

教師與 TA 教學工作坊

超強的 PowerPoint 投影片編輯技巧



以教育彩繪台灣的未來

國立臺灣大學 生化科技學系

莊榮輝



莊榮輝
↓
投影片

1 以 PowerPoint 展示你的演講 – 原則

2 注意使用字型

3 圖形基本格式與變化

Basics

4 流程圖設計原則

5 以動畫模擬實驗之進行

6 PowerPoint 加值妙用

7 準備演講及臨場表現

Advanced

8 使用 PowerPoint 心得總結

- 說明文字
- 步驟流程
- 成果摘要
- 向量圖形
- 點陣圖形
- 掃描圖片



簡要流程

- ▼ **安排劇本及故事流程**
把報告的內容寫成 **劇本**
- ▼ **設計每一張投影片內容**
簡潔、明白、正確 (**轉譯**)
- ▼ **反覆練習預演**
至少預演五次以上
- ▼ **臨場努力發揮**
誠懇地說明、實在地回答
(注意聽眾組成與需求)

還記得藍底白字幻燈片的時代嗎？

LETTERS

Long-term potentiation depends on release of D-serine from astrocytes

Christian Henneberger¹, Thomas Papouin¹, Stéphane H. Oliet² & Dmitri A. Rusakov¹

Long-term potentiation (LTP) of synaptic transmission provides an experimental model for studying mechanisms of memory. The classical form of LTP relies on N-methyl-D-aspartate receptor (NMDAR) activity, and it has been shown that astrocytes regulate their activation through Ca²⁺-dependent release of the NMDAR co-agonist D-serine¹. Release of D-serine from glia enables LTP in cultured astrocytes and explains a correlation between release of D-serine and LTP in the hippocampus. However, it remains unclear whether D-serine release is essential for LTP in the intact brain. Here we show that clamping internal Ca²⁺ in individual CA1 astrocytes blocks LTP induction in nearby synapses by decreasing the occupancy of NMDAR on agonist sites. This LTP blockade can be reversed by exogenous D-serine or glycine, whereas depletion of D-serine or glycine of astrocytes in an individual astrocyte blocks local LTP. We therefore demonstrate that Ca²⁺-dependent release of D-serine from astrocytes controls NMDAR-dependent plasticity in many thousands of excitatory synapses nearby.

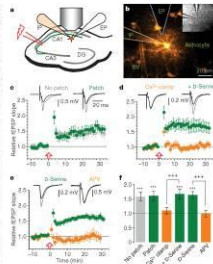


Figure 1 | Clamping astrocytic Ca²⁺ blocks LTP at nearby synapses in a synapse-dependent manner. **a**, Representative traces showing the effect of clamping astrocytic Ca²⁺ on NMDAR currents evoked by a 50 Hz burst of 100 pulses (500 ms) at 100 Hz. **b**, Summary graph showing the effect of clamping astrocytic Ca²⁺ on LTP induction and maintenance. **c**, Representative traces showing that exogenous D-serine or glycine reverses the LTP blockade. **d**, Summary graph showing that exogenous D-serine or glycine reverses the LTP blockade. **e**, Representative traces showing that depletion of D-serine or glycine in astrocytes blocks LTP. **f**, Summary graph showing that depletion of D-serine or glycine in astrocytes blocks LTP. **g**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **h**, Summary graph showing that D-serine or glycine application reverses the LTP blockade. **i**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **j**, Summary graph showing that D-serine or glycine application reverses the LTP blockade. **k**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **l**, Summary graph showing that D-serine or glycine application reverses the LTP blockade. **m**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **n**, Summary graph showing that D-serine or glycine application reverses the LTP blockade. **o**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **p**, Summary graph showing that D-serine or glycine application reverses the LTP blockade. **q**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **r**, Summary graph showing that D-serine or glycine application reverses the LTP blockade. **s**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **t**, Summary graph showing that D-serine or glycine application reverses the LTP blockade. **u**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **v**, Summary graph showing that D-serine or glycine application reverses the LTP blockade. **w**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **x**, Summary graph showing that D-serine or glycine application reverses the LTP blockade. **y**, Representative traces showing that D-serine or glycine application reverses the LTP blockade. **z**, Summary graph showing that D-serine or glycine application reverses the LTP blockade.

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NEWS & VIEWS

NEUROSCIENCE

Astrocytes as aide-mémoires

Mirko Santello and Andrea Volterra

Memory formation is known to occur at the level of synaptic contacts between neurons. It therefore comes as a surprise that another type of brain cell, the astrocyte, is also involved in establishing memory.

Memory is the result of long-lasting changes in synaptic activity usually involving the activation of NMDA receptors (NMDARs) — a special class of receptor for the excitatory neurotransmitter glutamate. Memory formation has always been thought to depend on events occurring exclusively in neurons. But the brain possesses another cell population, glial cells, which include the highly ramified, star-shaped astrocytes. Despite their abundance — they make up 90% of all human brain cells — astrocytes have been relatively overlooked in the search for mechanisms of memory formation because they lack electrical excitability and do not communicate like neurons do. But astrocytes are

the first direct evidence for this proposal. The authors induce long-term potentiation (LTP) of excitatory synapses in the hippocampus using a high-frequency-stimulation protocol, which involves applying repetitive electrical stimuli to the presynaptic fibres. LTP is the sustained increase in synaptic strength associated with memory formation, and the authors monitored this synaptic potentiation locally, in domains roughly corresponding to the territories of individual astrocytes. They did this by recording the electrical signal generated by the ensemble of synapses in the territory, using an extracellular electrode or, alternatively, directly through the astrocyte.

of NO synthases contain a haem bound to a cysteine amino acid (the base, B, in Fig. 1b). But their activity is confined to the amino acid L-arginine, which it converts to NO — a signalling molecule vital to the nervous, immune and cardiovascular systems. The chemistry involves two sequential oxidations, each requiring oxygen, protons and NADPH. Each step proceeds via oxy, and follows on to either peroxo², hydroperoxy or cpd I intermediates. In some enzymes, such as haem oxygenases (HOs), ferric hydroperoxide is the oxidizing species^{1,4}, and the substrate is the haem itself. HOs are found in many organisms, and in mammals the oxidation products are biologically vital: biliverdin, which acts as an antioxidant; liberated iron(II) ions, which are recycled for use elsewhere (primarily in haems); and carbon monoxide, which is used as a neurotransmitter. Reactions mediated by the enzyme cytochrome c oxidase, a member of the haem-copper oxidase (HCO) superfamily, probably also proceed through a ferric hydroperoxy complex, which then undergoes O–O cleavage and formation of cpd II (ref. 15). HCOs facilitate proton pumping across mitochondrial membranes, which generates a proton

astrocytes expressed LTP at nearby synapses but not at synapses near the neighbouring control cell (Fig. 4d, and Supplementary Fig. 12). A qualitatively identical result was obtained when LTP was induced in a standard hippocampal slice (Hippocampal slice) at 300 Hz for 20 s, a protocol that normally induces LTP in the hippocampus. However, when the astrocytes were clamped, LTP was blocked at nearby synapses but not at synapses near the neighbouring control cell (Fig. 4e, and Supplementary Fig. 13). With a 100 Hz LTP protocol, LTP recovery occurred at nearby but not distant synapses (Fig. 4b), which is consistent with the tissue's inability to cope with high-frequency stimulation. Our findings demonstrate that induction of NMDAR-dependent LTP in the hippocampus requires D-serine release from astrocytes. NMDARs provided a natural synaptic pathway for D-serine release from an astrocyte. Receptor-activated activity transiently increases intracellular calcium, which in turn triggers D-serine release from astrocytes. In cultured astrocytes, D-serine release is dependent on calcium entry from the extracellular space. This could potentially give rise to a feedback mechanism regulating between-astrocyte NMDAR-dependent plasticity across a neuronal domain affected by

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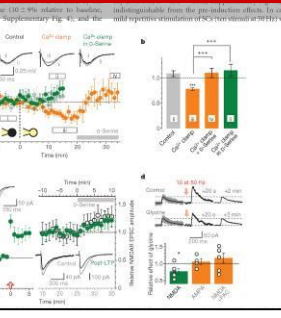
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LETTERS

Collect → Digest → Abstract → Present

Stimulus, clamping the intra-astrocyte Ca²⁺ concentration completely suppressed LTP at nearby synapses, and the addition of 10 μM D-serine to the bath restored LTP at nearby synapses, and the addition of 10 μM D-serine to the bath blocked the inhibitory effect of Ca²⁺ clamp (100 ± 12%, n = 7; Fig. 2a, b). Ca²⁺-dependent release of D-serine from glia enables LTP in cultured astrocytes and explains a correlation between release of D-serine and LTP in the hippocampus. However, it remains unclear whether D-serine release is essential for LTP in the intact brain. Here we show that clamping internal Ca²⁺ in individual CA1 astrocytes blocks LTP induction in nearby synapses by decreasing the occupancy of NMDAR on agonist sites. This LTP blockade can be reversed by exogenous D-serine or glycine, whereas depletion of D-serine or glycine of astrocytes in an individual astrocyte blocks local LTP. We therefore demonstrate that Ca²⁺-dependent release of D-serine from astrocytes controls NMDAR-dependent plasticity in many thousands of excitatory synapses nearby.



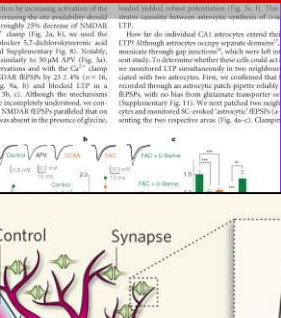
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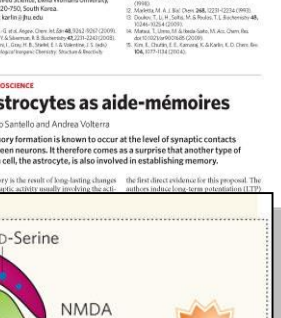
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投影片的製作原則：簡潔、明白、正確

- (1) 使用純色**簡單**背景，不要附加任何無意義圖案。
- (2) 每張投影片都有清楚**主題**，可標在上緣或下緣。
- (3) 無論中英文打字習慣，務必依照正式打字**規則**。
- (4) 注意**文字**的適當安排，如字距、行距、字型等。
- (5) 文字不得出現拼字或打字**錯誤**，注意標點符號。
- (6) 設計**版面**不要太過複雜，反之也不要過分貧乏。
- (7) 安排整體版面的**平衡**與美感，以及色彩之協調。
- (8) 適當使用**動畫**，可提升報告的層次感與故事性。
- (9) 使用照片、漫畫、圖表**提升**聽眾的理解與興趣。
- (10) 多利用**流程圖**來說明事件，或表達複雜的概念。

等幅字型

中黑體

粗圓體

Arial

PowerPoint 的確是一個良好的報告工具，很容易學會，功能相當多樣而且強大；每個人都應該學會，而且好好應用在自己的研究進度、成果報告、論文口試上，以後還極可能應用在你的事業。下圖左側說明一張用 PowerPoint 所做出的投影片，可容納何種物件，右側列出製作投影片報告的四個主要步驟；這些要點將一一說明。

正直字型

細明體

超明體

Time New Roman

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弧度字型

標楷體

隸書體

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中英文之間請空半格

Heavy metals are toxic to most living organisms and cause health problems by contaminating agricultural products. In plant, phytochelatin synthase (PCS) uses glutathione (GSH) as its substrate to catalyze the synthesis of heavy metal-binding peptides, known as phytochelatins (PC). PCS has been described as a constitutive enzyme that may be controlled by post-translational modifications. However, the detailed mechanism of its catalytic activity is not clear. In this study, *in vitro* experiments demonstrate that PCS activity increased following phosphorylation by casein kinase 2 (CK2), and decreases following treatment with alkaline phosphatase.

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只有 MS Word 會自動空半格

C-domain)，其中 N-domain 為催化區所在，而 C-domain 有很多 Cys-Cy 或 Cys-X-Cys 序列，可能可與鎘結合 (圖三上)。藍綠藻也表現有 PCS，比較有趣的是這種 PCS (NsPCS) 只有 N-domain 部份，因此分子量大約只有一般 PCS 的一半 (Tsuji et al., 2004)。NsPCS 雖然也會合成 PC，但其效率非常差，反而只會進行上述的 acylation 半反應，去除 GSH 的 Gly 後生成 γ -Glu-Cys (γ EC)。NsPCS 因為分子較小，因此已經被解出 X-ray 結構 (Vivares et al., 2005)，證實具有 Cys-His-Asp 催化 triad，也看到了 γ EC 的結合位置 (圖三下 B)。雖然如此，整個催化機制仍然不清楚，尤其是第二個 GSH 如何進入活性區，更眾說紛紜。甚至有人認為第二個 GSH 先結合到 C-domain 上，然後再與 γ EC 連結。這就開啟了我們探索 PCS 的切入點。

PCS 含有 485 個胺基酸，分子有兩個 domains (N-domain 及 C-domain)，其中 N-domain 為催化區所在，而 C-domain 有很多 Cys-Cy 或 Cys-X-Cys 序列，可能可與鎘結合 (圖三上)。藍綠藻也表現有 PCS，有趣的是這種 PCS (NsPCS) 只有 N-domain 部份，因此分子量大約只有一般 PCS 的一半 (Tsuji et al., 2004)。NsPCS 雖然也會合成 PC，但其效率非常差，反而只會進行上述的 acylation 半反應，去除 GSH 的 Gly 後生成 γ -Glu-Cys (γ EC)。NsPCS 因為分子較小，因此已經被解出 X-ray 結構 (Vivares et al., 2005)，證實具有 Cys-His-Asp 的催化 triad，也看到了 γ EC 的結合位置 (圖三下 B)。雖然如此，整個催化機制仍然不清楚，尤其是第二個 GSH 如何進入活性區 (second substrate site)，更是眾說紛紜。甚至有人認為第二個 GSH 先結合到 C-domain 上，然後再與

大家都知道英文單字之間要空格

因此中文與英文之間也要空半格

打字規則建議

This is an example^x, we should type correctly^x.

Avoid using Chinese font in English.

5mL 2M 100X% 3 7X°C

玉米 (XZea maysX) 是重要作物

如何分辨DNA與RNA?

標點符號
適當空格

英文字句不要
使用中文字型

數字與單位之
間要注意空格

這些都是
細明體英文

有些要空格
有些不能空
(%, °C)

括號外側要空半格
括號內側不能空格

小括號請用
英文字型

勿用全
形數字

細節會影響整體觀感

This is an example, we should type correctly.

Avoid using Chinese font in English.

5 mL 2 M 100% 37°C α β γ

玉米 (*Zea mays*) 是重要作物

如何分辨 DNA 與 RNA? → 如何分辨 DNA 與 RNA?

希臘字母
用 symbol

中英文混用時
中英間要空格

注意斜體

Time New
Roman

Catalytic triad: Asp 102 ← His 57 ← Ser 195 *charge relay*

(1) 環境 pH 對酵素活性有極大影響 → 活性區的 胺基酸 受影響：

His 57 ($pK_a = 6$): 當環境 pH > 6, imidazole 失去 H^+ (charged)

Ile 16 (new N-terminal): 當環境 pH > 9, NH_3^+ 失去 H^+ (不帶電)

Ser 195: DIFP 可與 Ser-OH 反應 → 失去活性

(2) 催化機制：兩個步驟

▼ **Acylation**: 切開後 N-peptide 共價結合在酵素上 (Ser 195)

▼ **Deacylation**: 加水分解後釋出 N-peptide (slow step)

Nitrophenyl acetate (作用很慢的基質類似物)

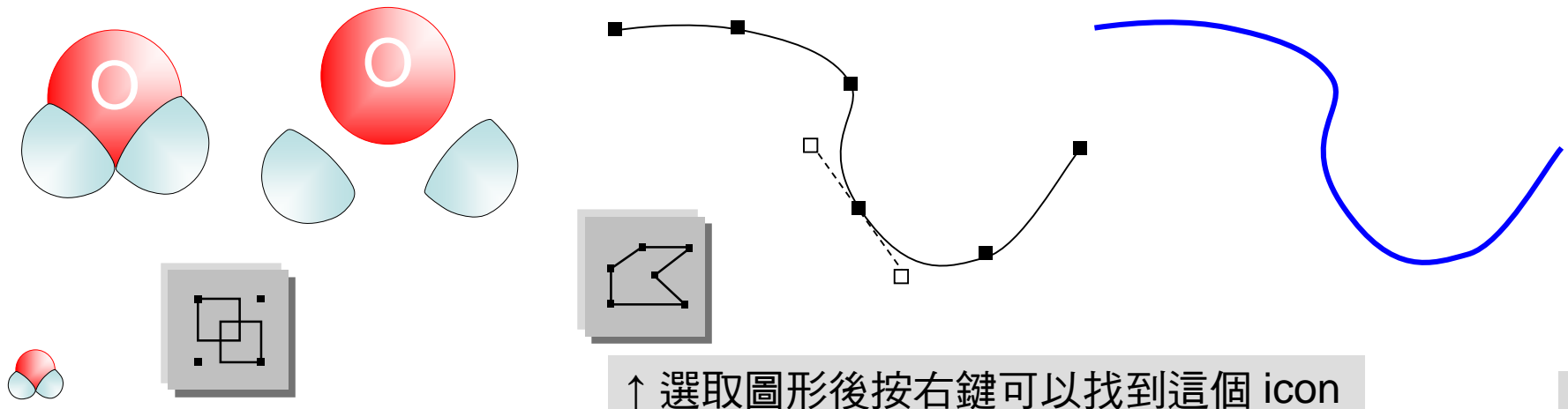
(3) 穩定過渡狀態：

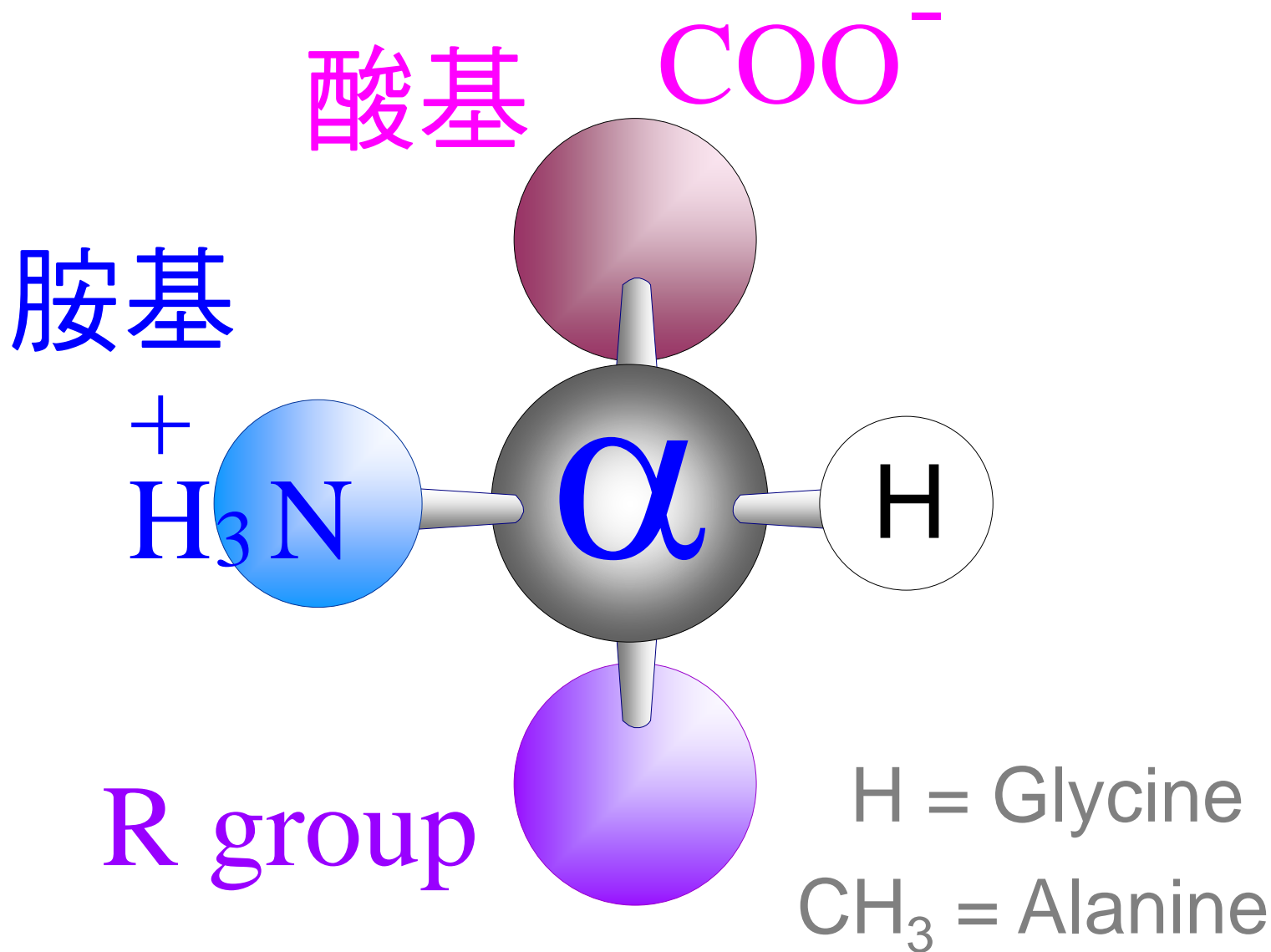
-C-O⁻ 可與 Gly 193 與 Ser 195 的 -N-H 產生氫鍵而穩定之

(4) 專一性結合區：活性區附近有 non-polar pocket 辨識基質

3.1 向量圖的應用比想像還廣大

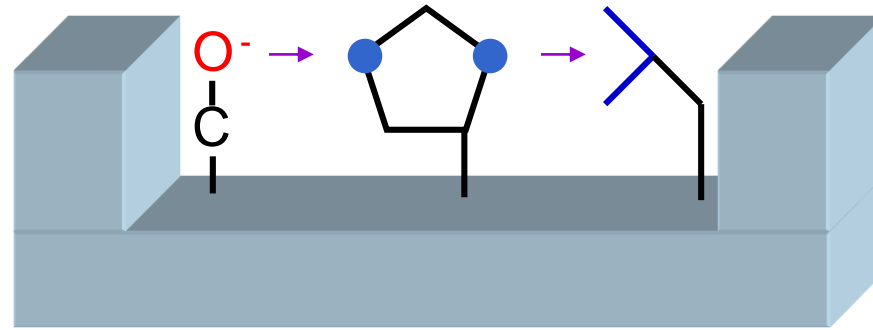
- (1) 複雜圖形都可由數個基本圖案組成。
- (2) 善用『**群組**』功能管理圖形之層次。
- (3) 特殊形狀先畫出大致輪廓後再修改。
- (4) 利用『**編輯端點**』可做出各種形狀。
- (5) 移動物件若同時按 **Alt** 可隨意遊走。





這個分子其實是由梯形與圓形所構成

轉譯



← 有用的組合

Hi, Everybody!

↙ 有趣的組合



3.2 把點陣圖變得更清晰亮麗

- (1) 把照片、掃描圖集中在專用檔案夾。
- (2) 選取圖片按右鍵打開**設定圖案格式**。
- (3) 先把點陣圖貼到投影片的大概位置。
- (4) 修飾每張圖片：對比、亮度、**裁剪**。
- (5) 圖片儘量放大，切勿改變長寬比例。
- (6) 再把各點陣圖排好，注意版面平衡。
- (7) 在『**圖片工具格式**』可壓縮點陣圖。

再糟糕的照片都可用專業軟體整修為堪用品。

原圖



對比↑



明亮↓



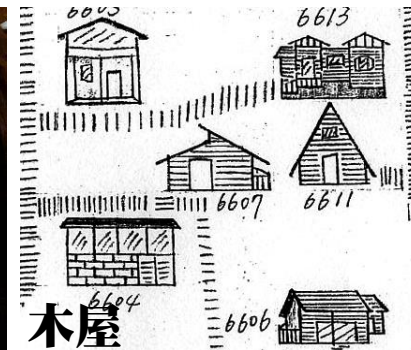
對比↑
明亮↓



2008 整體滿意度 (Final evaluations = 4.6)

專題與論壇

Over one hundred participants



some feedbacks...

- 原本以為三天兩夜應該是浪費時間之旅，但結果發現確實大部分內容都非常有用。
- ... 認識學院夥伴建議時間可以延長 ... 創始個人研究室時的困難與需求 ...
- ... 可安排新進教師與已進入台大 2~3 年面臨評估及升等之助理教授 ...

3.3 由點陣圖轉繪向量圖

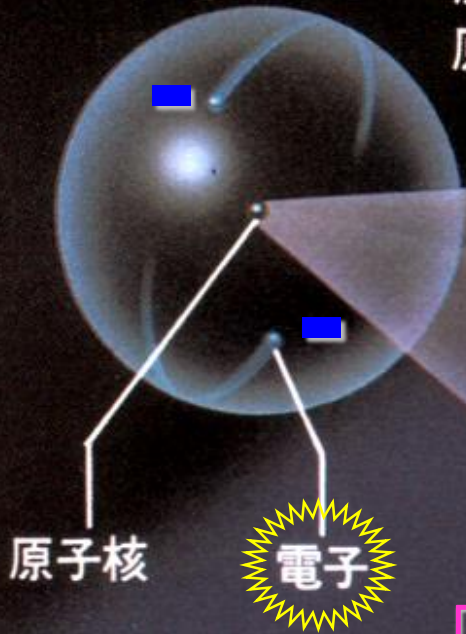
- (1) 把所要的**點陣圖**掃描下來存為 jpg 。
- (2) **複製**到所編輯 PowerPoint 投影片 。
- (3) 依照點陣圖之圖形**外框**畫出向量圖 。
- (4) 完成向量圖後把原來的點陣圖**去掉** 。
- (5) 所得各向量圖物件可個別指定**動畫** 。

不需美術根基就可以畫出**像樣**的圖形 。

由基本粒子到原子

原子

原子是由
原子核和電子組成。



原子核

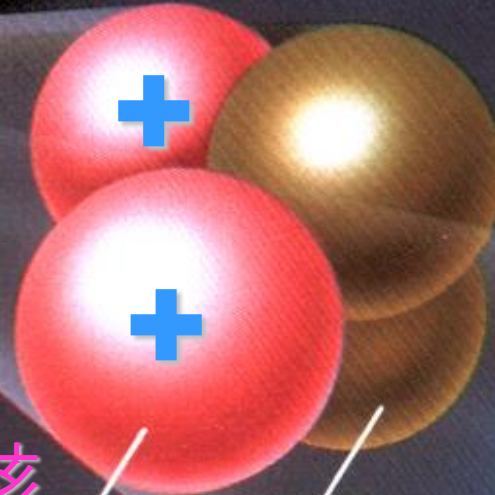
電子

原子核是由
質子和中子構成。

原子核

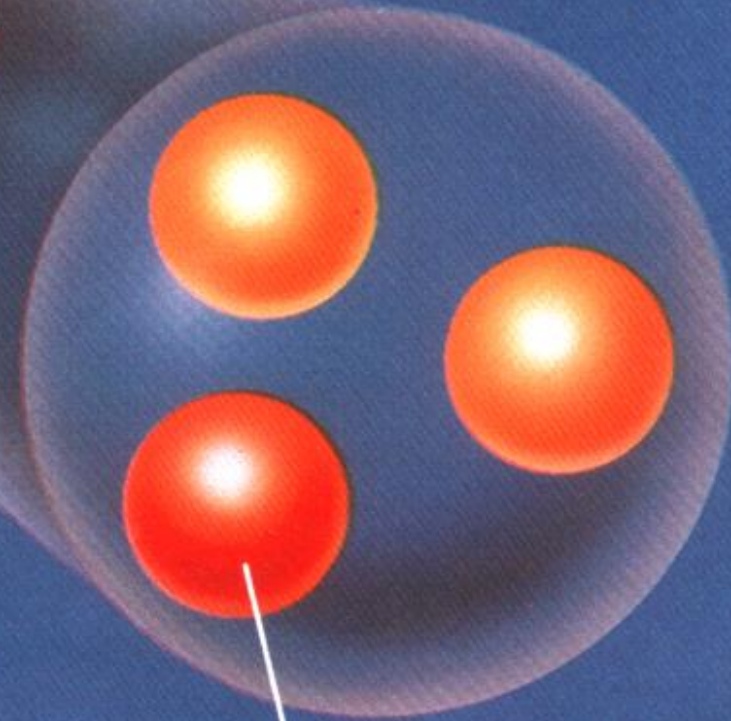
質子

中子



基本粒子

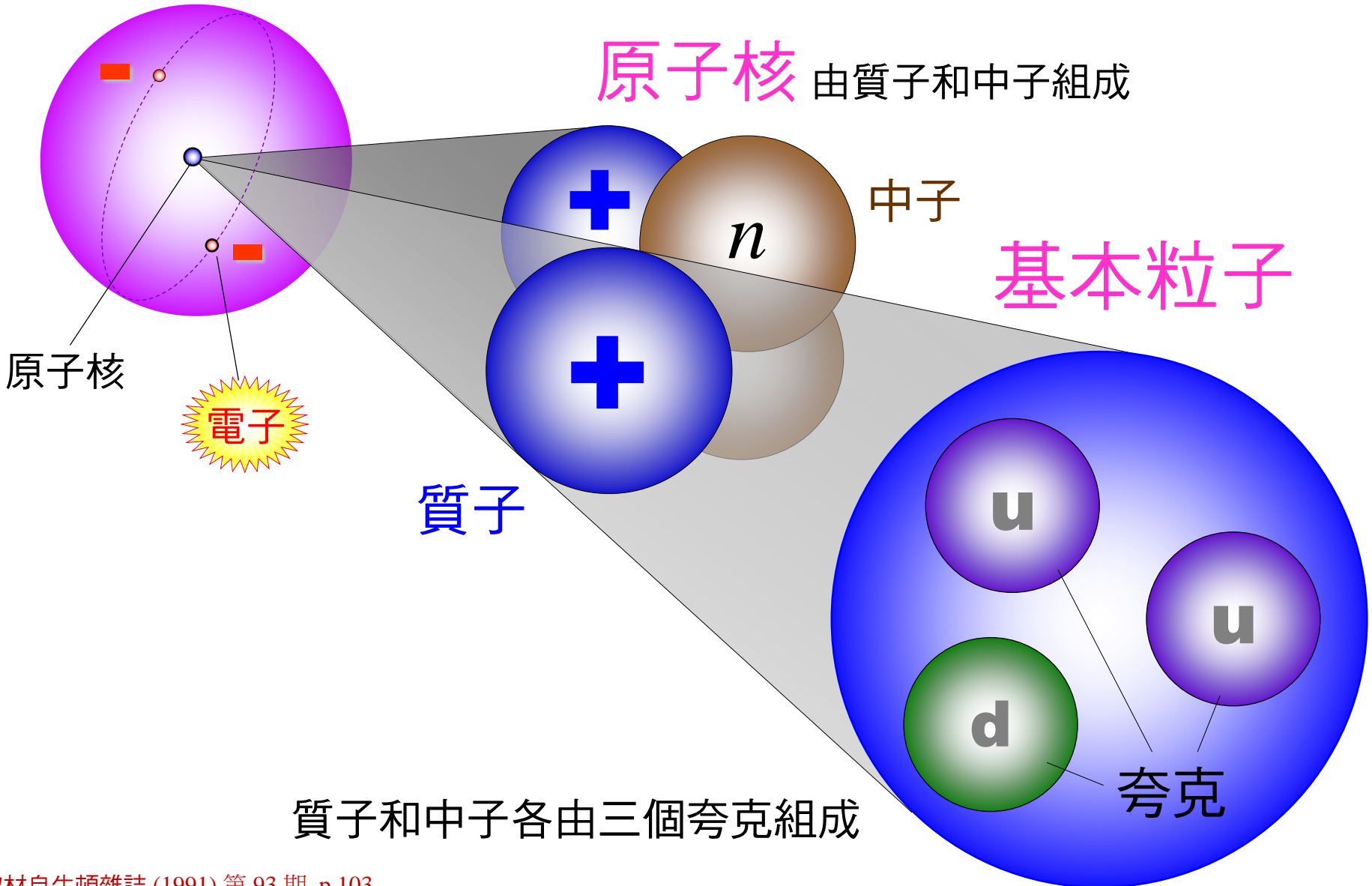
質子和中子
分別由三個夸克形成。



夸克

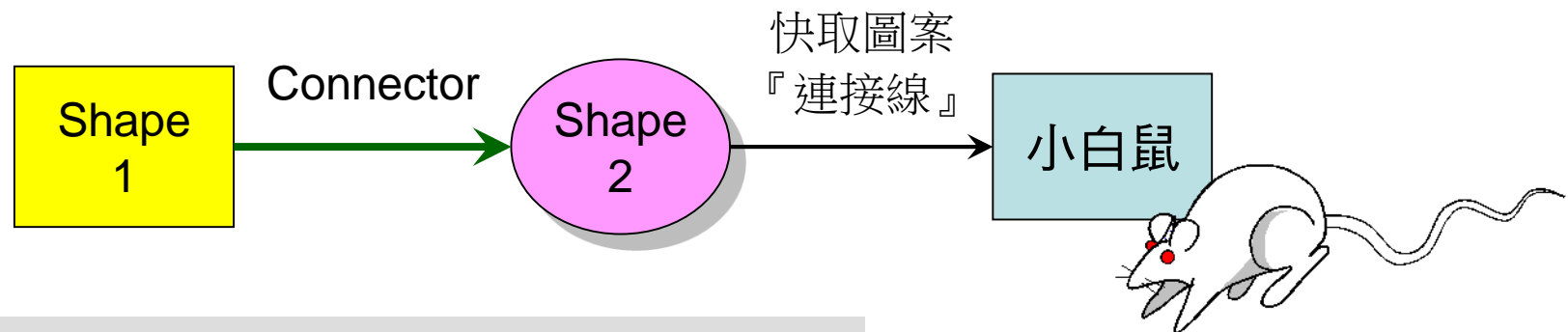
由基本粒子到原子

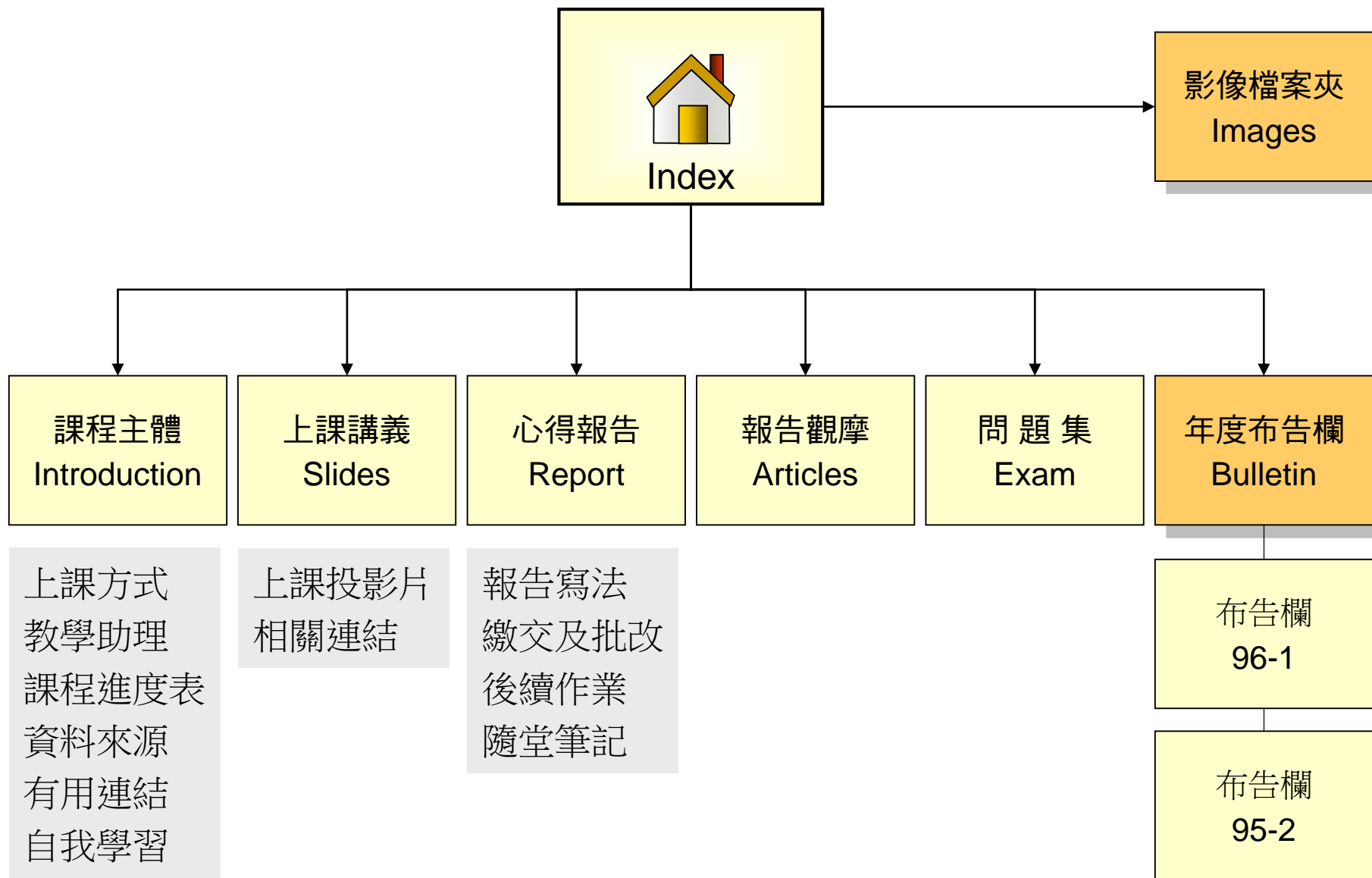
原子 由原子核與電子組成

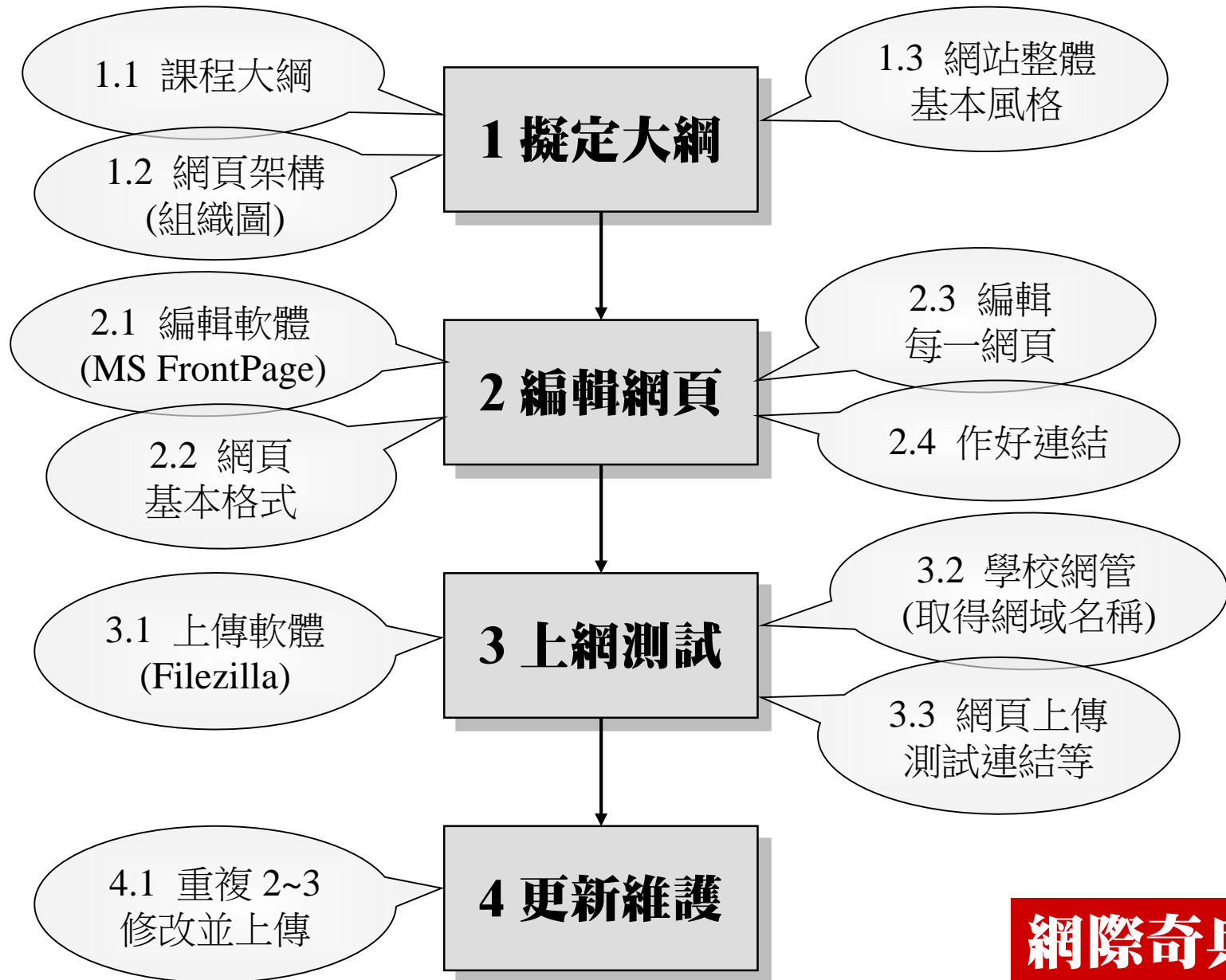


質子和中子各由三個夸克組成

- (1) 把複雜的觀念或**程序**轉成**流程圖**。
- (2) 先在白紙大致擬出整個**流程草圖**。
- (3) 流程由 **shape** 與 **connector** 組合。
- (4) Shape 可使用基本圖案也可自製。
- (5) 流程以動畫播出可強化**邏輯**層次。



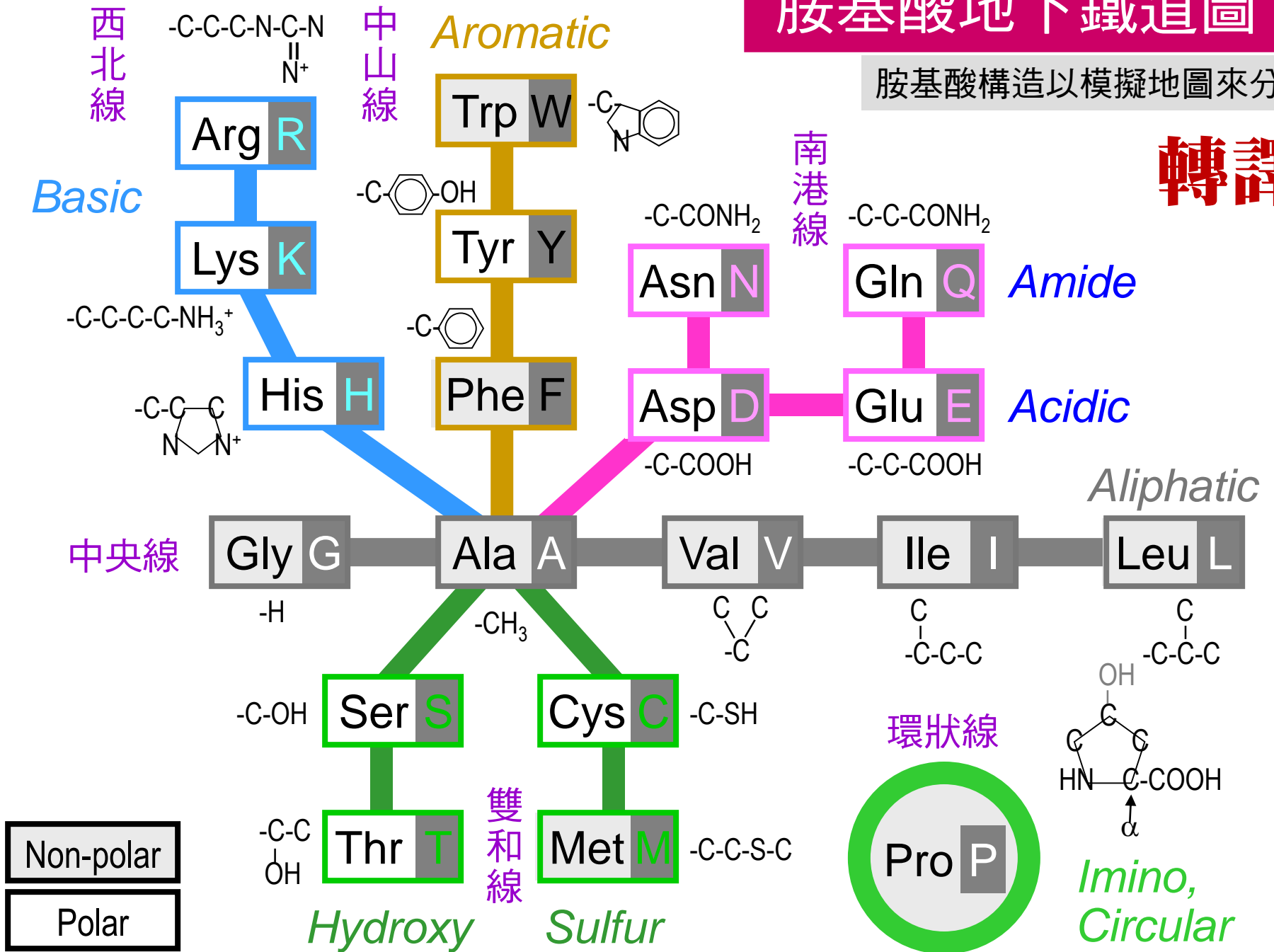




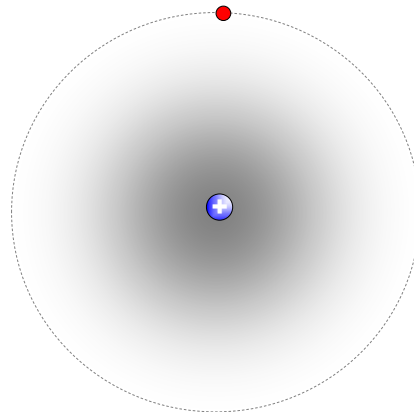
胺基酸地下鐵道圖 22

胺基酸構造以模擬地圖來分類

轉譯

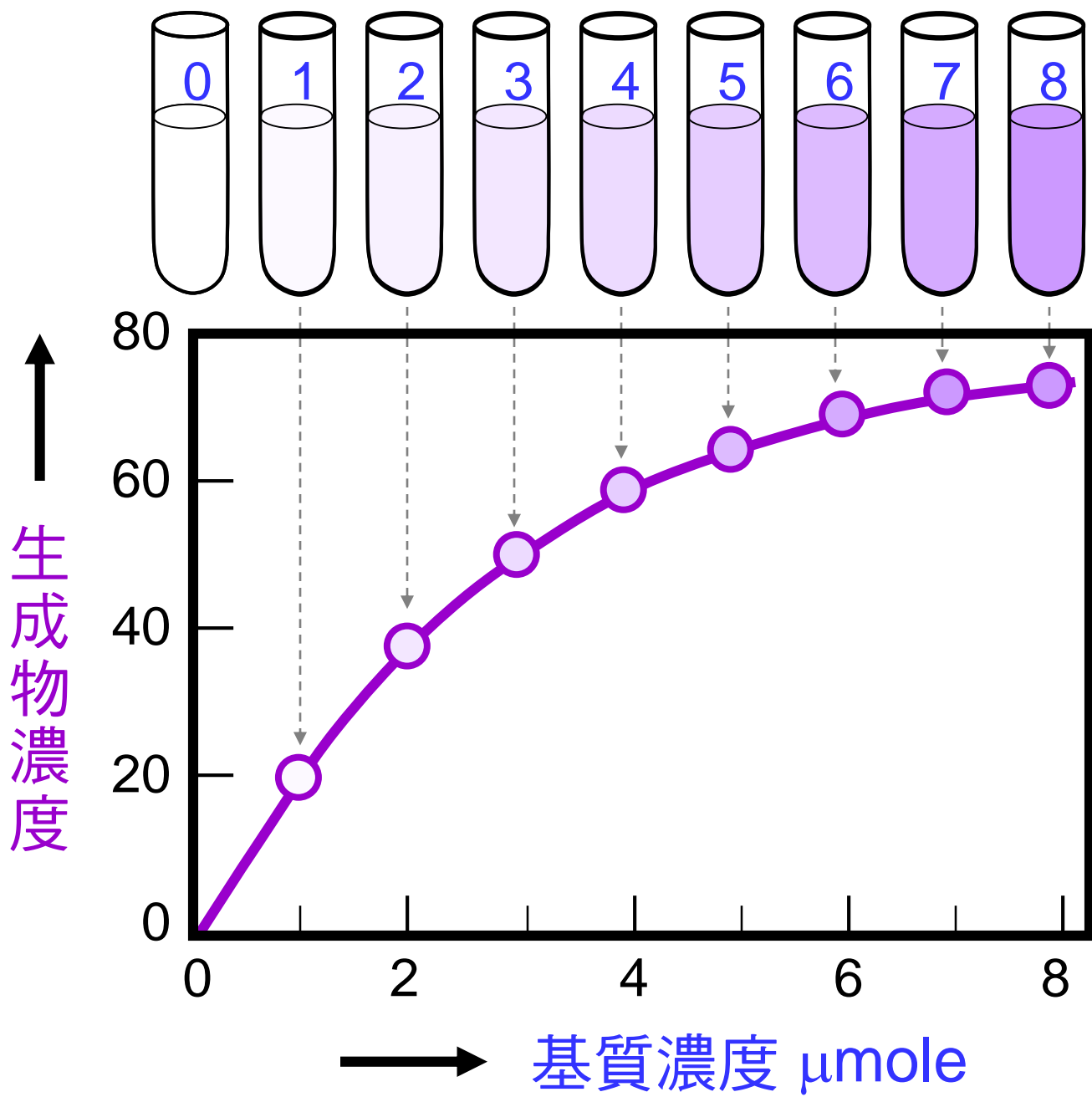


- (1) 運用動畫可說明動作之**先後**次序。
- (2) 很多實驗**設計**可以利用動畫解說。
- (3) **儀器**的操作流程以動畫模擬說明。
- (4) 動畫可系統性地整理出實驗**結果**。
- (5) 原子軌域可用動畫顯示電子環繞↓



這個氫原子由三個正圓形組成

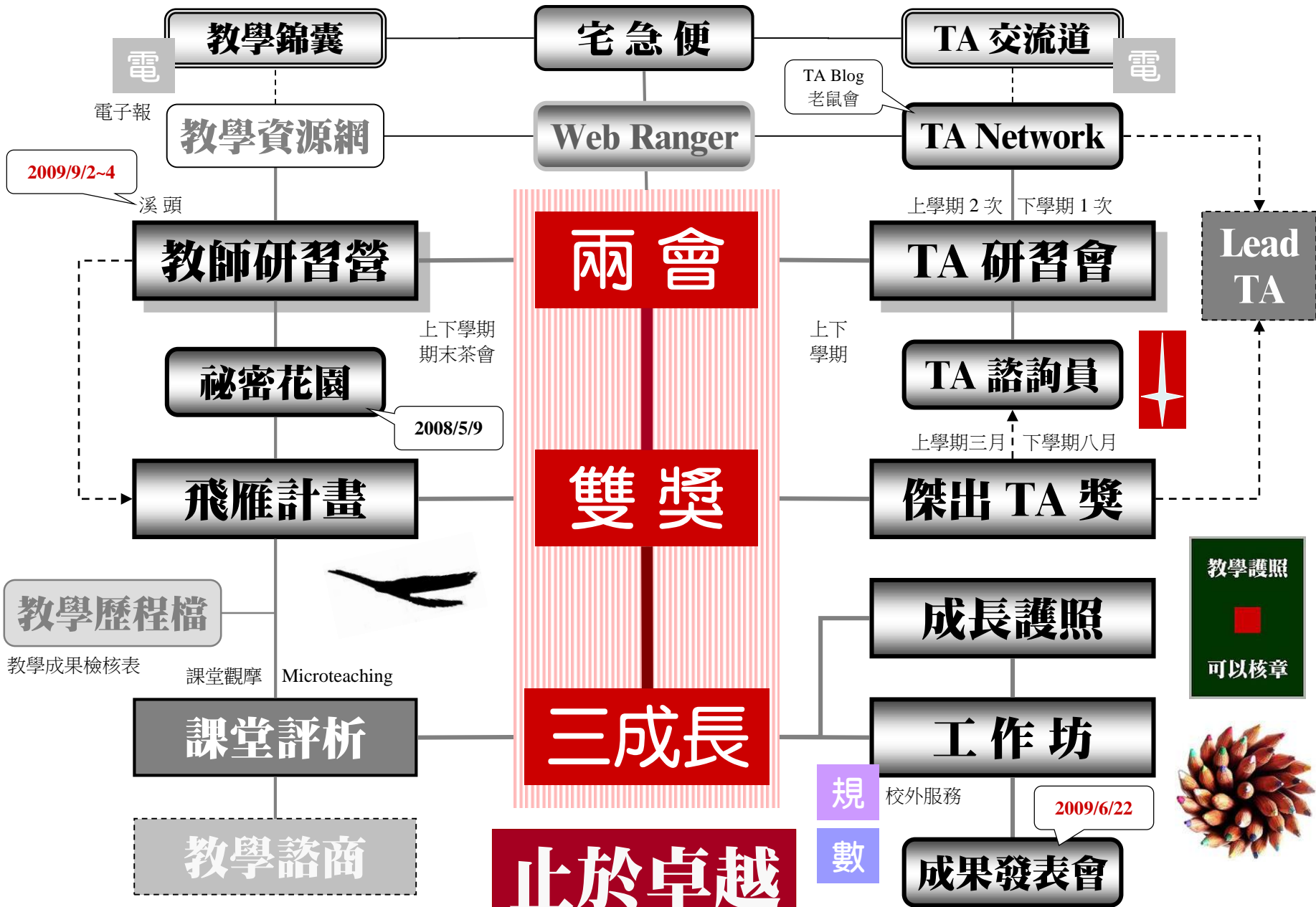
提高基質濃度增強酵素活性表現



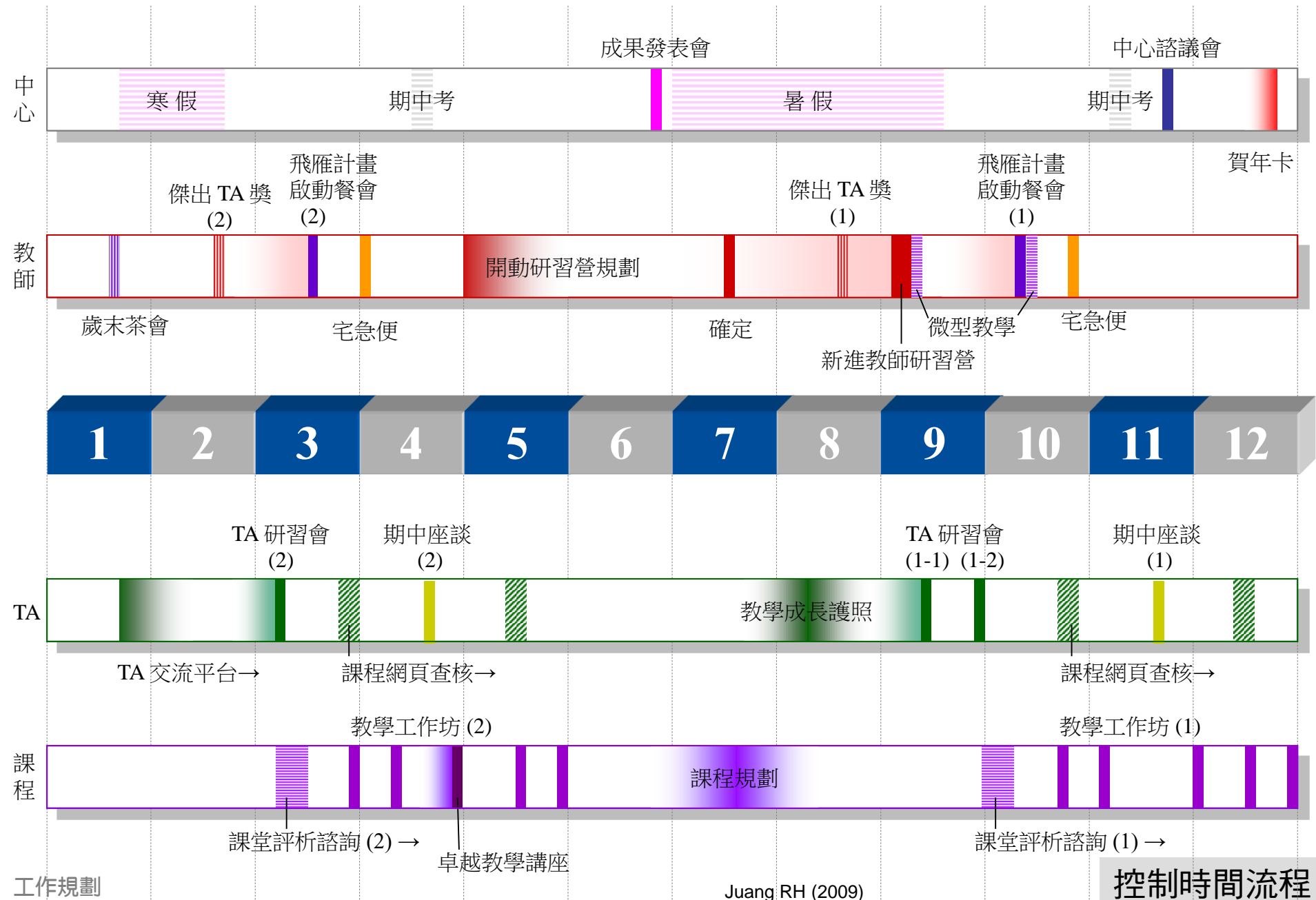
以動畫說明動力學實驗操作過程

- (1) 計畫、專案等可直接在 PowerPoint 規劃。
- (2) 設計、編排投影片過程就是一種**思考磨練**。
- (3) 各種成果都以 PowerPoint 格式整理出來：
 - (a) 學生實驗課以『**One-Page Show**』精簡報告
 - (b) 研究生實驗進度以 PowerPoint 與老師討論
- (4) 可以製作很多圖表，並方便地轉成海報：
流程圖、組織圖、甘特圖、時間表、配置圖
- (5) 若要保證字型完整呈現，轉檔成 pdf 播放。
- (6) PowerPoint Show 可自動播放圖文與音樂。
- (7) 保留一些空白，讓學生在課堂上現場抄下。

教師發展組 工作主軸 2009



教師組年度紀事及分工



6.1 實驗成果以 PowerPoint 整理及報告

Tools for Proteomics

Sample: 竹筴 (50 g)

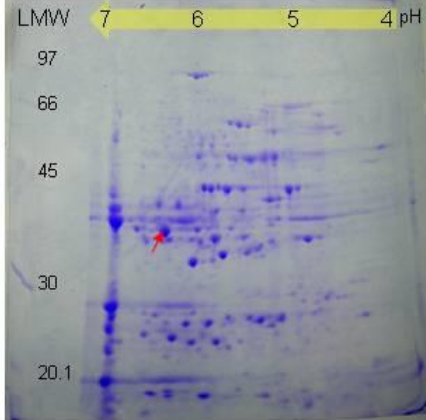
Protocol X → 2DE → CBR staining → spot picking → In-gel digestion (trypsin) → LC/MS/MS

Protocol Y → 2DE → Western transfer → spot picking → Edman sequencing (N-terminal sequencing)

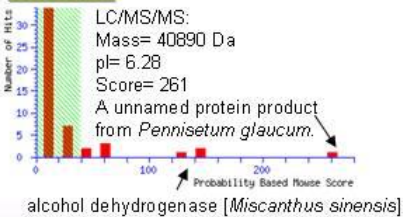
Protocol Z → 2DE → Western transfer → immunostaining

B1 洪櫻姿 黃婉婷

One-Page Show



Results



Discussion

1. 免疫染色時，皆清洗 5-6 次，為
2. Marker 不清楚，如何改進以避

X2-Gel filtration and 原態蛋白質分子量測定 D4 石少岡 毛怡文

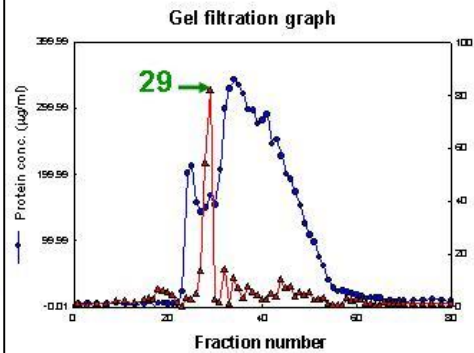


Fig. 1. GF 分割之蛋白質定量與 SP 分析

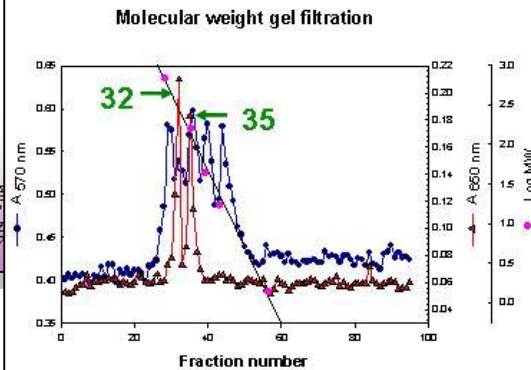


Fig. 4. 原態蛋白質分子量初步測定

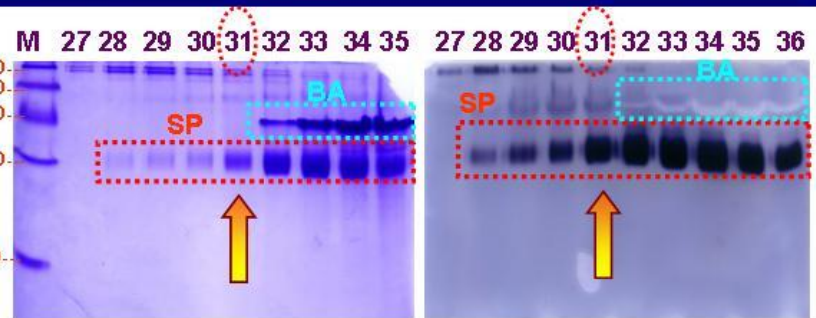


Fig. 2. GF 分割之 CBR 染色

Fig. 3. GF 分割之活性染色

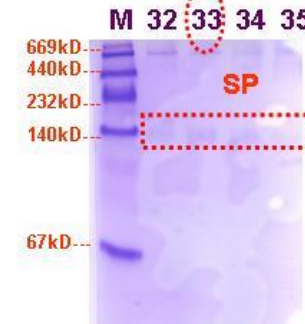


Fig. 5. 分子量測定之 CBR 染色

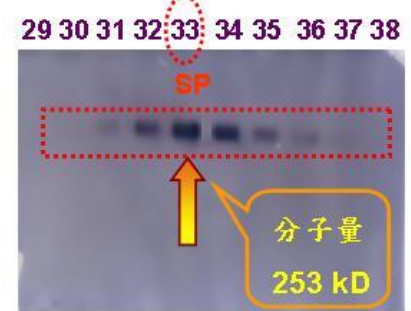


Fig. 6. 分子量測定之活性染色

結論

- ★ Gel filtration 選定第 31 管進行原態蛋白質分子量測定
- ★ 選定第 33 管，初步求得 SP 分子量為 253 kD
- ★ 原態蛋白質分子量測定出現二支峰值之可能原因

How?

(1) 到『設計』自訂

『**投影片大小**』設定：

例如：寬 91 高 128 cm

(2) 編輯海報內容

(3) 以檔案直接送印

(4) 或轉存成 jpg 檔案



6.3 善用列印設定以完美呈現效果



(2) 在印表機
設定頁數

一張四頁的列印效果

頁數的魔術數字

4×4×2

- (1) 以『一張一頁』存為 pdf 格式。
- (2) 在『**印表機**』內容選一張多頁。
- (3) 在列印項目選『**投影片**』列印。
- (4) 若以『**講義**』列印則圖片較小。

6.4 一張列印 16 頁作為現場提示

教師與 TA 教學工作坊

超強的 PowerPoint 投影片編輯技巧

以教育彩繪台灣的未來

教學發展中心 教師發展組 主辦
莊 翠 卿

投影片工作坊大綱

- 1 以 PowerPoint 展示你的演講 - 原則
- 2 注意使用字型
- 3 圖形基本格式與變化
- 4 流程圖設計原則
- 5 以動畫模擬實驗之進行
- 6 PowerPoint 加值妙用
- 7 準備演講及臨場表現
- 8 使用 PowerPoint 心得總結

1 以 PowerPoint 展示你的演講

- 說明文字
- 步驟流程
- 成果摘要
- 向量圖形
- 點陣圖形
- 掃描圖片

安排劇本及故事流程
把報告的內容寫成劇本

設計每一張投影片內容
簡潔、明白、正確

反覆練習預演
至少預演五次以上

臨場努力發揮
誠懇地說明、實在地回答

還記得藍底白字幻燈片的時代嗎?

投影片的制作原則

- (1) 使用純色簡單背景，不要附加任何無意義圖案。
- (2) 每張投影片都有清楚主題，可標在上緣或下緣。
- (3) 無論中英文打字習慣，務必依照正式打字規則。
- (4) 注意文字的適當安排，如字距、行距、字型等。
- (5) 文字不得出現拼字或打字錯誤，注意標點符號。
- (6) 整個版面不要太過複雜，反之也不要過分貧乏。
- (7) 安排整個版面的平衡與美感，以及色彩之協調。
- (8) 適當使用動畫，可提升報告的層次感與故事性。
- (9) 使用照片、漫畫、圖表提升聽眾的理解與興趣。
- (10) 多利用流程圖來說明事件，或表達複雜的概念。

打字規則建議

This is an example we should type correctly.
Avoid using Chinese font for English.
5mL 2M 100% 37°C
玉米 (XZea maysX) 是重要作物
如何分辨 DNA 與 RNA?

英文文字向不
使用中文字型
這些都是
細明體英文
有些英文格
有些不能空
格

數字與單位之
間要注意空格
括號外圍英文字
符與內圍不能空
格

小號體用
英文字型
Time New
Roman

This is an example, we should type correctly.
Avoid using Chinese font for English.
5mL 2M 100% 37°C
玉米 (Zea mays) 是重要作物
如何分辨 DNA 與 RNA? → 如何分辨 DNA 與 RNA?

中英文混用時
中國國家空
格

2 注意使用字型

等幅字型	正直字型	弧度字型
中黑體	細明體	標楷體
粗圓體	超明體	魏碑體
Arial	Time New Roman	

PowerPoint 的標題一般最佳的選擇是 Arial 或 Time New Roman。這能確保字體清晰且易於閱讀。避免使用過於花哨或難以辨識的字體。在選擇字體時，應考慮到演講的場合和觀眾的年齡層。例如，在正式場合應選擇較為穩重、專業的字體，而在輕鬆的場合則可選擇較為活潑、親切的字體。此外，字體的顏色和大小也是影響可讀性的關鍵因素。確保字體顏色與背景形成足夠的對比度，且字體大小足夠大，以便遠處的觀眾也能看清。

Chymotrypsin 的活性區

Catalytic triad: Asp102-His57-Ser195 charge relay

- (1) 環境 pH 對酵素活性有極大影響 → 活性區的 胺基酸 變影響：
His 57 (pKa = 6) 當環境 pH > 6, imidazole 失去 H⁺ (charged)
Ile 16 (new N-terminal) 當環境 pH > 9, NH₃⁺ 失去 H⁺ (不帶電)
Ser 195: D1EP 可與 Ser-OH 反應 → 失去活性
- (2) 催化機制：兩個步驟
▼ Acylation 切斷後 N-peptide 共價結合在酵素上 (Ser195)
▼ Deacylation 加水分解後釋出 N-peptide (slow step)
Nitrophenyl acetate (作用很強的基質類似物)
- (3) 穩定過渡狀態：
-C=O 可與 Gly193 與 Ser195 的 -NH 產生氫鍵而穩定之
- (4) 專一性結合區：活性區附近有 non-polar pocket 辨識基質
先卸重點後出來，再深入說明每一點細節

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ATCG

包括動物、植物、微生物之所有生物，以及病毒等，都是使用這四種遺傳密碼單位；這是天地萬物合一，以及眾生皆平等的最佳說明。

胺基酸也是一樣
ACDEFGHIKLMNPQRSTVWY

這類全是用字形拼成的

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3 圖形基本格式與變化

基本向量圖	修飾	群組
直線 圓弧 手繪 手繪 手繪	顏色 點 旋轉 修改 曲線	群組 立體
形狀 黃色 紅色 藍色 綠色	透明 陰影	

1 可先把這個 Icon 放到繪圖工具列

向量圖的應用比想像還廣大

- (1) 複雜圖形都可由數個基本圖案組成。
- (2) 善用『群組』功能管理圖形之層次。
- (3) 利用『編輯端點』可做出各種形狀。
- (4) 特殊形狀先大致畫出輪廓後再修改。
- (5) 移動物件若同時按 Alt 可隨意遊走。

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L-Form Amino Acid

胺基 + H₃N

羧基 COO⁻

α

H

R group

H = Glycine
CH₃ = Alanine

這個分子其實是由球形與圓形所構成

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新的 Ile16 N-端可穩定 Asp194

Adapted from Deshaie & Fuller (1991) Biochemistry Experiments, p.256

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ESI-MS/MS can analyze smaller fragments

Source Analyzer Detector

LC ESI MS/MS (on trap or TOF)

ElectroSpray Ionization Quadrupole 四極桿

LC high voltage needles solvated ions desolvated ions

不同酵素可能採取類似的催化機制

Hi, Everybody!

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把點陣圖變得更清晰亮麗

- (1) 把照片、掃描圖放在同一個檔案夾。
- (2) 在視窗的工具列顯示常用繪圖按鈕。
- (3) 先把點陣圖貼到投影片的大概位置。
- (4) 對每張圖片修飾對比、亮度、裁剪。
- (5) 圖片儘量放大，切勿改變長寬比例。
- (6) 再把各點陣圖排好，注意版面平衡。

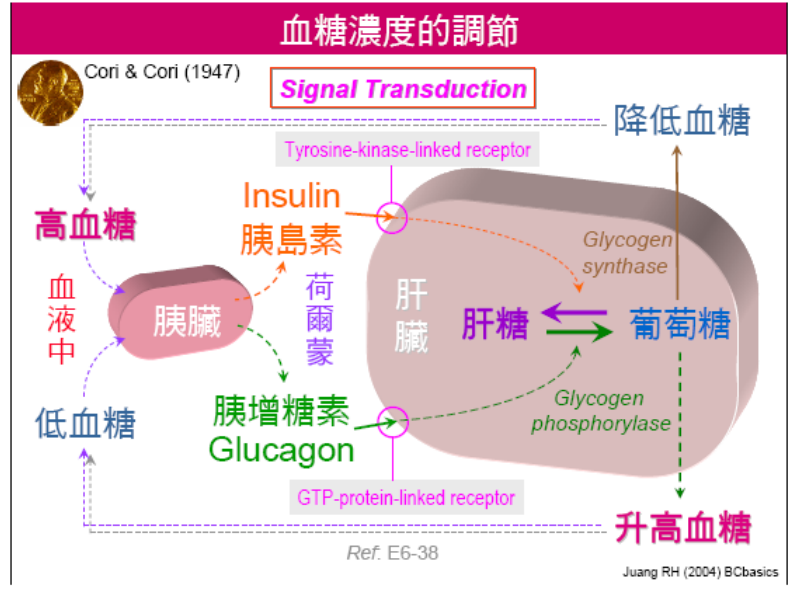
工具 ↓ 自訂 ↓ 指令 ↓ 指令 ↓

點陣圖可以變得更亮麗

- (1) 把照片、掃描圖等收集放在檔案夾。
- (2) 在 PowerPoint 顯示重要修飾按鈕。
- (3) 把點陣圖貼到投影片的大概位置上。
- (4) 亮度、裁切、注意版面均衡。

演講要掌握整體順序，至少要暗知下一張投影片

6.5 以『備忘稿』模式提供內容摘要



血糖 太高或太低對人體都有不好的影響，因此體內有極為複雜的血糖調節系統，主角是合成肝糖的肝糖合成酶 (glycogen synthase, GS)，以及降解肝糖以生成葡萄糖的肝糖磷解酶 (glycogen phosphorylase, GP)。此二酵素分別受到荷爾蒙胰島素 (insulin) 及胰增糖素 (glucagon) 的影響，人體便可利用控制荷爾蒙的濃度來調節血糖濃度。

這兩種荷爾蒙分子到達目標細胞時，細胞膜上有此荷爾蒙的接受體，當兩者接合之後信息便可傳入細胞內，引發酵素活性，進行所需要的糖類代謝。這些信息是如何傳導給最終的酵素 GS 及 GP？這即是最近極為蓬勃的信息傳導，以及典型的酵素調控機制。以下就以肝糖磷解酶為主要對象及實例，說明酵素如何以磷酸化、信息傳導分子以及迴饋控制的方式，進行其活性的調節。

肝糖磷解酶具有以上各種調控機制，很少有酵素如此密集地被調控著，因為肝糖磷解酶在糖類的利用實在是太重要。以下我們先瞭解肝糖磷解酶的分子構造及生化性質。

可撰述更詳細文字說明

E6-27

Specific probe for every single protein?

Bamboo shoots

	Underground	Full-grown (60 cm)
Silver staining		
Western		

Starch phosphorylase (mAb detection)

Three possible approaches:

- (1) Monoclonal antibody
- (2) Phage display (phage antibody)
- (3) DNA or RNA aptamer

Challenges for hybridoma technique:

- (1) Redundant and time-consuming
- (2) Poor immunogenic proteins
- (3) Some proteins are less abundant

Pure Ag → Single mAb → Proteome → Ab bank

When comparing the 2-DE patterns, it was evidently that a specific probe could simplify the complex pattern into *neat and clear contrast* for a better comparison. In order to obtain specific probes, generally, there are three possible approaches: [1~3].

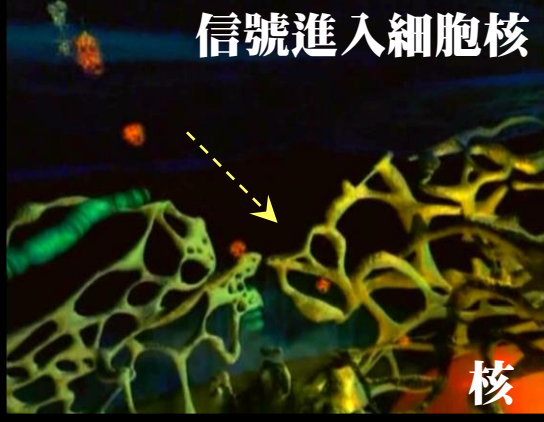
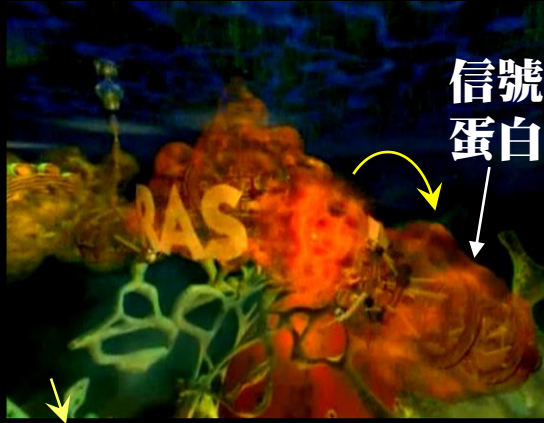
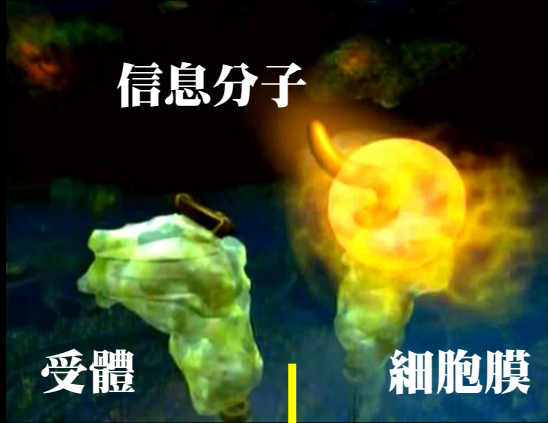
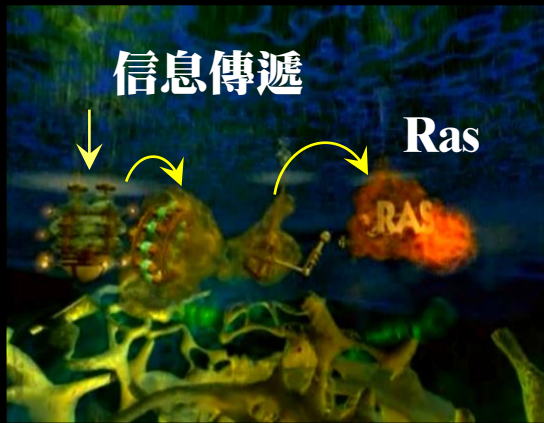
We preferred the hybridoma technique which takes the advantage of the natural immune response to generate **huge diversity** of the antibodies. However, technical challenges do exist to this 30-year old method, as following: [1~3].

Nonetheless, we decided to test the idea of **transforming** the conventional “*pure Ag to produce single mAb*” into “*immunize the whole proteome to obtain the Ab bank*.” At least, to run a pilot test to prove this idea.

做英文簡報也很有用

6.6 在投影片內直接播放影片

- (1) 盡量把影片的檔案大小與長度**減小**。
- (2) 把檔案轉換成 **mpeg** 或者 **wmv** 格式。
- (3) 務必把 ppt 檔與影片檔案**放在一起**。
- (4) 投影片是以**連結**方式記住影片位置。
- (5) 換電腦時要**同時**帶影片並修正連結。
- (6) 除非必要，否則不要插入太多影片。
- (7) 影片檔案很大，還是獨立放映較好。
- (8) 若必須放出聲音，事先要接好**音源**。



高橋流簡報法

- (1) 一定要**儘早準備好**，尤其新手更要提早。
- (2) 事前規劃要隨時記得**聽眾**的組成與需求。
- (3) 使用『**story board**』把故事劇本畫出來。
- (4) 儘快完成『**First draft**』然後反覆修改。
- (5) 使用有**版權**資料時，要附加出處或許可。
- (6) 所有投影片請依序編上**頁碼**，方便討論。
- (7) 至少要練習五次，並熟悉投影片的**次序**。
- (8) 演講前要**檢查**投影機、簡報器、雷射筆。
- (9) 大家都會**緊張**，勤加練習可降低焦慮感。
- (10) 演講時不要忘記隨時用**雷射筆**指示重點。

- (1) 最厲害的上課方式是一個人加一張嘴單刀赴會。
- (2) 但使用投影片確有傳統演講所無法達致的效果。
- (3) 無論用何種方式，**熱誠**與**努力**是最根本的條件。
- (4) 做出優秀的投影片，要花費龐大的工夫與時間。
- (5) 設計過程可促進深度思考、創新、整合與琢磨。
- (6) 缺點是部份學生因為太輕易瞭解而引發輕忽感。
- (7) 若多數學生有投影片就不上課，要想辦法改進。
- (8) 今年準備好投影片，明年就可高枕無憂？**大錯！**
- (9) PowerPoint 不只是簡報，還匯集很多有用功能。
- (10) 把 PowerPoint 做為轉譯、創新、規劃的平台。

科技影響教學

始終不離人性