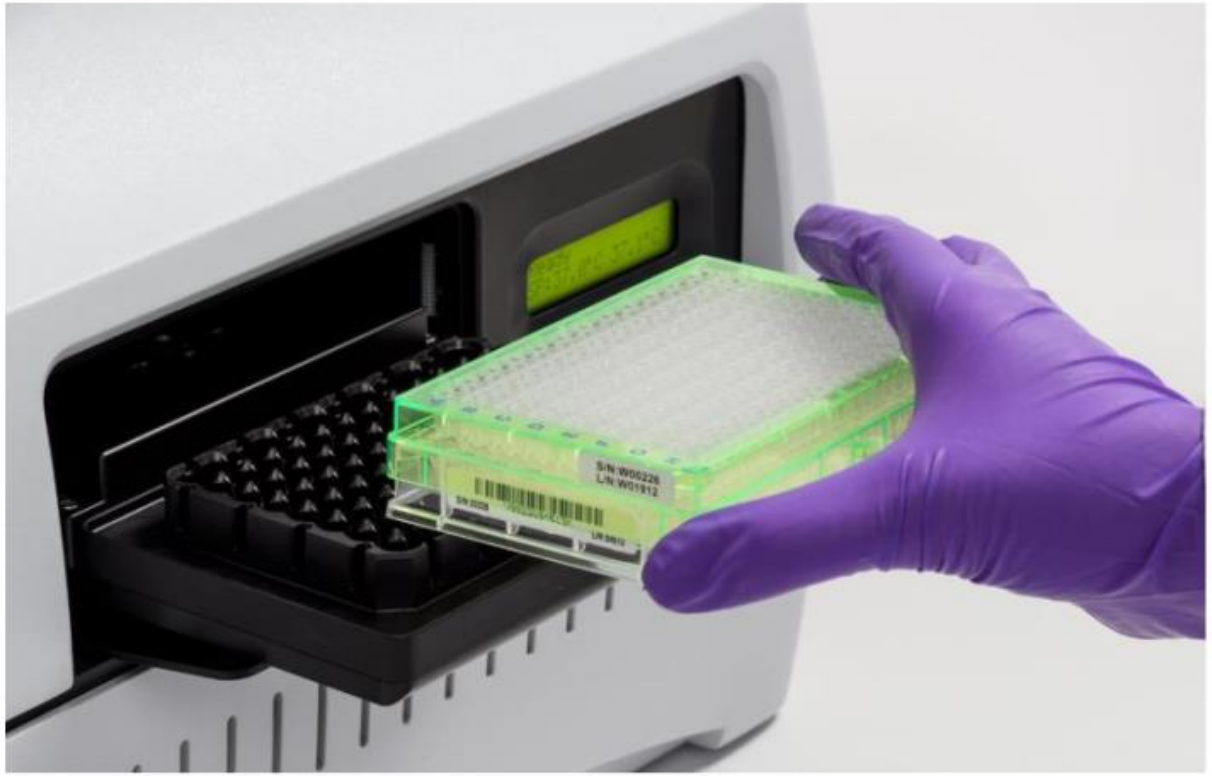
注意探針盤放置方向（A-D 行標識在左側或探針盤三角缺口位於左下角）

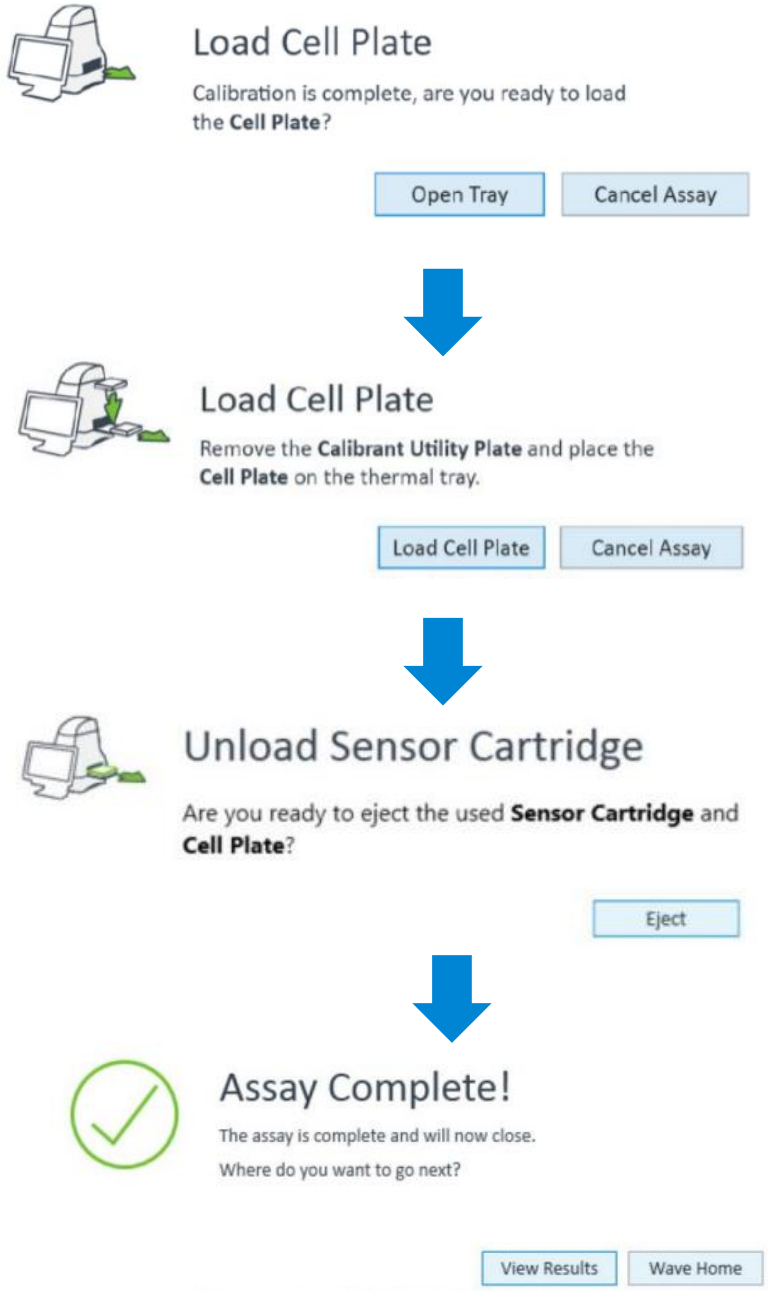
點選 Start Run



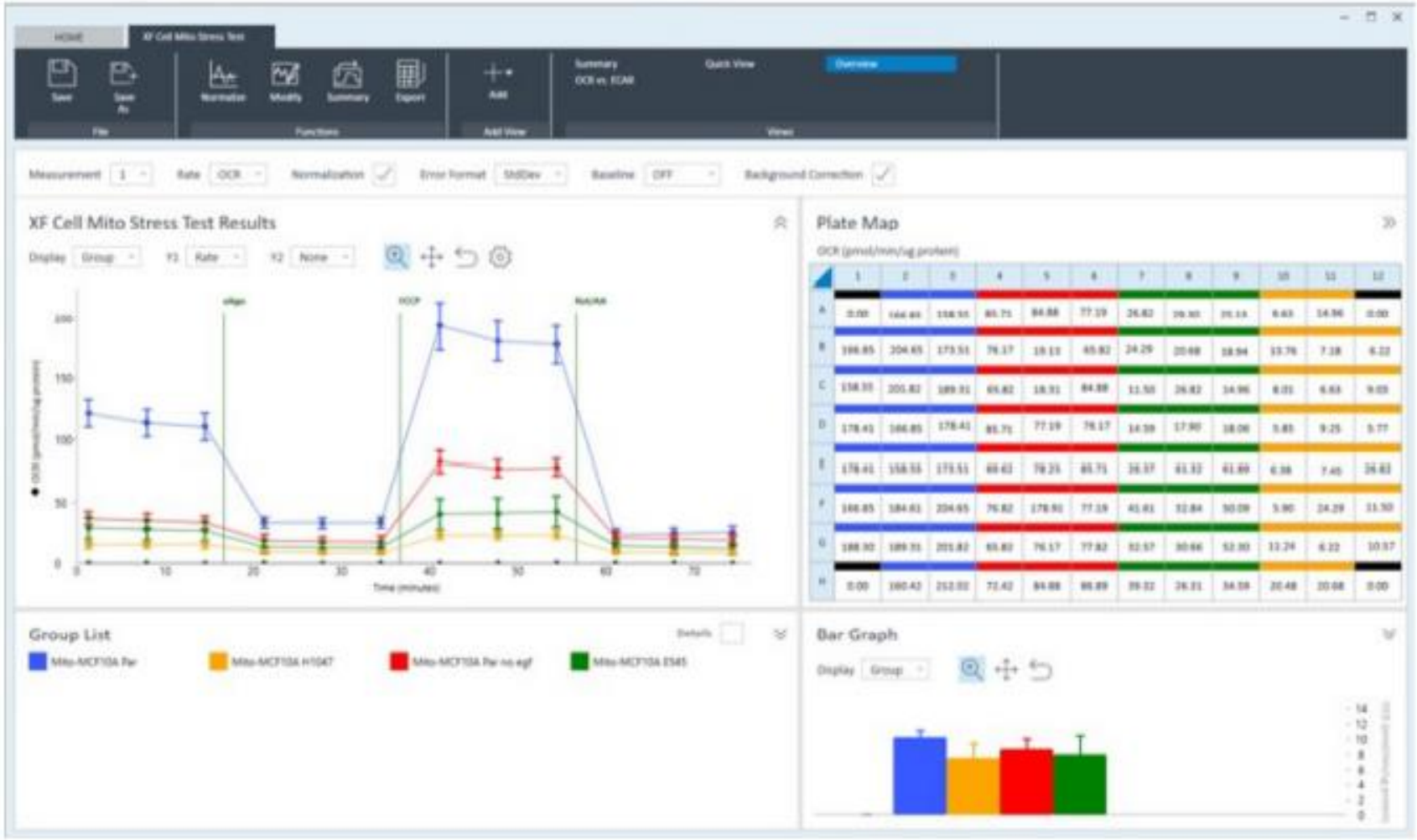
Calibration (10 – 20 分鐘)

STEP 9: 上機




Load Cell Plate
Calibration is complete, are you ready to load the **Cell Plate**?
Open Tray
Cancel Assay
Load Cell Plate
Remove the **Calibrant Utility Plate** and place the **Cell Plate** on the thermal tray.
Load Cell Plate
Cancel Assay
Unload Sensor Cartridge
Are you ready to eject the used **Sensor Cartridge** and **Cell Plate**?
Eject
Assay Complete!
The assay is complete and will now close.
Where do you want to go next?
View Results
Wave Home

STEP 10: 分析數據


XF Cell Mito Stress Test Results
Plate Map
Group List
Bar Graph

Seahorse 數據分析 - 影像標準化

影像標準化的重要性

由於細胞類型不同、藥物毒性、增殖、細胞分化及人為操作等誤差影響，Seahorse 的數據必須進行標準化處理，再進行分析。

- 使不同細胞、不同孔、不同盤、不同實驗之間的數據資料可相互比較。
- 幫助解釋 Seahorse XF 數據，和發現數據間的關聯性，變得更容易。
- 使 Seahorse XF 實驗分析流程標準化。

Seahorse XF 影像標準化的流程

Combine XF plate outgas step with brightfield imaging

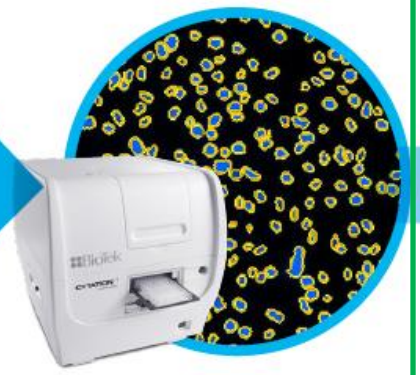
Document

Automate *in-situ* nuclear staining

Analyze

Automate acquisition and cell count calculations

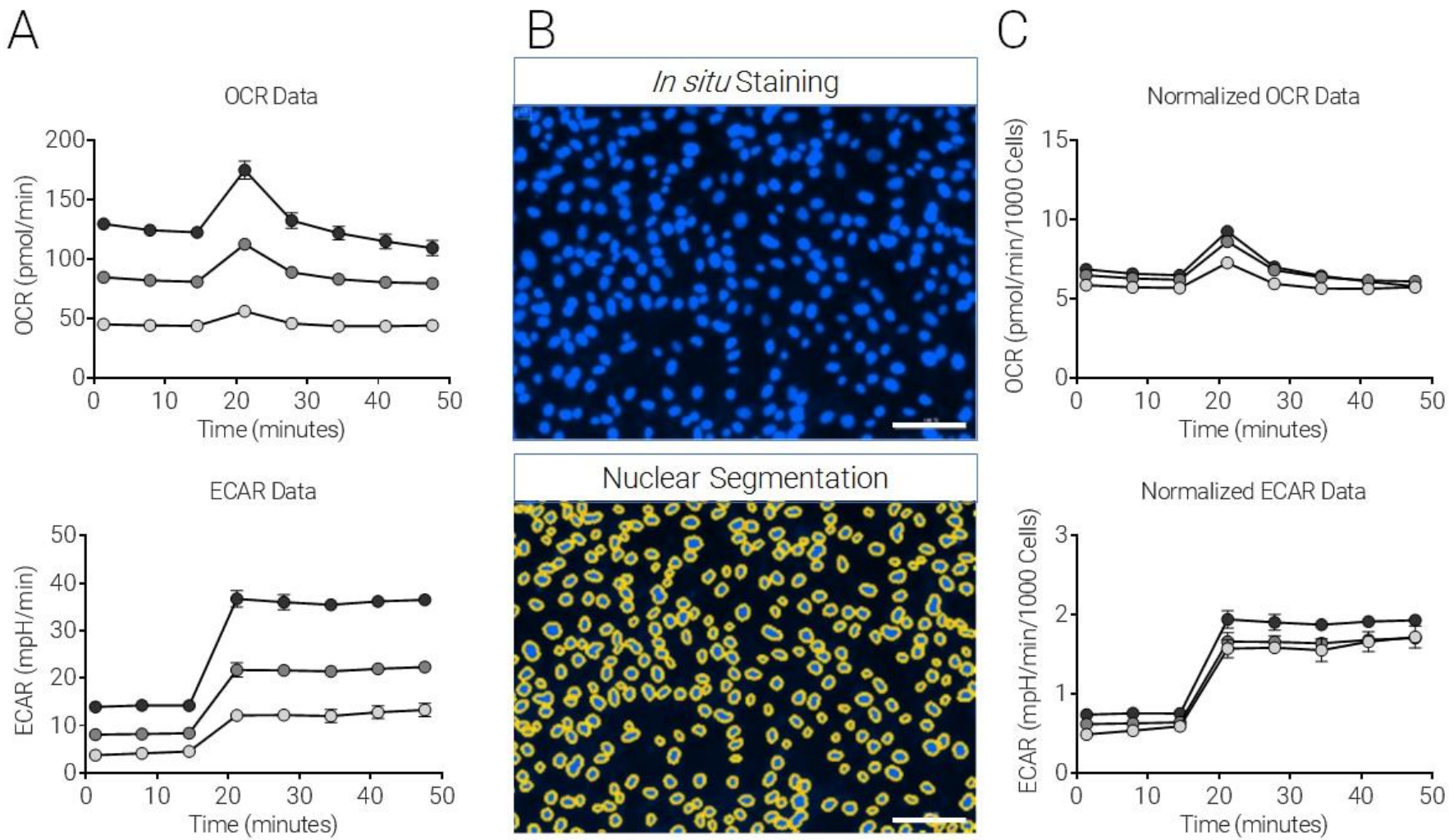
Normalize



Visualize images and cell count heatmaps in Wave

Interpret

細胞數量影響 Seahorse 數據的結果

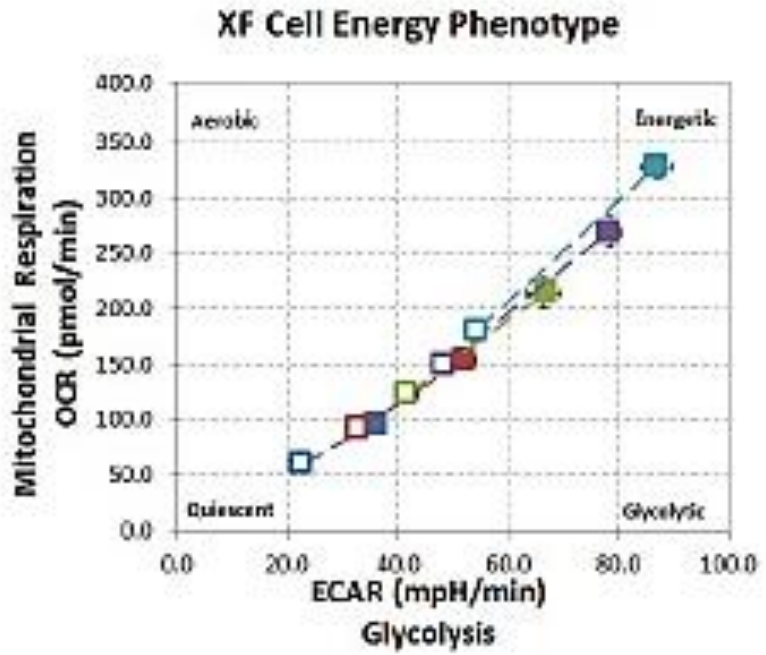


SKOV3 cells were plated at 1×10^4, 2×10^4, and 3×10^4 cells per well

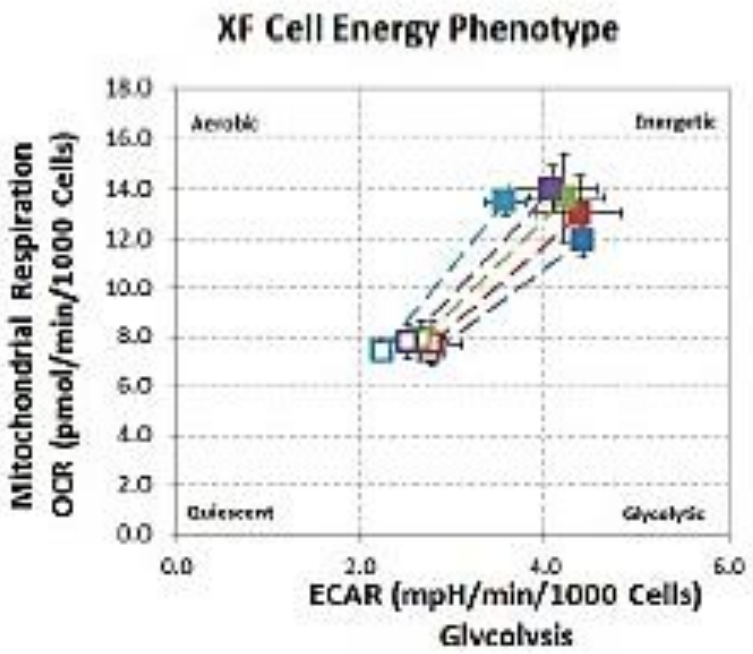
Agilent technical overview:
Methods and strategies for normalizing XF metabolic data to cellular parameters

標準化改善數據結果

Example of XF data normalization using in situ nuclear staining of HT-29.



BEFORE NORMALIZATION

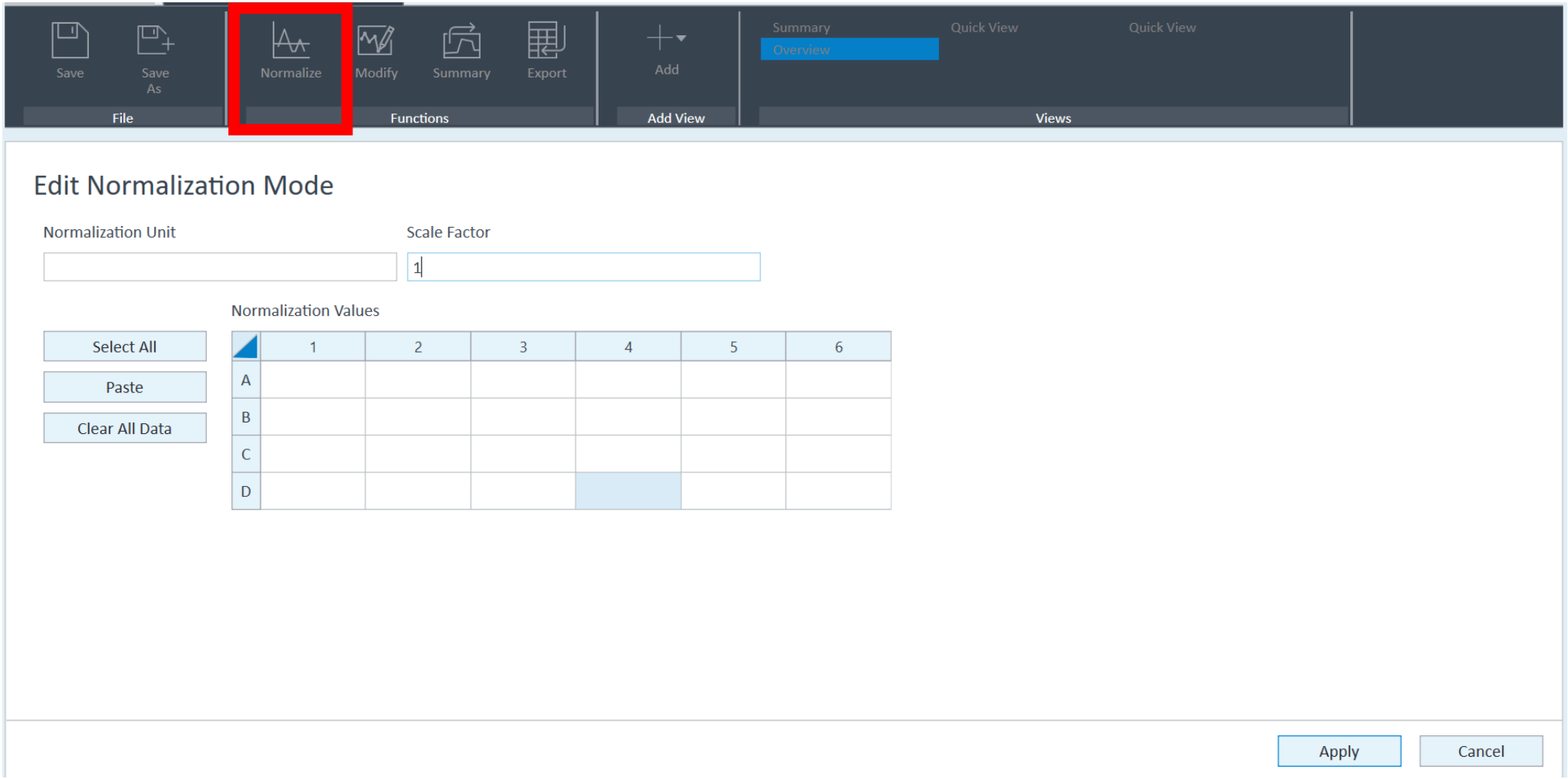


AFTER NORMALIZATION

將不同的細胞數接種於不同孔中。標準化前，代謝表型是隨機散佈於圖表上，無任何關聯性。標準化後，代謝表徵具有相似性。

Agilent technical overview:
Methods and strategies for normalizing XF metabolic data to cellular parameters

Wave 軟體 - Normalization

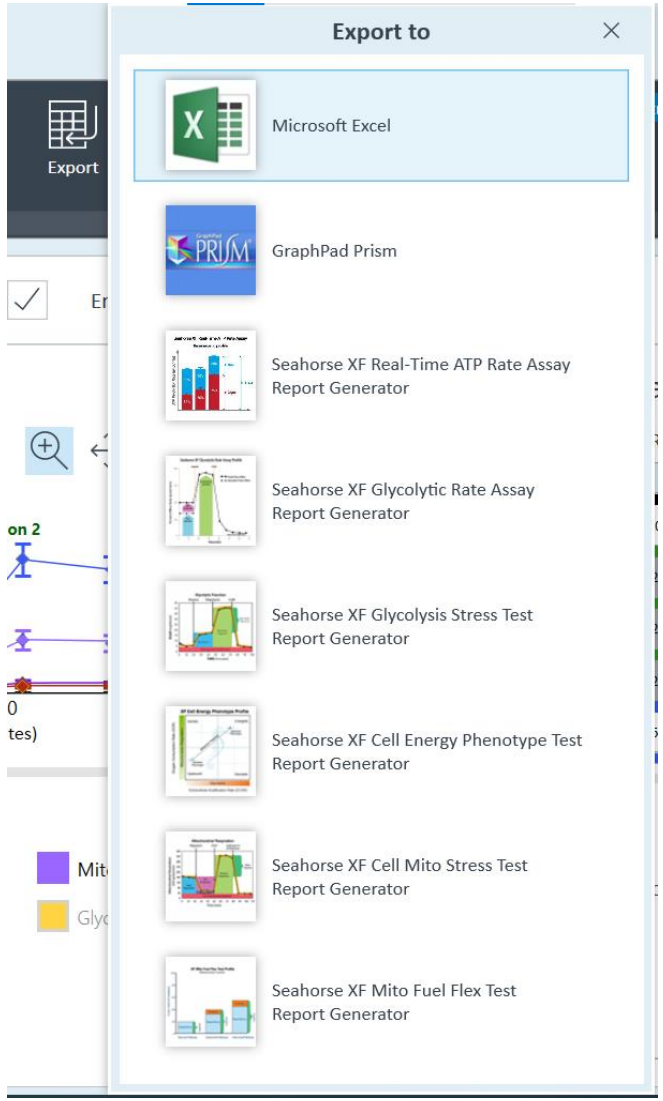


Wave 數據分析

Wave 數據分析介面

	1	2	3	4	5	6	7	8	9	10	11	12
A	0.00	27.27	19.52	7.17	8.22	9.95	7.24	10.37	9.15	7.57	6.25	0.00
B	28.79	34.45	28.69	10.07	11.03	12.38	8.60	8.11	7.59	8.81	8.55	7.84
C	28.76	31.09	34.74	9.78	11.18	11.93	10.01	8.15	7.29	5.00	6.06	7.39
D	29.11	29.21	32.82	7.66	9.87	11.57	7.19	7.86	7.51	7.46	7.27	6.64
E	53.98	48.49	52.14	11.98	13.94	17.91	5.44	5.95	6.74	1.40	3.13	5.30

匯出實驗報告



- Excel
- GraphPad Prism
- Report Generator

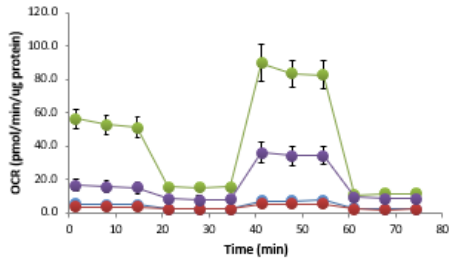
Report Generator 範例

Seahorse XF Cell Mito Stress Test
Single-File Summary Report

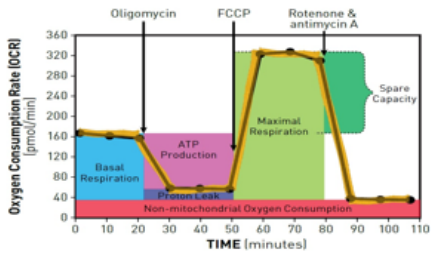
Agilent Technologies

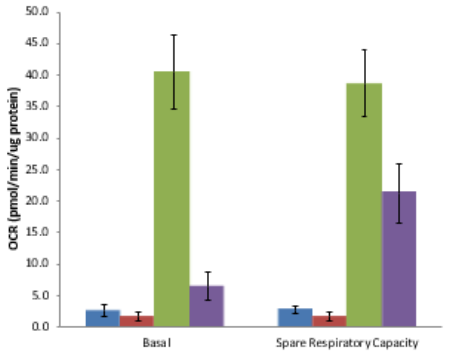
Assay Name: XF Mito and Glyco Stress Test MCF10A Protein Normalized **Last Run:** 6/28/2014 2:24 AM
Project Name: Principal

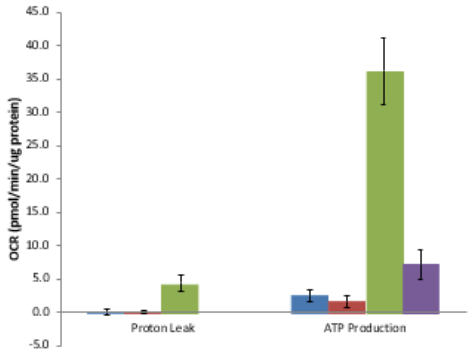
Mitochondrial Respiration



Seahorse XF Cell Mito Stress Test Profile
Mitochondrial Respiration







Notes:

Edit Current Group Selection

Normalize ON

Group Legend:

Mito-MCF10A E545 Mito-MCF10A H1047
Mito-MCF10A Par Mito-MCF10A Par no egf

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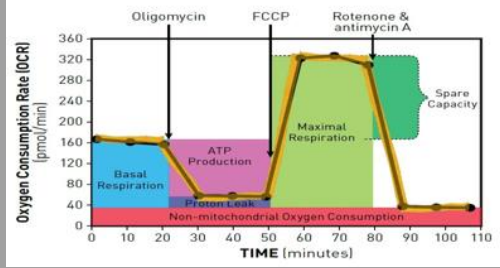
Assay Name: XF Mito and Glyco Stress Test_MCF10A_Protein Normalized

Report Generator Version: 4.03

Seahorse XF Cell Mito Stress Test Equations & Example Calculations

The parameter values and error bars in the Seahorse XF Report Generators represent the average of the individual well calculations for each group on the plate map. This is sample data **only** - not real assay result data.

Seahorse XF Cell Mito Stress Test Profile
Mitochondrial Respiration



Parameter Value	Equation
Non-mitochondrial Oxygen Consumption	Minimum rate measurement after Rotenone/antimycin A injection
Basal Respiration	(Last rate measurement before first injection) – (Non-Mitochondrial Respiration Rate)
Maximal Respiration	(Maximum rate measurement after FCCP injection) – (Non-Mitochondrial Respiration)
H+ (Proton) Leak	(Minimum rate measurement after Oligomycin injection) – (Non-Mitochondrial Respiration
ATP Production	(Last rate measurement before Oligomycin injection) – (Minimum rate measurement after Oligomycin injection)
Spare Respiratory Capacity	(Maximal Respiration) – (Basal Respiration)
Spare Respiratory Capacity as a %	(Maximal Respiration) / (Basal Respiration) × 100
Acute Response	(Last rate measurement before oligomycin Injection) – (Last rate measurement before acute injection)
Coupling Efficiency	ATP Production Rate) / (Basal Respiration Rate) × 100

Summary Printout | Bar Charts | Normalize | Measures Sheet | Assay Parameter per Well | Sample Calculations

Agilent

Trusted Answers