

# e 化醫學教育與研究

## Education and Research in Biomedical Informatics



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Taipei Medical University  
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Taiwan Association for Medical Informatics  
TAMI

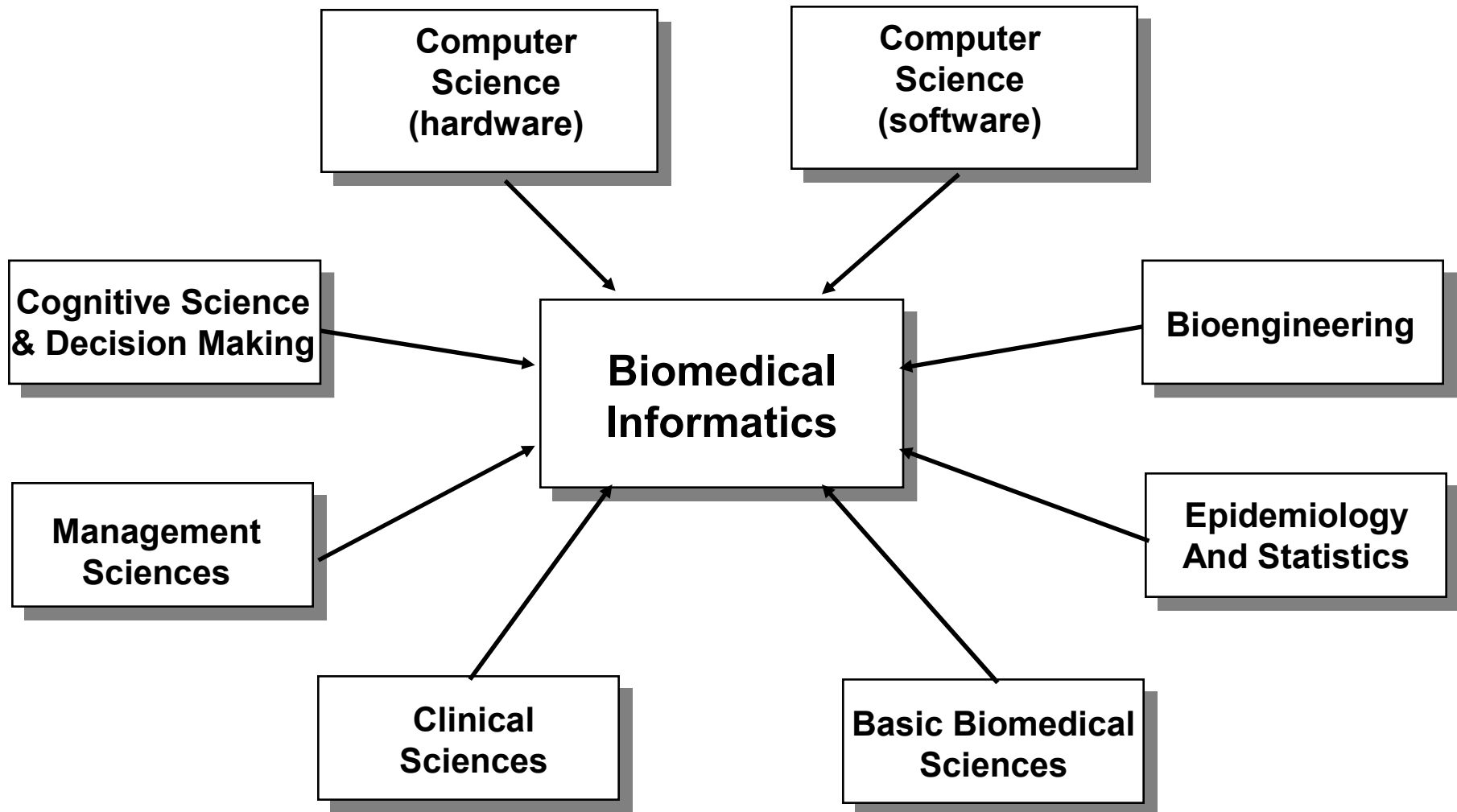
# The Problem

- Too much information 資訊氾濫
  - A new article is added to medical literature every 26 seconds
  - Scientific articles grow exponentially.
- Not enough time or access to information 時間不足
  - Clinicians have more questions than they look for answers
  - Doctors have up to 6 questions per patient encounter
  - Pursue answers in one third of cases
  - Spend about two minutes searching for an answer
- Clinical knowledge dates rapidly 知識快速發展
  - Clinicians' knowledge decays with years since graduation (Evans et al., 1984)
  - More impact: learning on the job
- On-line access to evidence and learning just-in-time
  - keeping up-to-date and learning occurs in the real tasks 即時學習

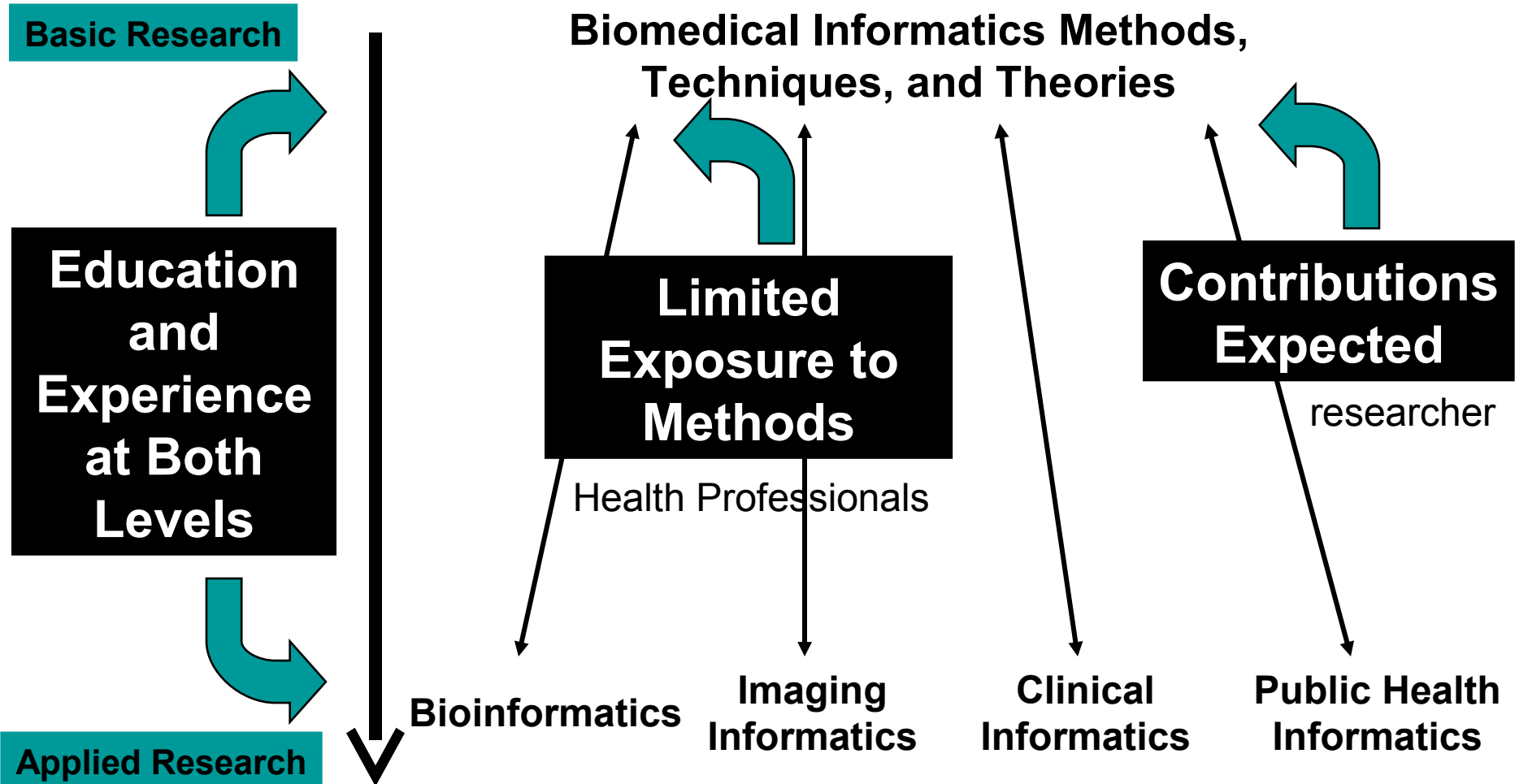
# Biomedical Informatics

## Disciplines

多元化的醫學教育訓練



# Education of Biomedical Informatics Professionals

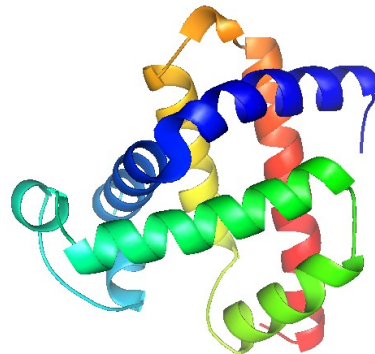
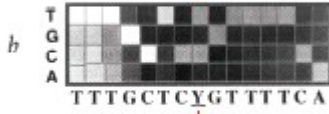
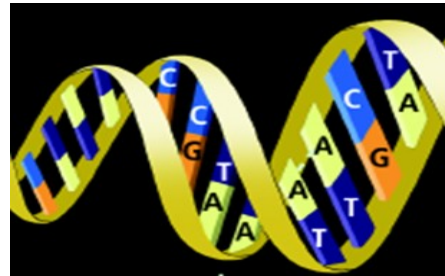
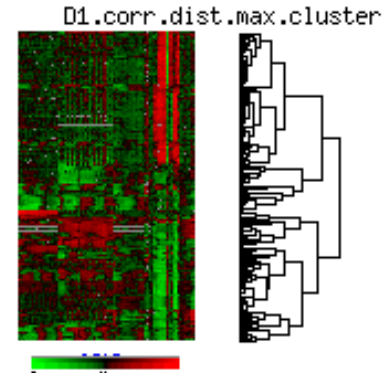
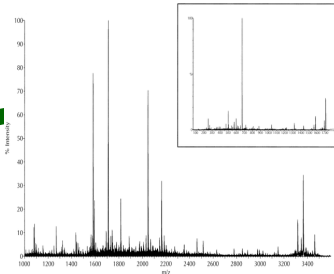
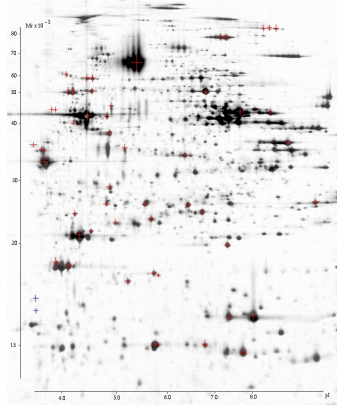


# Integrated Biomedical Informatics for Clinical Research

醫學研究之道，就是整合研究數據

- 2003年9月30日，美國國家衛生研究院（NIH）院長塞烏尼（Elias Zerhouni）宣佈：對美國政府資助的醫學研究進行重整。
- 「研究路線圖」的計畫 Roadmap
- National Electronics Clinical Trials and Research (NECTAR) network
- 建立完整的路線圖以及徹底更新醫學數據的收集、儲存及共享
- 把龐大且分散的資料庫結合成一個巨大的資料庫
- 發展軟體，使實驗計畫的撰寫能簡化並標準化
- 減少紙張的使用

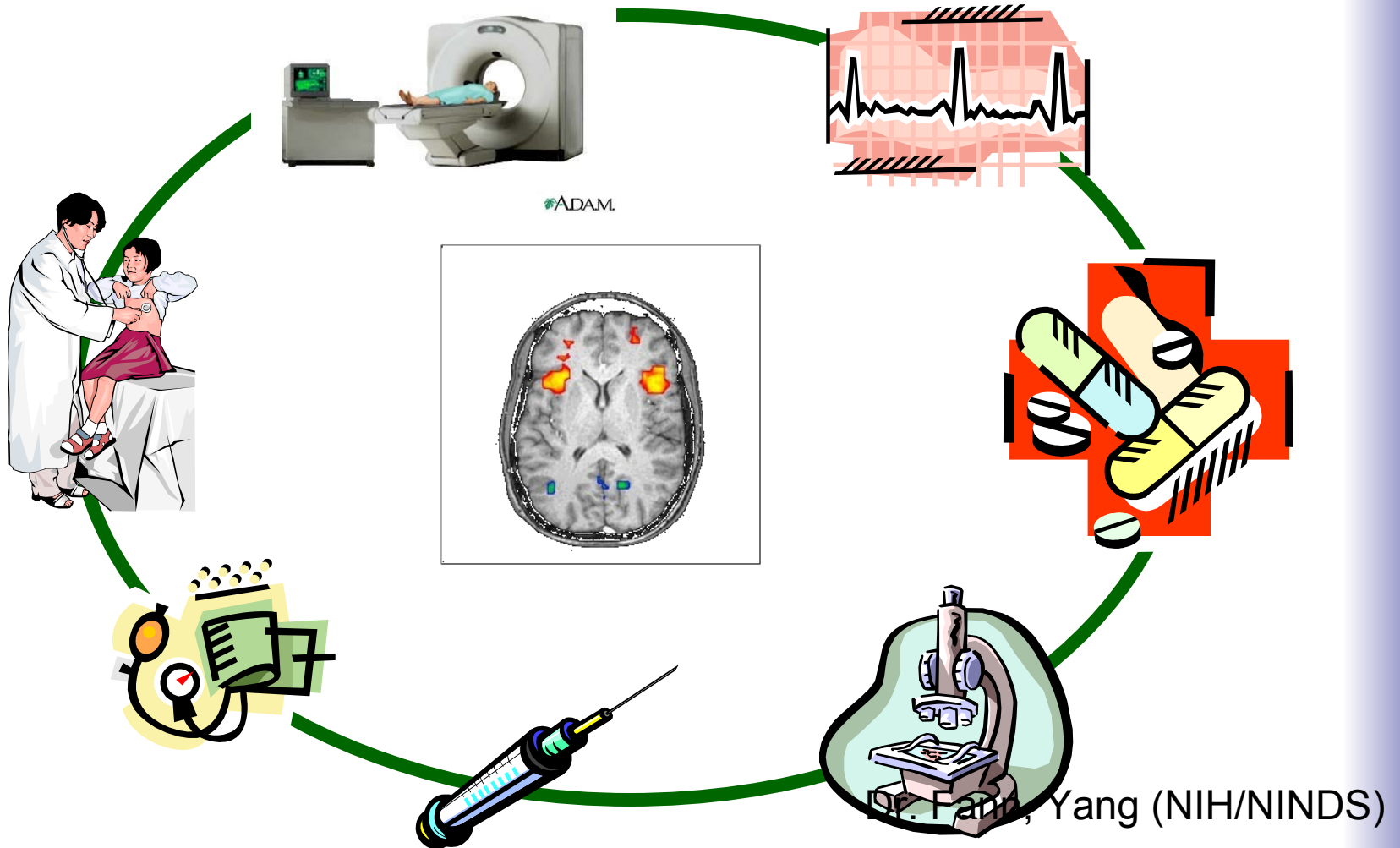
# Clinical Research – Biological Data



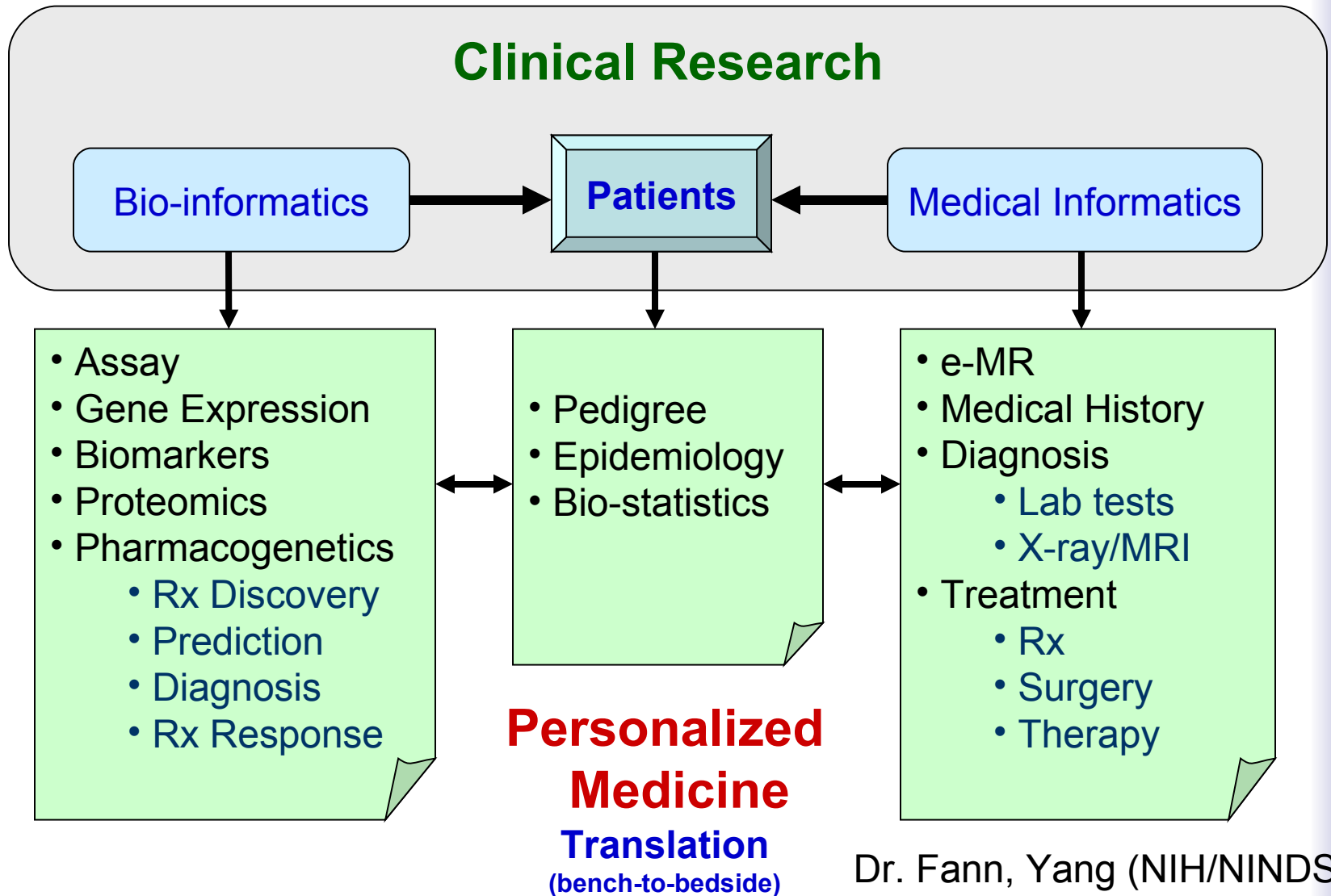
```
>IMAGE:275615 5' mRNA sequence
GACAGCATTCGGCCGAGATGCTCGCTCCGTCCTTAGCTGTGCT
CGCGCTACTCTCTCTTTCTGGCC
TGGAGGTATCCAGCGTACTCCAAGATTACAGTTTACTCACGTCATC
CAGCAGAGAATGGAAAGTCAAAT
TTCTTGAAATGCTATGTGCTCTGGGTTTCATCCATCCGACATTGAAGT
TGACTTACTGAAGATGGAGAGA
GAATTGAAAAAGTGGAGCATTACAGACTTGTCTTTTCAGCAAGGACTGG
TCTTTCTATCTCTTGTACTACAC
TGAATTCACCCCACTGAAAAAGATGATGCTGCTGCCGTGTTGAAC
CATGTNGACTTTGTACAGNCCC
AAGTTNAGTTTAAGTGGGNATCGAGACATGTAAGCAGGCATCATGG
GAGGTTTTGAAGNATGCCGCTTT
TTGGATTGGGATGAATCCAAATTTCTGGTTTCTGTTGNTTTTTAAT
ATTGGATATGCTTTT
```

# Clinical Research – Clinical Data

During a computerized tomography (CT) scan, a thin X-ray beam rotates around an area of the body, generating a 3-D image of the internal structures

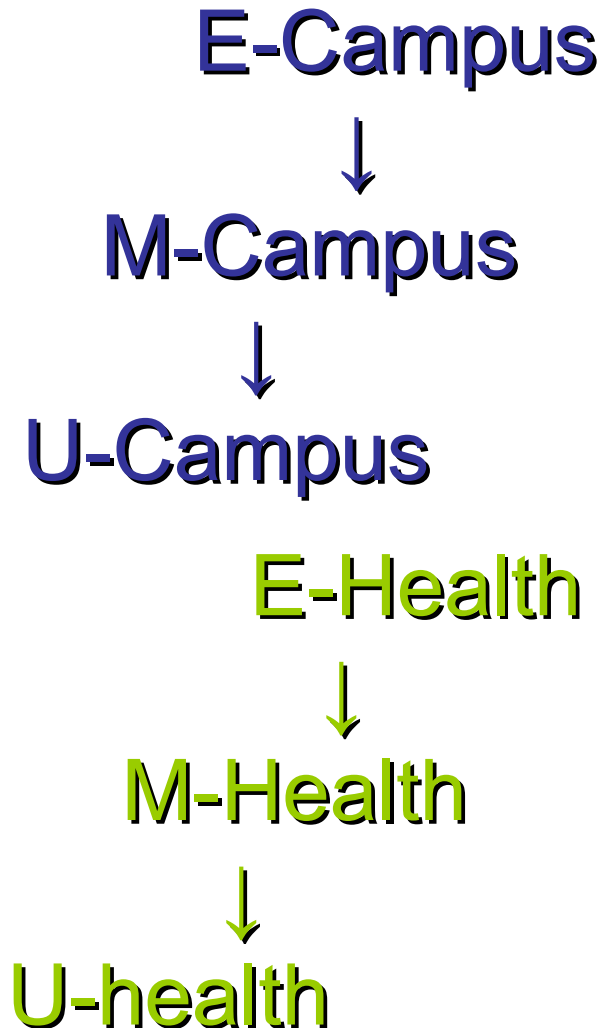


# Emerging Fields of Clinical Research





# Vision of U-Campus



完整、正確且及時的資訊

*Complete, accurate  
and timely*

*information.. - When  
you need it, Where  
you need it.*

Taipei Medical University, ISC

# 虛擬醫學園區

## Virtual Medical Campus-VMC

- 資訊基礎建設 (Health Education Information Infrastructure)
  - 跨校、跨領域、跨國以及跨世紀的醫學教育及研究
- 高速且無所不在的網路基礎建設所連結的虛擬空間
  - 虛擬教室 (Virtual Classroom)、虛擬實驗室 (Virtual Laboratory)、虛擬教學醫院 (Virtual Teaching Hospital)、虛擬圖書館 (Virtual Library)
- 運算資源、儲存空間及快速存取
  - 異質性 (Heterogeneous) 多媒體資料倉儲
  - 分散式高速工作站群組 (High-performance workstation clusters)
  - 即時三維動畫 (Real-time 3D Animation)
  - 即時模擬 (Real-time Simulation)

# 數位化多元學習環境

- 隨時隨地的數位學習環境
- 精采創新具國際競爭力的學習內容
- 運用數位模擬科技銜接理論與實務

# 多媒體數位學習平台

## Multimedia e-learning platform

- Web-based learning group 數位學習社群 (MyTMU) 網站：ourPhoto, ourLesson, ourFile, ourList, ourCalendar
- 以院為基礎之課程整合數位學習基礎平台
  - 課程的縱向橫向整合
  - 以各相關課程數位化為本，建立整合知識庫 (Integrated knowledge repository)

# 北醫學習入口 MyTMU



<http://my.tmu.edu.tw>

個人

MyList

群體

OurCalendar

OurPhoto

OurKnowlege

OurFile

OurLesson

MyChat

MyMail

MyLibrary

MyBox

MyBlog

- 會員式功能
- 線上情境式互動
- 寄發群組信件
- 學生學習狀況統計

PBL cases, 影音課程



# MyTMU 學習社群數位課程

## ( 數位內容教材庫資料量 >310GB)

(anatomy 解剖學 brainstem)

Mesencephalic nucleus and tract  
Superior cerebellar peduncle  
Main sensory nucleus  
Middle cerebellar peduncle  
Motor nucleus  
Trigeminal nerve  
Medical lemniscus

Modified from Nolte: The Human Brain, 5th ed.  
Copyright © 2002 by Mosby, Inc.

**3. Main sensory nuclei**  
-- primarily concerned with **discriminative touch & proprioception**; *homologue of medial lemniscus*

TUMOR GROWTH

01:20

psychology

心理學

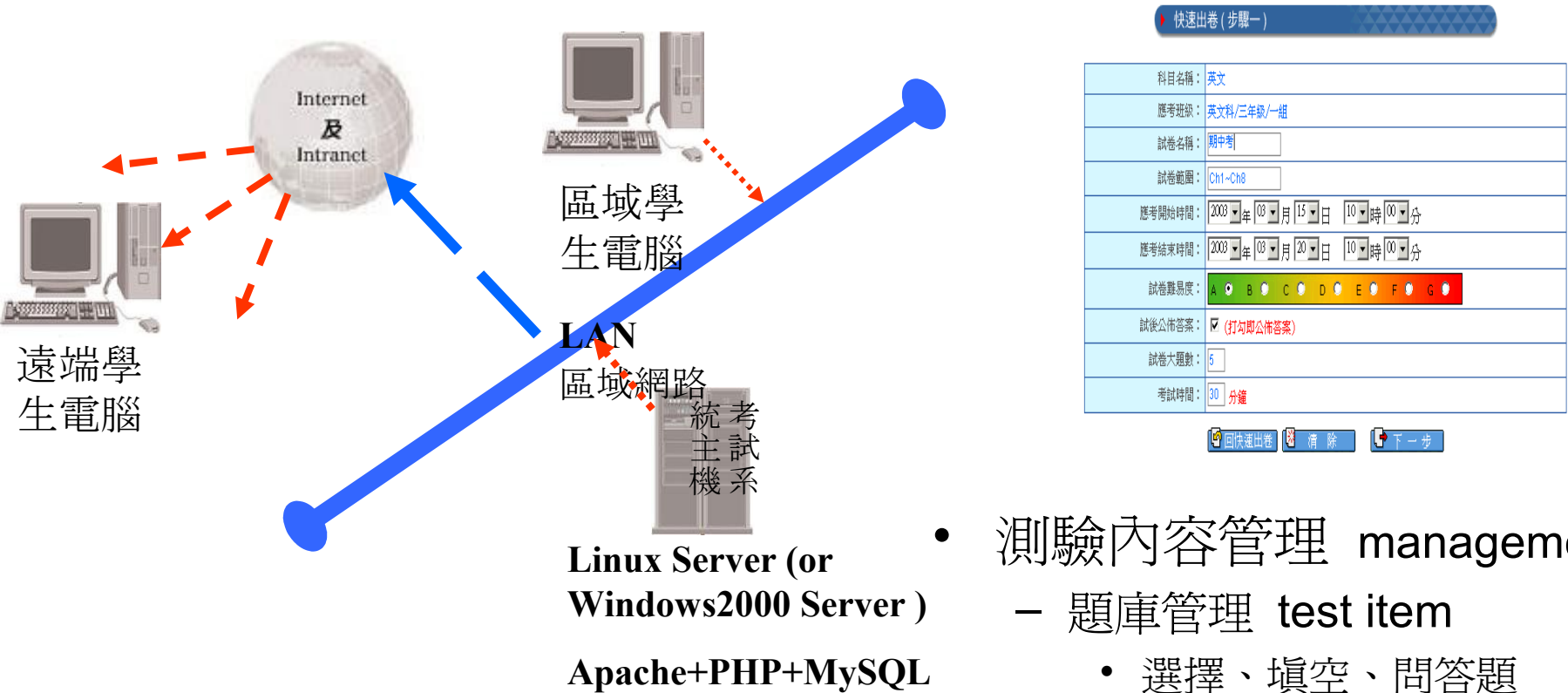
- Pathophysiology (trigemino-vascular, **hypothalamus**)--  
**hypoxemia**
- Diagnosis (signs)
- Treatment
  - Abortive therapy
  - Prophylactic therapy
- Assessments for headache (diary, monitoring, counseling...)

Tau-Hua Wu, Ph.D. (2003)

(藥物治療學)

# 線上測驗系統

## On-line multimedia test system



- 測驗內容管理 management
  - 題庫管理 test item
    - 選擇、填空、問答題
  - 試卷管理 test form
    - 閱卷、編修、分析、備份
- 線上模擬測驗 on-line test



# Video repository



觀看影片前,請先安裝 Realplayer可以按圖示取得.

## 最新影片

- 電視篇>
- 專題演講>
- 理學檢查
- 內視鏡
- 數位博物館
- 其他

## 最新影片

財務系統說明會(二)	趙達愷 組長	2006/08/04
財務系統說明會(一)	趙達愷 組長	2006/08/03
Clinical Bioinformatics for Biomarker Discovery	Dr. Yang C. Fann	2006/06/23
Knowledge Management for Biomedical Informatics: case study and NIH experience	Dr. Yang C. Fann	2006/06/22
Integrated Biomedical Informatics for Clinical Research 2	Dr. Yang C. Fann	2006/06/22
Integrated Biomedical Informatics for Clinical Research 1	Dr. Yang C. Fann	2006/06/22
Recent Advances in Biomedical Informatics at NIH 2	Dr. Yang C. Fann	2006/06/20
Recent Advances in Biomedical Informatics at NIH 1	Dr. Yang C. Fann	2006/06/20
Genetic Susceptibility to Severe Adverse Drug Reactions: Perspective for Future Medicine	陳垣崇院士	2006/05/17
Exploiting Indirect Neighbours and Topological Weight to Predict Protein Function from Protein-protein Interactions	Limsson wong	2006/06/08
全面品質教育	邱文達副校長	2006/04/12
One way guidelines: a dead end. The why and how to implement a systematically fed back process of authoring, deployment and continuous improvement	Prof. Dr. Thomas Wetter	2006/03/16
研究所四部曲	何玉山教授	2006/03/23
九十四學年度解剖教學英靈追思紀念會	台北醫學大學	2006/03/22
談教養	Kun-yen Huang, M. D., Ph. D.	2006/02/20

## 關鍵字搜尋

  
Go

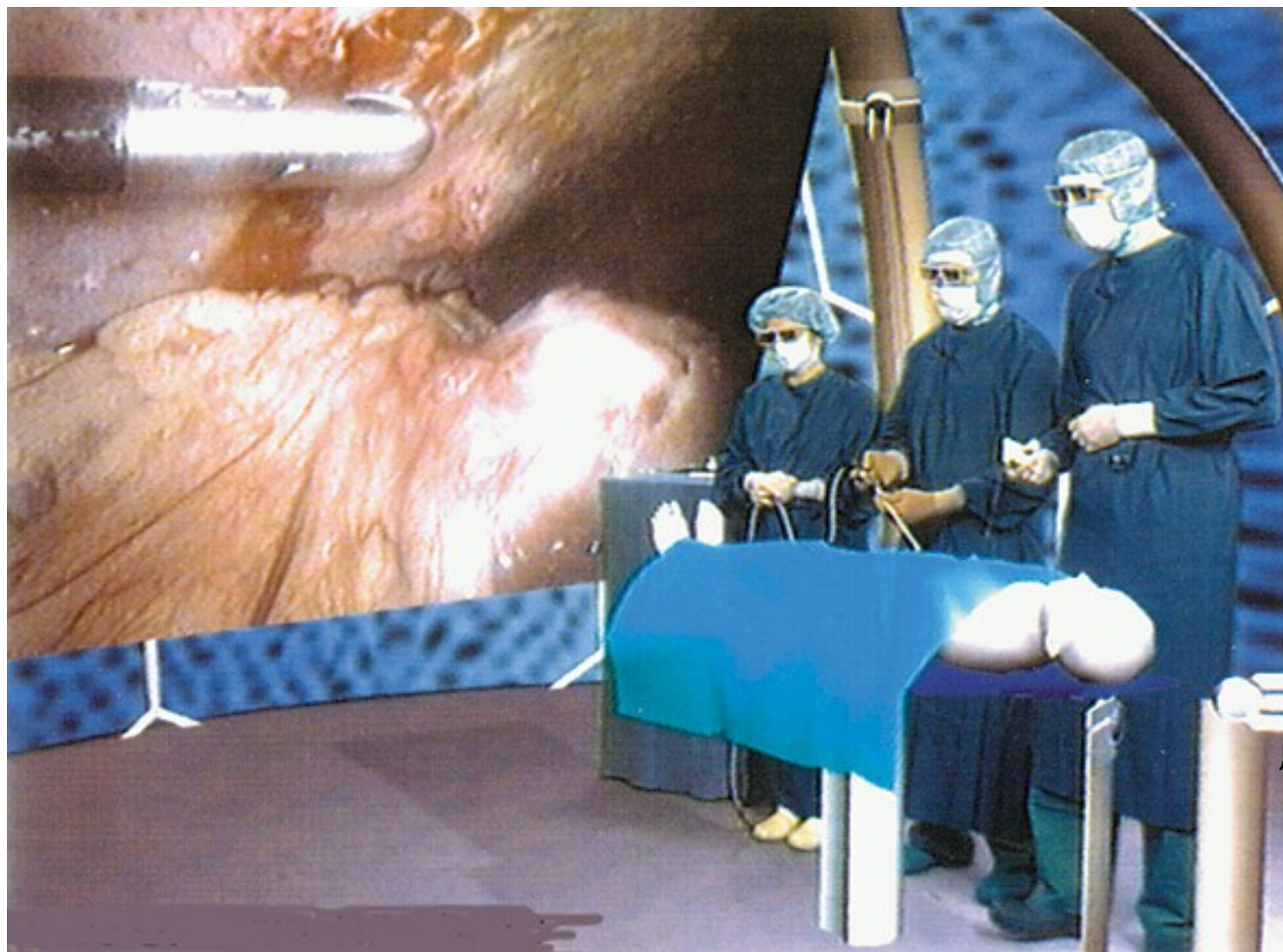
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管理員登入

219 visitors to this site



# 互動式虛擬內視鏡手術



忠孝醫院神經外科  
許明暉主任提供

# 病理切片資料庫 查詢系統 虛擬顯微鏡

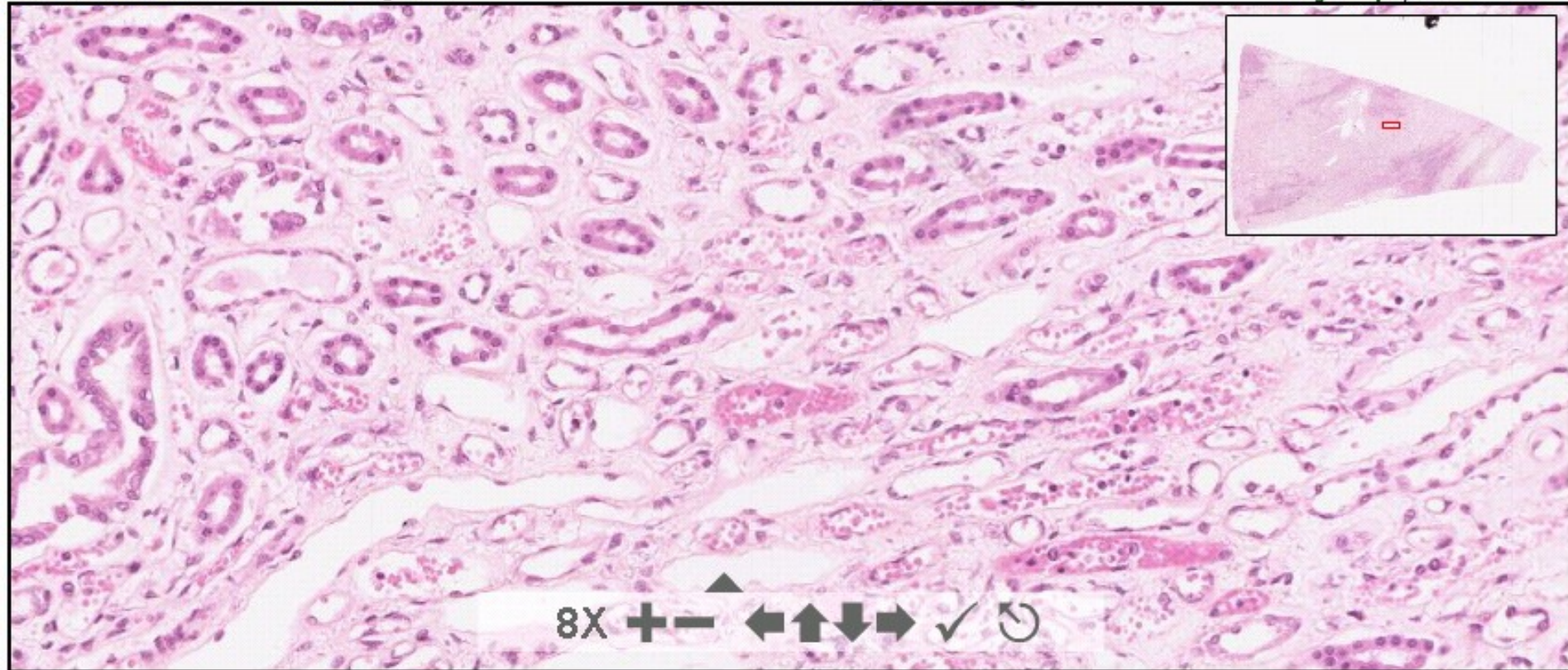
**SPECTRUM™**  
Digital Pathology Information Management System

42088 x 27968 size 3.29GB mag 20X

Kidney

[Return to image directory](#)

info help  
(open with ImageScope)  





# 臺北醫學院附設醫院

## 內視鏡／超音波影像查詢系統

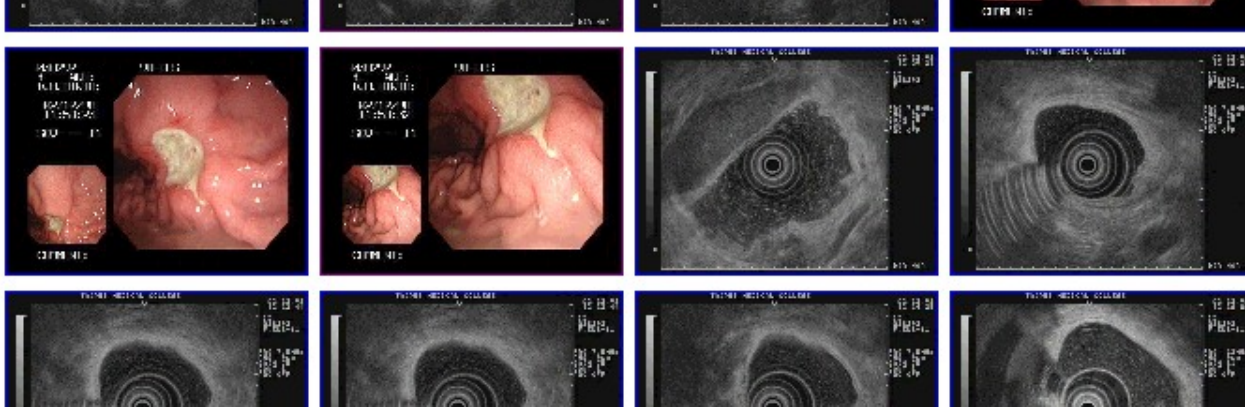
### 多媒體電子病歷

生化二查詢(病歷號140953)

日期	86/07/09	86/07/16	86/08/14	86/08/19	86/08/27	86/09/18	86/10/09	86/11/13	86/12/19	86/12/31
案號	01055	01910	01686	02156	03119	02211	01166	01222	02278	03304
GLU A mg/dl			90			106				
Alb g/dl		2.9	2.9	2.9		3.5	3.9	4.1		4.1
Total protein g/dl		6.7	6.1	6.4		6.7	7.5	7.8		7.1
BUN mg/dl			10.8			12.2				13.5
Cre mg/dl			0.6			0.6				0.8
UA mg/dl			2.7			2.9				4.6
Cho mg/dl		122	165			236	225	242		118
TG mg/dl		67	55			65	68			45
ALP u/L			161		253	336	198	185	118	115
GOT lu/L		163	95	115	79	69	102	101	114	95
GPT lu/L		161	73	80	64	47	64	61	76	66
rGt lu/L			145			130				47
ZTT mg/dl			15.2			14.3				8.2
Bili D mg/dl			0.7			0.5				0.5
Bili T mg/dl			1.3			1.1				1.1
Ca mg/dl						8.2				
Cl B. meq/L	99					96				
Na B. meq/L	134					134				
K B. meq/L	4.3					4.1				

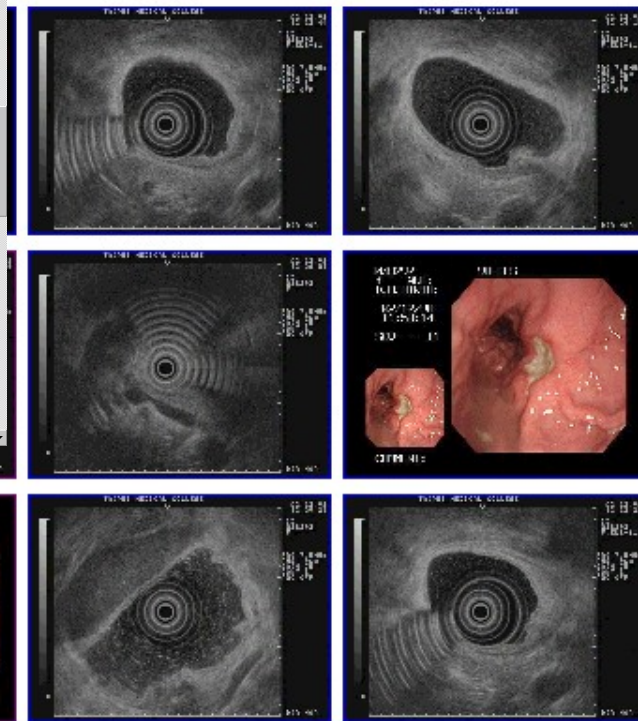
血清免疫查詢(病歷號140953)

日期	86/06/30	86/07/09	86/08/14	86/08/15	86/08/19	86/10/07	86/11/27	87/01/05
案號	01431	00671	00958	01005	01129	01615	01018	00024



基本資料

性別	年齡	身份證號
	85	K200086020



# Why Digital Game-Based Learning?

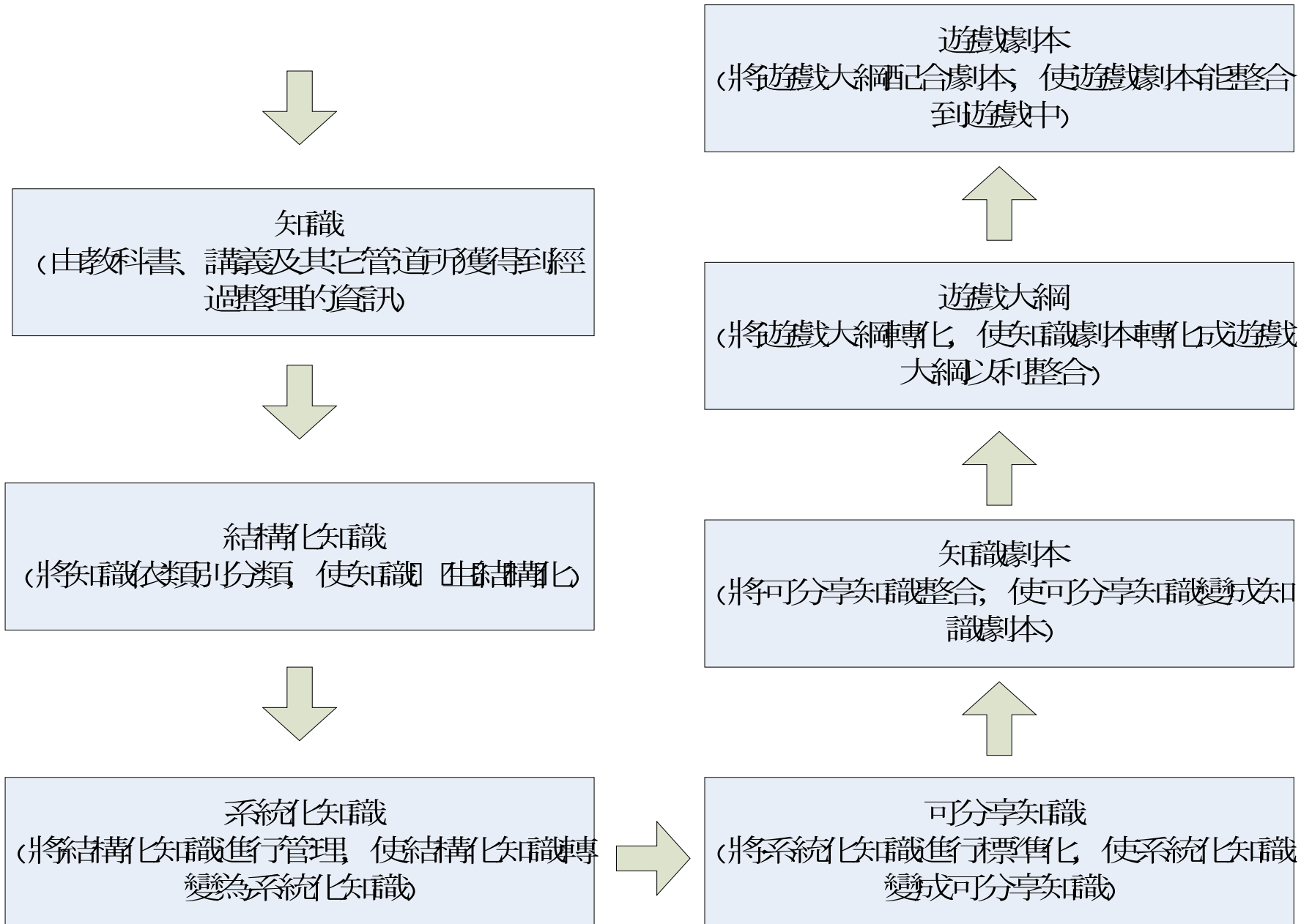
- Digital Game-Based Learning meets the **needs and learning styles** of today's and the future's generations of learners
- Digital Game-Based Learning is motivating because **it is fun**
- Digital Game-Based Learning is **versatile, adaptable** to almost any subject, information, or skill to be learned, and **effective**, when used correctly

# Learning activities used in Digital Game-Based Learning

- Practice & feedback
- Learning by doing
- Learning from mistakes
- Goal-oriented learning
- Discovery learning and guided discovery
- Task-based learning
- Question-led learning
- Role-playing
- Coaching
- Constructivist learning
- Accelerated (multisense) learning
- Selecting from learning objects
- Intelligent tutoring

# 融合網路遊戲特性之創新數位學習平台 GBeL(Game-Based e-Learning)

- **Epidemiology Example: Japanese Encephalitis**
- 以日本腦炎病毒為例，參考問題導向學習及本體學之基本概念，建立了一套知識管理與轉化為遊戲的流程 -- **Knowledge Representation for Game-Based Interface (KReGI)**
- 根據這個流程，設計適合的遊戲角色與情節事件，並將之撰寫成劇本，導入遊戲平台中，測試知識轉化流程的適用性及與遊戲平台的結合度





# 使用者介面 user interface

功能列

遊戲主視窗

裝備武器與防具圖形視窗



裝備武器與防具文字視窗

離開遊戲

個人資訊

攻擊與裝備選項

逃走或離開

顯示地圖

魔法選項

道具選項



# 戰鬥畫面 combat scenario

Well of Souls - GBeL of virology

File Sound Books Guilds Web Help

Thinker casts Summon Ash on Archer Fish.  
Archer Fish has been killed.



You attempt to flee, but are drawn back.  
Archer Fish has been killed.

Equipment

Att: +70  
Def: +200

Train Hand  
Train Pet  
Call  
Hide Junk

Conquistador  
(L: 16, A: 0, D: +40) Protects the air above your head.

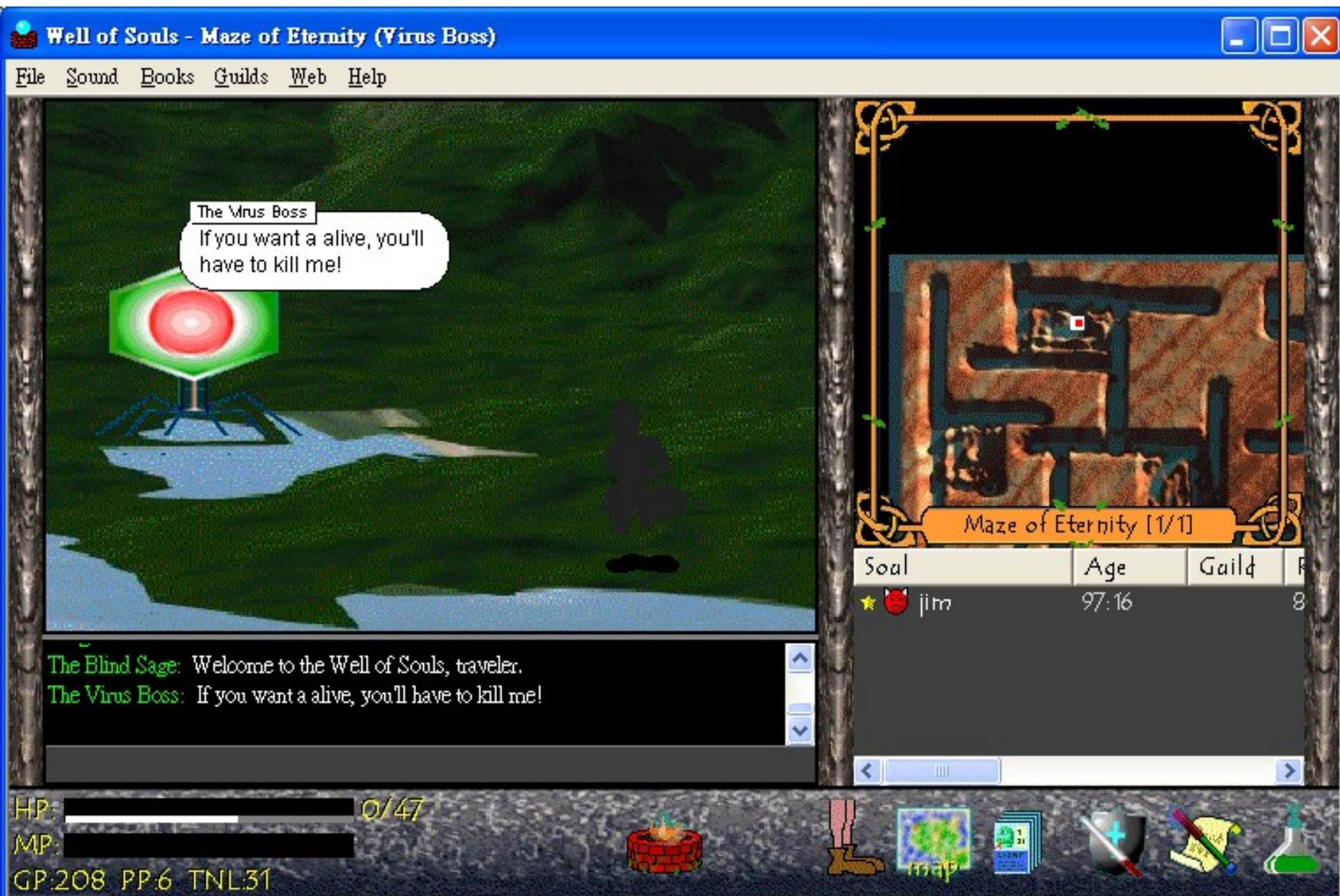
Equipment	Type
E Bitsooth Amalet	Amalet 16
E Brass Tunic	Armor 16
E Conquistador	Helmet 16
Dead Orc	Helmet 6
E Equestrians	Boots 15

HP: 115/155  
MP: 162/162  
GP:15K PP:4868 TNL:219





# 病毒出場畫面 the virus



# 建立一個預防俱樂部毒品濫用之網路學習模式

- 結合藥物濫用資訊（**Drug Abuse Information**）和數位學習（**E-learning**）系統發展的特點，建立一不受時空限制的藥物濫用防制資訊醫學教育網路。
- 基於毒品濫用族群之人格特性，開發一互動式網路線上學習模式，『**虛擬藥物濫用情境模擬**』（**Virtual Drug Abuse Scenario Simulation, VDASS**）
- 藉由模擬各種俱樂部毒品濫用後感覺、症狀、行為、副作用、後遺症等之情境，以及如何尋求解決管道之特色，讓已濫用者提高對線上學習之動機，更讓因「好奇心」驅使下以身試藥之行為降低。



# Virtual Drug Abuse Scenario Simulation



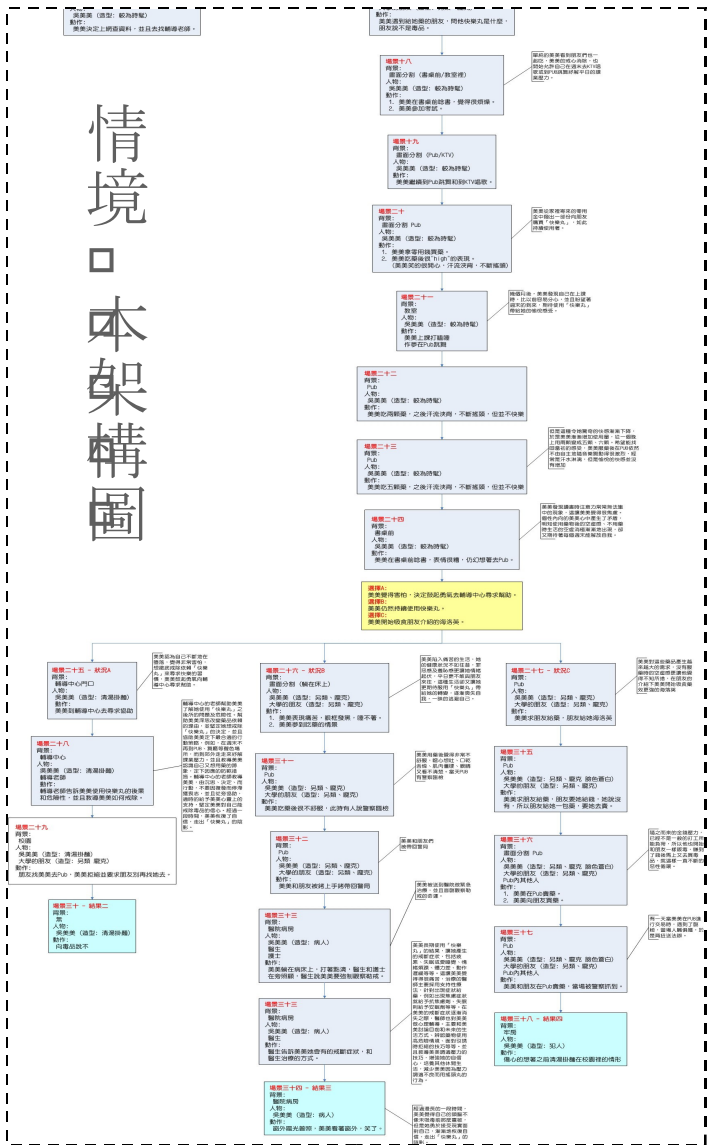
情境模擬動畫-MDMA - Microsoft Internet Explorer

美美覺得有點害怕，不敢服用

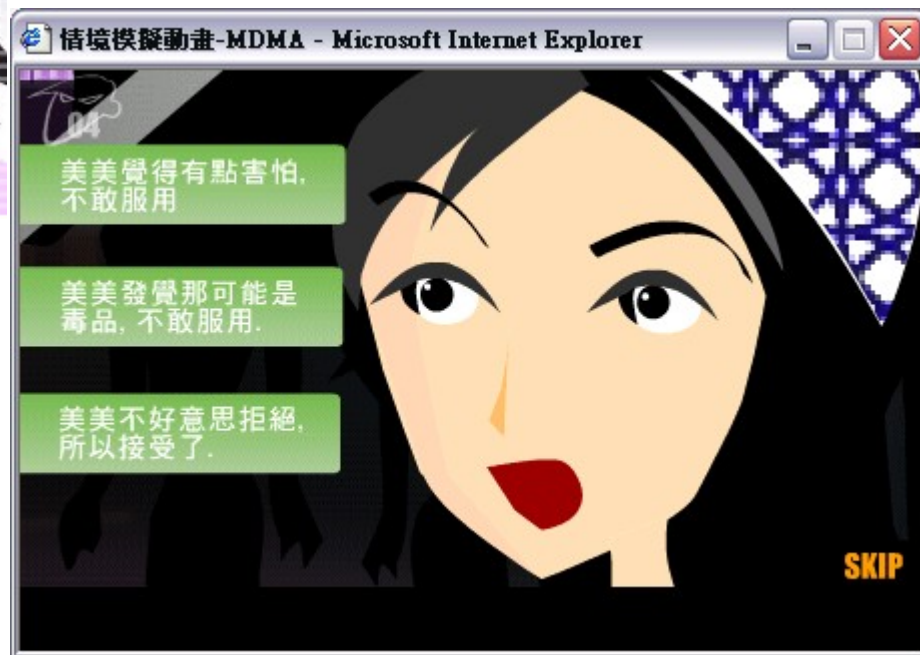
美美發覺那可能是毒品，不敢服用。

美美不好意思拒絕，所以接受了。

SKIP



# 虛擬藥物濫用情境模擬動畫 (VDASS)



# 思考

- 平台
- 內容
- 方法
- 互動
- 評估

# e 化教育與人文校園

- 教育是心靈的分享，智慧的□ 迪
- 教育的內涵： 認知，意志，行為，情感
- 醫師醫治病人時，若不深入了解病人生活，只是機械式的對症下藥，就像播種而不鬆動土壤，得不到成效。 加州大學柏克萊分校的傑克教授
- 李嗣涔，要求新生做到，「四不」，不做弊、不抄襲、不翹課、不亂停□ 踏車□; 品德與教養
- 要有一個健全的 career ，個人的通識、一般知識一定要很豐富，所有的之事都是建築在 general knowledge ，上面的 professional knowledge 才會堅固，知識分子必須具備人文方面的知識涵養，培養公共責任的價□ 。 黃崑巖教授

# 問題及討論

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