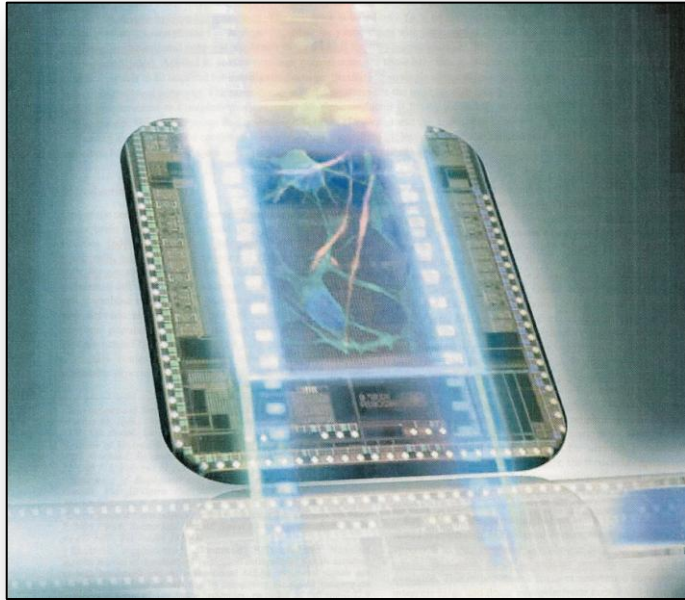




## Bio-chips

### —生物晶片簡介

#### Group 3

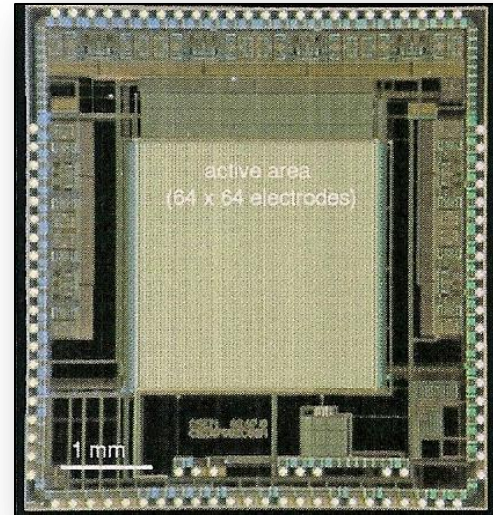
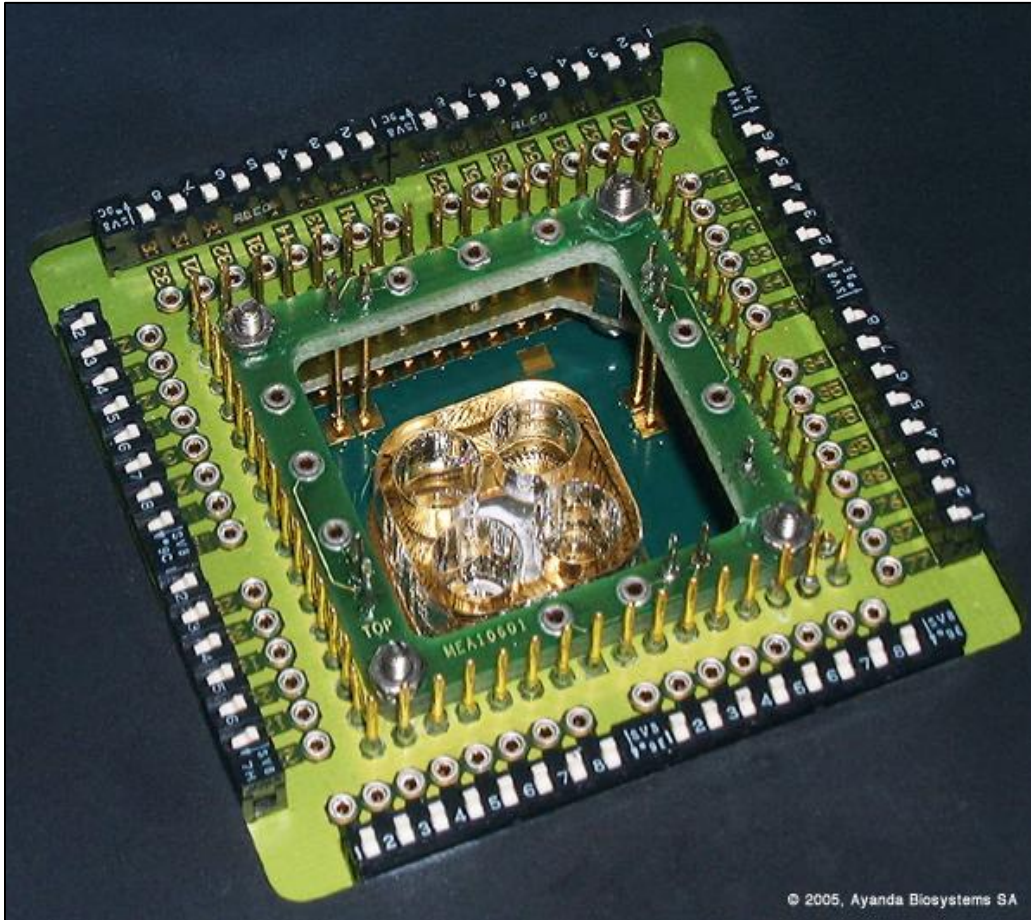
B96505006 羅聖皓

B96901002 陳品亘

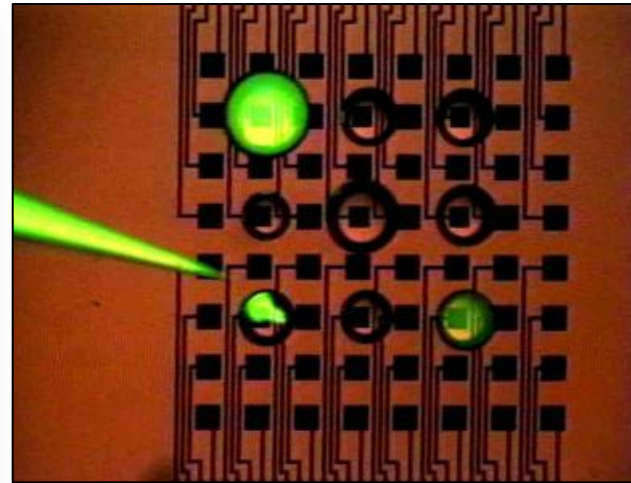
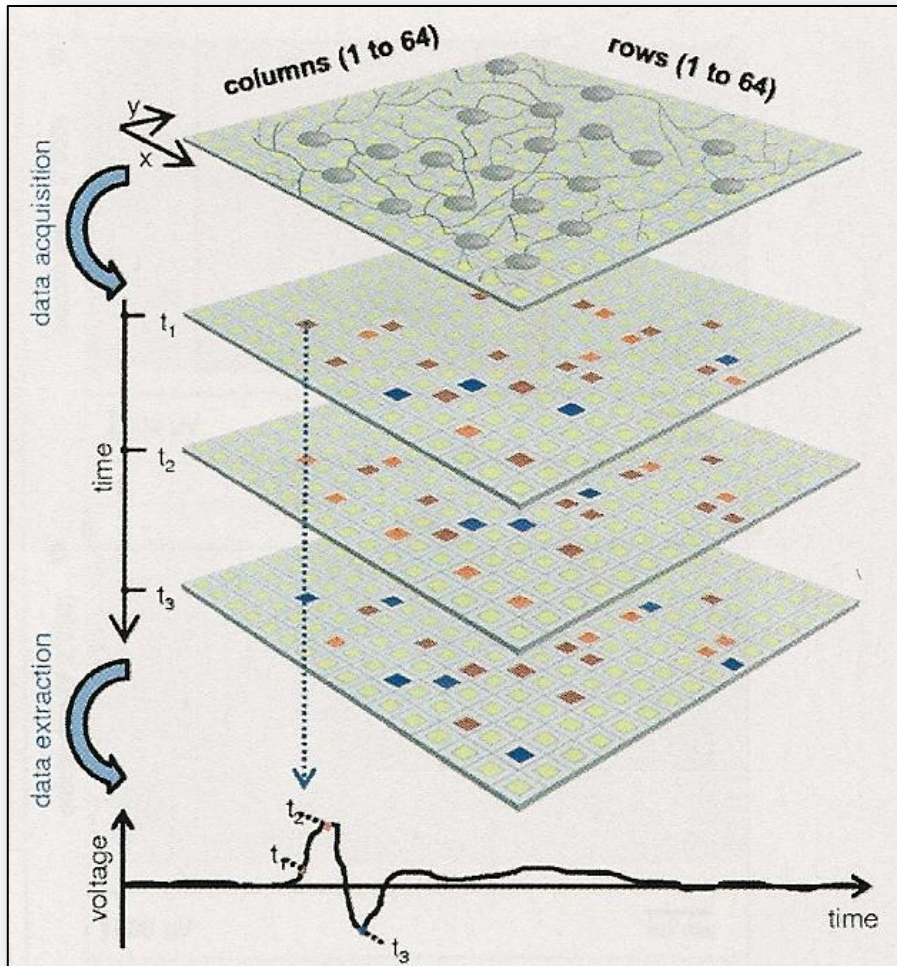
B96901035 趙昺博

2010.04.13

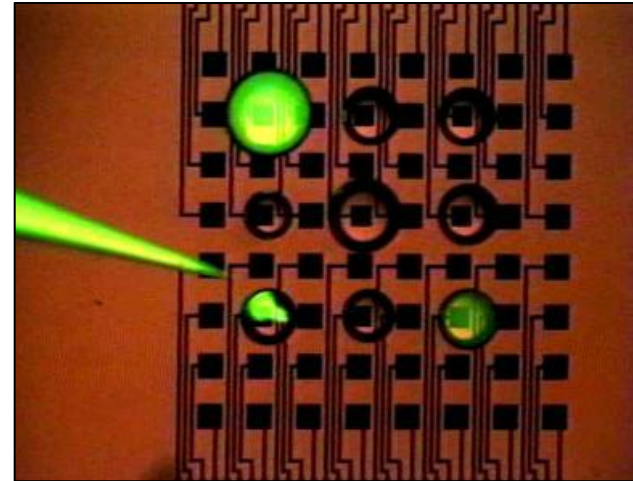
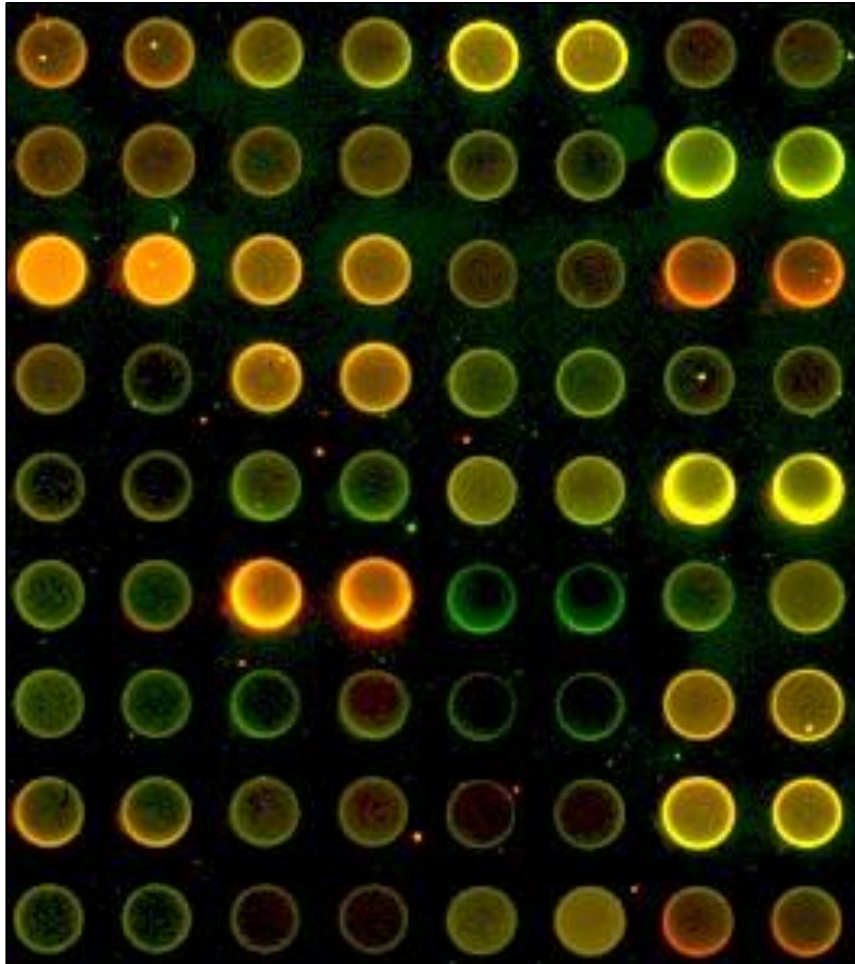
## 微陣列



- 小型分析裝置，可快速、精確大量研究生物基因組信息
- 探針：來自細胞、組織的mRNA，經反轉錄得螢光染料標記的 cDNA 。



- 高密度點陣，固定在表面化學塗布處理過的玻璃表面
- 再將含有成千上萬個基因的玻璃微陣列晶片，進行雜合反應(Hybridization)。



- 螢光標記的cDNA與晶片上相匹配的DNA，發生雜合反應
- 晶片上的點呈現出螢光訊號
- 訊號強度與基因表現的程度成正相關

## 生物晶片技術

準備DNA探針

正常

腫瘤

逆轉錄/  
聚合酶  
鏈反應

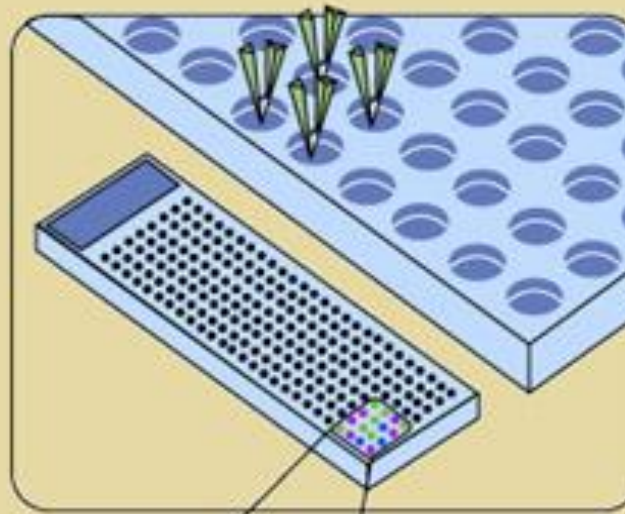
螢光物質  
標記

混合同  
量數

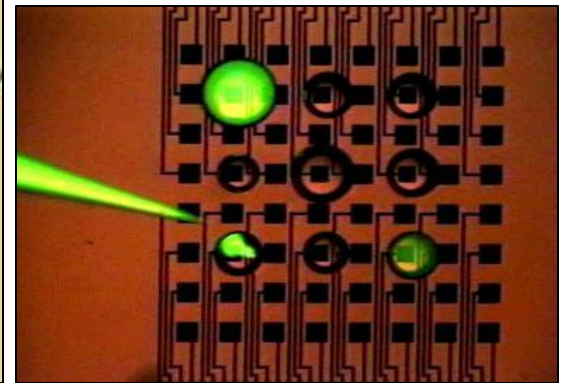
微陣陣的  
雜交探針

觀察

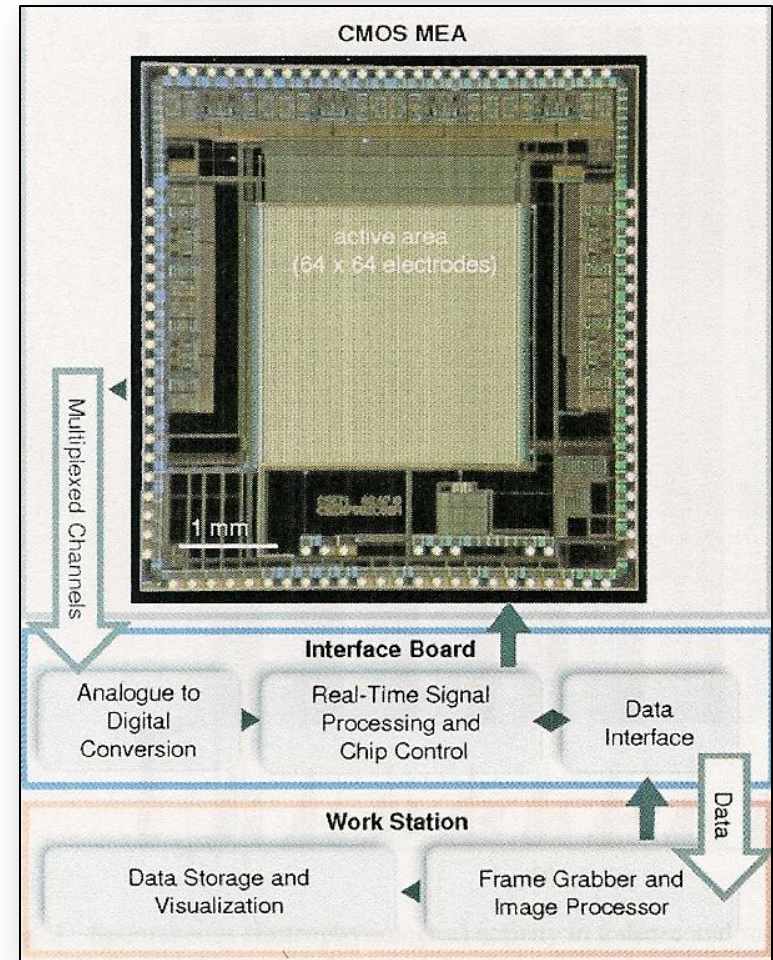
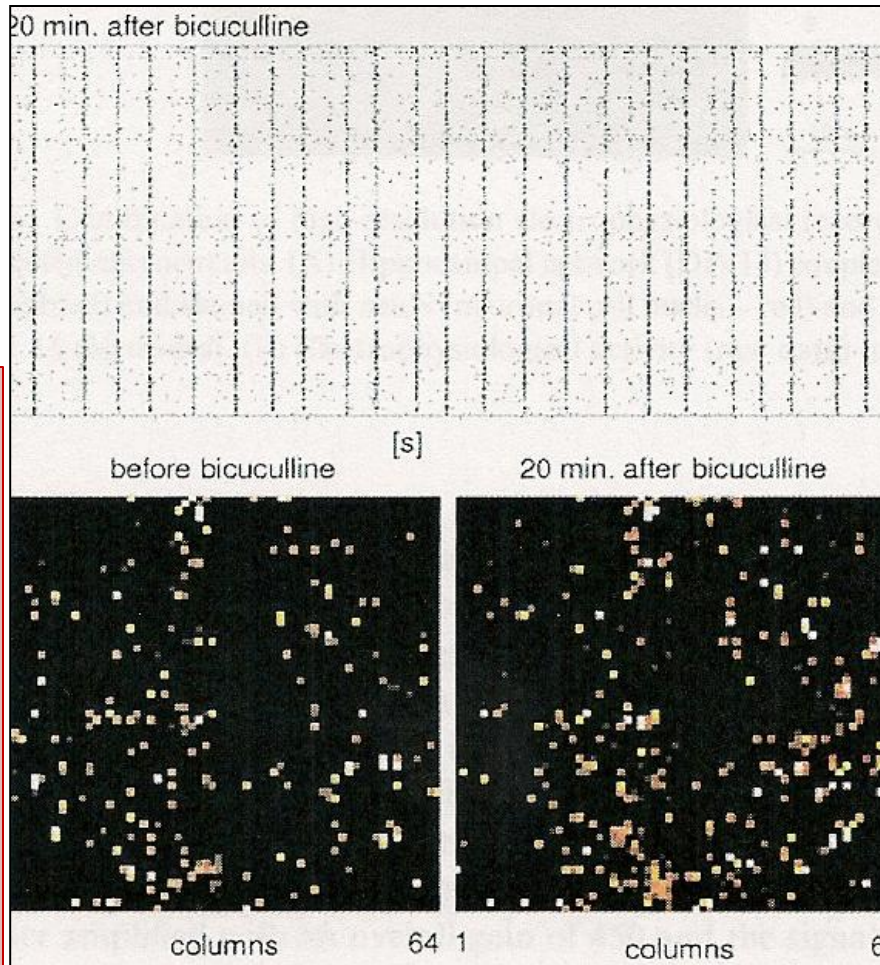
準備微陣陣



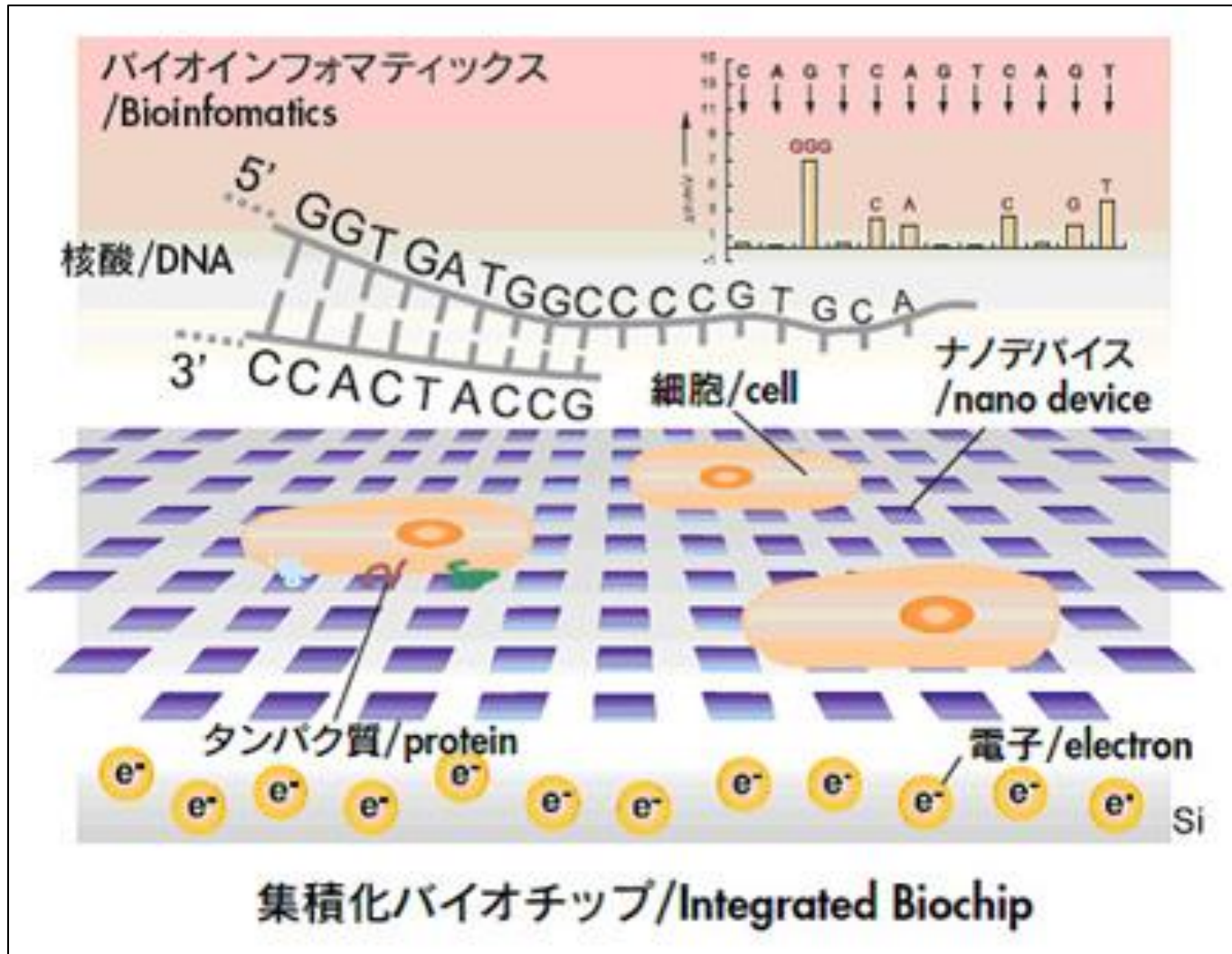
生物晶片・程序示意圖

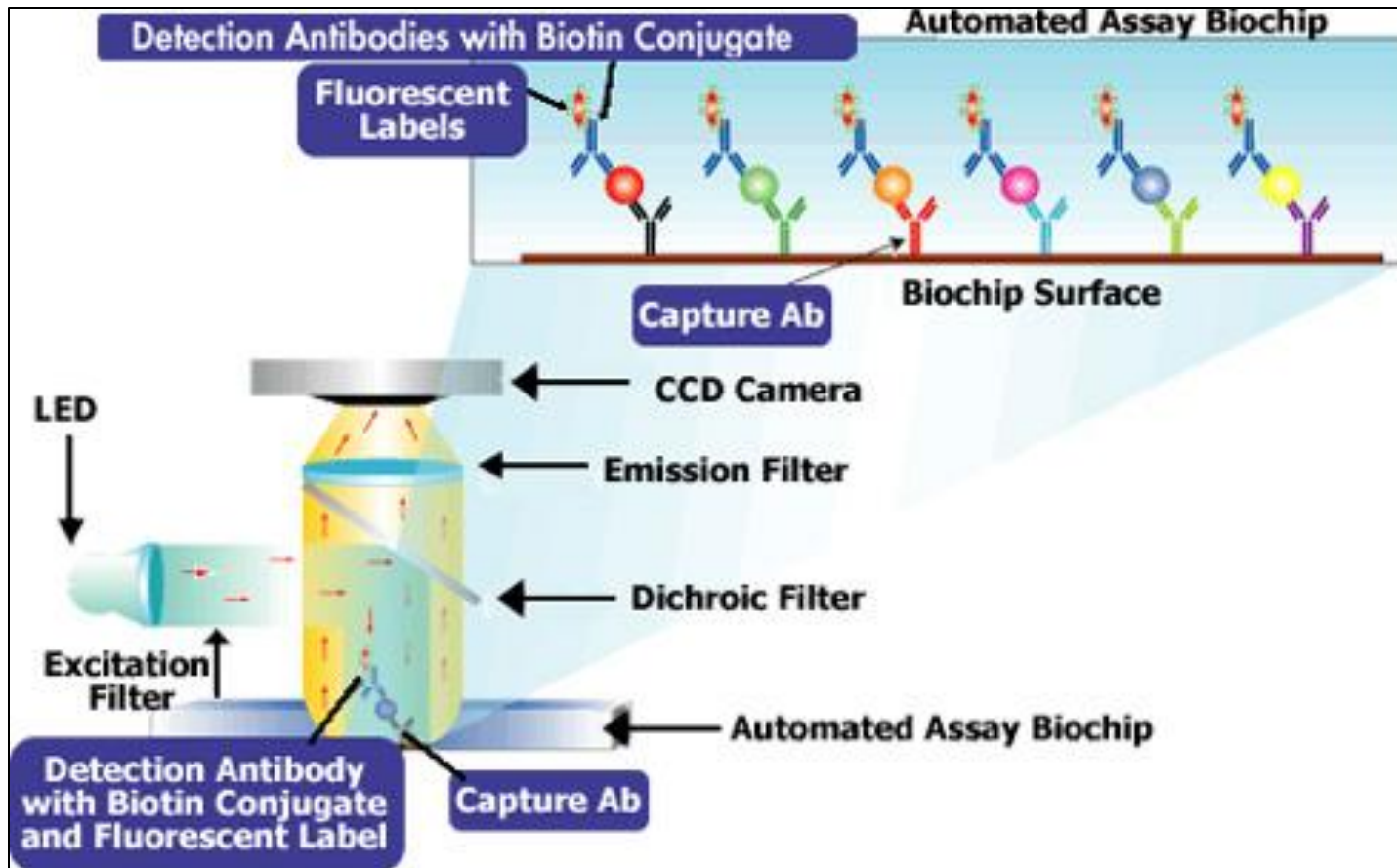


許多的螢光訊號產生



- 平面的基質載體，有著**吸附基因**的構造
- 上面成千上萬的探針（點）的特徵：  
規則的、顯微尺度的、平面的、具特異性的





生物晶片・基質載體吸附抗體

- 規則陣列之用意

大規模製備、  
檢測與分析能夠快速進行、  
有助於強度的計算與定量、  
絕對位置可定位 & 分隔訊號。

- 顯微尺度

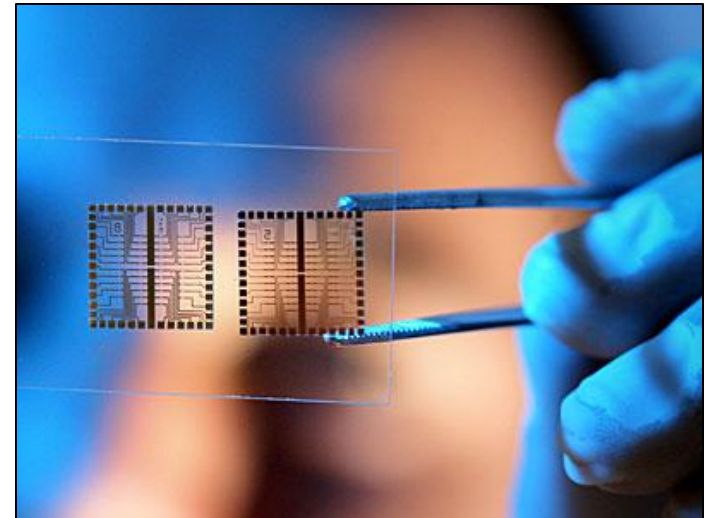
點制的微陣列的點大小：50-350um

組織晶片上面點的大小：200-600um

優勢：使高密度能夠實行(5000點/平方公分)

→ 能在一片晶片上，同時分析整個基因組

使微型化和自動化成為可能。



**Biochip Pattern**

## • Introduction of DNA Chips

- (1) 檢測特定DNA序列
- (2) 具有數以千計的探針(**probes**)
- (3) Since an array can contain tens of thousands of probes, a microarray experiment can accomplish many genetic tests **in parallel**.

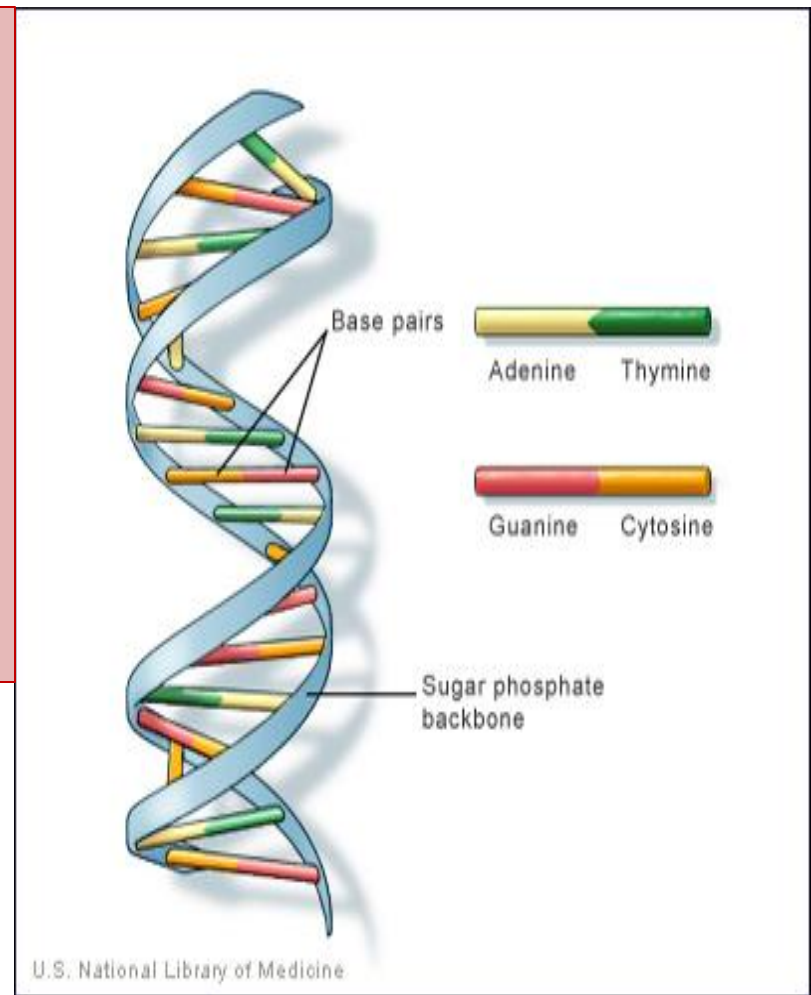
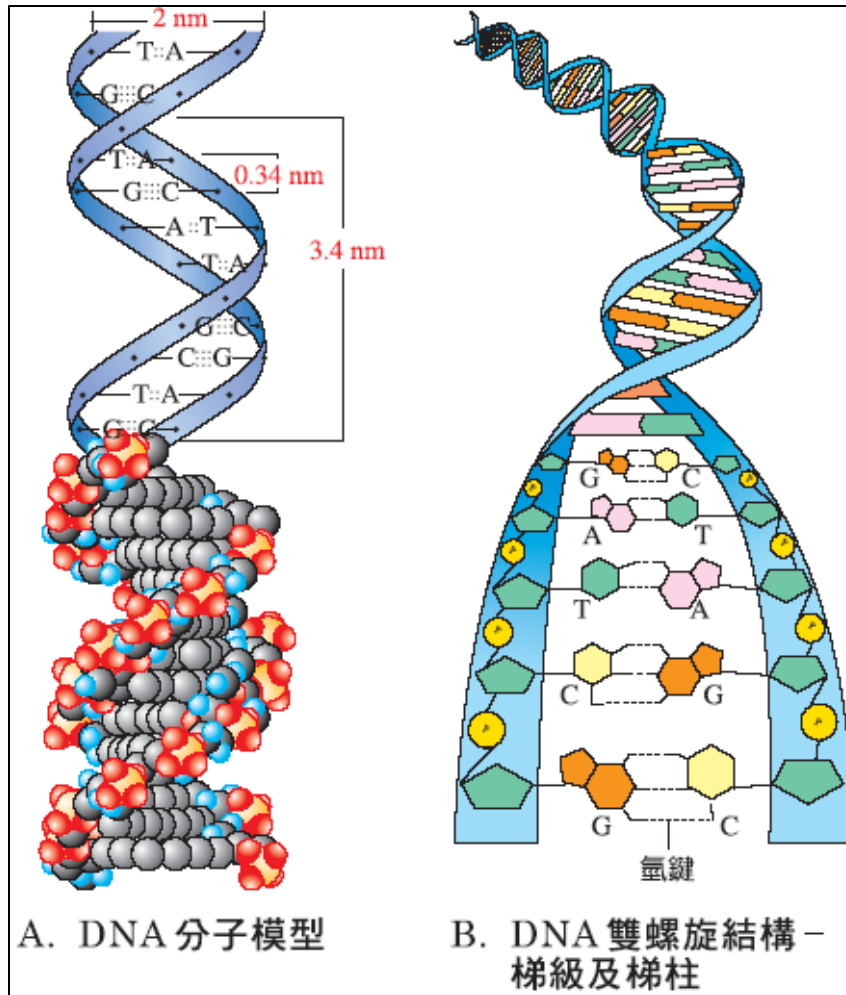
「能夠同時分析整個基因組」



© David Kawai

Gene chip

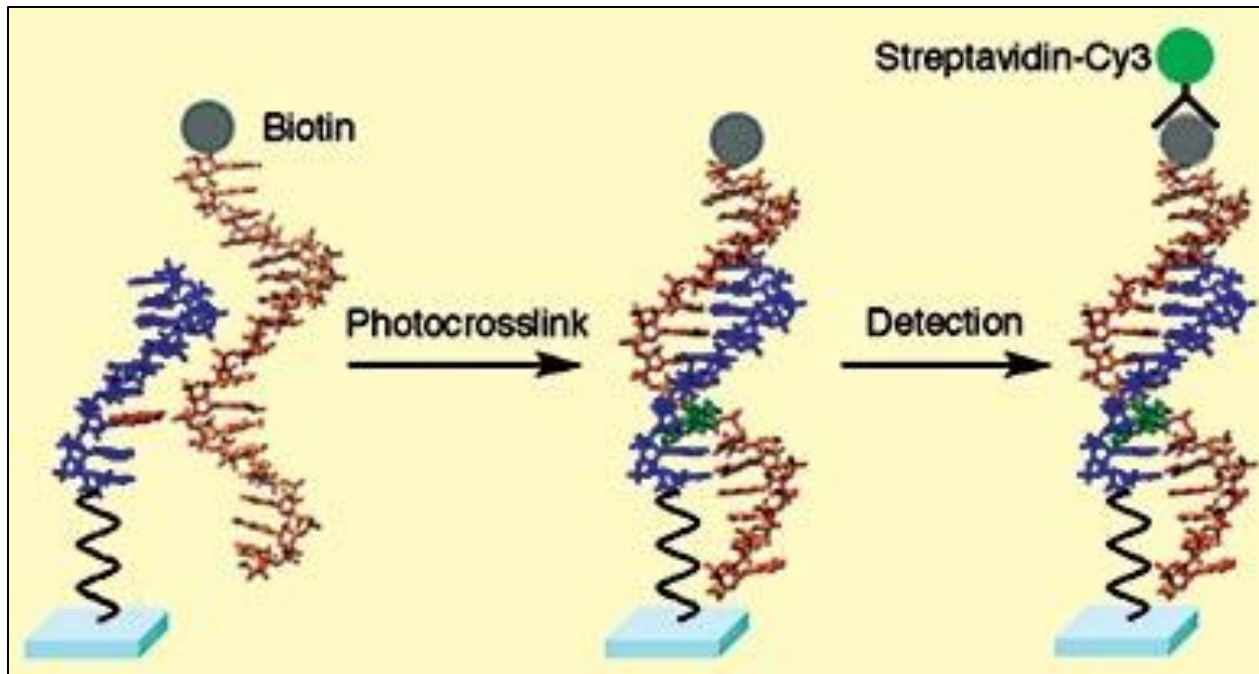
核苷酸・雙股螺旋結構





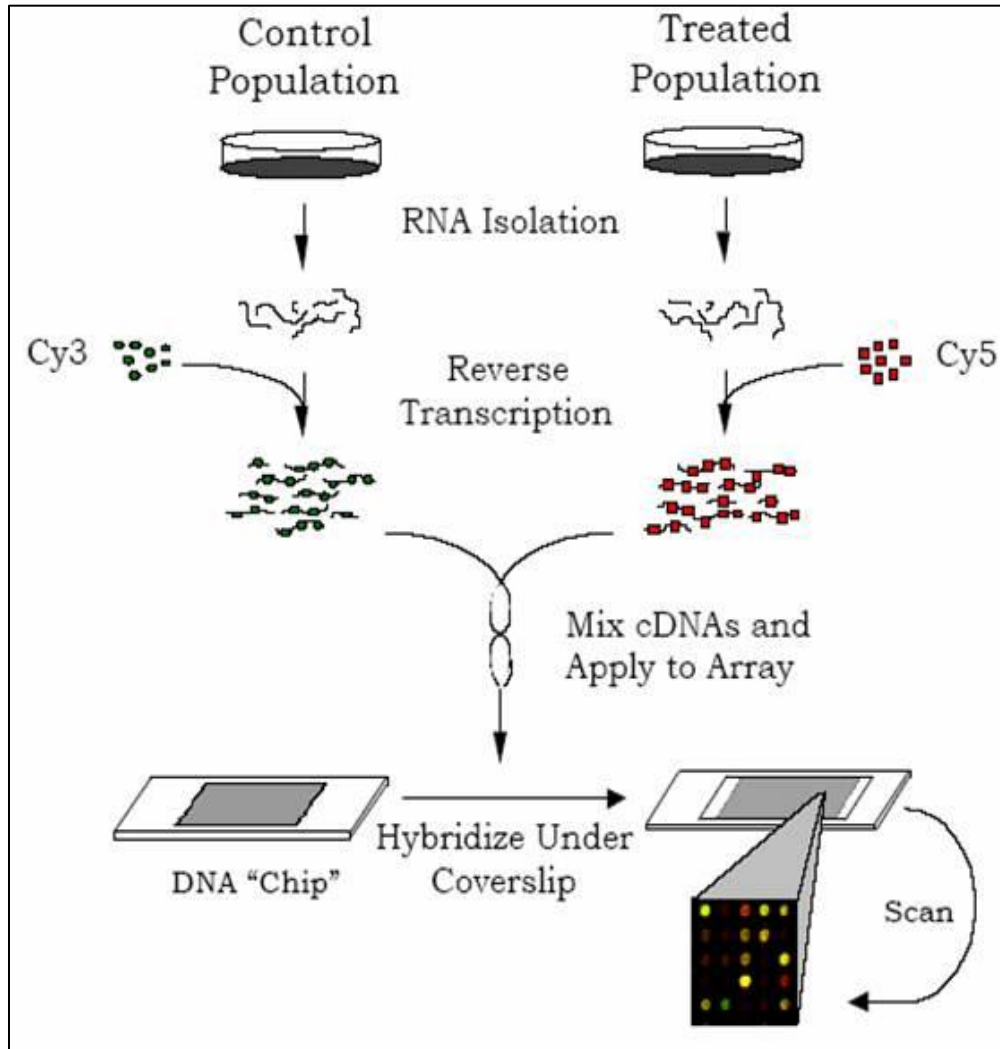
- **Probe**
- **Target**
- Probe-target **hybridization** is usually detected of **labeled targets** to determine relative abundance of nucleic acid sequences in the target.

雜合反應



雙股螺旋反應過程

## • How to Conduct an Experiment



生物晶片・實際操作步驟示意圖

## • Let's see an interesting animation!



This animation will demonstrate how DNA microarray experiments are performed.

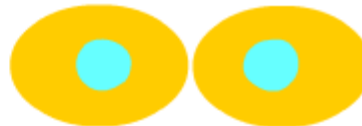
Throughout the animation, you may use the mouse to identify components of the experiment. Try the yeast cell below for starters.

We will use yeast as a model system to illustrate one use of microarrays, sometimes called DNA chips.

If you have already seen the ICAT animation, you may

**Skip**

the first part of this animation and go directly to the part that is unique to DNA chips.

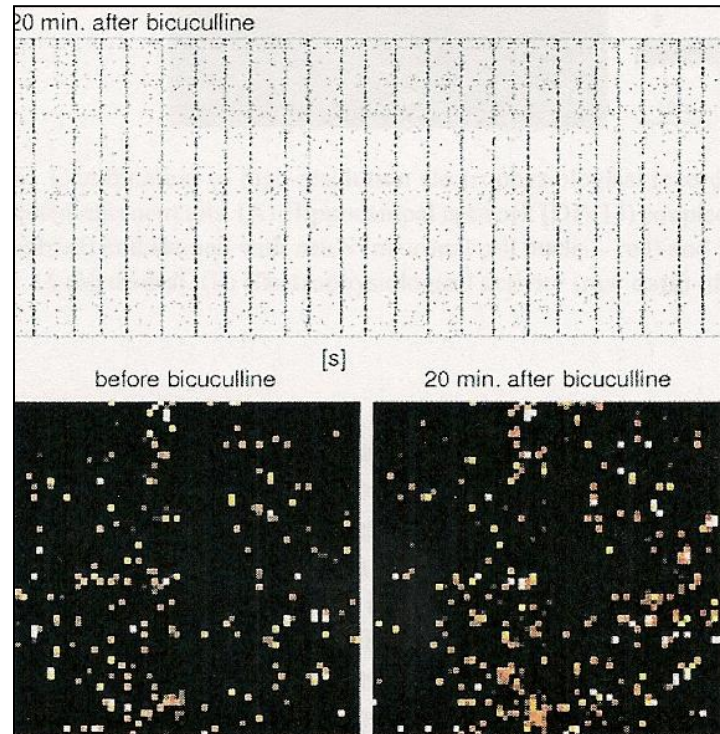
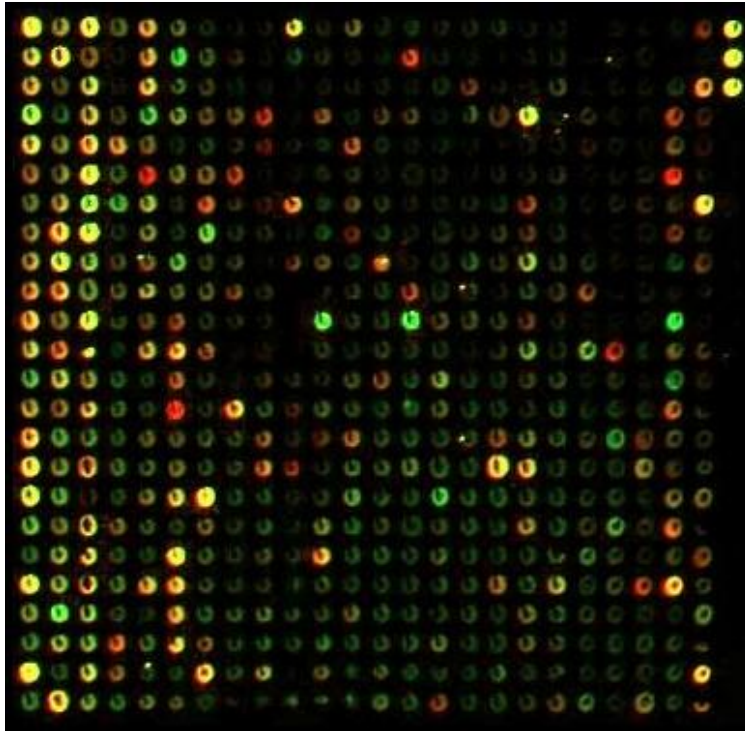


DNA Microarray Methodology

## • Results

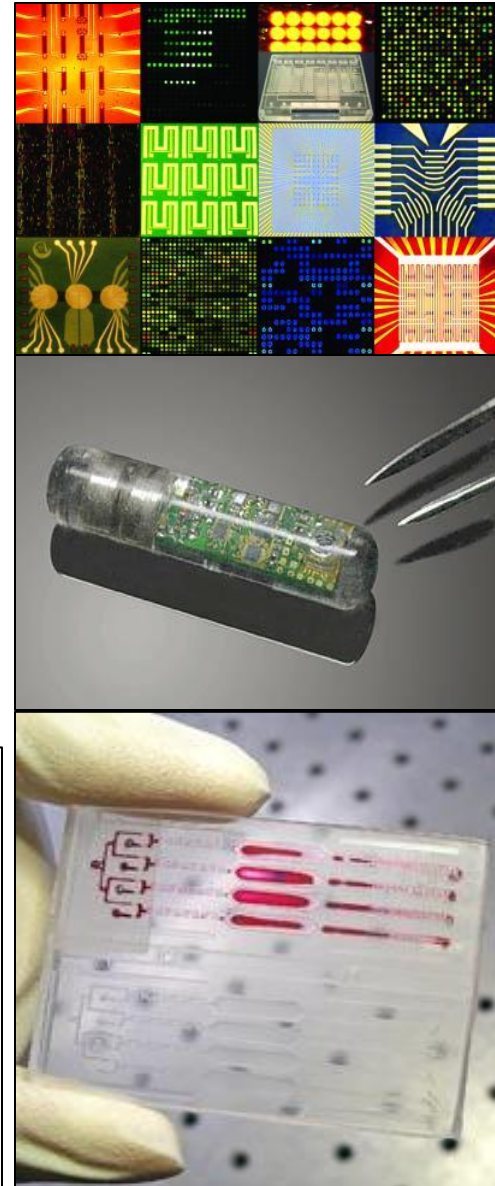
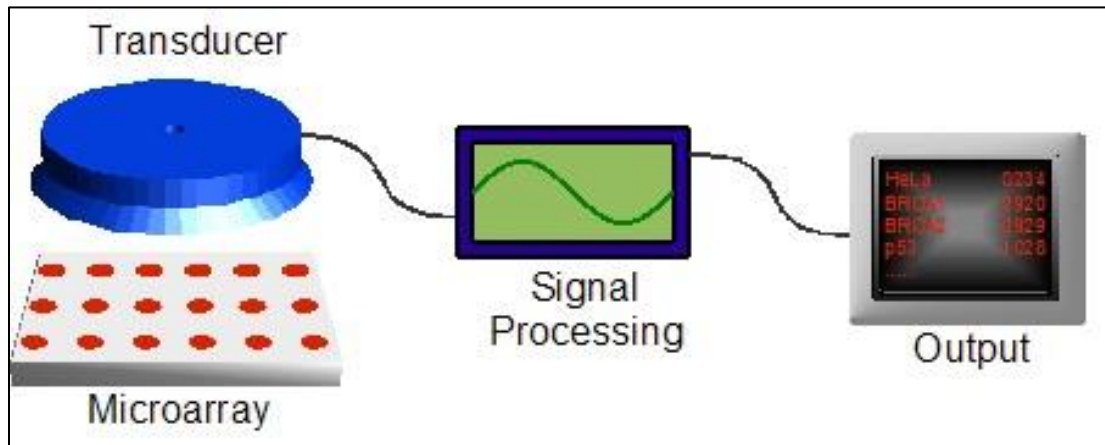
Total strength of the signal, depends on **the amount of target sample** binding to the probes present on that spot.

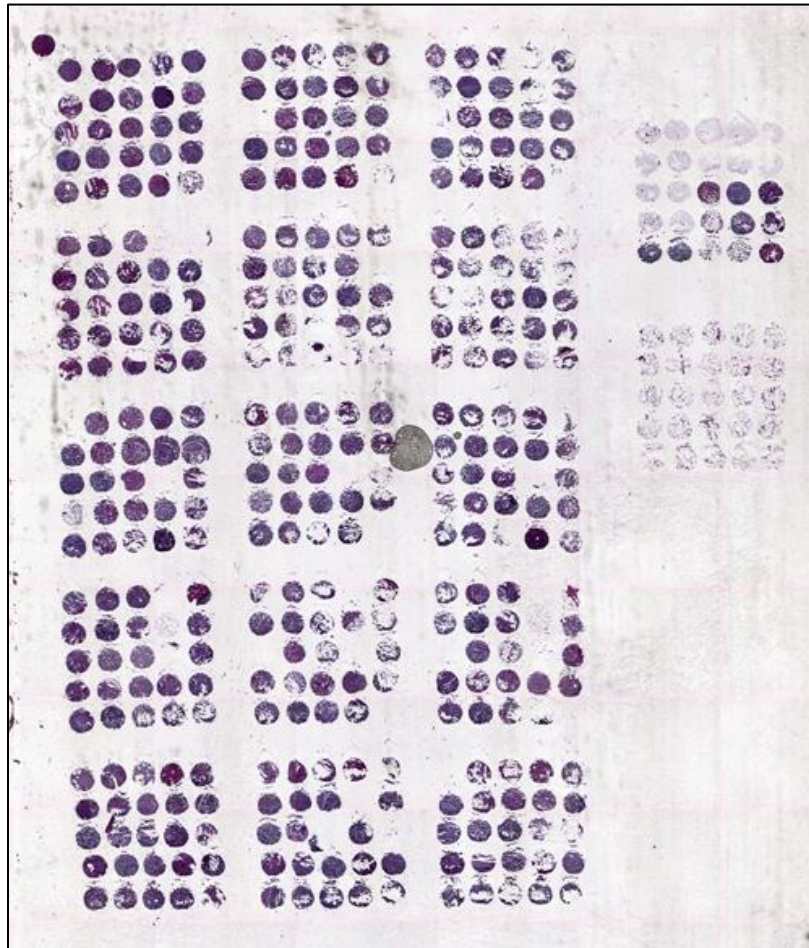
訊號強度和基因表現正相關



## • Some Relevant Applications

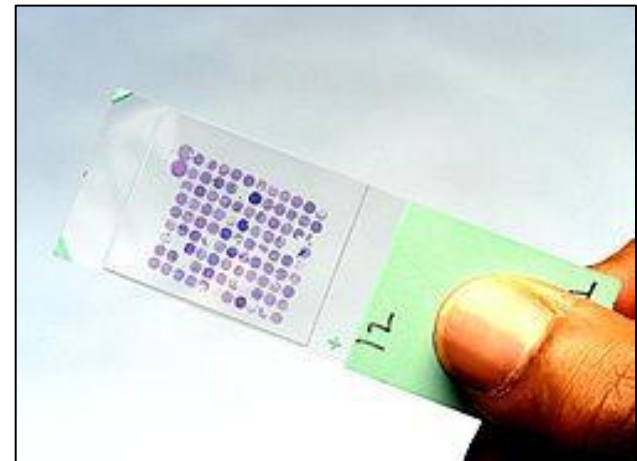
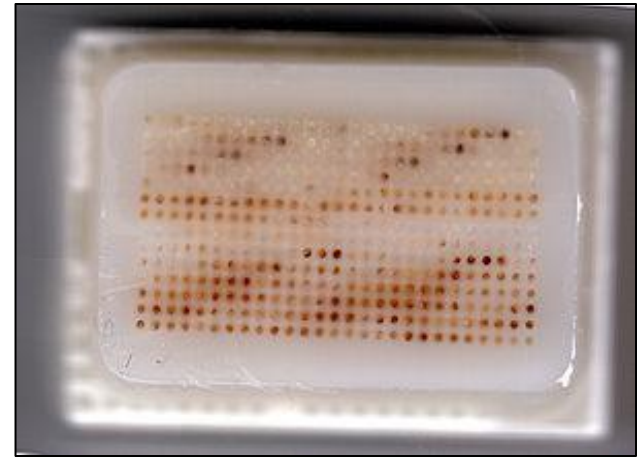
- (1) 差異表現基因的篩選
- (2) 基因突變之解析
- (3) 藥物開發及藥理學研究
- (4) 致病原對細胞宿主之影響
- (5) 遺傳網路的建構

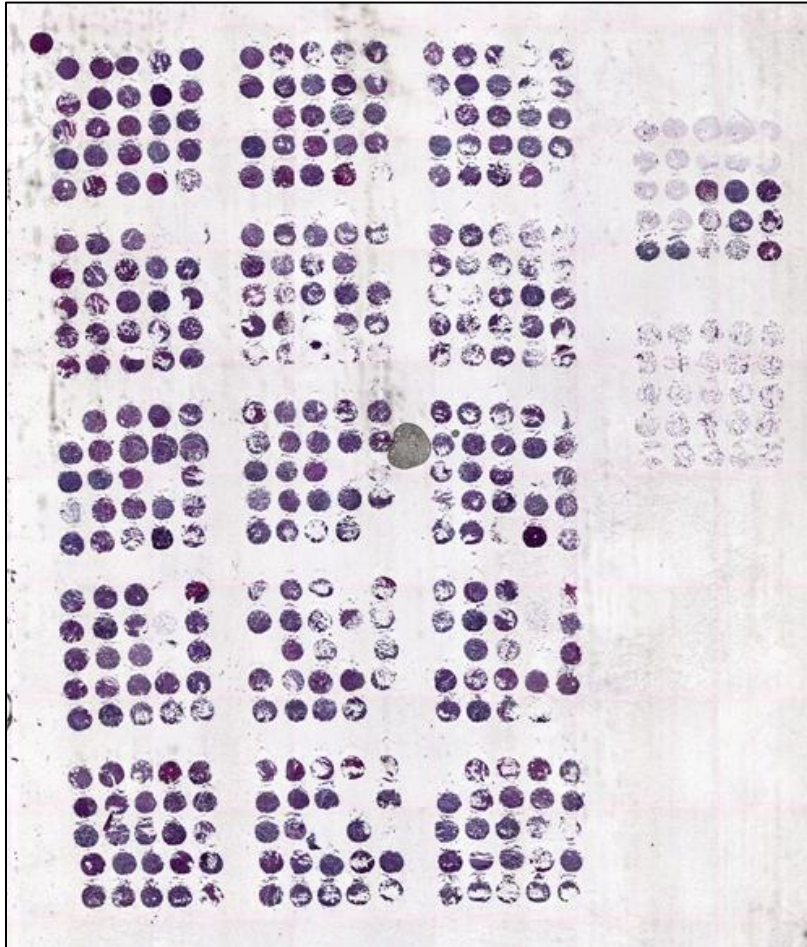




Tissue Microarray

組織微陣列晶片

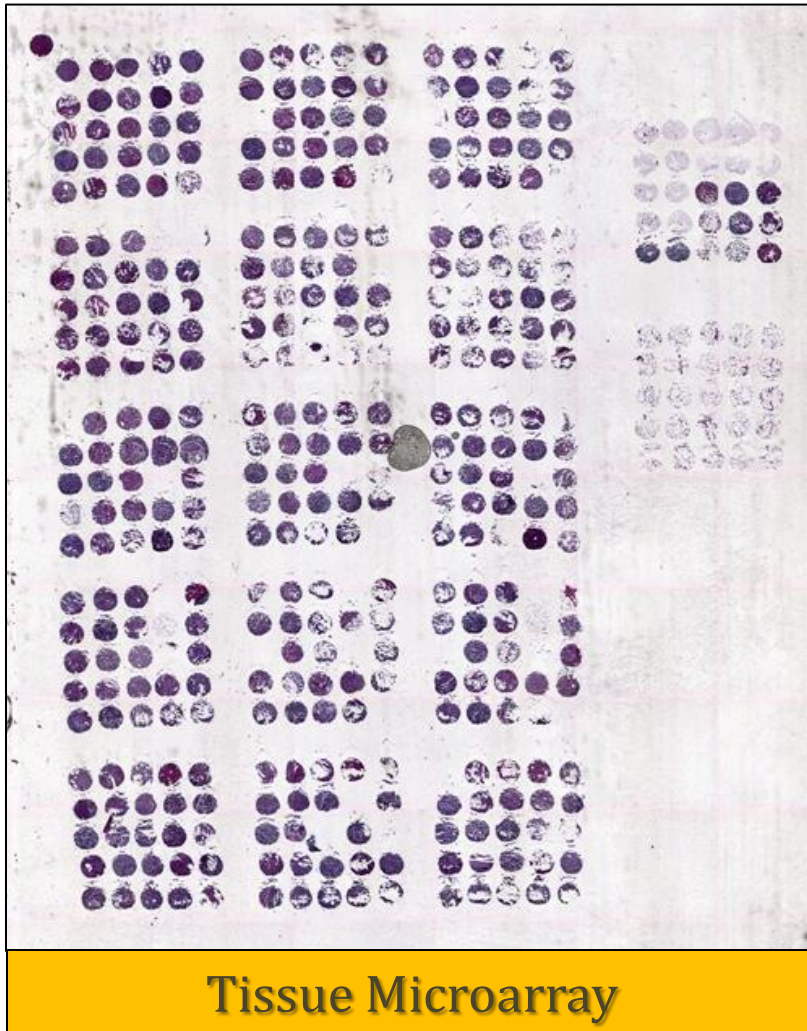




Tissue Microarray

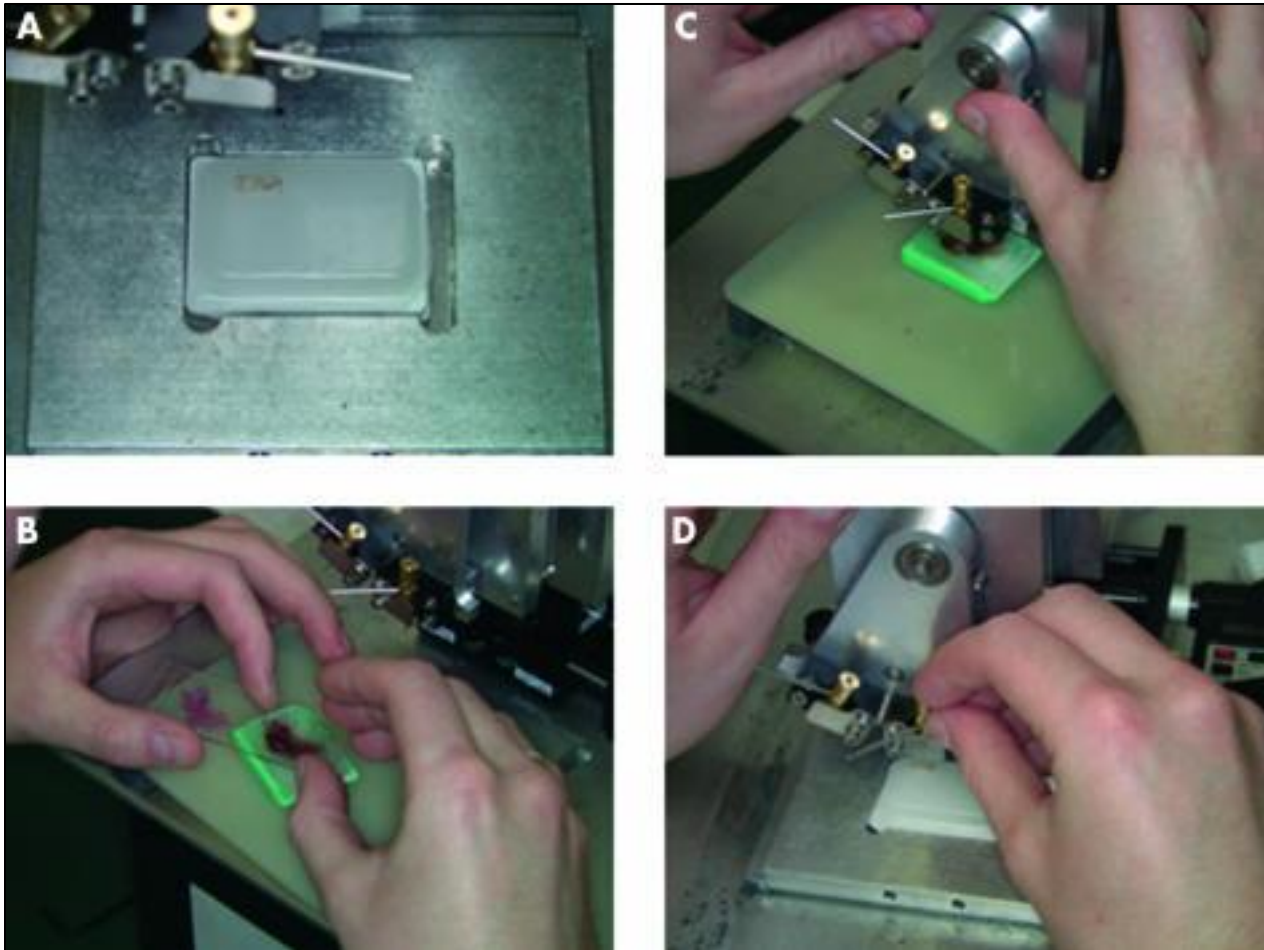
- What is Tissue MA?

- TMA
- Facilitate research on **a large series of tissues in parallel** in a single experiment

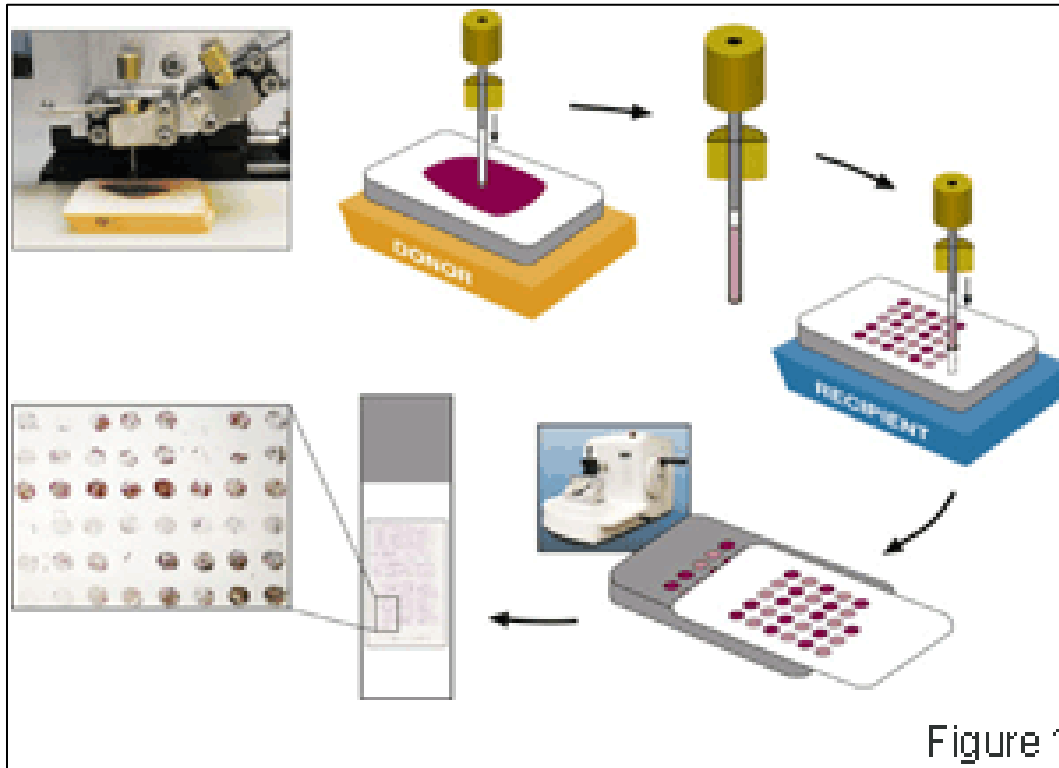


## • How to Build Tissue MA?

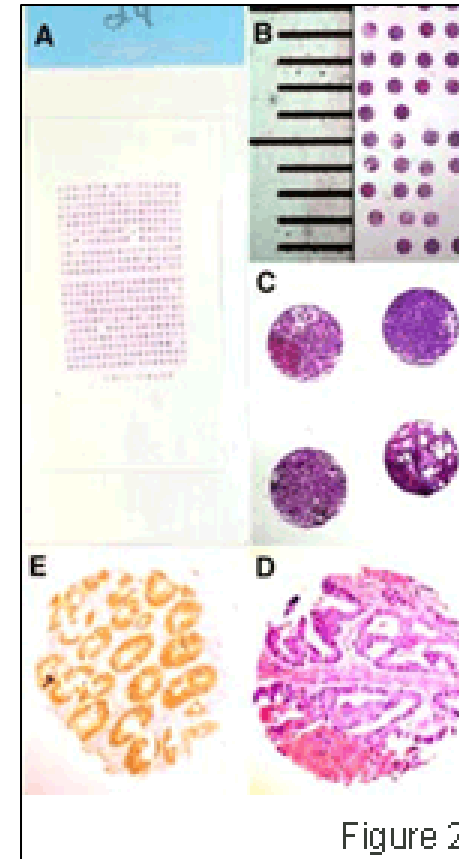
- A needle to biopsy
- Paraffin-embedded
- Haematoxylin and eosin stained section
- Removed the tissue core from the **donor block**
- Placed in the prepared hole in the paraffin wax **acceptor block**

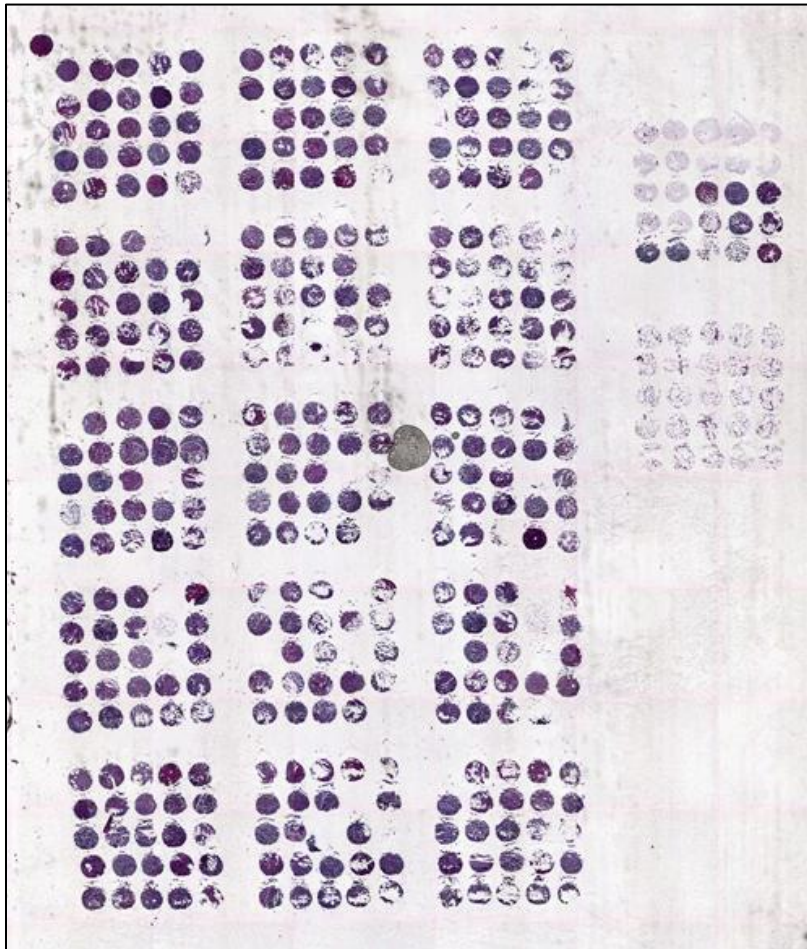


Procedure of Exp. of Tissue Microarray



Procedure of Exp. of Tissue Microarray





Tissue Microarray

- **What's good**

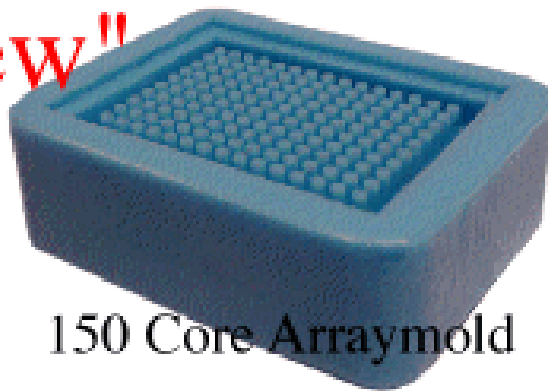
- Make difference more different
- Small laboratory
- High throughput
- Require less skills
- Quality control

- **Where is Tissue MA**

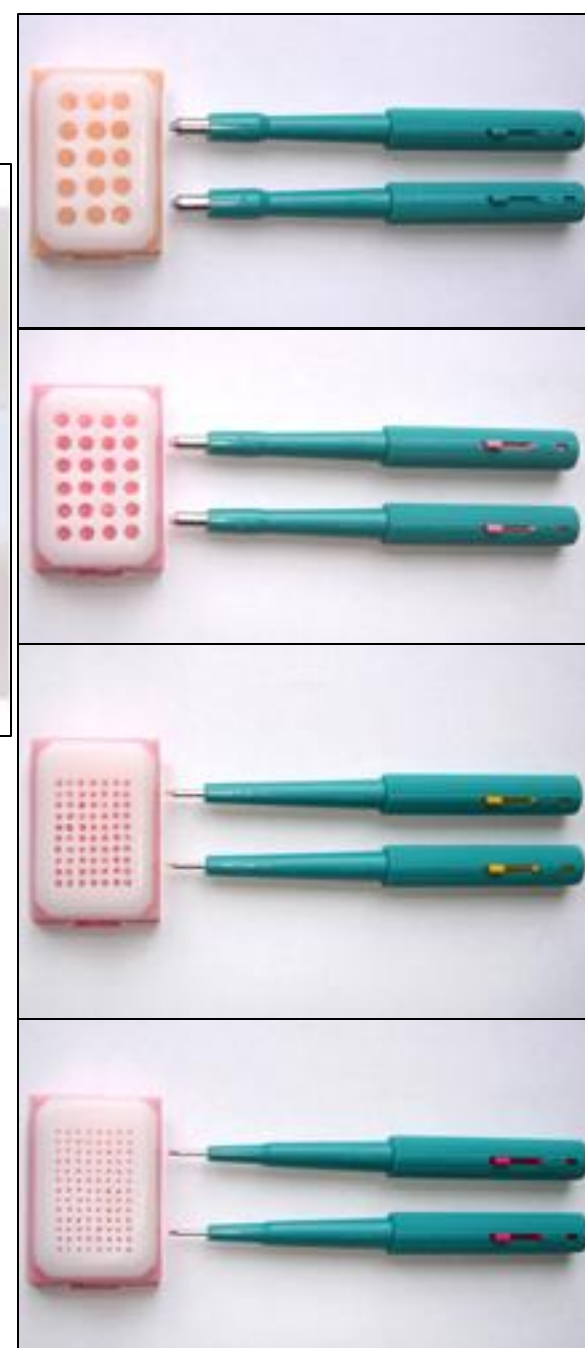
- Cancer tissues
- Animal models
- Cell lines



"New"



150 Core Arraymold



Tissue MA

Q&A Time

Thanks for your attention!!