Agilent BioTek Synergy H1
多功能微量盤檢測儀

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level
Discovering new boundaries
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

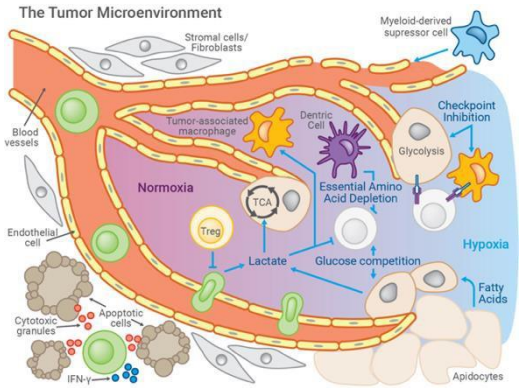
NovoCyte
流式細胞分析儀

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

Seahorse
實時無標記細胞能量分析儀



RTCA無標記
細胞實時動態分析

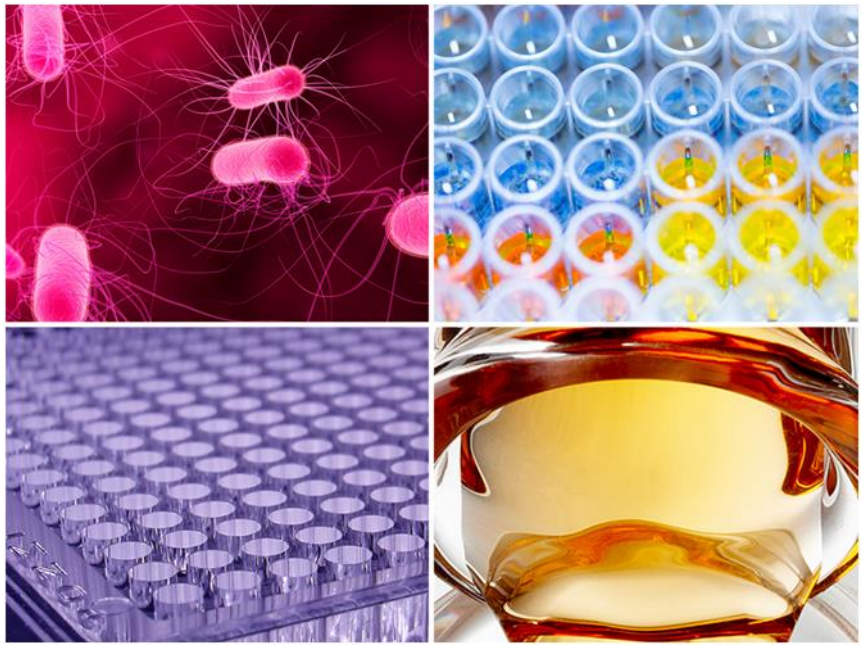
自動化清洗與分注儀

Cytation
細胞自動化影像與光學檢測

BioSpa 8
自動化活細胞培養箱

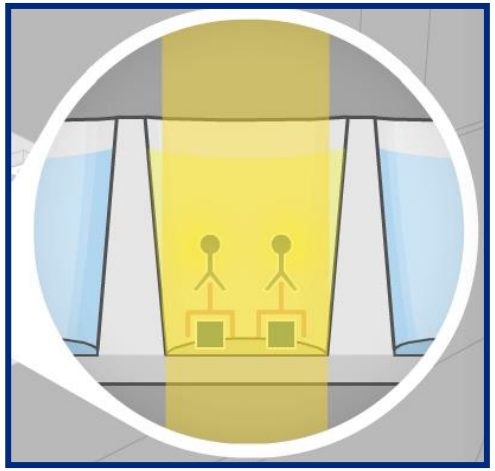
Outline

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

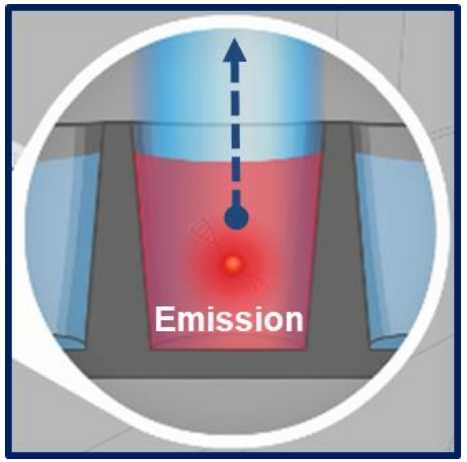


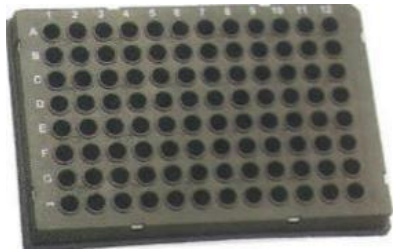
偵測方式

Absorbance
吸收光

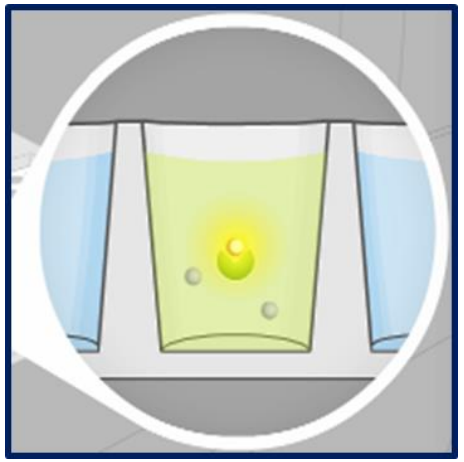


Fluorescence
螢光





Luminescence
冷光



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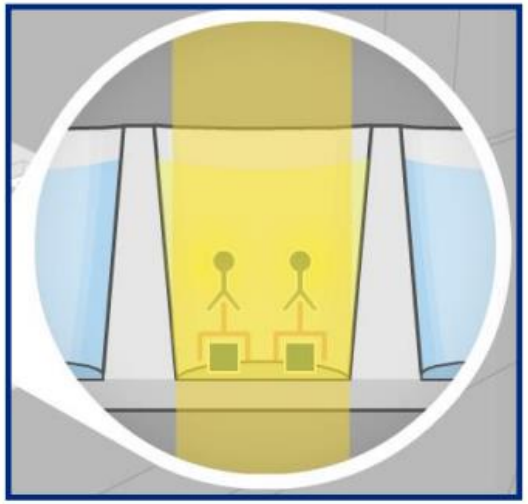
吸收光原理



Applications

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

Beer's Law

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

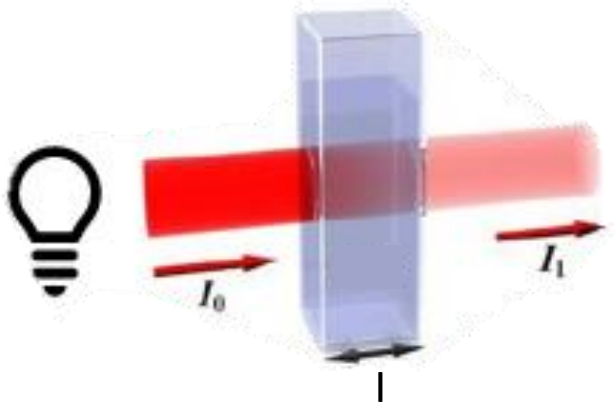
Lambert's Law

= 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

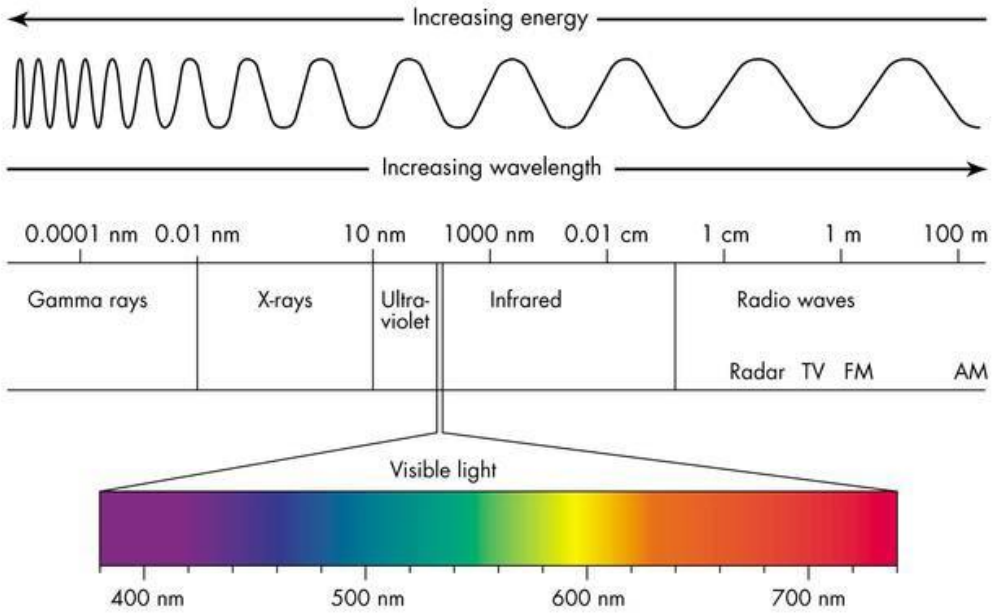
- 當光穿透樣品溶液時，光的吸收度(A)與吸收係數(ε)、光徑長(l)、濃度(c)三者均呈正比：A = ε l c



A = ε l c → 從吸收度推算測量液體濃度

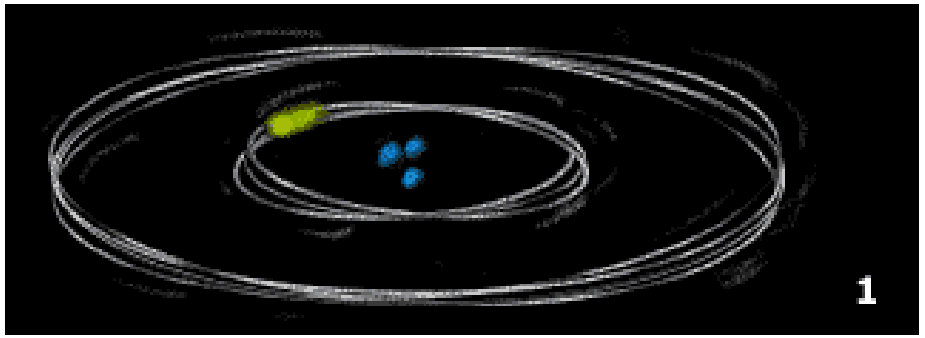
OD值 Optical Density

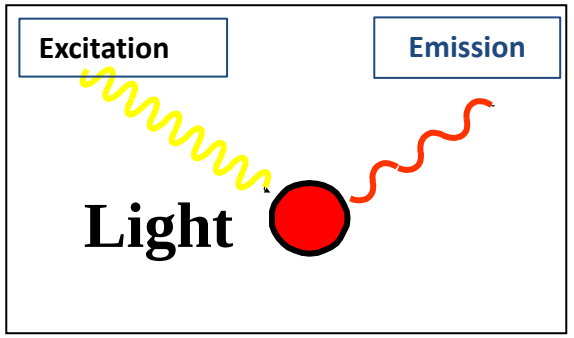
- 每種物質有其特定的吸收波長
- 一物質在某特定波長及固定距離下對該光源的吸收值

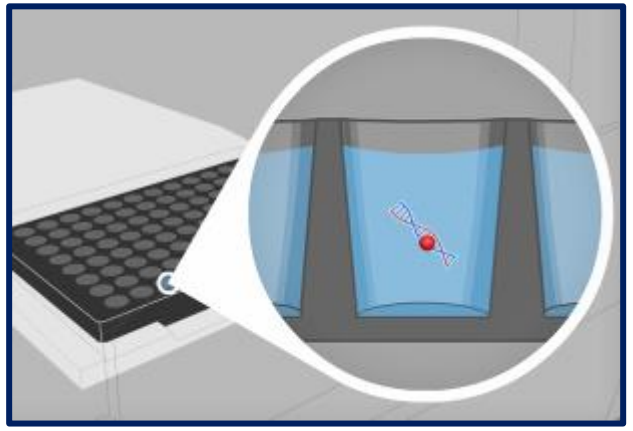


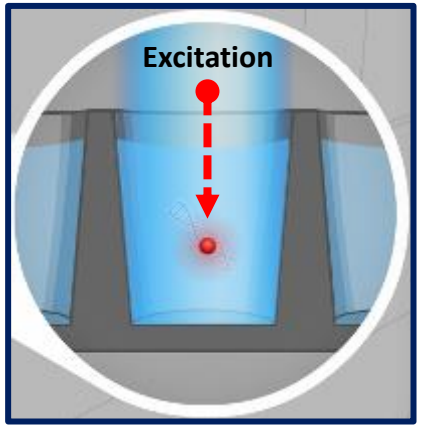
藉由觀察樣本之吸收度(A)或O.D.，可得知待測樣本之濃度

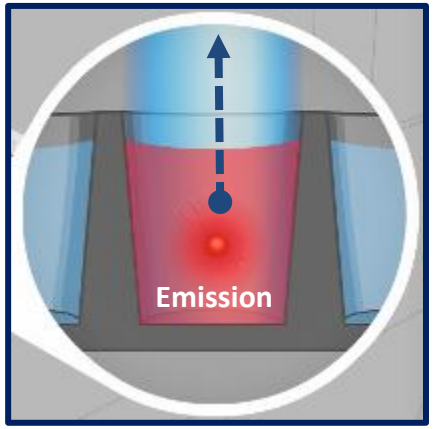
螢光原理







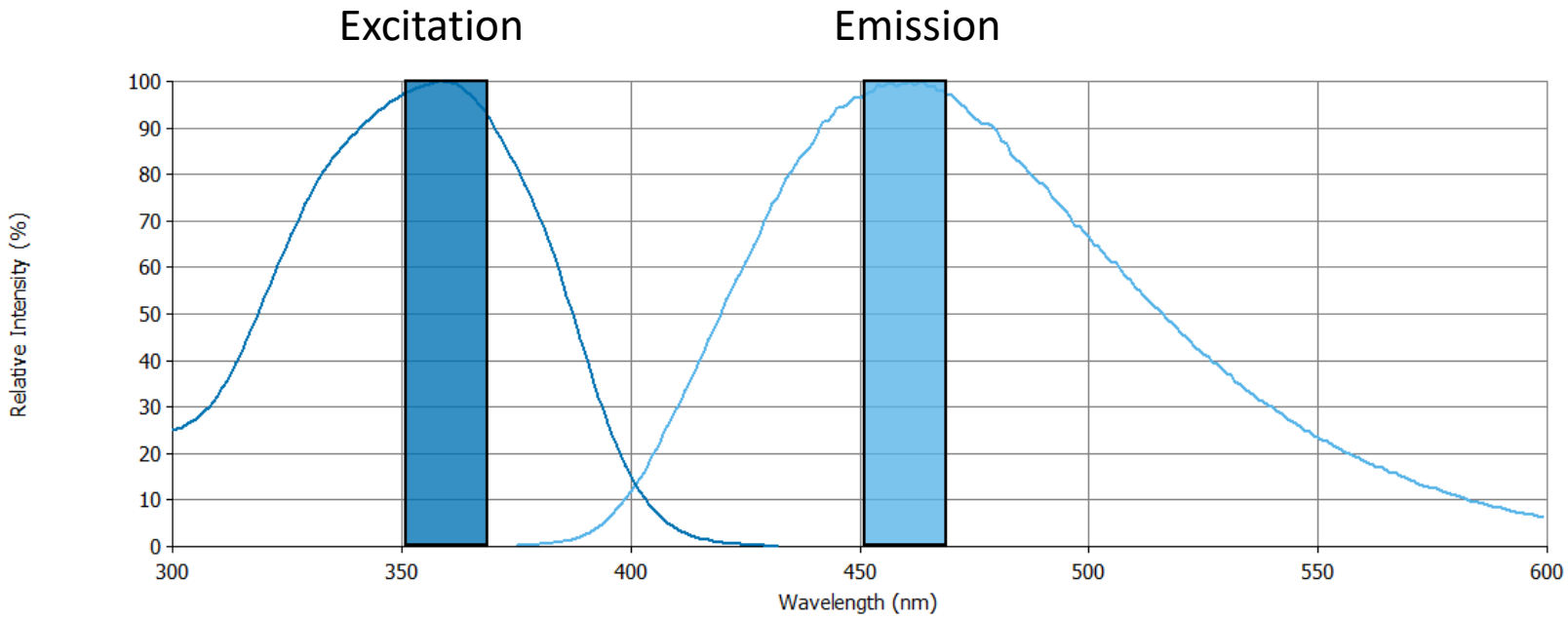




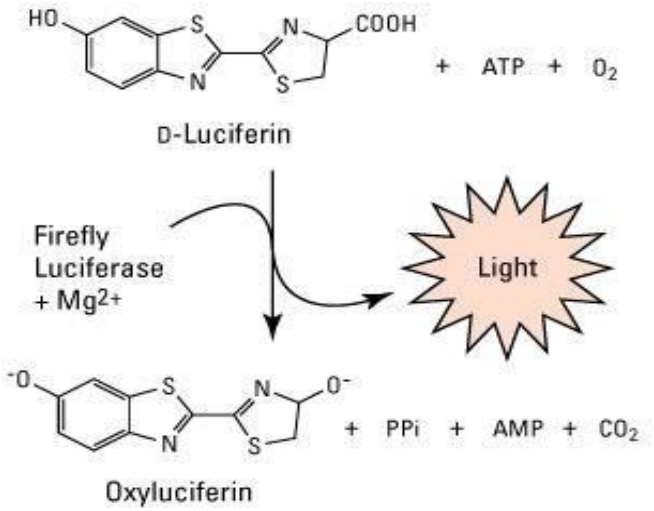
Unit：RFU (Relative Fluorescence Units)

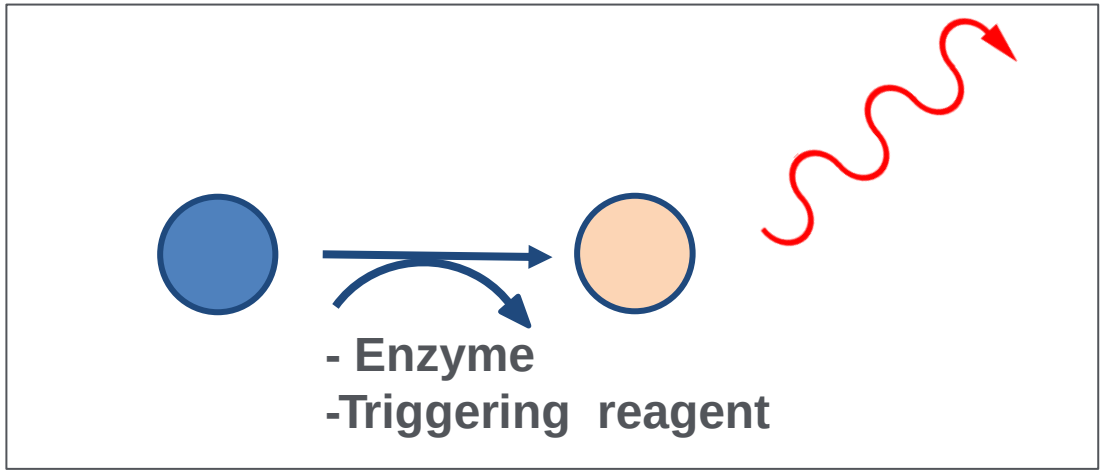
螢光原理

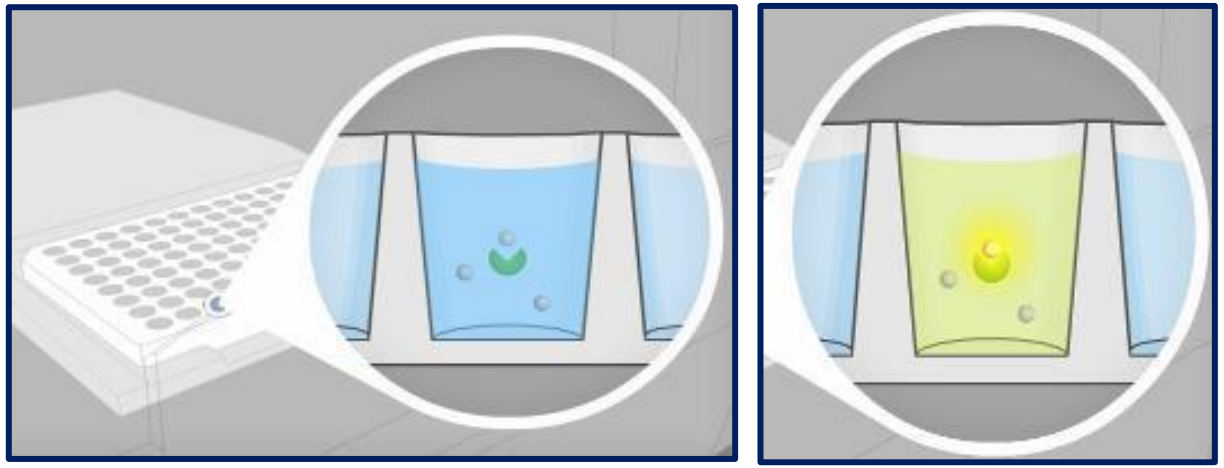
- Excitation 激發光
  - 光源激發螢光分子
- Emission 散射光
  - 螢光分子產生散射光
- 儀器偵測的是?
  - Emission激發光的數值
- Bandpass?
  - 波長可通過的範圍
- 460/40代表?
  - 440~480 nm範圍可通過濾鏡



冷光原理







Unit：RLU (Relative Luminescence Units)

H1 規格功能

偵測系統

全波長吸收光

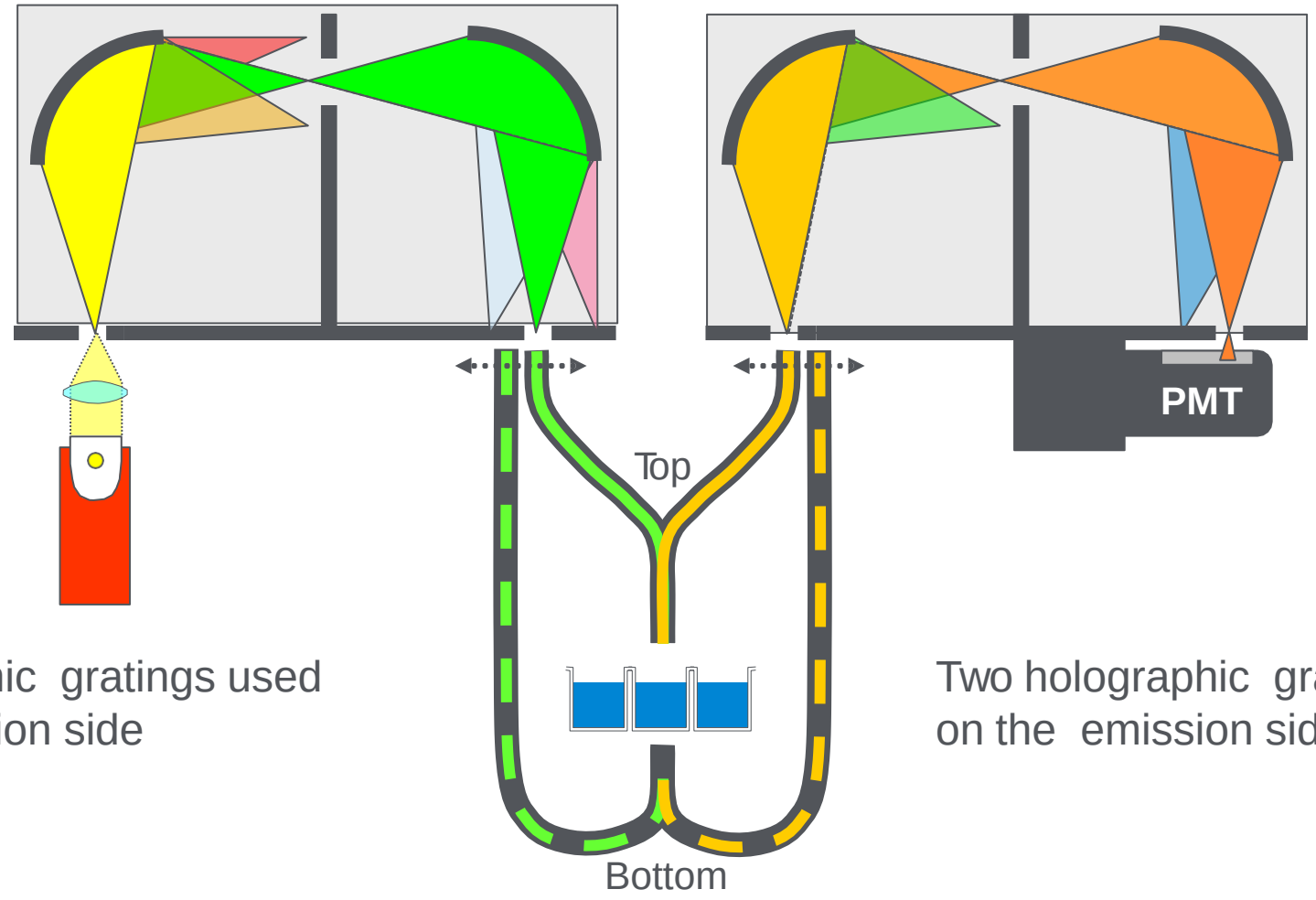
- 壽命長的氙氣燈，無需頻繁更換燈源
- 簡單的光學路徑，確保極佳的靈敏度(讀值解析度達0.0001 OD)
- 波長選擇：230 – 999 nm UV-VIS 連續波長，可調刻度1nm，無需濾鏡

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

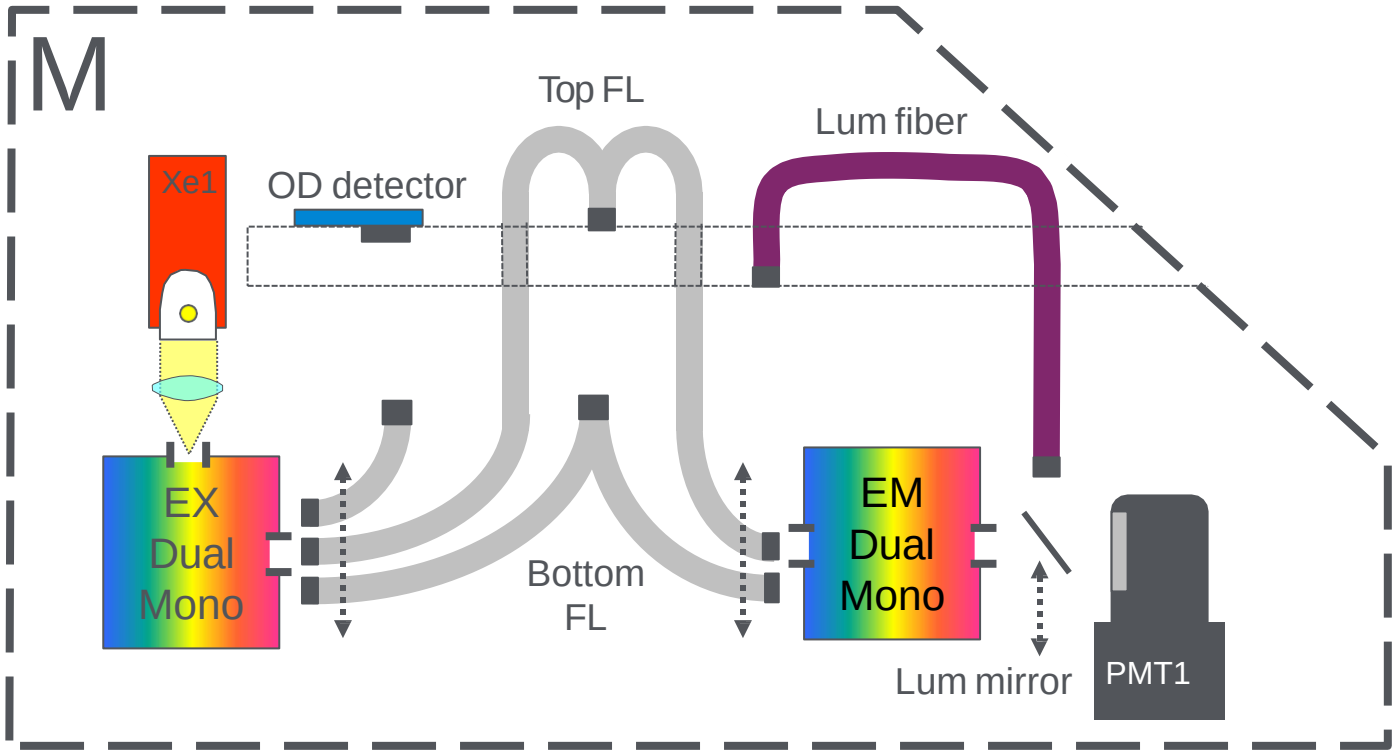
Quadruple Grating Monochromator System



Two holographic gratings used on the excitation side

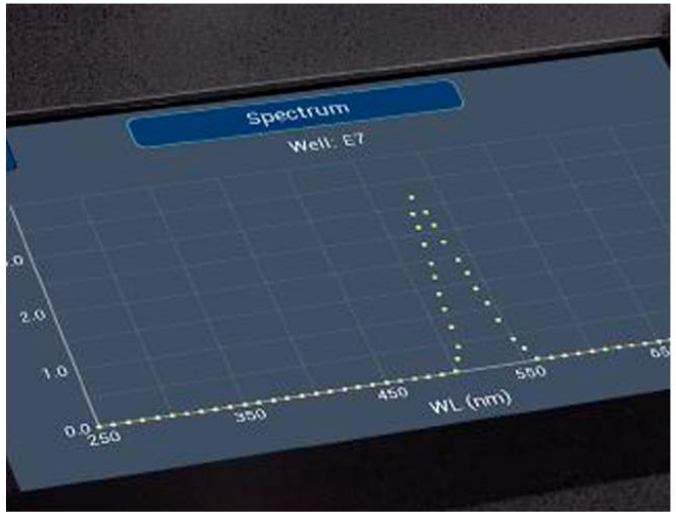
Two holographic gratings used on the emission side

光路結構

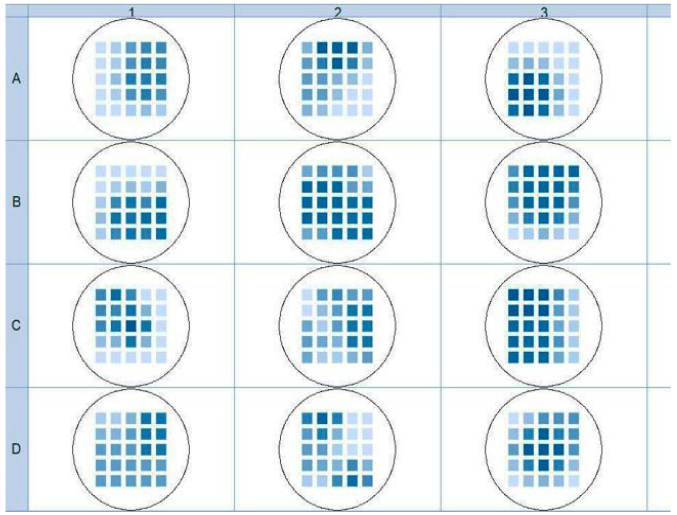

M
Top FL
Lum fiber
Xe1
OD detector
EX
Dual
Mono
Bottom
FL
EM
Dual
Mono
Lum mirror
PMT1

讀取方法

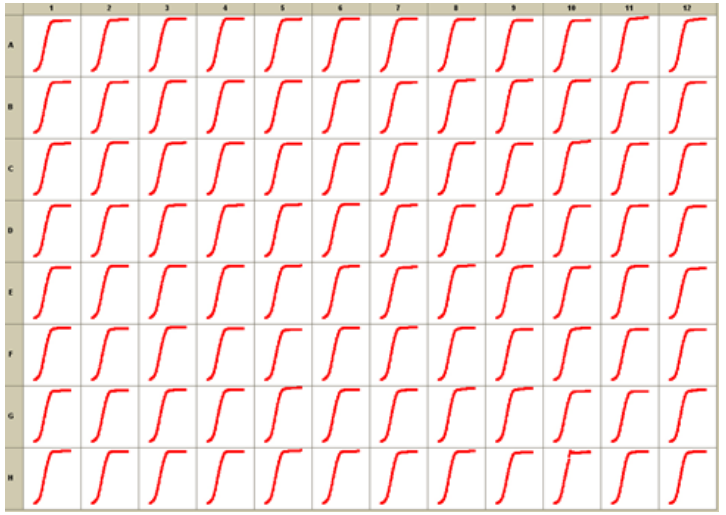
- 終點法、動力學分析、孔域掃描、光譜掃描



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

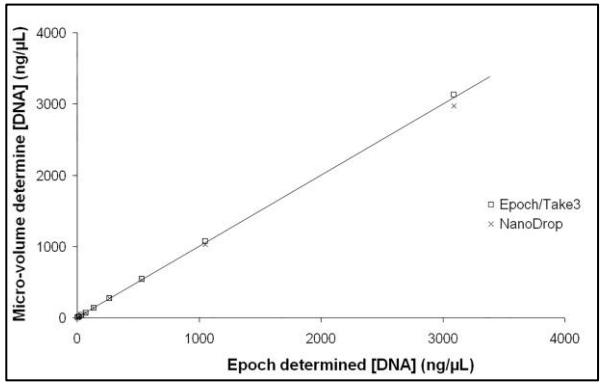
6-384孔微量盤

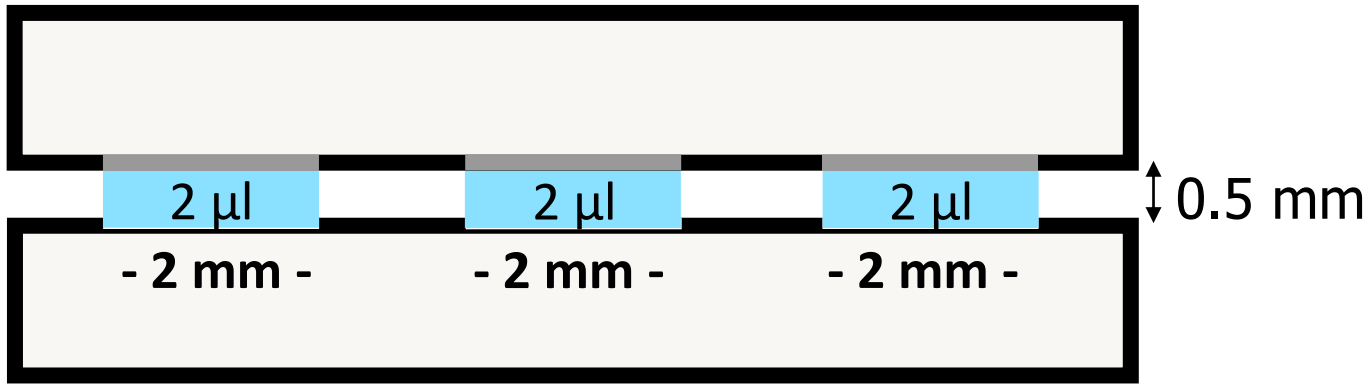
Take3
超微量定量偵測盤

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 µL) 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 µL樣本。





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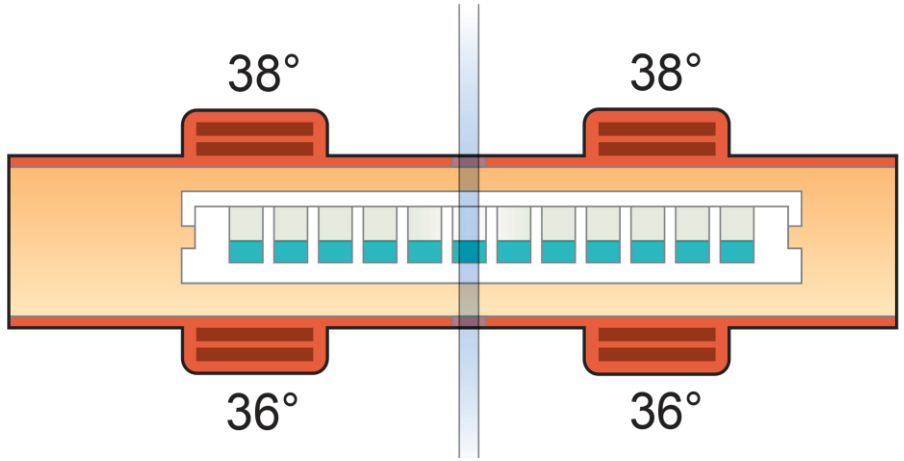
4-Zone 溫控設計與預防水氣凝結

- 精準的溫度控制：

  溫度一致性 +/- 0.5°C @ 37°C
- 加溫可至45℃
- “無風扇式 Fan-Free” 設計：

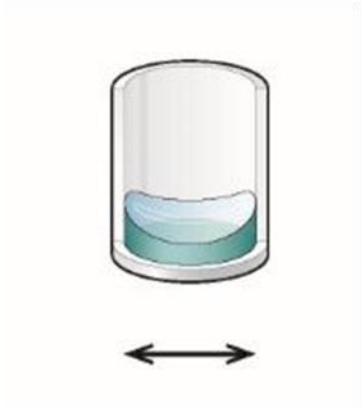
  避免 edge effect
- 預防水氣凝結於上蓋：

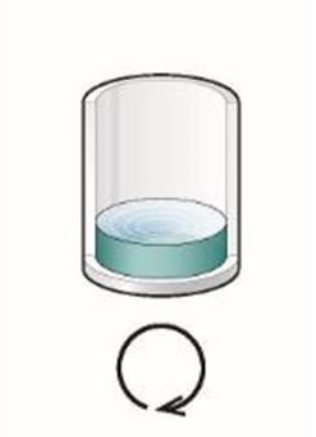
  上方加熱板溫度高於下方加熱板，形成溫度梯度



上方加熱面板的溫度較高

多種震盪模式



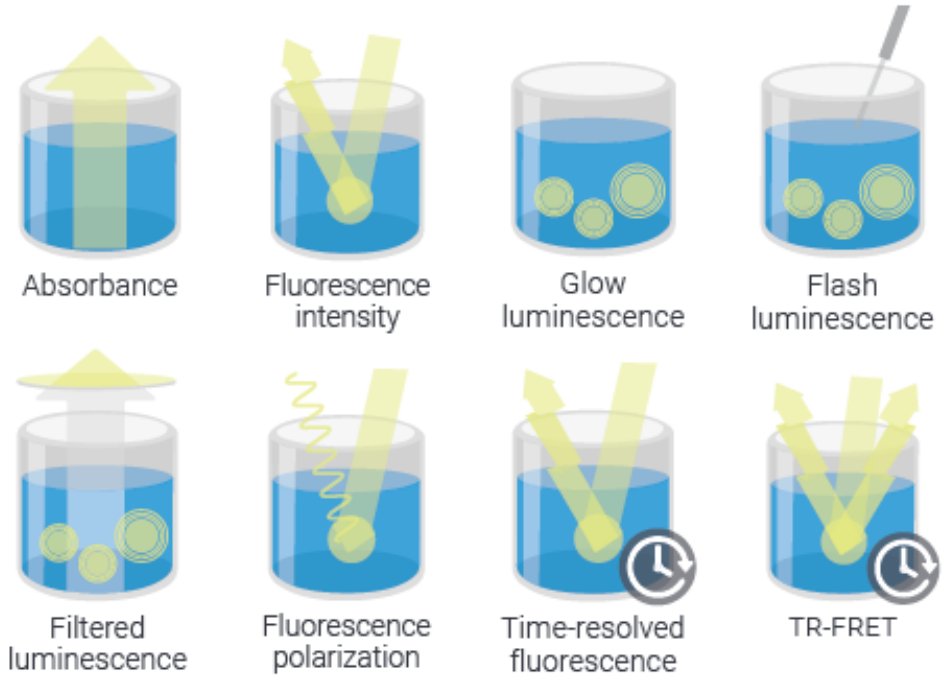


Linear shaking 線性震盪	Orbital shaking 橢圓形震盪	Double-orbital shaking 雙橢圓形震盪
強烈震盪，適合非細胞實驗	較溫和的震盪，適合細胞實驗	適合細胞實驗， 可避免細胞聚 集於中心成團

Synergy H1 偵測模式&應用

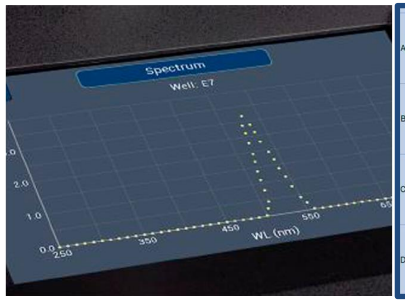
吸收光、螢光、冷光

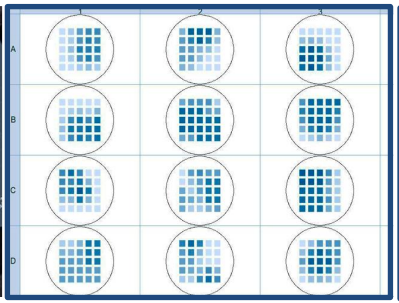
- ✓ 核酸定量
- ✓ 蛋白質定量
- ✓ 酵素動力學分析
- ✓ 生物標記定量
- ✓ ELISA
- ✓ 基因分析
- ✓ 細胞增生
- ✓ 細胞毒性

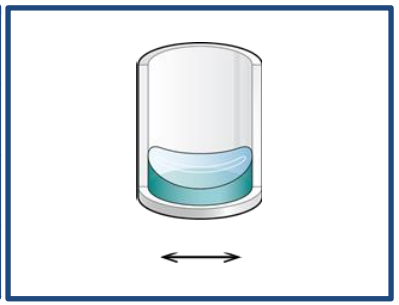


Synergy H1

- ✓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)



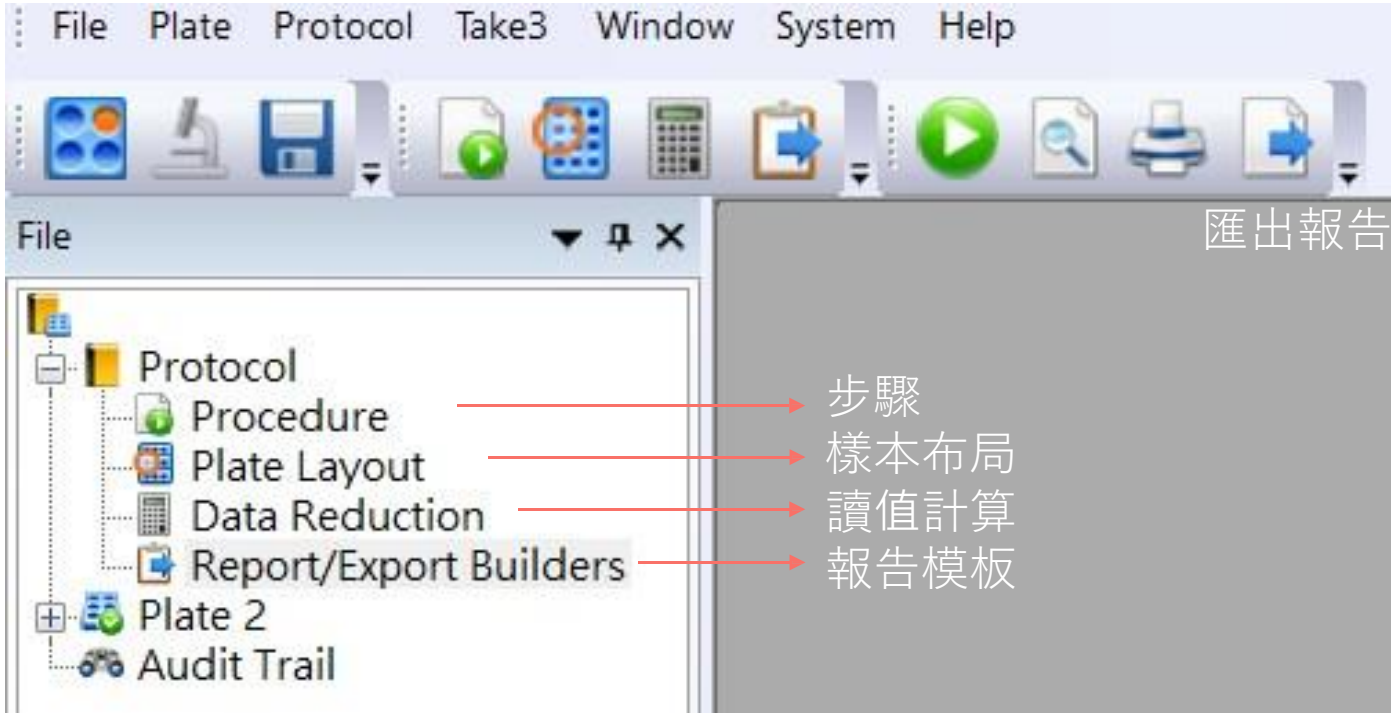




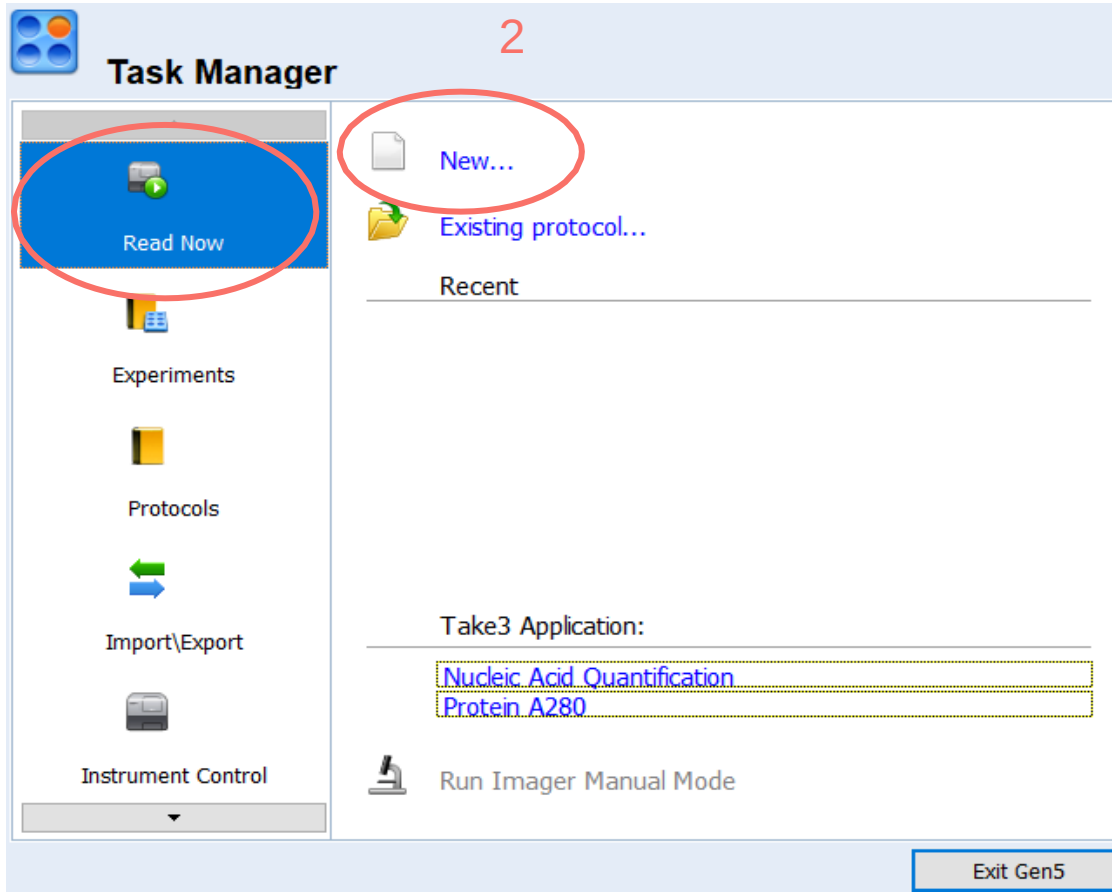
Gen5軟體的功能介面介紹

功能

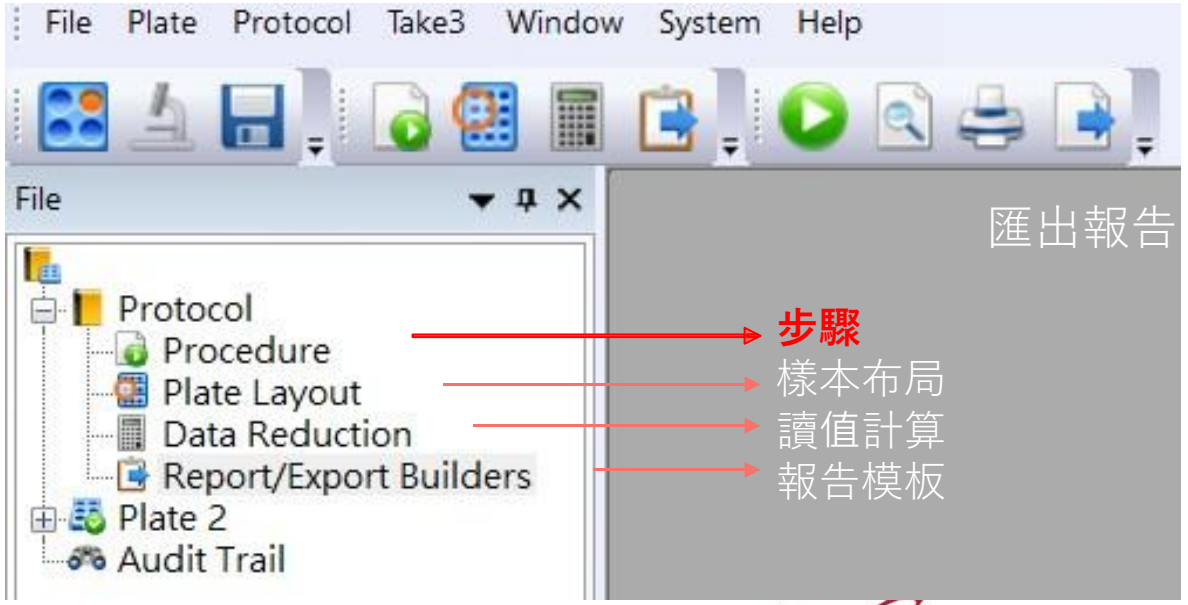
- 盤型
- 設定波長、溫度、震盪
- Plate Layout: 樣本佈局
- Data Reduction: 讀值運算及標準曲線
- 匯出報告



建立新的實驗檔

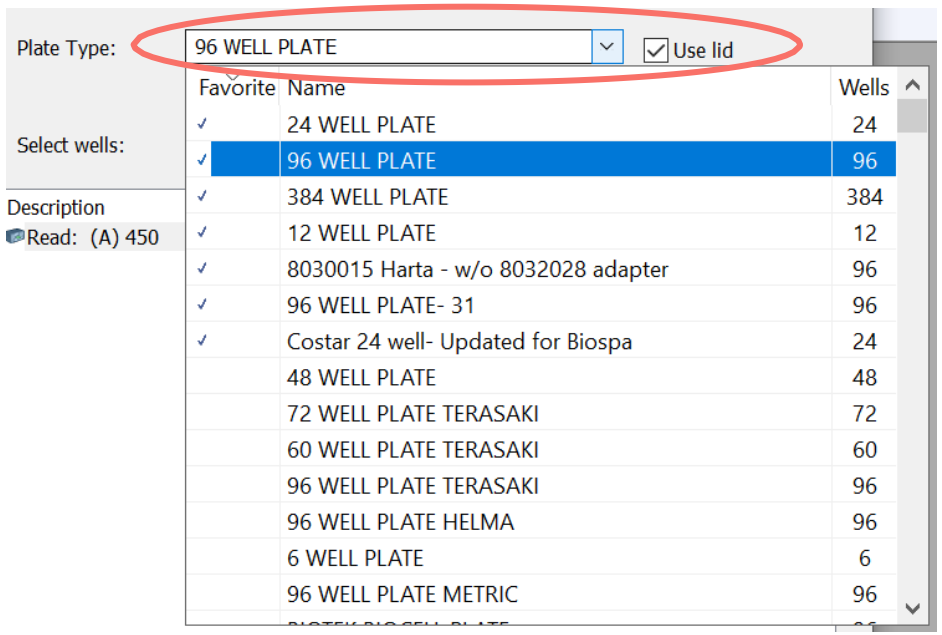


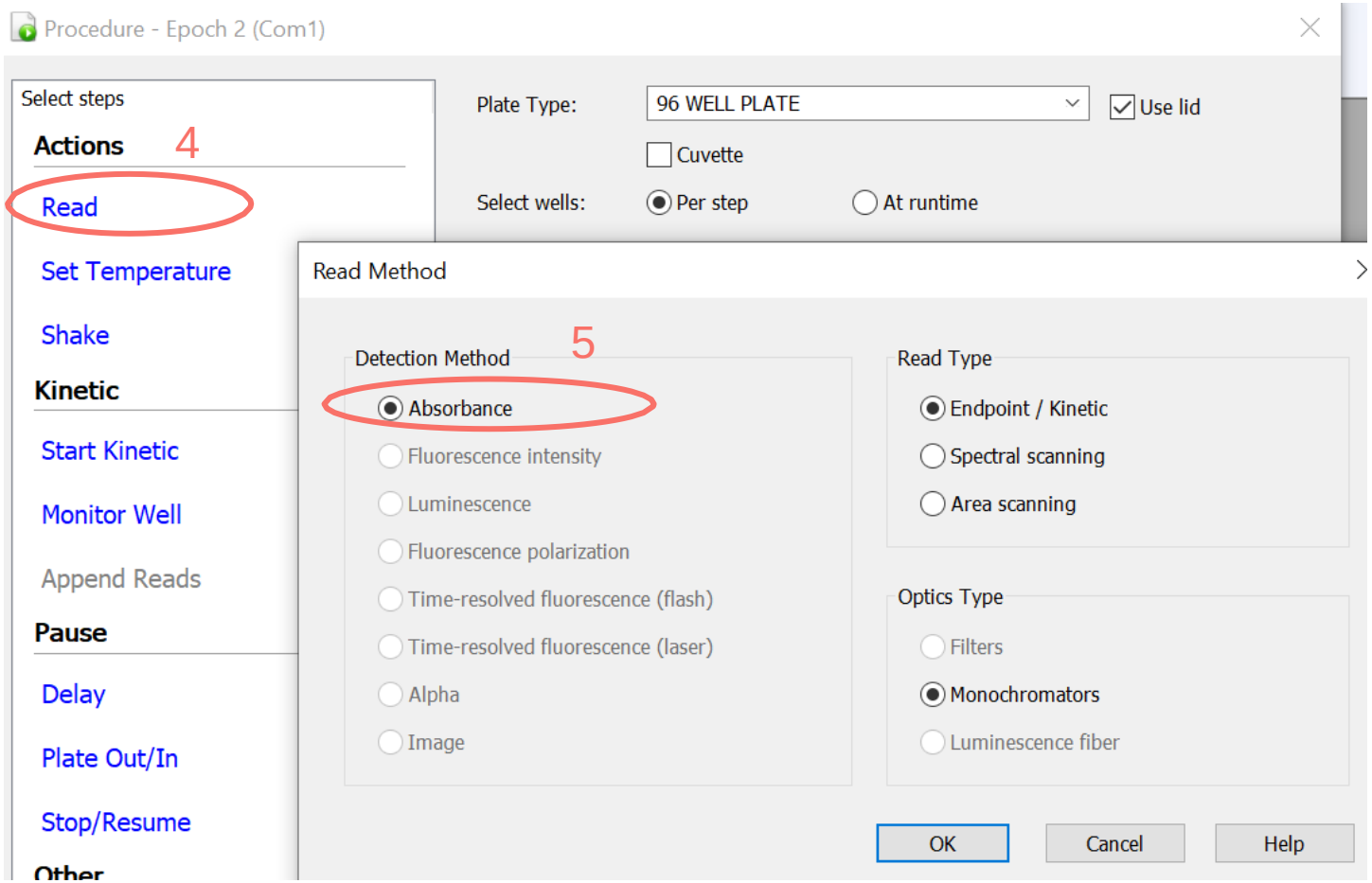
- Experiment
- Protocol



Protocol-Procedure設置

3

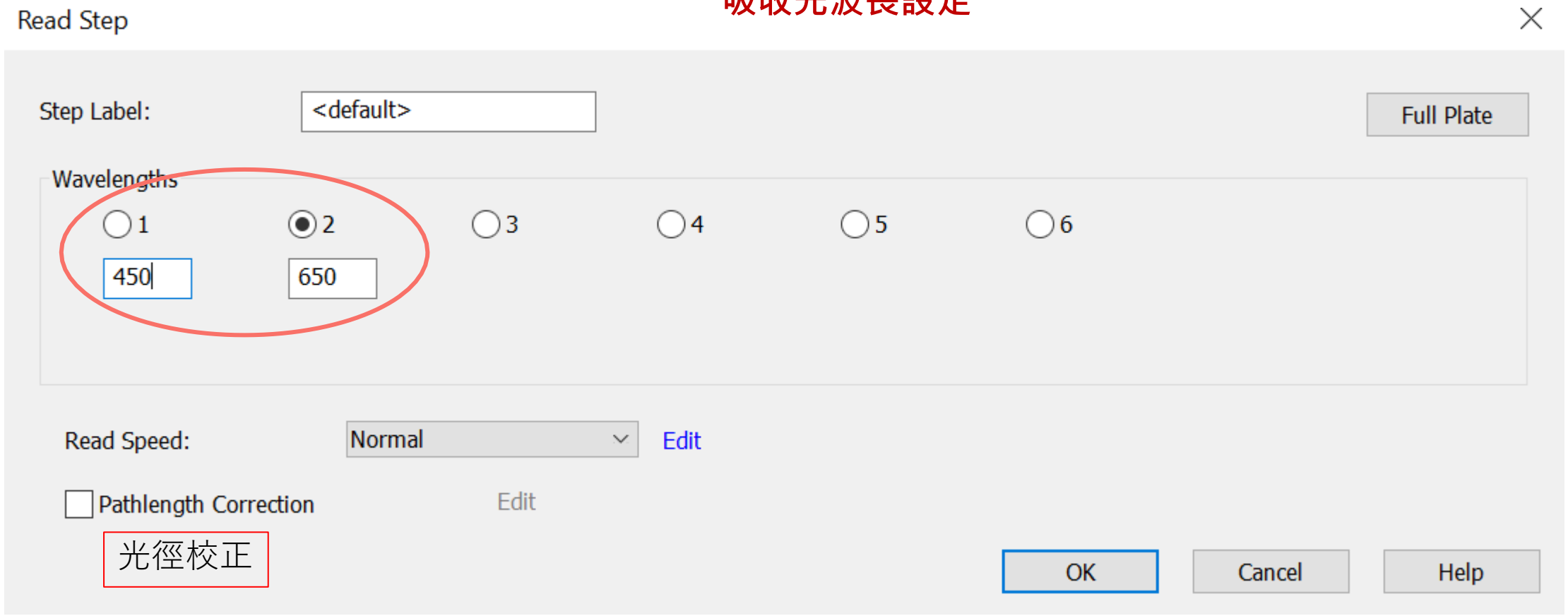




3.選取盤型
4.選取偵測步驟
5.選取偵測模式

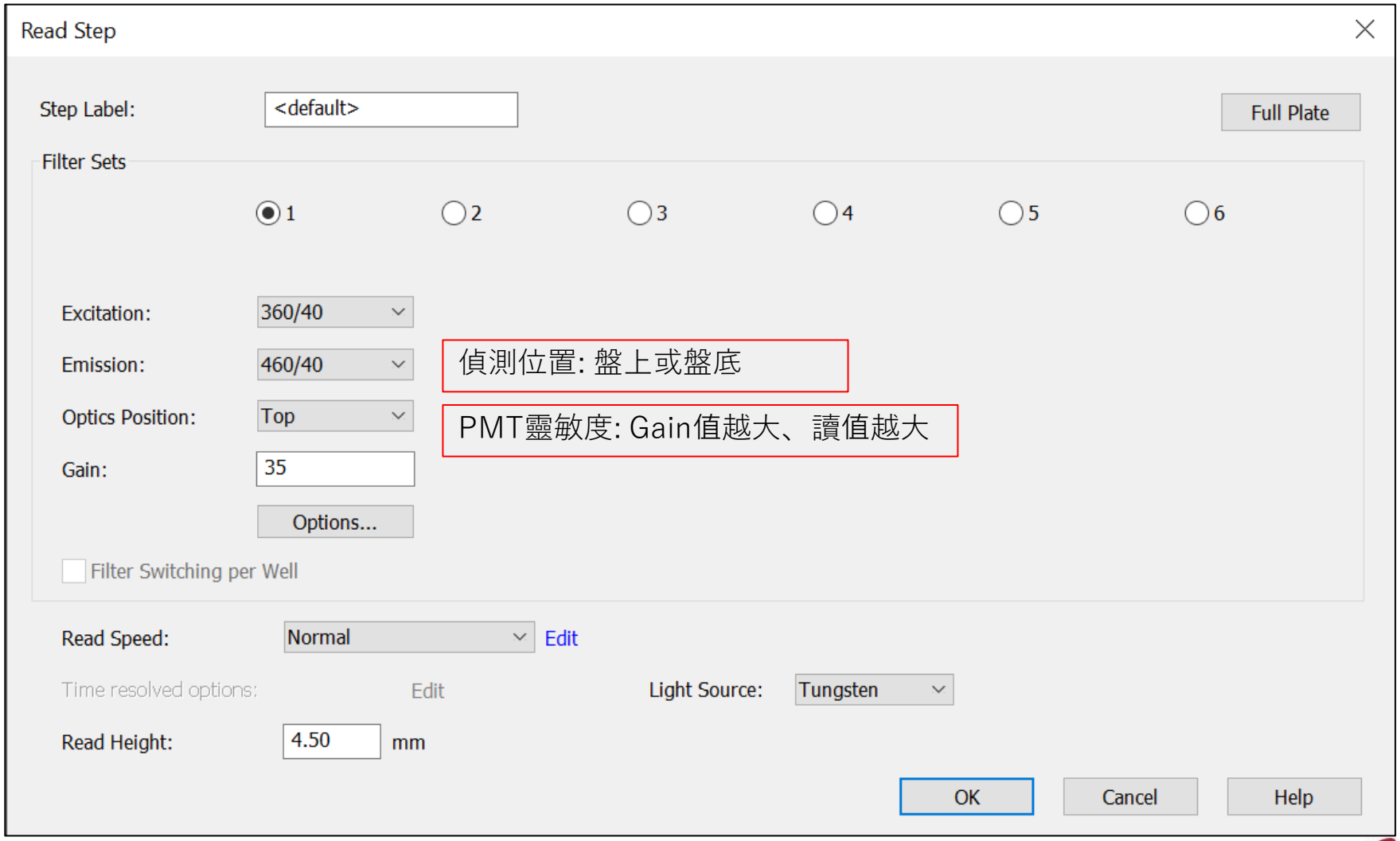
Protocol-Procedure設置

吸收光波長設定



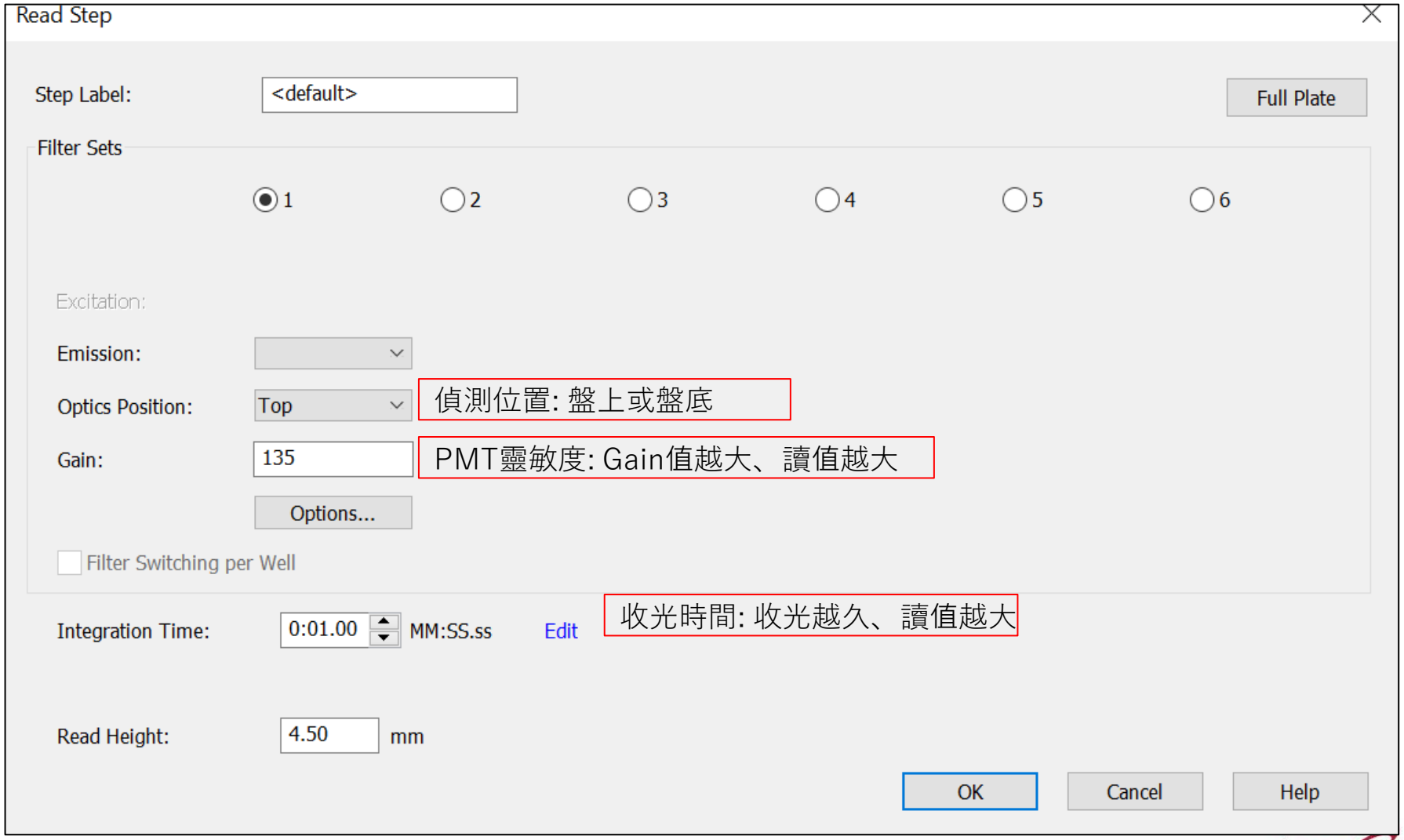
Protocol-Procedure設置

螢光波長設定



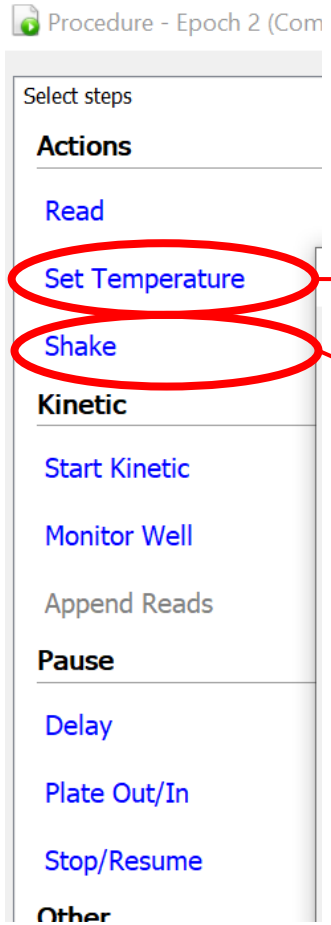
Protocol-Procedure設置

冷光設定

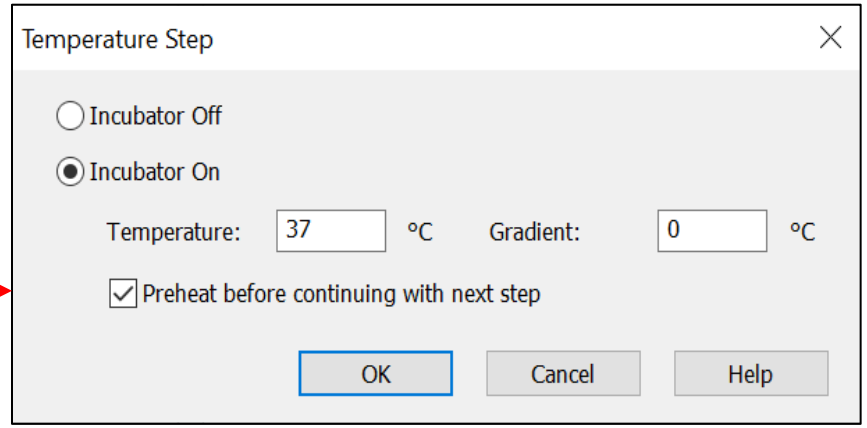


Protocol-Procedure設置

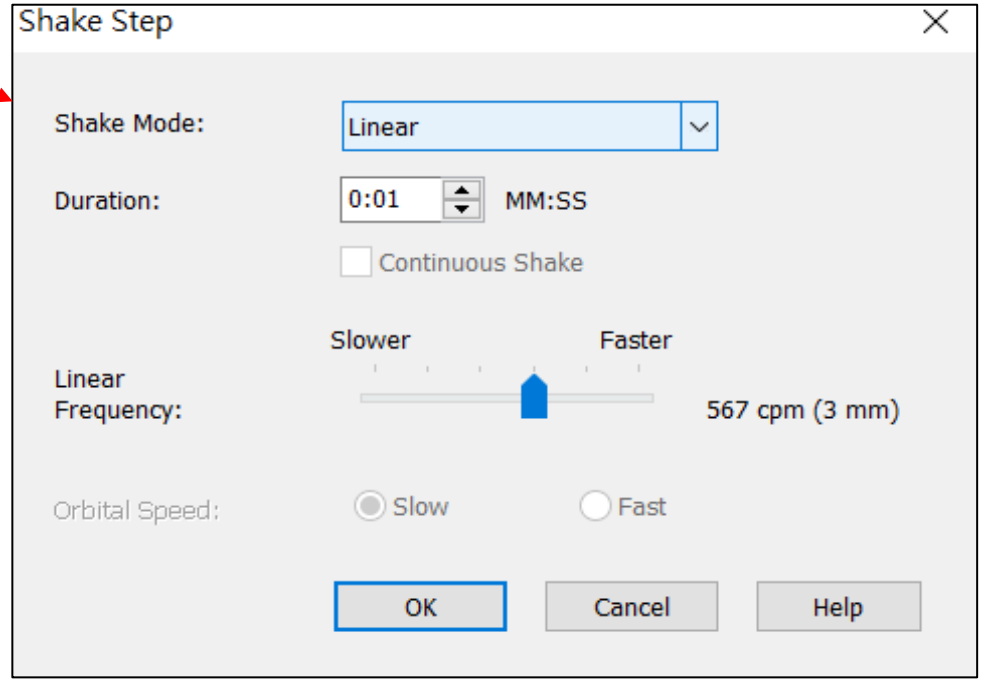
溫度及震盪



設定溫度

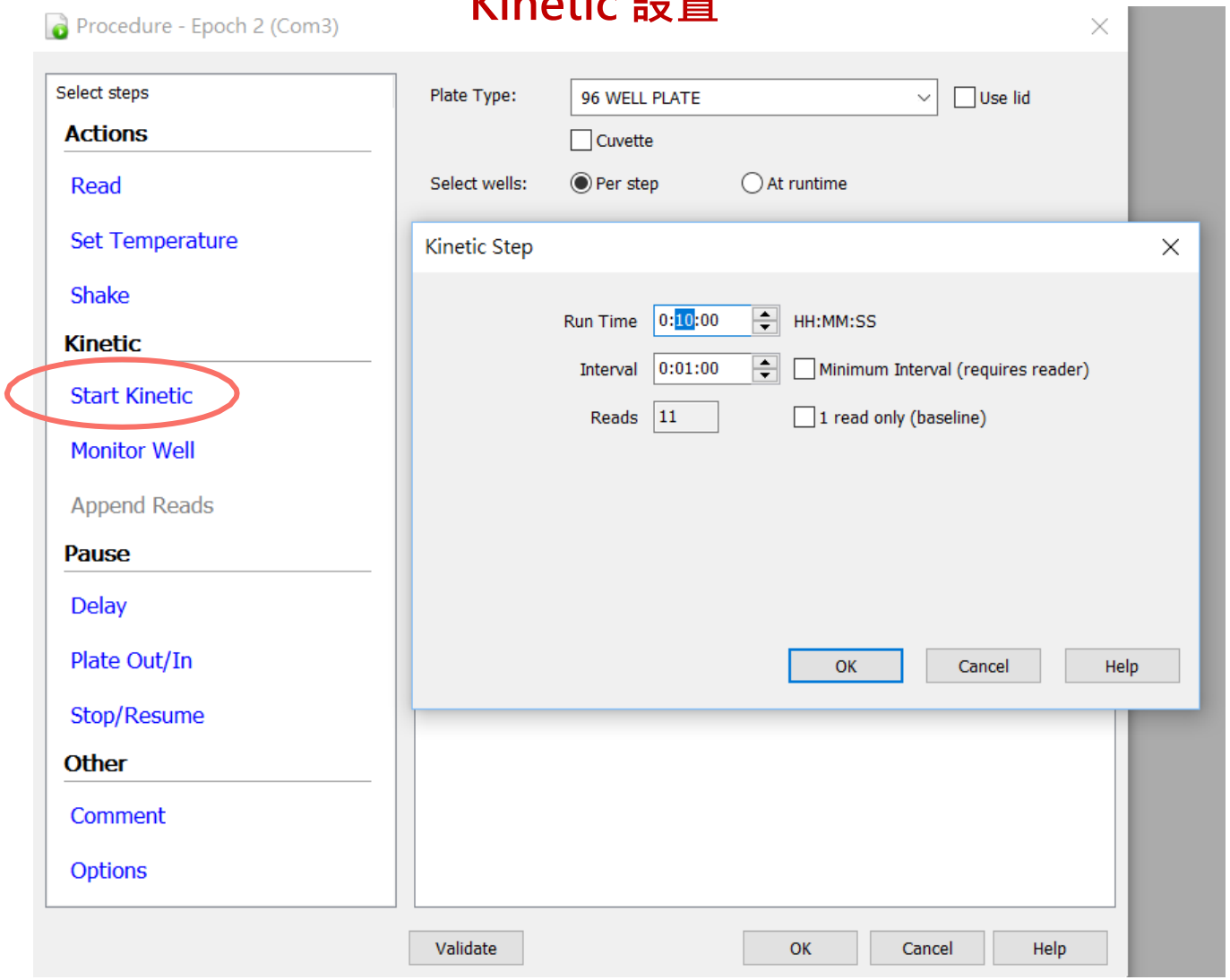


設定震盪

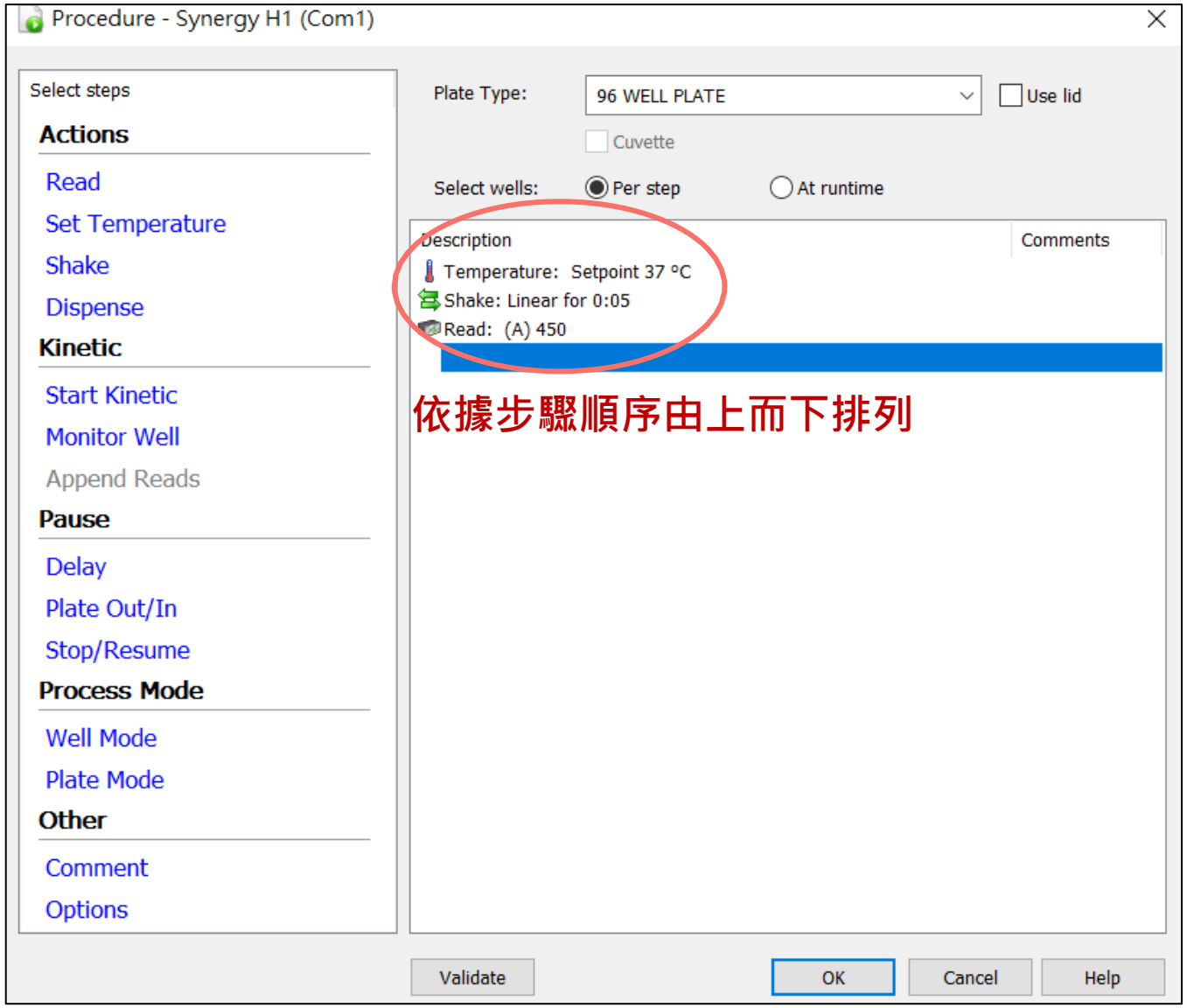


Protocol-Procedure設置

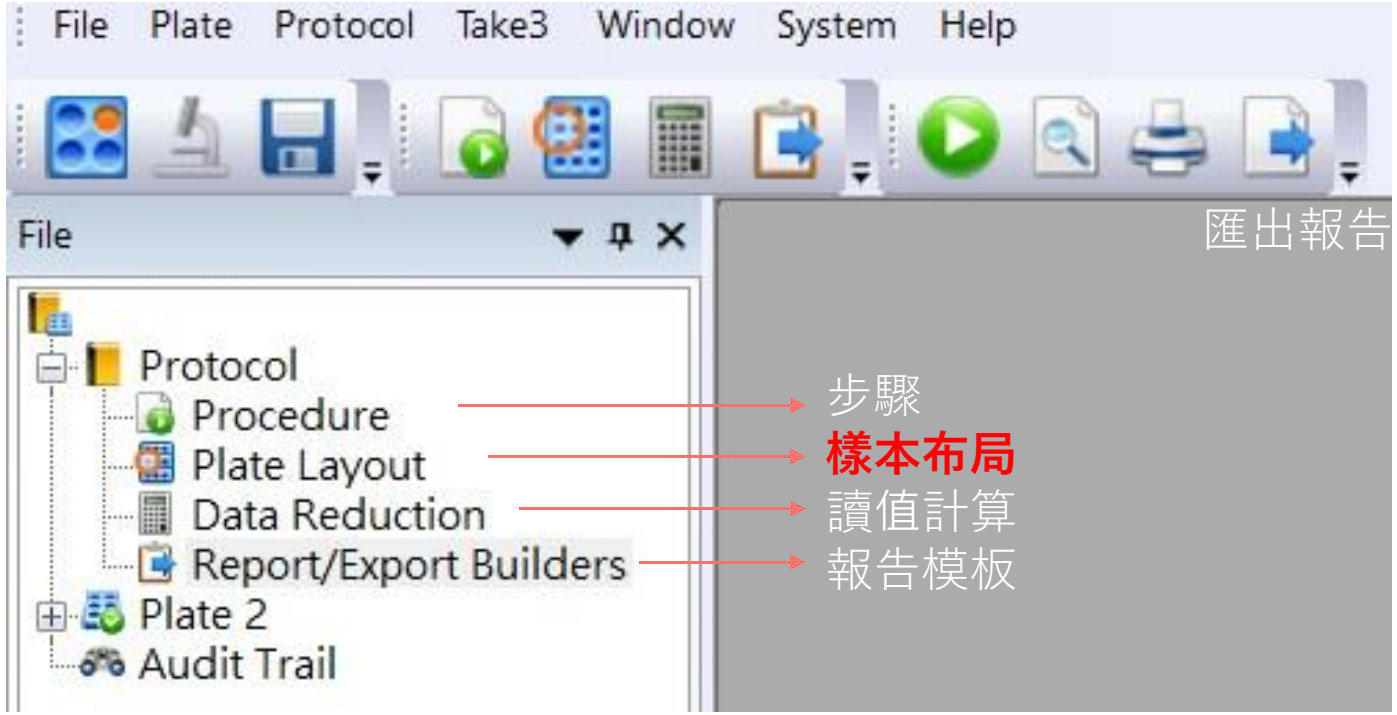
Kinetic 設置



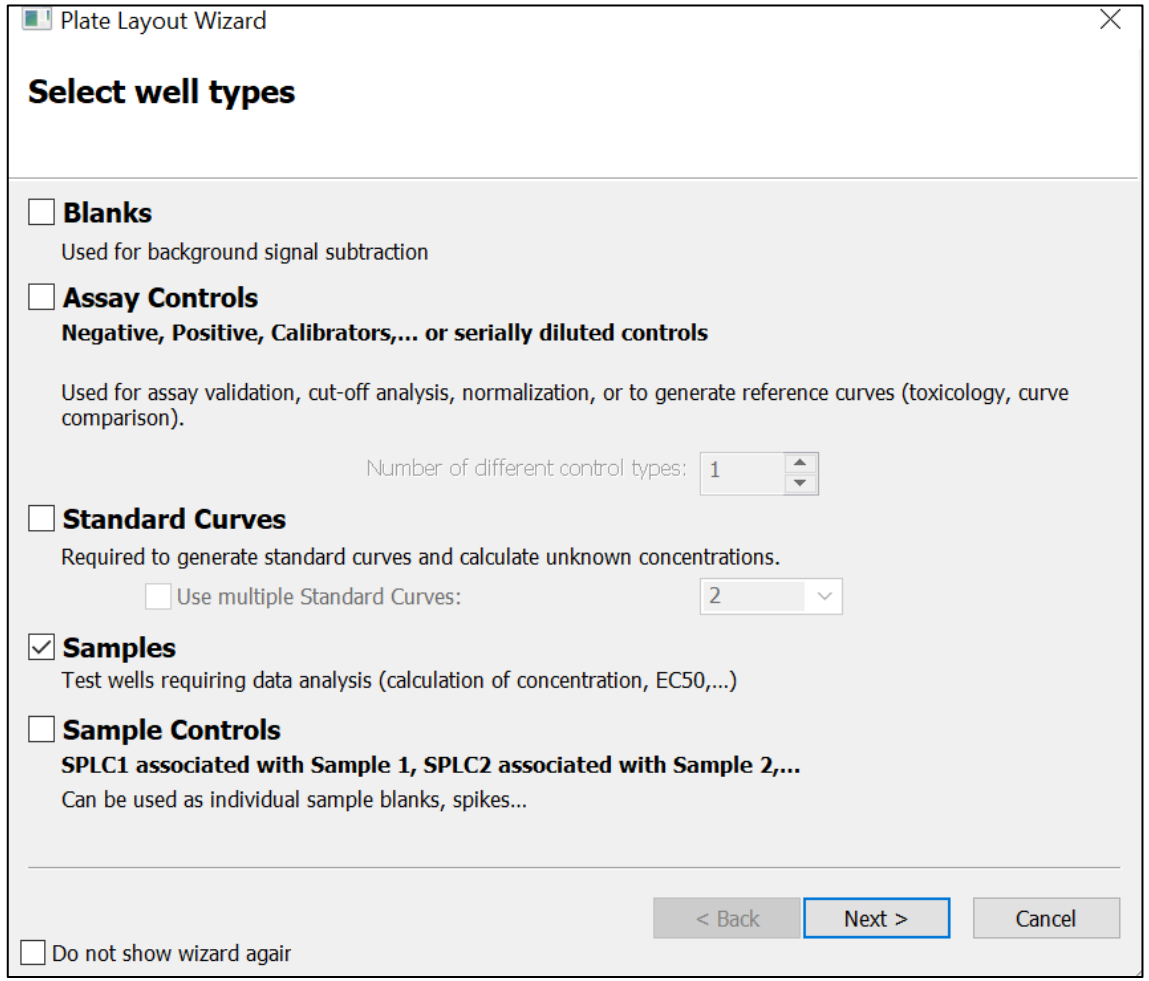
Protocol-Procedure設置



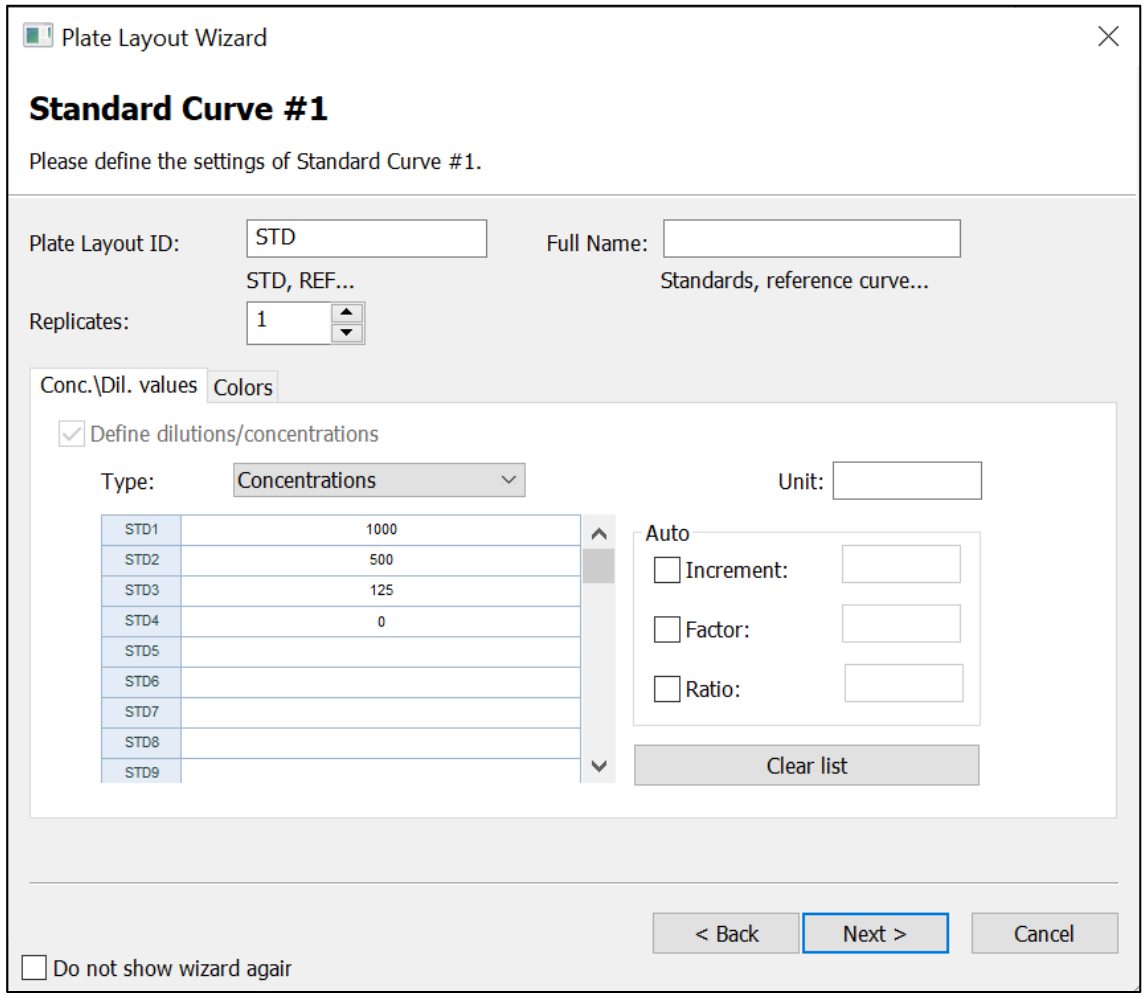
Protocol-Plate Layout設置



Protocol-Plate Layout設置

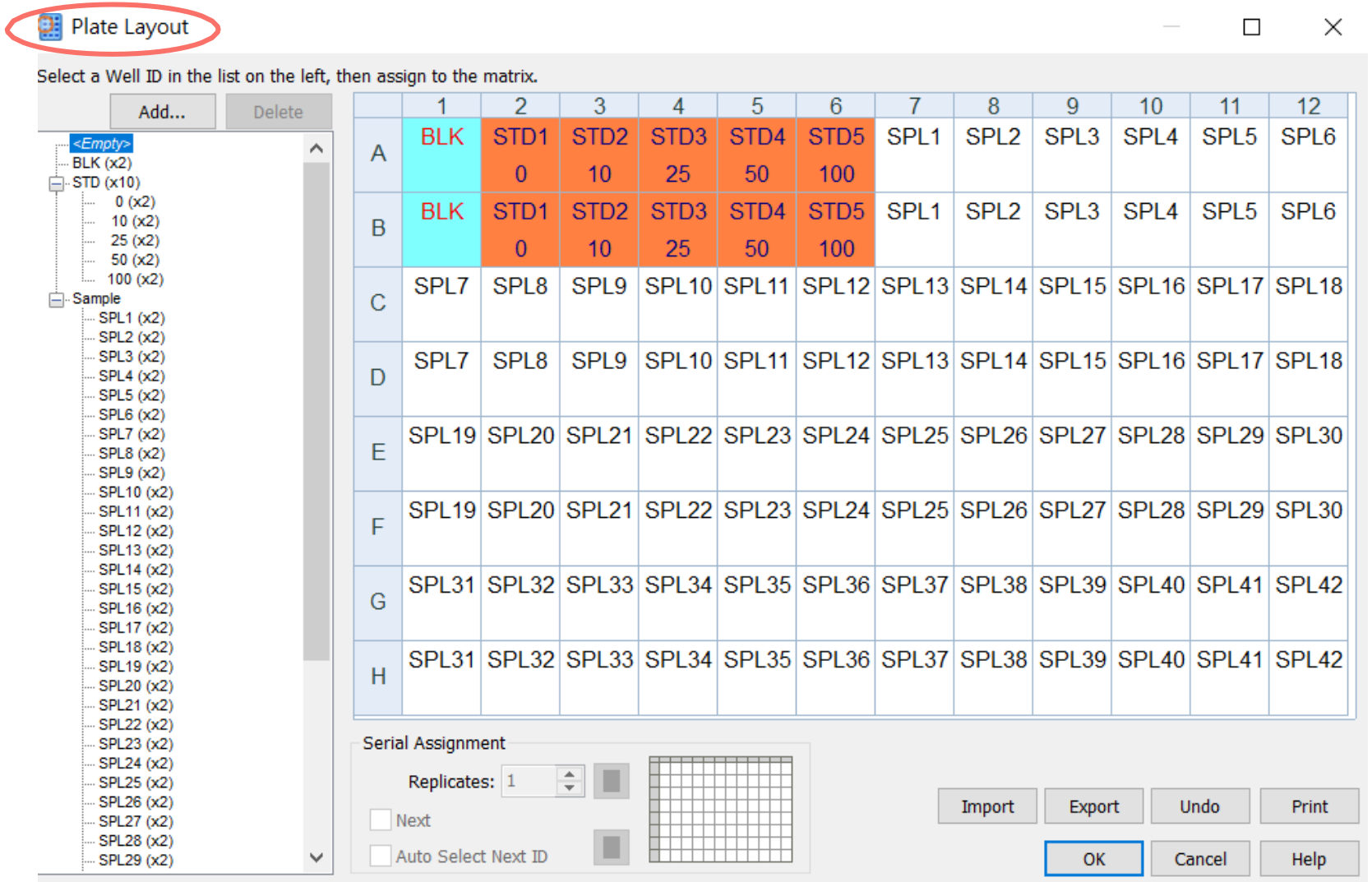


勾選樣本類型

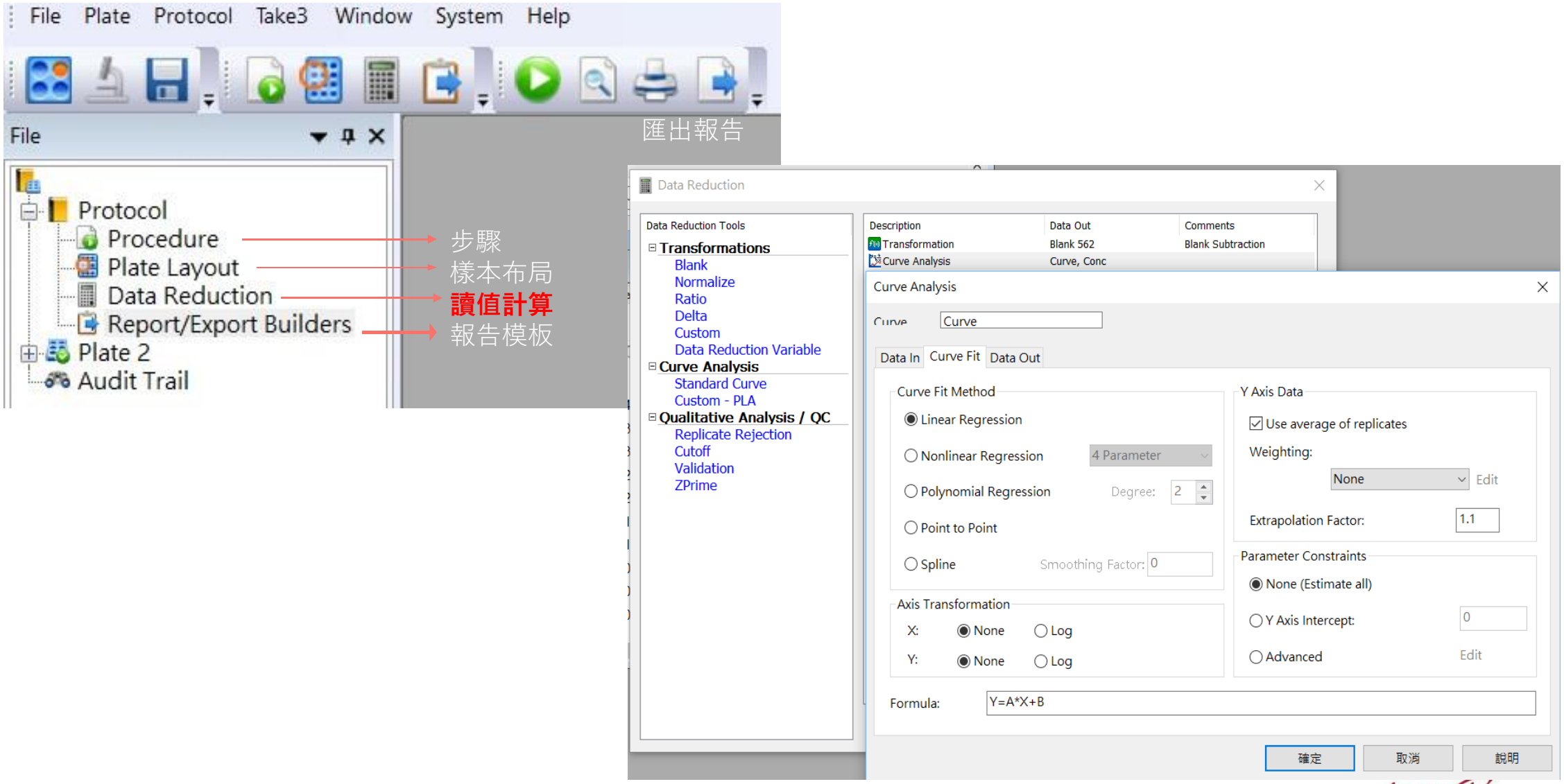


輸入標準品濃度

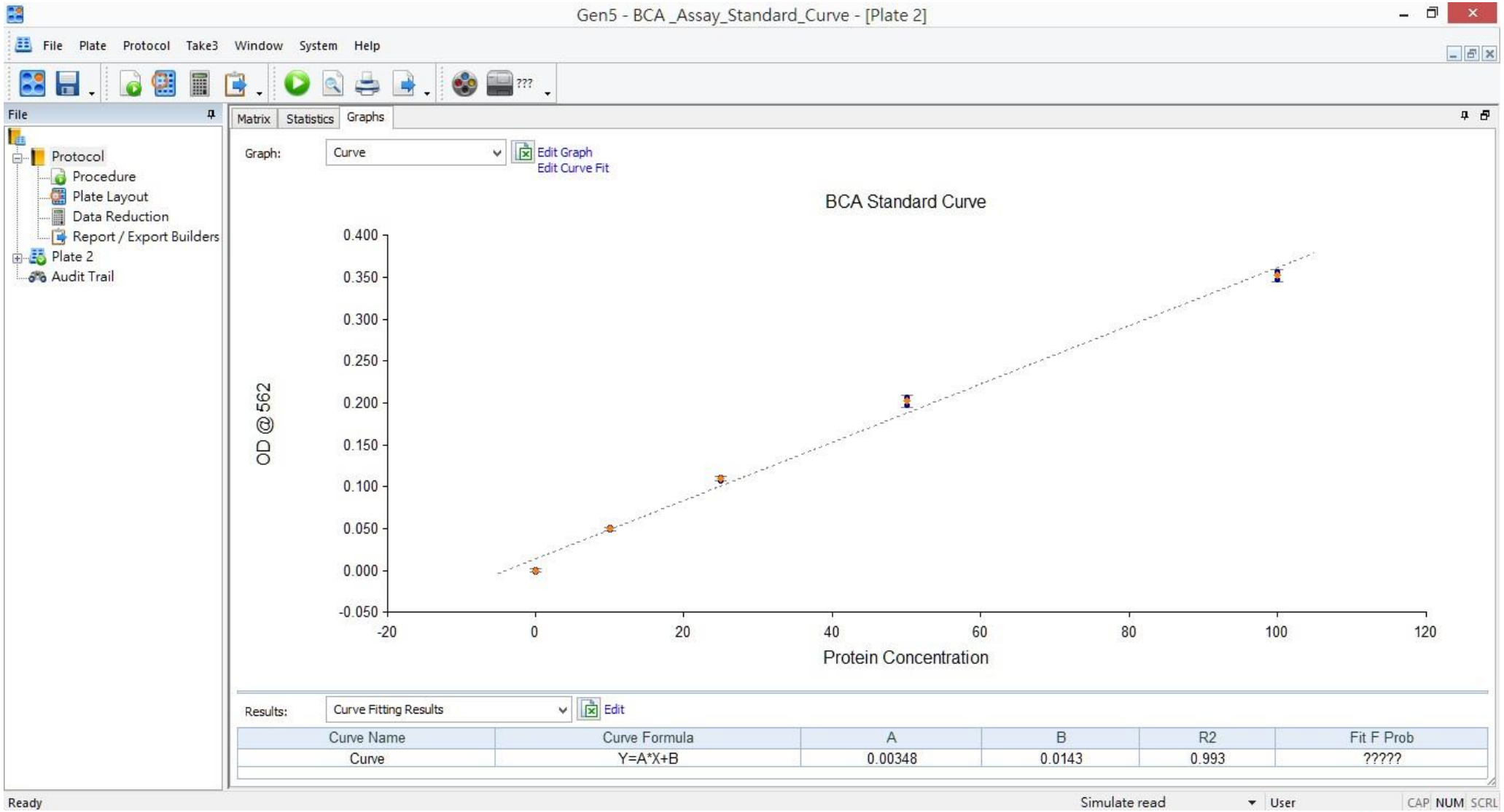
Protocol-Plate Layout設置



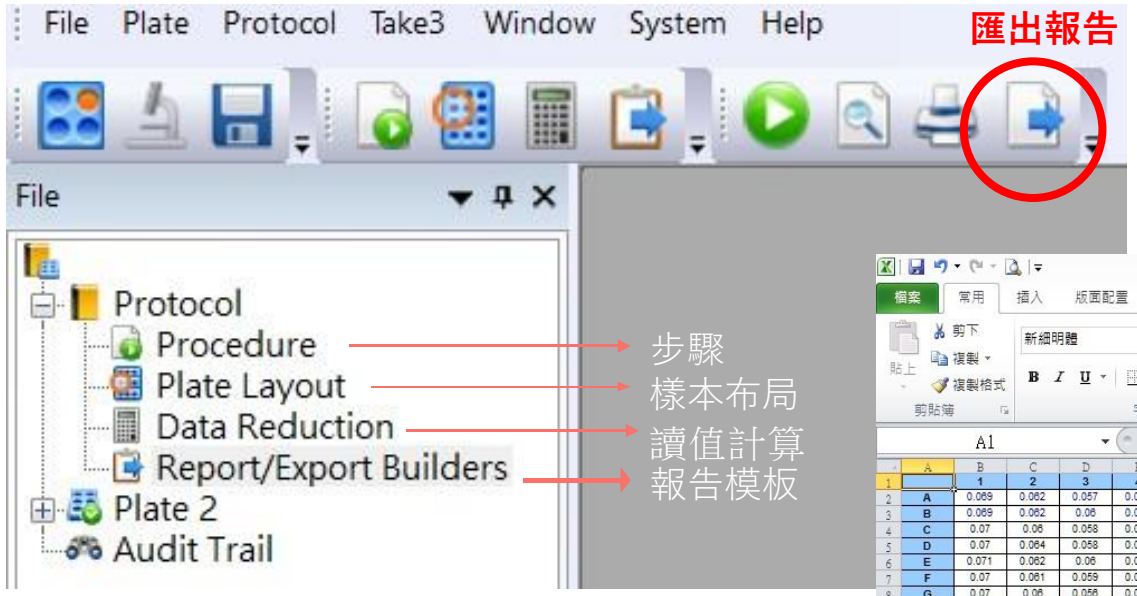
Protocol-Data Reduction

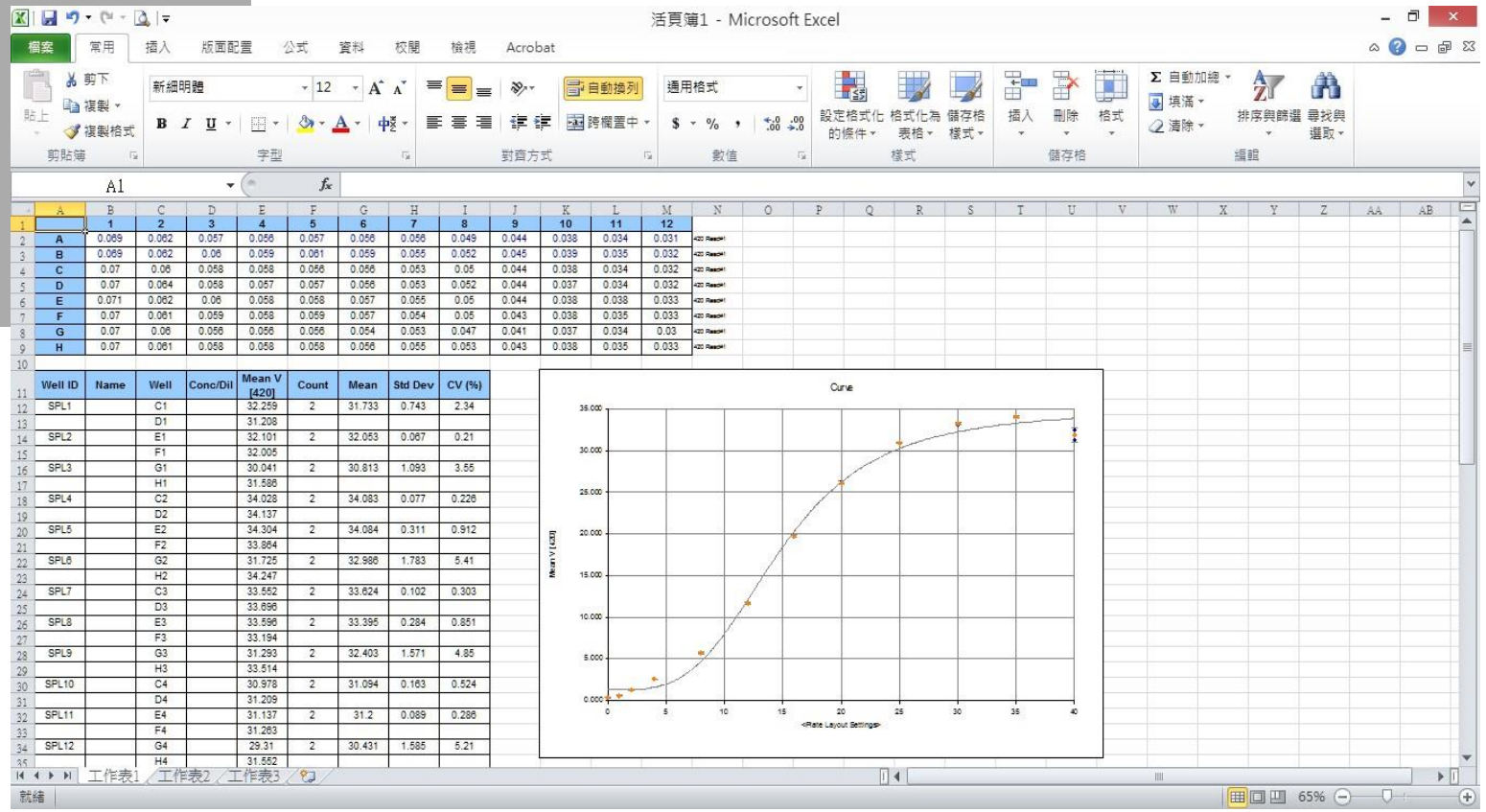


Protocol-Data Reduction



Protocol-匯出報告





THE END
感謝聆聽

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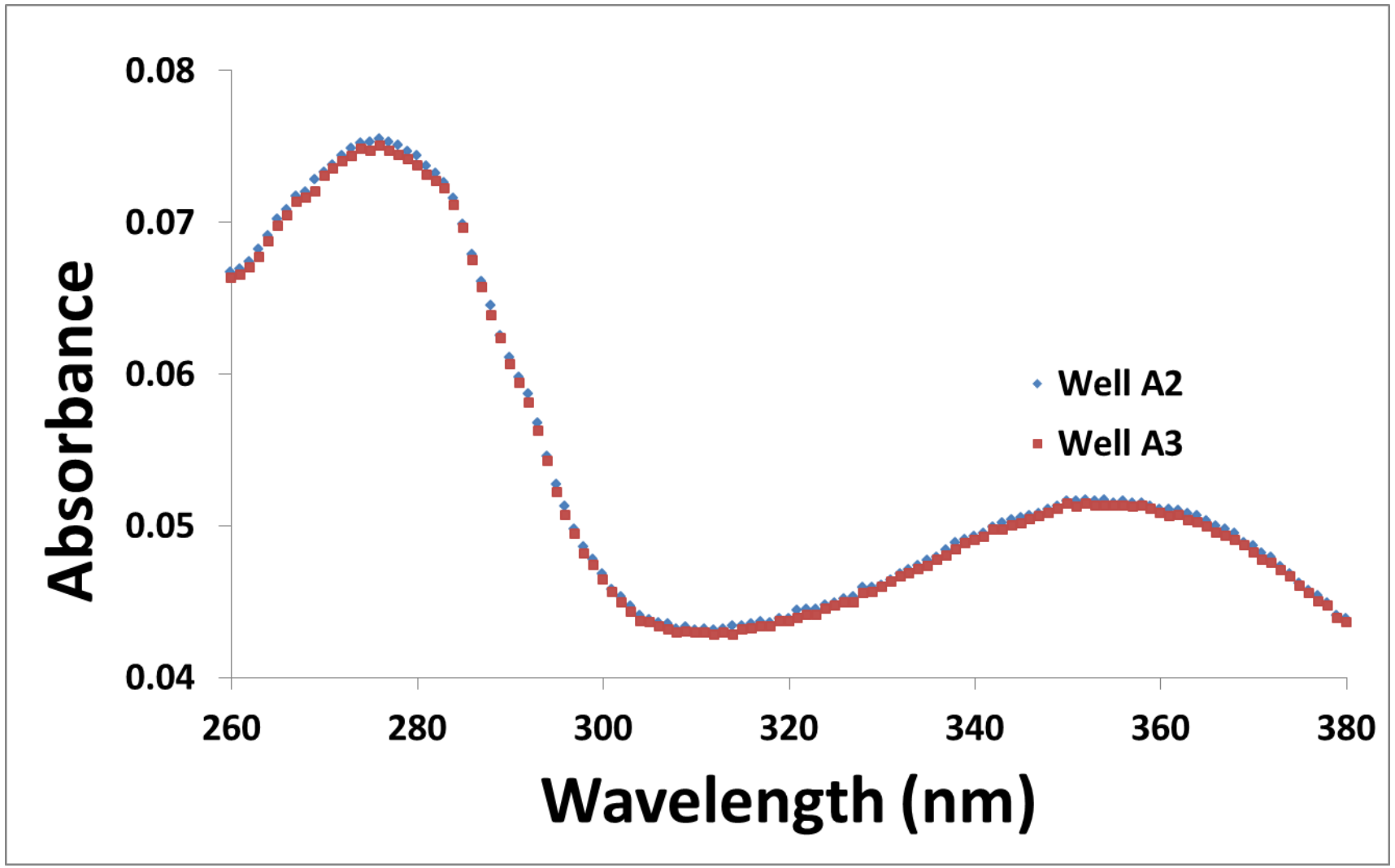
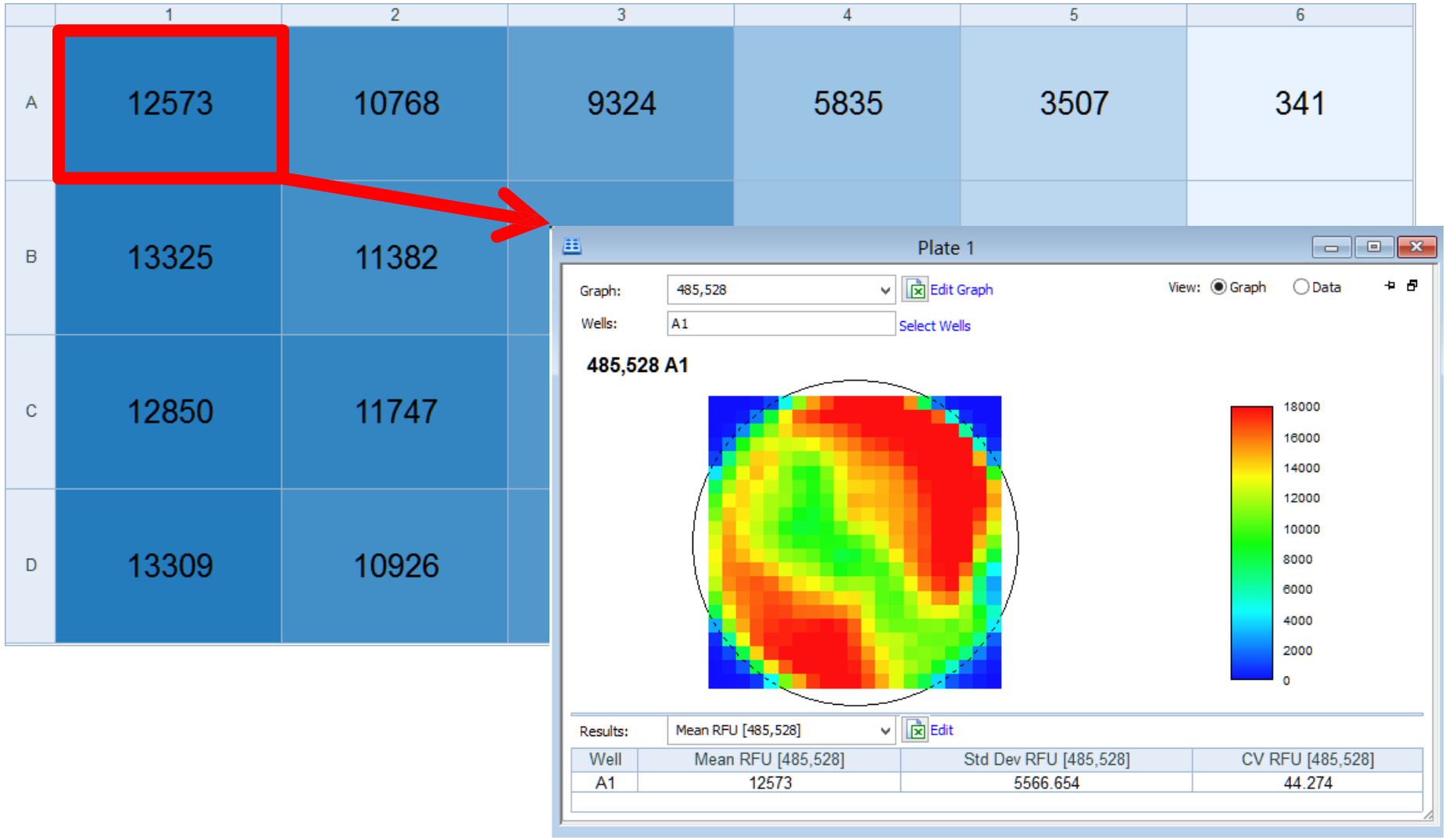
Gen5 軟體功能: 光譜掃描



Gen5 軟體功能: 孔域掃描



Gen5 軟體功能: Kinetic