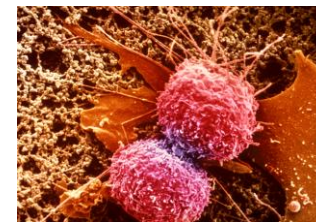


## Luminex<sup>®</sup>200 和 Milliplex 试剂盒介绍



产品专家  
岳丹琪

# 今天的默克密理博：生命科学全套解决方案



Protein Research

Neuroscience

Epigenetics

Stem Cells

Cell Signaling

Drug Discovery

Cancer Research

Assay Kits

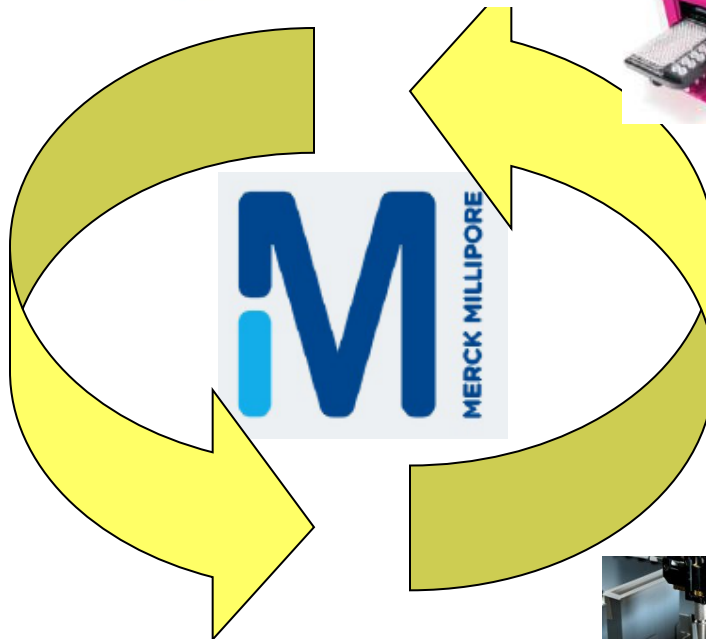
Antibodies

Cells

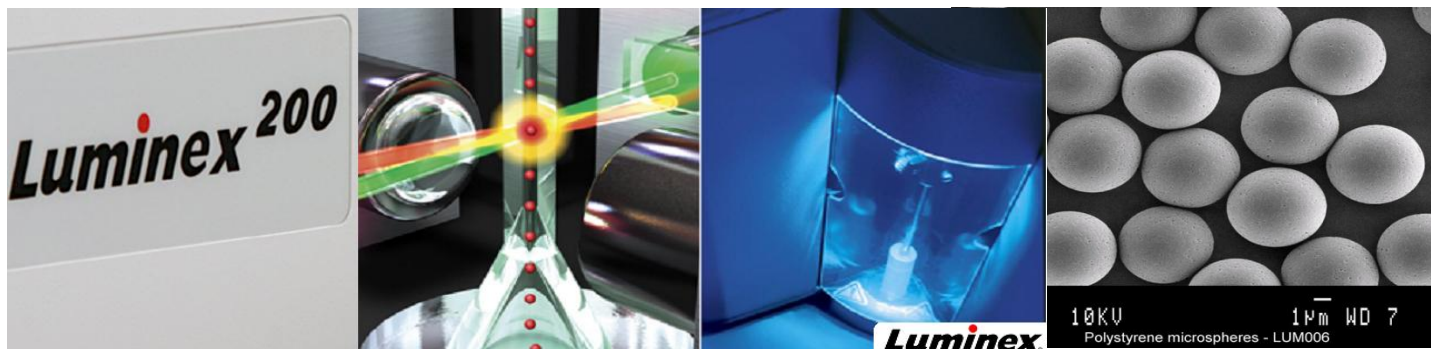
Biotools

Instruments

Cell culture media & plates



- 1997年，Clinical Chemistry杂志介绍Luminex技术，誉之为“真正的临床应用型生物芯片”。
- 2001年，Luminex技术获美国FDA认证，成为首个，也是唯一得到美国FDA许可的用于临床诊断的多指标检测技术。
- 2005年6月，基于Luminex技术的文章发表在《Nature》杂志上，标志着该技术在科学研究领域得到的最高荣誉。
- 2005年11月，全球科技产业和行业研究权威机构Frost & Sullivan授予Luminex技术“2005年度国际临床诊断技术革新大奖”，标志着Luminex技术在国际临床诊断技术领域的领军地位得到了最权威的认可。
- Merck Millipore和Luminex公司组成密切的战略合作伙伴关系，共同开发液相芯片技术。



- Luminex have developed a rapidly expanding menu of applications using the **xMAP** technology platform.

## 蛋白检测

Cancer Markers

Cardiac Markers

Cellular Signaling

Cytokines, Chemokines, and Growth Factors

Endocrine

Isotyping

Matrix Metalloproteinases

Metabolic Markers

Neurobiology

Transcription Factors/Nuclear Receptors

## 基因研究

Gene Expression Profiling

Genotyping

## 遗传疾病

Cystic Fibrosis

Cytochrome p450

## 免疫诊断

Allergy Testing

Autoimmune Disease

HLA Testing

Infectious Disease

## 生物安全/环境监测

***Broad menu of proteomic and genomic applications***

# 1. **xMAP**技术与*Luminex200*介绍

## 2. **Milliplex**蛋白检测试剂盒

# 什么是xMAP

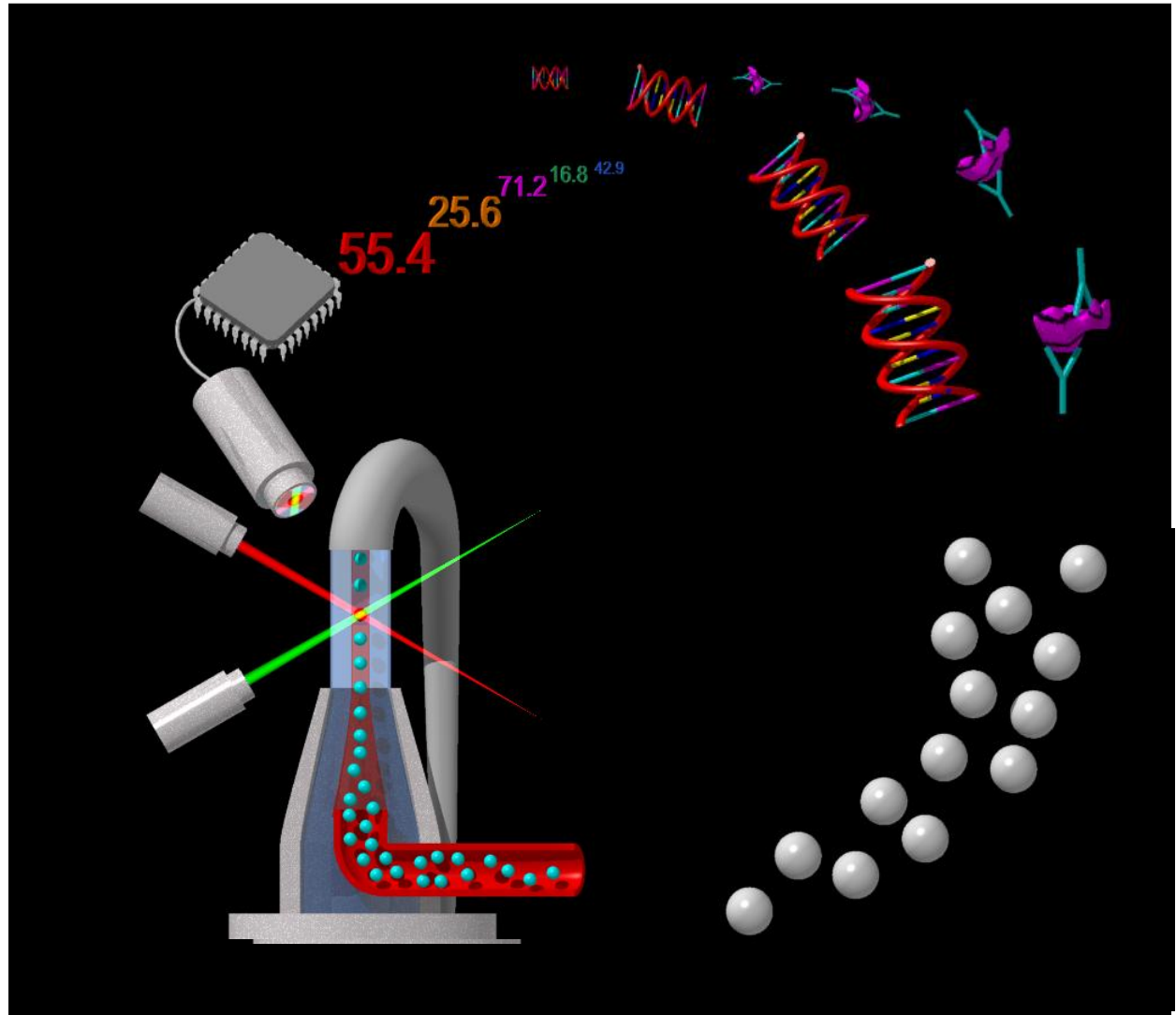
- **X** = The Unknown (what you are looking for)
  - **M** = Multi (many)
    - **A** = Analyte (test substance)
      - **P** = Profiling (analysis of)



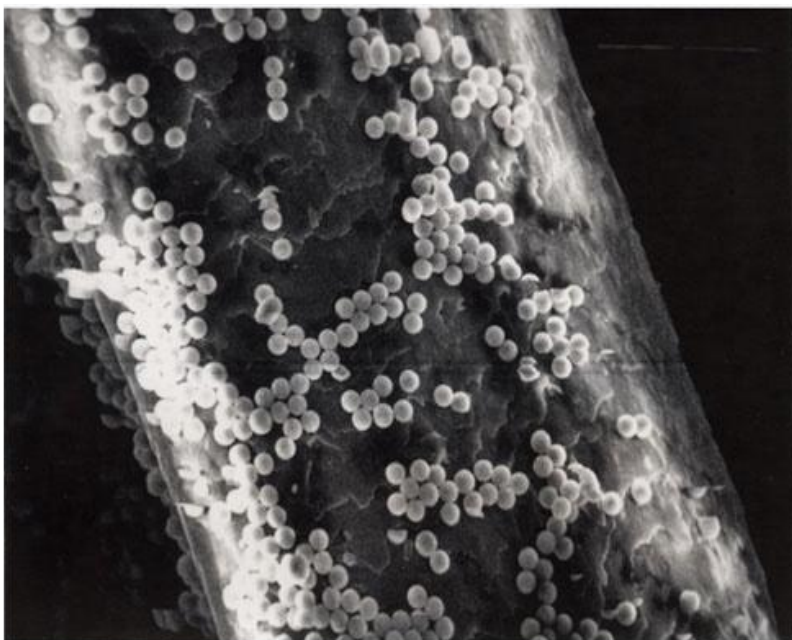
# xMAP检测系统组成

- *4 basic components*

- 生物试剂
- 微球
- 流路和光学系统
- 数据处理输出

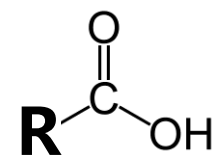


xMAP Technology: The power is in the beads



SEM photo of 3.4 micron particles on human hair, 1000x

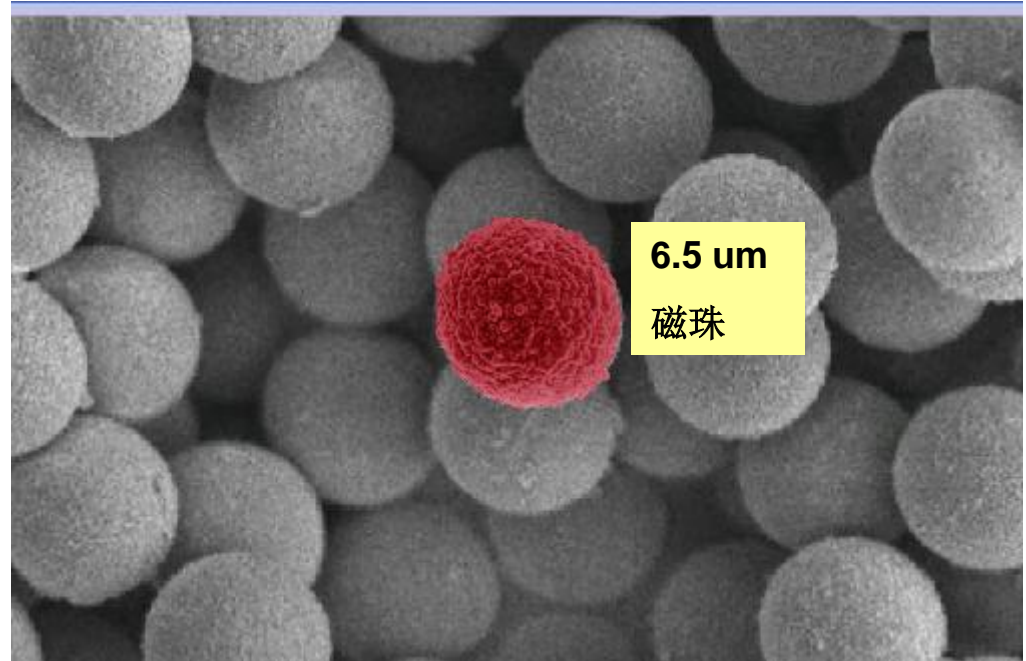
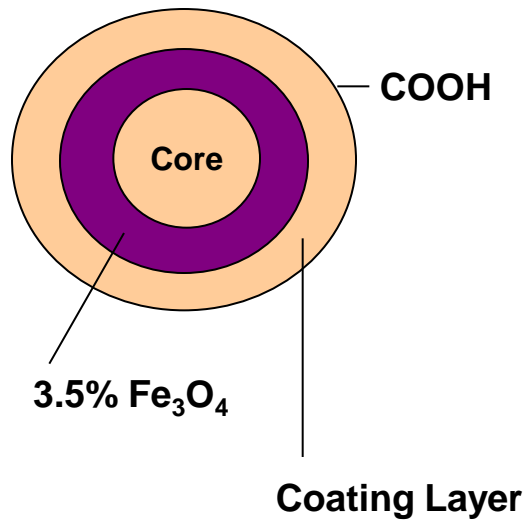
- > 5.6 micron microsphere
- > Carboxylated surface



- > Small bead size
  - > Suspension in liquid
  - > Fast kinetics
  - > High surface-to-volume ratio

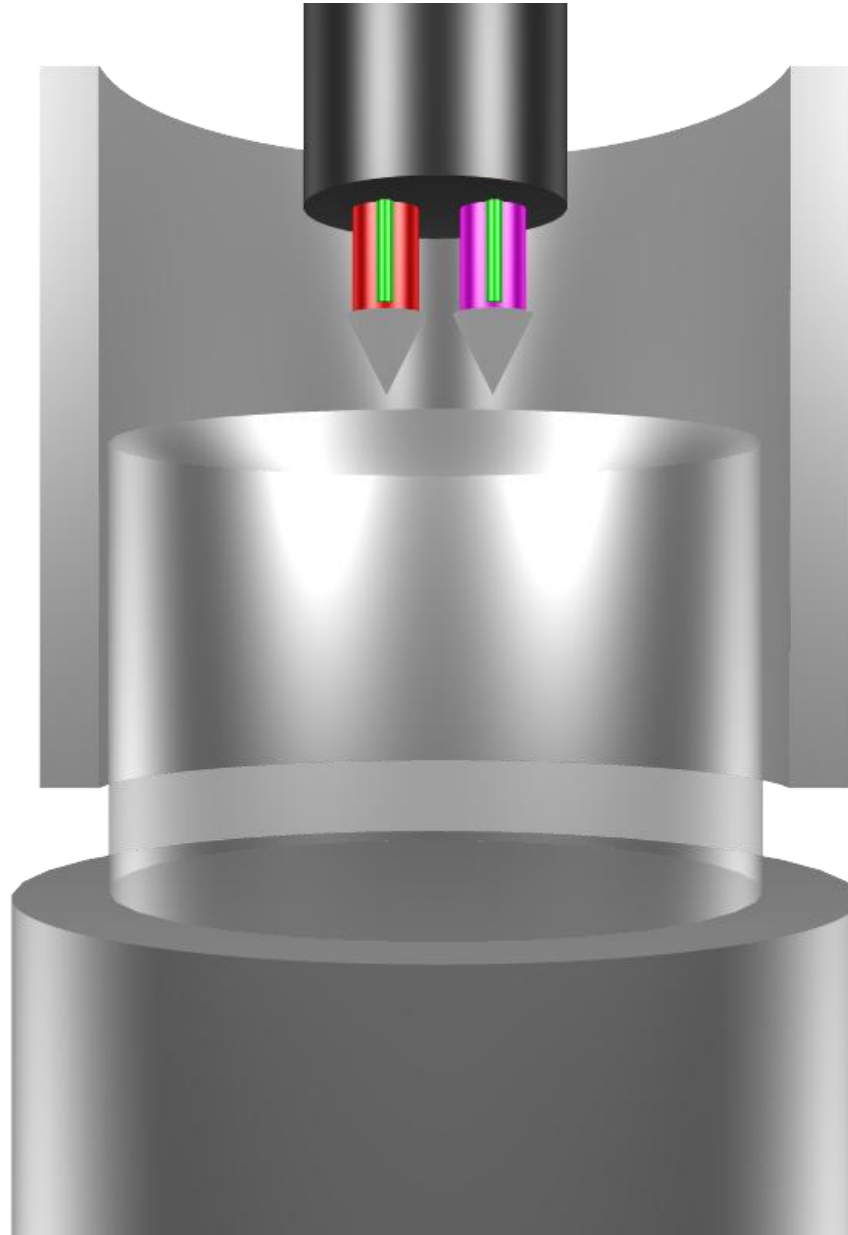


# xMAP核心: 颜色编码的微珠

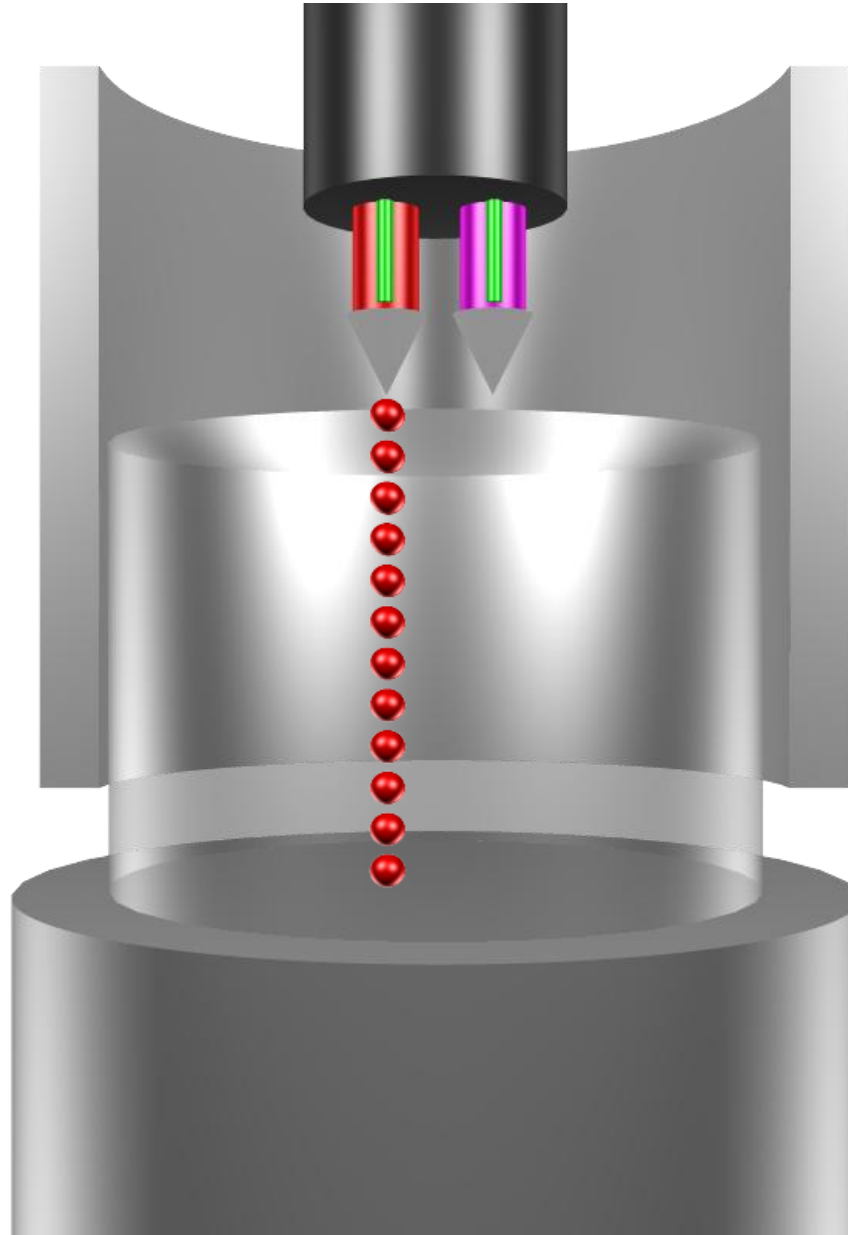


Same chemicals used in magnetic bead conjugation to bio-molecules

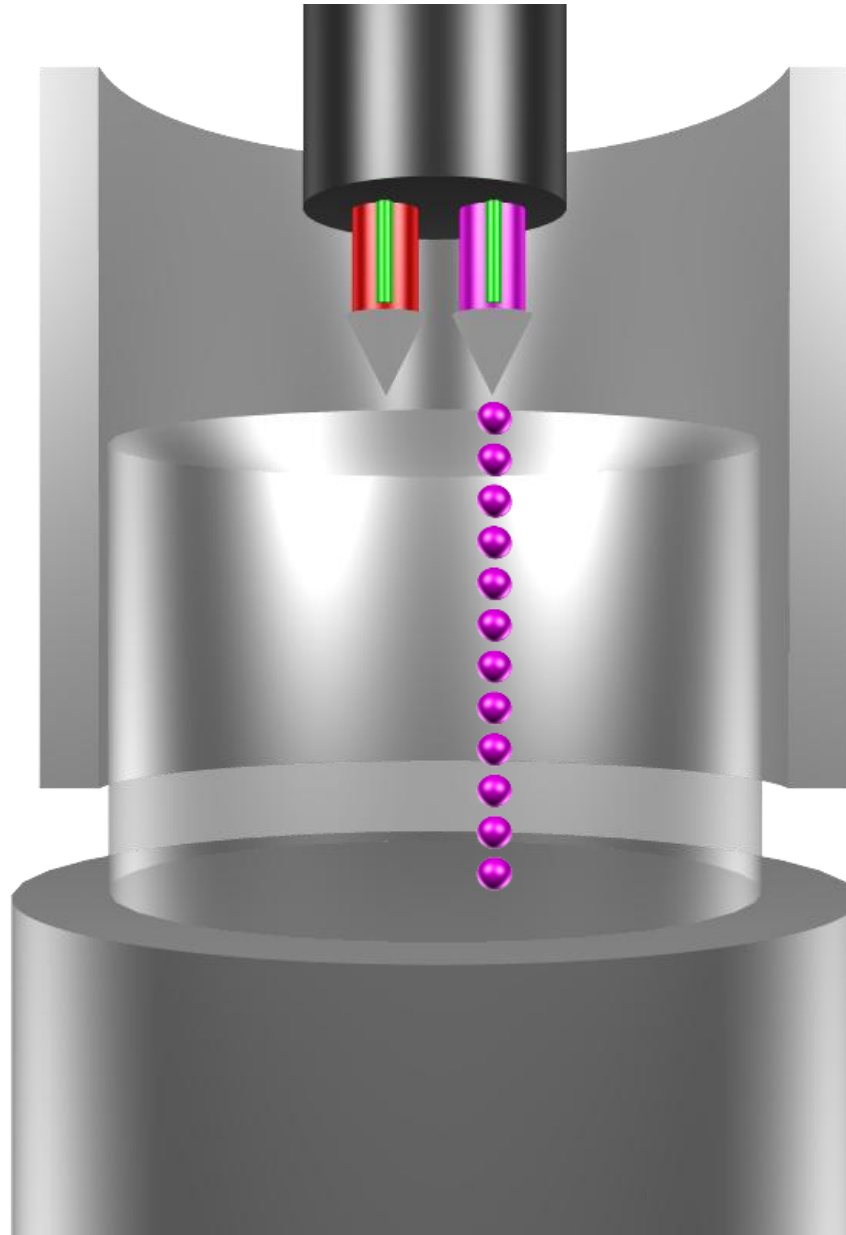
# xMAP technology- color coding



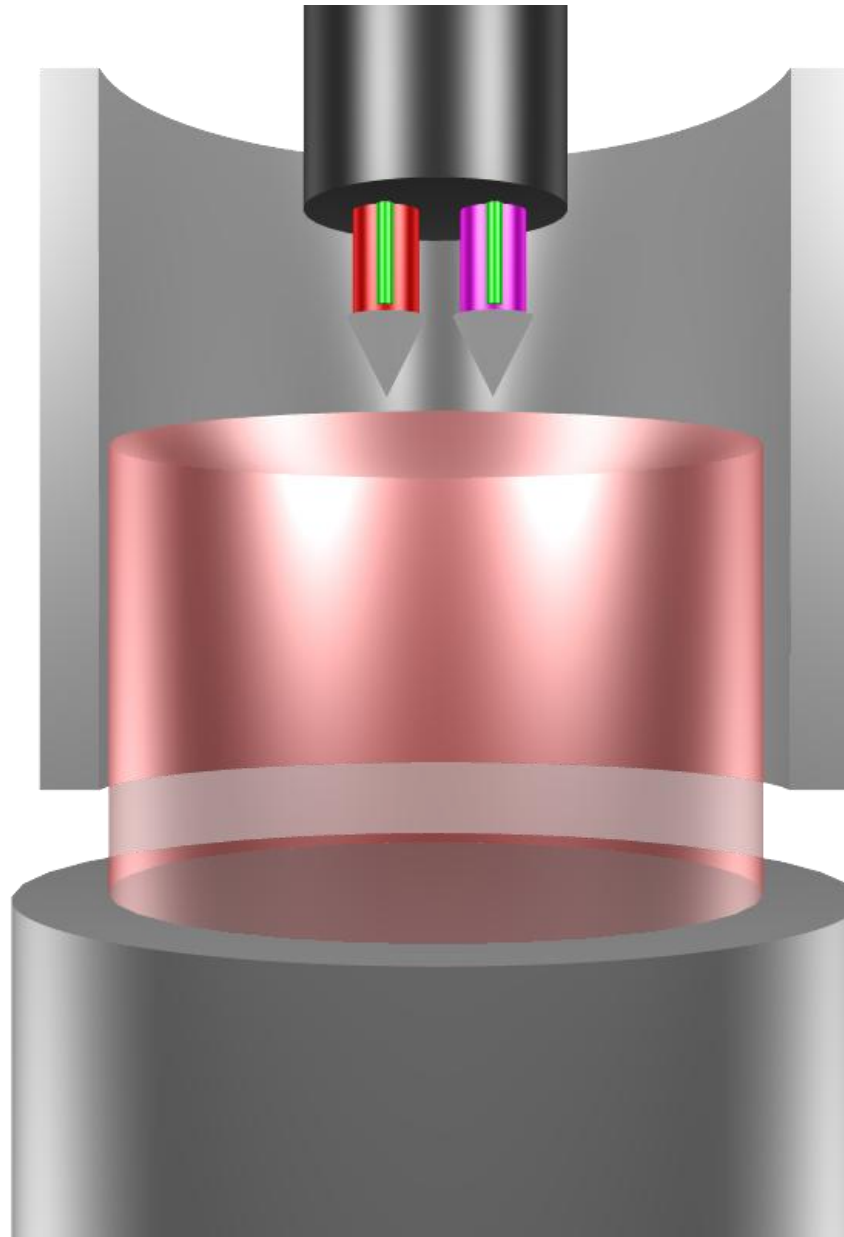
# xMAP technology- color coding



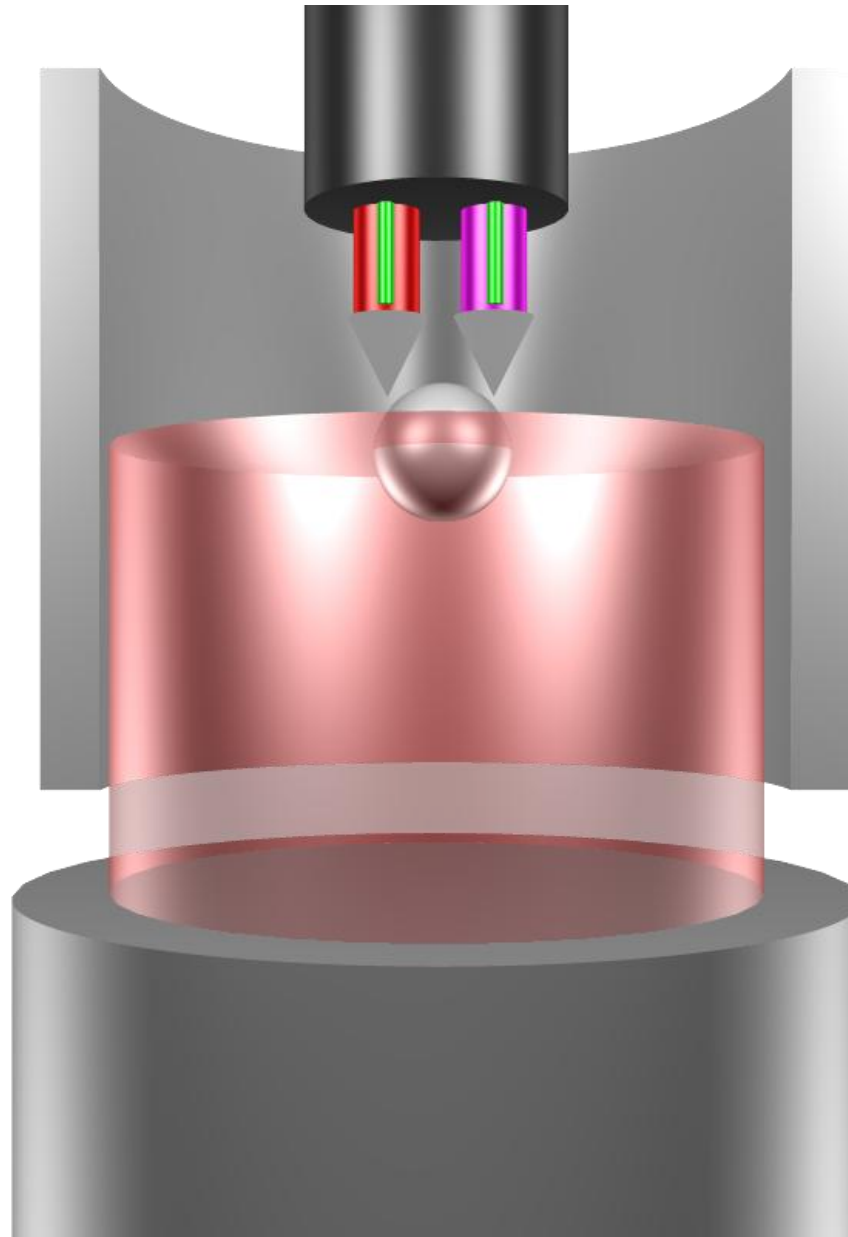
# xMAP technology- color coding



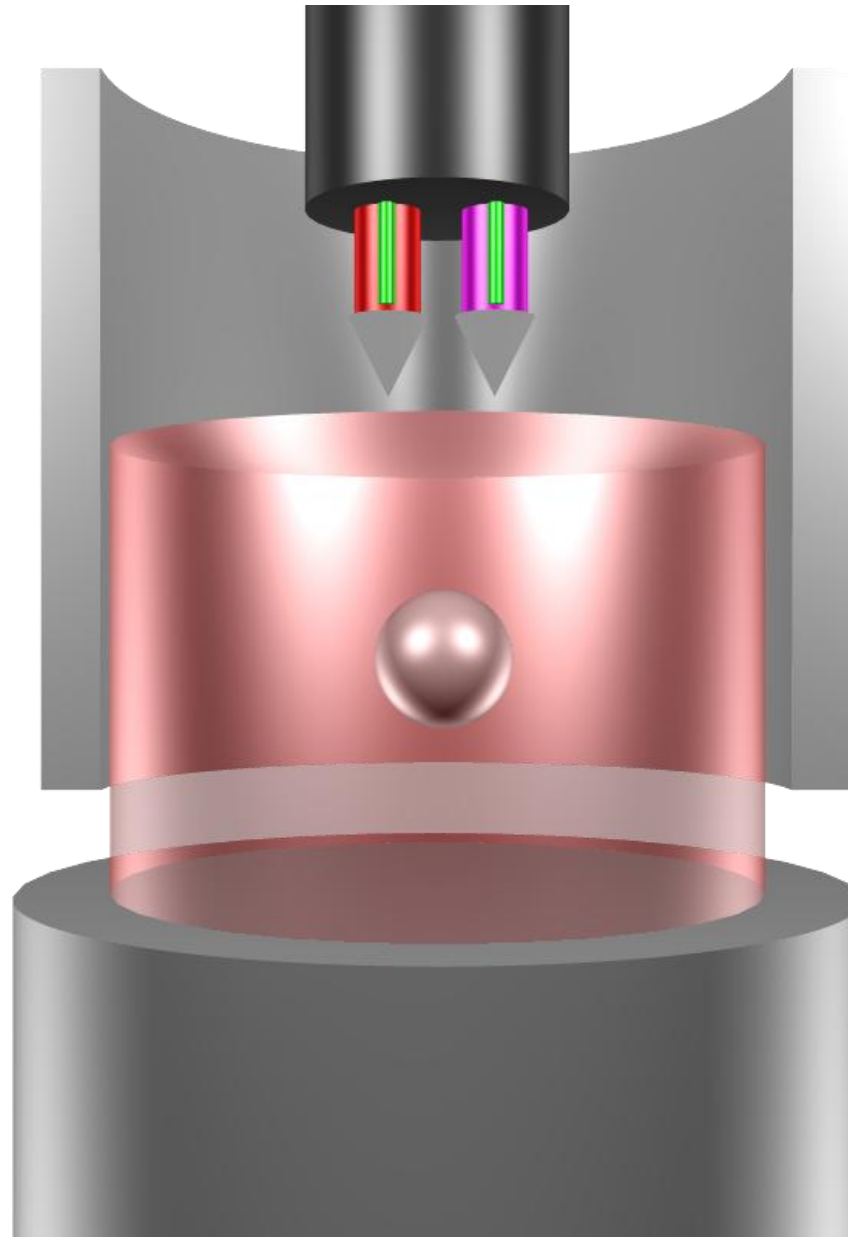
# xMAP technology- color coding



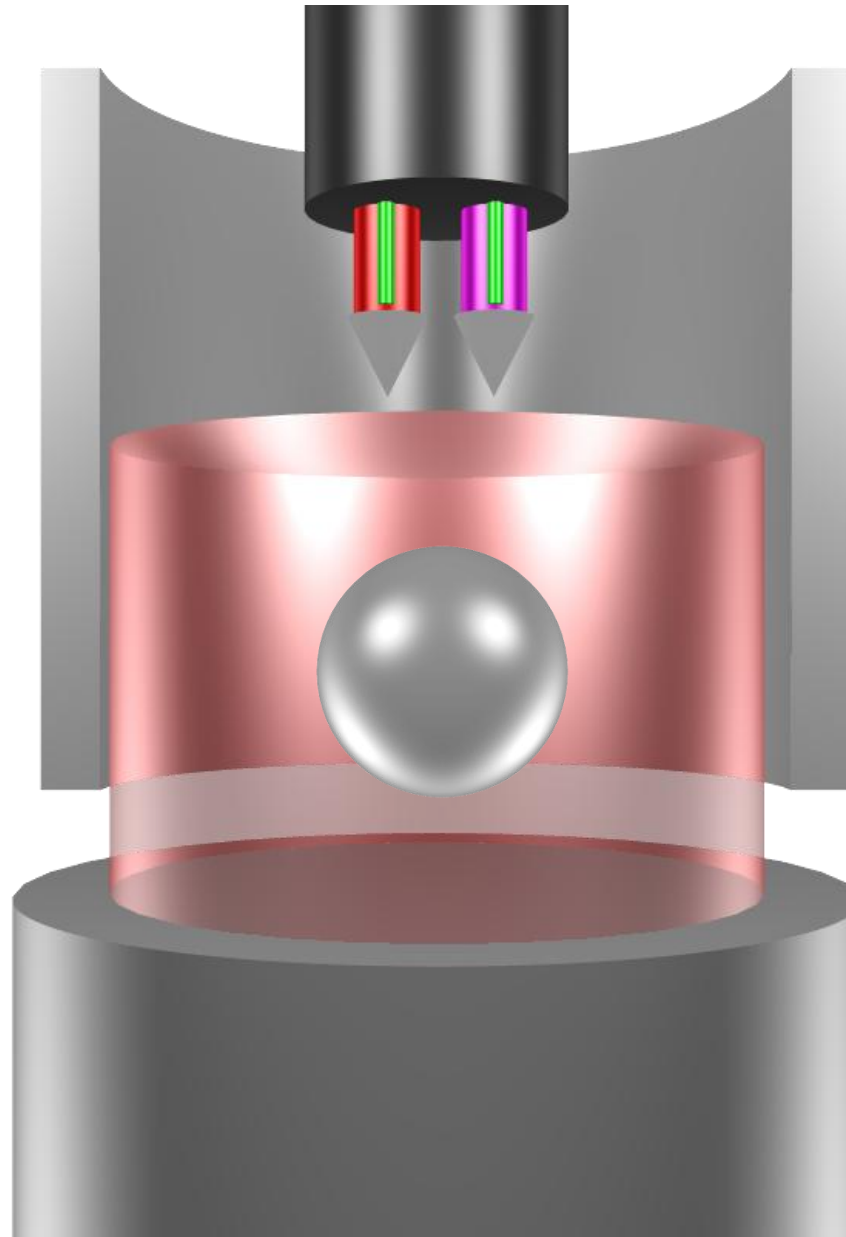
# xMAP technology- color coding



# xMAP technology- color coding

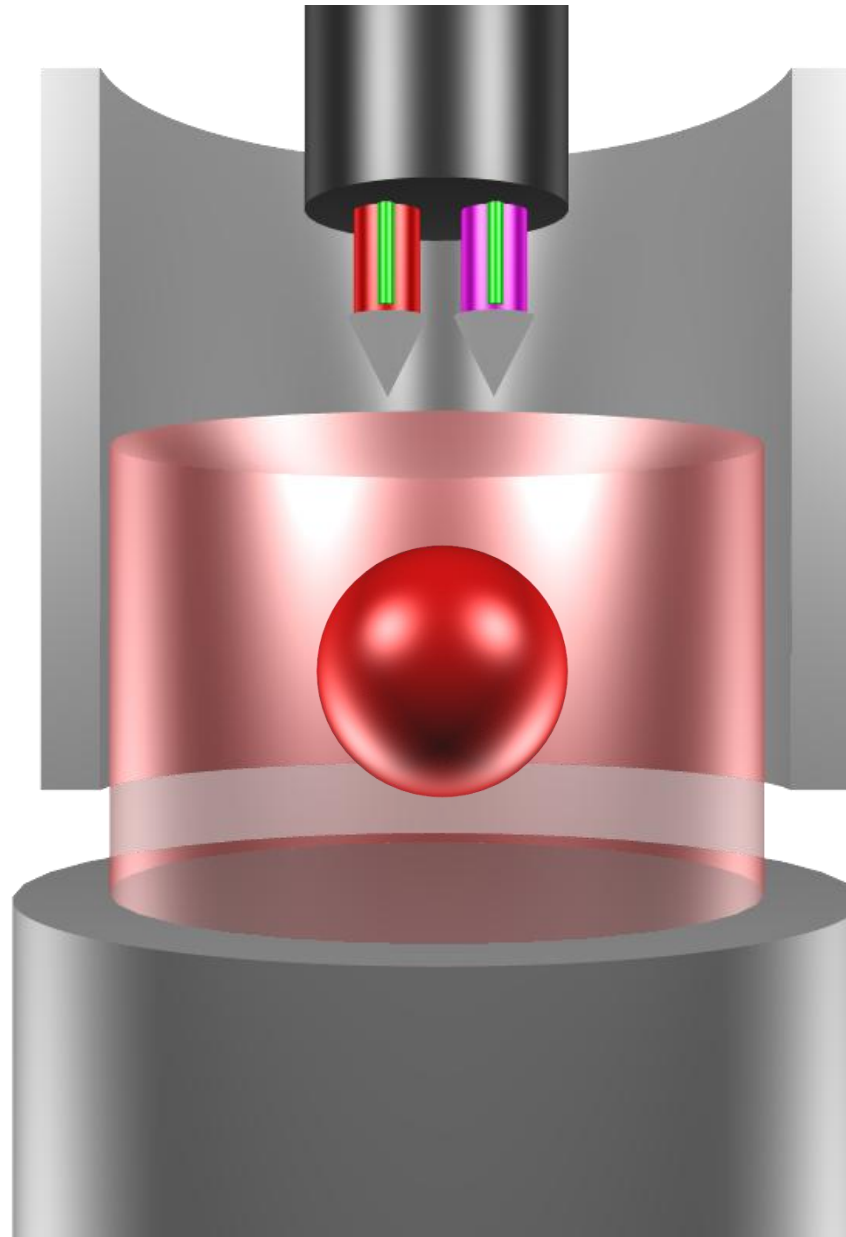


# xMAP technology- color coding

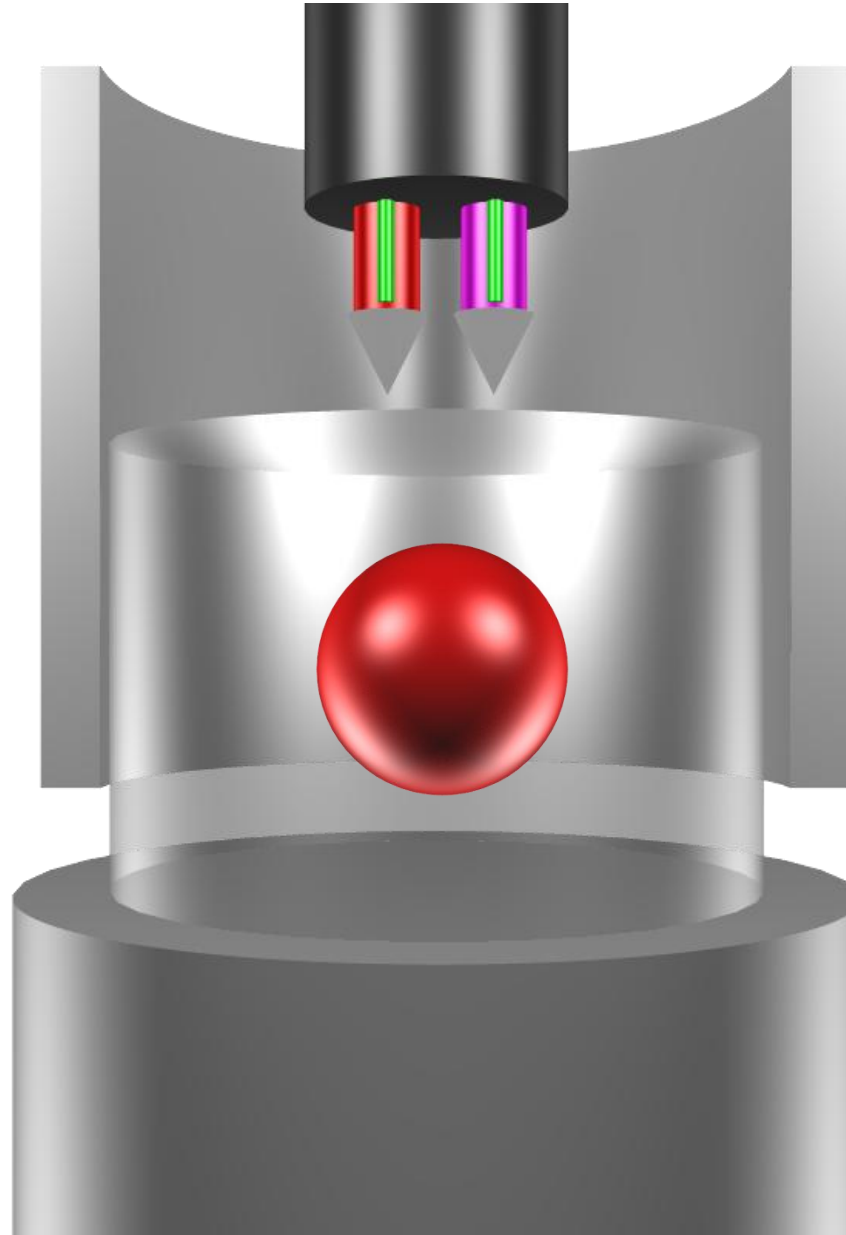




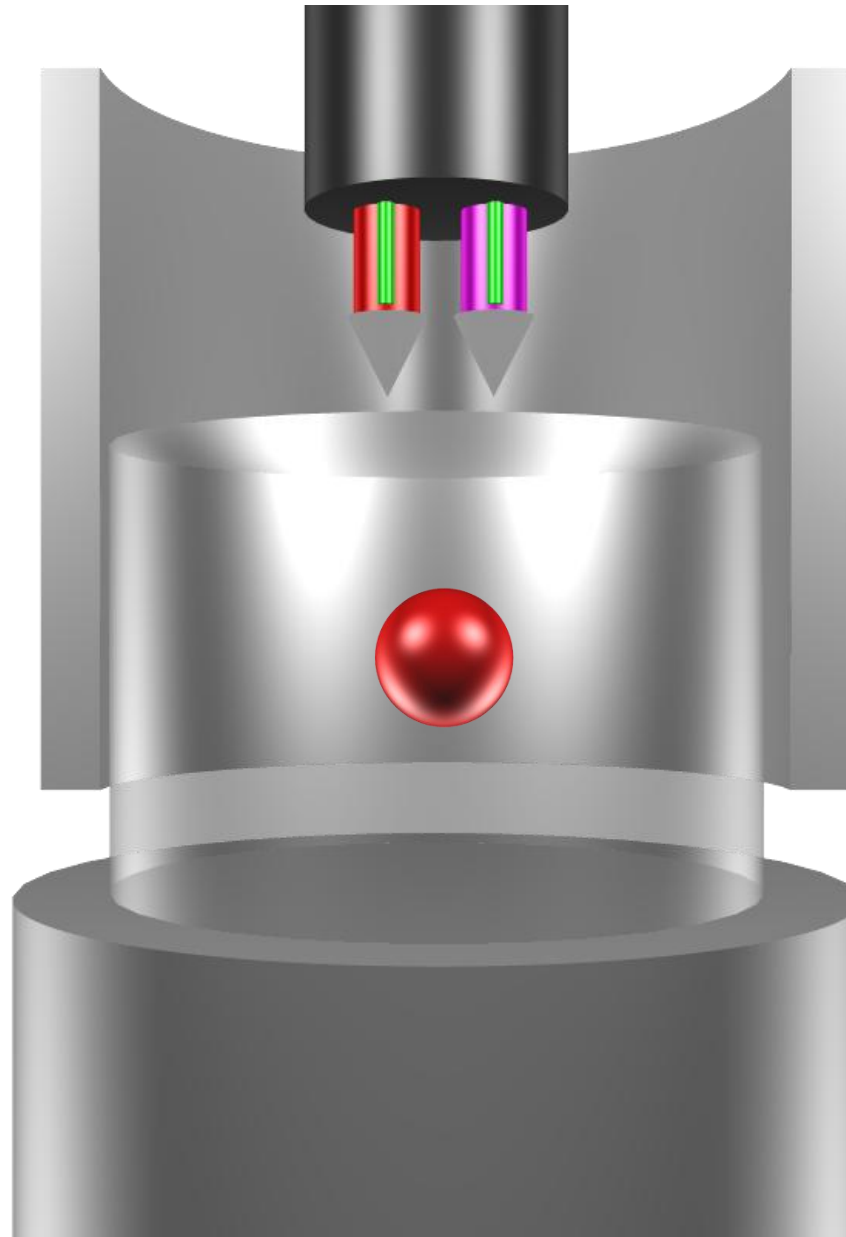
# xMAP technology- color coding

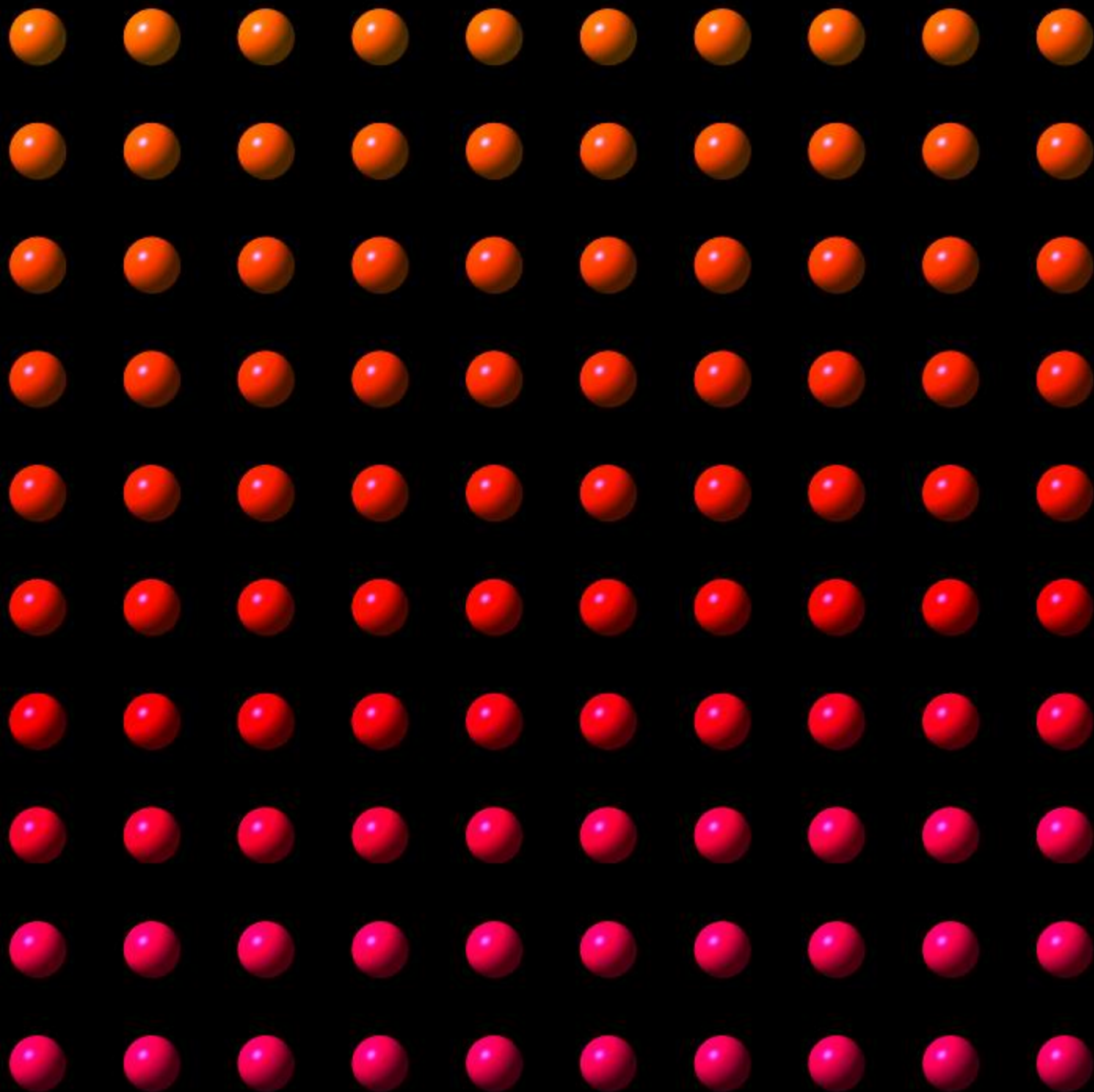


# xMAP technology- color coding



# xMAP technology- color coding

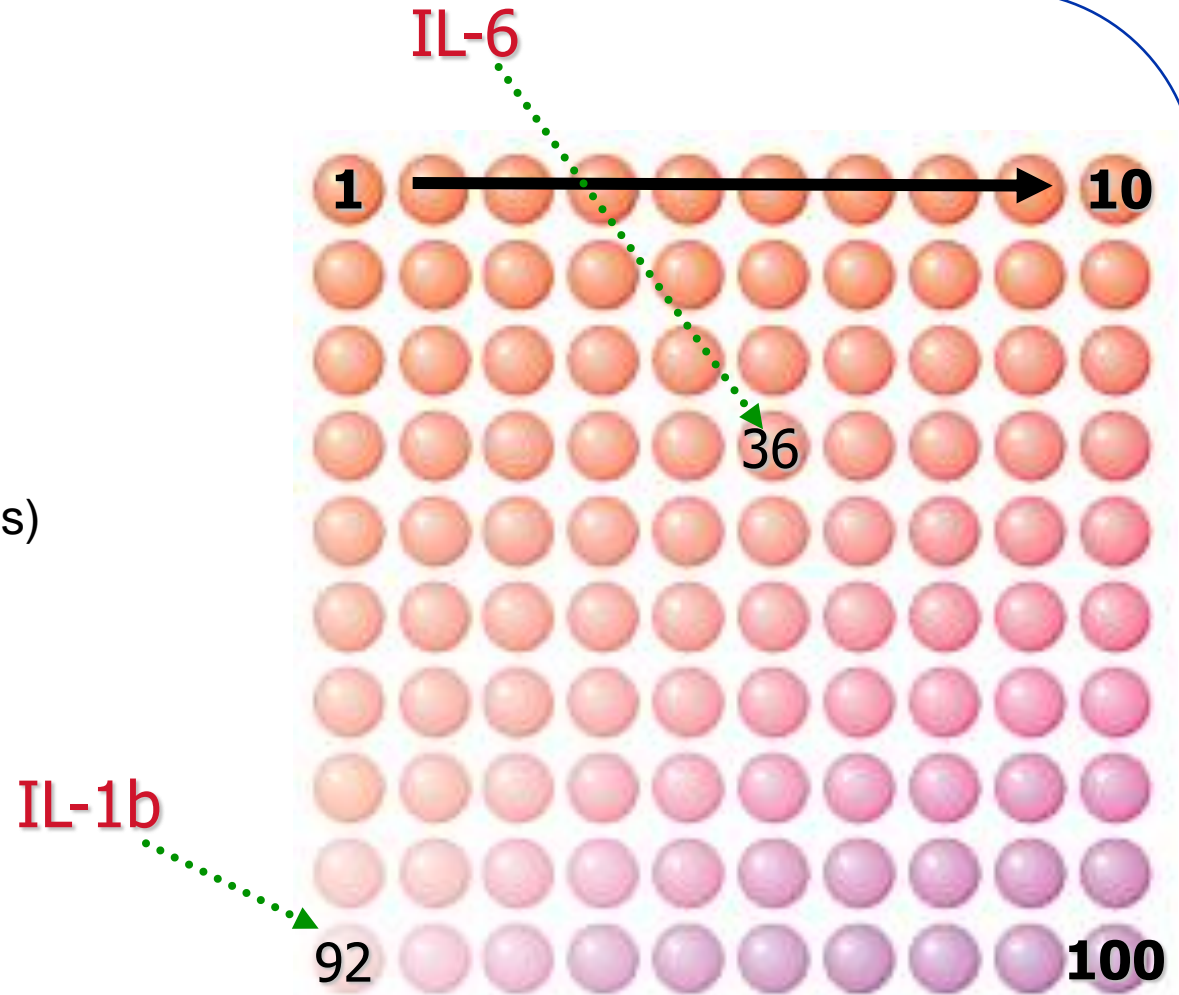




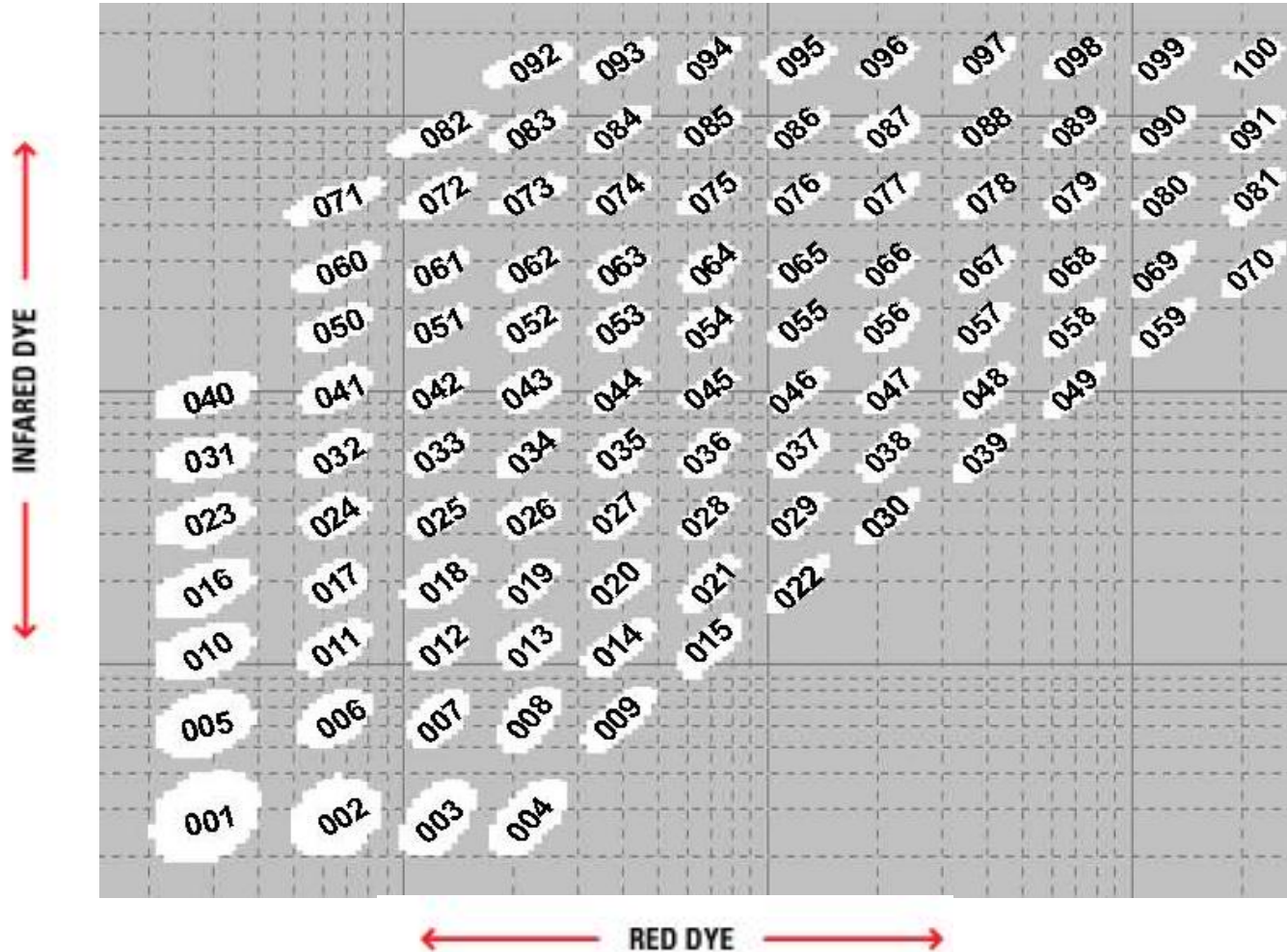
# 100 个独特微球

Dyeing process creates  
unique “spectral address”

- Dye ratio
- 100 bead colors (regions)



# xMAP Technology - Bead Map



# xMAP 各级检测平台

拥有 xMAP 多重检测技术

多重检测的能力

50-重检测



MAGPIX

100-重检测



Luminex 200

500-重检测



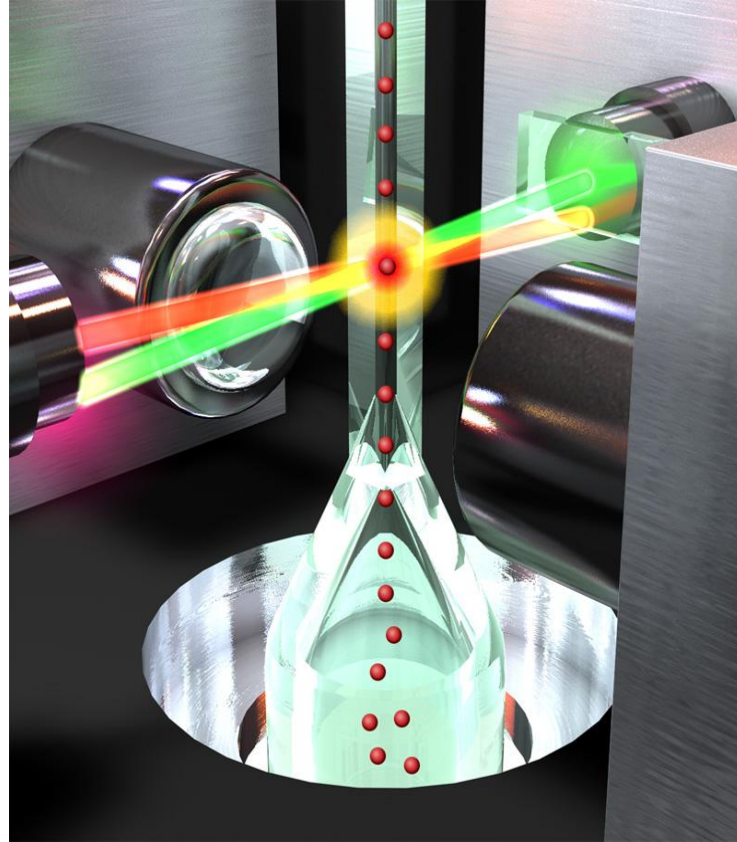
FLEXMAP 3D

通量和价格



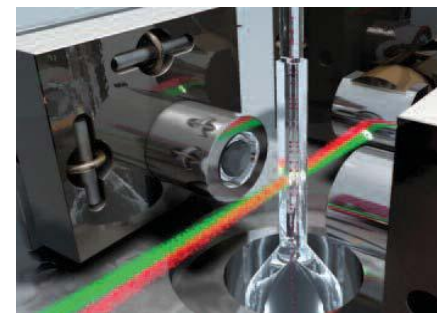
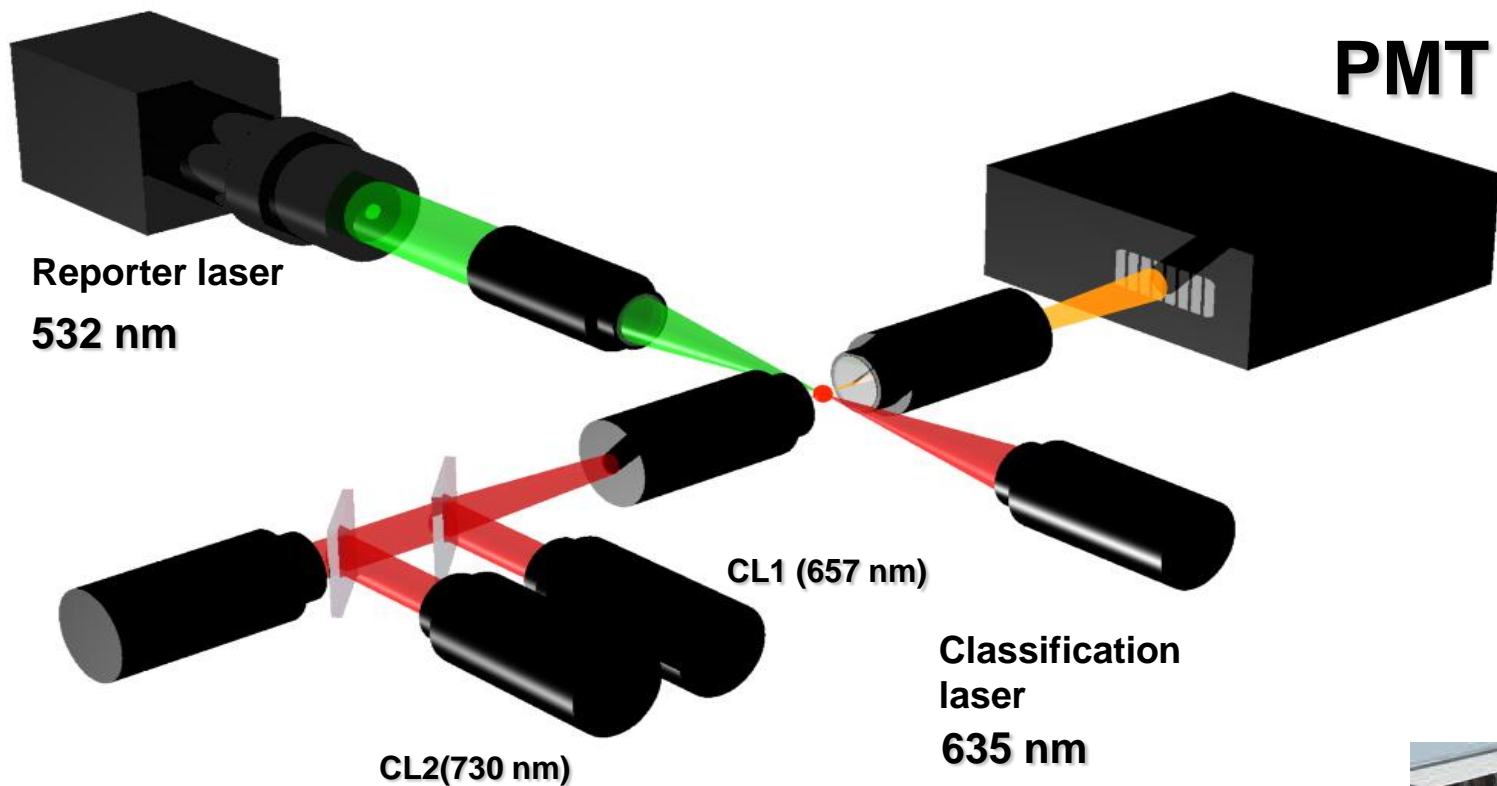
操作软件	xPONENT 3.1
光路系统	双激光系统
使用微球	磁珠/塑料珠兼容系统
检测体系	100-重检测
应用范围	蛋白/核酸
读盘类型	96 孔板

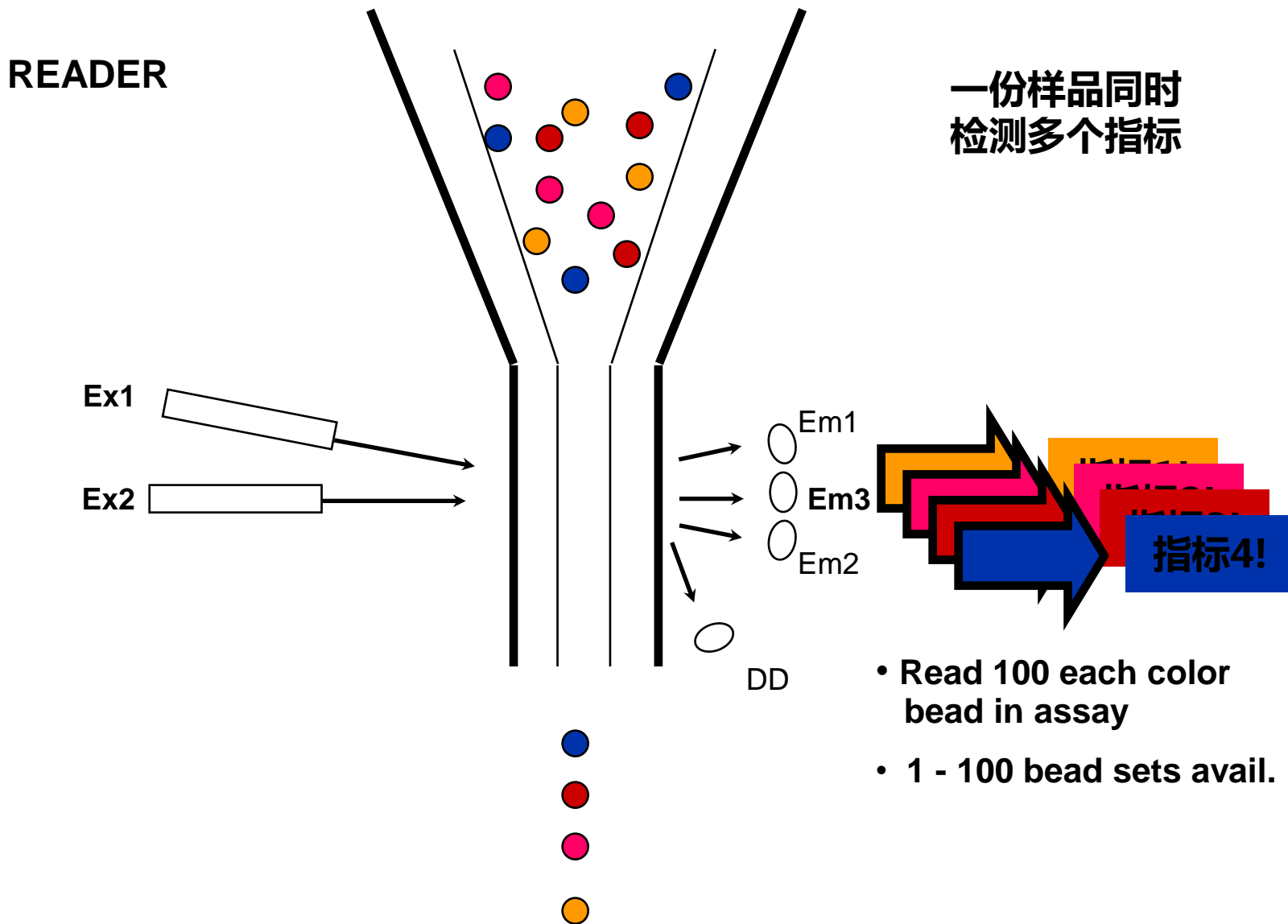




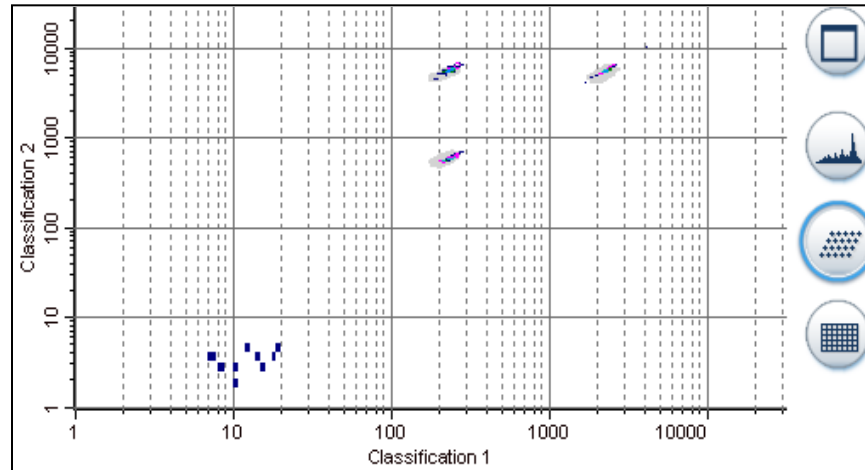
# 双激光系统工作原理

## 双激光系统





# 结果输出



**Results**

Settings

Logs

Sample Det...

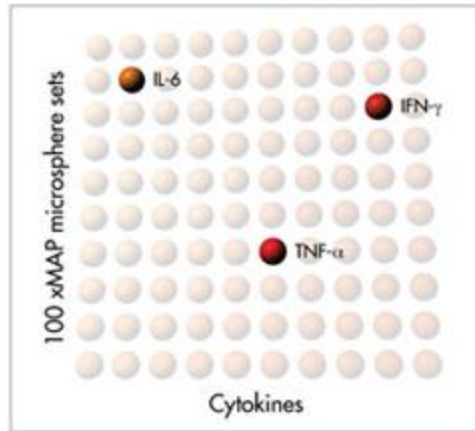
## Batch Details: Results

Instructor Batch "Example Batch", created 11/9/2006 11:49:32 AM.

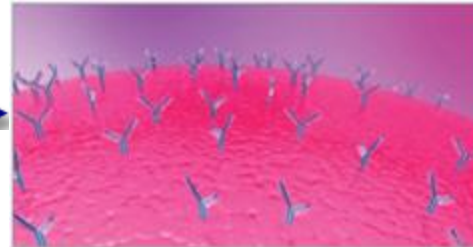
Statistic:  Analyte:   Single

Well	Sample	Run ...	AFP	CKMB	Estriol	hCG	Myoglo...	Troponin	TSH
1,A1	S1	Ok	178.5	13.0	9225.0	10719.5	23.5	29.5	27.0
1,B1	S1	Ok	184.0	13.0	9052.0	10782.0	24.0	30.0	28.0
1,C1	S2	Ok	986.0	34.5	4404.0	7656.0	102.0	86.5	90.0
1,D1	S2	Ok	991.0	35.0	4282.5	7514.0	104.0	86.0	88.0
1,E1	S3	Ok	2225.5	163.0	1646.0	4191.0	337.0	172.0	232.0

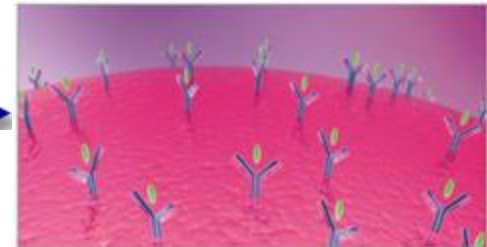
# xMAP 技术流程



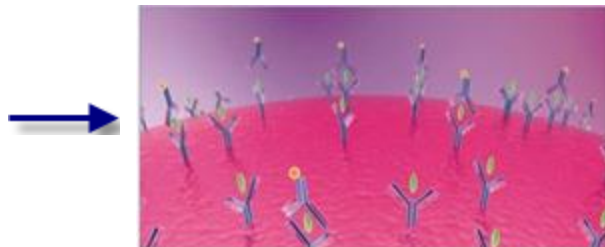
1. Microspheres are dyed to create 100 distinct colors



2. Microspheres are coated with capture antibody



3. Sample is added to microspheres and analyte is captured



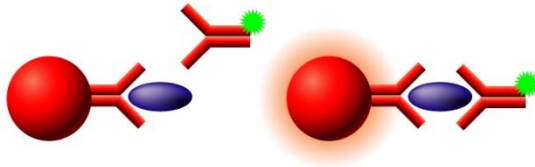
4. Fluorescent tagged detection antibody is added



5. Lasers detect both bead dyes and tagged detection antibody

## Traditional Surface Chemistries

Immunoassay



Nucleic Acid Assay



Enzyme Assay



Receptor-Ligand



# Comparison between ELISA & xMAP

10 proteins  
80 samples

.....

Number of plates required

Total time to result

Results per plate

Total sample used per panel

Internal controls possible?

Dynamic Range

Lower limit of  
detection

## xMAP® Technology



3 hours

800

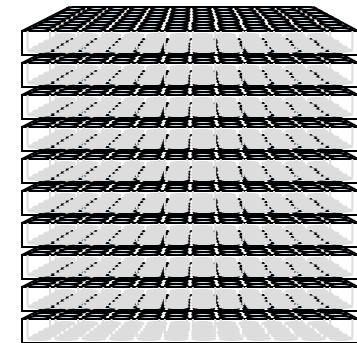
50 µl

YES

1-10,000 pg/ml

~1 pg/ml

## ELISA



10 hours

80

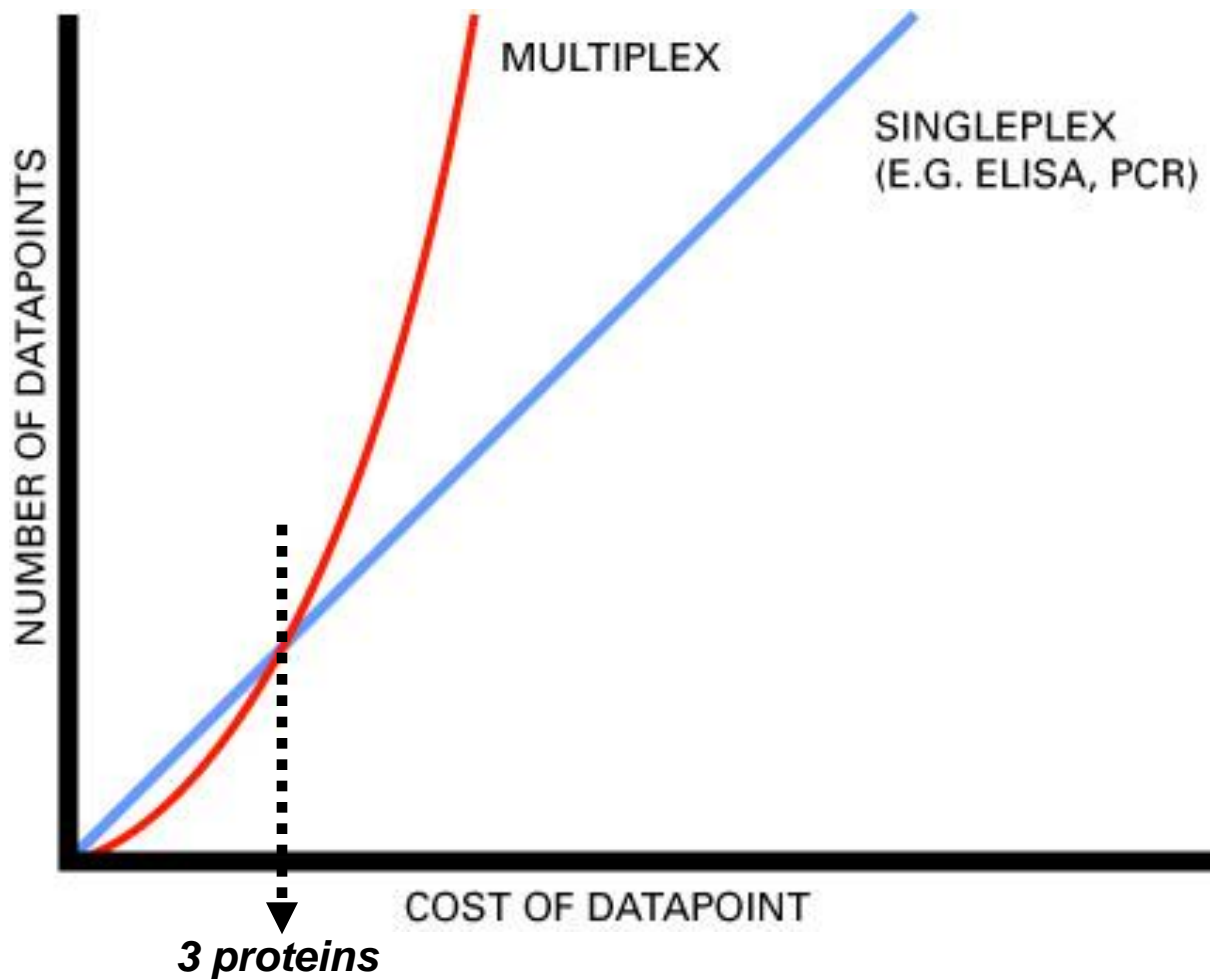
4 ml

NO

10-2500 pg/ml

~1 pg/ml

# Advantage of XMAP



**Cost savings:**  
**Labor**  
**Reagents**  
**Time**



1. 通量高: 仅需微量样品(25-50ul), 1次检测, 最多100个指标
2. 速度快: 30m-45m读完96孔板
3. 成本低: 试剂用量少, 能有效降低临床应用成本
4. 灵敏度高: 蛋白检测低限可达1pg/ml

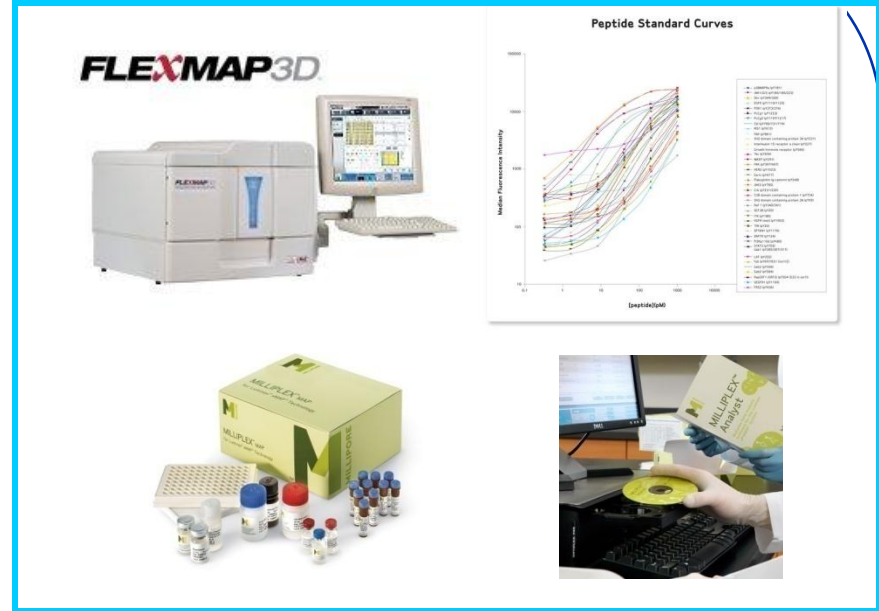
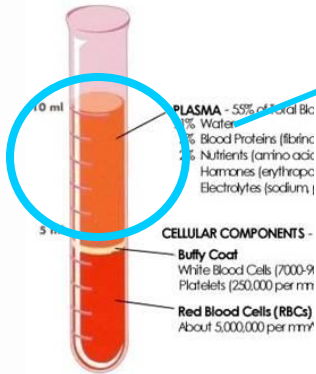
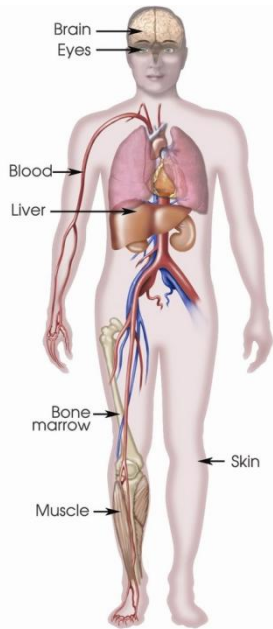
# 1. **xMAP**技术与**MAGPIX**介绍

# 2. **Milliplex**蛋白检测试剂盒

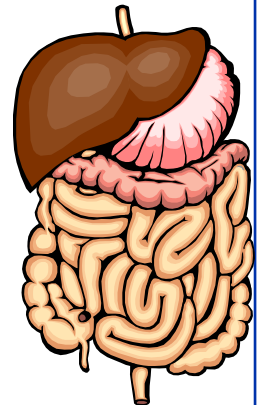
# Milliplex试剂盒介绍



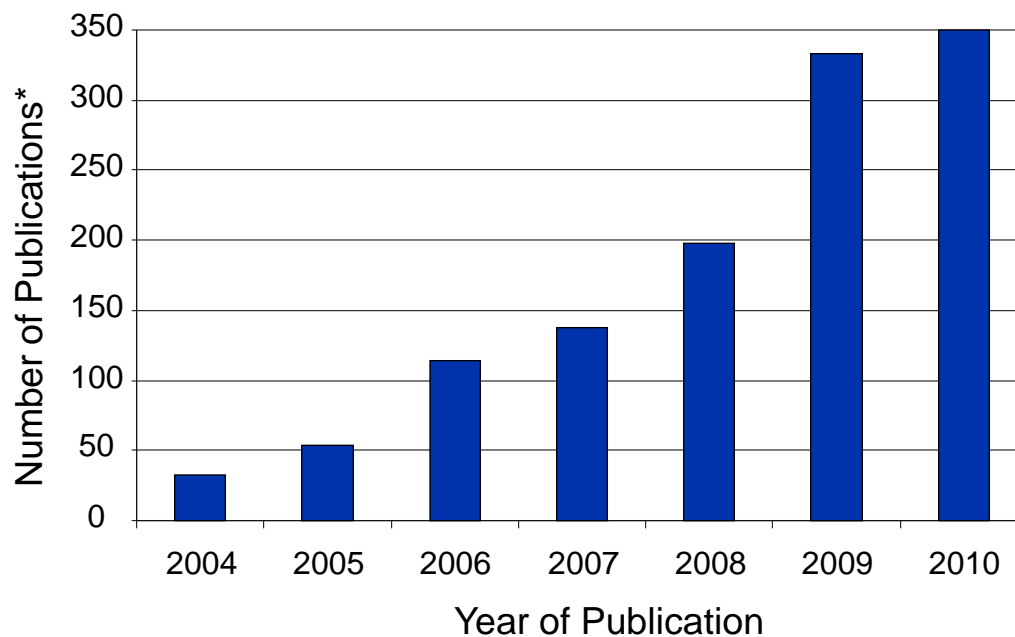
# Why Milliplex?



Milliplex allows detection & measurement of many analytes in a single sample, which is particularly useful when analyzing serum, CSF, secretions, Urine or other physiological samples.



# Increasing Rate of MILLIplex Publications



\*Data was compiled on 4.17.11 through searching PubMed for keyword Luminex OR Lincoplex OR MILLIplex OR Beadlyte

## Human

- Adipokine
- Bone
- Cytokine
- CVD
- Endocrine
- Gut
- Pituitary
- Cancer
- Sepsis
- Neural
- Toxicity



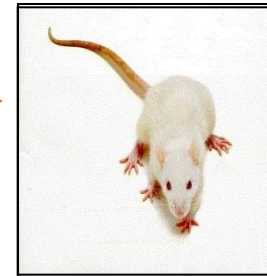
## Primate

- Cytokine
- Metabolic



## Rat

- Adipokine
- Bone
- Cytokine
- Endocrine
- Pituitary



## Canine

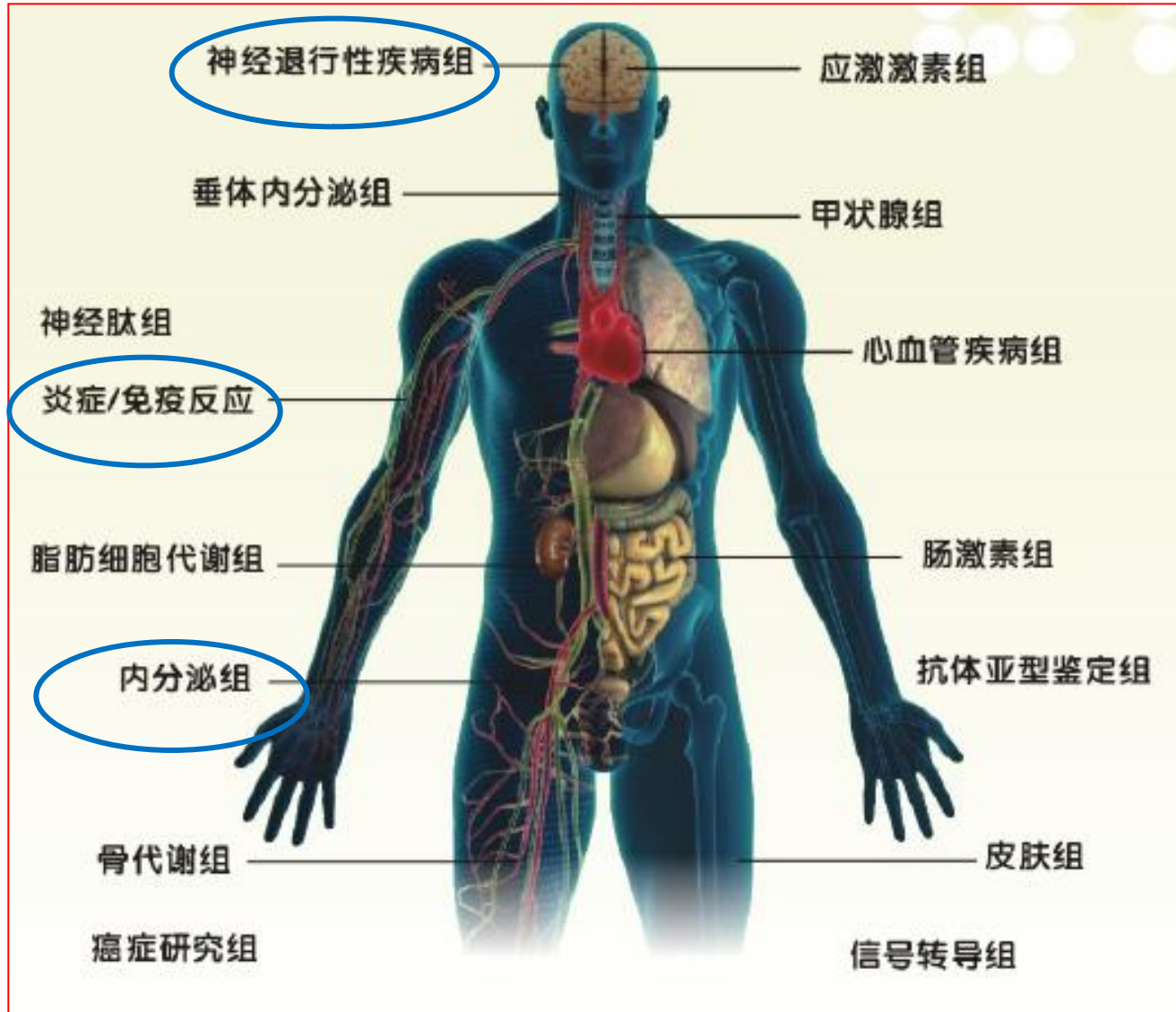
- Adipokine
- Cytokine
- Endocrine



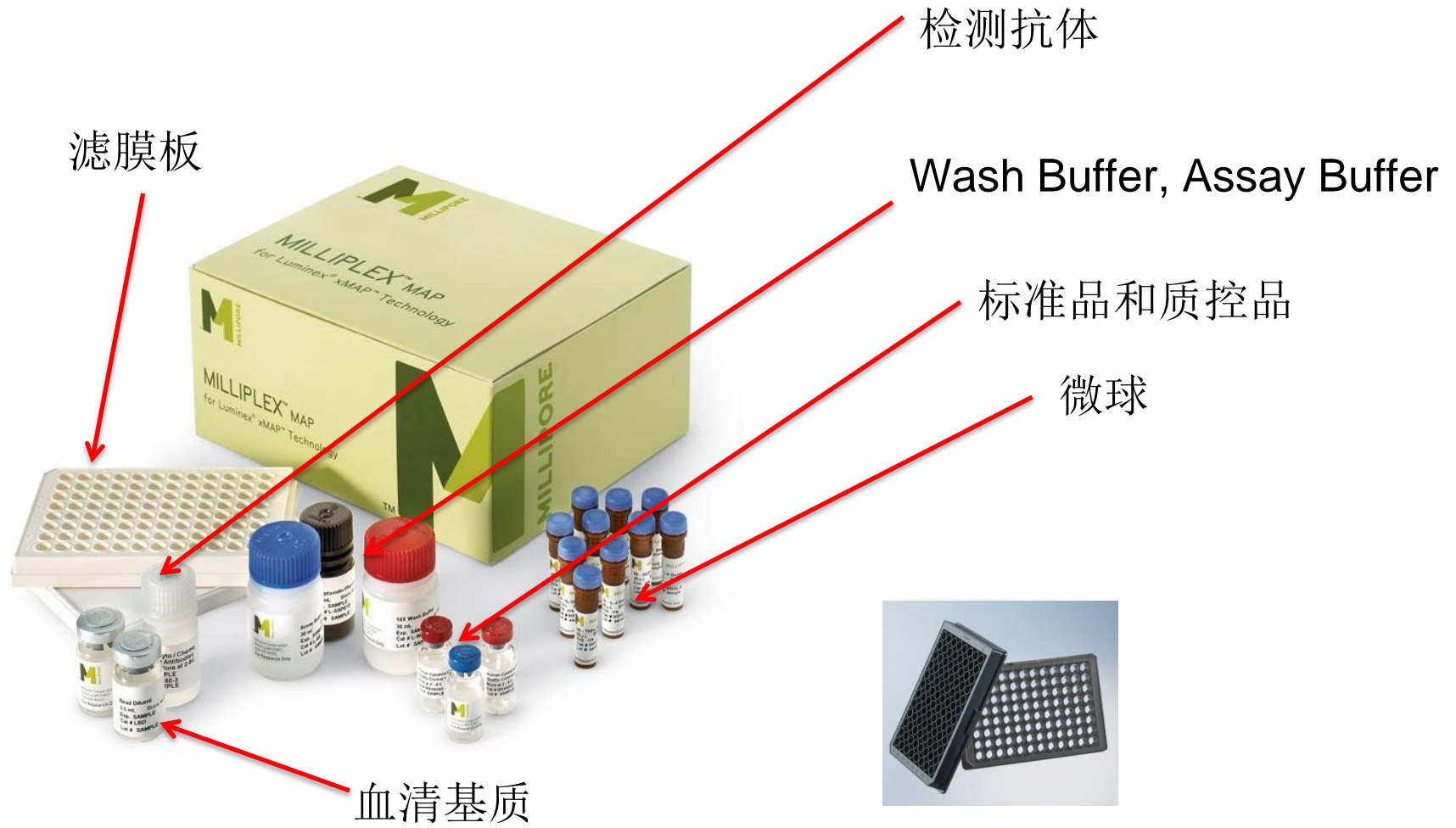
## Thyroid Mouse

- Adipokine
- Bone
- Cytokine
- CVD
- Endocrine





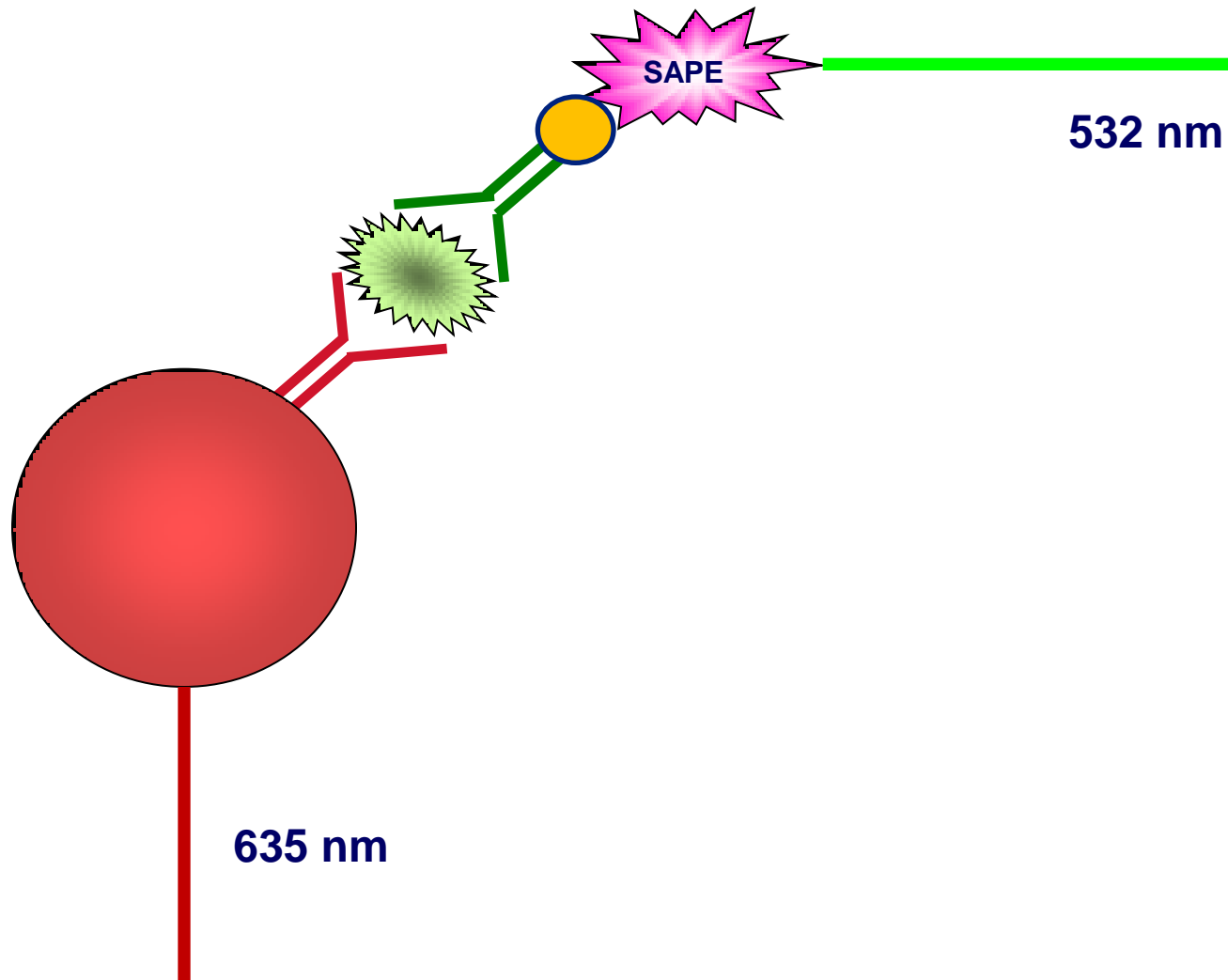
# 试剂盒成份



Kits are consistent lot-to-lot!



# Milliplex试剂盒检测原理



1. 试剂盒应用范围广，涵盖细胞因子，神经退行性疾病，细胞信号转导，代谢疾病等多种因子检测。
2. 种属类别多，包括人，大鼠，小鼠等。
3. 可用于多种样本检测，样本用量少。
4. 具有严格的质控品和标准品
5. 批次差异少
6. 一个试剂盒包含实验所需所有试剂

# 细胞因子检测试剂盒

## HUMAN(42-Plex)

IL-1a	G-CSF
IL-1b	GM-CSF
IL-1ra	IFN $\gamma$
IL-2	MDC
sIL-2R $\alpha$	MCP-3
IL-3	TNF $\alpha$
IL-4	EGF
IL-5	VEGF
IL-6	TGF $\alpha$
IL-7	RANTES
IL-8	GRO
IL-9	IP-10
IL-10	MCP-1
IL-12p40	MIP-1a
IL-12p70	MIP-1b
IL-13	sCD40L
IL-15	Fractalkine
IL-17	PDGF-AA
Eotaxin	PDGF-AB/BB
FGF-2	TNF $\beta$
Fit-3 ligand	
IFN $\alpha$ 2	



## MOUSE (32-Plex)

IL-1 $\alpha$	G-CSF
IL-1 $\beta$	GM-CSF
IL-2	Eotaxin
IL-3	IFN $\gamma$
IL-4	TNF $\alpha$
IL-5	MCP-1
IL-6	MIP-1 $\alpha$
IL-7	IP-10
IL-9	KC
IL-10	MIP-1 $\beta$
IL-12(p40)	VEGF
IL-12(p70)	LIF
IL-13	LIX
IL-15	M-CSF
IL-17	MIG
MIP-2	MIP-1 $\beta$
RANTES	

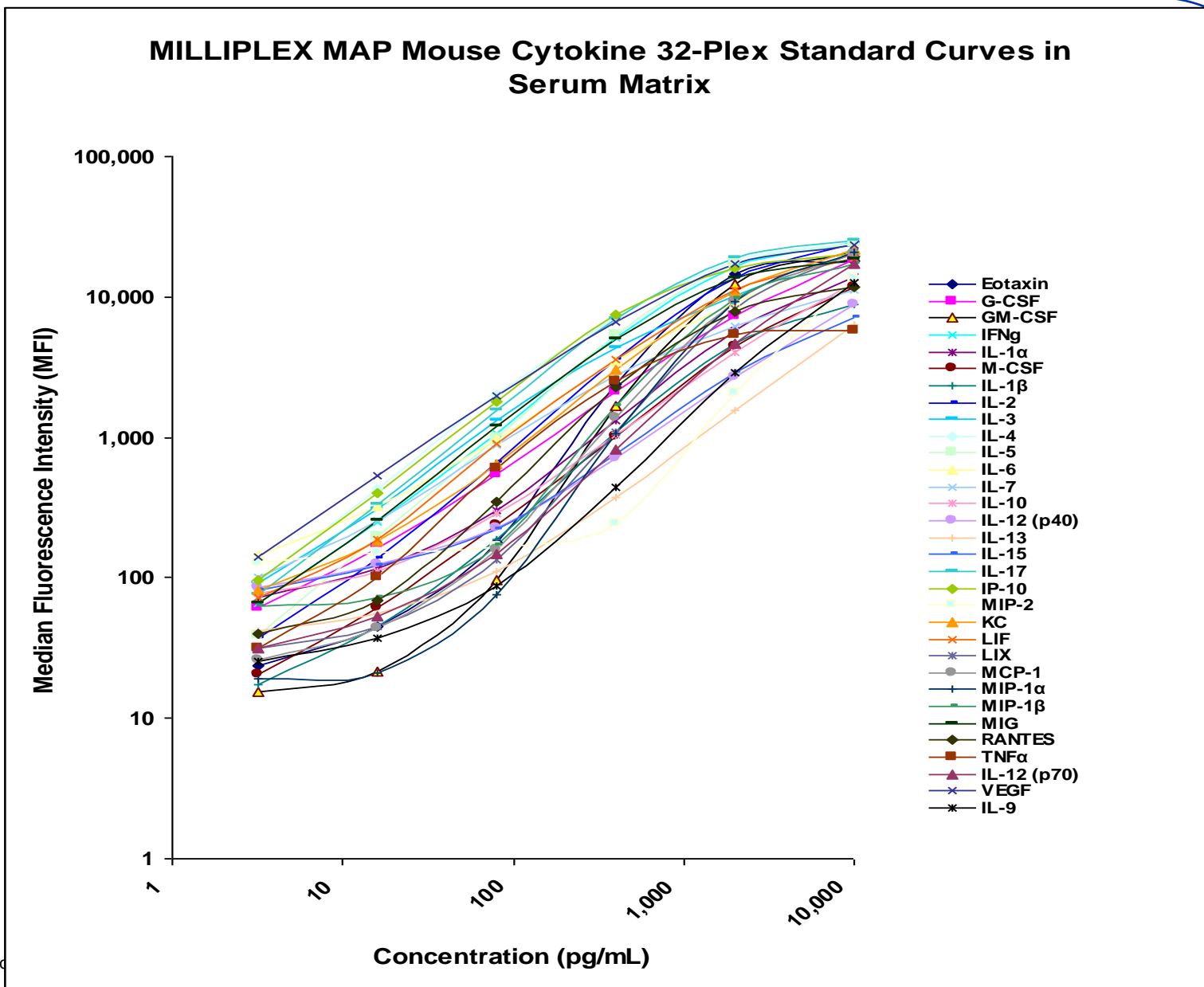


## RAT (24-Plex)

IL-1 $\alpha$	G-CSF
IL-1 $\beta$	GM-CSF
IL-2	IFN $\gamma$
IL-4	TNF $\alpha$
IL-5	VEGF
IL-6	Eotaxin
IL-9	IP-10
IL-10	MCP-1
IL-12p70	MIP-1 $\alpha$
IL-13	GRO/KC
IL-17	Leptin
IL-18	RANTES
	TGF $\beta$ 1



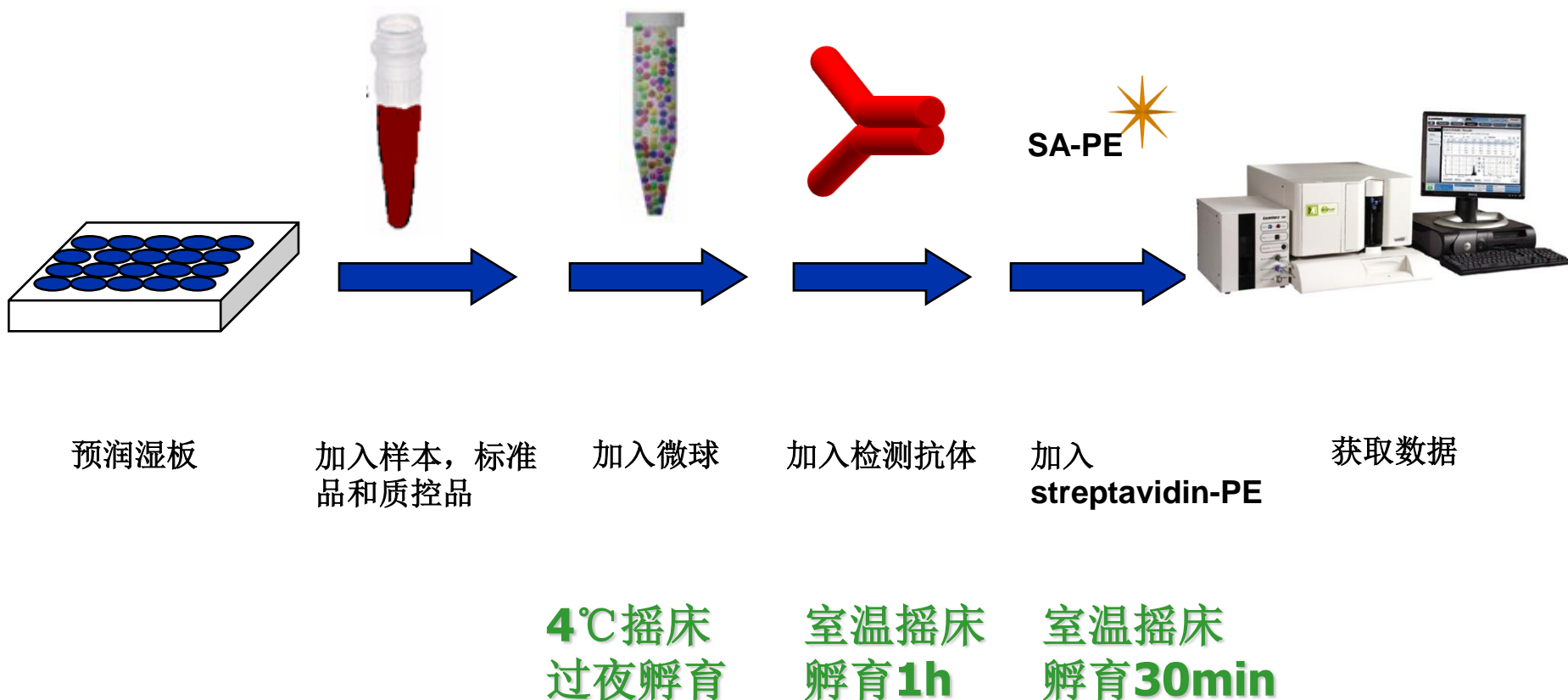
# 小鼠细胞因子检测试剂盒标准曲线



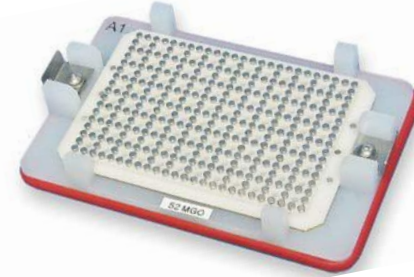
# 小鼠细胞因子检测试剂盒灵敏度

Cytokine	Sensitivity	Intra-assay CV%	Inter-assay CV%	% Recovery in Serum Matrix	Inter-lab Correlations (N = 16 Samples)
Eotaxin	5.8	7.4	6.8	101.1	0.97
G-CSF	1.6	8.4	8.0	100.1	0.97
GM-CSF	6.8	8.0	5.4	99.2	0.98
IFN $\gamma$	1.5	5.9	7.1	99.1	1.00
IL-1 $\alpha$	11.8	7.3	6.2	98.4	0.96
IL-1 $\beta$	3.5	8.1	7.0	101.4	0.99
IL-2	1.1	5.6	4.2	100.3	0.97
IL-3	1.1	9.1	5.4	100.3	0.98
IL-4	0.5	8.1	8.5	100.6	0.98
IL-5	1.1	9.7	4.7	100.3	0.99
IL-6	4.0	10.4	7.9	100.4	0.99
IL-7	1.3	8.8	6.9	100.1	0.98
IL-9	8.0	8.0	7.1	101.5	0.98
IL-10	5.8	7.0	10.1	100.4	0.99
IL-12 (p40)	7.9	8.7	9.0	102.5	0.99
IL-12 (p70)	6.2	7.6	5.5	100.4	0.97
IL-13	9.8	11.9	10.9	100.1	0.74
IL-15	11.7	9.4	11.9	103.8	0.92
IL-17	0.6	7.5	6.3	99.6	0.99
IP-10	0.8	10.0	10.3	103.2	0.98
KC	2.2	9.9	10.9	100.5	0.96
LIF	1.1	9.2	7.6	100.2	0.98
LIX	13.9	5.2	5.9	100.5	0.95
MCP-1	7.5	5.8	4.4	101.7	1.00
M-CSF	1.9	11.3	11.5	100.4	0.99
MIG	2.3	10.3	20.4	100.8	0.94
MIP-1 $\alpha$	10.4	7.0	8.4	100.4	0.99
MIP-1 $\beta$	13.5	5.0	6.3	103.0	0.99
MIP-2	105.5	21.3	21.2	123.2	NA
RANTES	3.5	10.3	13.0	100.5	0.99
TNF $\alpha$	1.5	16.3	11.8	105.1	0.95
VEGF	0.4	7.9	12.1	100.1	0.99

# 人细胞因子检测实验操作流程



# Luminex 200检测体系



*Luminex 200 System include:*



***Luminex Analyzer***



***MILLIPLEX MAP***



***MILLIPLEX Analyst***

# Merck Millipore北美研发中心

## St. Charles





# Merck Millipore Asia Tech Support Center 亚洲技术支持团队



Millipore Asia Tech Service Mailbox  
亚洲技术服务信箱

[asiatechserv@merckgroup.com](mailto:asiatechserv@merckgroup.com)

Toll-Free Tech Service Hotline  
中国免费技术服务电话  
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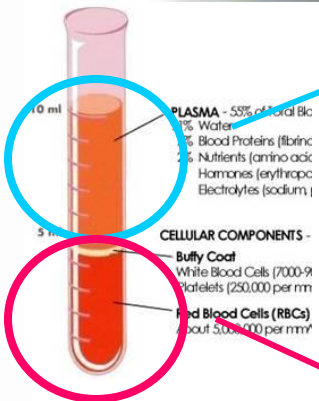
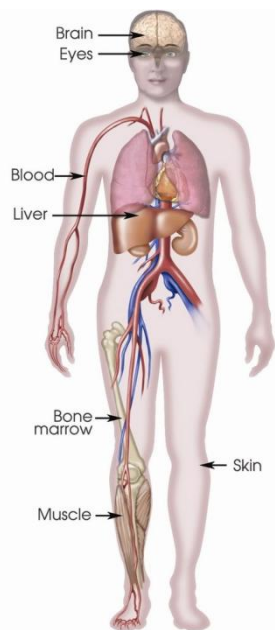
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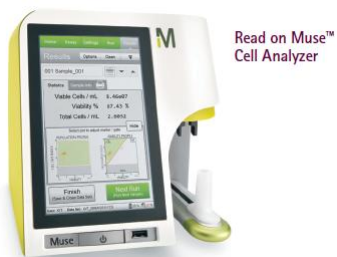
# 默克密理博微检测平台

## Direct Detect 红外微定量分析仪



**FLEXMAP3D**

Peptide Standard Curves



## MUSE 全能细胞状态分析仪

StauraSpore

	1	2	3	4	5	6	7	8	9	10	11	12
A	●	●	●	●	●	●	●	●	●	●	●	●
B	●	●	●	●	●	●	●	●	●	●	●	●
C	●	●	●	●	●	●	●	●	●	●	●	●
D	●	●	●	●	●	●	●	●	●	●	●	●
E	●	●	●	●	●	●	●	●	●	●	●	●
F	●	●	●	●	●	●	●	●	●	●	●	●
G	●	●	●	●	●	●	●	●	●	●	●	●
H	●	●	●	●	●	●	●	●	●	●	●	●

CASP 9  
Ann V MitoP



**Any  
Questions?**