

Agilent BioTek Synergy H1 多功能微量盤檢測儀



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進階生物科技
Level Biotechnology Inc.

安捷倫細胞分析產品

Building a comprehensive story



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

安捷倫細胞分析整合平台

NovoCyte 流式細胞分析儀



RTCA無標記
細胞實時動態分析



BioSpa 8
自動化活細胞培養箱



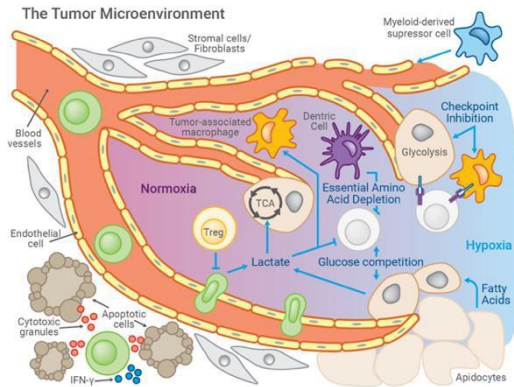
Cytation
細胞自動化影像與光學檢測



Seahorse
實時無標記細胞能量分析儀

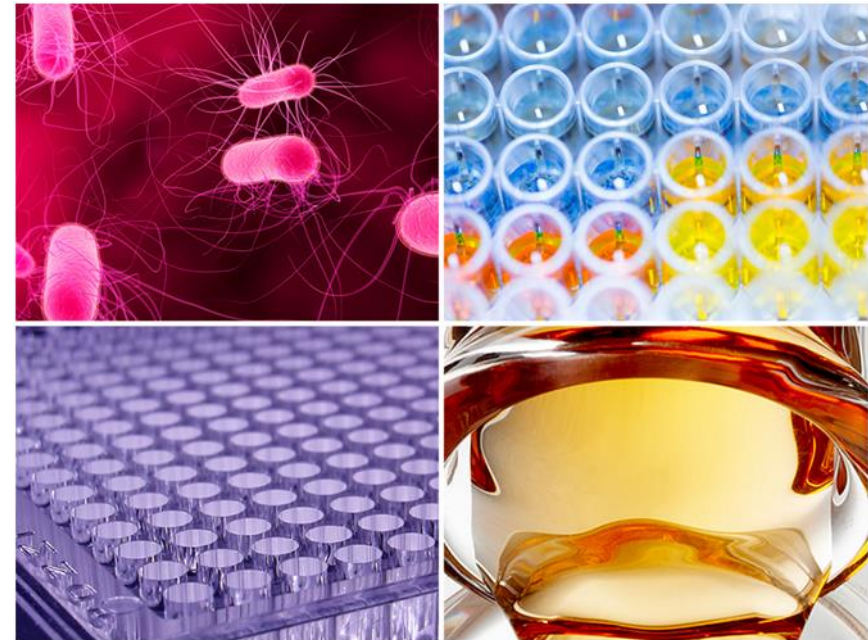


自動化清洗與分注儀



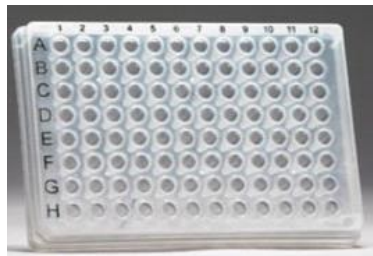
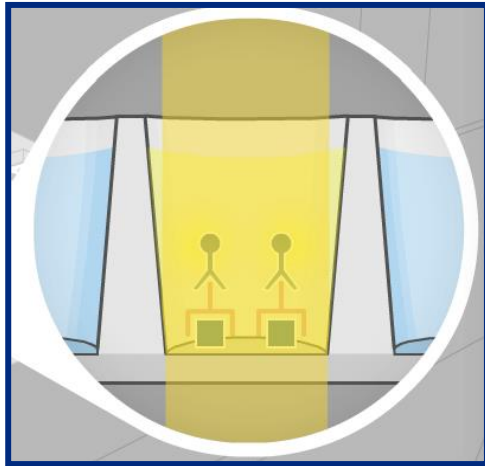
Outline

- 偵測方式：吸收光、螢光、冷光
- **Synergy H1**
 - 功能
 - 應用
- 軟體介紹

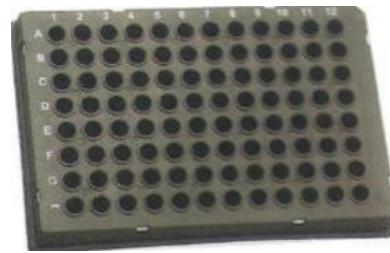
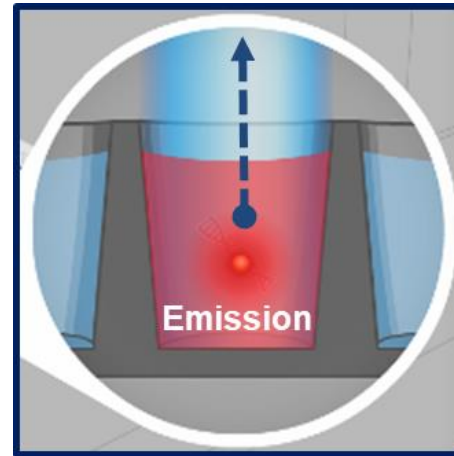


偵測方式

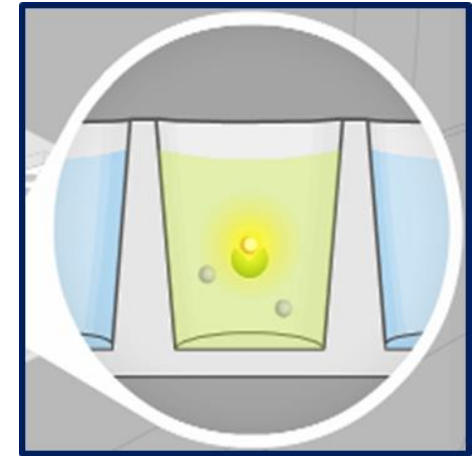
Absorbance
吸收光



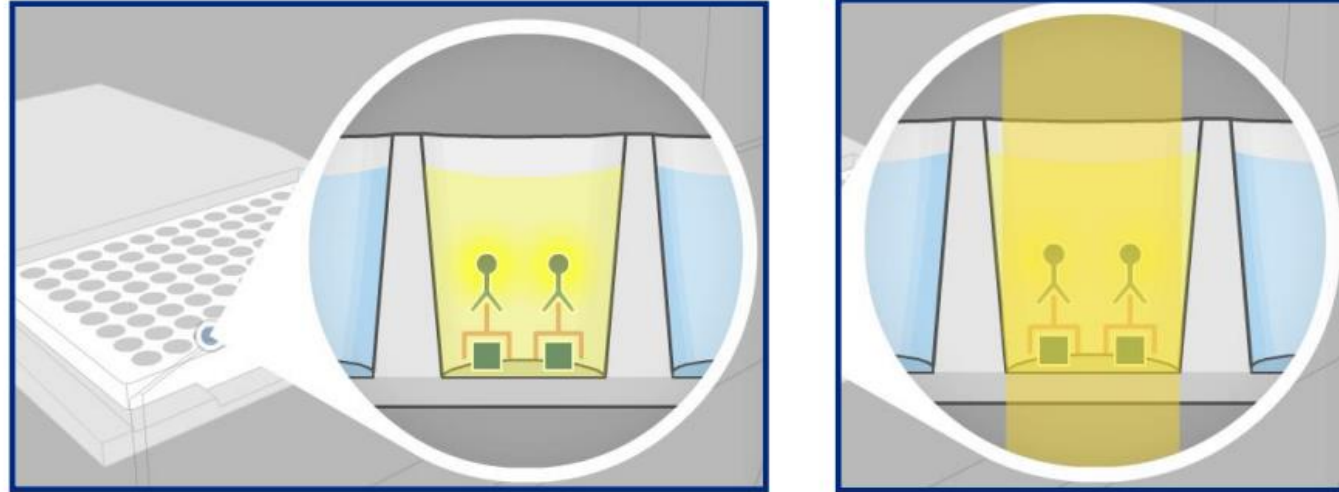
Fluorescence
螢光



Luminescence
冷光



吸收光原理



Applications

- ELISA
- 260/280 nm (DNA)
- Protein Quantification
- Enzyme Kinetic Assay
- Colorimetric

$$\text{Absorbance (A)} = \text{Log}_{10} \frac{I_0}{I_t} = \epsilon \cdot c \cdot L$$

Beer's Law

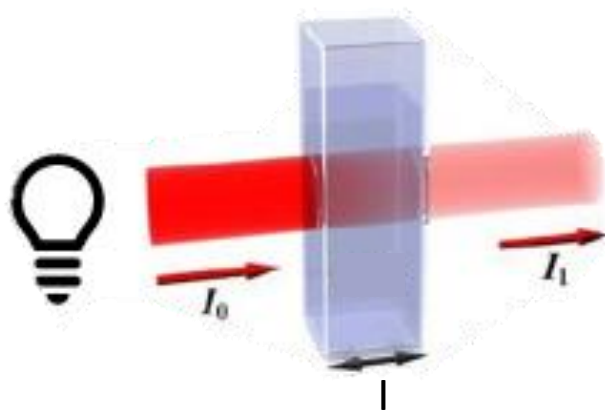
Lambert's Law

= Optical Density (O.D.)

I_0 : Intensity of the light entering the sample
 I_t : Intensity of the light leaving the sample
 ϵ : Molar attenuation (=extinction) coefficient ($M^{-1}cm^{-1}$)
 c : Concentration of medium
 L : Pathlength of the light

比爾定律 Beer's law

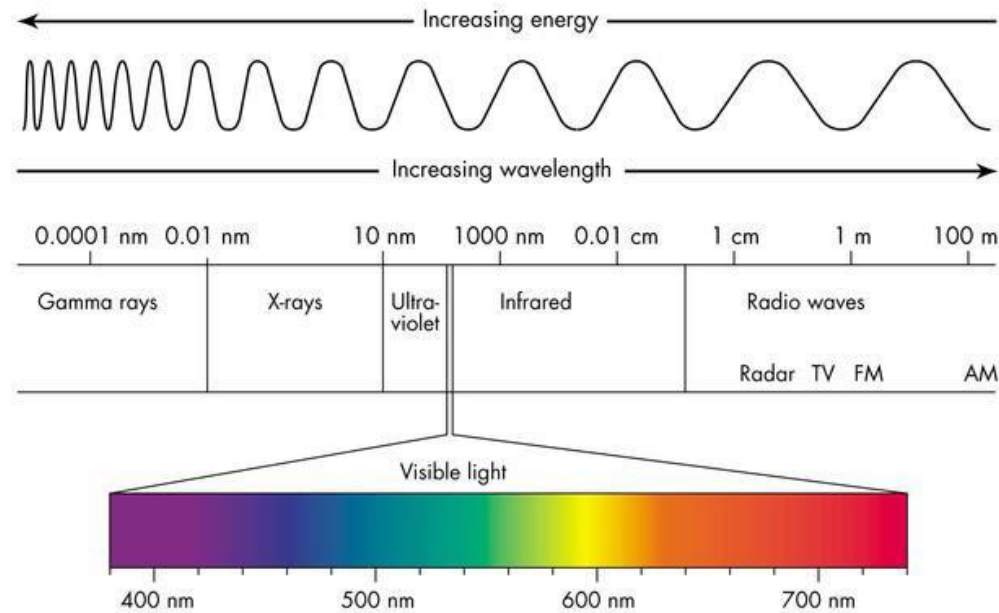
- 當光穿透樣品溶液時，光的吸收度(A)與吸收係數(ϵ)、光徑長(l)、濃度(c)三者均呈正比： $A = \epsilon l c$



$A = \epsilon l c$ → 從吸收度推算測量液體濃度

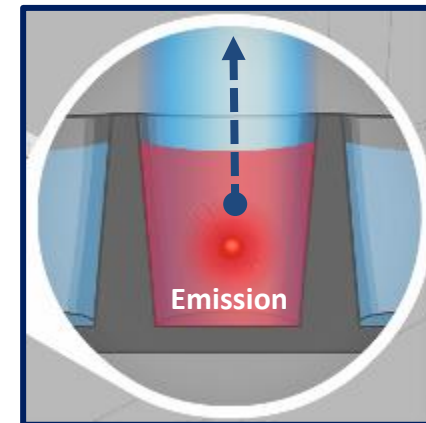
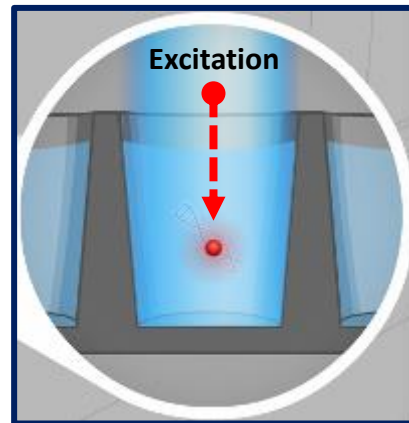
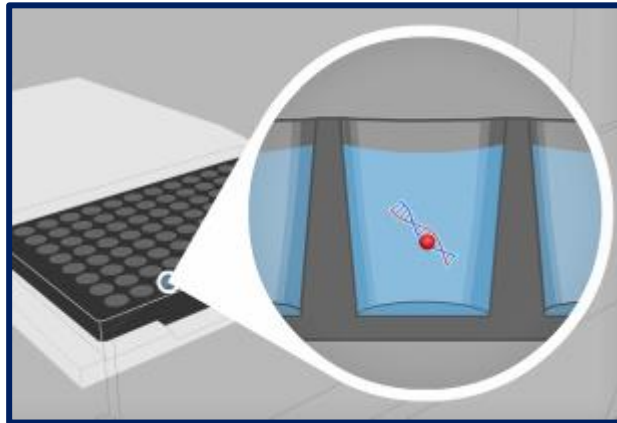
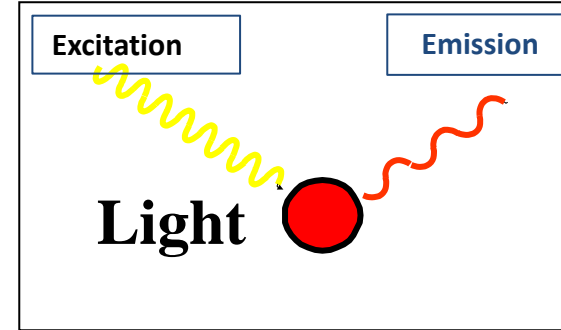
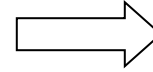
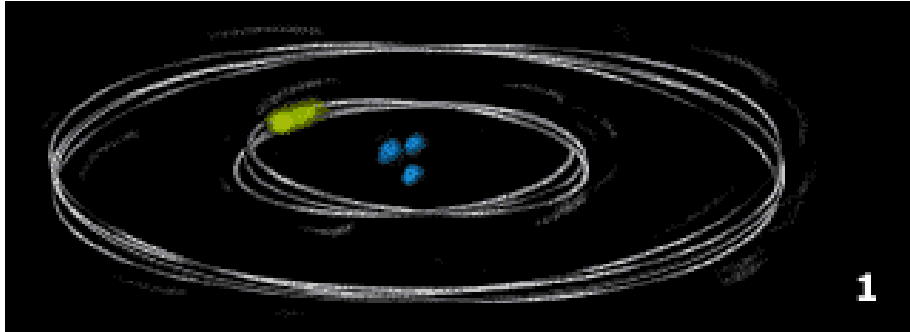
OD值 Optical Density

- 每種物質有其特定的吸收波長
- 一物質在某特定波長及固定距離下對該光源的吸收值



藉由觀察樣本之吸收度(A)或O.D.，可得知待測樣本之濃度

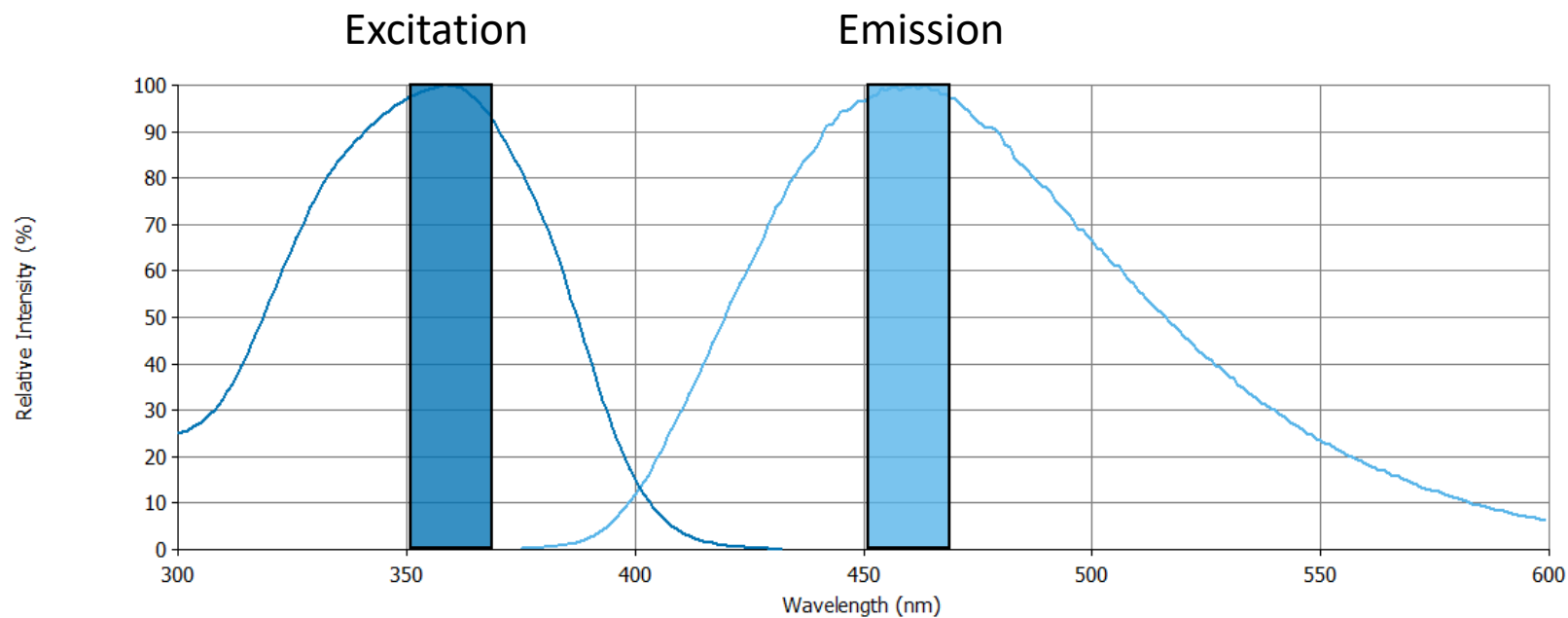
螢光原理



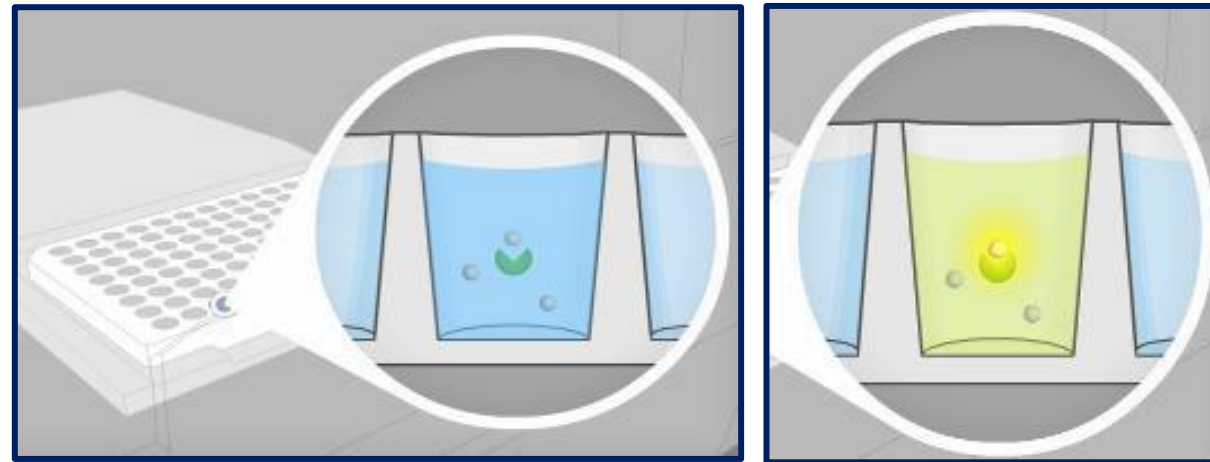
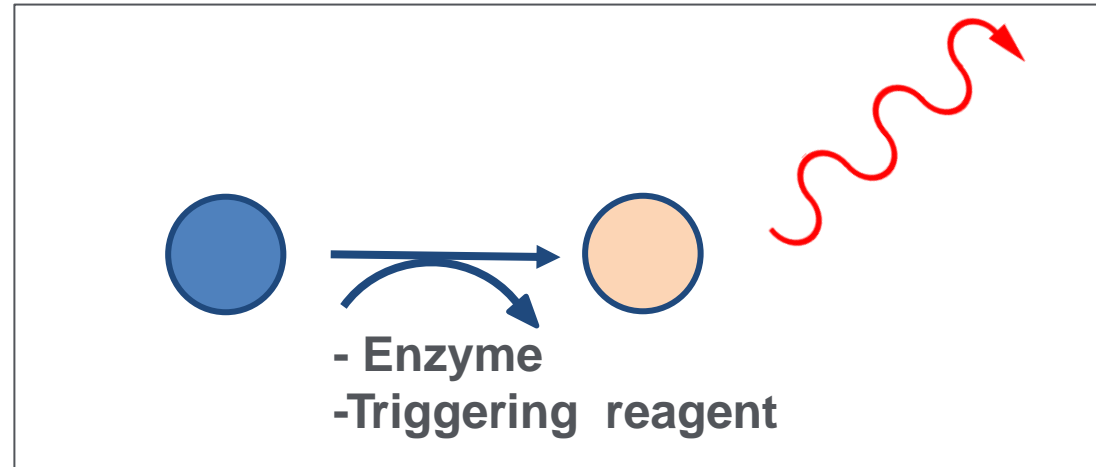
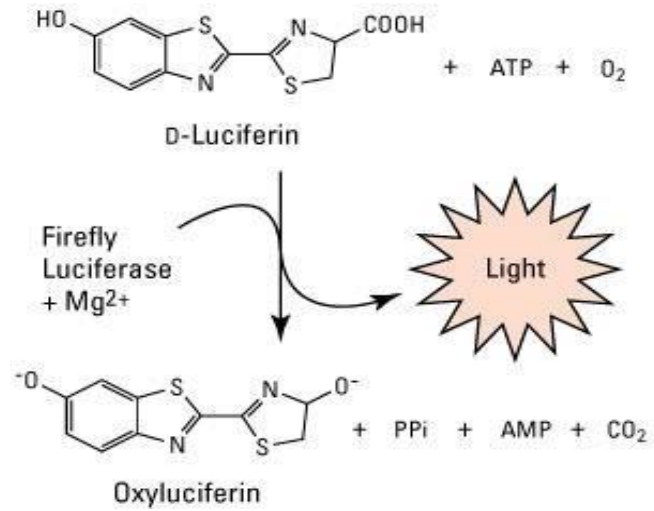
Unit : **RFU** (**R**elative **F**luorescence **U**nits)

螢光原理

- **Excitation 激發光**
 - 光源激發螢光分子
- **Emission 散射光**
 - 螢光分子產生散射光
- **儀器偵測的是?**
 - Emission激發光的數值
- **Bandpass?**
 - 波長可通過的範圍
- **460/40代表?**
 - 440~480 nm範圍可通過濾鏡



冷光原理



Unit : **RLU** (Relative Luminescence Units)

H1 規格功能



偵測系統

全波長吸收光

- 壽命長的氙氣燈，無需頻繁更換燈源
- 簡單的光學路徑，確保極佳的靈敏度(讀值解析度達0.0001 OD)
- 波長選擇：230 – 999 nm UV-VIS 連續波長，可調刻度1nm，無需濾鏡

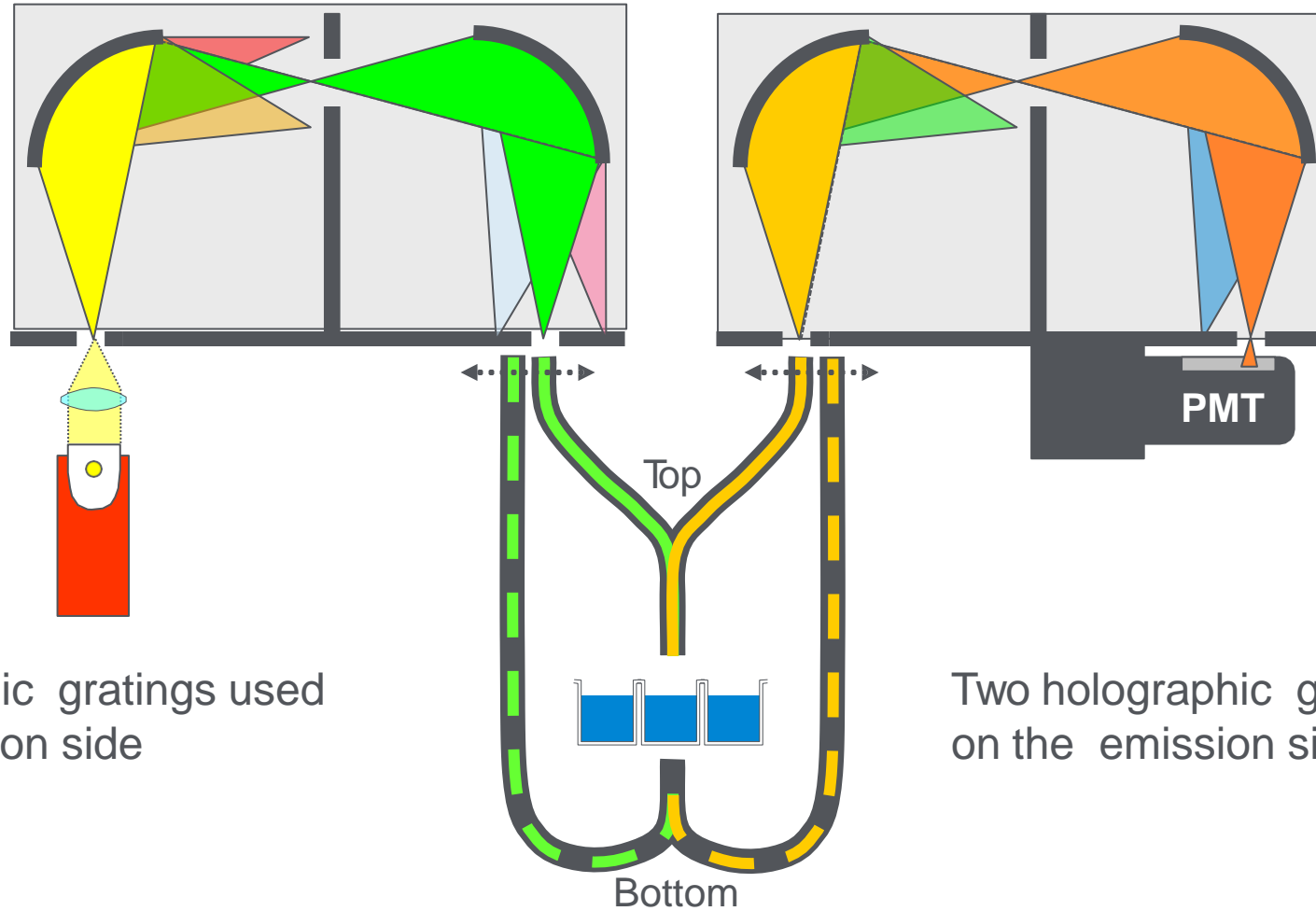
全波長螢冷光

- 波長選擇：250 – 900 nm，可調刻度1nm
- Fixed: 16 nm



全波長光學系統

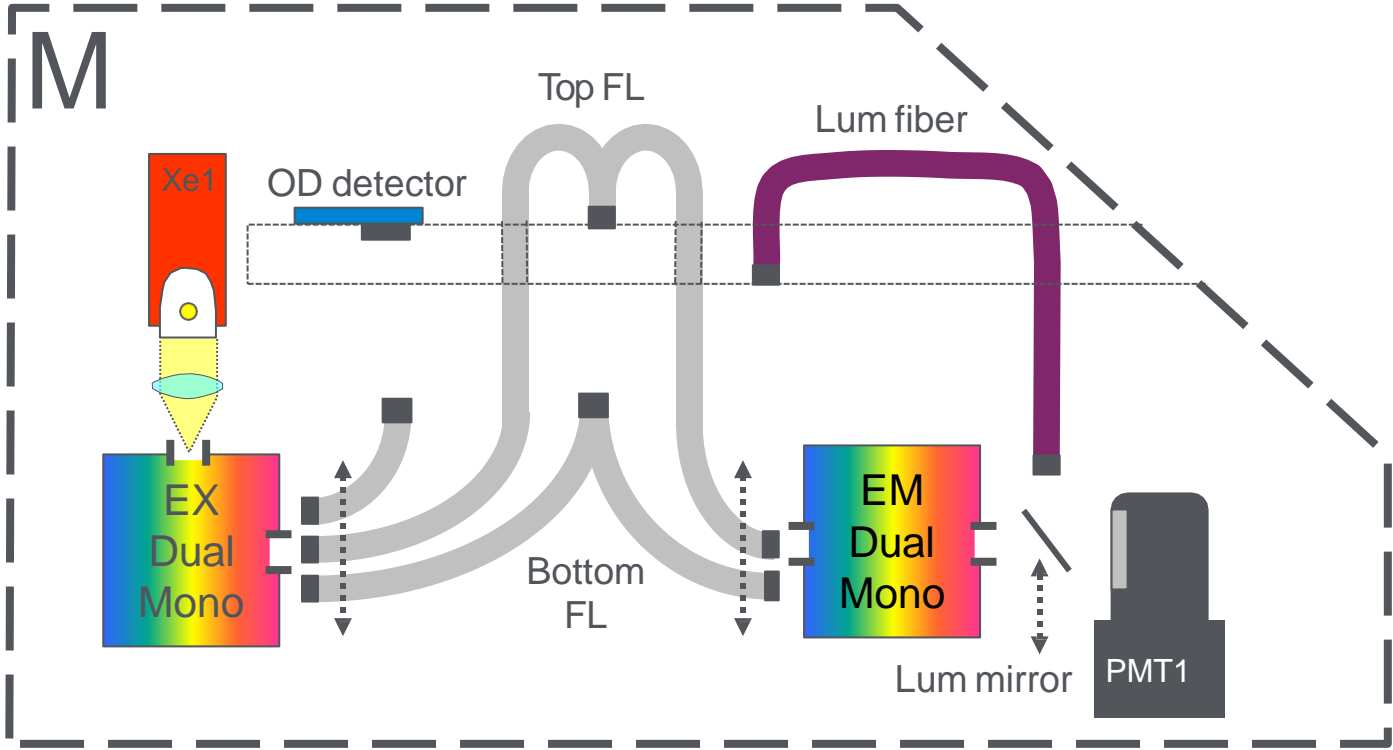
Quadruple Grating Monochromator System



Two holographic gratings used on the excitation side

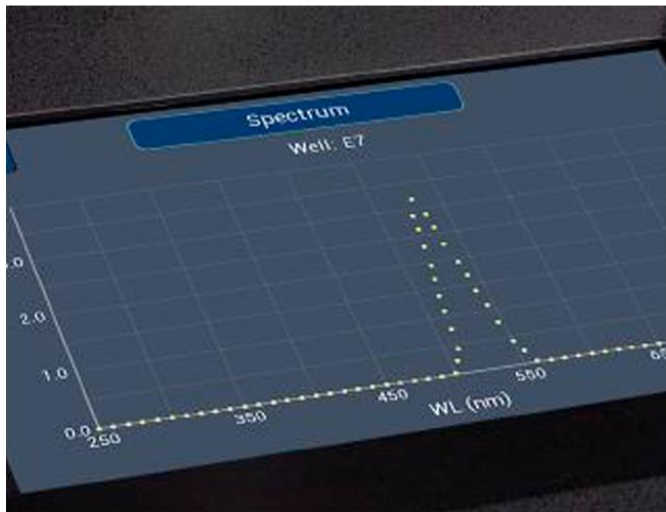
Two holographic gratings used on the emission side

光路結構

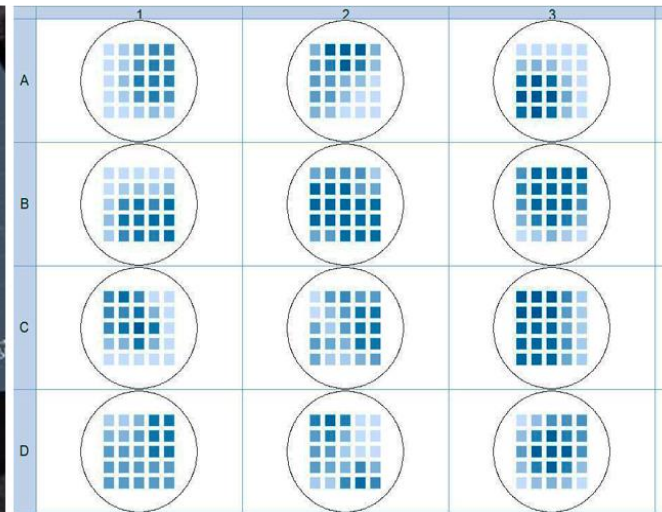


讀取方法

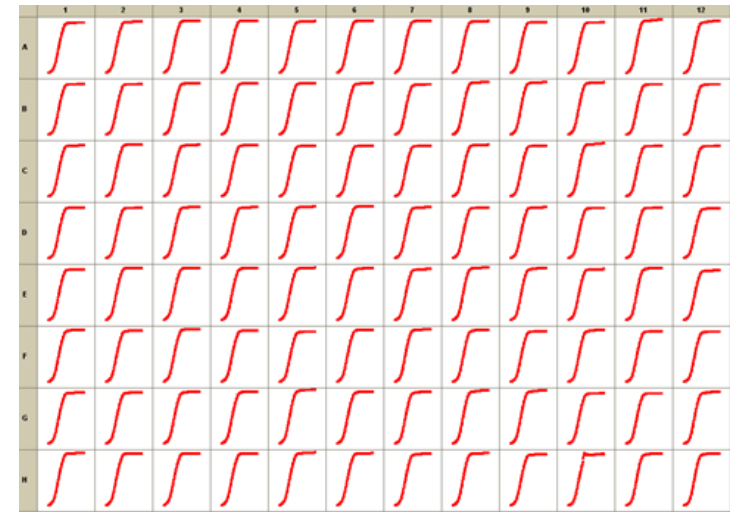
- 終點法、動力學分析、孔域掃描、光譜掃描



光譜掃描



孔域掃描



動力學分析

微量盤類型

- 適用 6 至 384 孔微量盤，Take3 和 Take3 Trio 超微量定量偵測盤



6-384孔微量盤



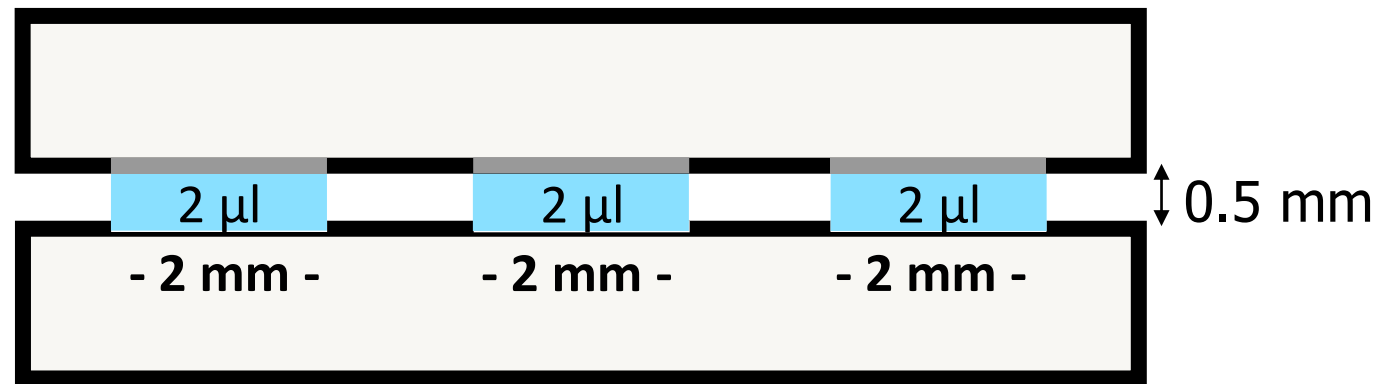
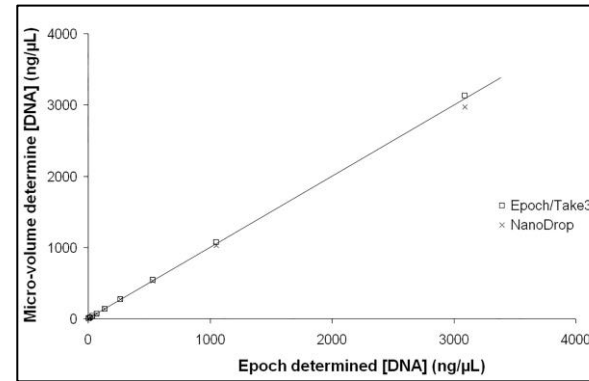
Take3
超微量定量偵測盤



Take3 Trio
超微量定量偵測盤

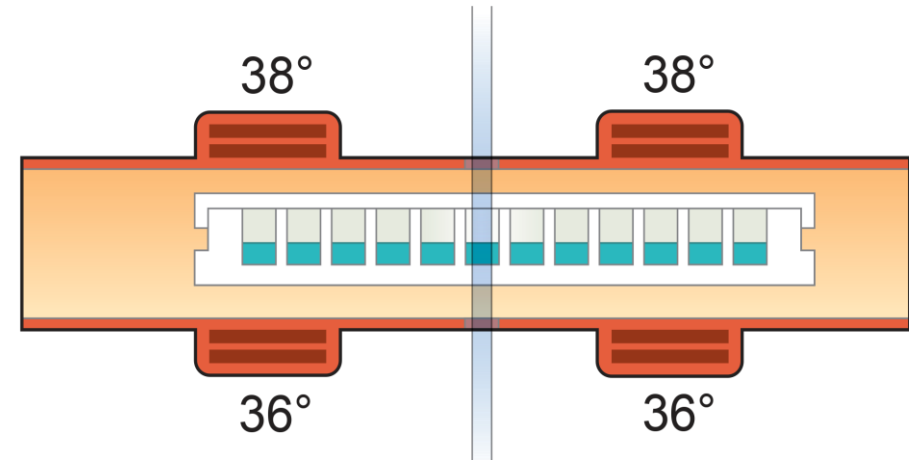
Take3 超微量定量偵測盤

- Take3 可應用於 微量樣本 (2 μ L) 的分析與檢測，如核酸與蛋白質的定量。
- 無需稀釋珍貴樣本，一次最多可檢測 16 或 48 個 2 μ L 樣本。



4-Zone 溫控設計與預防水氣凝結

- 精準的溫度控制：
溫度一致性 $\pm 0.5^{\circ}\text{C}$ @ 37°C
- 加溫可至 45°C
- “無風扇式 Fan-Free” 設計：
避免 edge effect
- 預防水氣凝結於上蓋：
上方加熱板溫度高於下方加熱板，形成溫度梯度



上方加熱面板的溫度較高

多種震盪模式

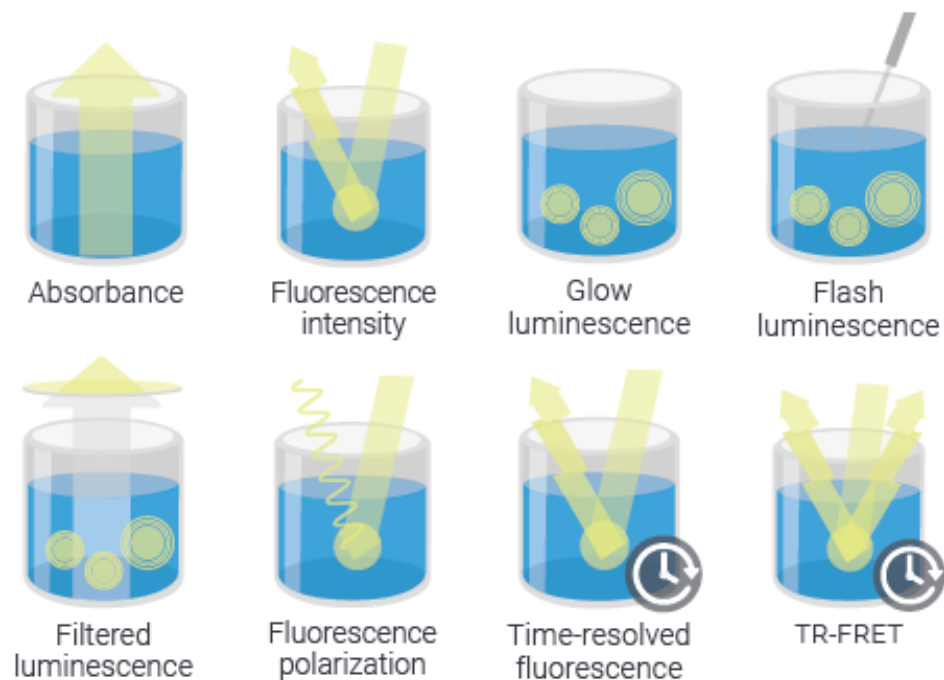


Linear shaking 線性震盪	Orbital shaking 橢圓形震盪	Double-orbital shaking 雙橢圓形震盪
強烈震盪，適合非細胞實驗	較溫和的震盪，適合細胞實驗	適合細胞實驗，可避免細胞聚集於中心成團

Synergy H1 偵測模式&應用

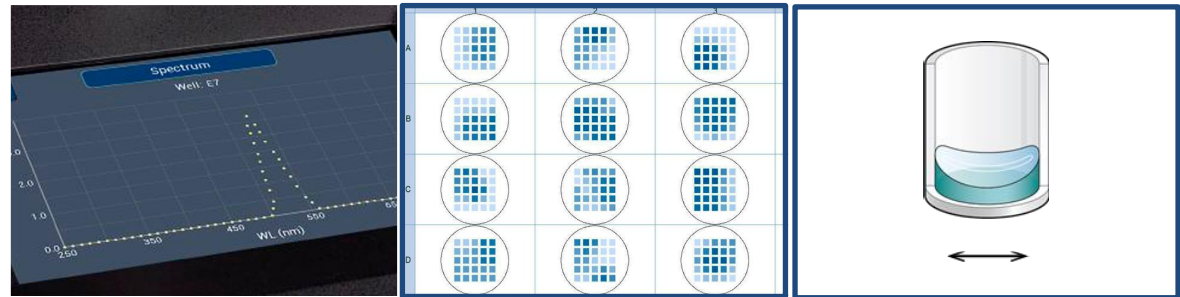
吸收光、螢光、冷光

- ✓ 核酸定量
- ✓ 蛋白質定量
- ✓ 酵素動力學分析
- ✓ 生物標記定量
- ✓ ELISA
- ✓ 基因分析
- ✓ 細胞增生
- ✓ 細胞毒性



Synergy H1

- ✓ 吸收光：230 – 999 nm 全波長(可調式頻寬單色分光器)
- ✓ 螢冷光：全波長
- ✓ 可讀取6、12、24、48、96和384孔盤
- ✓ 具震盪功能：Linear, orbital, double orbital
- ✓ 4 區加熱至 45 °C
- ✓ 具孔域掃描(Well area Scanning)功能
- ✓ 光譜掃描(Spectrum scanning)
- ✓ Z-focus (Auto)

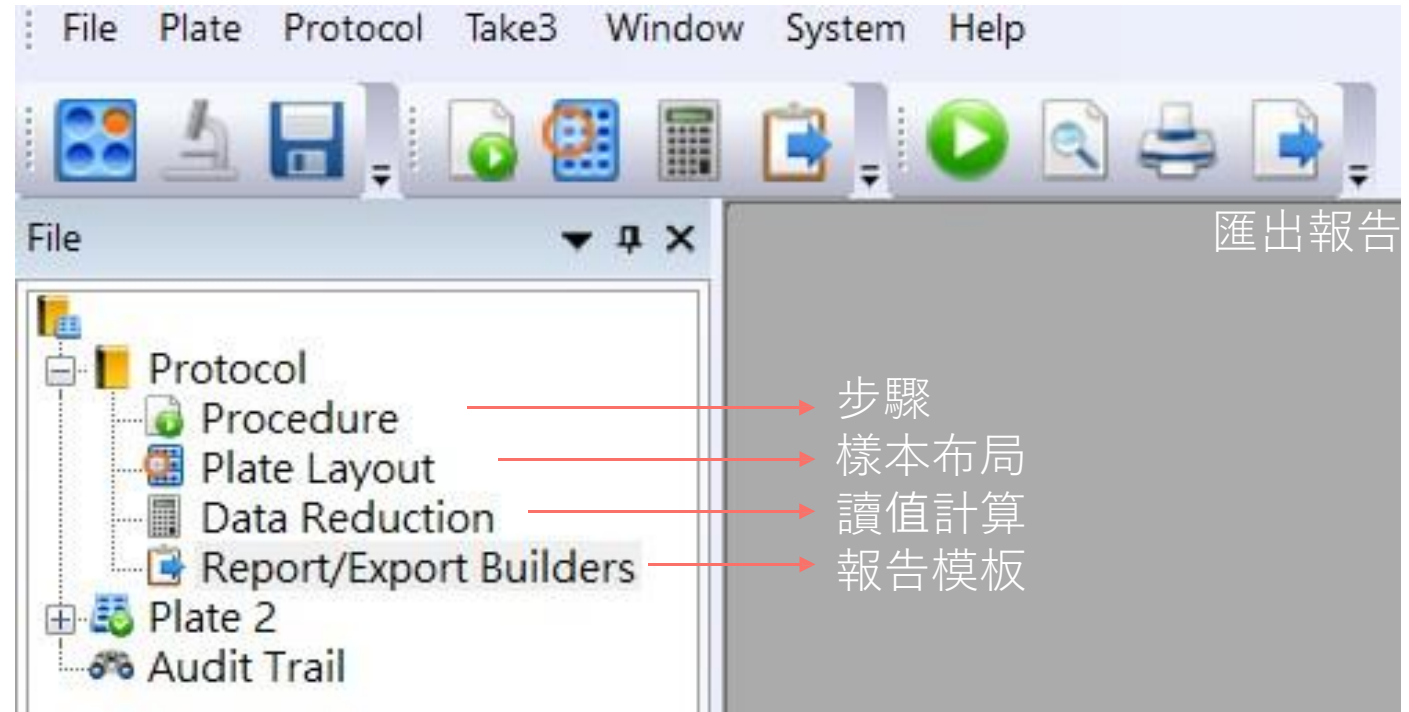


Gen5軟體的功能介面介紹

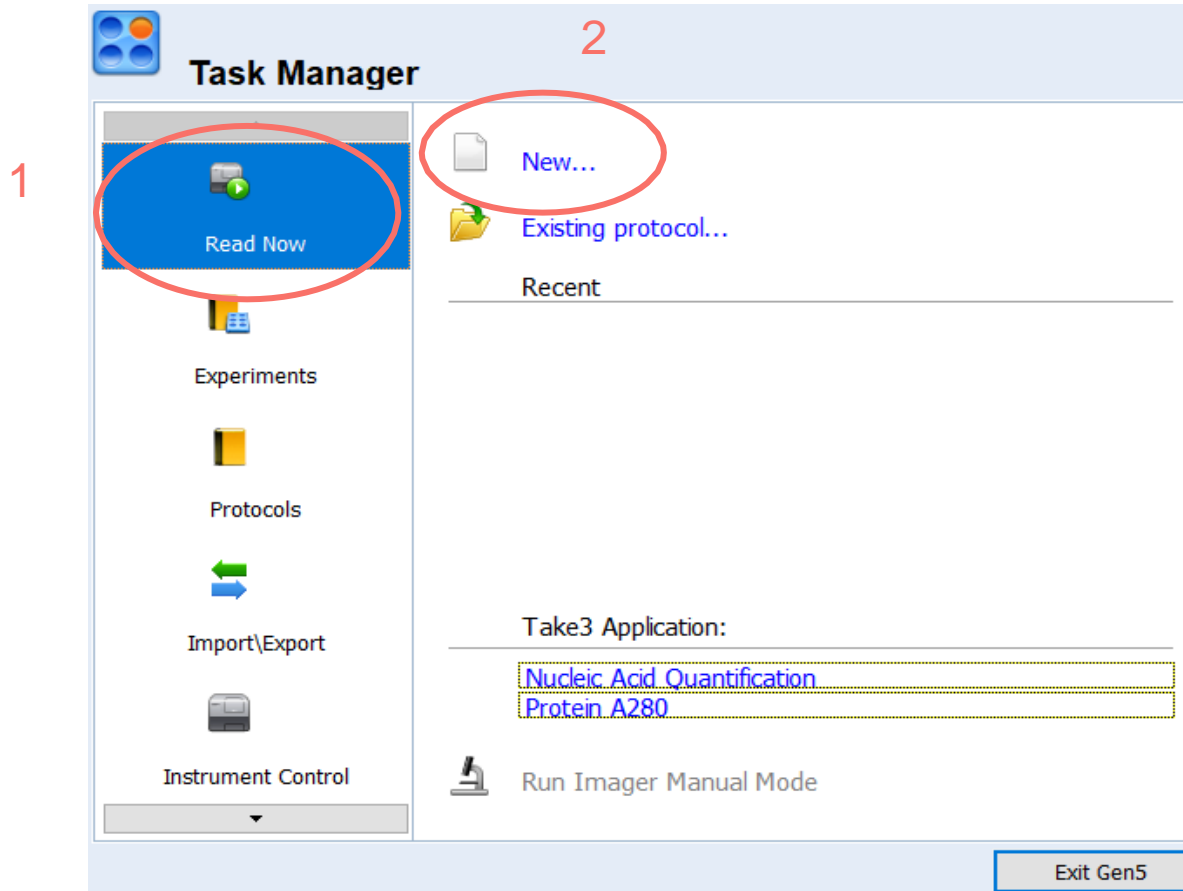


功能

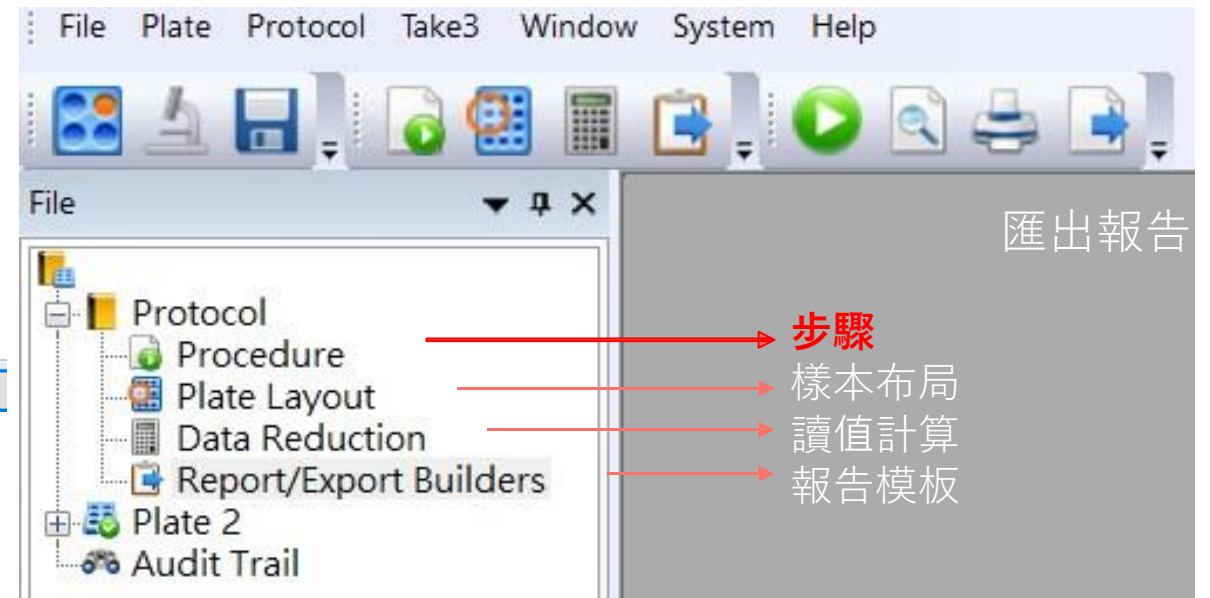
- 盤型
- 設定波長、溫度、震盪
- Plate Layout: 樣本佈局
- Data Reduction: 讀值運算及標準曲線
- 匯出報告



建立新的實驗檔



- Experiment
- Protocol



Protocol-Procedure設置

3

Favorite	Name	Wells
<input checked="" type="checkbox"/>	24 WELL PLATE	24
<input checked="" type="checkbox"/>	96 WELL PLATE	96
<input checked="" type="checkbox"/>	384 WELL PLATE	384
<input checked="" type="checkbox"/>	12 WELL PLATE	12
<input checked="" type="checkbox"/>	8030015 Harta - w/o 8032028 adapter	96
<input checked="" type="checkbox"/>	96 WELL PLATE- 31	96
<input checked="" type="checkbox"/>	Costar 24 well- Updated for Biospa	24
	48 WELL PLATE	48
	72 WELL PLATE TERASAKI	72
	60 WELL PLATE TERASAKI	60
	96 WELL PLATE TERASAKI	96
	96 WELL PLATE HELMA	96
	6 WELL PLATE	6
	96 WELL PLATE METRIC	96

3. 選取盤型

4. 選取偵測步驟

5. 選取偵測模式

Procedure - Epoch 2 (Com1)

Select steps

Actions 4

Read

Set Temperature

Shake

Kinetic

Start Kinetic

Monitor Well

Append Reads

Pause

Delay

Plate Out/In

Stop/Resume

Other

Plate Type: 96 WELL PLATE Use lid

Cuvette

Select wells: Per step At runtime

Read Method

Detection Method 5

Absorbance

Fluorescence intensity

Luminescence

Fluorescence polarization

Time-resolved fluorescence (flash)

Time-resolved fluorescence (laser)

Alpha

Image

Read Type

Endpoint / Kinetic

Spectral scanning

Area scanning

Optics Type

Filters

Monochromators

Luminescence fiber

OK Cancel Help

Protocol-Procedure設置

吸收光波長設定

Read Step



Step Label:

<default>

Full Plate

Wavelengths

1

2

3

4

5

6

450

650

Read Speed:

Normal



Edit

Pathlength Correction

Edit

光徑校正

OK

Cancel

Help

Protocol-Procedure設置

螢光波長設定

Read Step ×

Step Label: Full Plate

Filter Sets

1 2 3 4 5 6

Excitation: ▾

Emission: ▾

Optics Position: ▾

Gain: Options...

Filter Switching per Well

Read Speed: ▾ Edit

Time resolved options: Edit Light Source: ▾

Read Height: mm

OK Cancel Help

偵測位置: 盤上或盤底

PMT靈敏度: Gain值越大、讀值越大

Protocol-Procedure設置

冷光設定

Read Step

Step Label: Full Plate

Filter Sets

1 2 3 4 5 6

Excitation:

Emission:

Optics Position: 偵測位置: 盤上或盤底

Gain: PMT靈敏度: Gain值越大、讀值越大

Filter Switching per Well

Integration Time: MM:SS.ss Edit 收光時間: 收光越久、讀值越大

Read Height: mm

Protocol-Procedure設置

溫度及震盪

Procedure - Epoch 2 (Com)

Select steps

Actions

- Read
- Set Temperature**
- Shake**

Kinetic

- Start Kinetic
- Monitor Well
- Append Reads

Pause

- Delay
- Plate Out/In
- Stop/Resume

Other

設定溫度

Temperature Step

Incubator Off

Incubator On

Temperature: °C Gradient: °C

Preheat before continuing with next step

OK Cancel Help

設定震盪

Shake Step

Shake Mode:

Duration: MM:SS

Continuous Shake

Linear Frequency: Slower Faster 567 cpm (3 mm)

Orbital Speed: Slow Fast

OK Cancel Help

Protocol-Procedure設置

Kinetic 設置

Procedure - Epoch 2 (Com3)

Select steps

Actions

- Read
- Set Temperature
- Shake
- Kinetic**
- Monitor Well
- Append Reads

Pause

- Delay
- Plate Out/In
- Stop/Resume

Other

- Comment
- Options

Plate Type: 96 WELL PLATE Use lid

Cuvette

Select wells: Per step At runtime

Kinetic Step

Run Time: 0:10:00 HH:MM:SS

Interval: 0:01:00 Minimum Interval (requires reader)

Reads: 11 1 read only (baseline)

OK Cancel Help

Validate OK Cancel Help

Protocol-Procedure設置

Procedure - Synergy H1 (Com1)

Select steps

Actions

- Read
- Set Temperature
- Shake
- Dispense

Kinetic

- Start Kinetic
- Monitor Well
- Append Reads

Pause

- Delay
- Plate Out/In
- Stop/Resume

Process Mode

- Well Mode
- Plate Mode

Other

- Comment
- Options

Plate Type: 96 WELL PLATE Use lid
 Cuvette

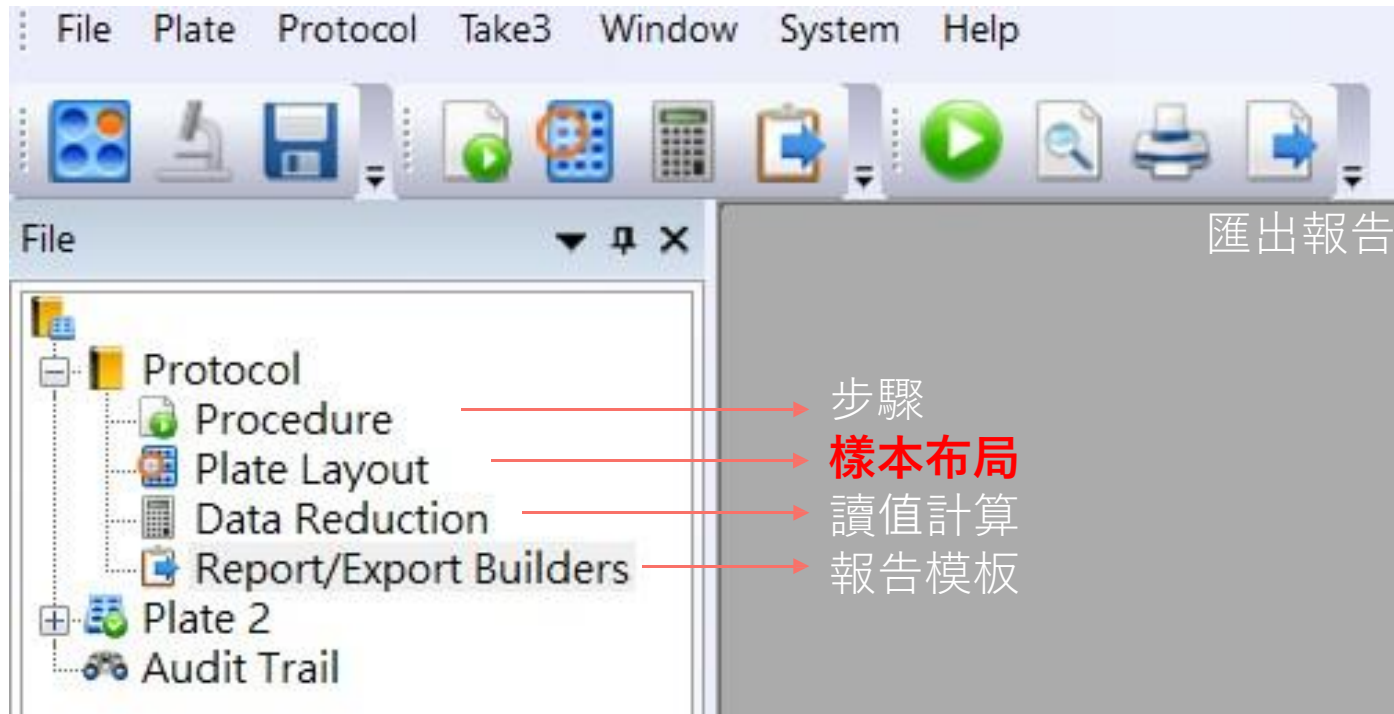
Select wells: Per step At runtime

Description	Comments
🌡️ Temperature: Setpoint 37 °C	
🌀 Shake: Linear for 0:05	
📄 Read: (A) 450	

依據步驟順序由上而下排列

Validate OK Cancel Help

Protocol-Plate Layout設置



Protocol-Plate Layout設置

Plate Layout Wizard

Select well types

Blanks
Used for background signal subtraction

Assay Controls
Negative, Positive, Calibrators,... or serially diluted controls
Used for assay validation, cut-off analysis, normalization, or to generate reference curves (toxicology, curve comparison).
Number of different control types: 1

Standard Curves
Required to generate standard curves and calculate unknown concentrations.
 Use multiple Standard Curves: 2

Samples
Test wells requiring data analysis (calculation of concentration, EC50,...)

Sample Controls
SPLC1 associated with Sample 1, SPLC2 associated with Sample 2,...
Can be used as individual sample blanks, spikes...

Do not show wizard again

< Back Next > Cancel

勾選樣本類型

Plate Layout Wizard

Standard Curve #1

Please define the settings of Standard Curve #1.

Plate Layout ID: STD Full Name: Standards, reference curve...
STD, REF...
Replicates: 1

Conc.\Dil. values Colors

Define dilutions/concentrations

Type: Concentrations Unit:

STD1	1000
STD2	500
STD3	125
STD4	0
STD5	
STD6	
STD7	
STD8	
STD9	

Auto
 Increment:
 Factor:
 Ratio:

Clear list

Do not show wizard again

< Back Next > Cancel

輸入標準品濃度

Protocol-Plate Layout設置

Plate Layout

Select a Well ID in the list on the left, then assign to the matrix.

Add... Delete

- <Empty>
- BLK (x2)
- STD (x10)
 - 0 (x2)
 - 10 (x2)
 - 25 (x2)
 - 50 (x2)
 - 100 (x2)
- Sample
 - SPL1 (x2)
 - SPL2 (x2)
 - SPL3 (x2)
 - SPL4 (x2)
 - SPL5 (x2)
 - SPL6 (x2)
 - SPL7 (x2)
 - SPL8 (x2)
 - SPL9 (x2)
 - SPL10 (x2)
 - SPL11 (x2)
 - SPL12 (x2)
 - SPL13 (x2)
 - SPL14 (x2)
 - SPL15 (x2)
 - SPL16 (x2)
 - SPL17 (x2)
 - SPL18 (x2)
 - SPL19 (x2)
 - SPL20 (x2)
 - SPL21 (x2)
 - SPL22 (x2)
 - SPL23 (x2)
 - SPL24 (x2)
 - SPL25 (x2)
 - SPL26 (x2)
 - SPL27 (x2)
 - SPL28 (x2)
 - SPL29 (x2)

	1	2	3	4	5	6	7	8	9	10	11	12
A	BLK	STD1 0	STD2 10	STD3 25	STD4 50	STD5 100	SPL1	SPL2	SPL3	SPL4	SPL5	SPL6
B	BLK	STD1 0	STD2 10	STD3 25	STD4 50	STD5 100	SPL1	SPL2	SPL3	SPL4	SPL5	SPL6
C	SPL7	SPL8	SPL9	SPL10	SPL11	SPL12	SPL13	SPL14	SPL15	SPL16	SPL17	SPL18
D	SPL7	SPL8	SPL9	SPL10	SPL11	SPL12	SPL13	SPL14	SPL15	SPL16	SPL17	SPL18
E	SPL19	SPL20	SPL21	SPL22	SPL23	SPL24	SPL25	SPL26	SPL27	SPL28	SPL29	SPL30
F	SPL19	SPL20	SPL21	SPL22	SPL23	SPL24	SPL25	SPL26	SPL27	SPL28	SPL29	SPL30
G	SPL31	SPL32	SPL33	SPL34	SPL35	SPL36	SPL37	SPL38	SPL39	SPL40	SPL41	SPL42
H	SPL31	SPL32	SPL33	SPL34	SPL35	SPL36	SPL37	SPL38	SPL39	SPL40	SPL41	SPL42

Serial Assignment

Replicates: 1

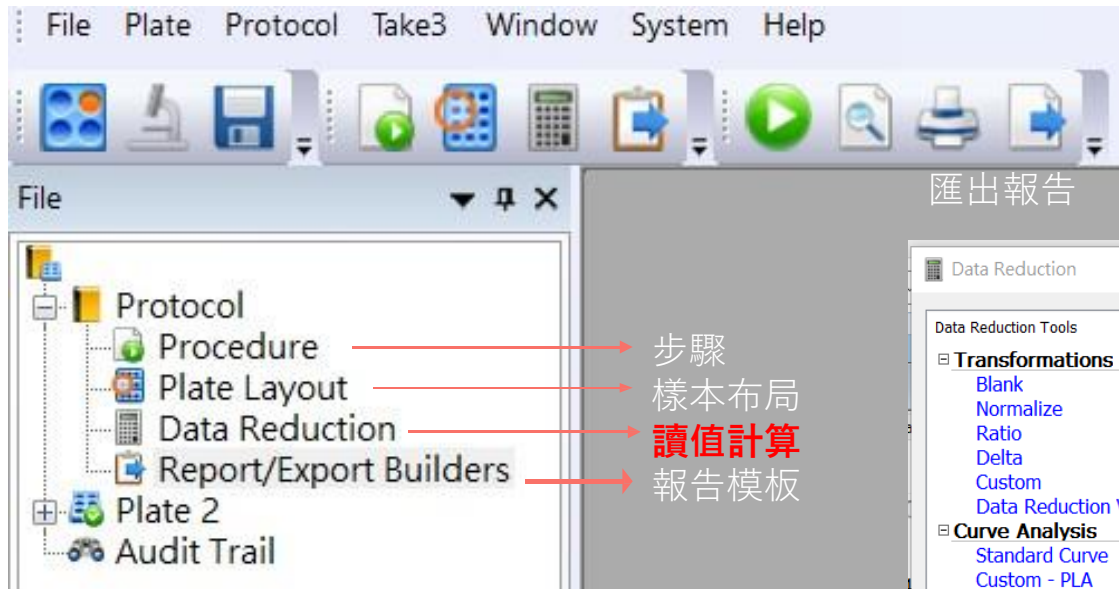
Next

Auto Select Next ID

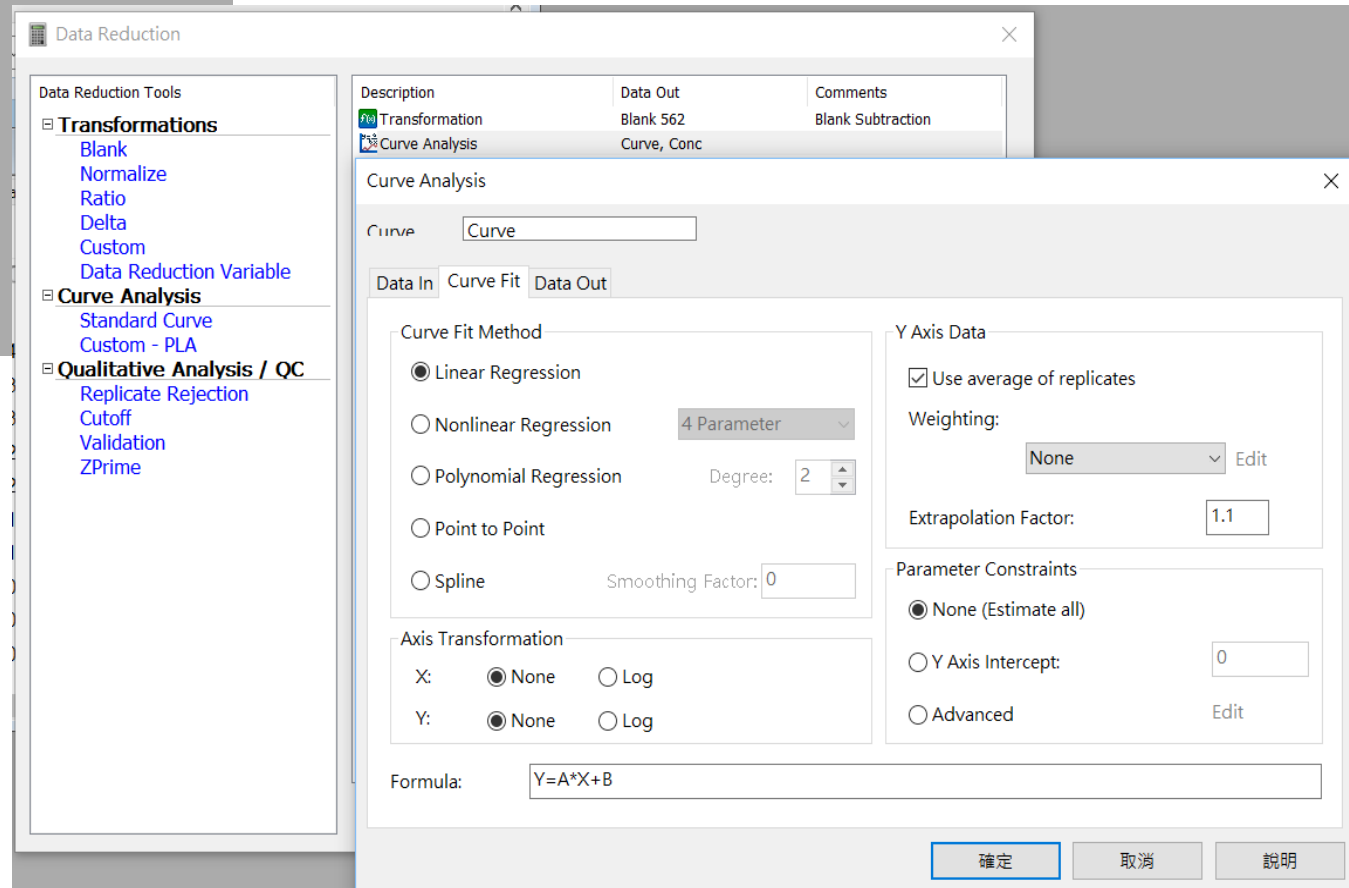
Import Export Undo Print

OK Cancel Help

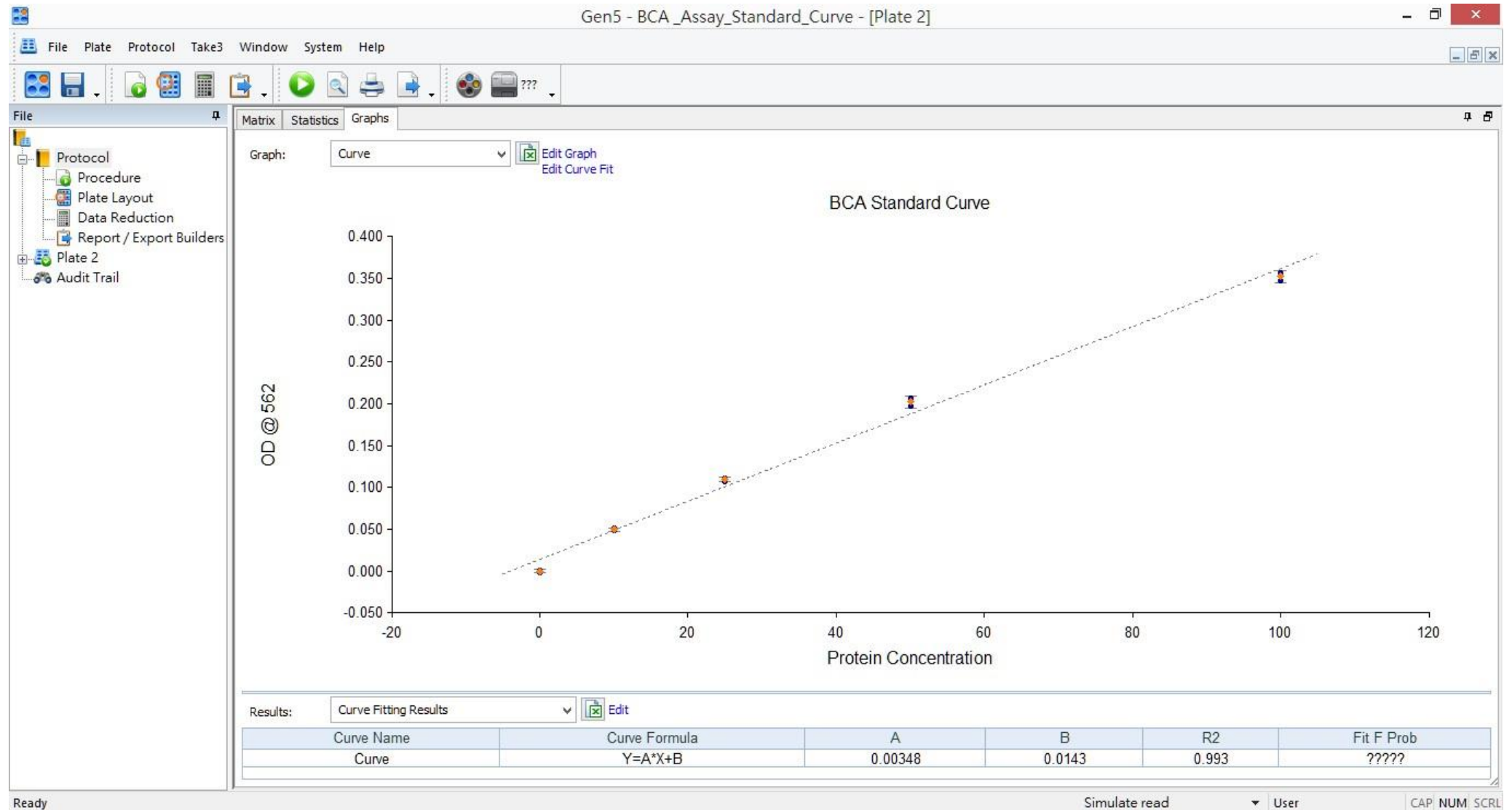
Protocol-Data Reduction



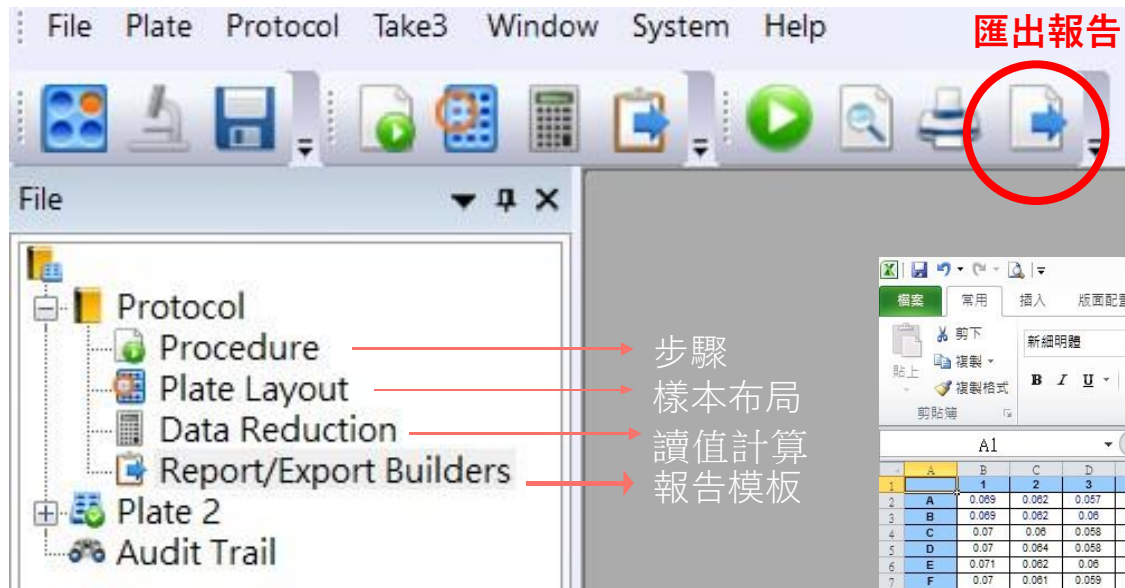
步驟
樣本布局
讀值計算
報告模板



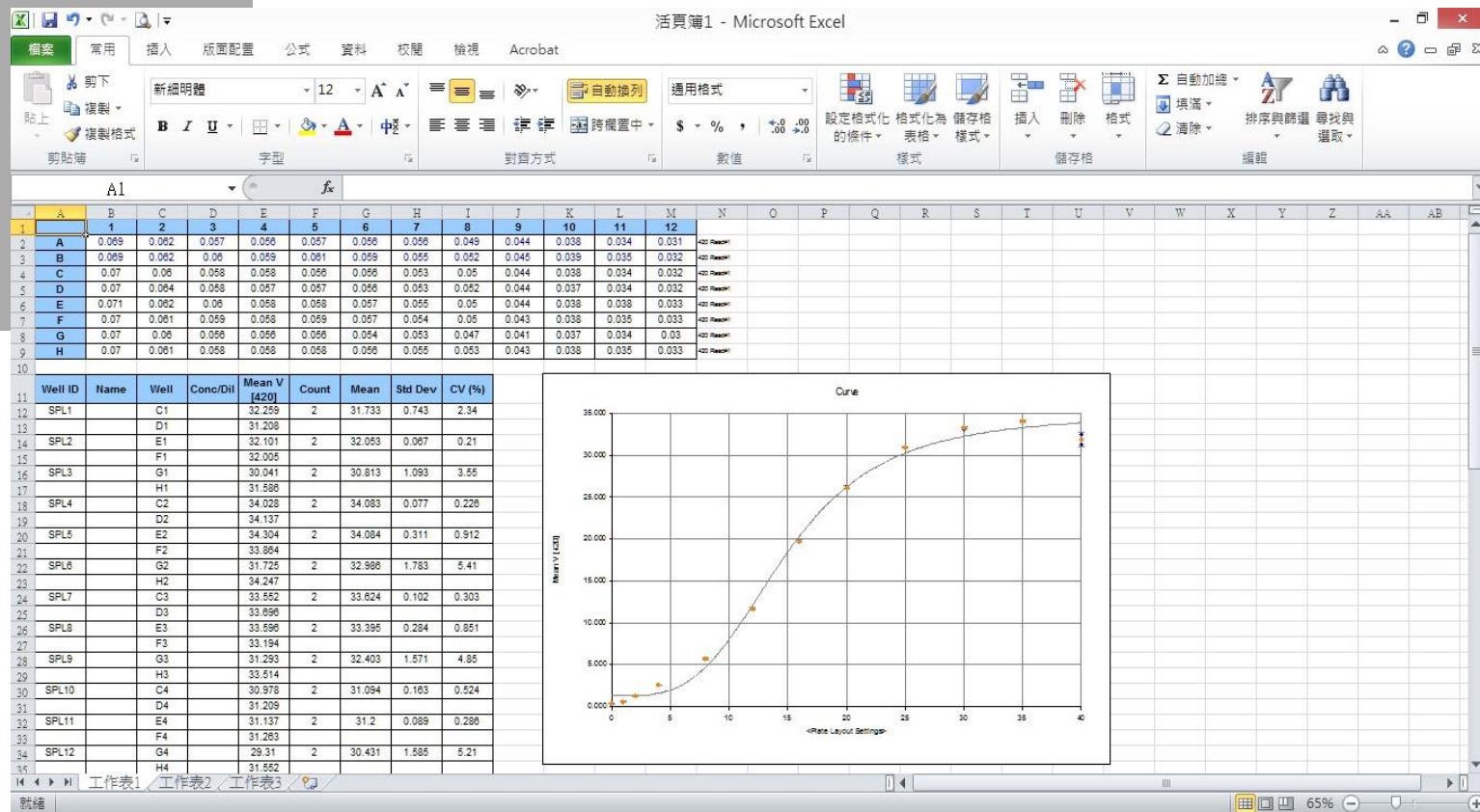
Protocol-Data Reduction



Protocol-匯出報告



步驟
樣本布局
讀值計算
報告模板



THE END

感謝聆聽



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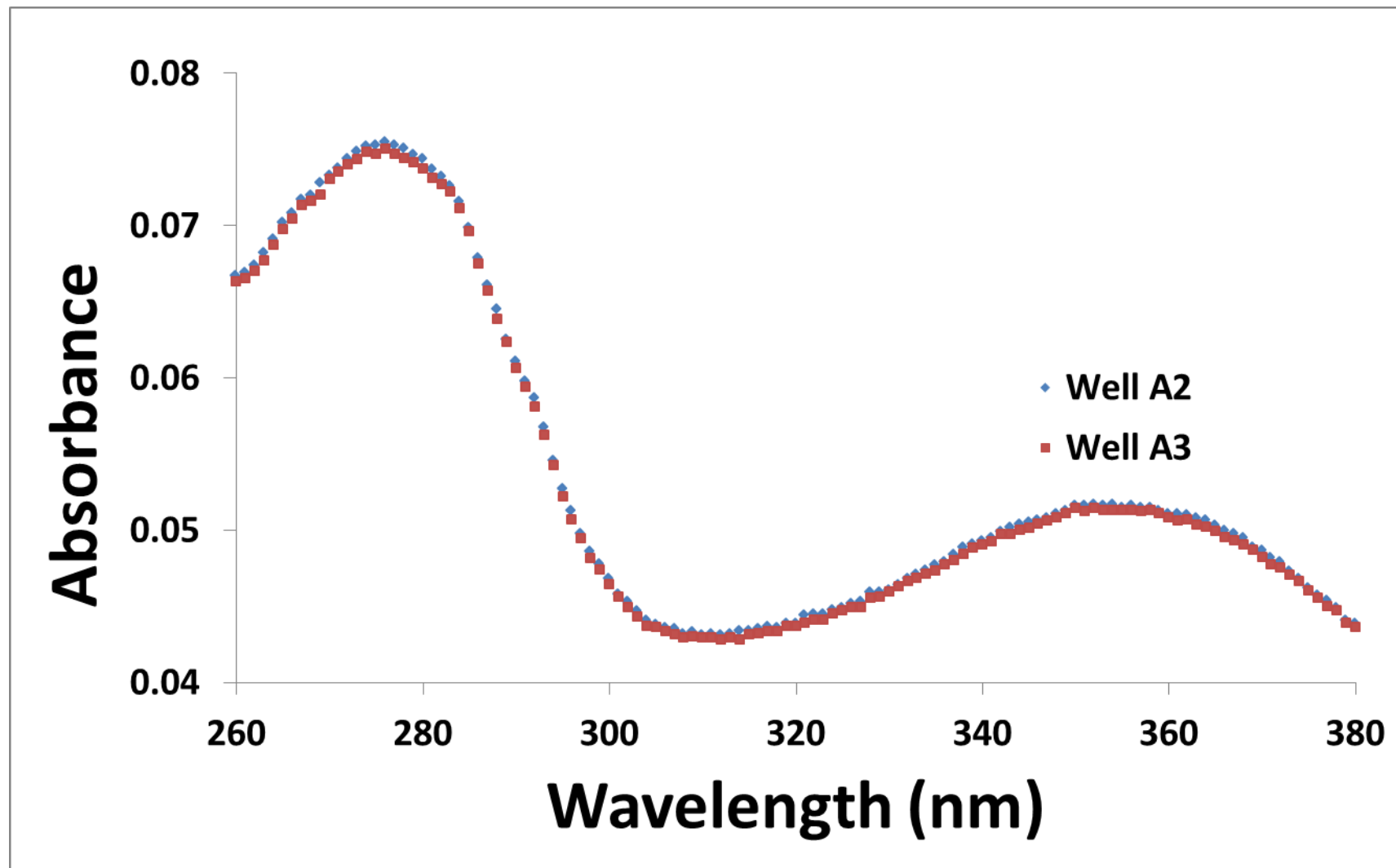


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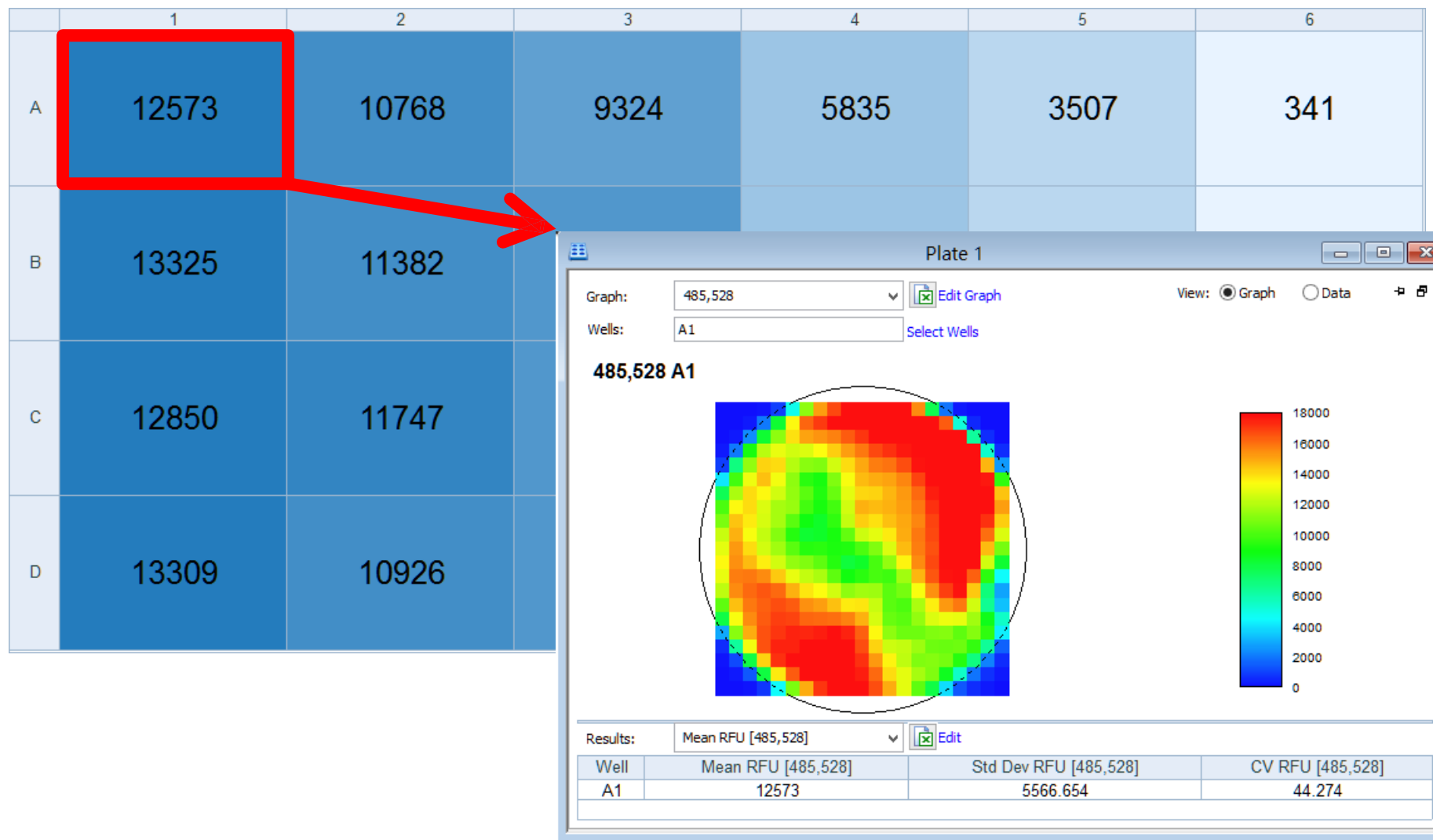


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