Gemini XPS and SpectraMax L Microplate Reader

金萬林企業股份有限公司

產品專員 紀幸玟 Donna

Introduction of KimForest

金萬林企業股份有限公司
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Email:kimforst@gmail.com
Gene On Link

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Customized

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DiscoveRx · M·T·T·I · DNASTAR® · enzymatics · gen 0 way · proteinsimple

DANAHER

WHO WE ARE | HOW WE WORK | OUR BUSINESSES | INVESTORS | NEWS | CAREERS

BUSINESS DIRECTORY

Looking for the world's most innovative science and technology companies? You'll find them here.

BECKMAN COULTER Life Sciences

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SCIEX

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phenomenex® ...breaking with tradition℠

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cytiva

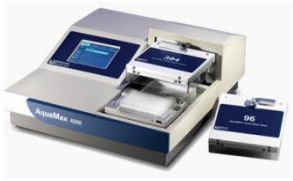
applied biosystems by Thermo Fisher Scientific

Product Portfolio in Global Market

BioResearch

- Leader in detection
- Focus on gov't and acad. research
- Modular and integrated systems

Microplate reader & Washer



Axon® Conventional Electrophysiology

GenePix® Microarray Analysis

Drug Discovery

- Leaders in niche markets
- Focus on pharma and biotech
- Complete automated solutions

ImageXpress® HCS screening

Reagents & Consumables

FLIPR® HTS screening

IonWorks® Automated Electrophysiology

Biotherapeutics

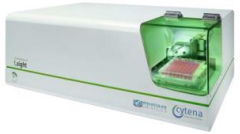
- Industry standard for cell line, protein and antibody development
- Complete automated solutions

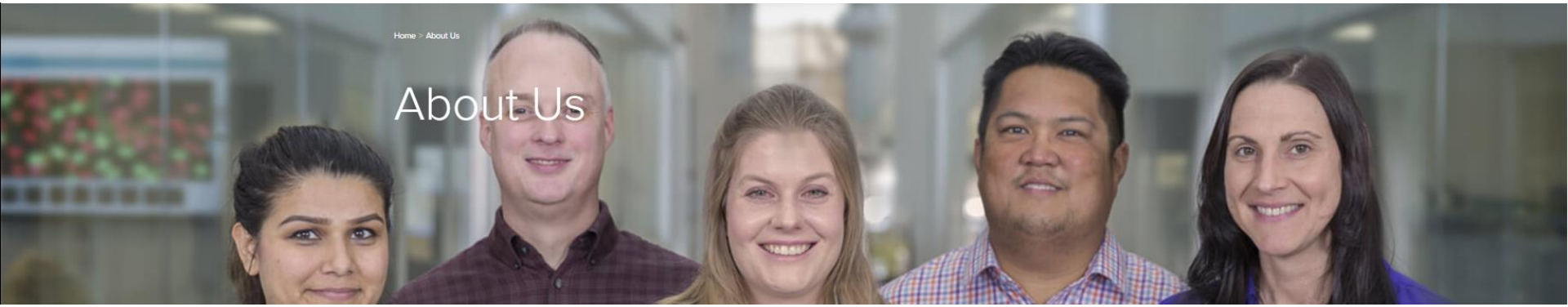
ClonePix™ 2 Cell Line Development

CloneSelect™ Imager

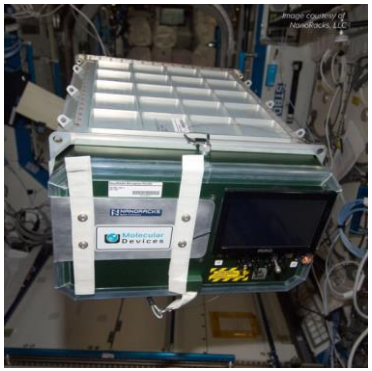
QPix™ - Ab & Protein Development

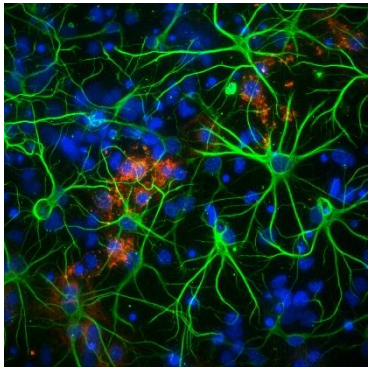
CloneSelect Single-Cell Printer Series





Providing innovative solutions for over 30 years

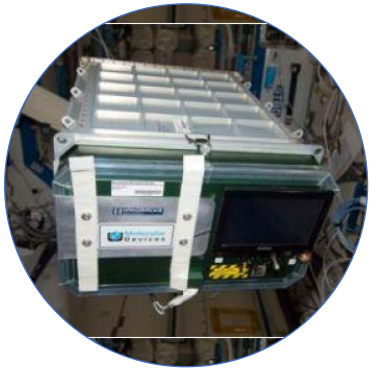




From your lab to Antarctica, the SpectraMax M2 microplate reader can help you take your research to every end of the Earth and beyond!

No matter where you want to go, we will help to get you there!

Sunnyvale -- June 22, 2016



Molecular Devices' SpectraMax M5e Multi-Mode Microplate Reader Launched to International Space Station via NanoRacks, LLC

NanoRacks, LLC is installing a new, reconfigured Molecular Devices' SpectraMax M5e multi-mode microplate reader on the International Space Station to perform experiments in microgravity.

SUNNYVALE, CALIF. -- JULY 19, 2016

Publish Like a Pro

Molecular Devices by the numbers - *some of the industry's most cited instruments

SpectraMax	FLIPR	GenePix	ImageXpress	FlexStation	SoftMax Pro	Axon	MetaMorph
42,500	10,300	22,000	1,460	3,810	9,240	76,700	54,400

Push the boundaries of basic research, translational research, drug discovery, and bioproduct development using products that thousands of scientists around the globe have already used in their publications.

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Basic Research

Find Your Own Microplate Reader

FlexStation 3

i3x

Paradigm

iD3/5

FilterMax

M2-M5

Gemini XPS Microplate Reader

Wavelength (Ex/Em):
Ex: 250 - 850 nm
Em: 360 - 850 nm

Microplate formats:
6, 12, 24, 48, 96, 384 well

Read mode:
Top read
- Fluorescence
- Luminescence
- Time-resolved Fluorescence

Read type:
Endpoint, Kinetic, Spectrum, Well scan

Features of Gemini XPS

(1) Auto PMT :

- Unique for FL, LUM and TRF
- Allow a **wide range of concentrations** to be prepared on one plate and read with one plate read

(2) Well scan :

- Reads **several points** in each well
- Useful for **Cell-based assay**

(3) Spectrum scan :

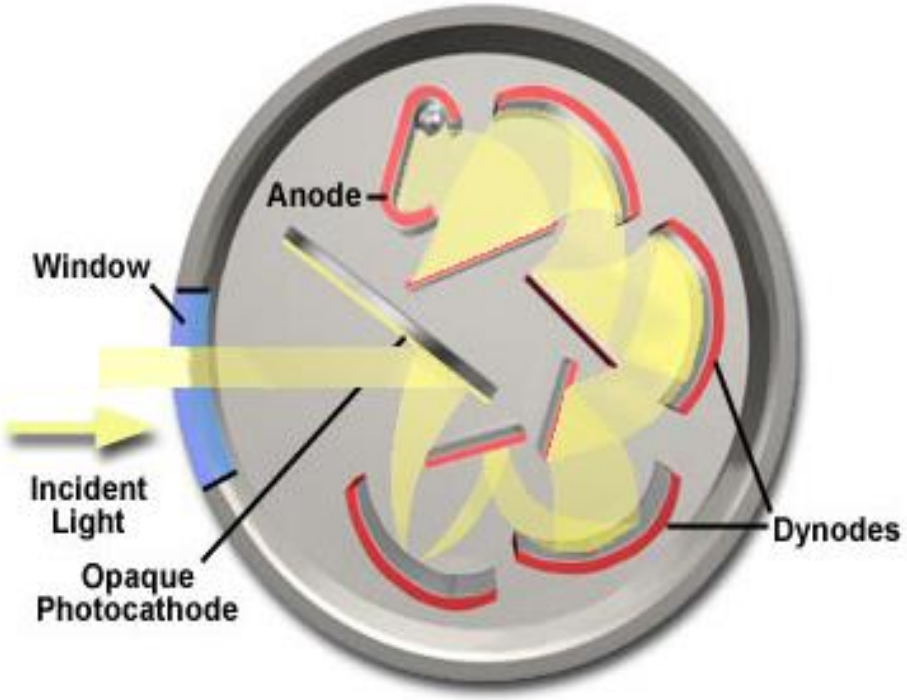
- To find the **best Excitation and Emission** wavelength

(4) Auto Cutoff :

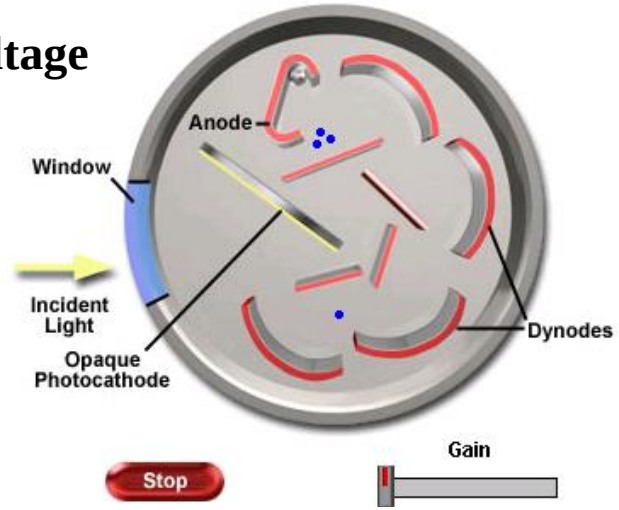
- Blocks as much of the **residual excitation light** as possible without unduly reducing the fluorescence signal

Auto Photomultiplier Tubes

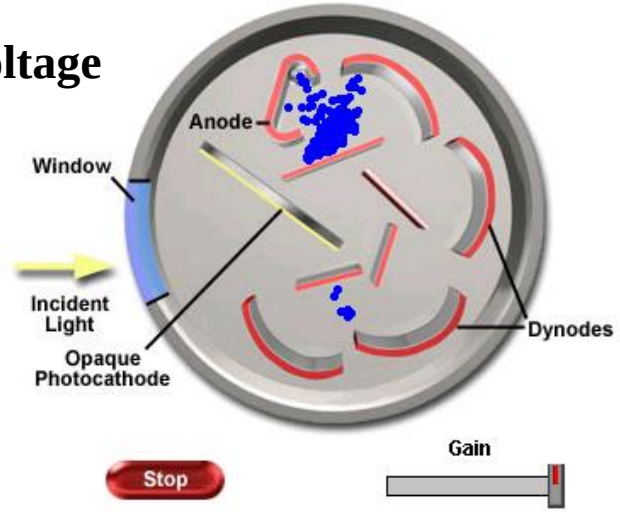
Photoelectric Effect



Low Voltage



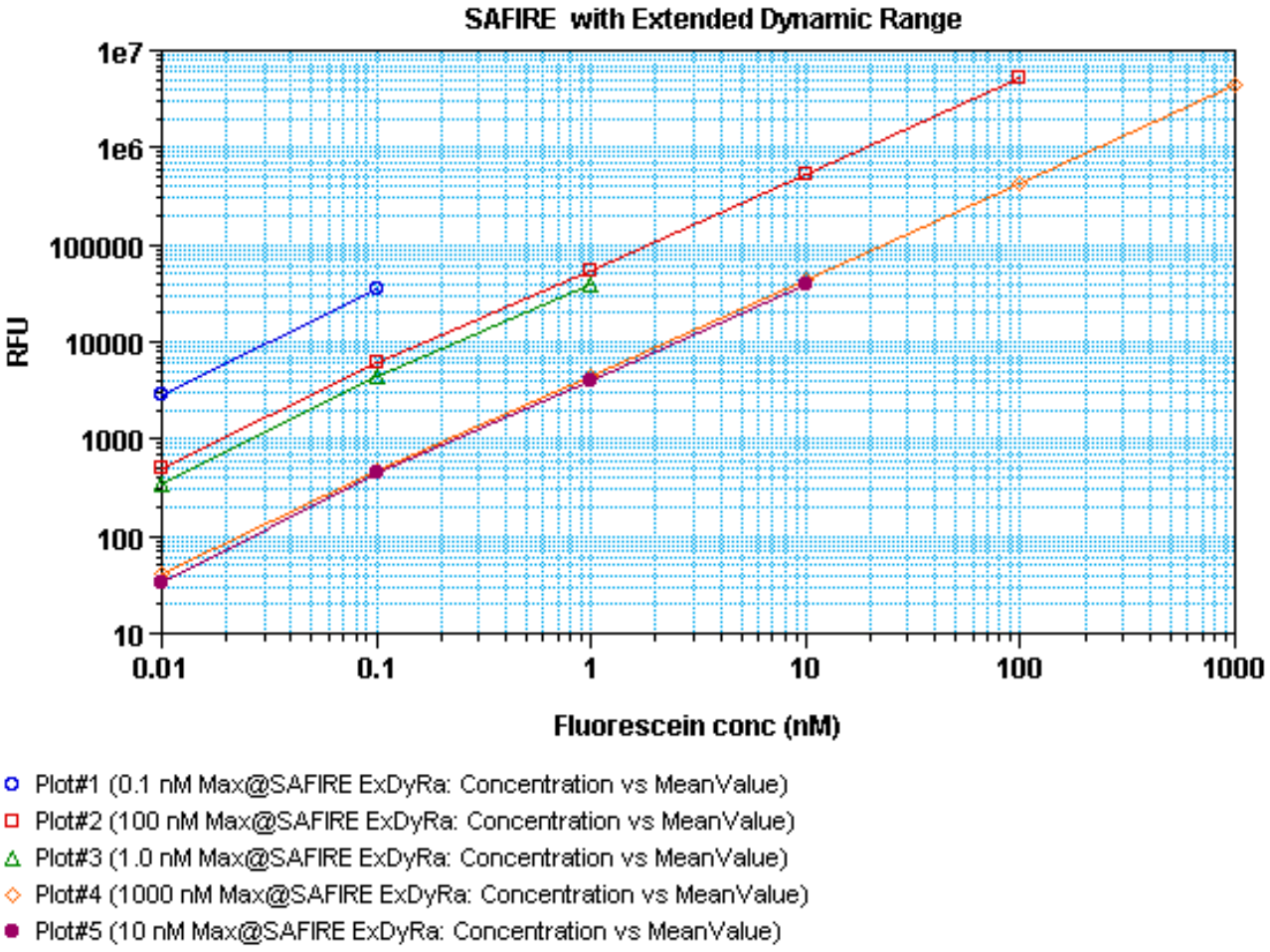
High Voltage



Absolute RFU" Auto PMT

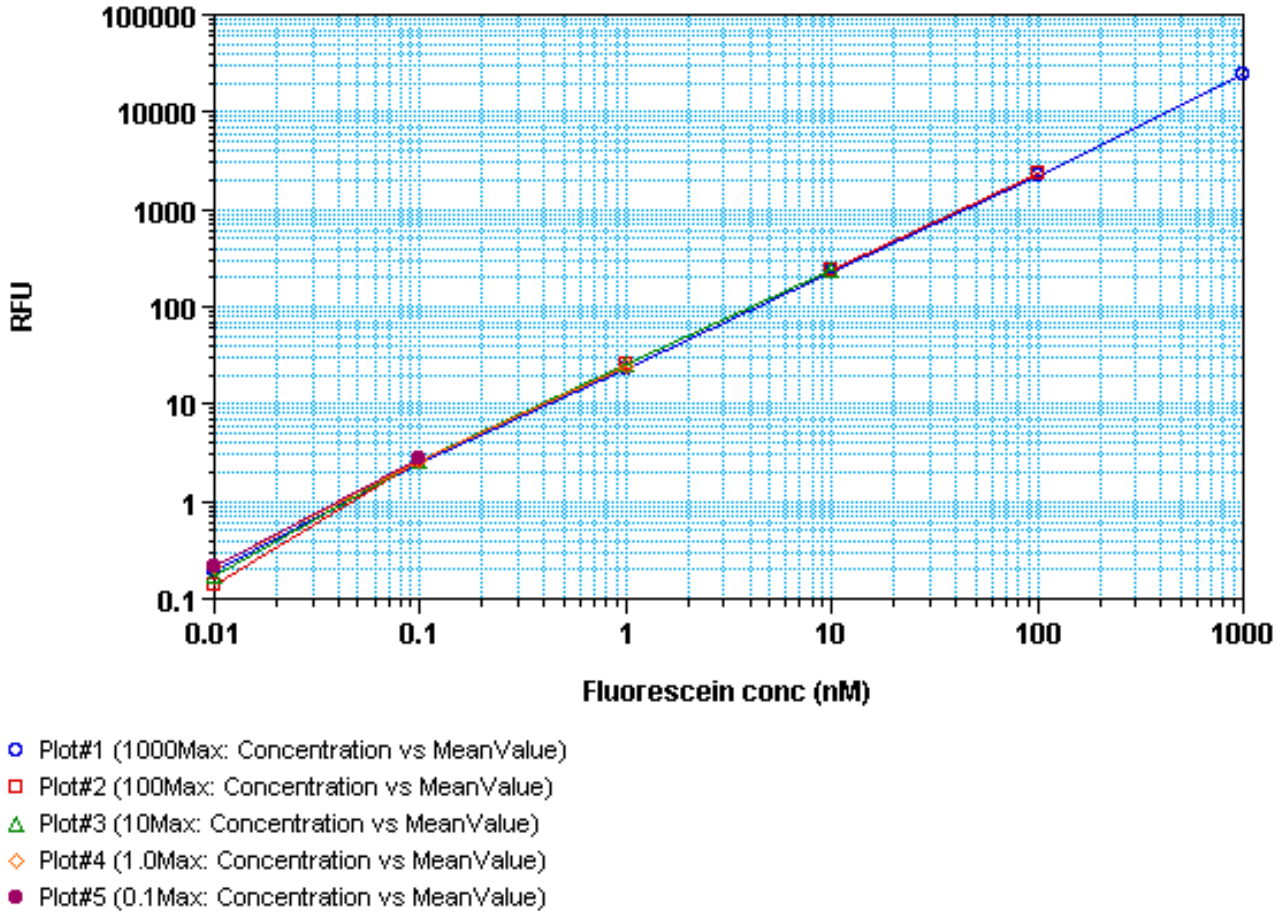
- Unique for FI, TRF, and Lum.
- Allow a wide range of concentrations to be prepared on one plate and read with one plate read.
- Software normalizes output for the voltage that was use for the read.
- Other readers require multiple reads and manual manipulation of data.

Challenge Without Auto-PMT



Multiple standard curves make data analysis difficult

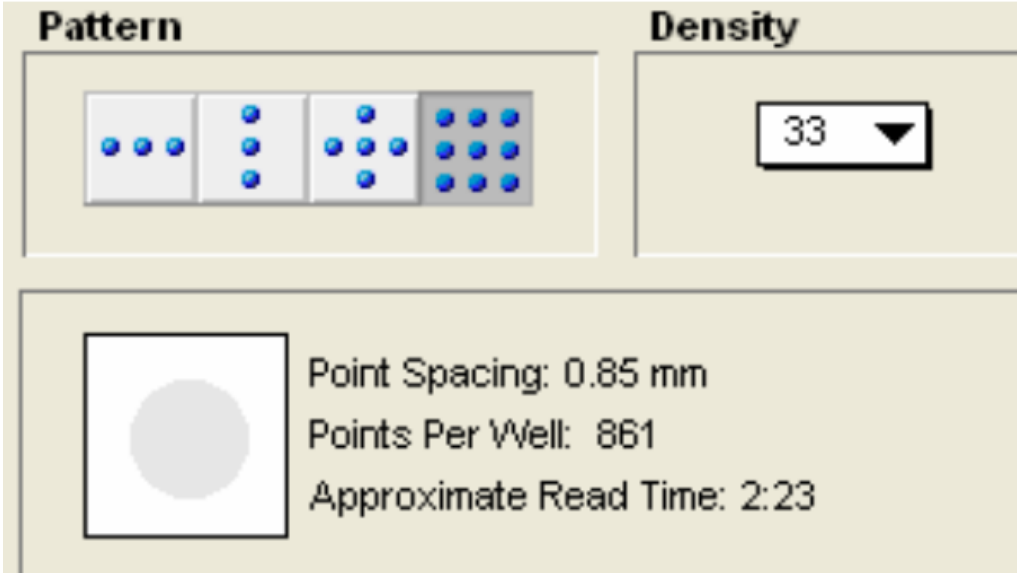
Benefits of Auto-PMT



Allows one read of plate and standard curves are reproducible **using software normalization.**

Well scan

- Read heads
  - Bottom
  - Top
- Endpoint analysis only
- Selective scanning
  - Read multiple data points
  - More accurate representation of cell population

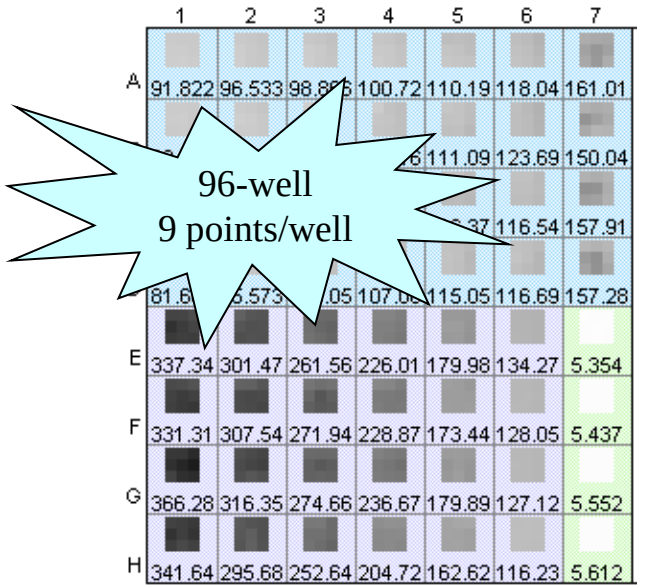


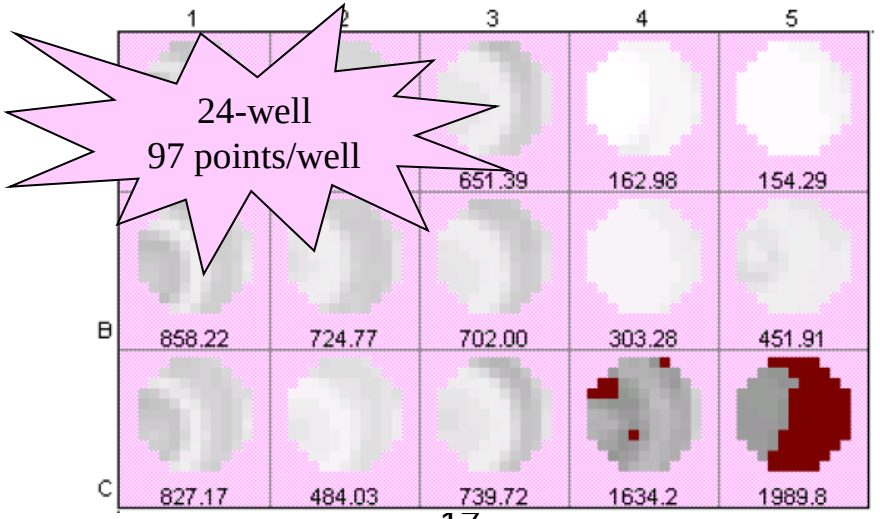
Well scan

- Well Scan reads several points in each well
- Cells often grow unevenly, so multiple reads per well improves results
- Well Scan feature in Molecular Devices' microplate readers gives you either:

  - **Average** of data points from each well

  - **Sum** of data points





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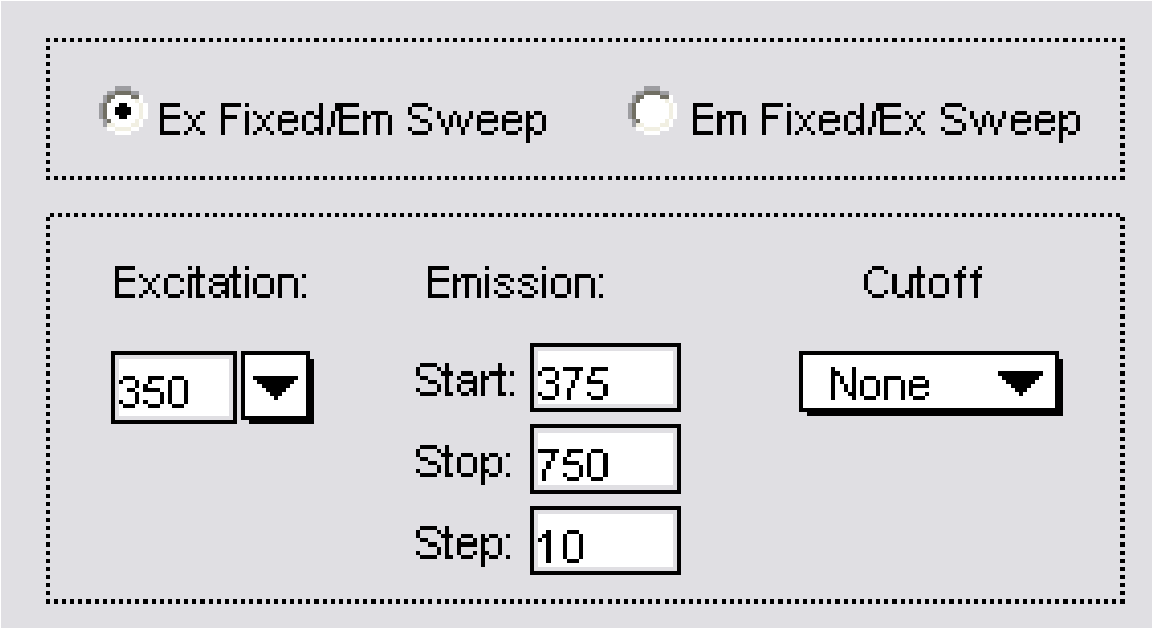
Spectrum Scan

- Optimize wavelengths for fluorophores
  - Excitation (250-850 nm)
  - Emission (250-850 nm)
  - 1 nm increments

- Cutoff filters
  - 15 filters

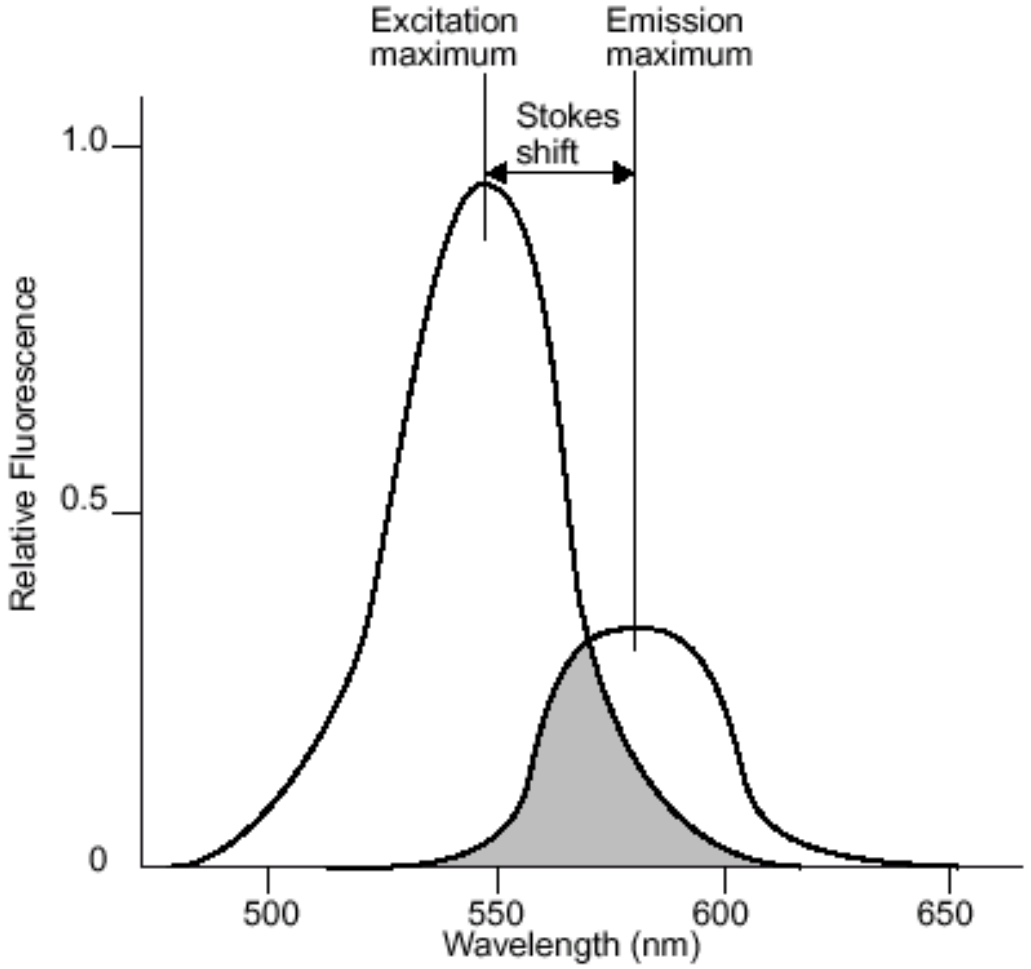


Auto Cut-off filter

Why Cut-Off Filters?

- Ex light many 10,000s x brighter than Em light

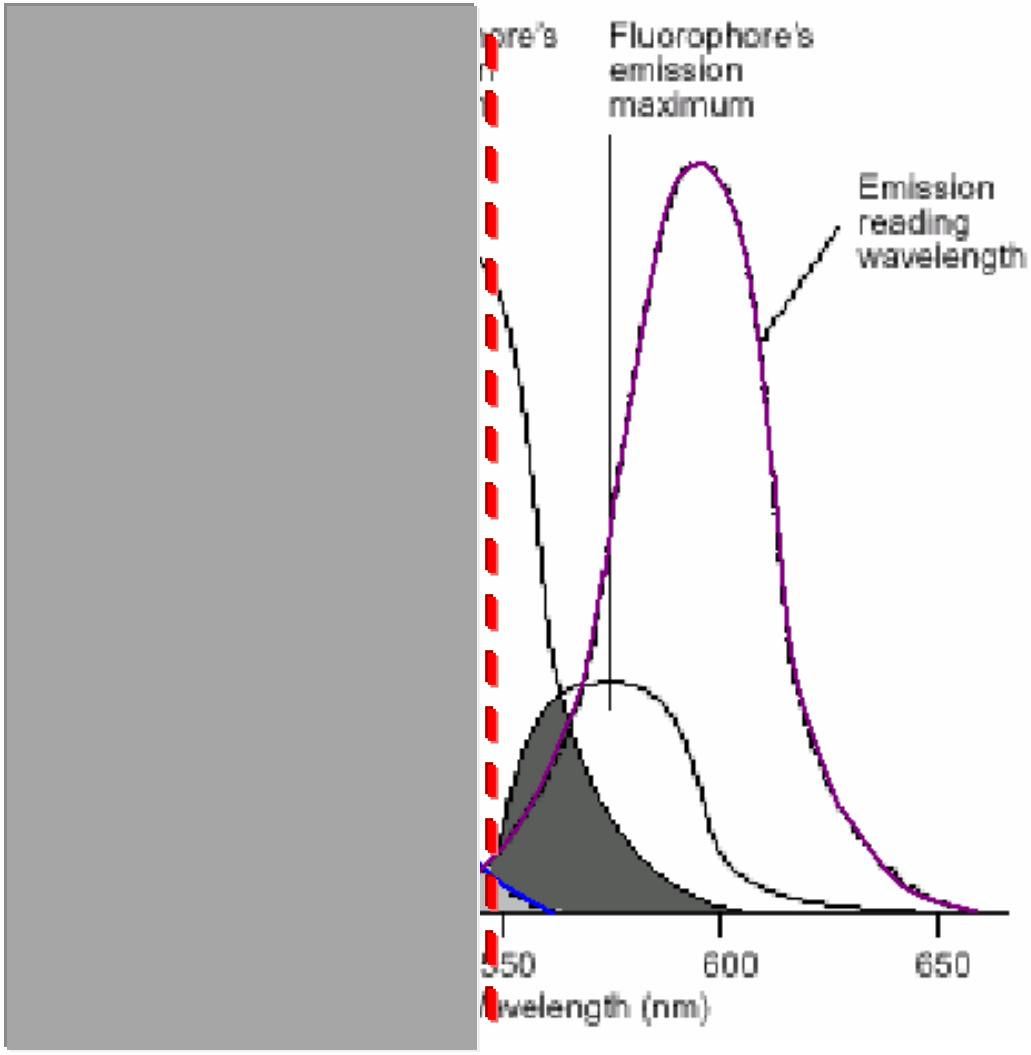
- Spectral separation needed to reduce interference of Ex with Em light



Optimizing Wavelength Selection

- Using Ex wavelength below Ex max and Em wavelength above Em max may provide best signal/noise.

- Cutoffs cause less Ex light mixing with Em light at the PMT



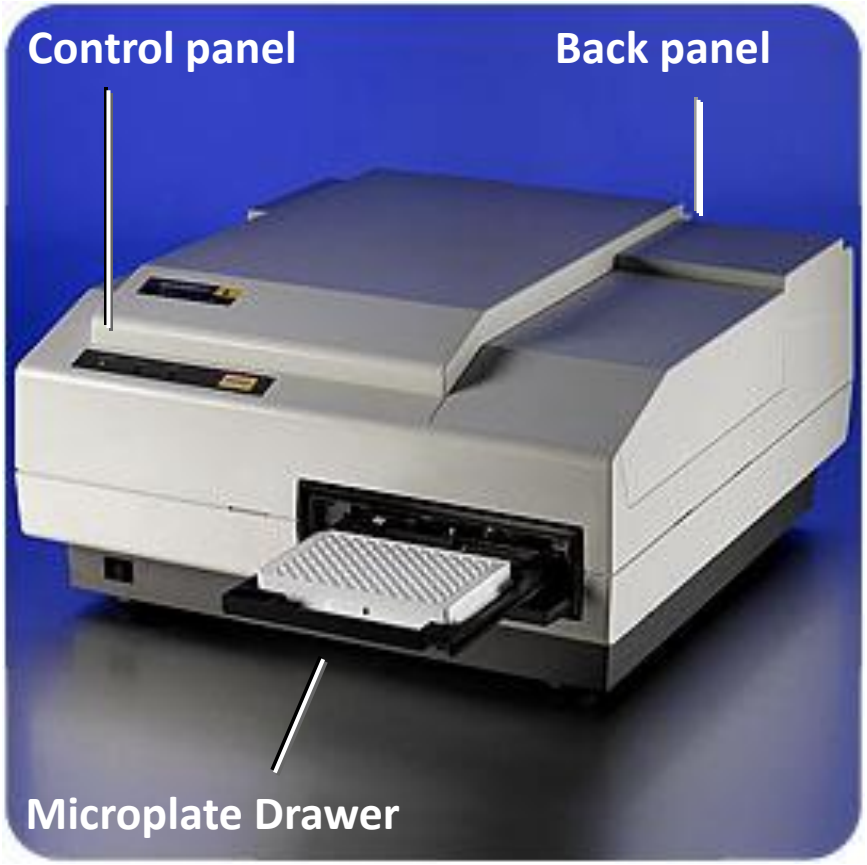
Gemini XPS Technical Specifications

- Microplates: 6, 12, 24, 48, 96, and 384 well
- Wavelength (Ex/Em): 250/360 ~ 850 nm
- Dual monochromators: 1 nm increment selection
- Light source:
  - Xenon flash lamp (1 joule/ flash)
  - Lifetime of 1 billion flashes ~ 1 million endpoint microplates
- Shaker time: 1 to 999 sec
- Temp. control:
  - 4℃ above ambient to 45℃

Gemini XPS Applications

- ELISAs and Immunoassays
- Nucleic Acid (DNA) Quantitation
- Protein Quantitation
- Reporter Gene Assays
- Cell Viability, Proliferation and Cytotoxicity
- Enzyme Assays
- Transporter Assays
- Phorsphotases/Kinases
- Microbial Growth

SpectraMax L Microplate Reader



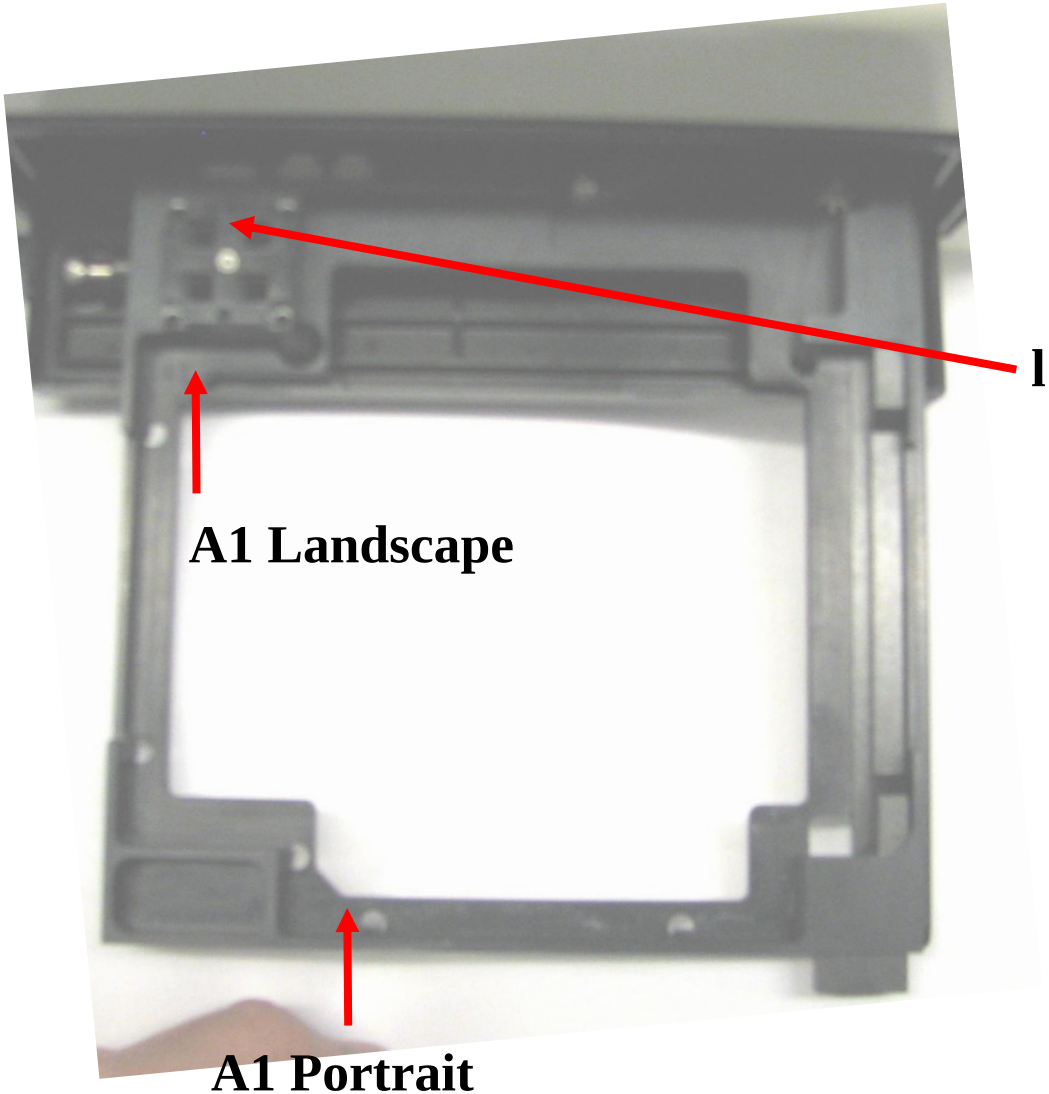
Wavelength:
380 – 630 nm

Microplate formats:
96 and 384 well

Read mode:
Top read - Luminescence

Read type:
- **Endpoint**
- **Dual-Read**
- **Kinetic**
- **Fast Kinetic**

Plate Drawer



Features of SpectraMax L

(1) Auto-PMT :

- **High sensitivity luminescence detection <0.2 fg firefly luciferase per well**
- **Simultaneous photon counting and analog detection for extended dynamic range**

(2) Aperture Design :

Low Background and crosstalk

- **$3x10^{-5}$ (white plate)**

(3) Upgradeable :

- **Dual injectors for flash luminescence**
- **Multi-detector configurations for higher throughput**

Luminescence Detection by PMT

- Measuring Luminescence :
  - Photomultiplier tubes (PMT) convert incoming photons to electrons
  - Incoming photon strikes photocathode → generates electron
  - Electron flows through a series of electron multipliers (dynodes) to the anode
  - Current flowing from the anode is proportional to the number of photons at the photocathode
  - Amount of amplification a PMT can produce depends on 1) the number of dynodes and 2) voltage applied to it

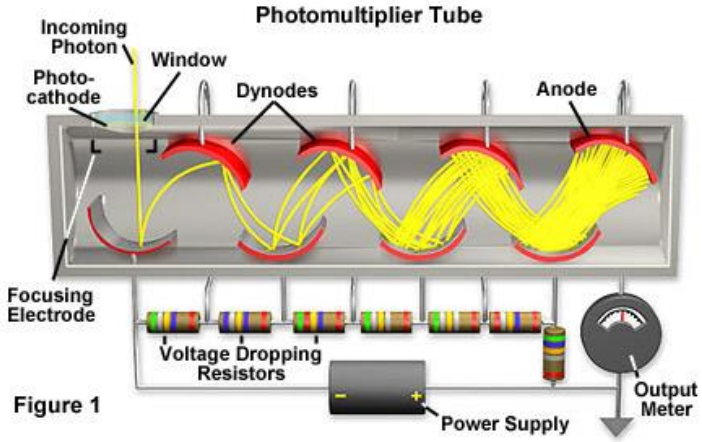


Figure 1

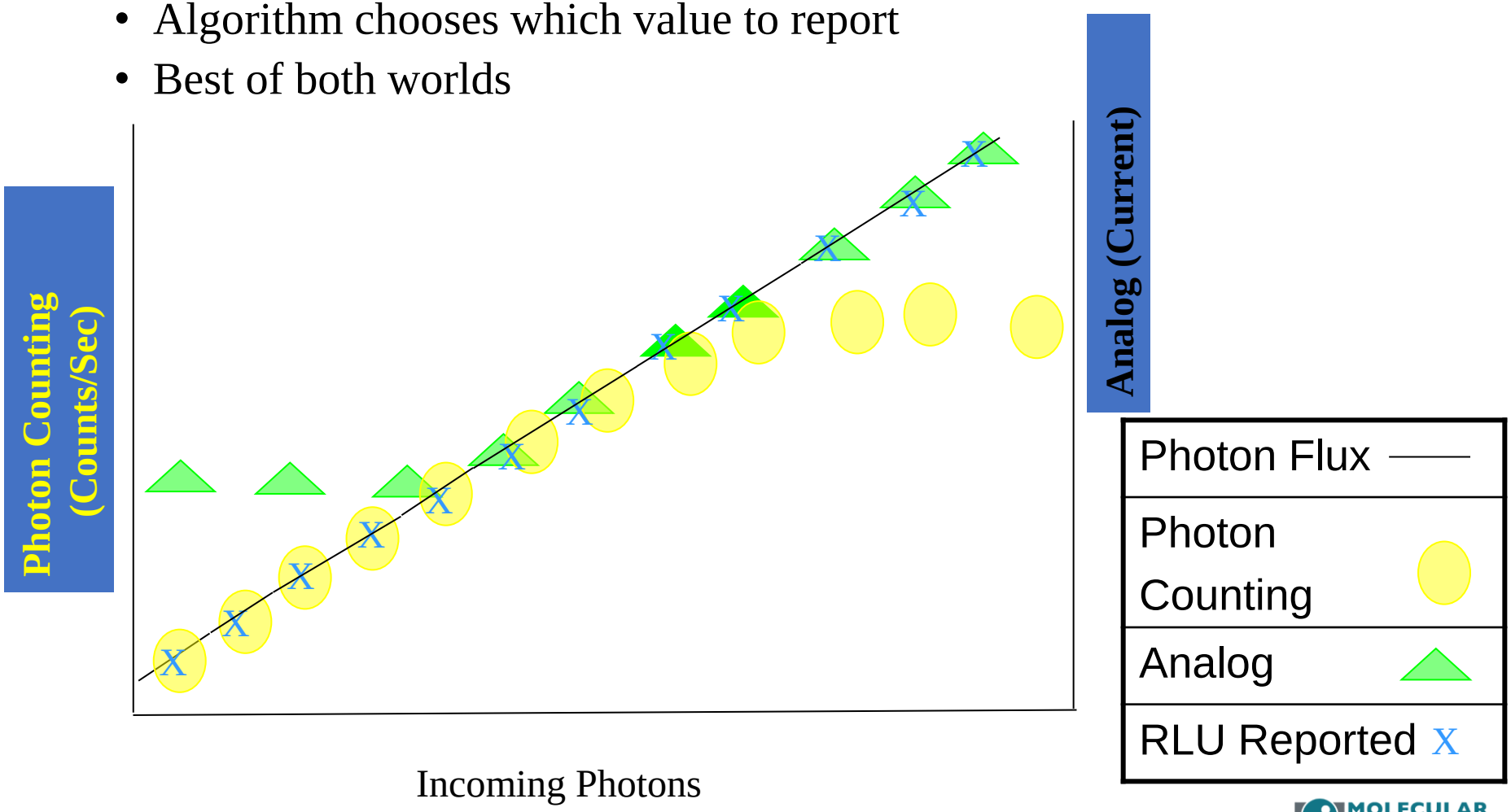
PMT Sensitivity: How PMT Current Is Measured

- **Analog**
  - Wide dynamic range achieved by converting PMT pulses into current
  - Downside – Loss of sensitivity because of difficulties in separating signal from noise

- **Photon Counting**
  - Excellent sensitivity achieved by converting PMT signal into digital pulses, pulses are then digitally filtered, only pulses larger than a threshold are counted.
  - Digital filtering of pulses does a great job of discriminating between signal and noise, resulting is high sensitivity
  - Downside – Photon counting has a limited linear range compared to analog detection

PMT Sensitivity: MaxRange PMT Setting

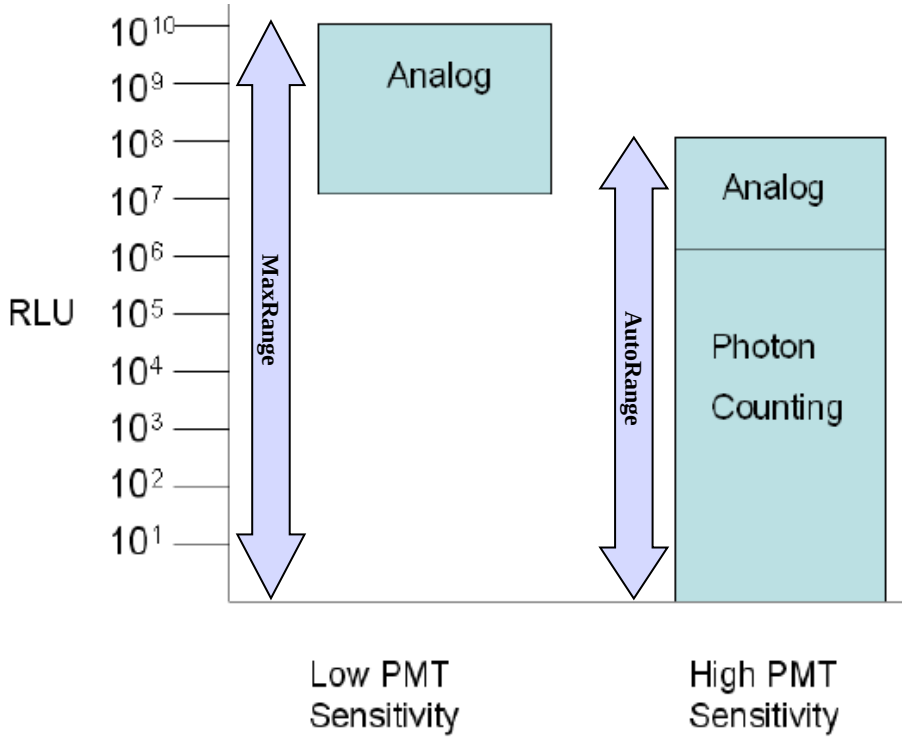
- Simultaneous Photon Counting and Analog Detection
  - Algorithm chooses which value to report
  - Best of both worlds



Extended Dynamic Range

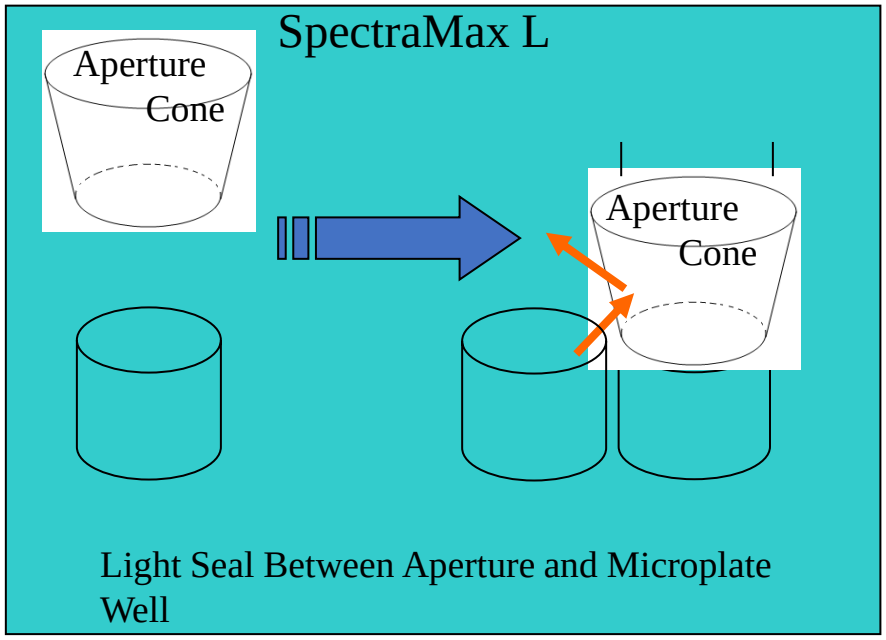
4 PMT Settings

- Analog Only: Ideal for very bright signals above 1.6 x 10^7 RLU (low PMT voltage)
- Photon Counting: Ideal for very dim and medium signals below 2.5 x 10^6 RLU (digital)
- AutoRange: Extends range of Photon Counting mode by adding Analog (high PMT voltage)
- MaxRange: Combines AutoRange and Analog Only modes
  - Captures entire dynamic range
  - **10 to 10^9 RLU**



SpectraMax L Aperture Design

- By design, the SpectraMax® L luminometer offers **higher sensitivity** and **lower crosstalk** by capturing the maximum amount of light from a test well and physically limiting light from adjacent wells.
- The aperture design does limit the types of plates that can be used on the system. (see known issues)



A Configurable System

Available in different configurations and depot-upgradeable for changing assay requirements

- Single detector (PMT):
  0 or 2 injectors
- 2-detectors:
  0, 2, or 4 injectors
- 6-detectors:
  0 or 12 injectors

- With injectors → flash
- Without injectors → glow

Types of Luminescence Assays

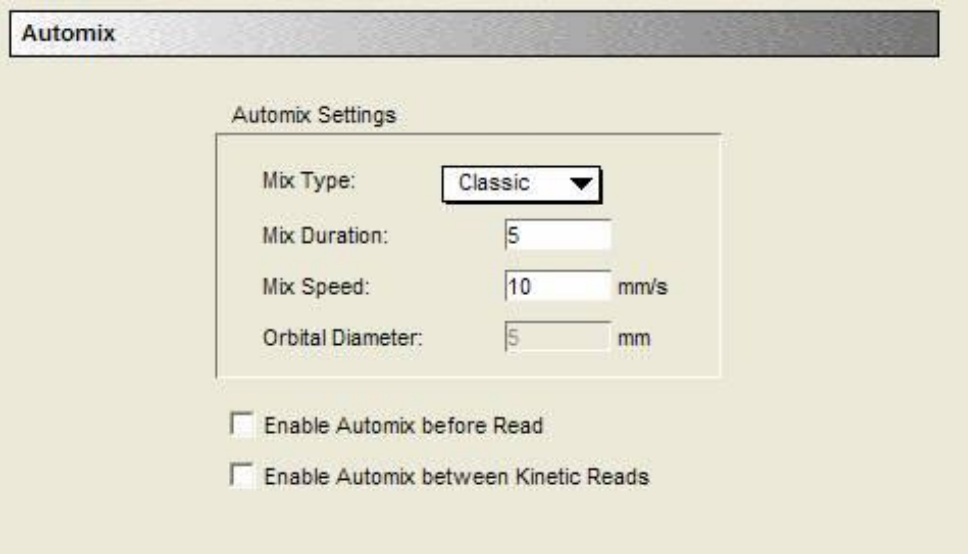
- **Glow**
  - Reaction kinetics are slow
  - Reagents can be added by hand
  - Plate will emit light for 20 minutes up to several hours

- **Flash**
  - Reaction kinetics fast enough to require an injector
  - Slow enough for injection followed by readhead movement and then read

- **“Extremely Fast Flash”**
  - Requires an injector in same position as readhead
  - Acridinium ester

Four Mode Mixing

- **Classic**
  - Same as AutoMix on most SpectraMax readers
  - Shakes along axis from front of instrument to back
- **Single Axis**
  - Shakes along same axis as Classic, but frequency doesn't change
- **Dual Axis**
  - Shakes In "L" pattern
- **Orbital**
  - Shakes in Circle pattern

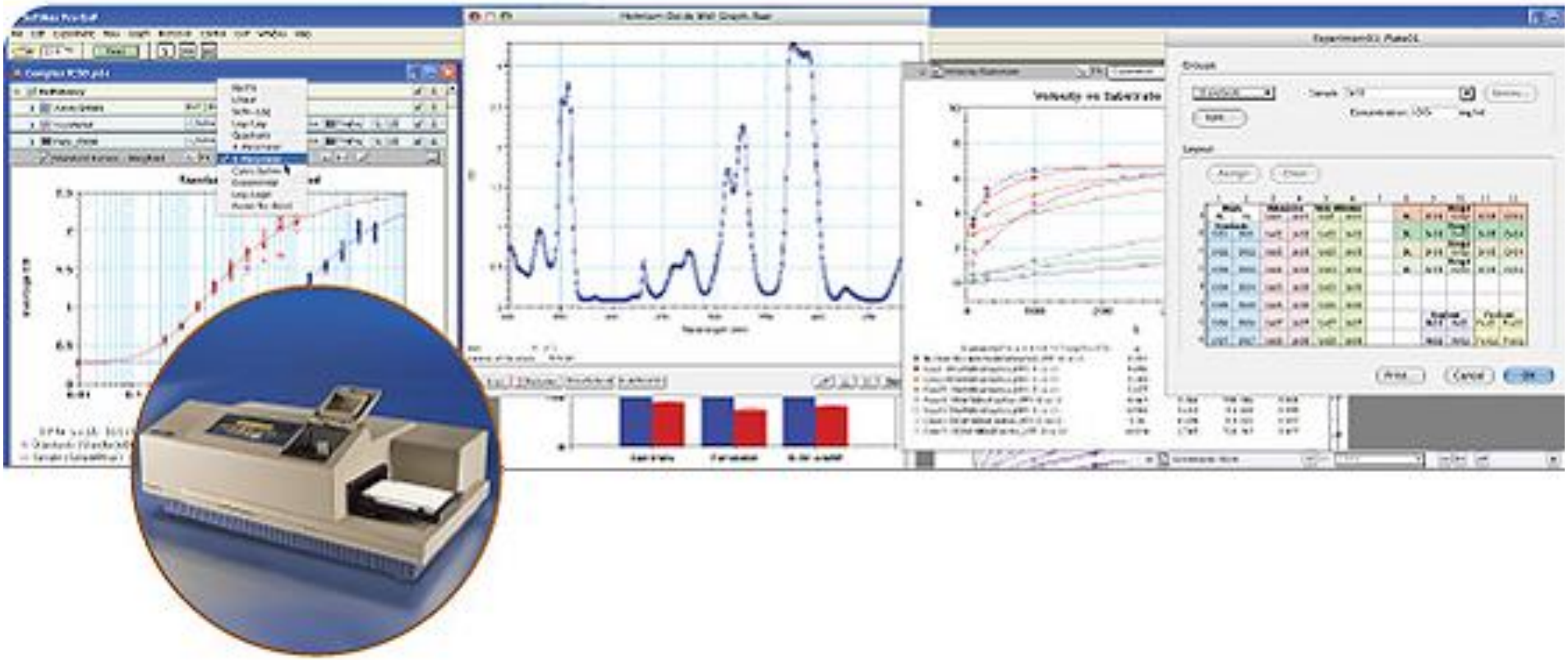


SpectraMax® L Applications

- ELISAs and Immunoassays
- Reporter Gene Assays
- Bioluminescence Resonance Energy Transfer (BRET)
- Enzyme Assays
- Cell Viability, Proliferation, and Cytotoxicity
- Aequorin Assays
- ATP Detection
- Mycoplasma monitoring

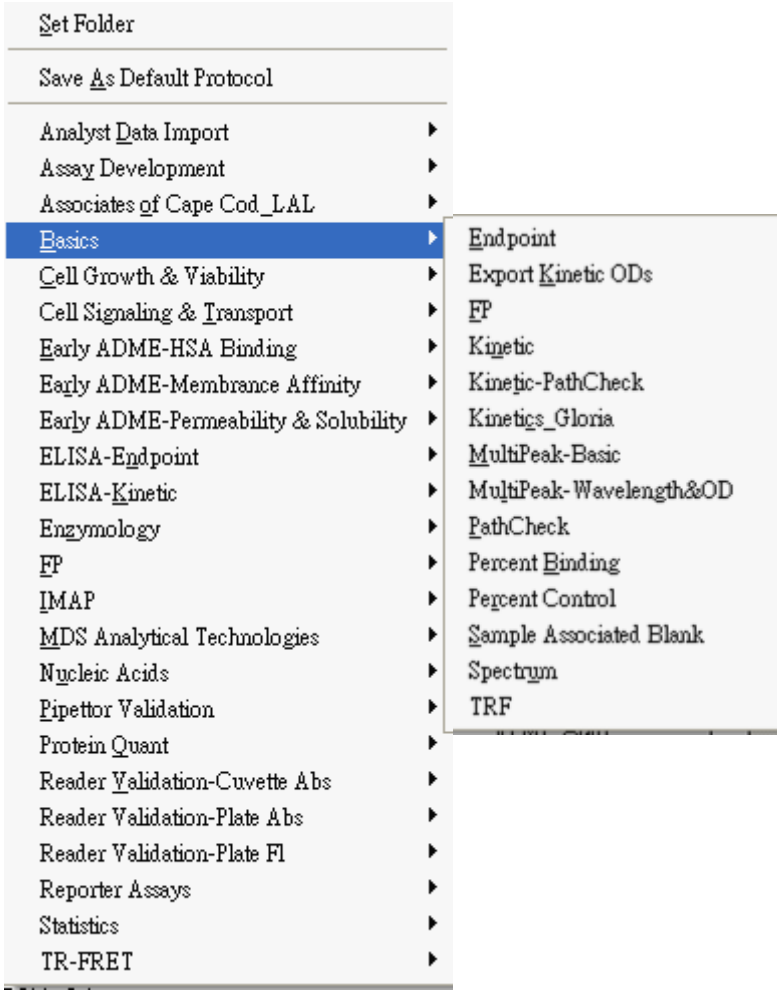
SoftMax® Pro 5 software

Resetting the Bar for Microplate Data Acquisition and Analysis



Method Protocols

- Assay methods set up as ready-to-run protocols
- Over **120** fully customizable protocols available
- Feature/Benefits:
  - Customers can save files as "protocols" to simplify repeated experiments in the future
  - Password protection for protocols ensures security of calculation methods



Group Section Overview

➢類似Excel的分析能力，可另外新增的判讀條件!!!

Add a Column to the Group section

Add a Summary object to the bottom

Edit a selected Summary object

Lock or Unlock a Section (GxP only)

Enable or disable printing of individual Sections

IL1a_Stds

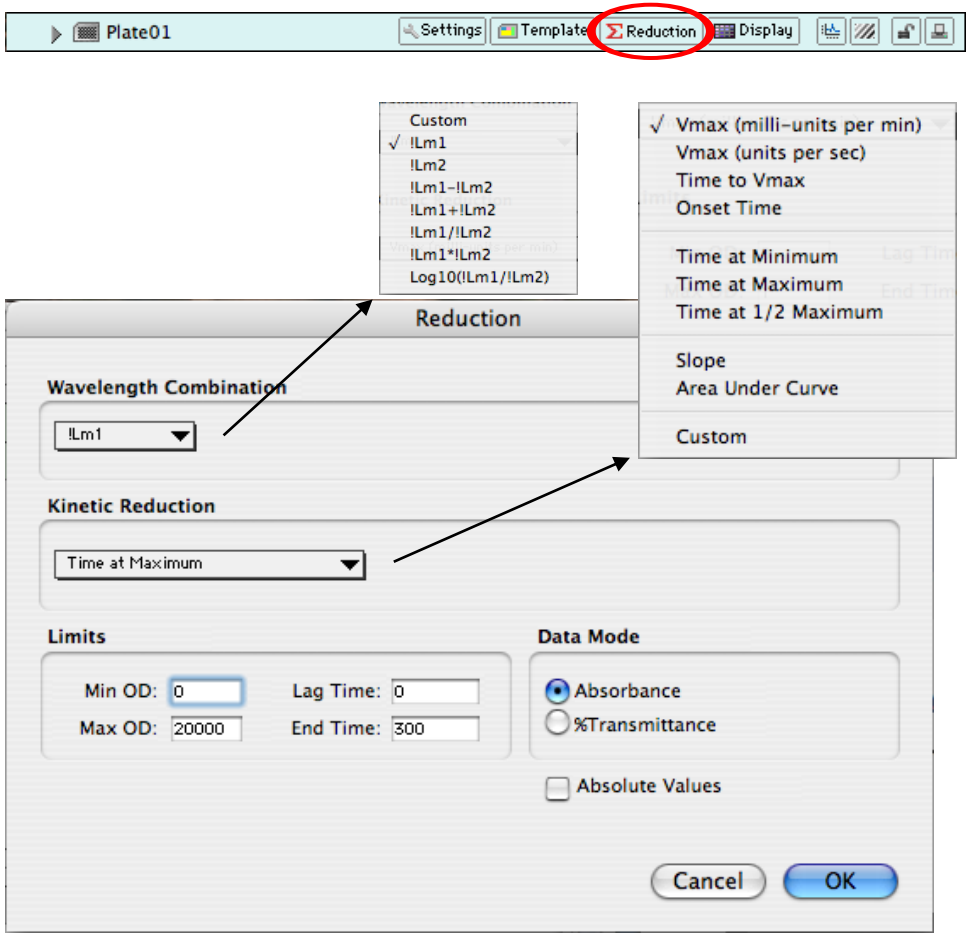
IL1a_Stds (pg/ml)

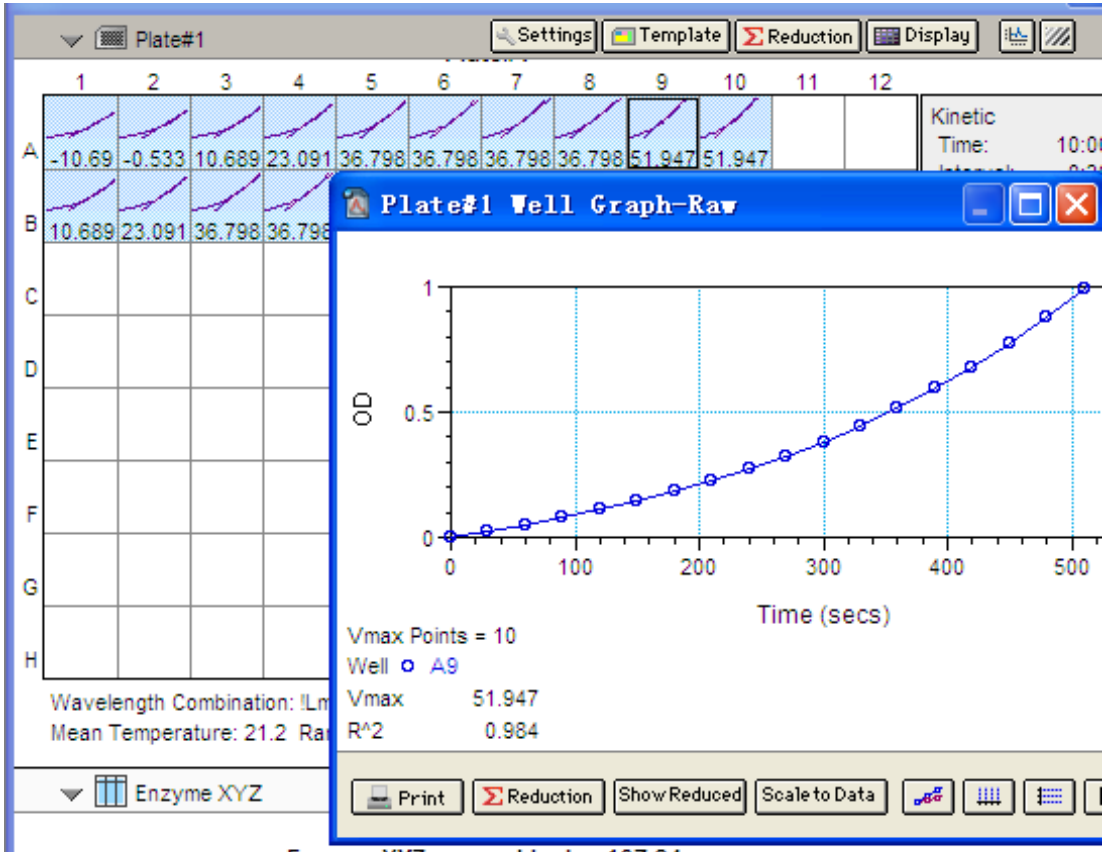
Sample	Conc	CalcConc	WellIDs	OD450-650	Mean OD	StdDev	CV%	Results
S01	1000.000	1000.903	A1	0.909	0.881	0.040	4.5	Fail
			A2	0.853				
S02	500.000	498.292	B1	0.619	0.603	0.023	3.8	Retest
			B2	0.587				
S03	250.000	251.550	C1	0.405	0.403	0.004	0.9	Pass
			C2	0.400				
S04	125.000	125.288	D1	0.268	0.270	0.003	1.0	Pass
			D2	0.272				
S05	62.500	63.139	E1	0.192	0.193	0.001	0.4	Pass
			E2	0.193				
S06	31.250	27.831	F1	0.141	0.143	0.002	1.5	Retest
			F2	0.144				
S07	15.625	17.811	G1	0.127	0.127	0.000	0.0	Pass
			G2	0.127				

Smallest standard value : 0.127
Largest standard value : 0.881

Plate Section - Reduction Settings

- **Apply a Formula to all wells in a Plate section**
  - Apply one formula or set of rules to all wells on plate
  - Options change depending on instrument settings selected





Enzyme XYZ, group blank = 107.24

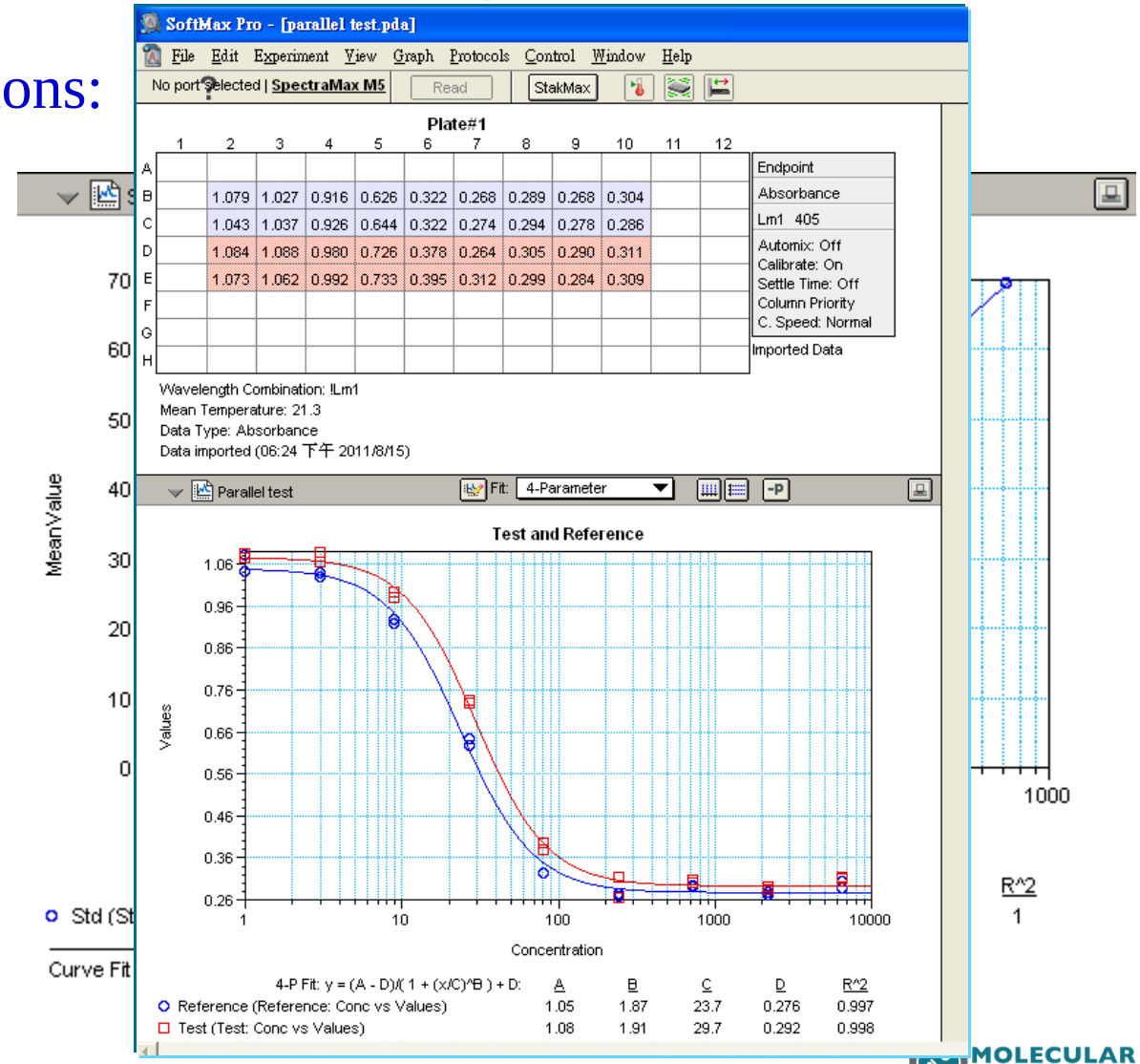
Sample	Wells	S	1/S	v	1/v	v/S	S/v	WellValues
Gr01	A2	1	1.000	11.3	0.089	11.279	0.089	0.533
	B2							23.091
Gr02	A3	2	0.500	23.7	0.042	11.872	0.084	10.689
	B3							36.798
Gr03	A4	4	0.250	29.9	0.033	7.486	0.134	23.091
	B4							36.798
Gr04	A5	6	0.167	36.8	0.027	6.133	0.163	36.798
	B5							36.798
Gr05	A6	8	0.125	36.8	0.027	4.600	0.217	36.798
	B6							36.798

SoftMax Pro 可以自動計算求得Vmax和Km

Curve Fitting

Ten curve-fitting functions:

- Linear,
- Semi-Log,
- Log-Log,
- Quadratic,
- 4-Parameter,
- 5-Parameter,
- Log-Logit,
- Point-to-Point,
- Exponential,
- Cubic Spline



Service Team

金萬林企業股份有限公司

產品技術應用服務

- 侯沛庠 MD 產品服務時間 07 年
- 劉儀君 MD 產品服務時間 06 年
- 黃士宣 MD 產品服務時間 03 年
- 李琇琴 MD 產品服務時間 02 年
- 紀幸玟 MD 產品服務時間 01 年

維修工程師

- 王佑毓 MD 產品維修年資 14 年
- 陳建因 MD 產品維修年資 09 年
- 齊龍生 MD 產品維修年資 03 年
- 洪啟堯 MD 產品維修年資 02 年
- 陳建廷 MD 產品維修年資 02 年

Your success is our success

Molecular Devices台灣分公司

資深產品應用經理

- Sophia Hsieh, Ph.D
- Pluck Chou

維修工程師

- Matt Chen
- Timmy Hsiung

Thank you for your attention

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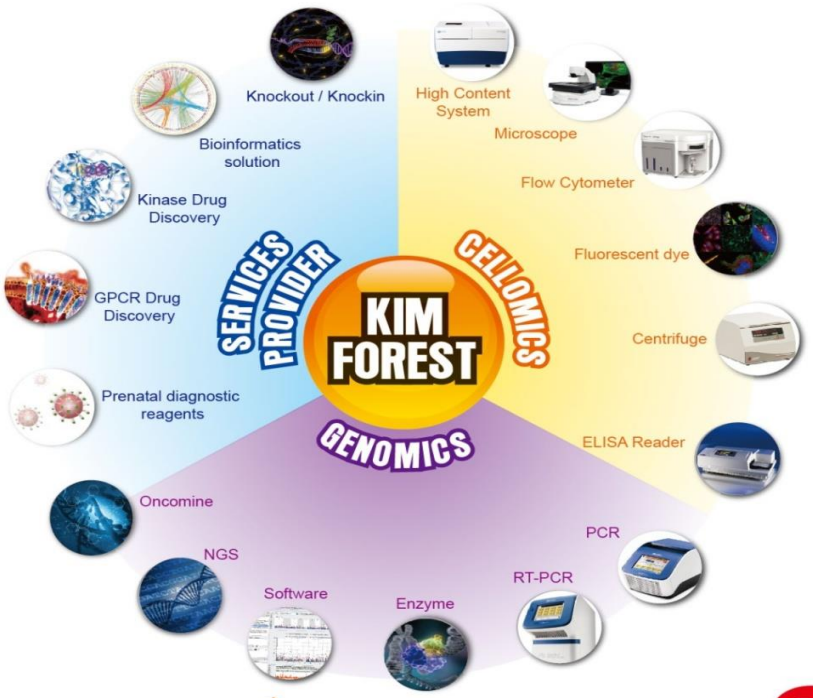

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