

為什麼我要有生命科學知識呢？

--生命科學知識對你的益處

**中央研究院臨海研究站
嚴宏洋 研究員**

清華大學生科系

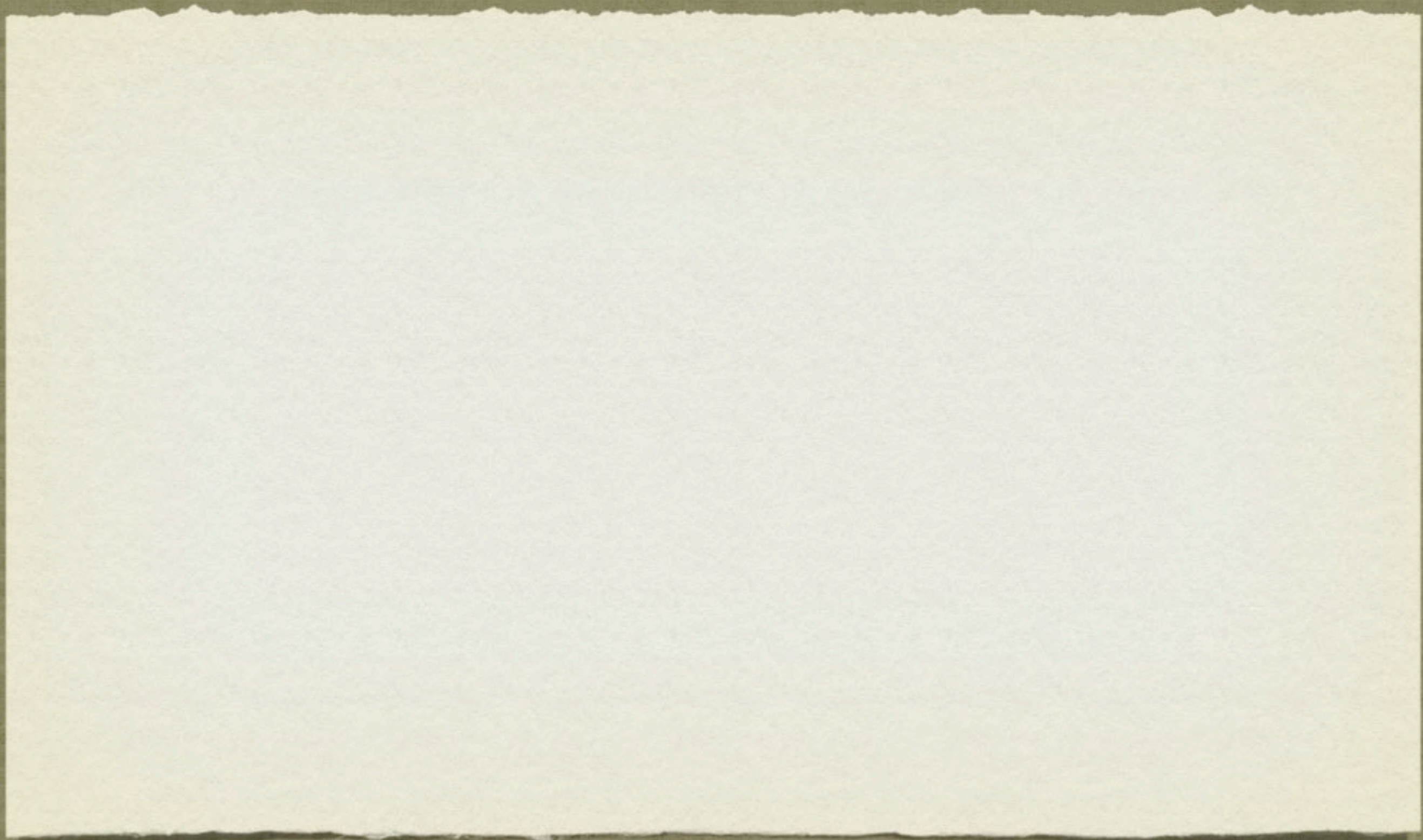
2011.06.08













國立清華大學生命科學系

National Tsing Hua University Department of Life Science

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即時新聞



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即時新聞

GO



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本系簡介

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本系簡介

沿革

配合生命科學發展及國家生技產業需要，本校於民國92年成立生命科學院。將原本屬於理學院的動物學系、植物學系和漁業科學研究所組織重新調整，分別成立生命科學系(招收大學部學生)、動物學研究所、植物科學研究所、分子與細胞生物學研究所、生態學與演化生物學研究所、漁業科學研究所(招收碩士班、博士班)。



Department of Life Science, NTU

我孫子的頭路？

榮獲日本奧斯卡13項大獎肯定

甲女是花悲情的大別
也去留住你最美的容顏

送行者
~ 禮儀師の樂章 ~

本木雅弘/廣末涼子/吉行和子/山崎努
配樂/久石讓

勇奪多項國際影展最佳影片
蒙特婁影展、橫濱電影節、日本體育博覽會、台北國際影展、釜山國際電影節、東京國際電影節、東京國際影展
連續8週排行TOP10 票房破30億日幣
2009奧斯卡外語片日本代表作品

2.27 全台感動獻映

電影人志

我孫子的頭路？

榮獲日本奧斯卡13項大獎肯定

印在心底悲痛的刻印
也刻在你最美麗的容顏

送行者
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連續8週排行TOP10 票房破30億日幣
2009奧斯卡外語片日本代表作品

2.27 全台感動獻映

聯華 龍眼人

WA 萬安生命

回首頁 網網相連 菁英招募 會員登入 員工專區

託付萬安 萬事心安

關於
關懷服務 社會公益
服務網
客服專區

殯葬禮儀 特殊日子提醒
最新動態 相關法規
生前契約
媒體新知

萬安新聞 More

- 萬安獨家贊助敏盛盃棒球賽
- NEW~仁德醫護管理專科學校來訪
- 八八水災 萬安生命把愛傳送到各角落
- NEW~惡水毀家園 災民盼為家人善終
- NEW~上海福壽園來台參訪

服務項目與內容

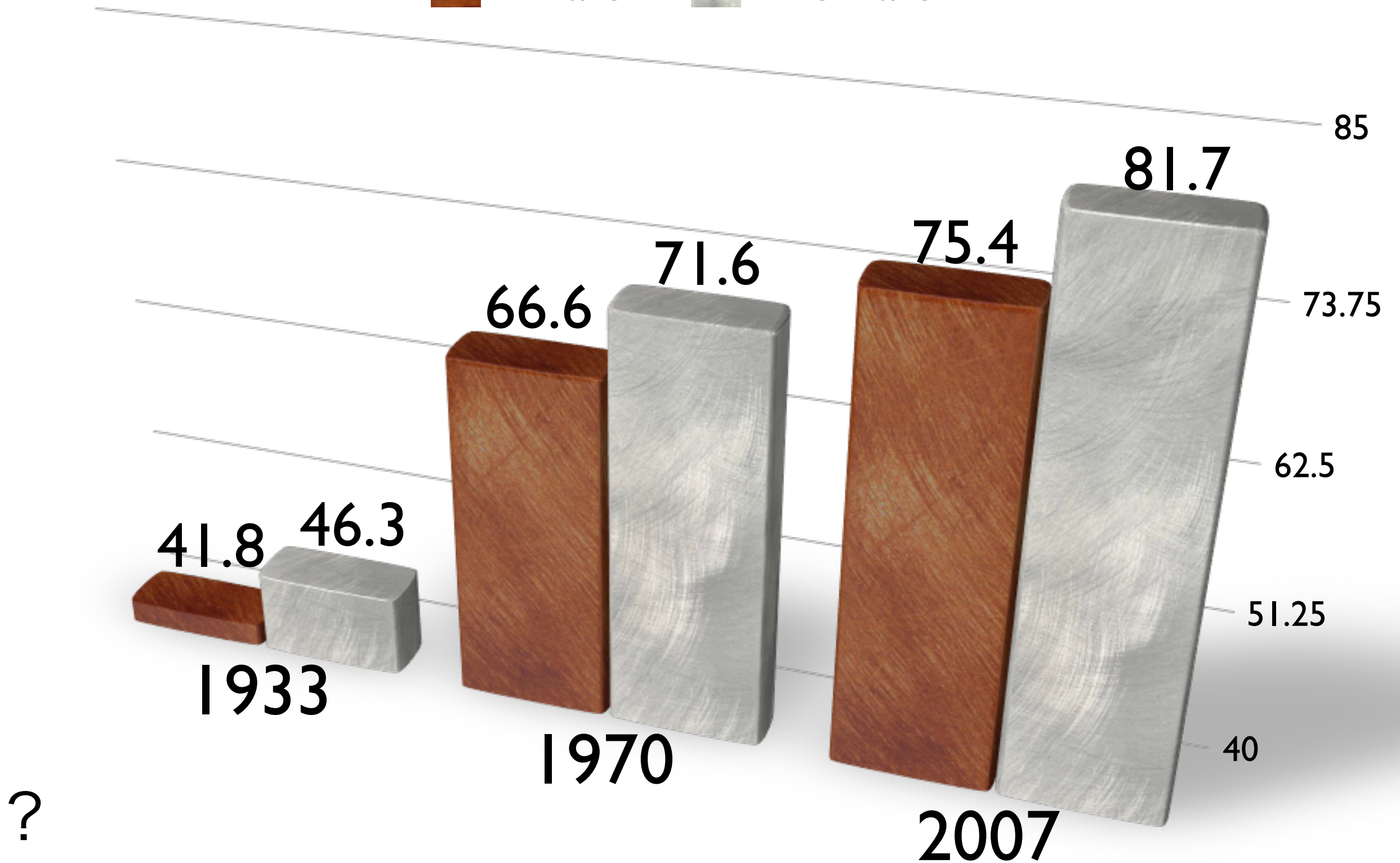
服務據點

全年無休 專人駐守
0800-899-999

我孫子的頭路？

Changes of Taiwanese Life Expectancy

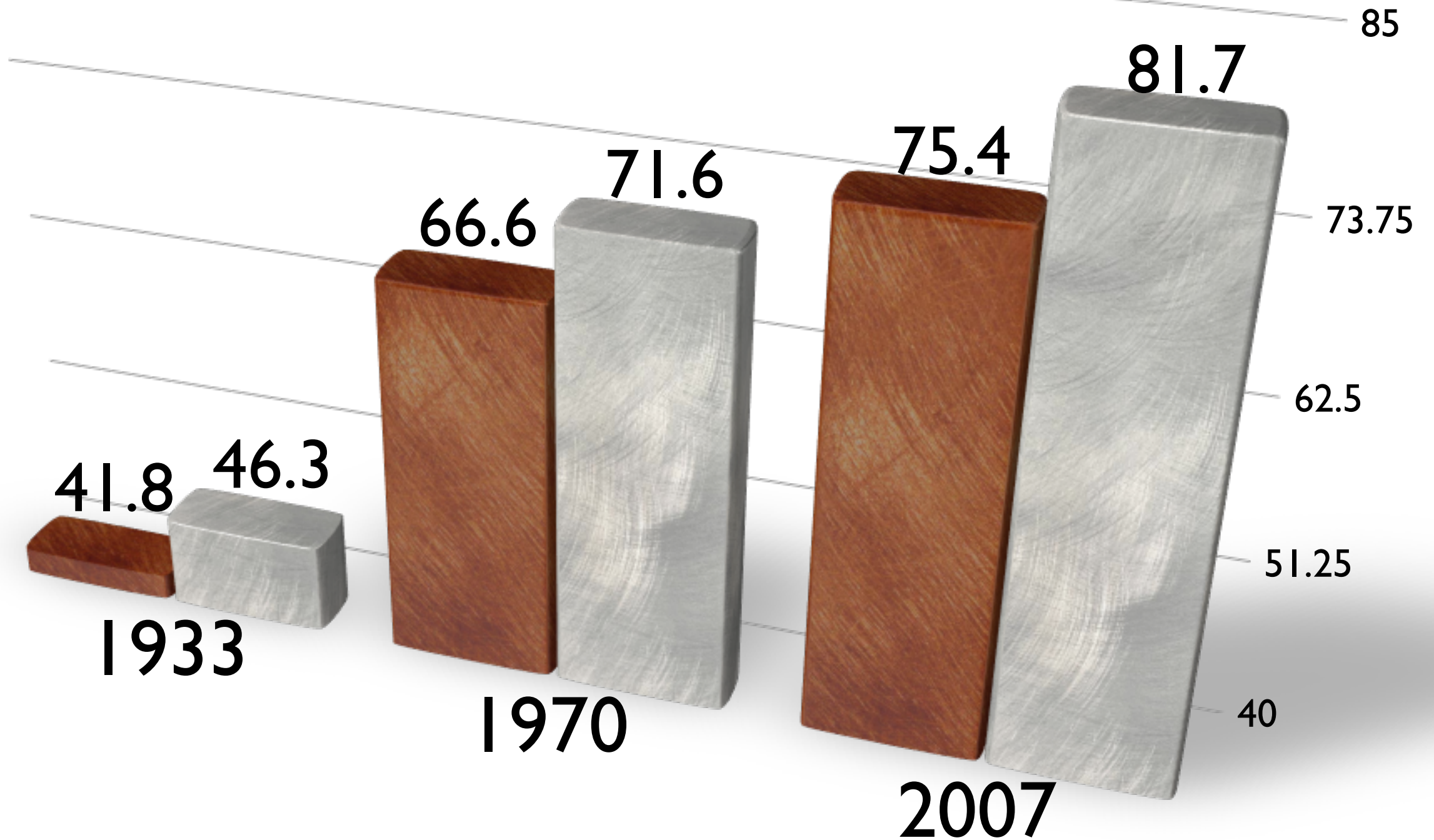
Male Female



Changes of Taiwanese Life Expectancy

公共衛生

Male Female

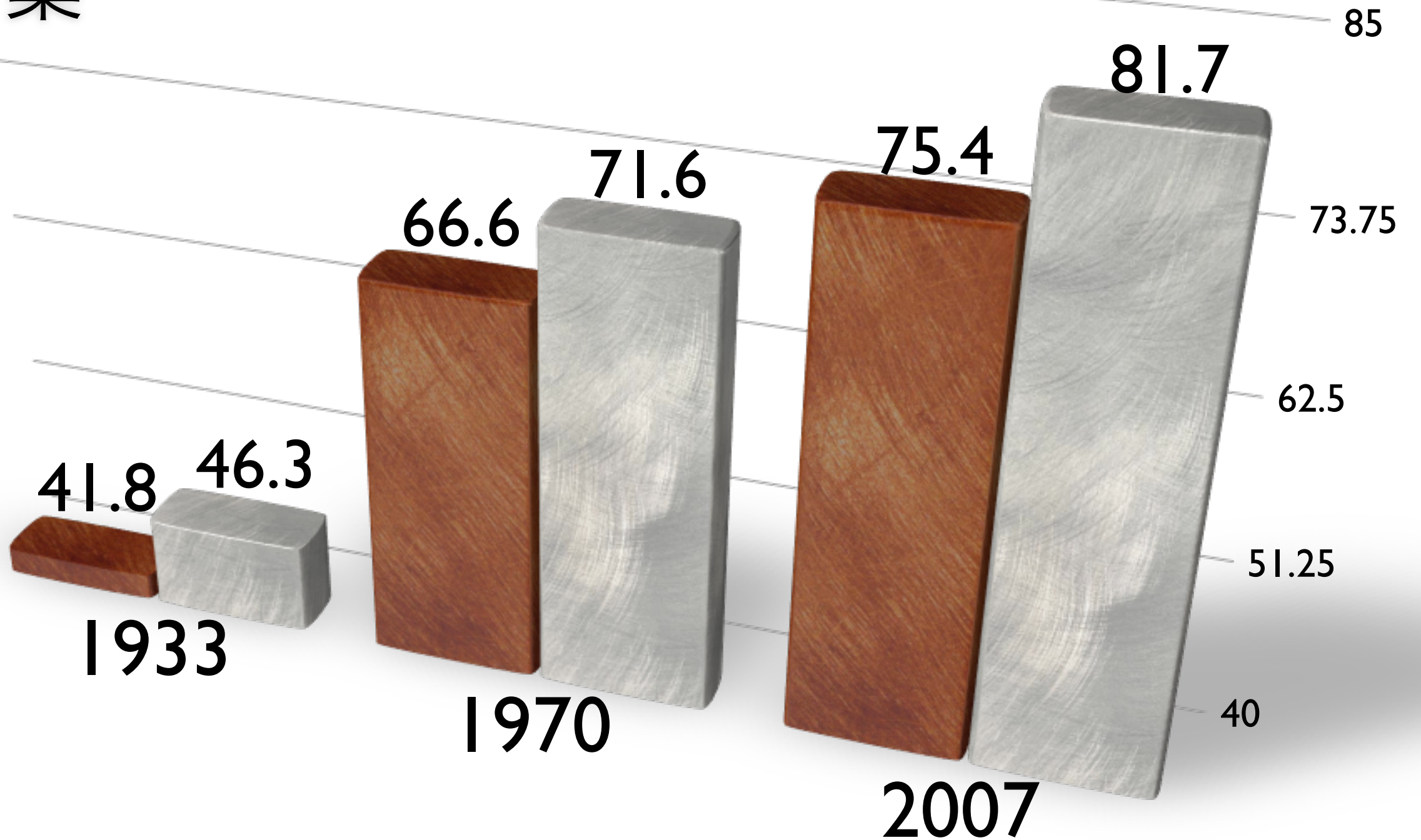


?

Changes of Taiwanese Life Expectancy

公共衛生
醫、藥

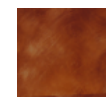
Male Female



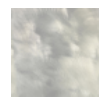
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Changes of Taiwanese Life Expectancy

公共衛生



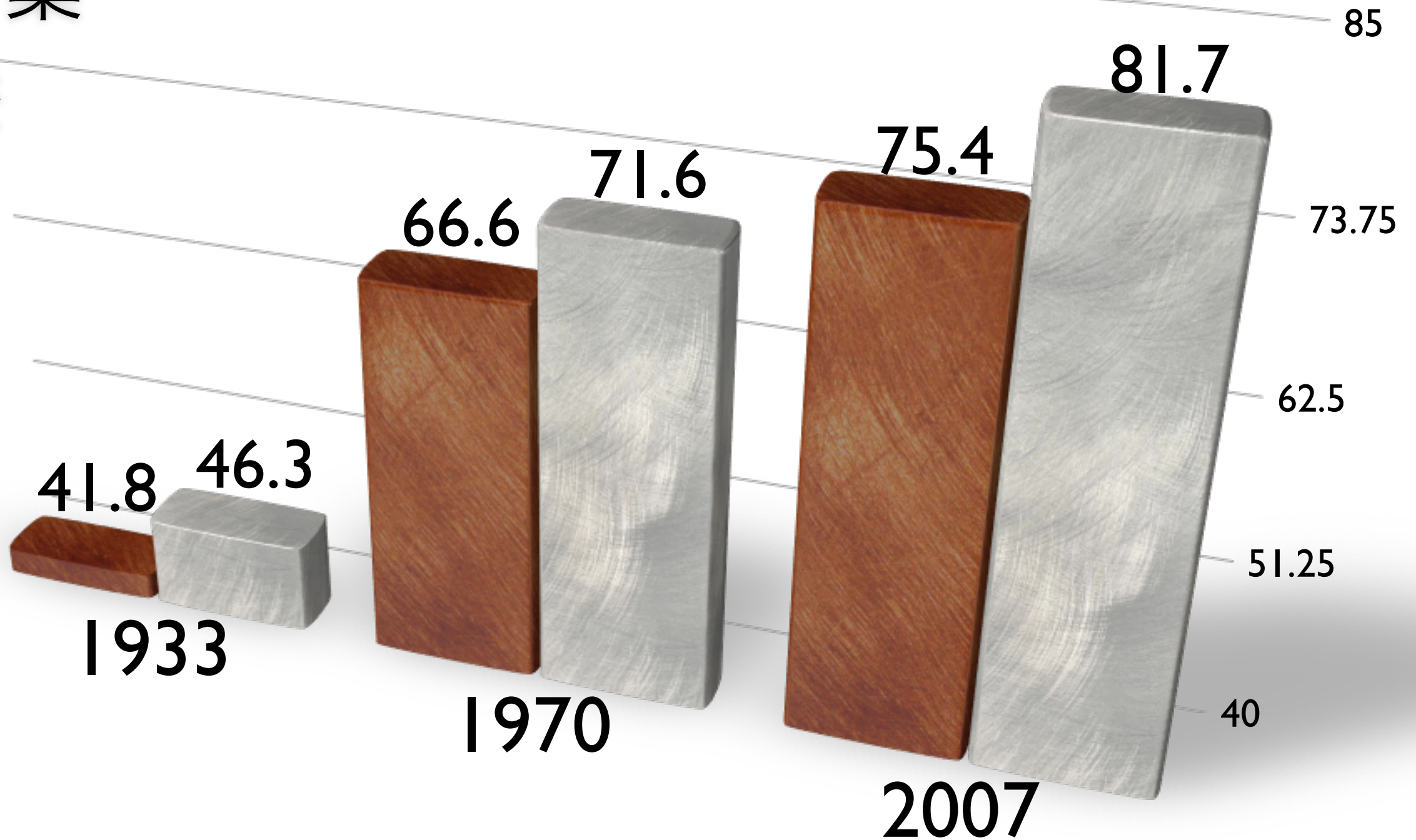
Male



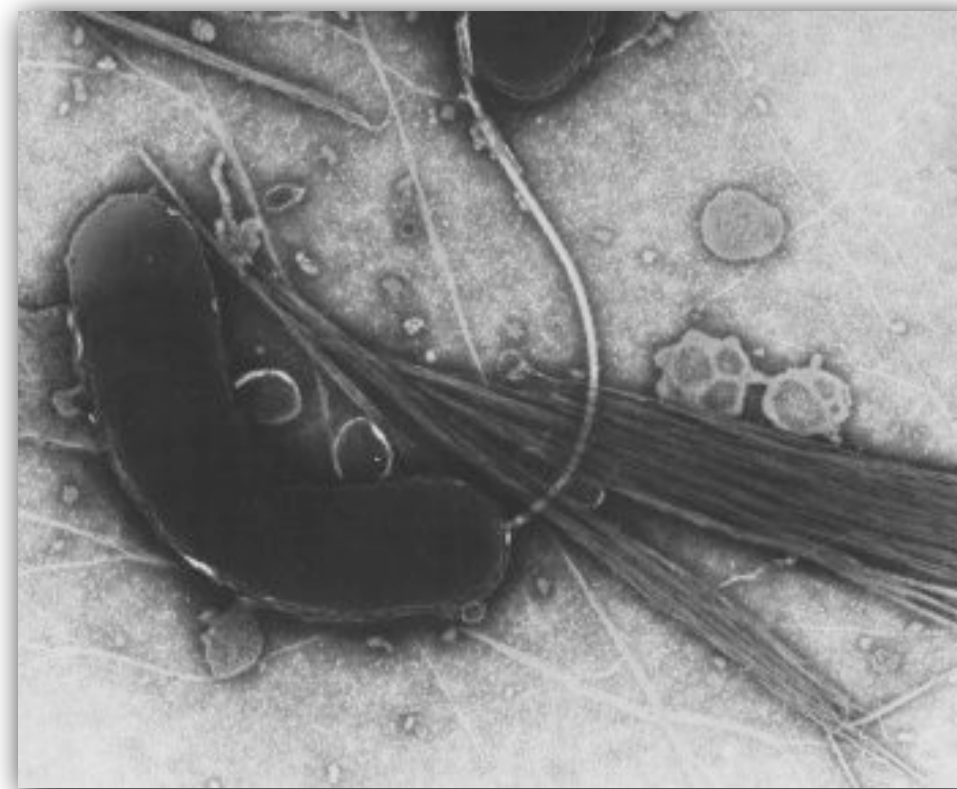
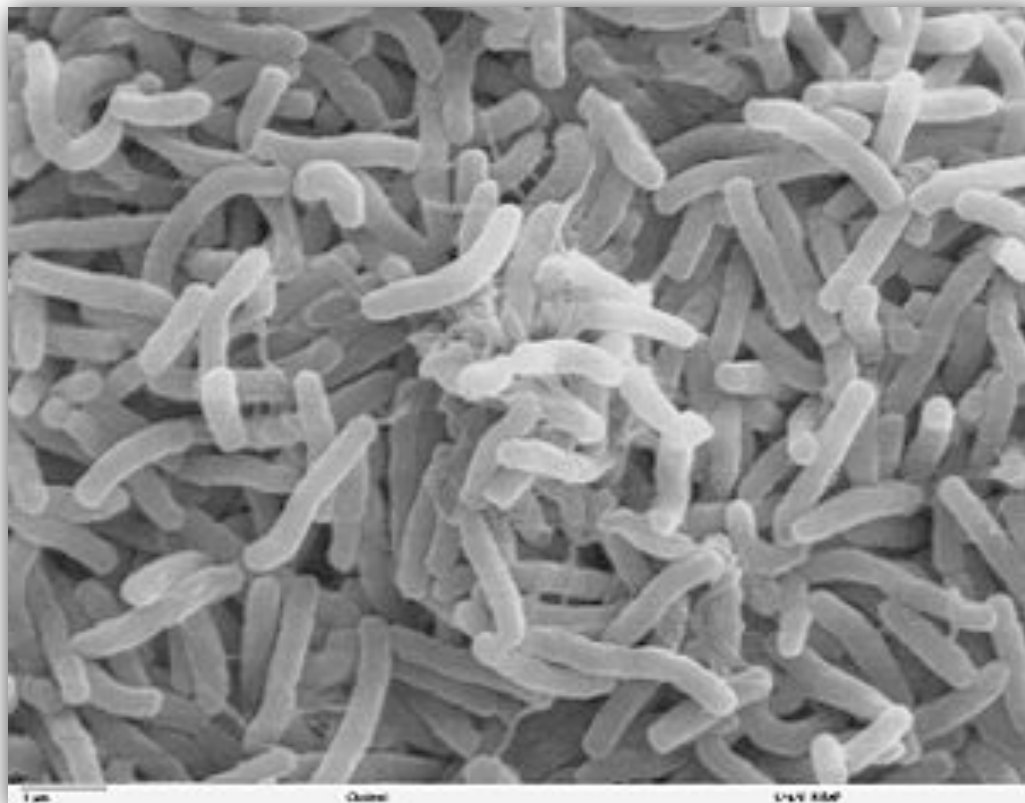
Female

醫、藥

營養



?



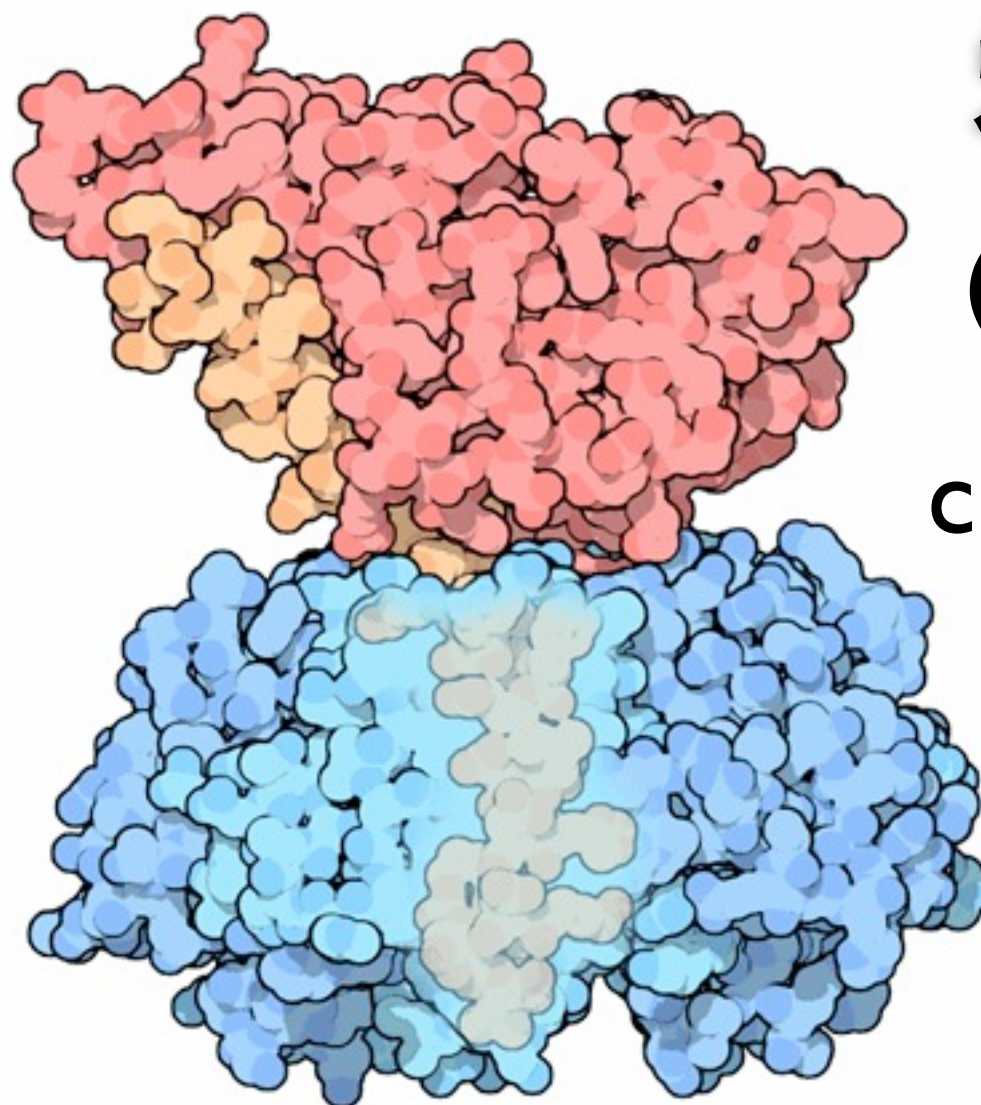
霍亂弧菌

(*Vibrio cholerae*)

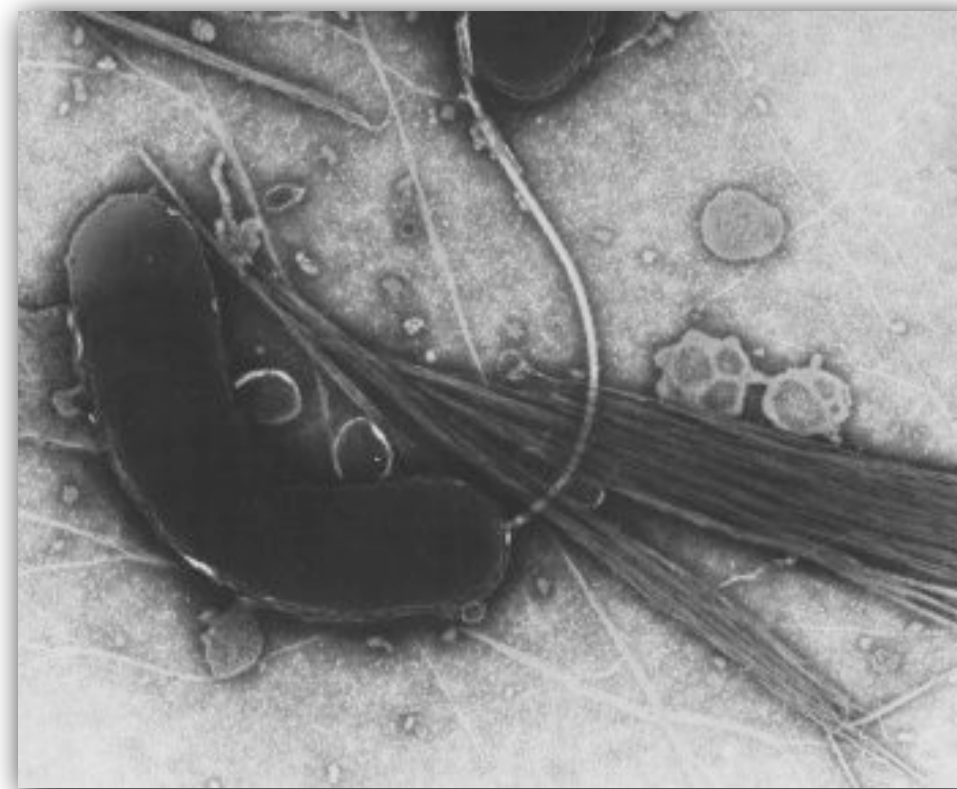
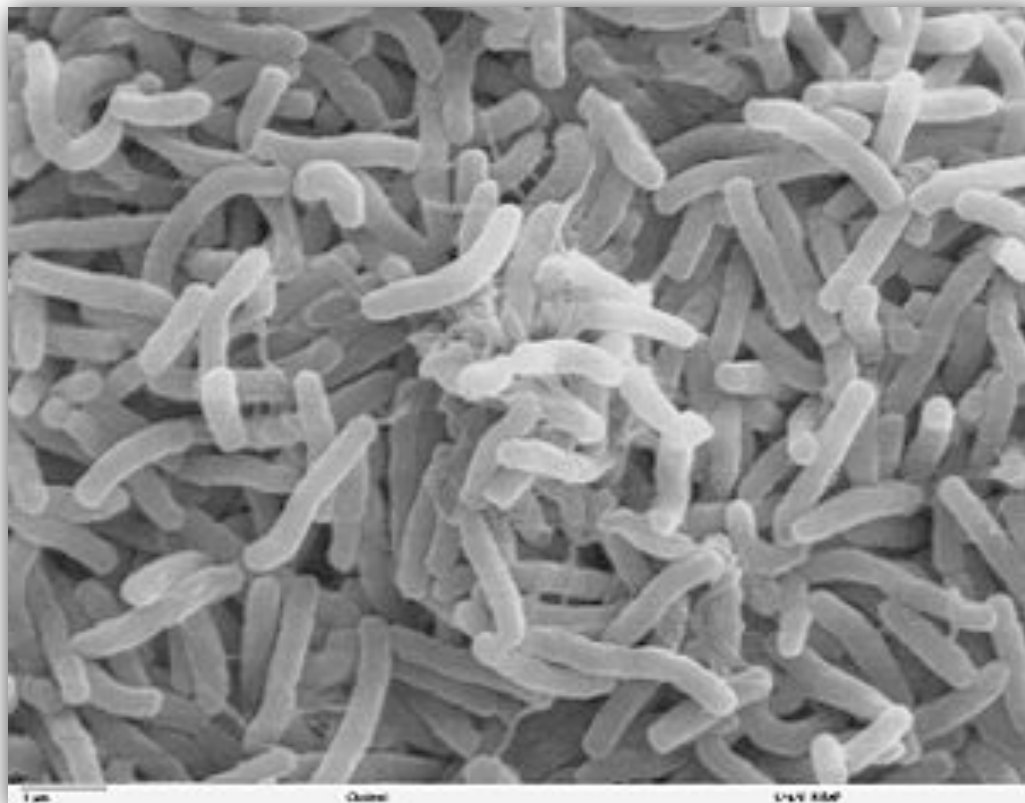
cholera toxin (CT)

toxic part

delivery region



?

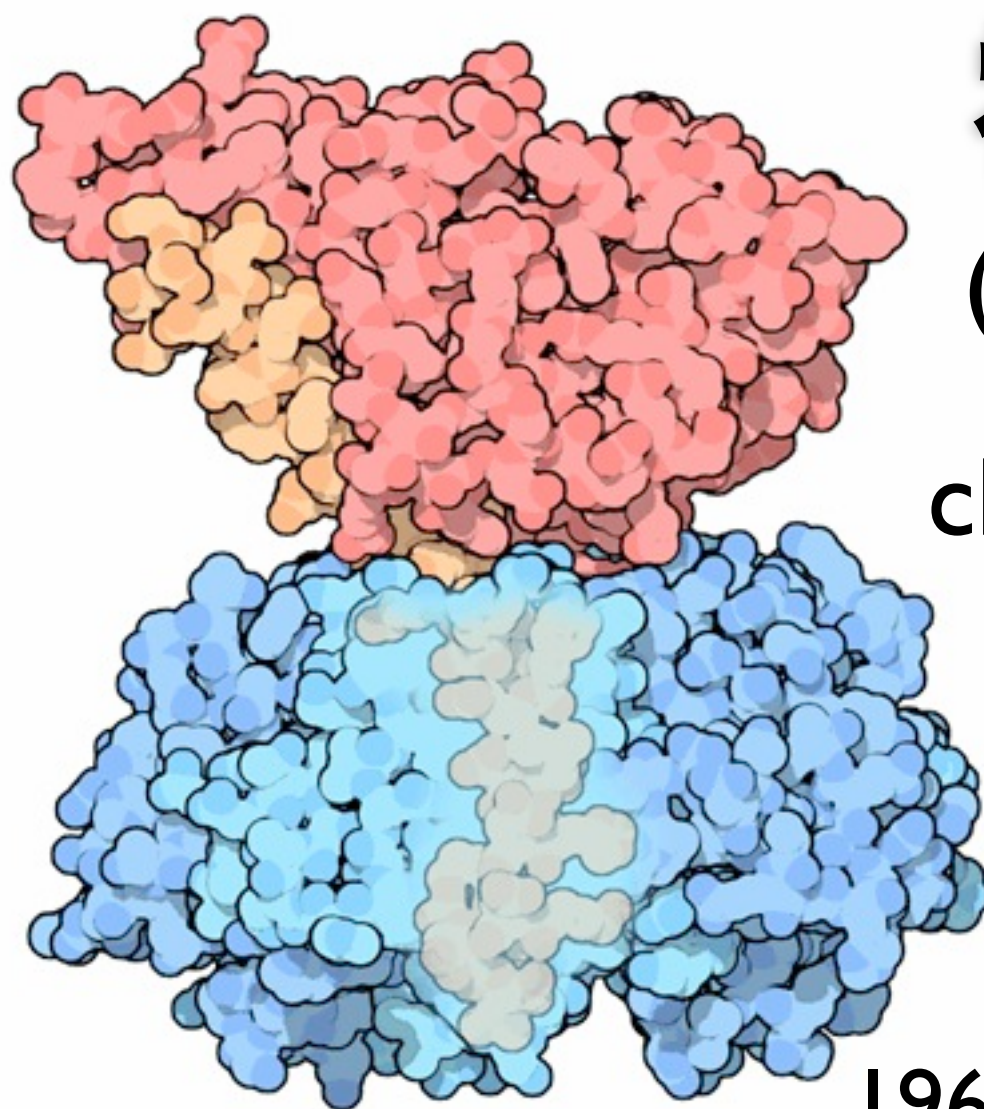


霍亂弧菌

(*Vibrio cholerae*)

cholera toxin (CT)

toxic part



delivery region

?

1962 (383 cases; 24 deaths)

1816~1970
7 outbreaks;

1816~1970
7 outbreaks;



Pyotr Tchaikovsky

1816~1970
7 outbreaks;



Charles X of France



Pyotr Tchaikovsky

1816~1970
7 outbreaks;



Charles X of France



Pyotr Tchaikovsky



Alexandre Dumas,
pere

1816~1970
7 outbreaks;



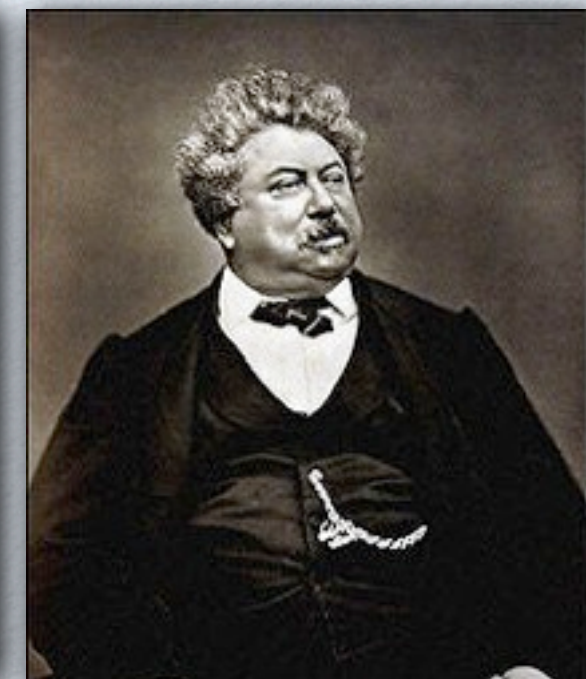
Charles X of France



Pyotr Tchaikovsky

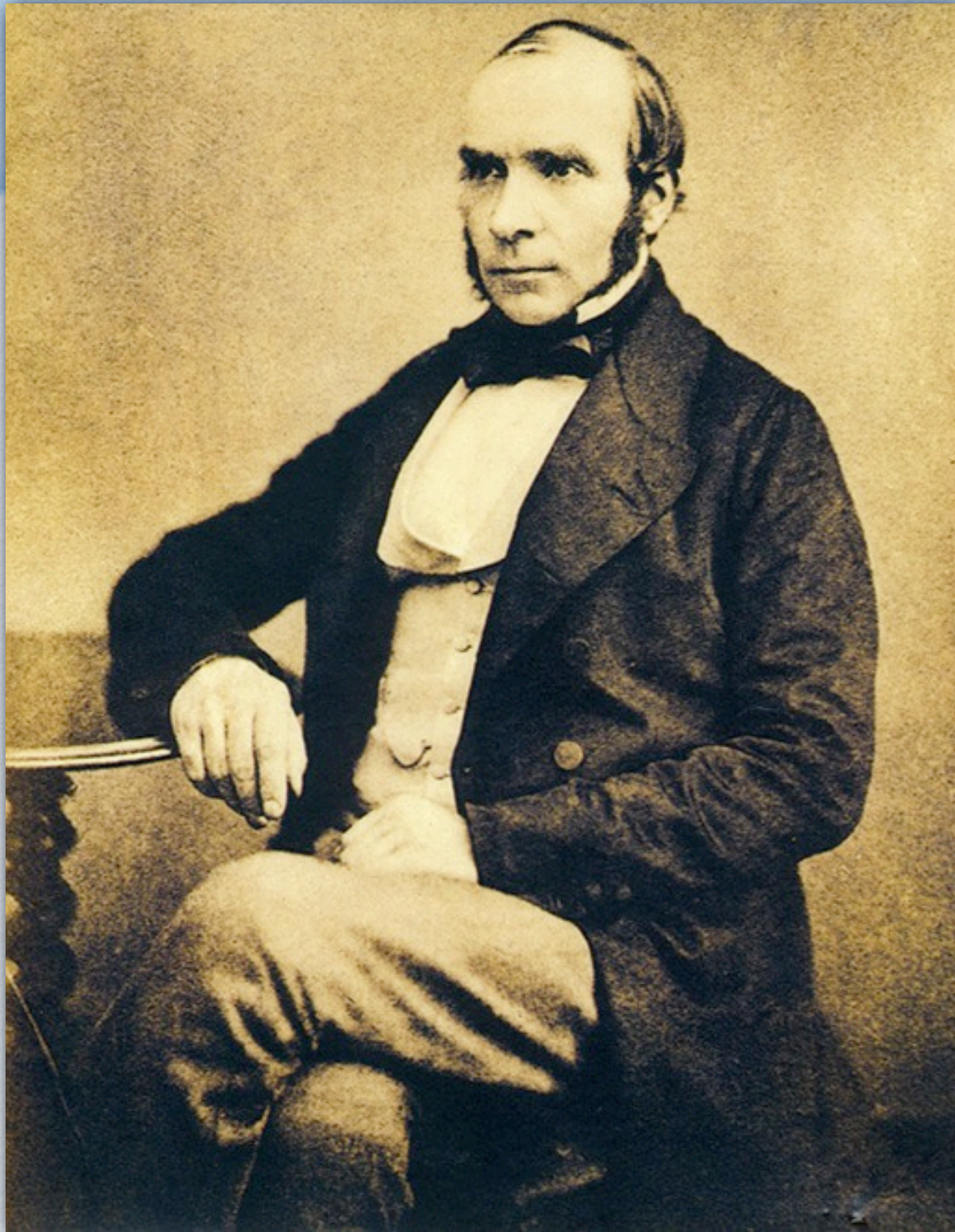


Georg Hegel

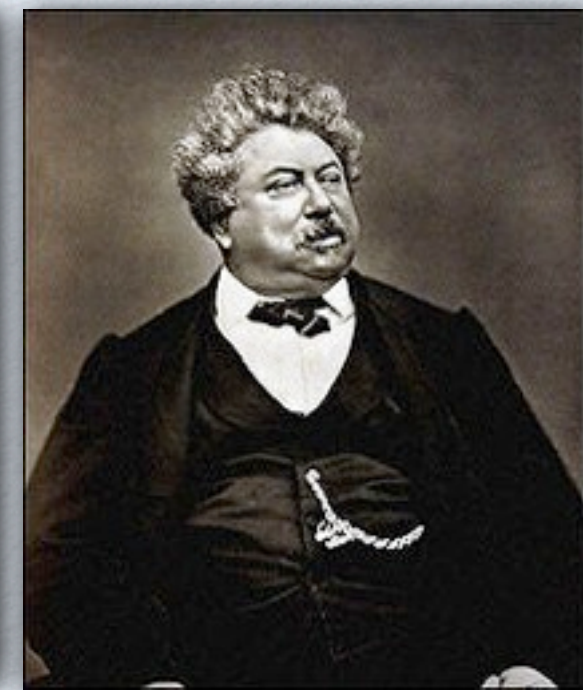


Alexandre Dumas,
pere

1816~1970
7 outbreaks;



Charles X of France Pyotr Tchaikovsky

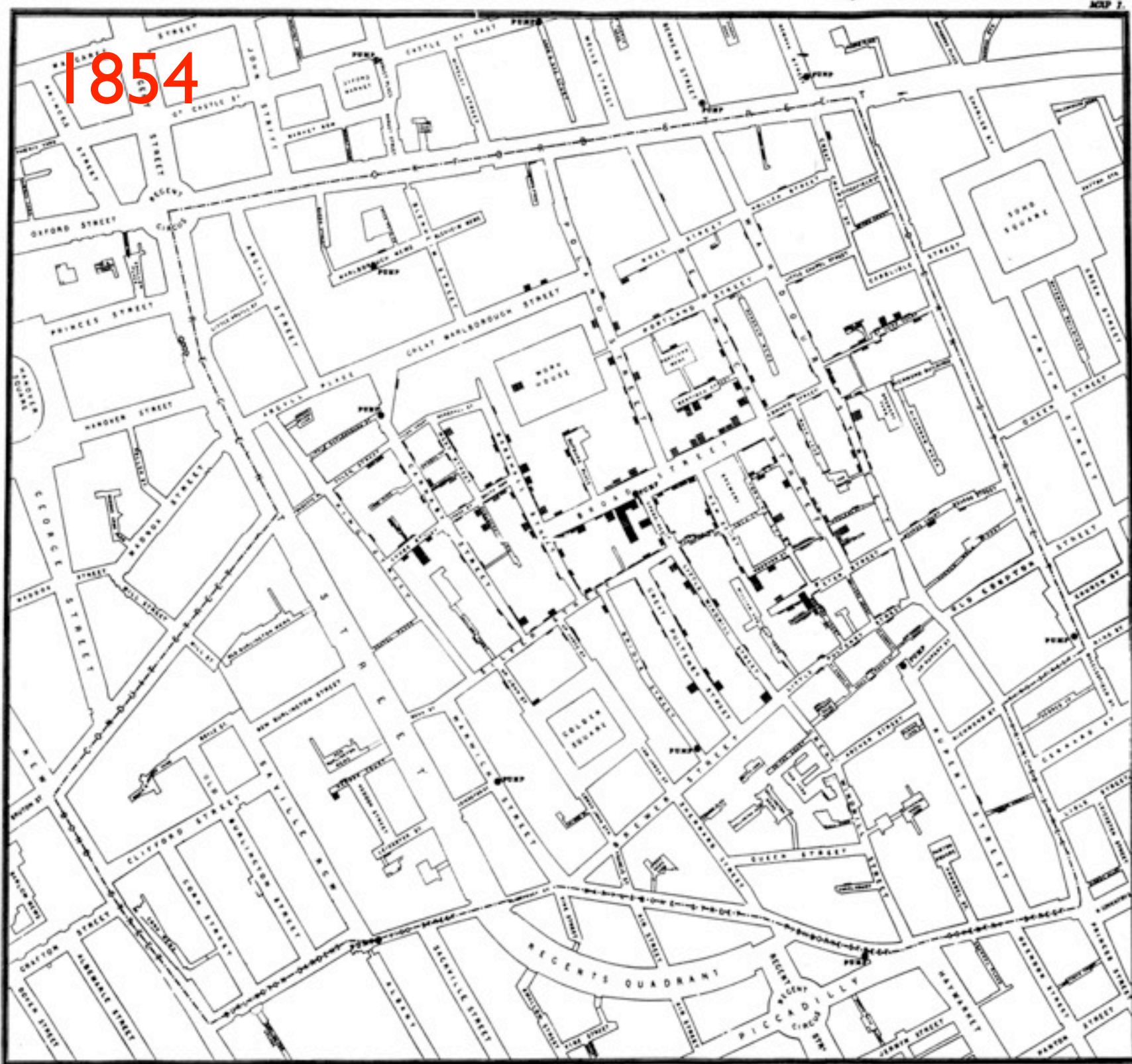


Georg Hegel

Alexandre Dumas,
pere

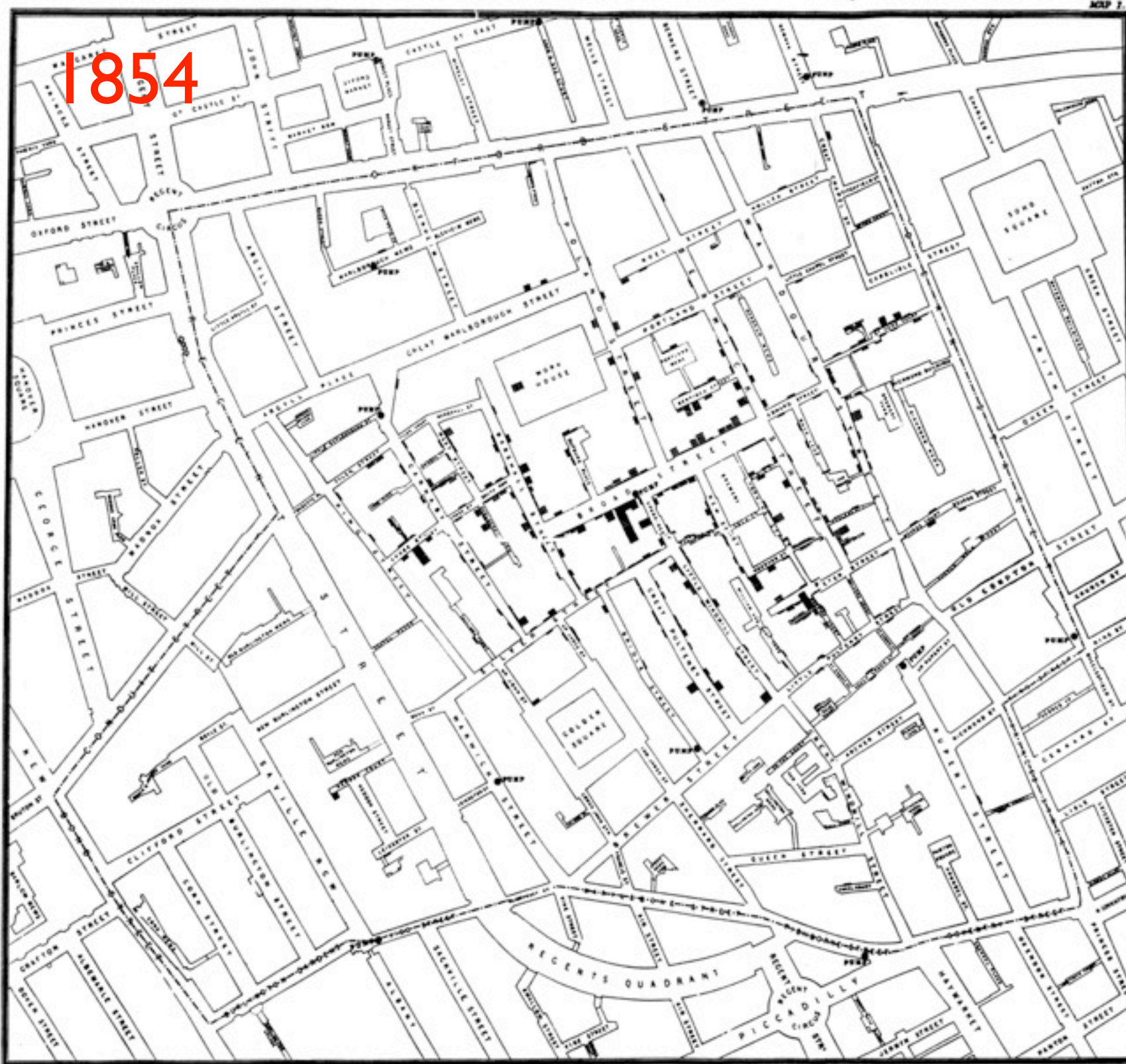
John Snow (1813.3.15~1858.6.16)

1854



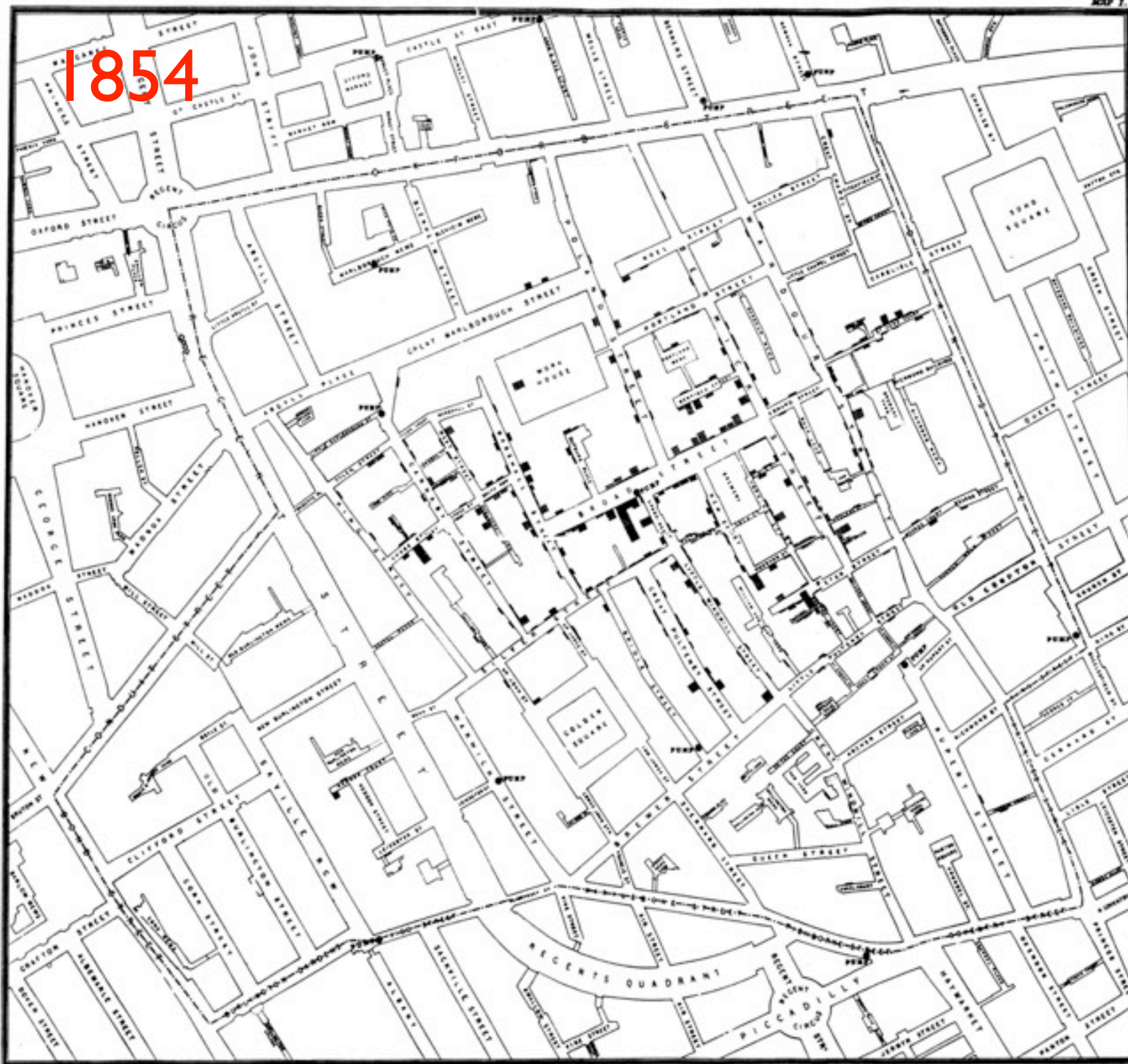
“On the mode of communication of cholera” (1855)

1854

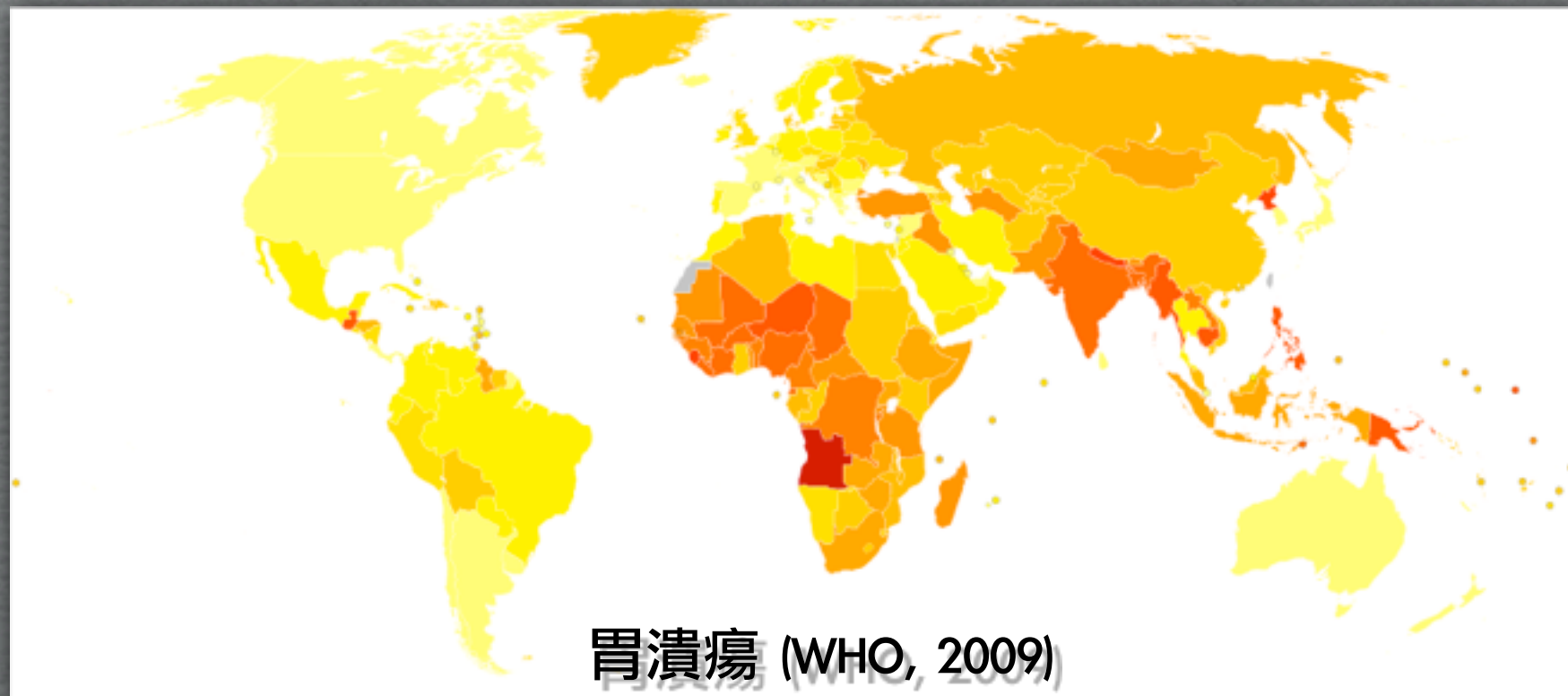
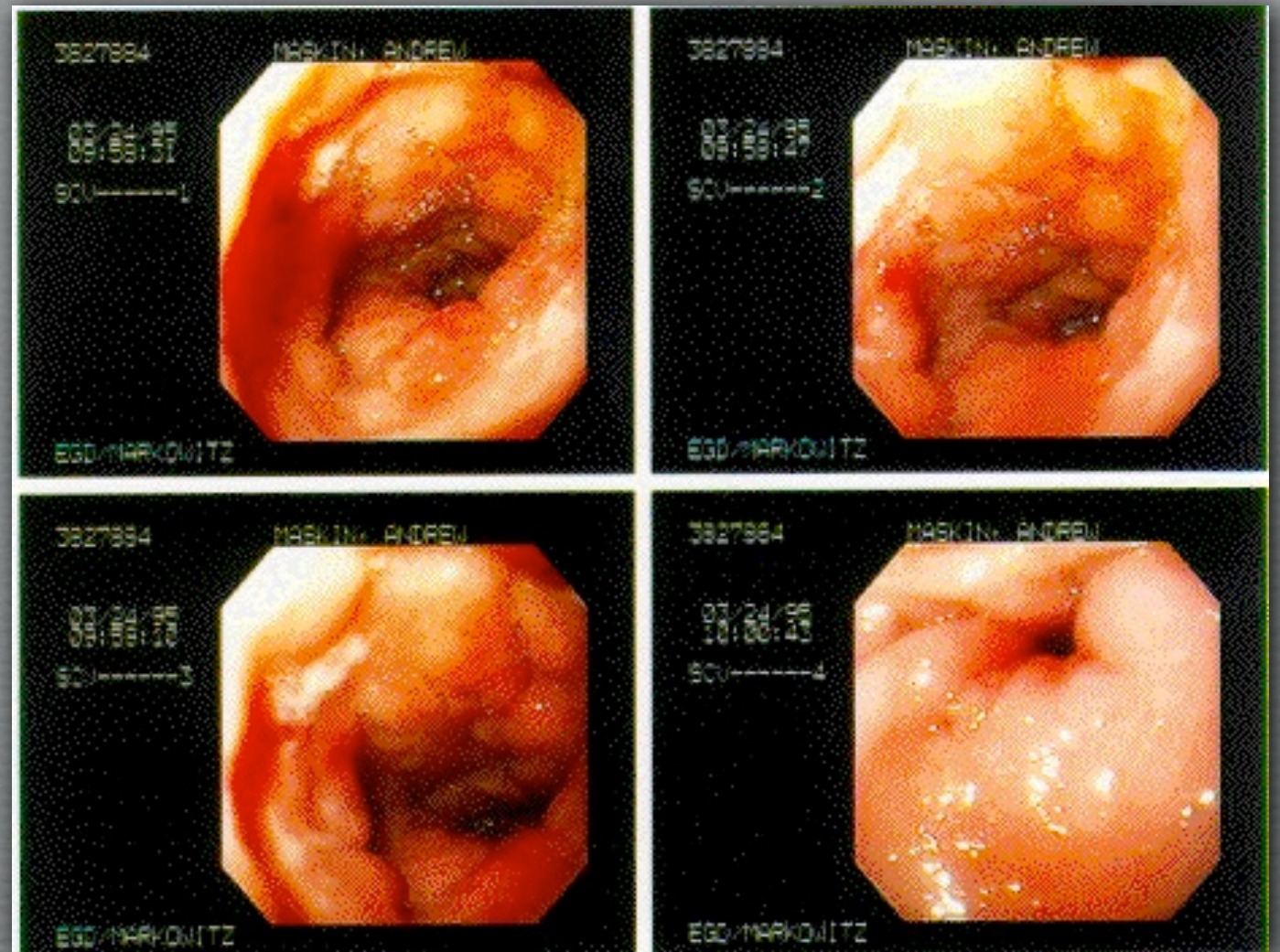


“On the mode of communication of cholera” (1855)

1854



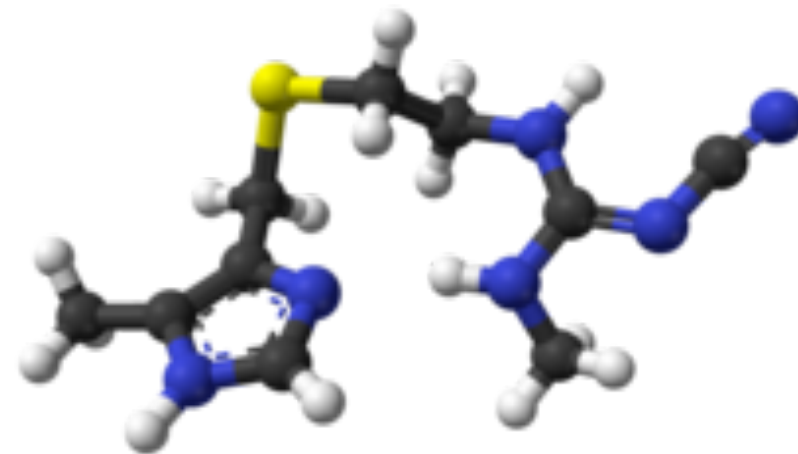
“On the mode of communication of cholera” (1855)





制酸錠

Bland diet: 白正無味

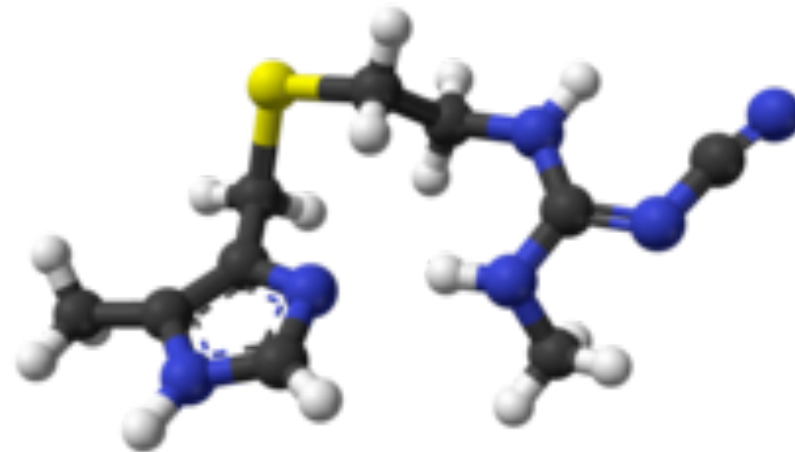


H₂受體拮抗劑 (**Zantac**)

病灶切除 (1970s)



制酸錠

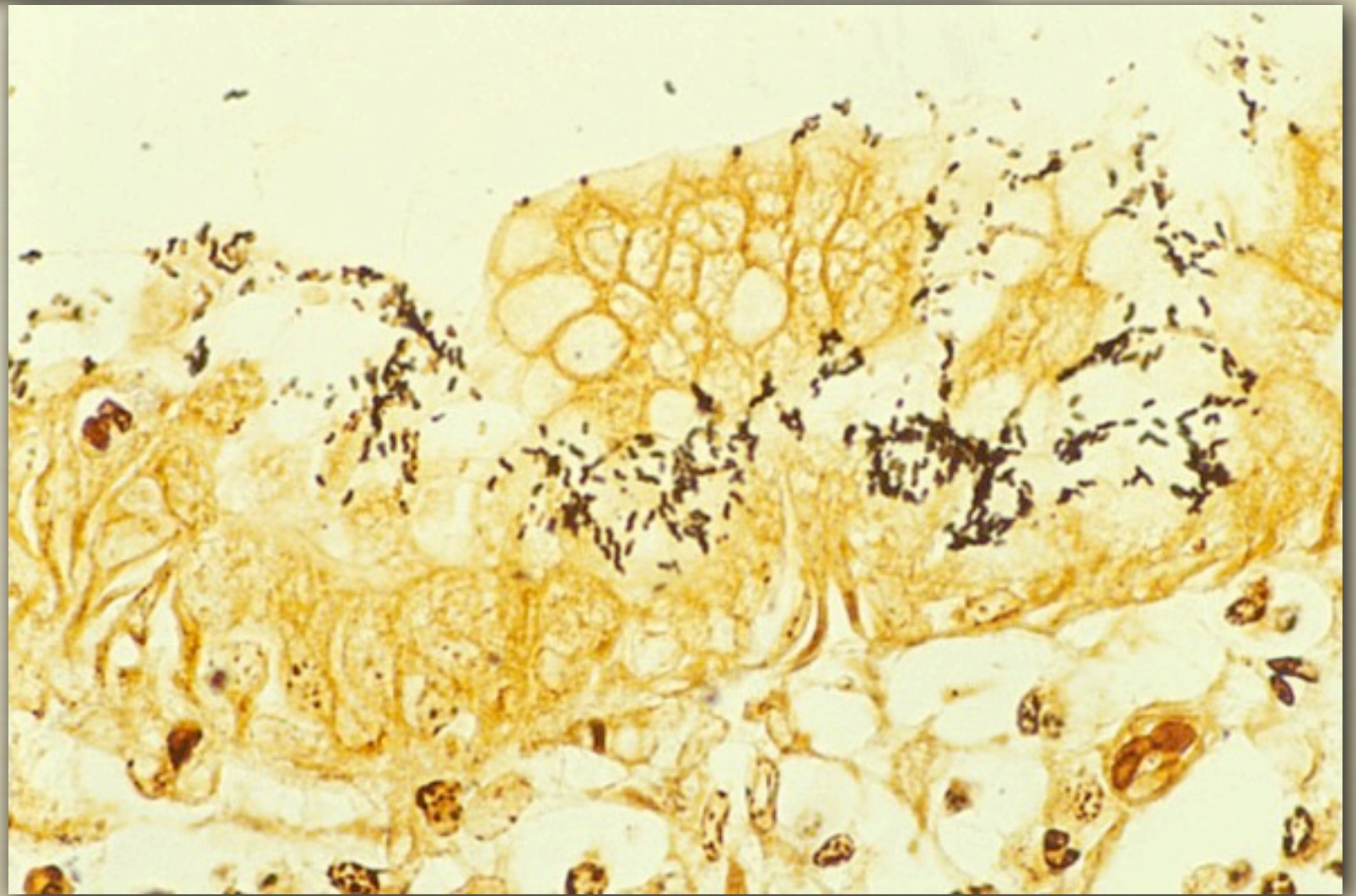
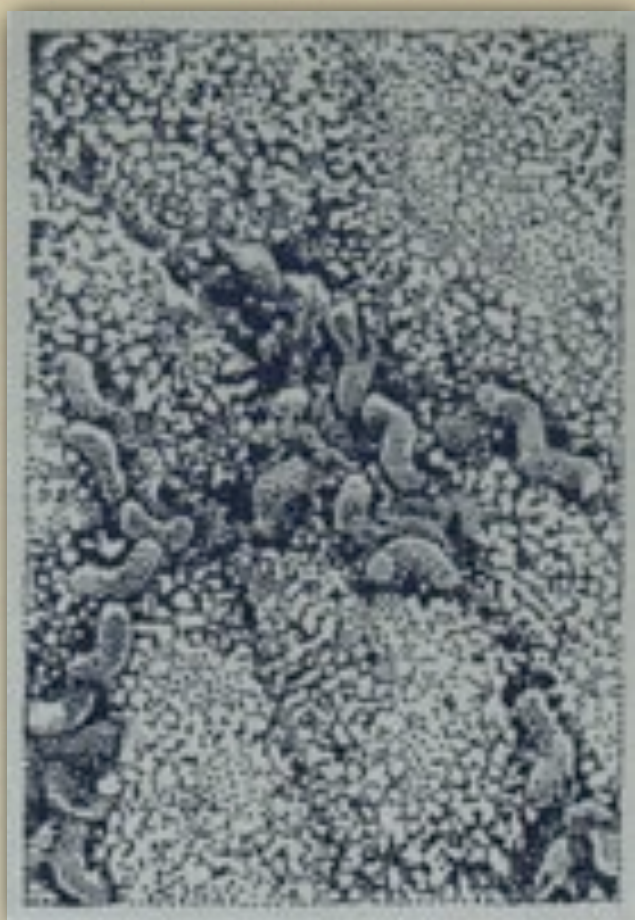


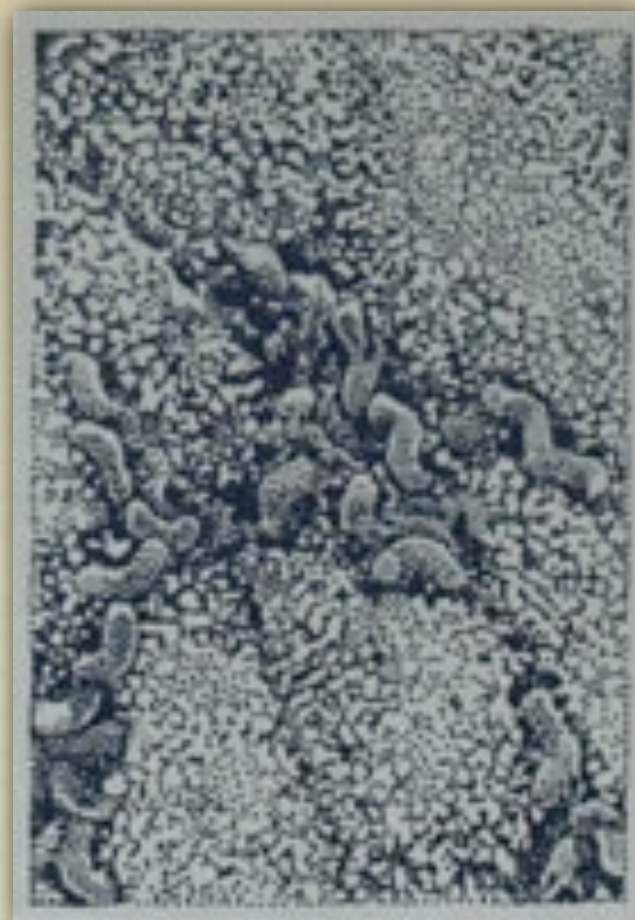
H₂受體拮抗劑 (**Zantac**)

Bland diet: 白正無味

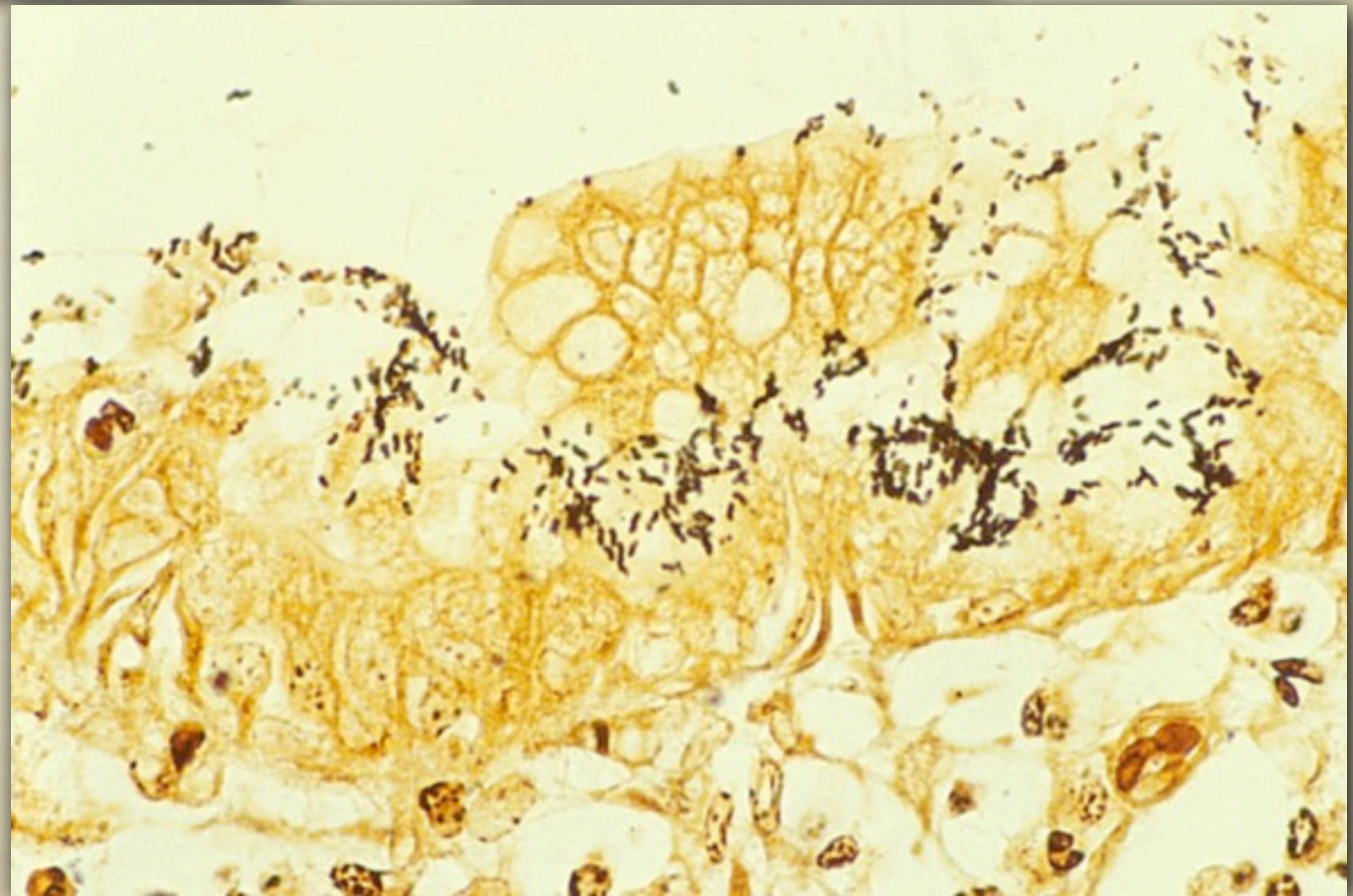
病灶切除 (1970s)

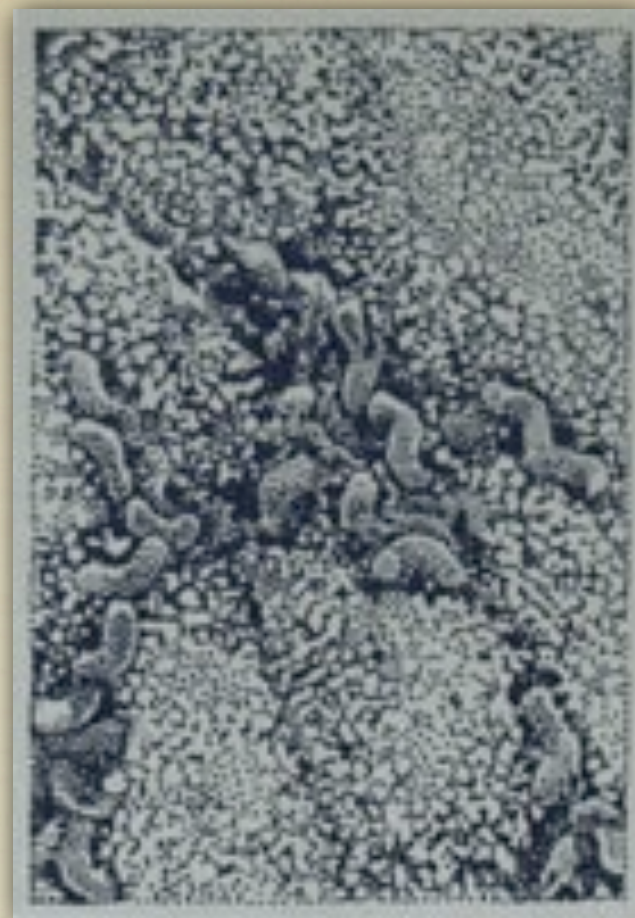
No Stress





1982

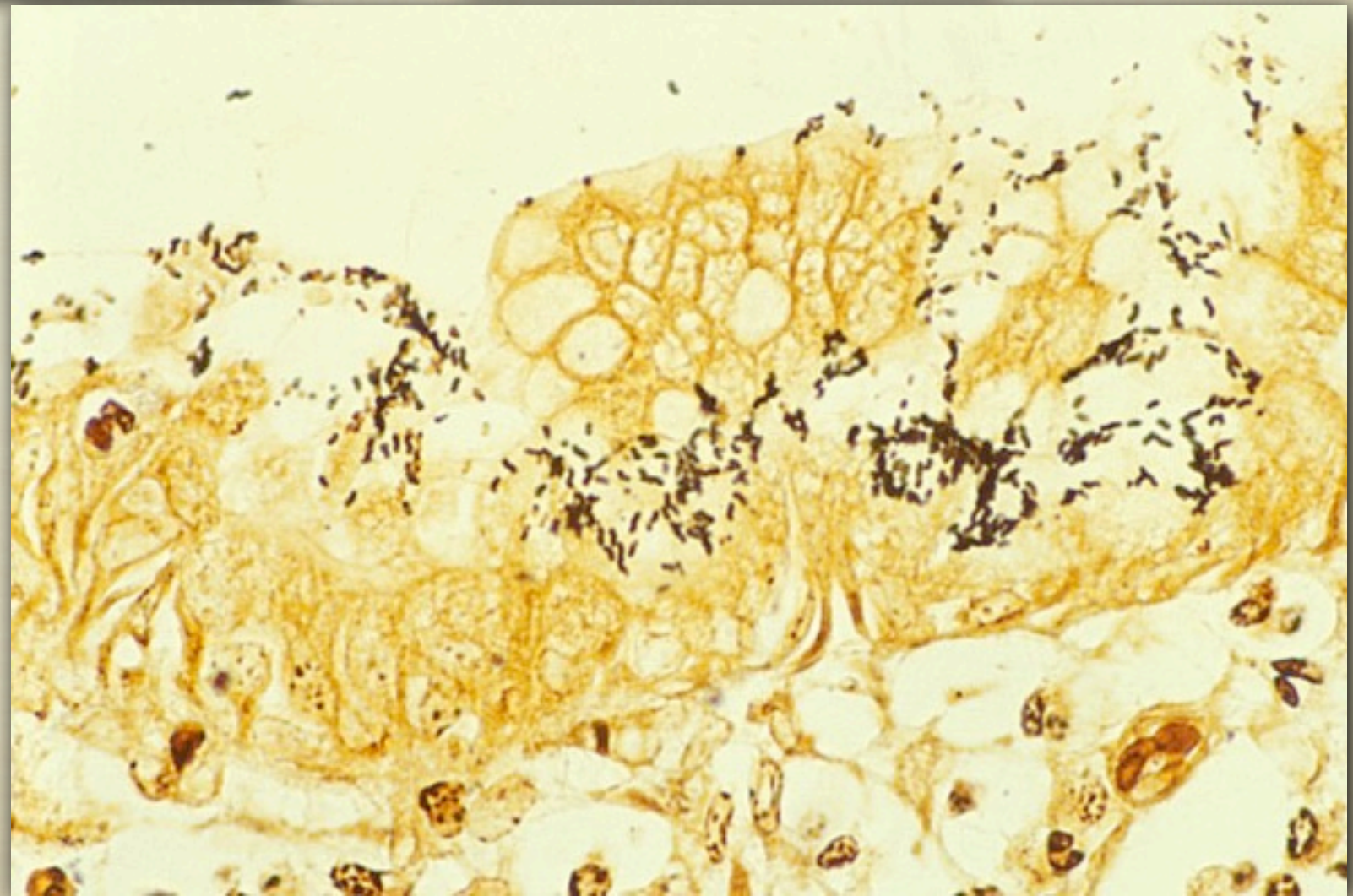




幽門螺旋桿菌

Helicobacter pylori

1982





Barry James Marshall

Robin Warren



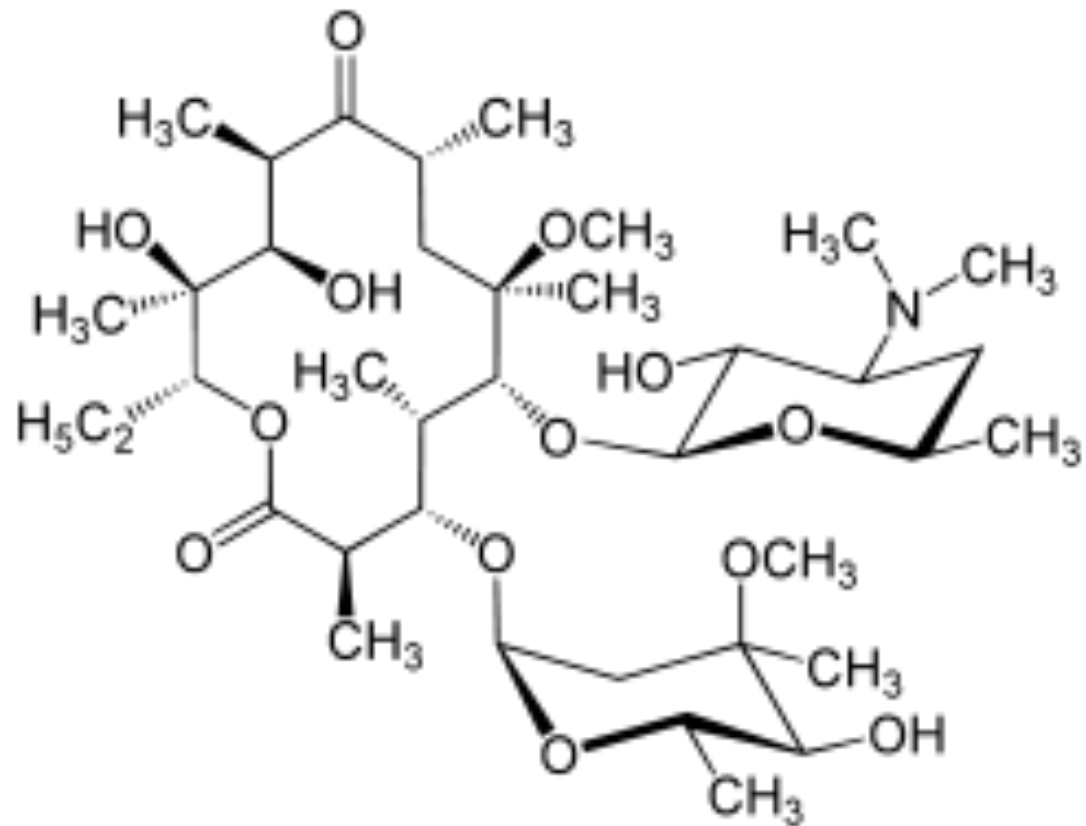
Barry James Marshall

Robin Warren

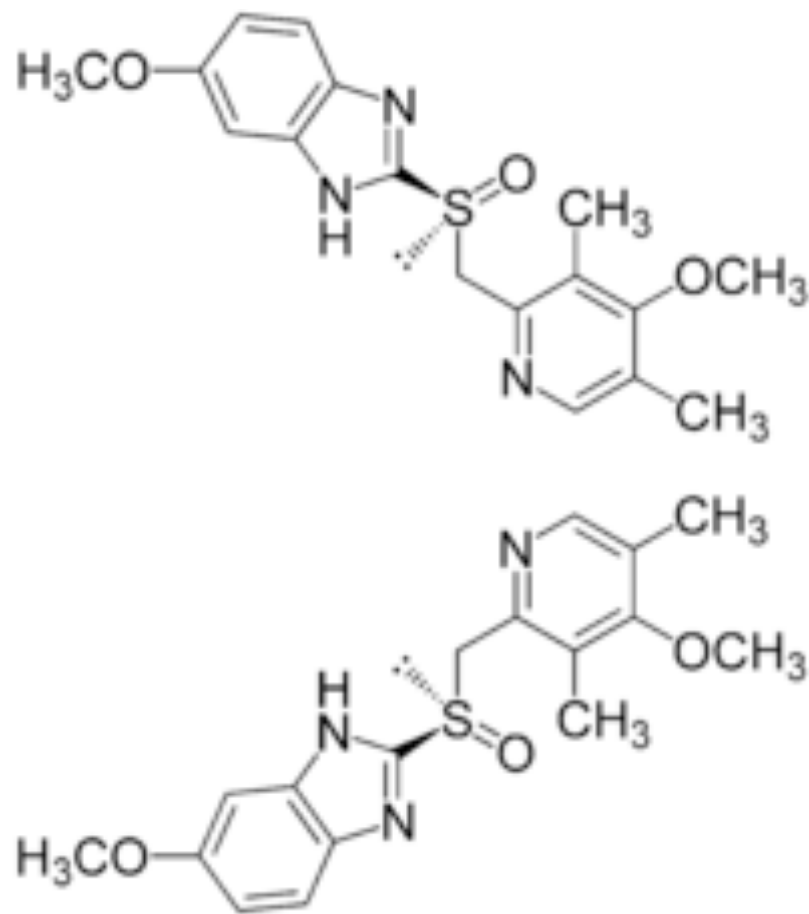


2005

4-week treatment



Clarithromycin (開羅理黴素)



Prilosec (制酸錠)



Scurvy 壞血症



James Lind (1716~1794)
Scottish surgeon (1753)

Age of Sailors



James Lind (1716~1794)
Scottish surgeon (1753)

Age of Sailors



**Albert Szent-Györgyi
(1893.9.16~1986.10.22)**

**1927 Hexuronic Acid
1937 Nobel Prize**

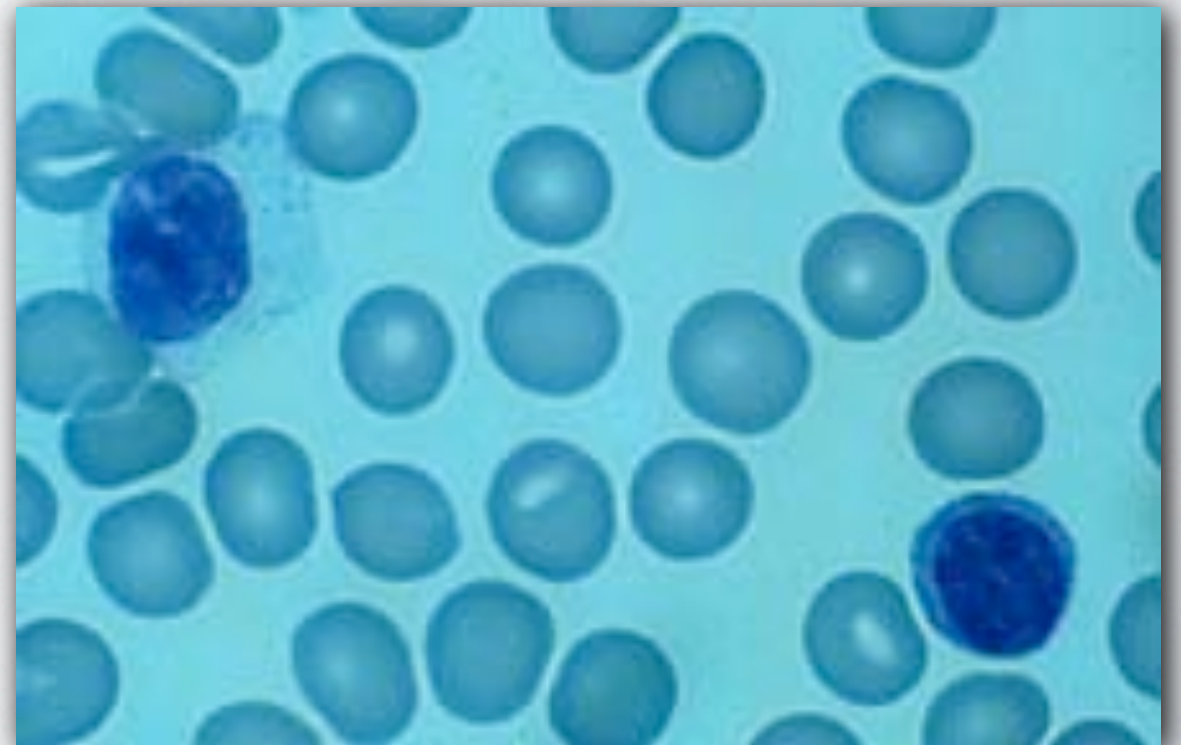
(isolated vit. c)



陰離子活性介面劑

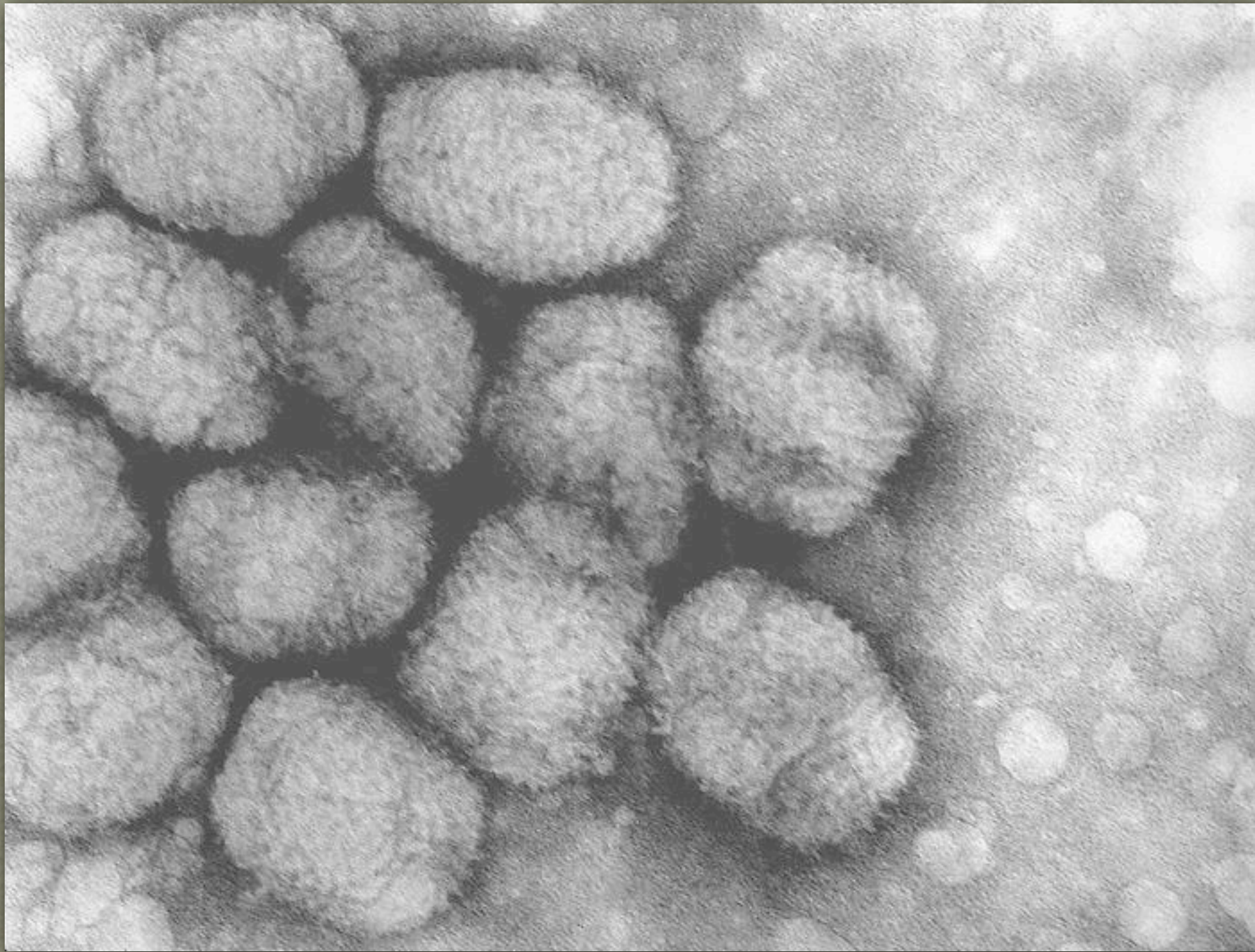
奈米粒子表面電位(zeta potential)

血球分離血液流暢





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Smallpox virus



Edward Jenner

(1749.5.17~1823.1.26)

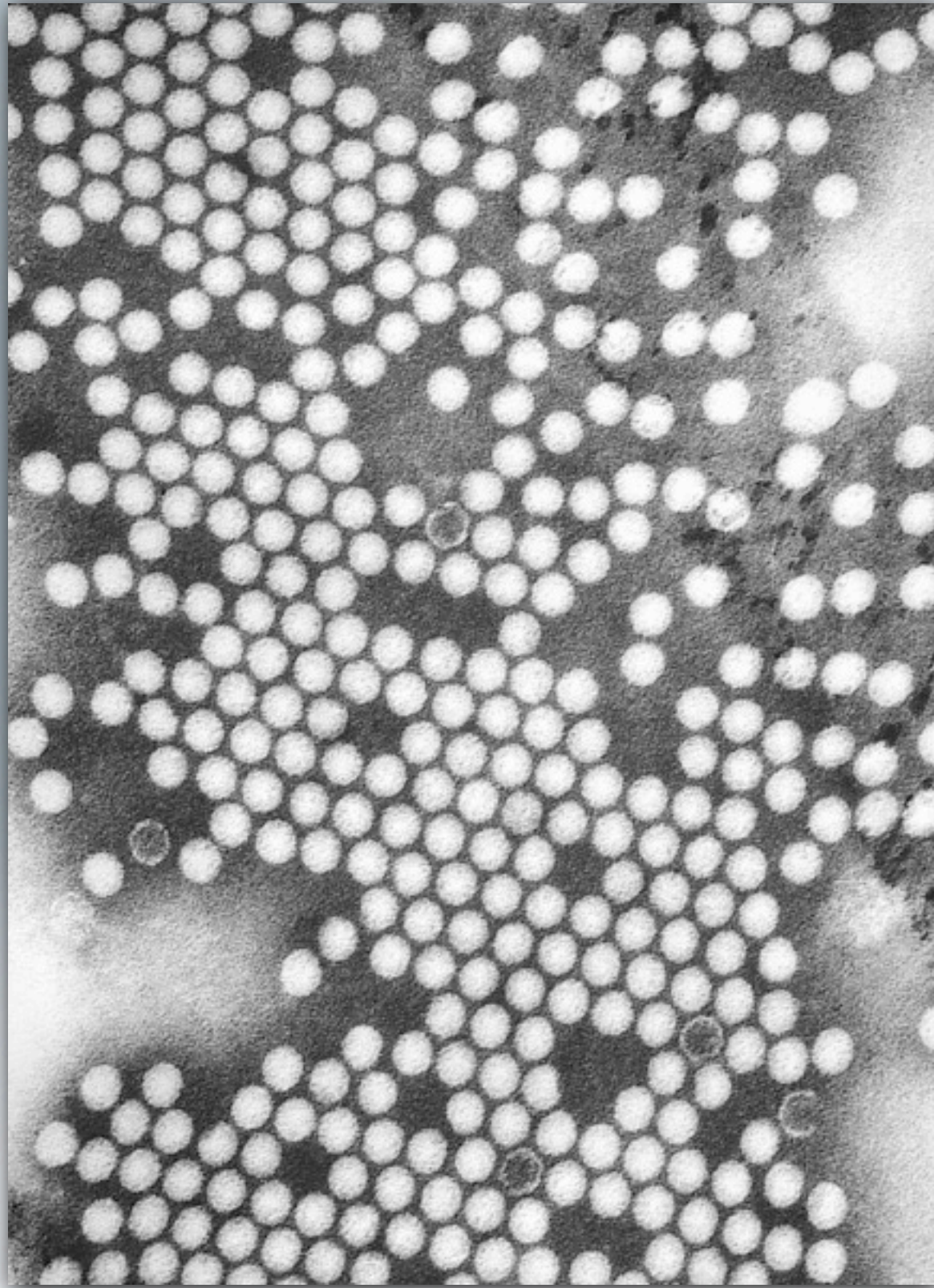
免疫學之父

13 Caseth.

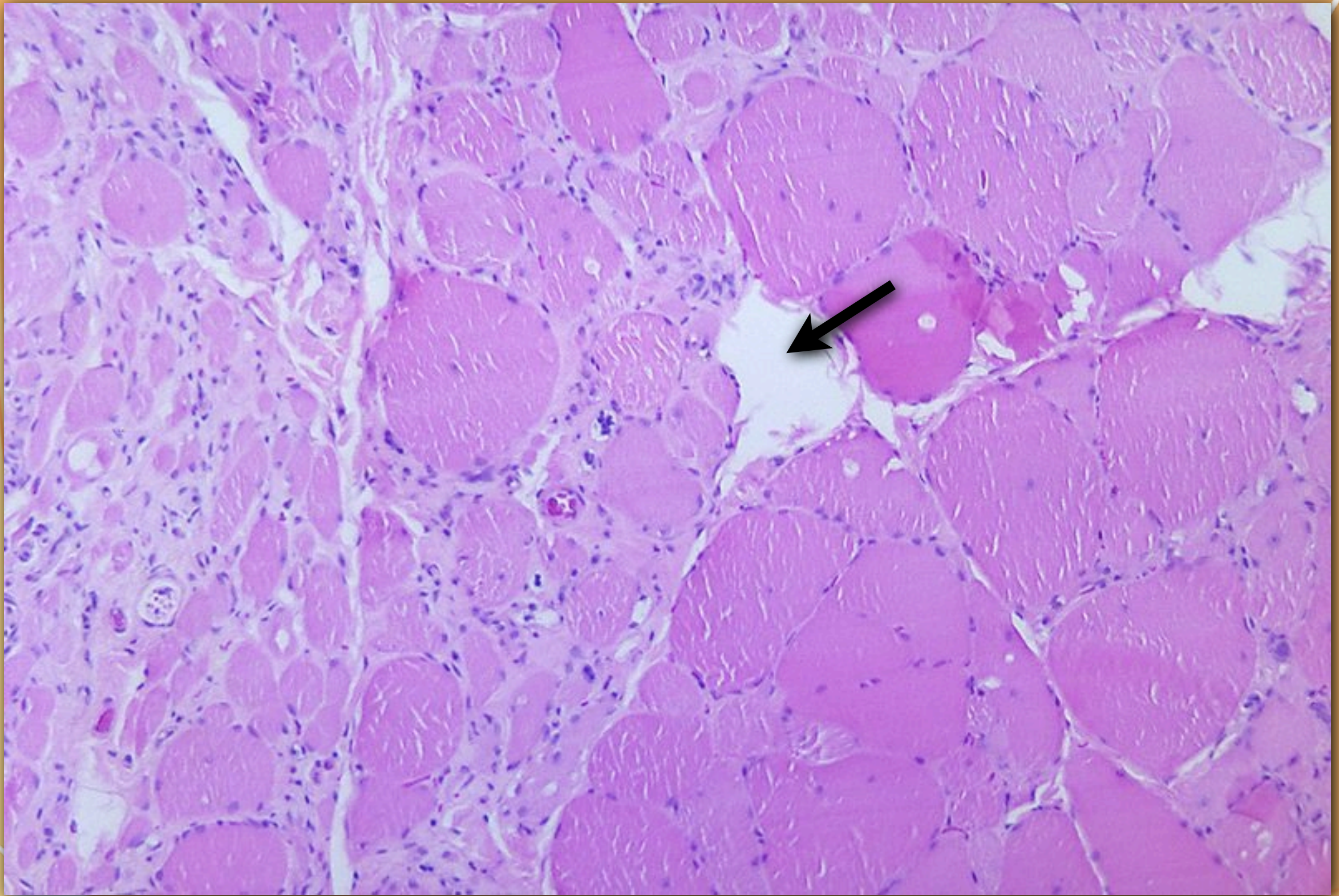
The more accurately to observe the progress of the infection, I selected a healthy Boy about eight years old for the purpose of inoculation for the Cow-pox. The matter was taken from a suppurated sore on the hand of a Dairy Maid, who was infected by her Master's Cows, and, ^{was} inserted, on the 14th of May 1796, into the arm of the Boy, by means of two superficial incisions, each about three quarters of an inch long. On the 7th day he complained of uneasiness in the arilla, & on the 9th he became a little shilly. Lost his appetite and had a slight head ache. During the whole of this day he was perceptibly indispos'd, & had rather a restless night; but, on the day following, he was perfectly well. The appearance, and progress of the incisions to a state of maturation, ^{were} ~~was~~ pretty much the same as when produced in a similar manner by variolous matter. The only difference, ^{which} I perceived, was, that the edges assumed rather a darker hue, and that the efflorescence spreading round the incisions, took on rather more of an erysipelatous look, than we commonly perceive when variolous matter has been made use of for the same purpose.

vide p. 13





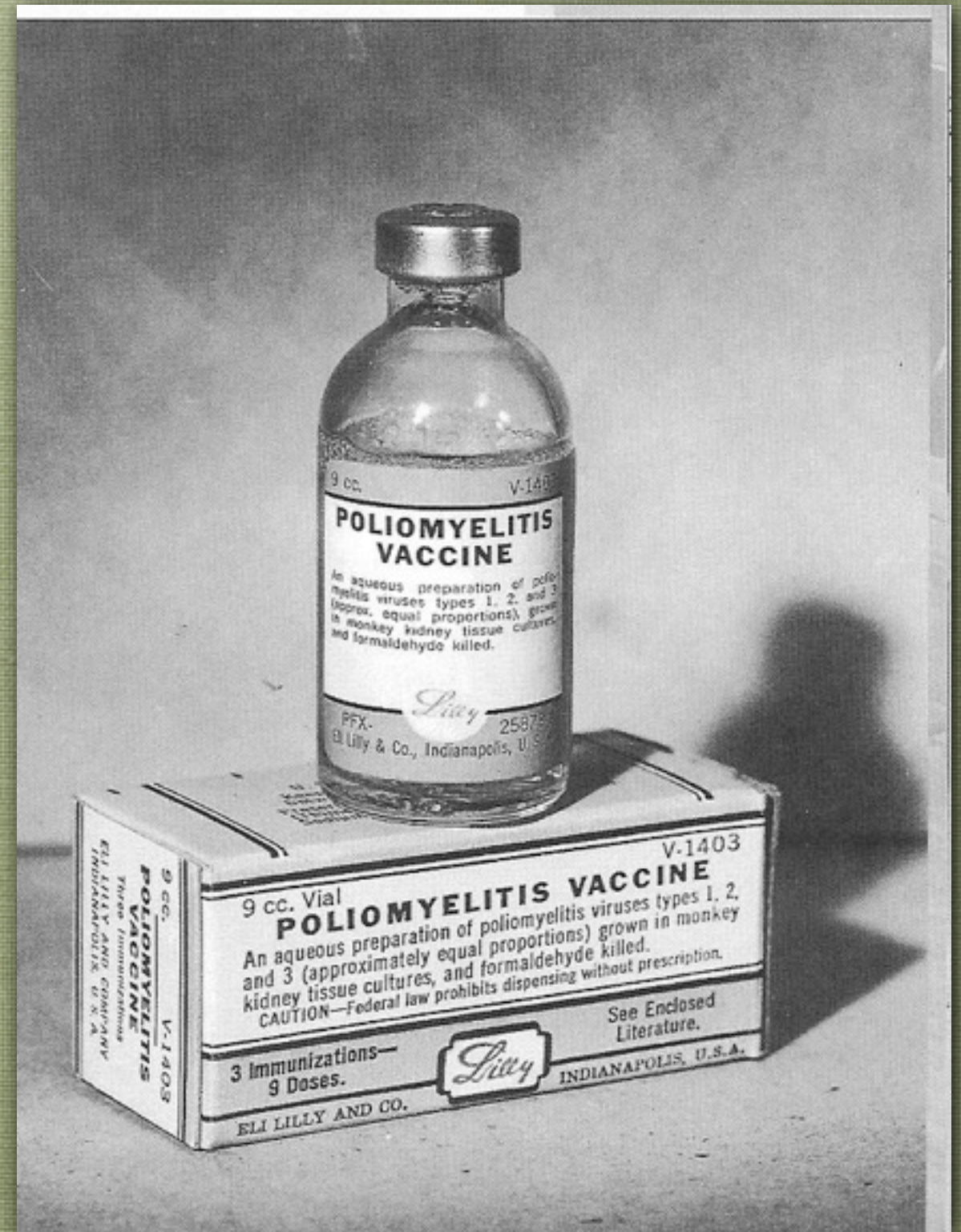
Polio virus



denervated neuron



Jonas Salk (1955)
(1914.10.28~1995.6.23)





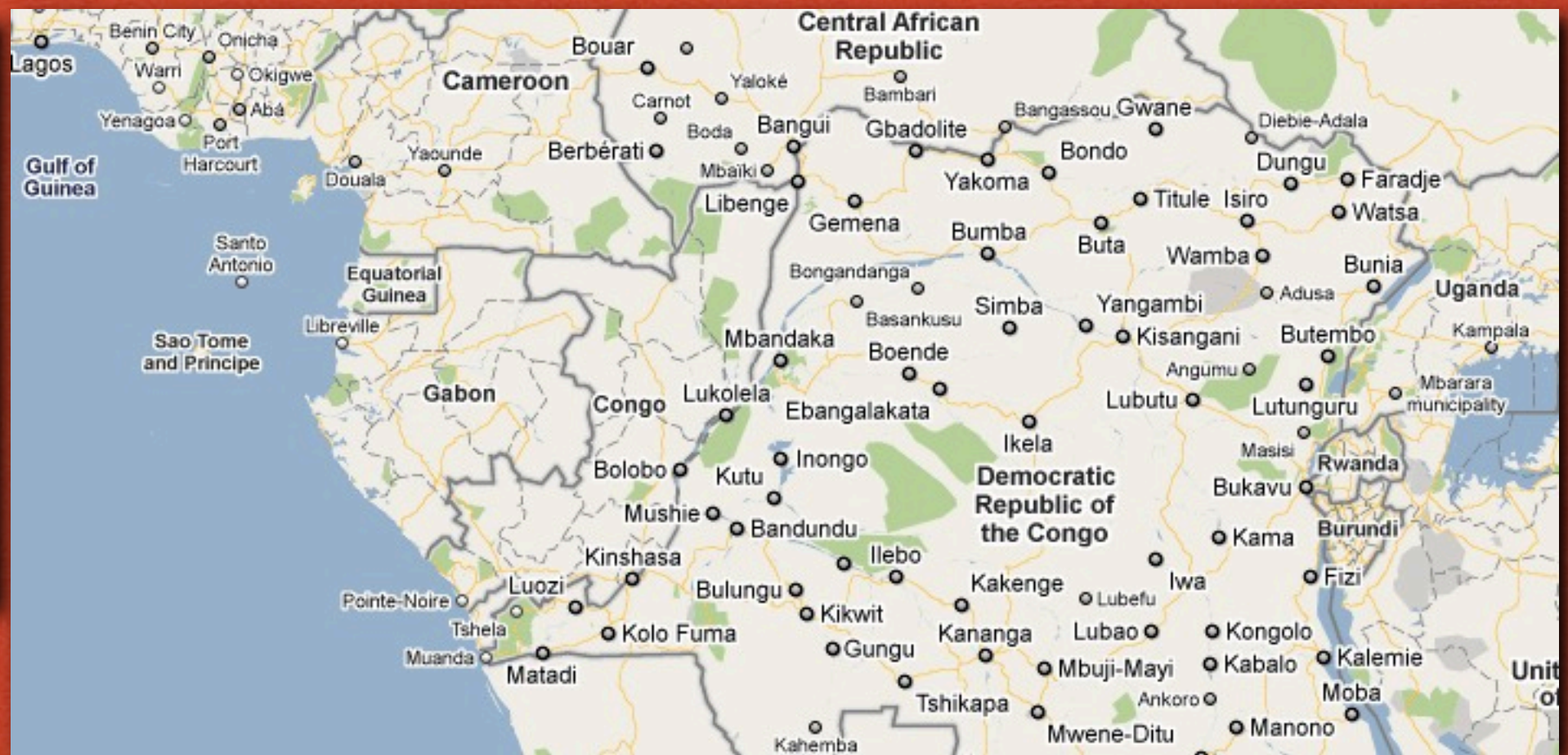
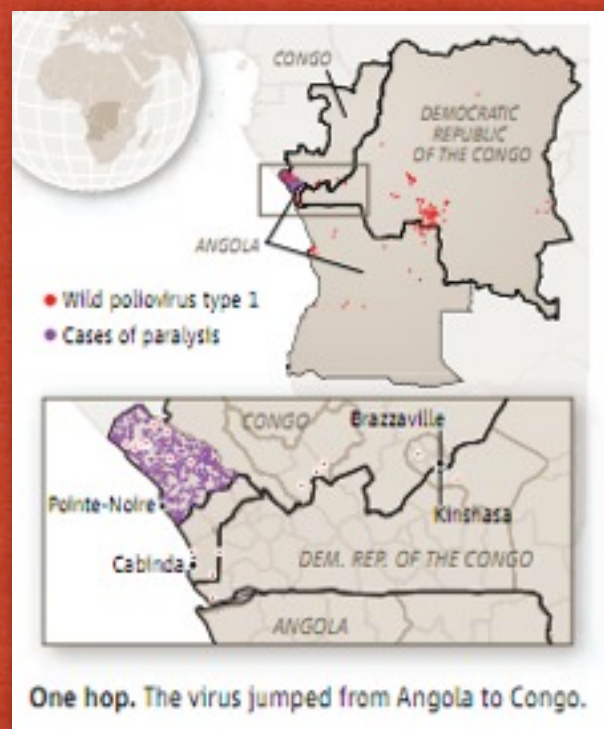
ALBERT SABIN, M.D.



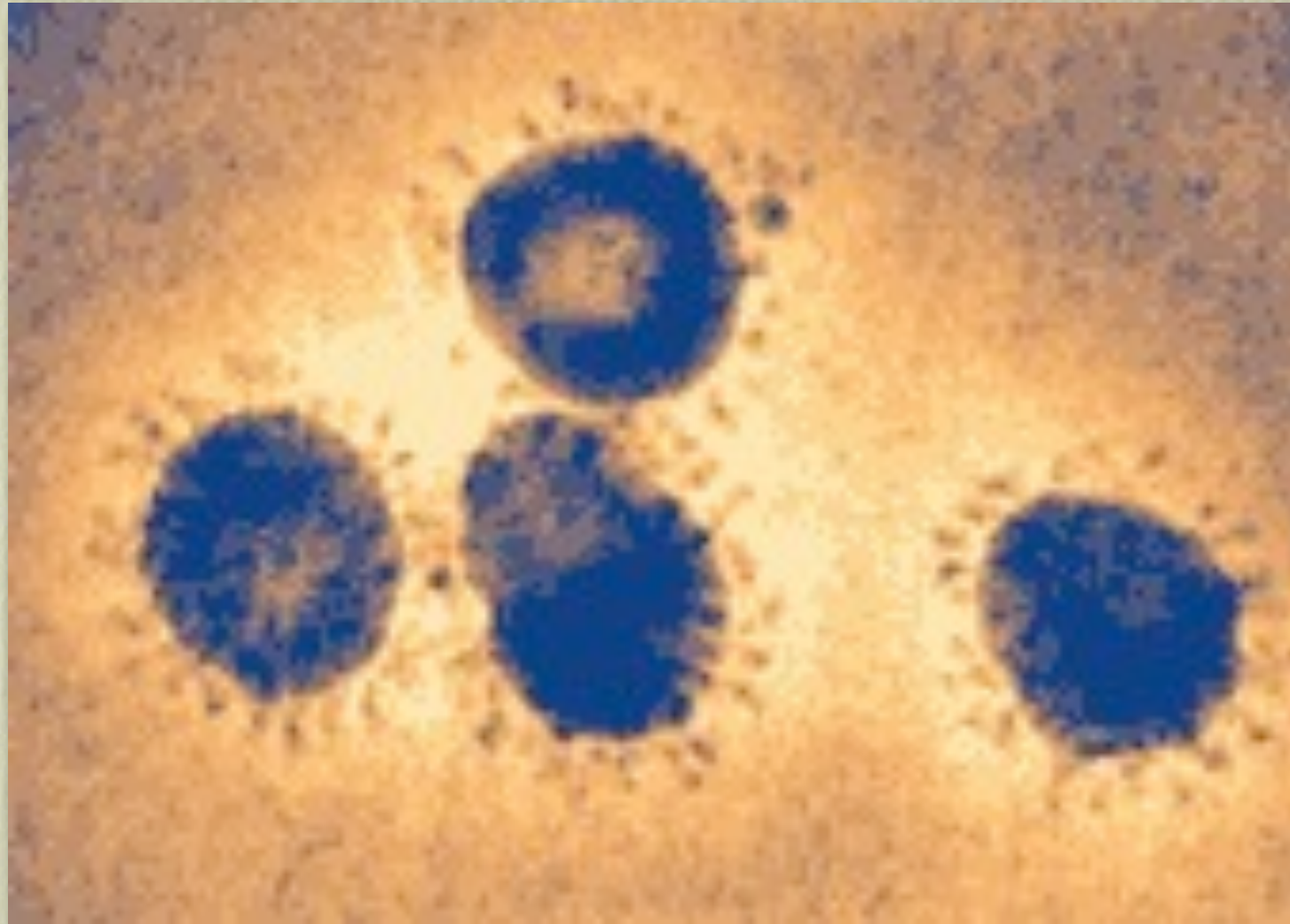
Albert Bruce Sabin
(1906.8.26 – 1993.3.3)

Polio death

Congo, Oct. 2010~
476 infected, 179 death (15~25 age)



Science 330, 1730-1731 (Dec. 24, 2010)



Severe Acute Respiratory Syndrome (SARS)

**Probable cases of SARS by country, 1
November 2002 – 31 July 2003.**

Country or Region	Cases	Deaths	SARS cases dead due to other causes	Fatality (%)
China *	5328	349	19	6.6
Hong Kong *	1755	299	5	17
Canada	251	44	0	18
Taiwan	346**	37	36	11
Singapore	238	33	0	14
Vietnam	63	5	0	8
United States	27	0	0	0
Philippines	14	2	0	14
Mongolia	9	0	0	0

**Probable cases of SARS by country, 1
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SARS 居家隔離實戰手冊



1. 預防SARS三部曲
2. 認識居家隔離篇
3. 衛生所人員工作篇
4. 基層村里幹事、村里長、警察工作篇
5. 接受居家隔離民眾篇
6. 密切接觸者居家隔離應注意事項 (A)
7. 專案防疫強制居家隔離者應注意事項 (B)
8. 居家隔離住戶環境衛生篇



珍愛生命

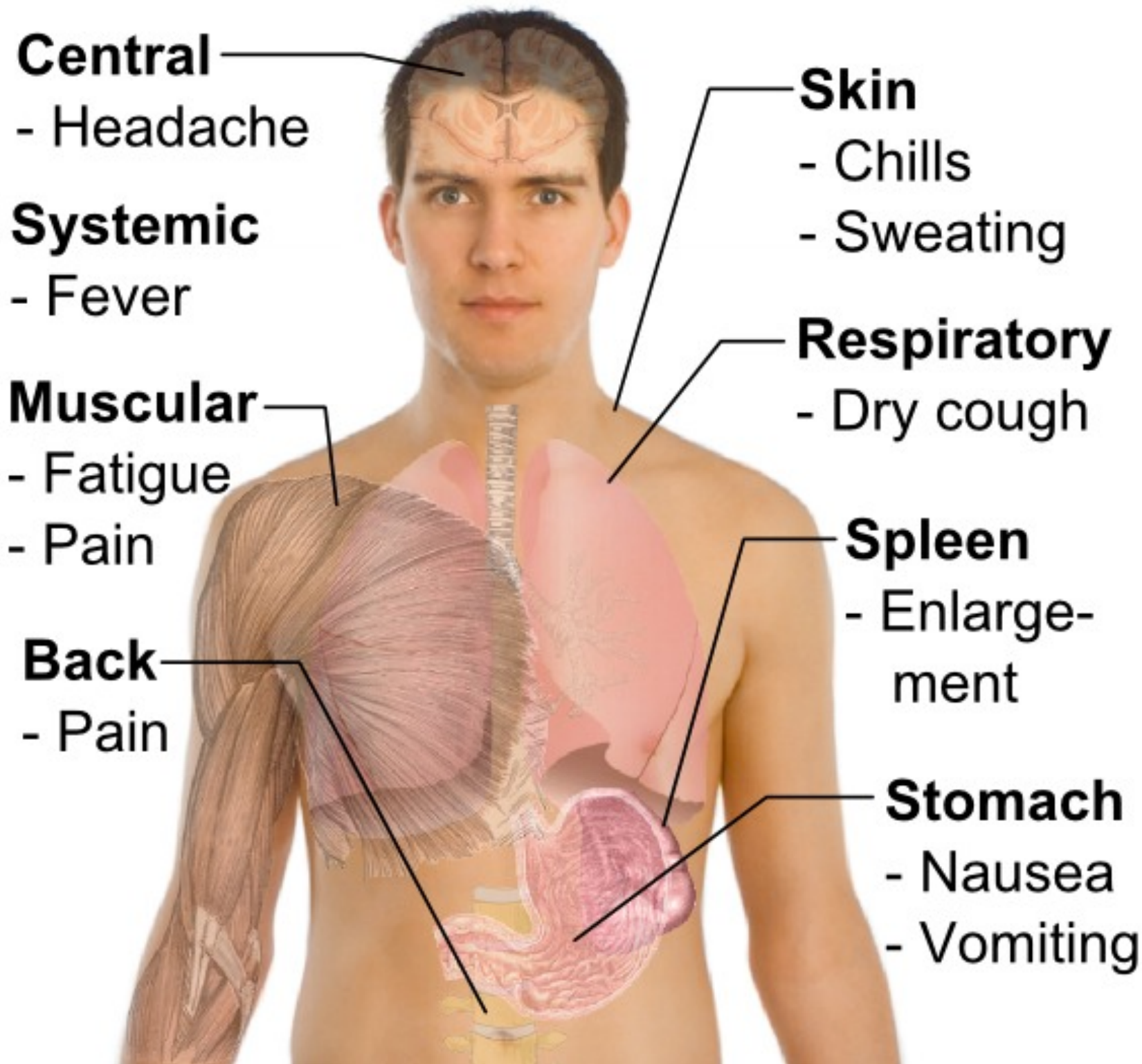
傳播健康

行政院衛生署

國民健康局

與您共同對抗 SARS

Symptoms of **Malaria**



**Leading Causes of Death in Children
Under Five Years of Age, Estimates for
2000-2003**

**(Source: World Health Organization, The
World Health Report 2005)**

Rank	Cause	Numbers (thousands per year)	% of all deaths
1	Neonatal causes	3,910	37
2	Acute respiratory infections	2,027	19
3	Diarrheal diseases	1,762	17
4	Malaria	853	8
5	Measles	395	4
6	HIV/AIDS	321	3
7	Injuries	305	3
	Other causes	1,022	10
	Total	10,596	100.0

**Leading Causes of Death in Children
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7	Injuries	305	3
	Other causes	1,022	10
	Total	10,596	100.0

芽孢子

b Sporozoites

a Infection

裂殖子

Merozoites

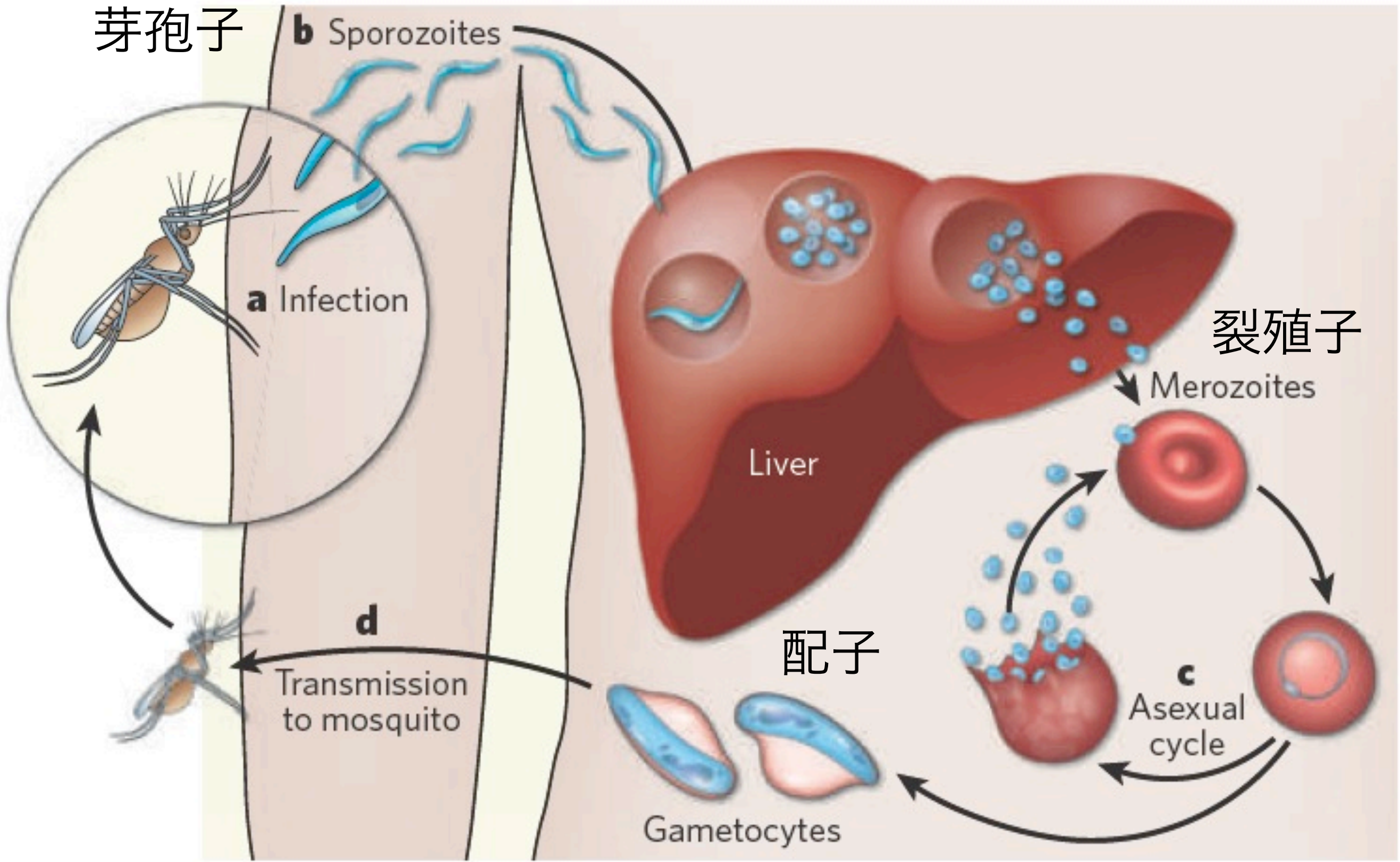
Liver

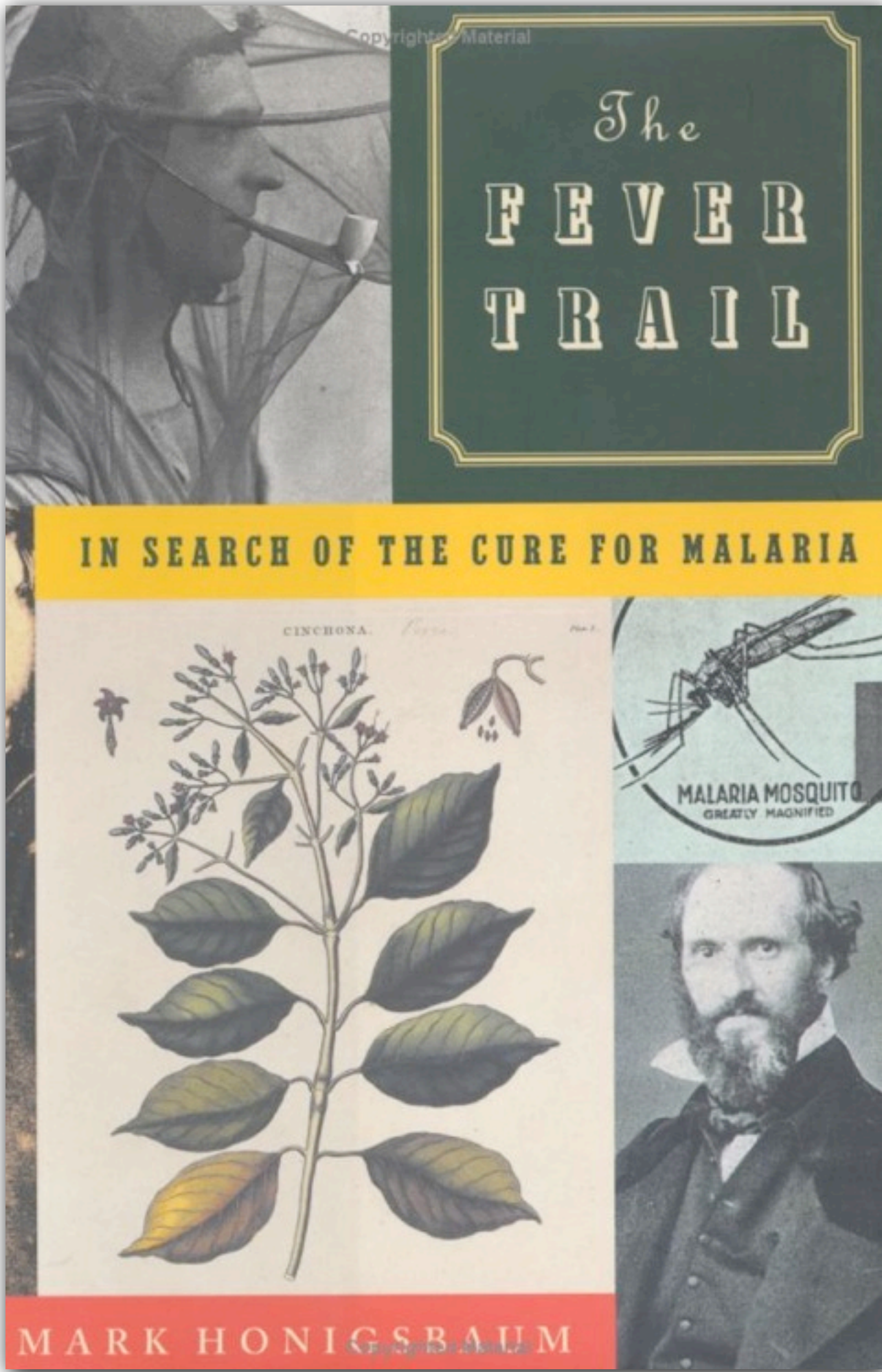
配子

c
Asexual cycle

d
Transmission to mosquito

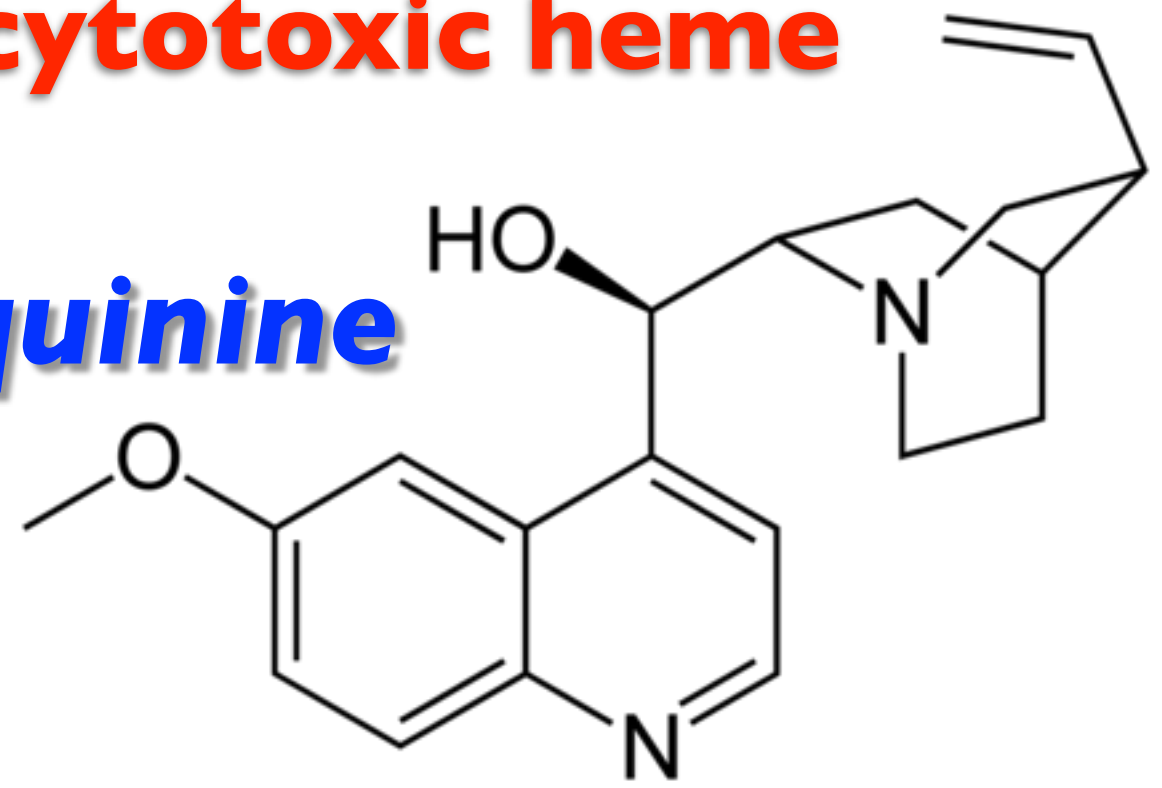
Gametocytes





aggregation of cytotoxic heme

quinine



Cinchona

青蒿



青蒿



Vietnam War

青蒿



Vietnam War
523 辦公室

青蒿



Daniel Klayman

Vietnam War

523 辦公室

青蒿

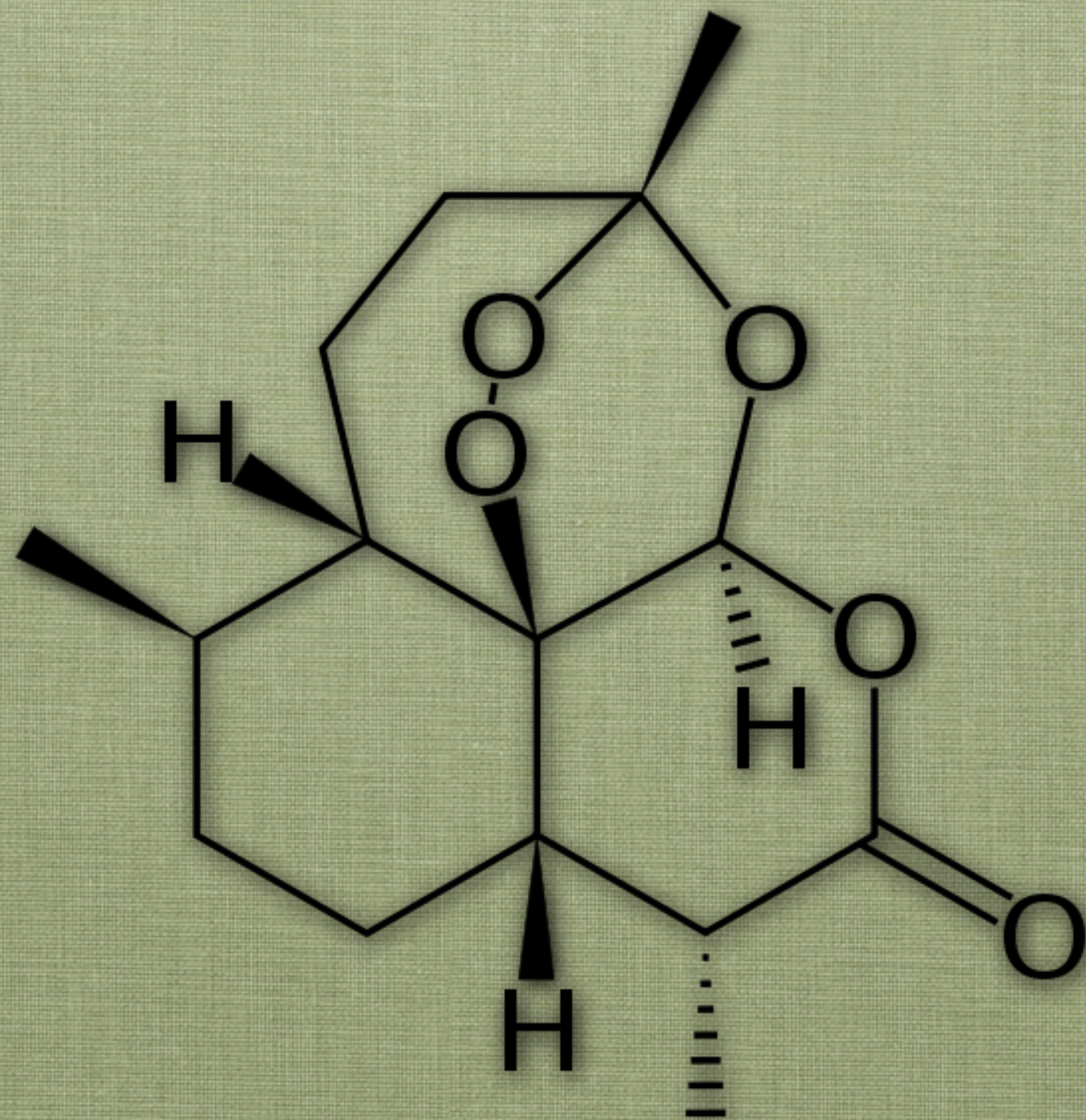


Daniel Klayman

Vietnam War
523 辦公室

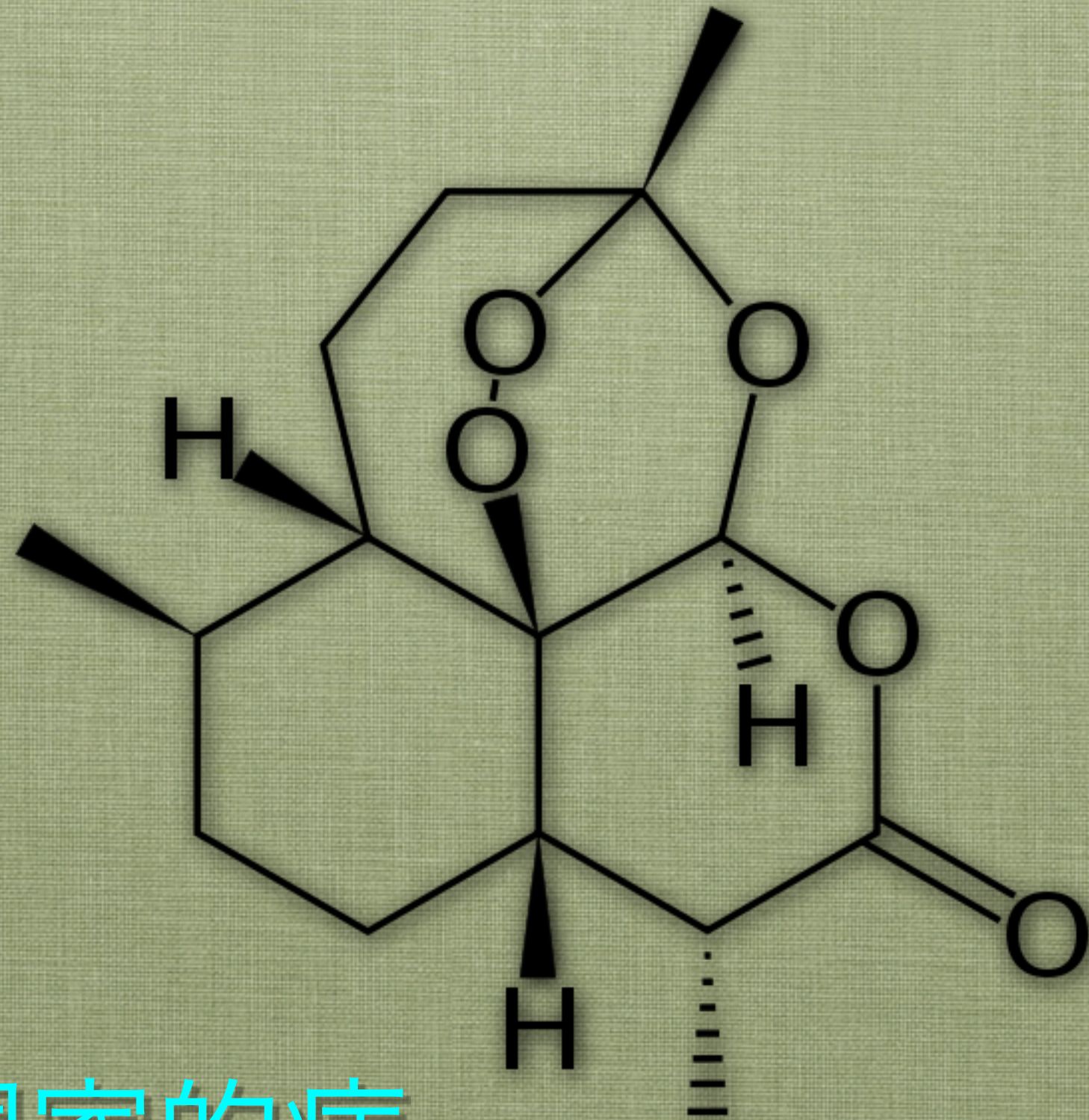
Artemisinin

青蒿素



Artemisinin

青蒿素



落後國家的病



Hybrid plants could boost artemisinin supplies from farms in Tanzania (above) and elsewhere.

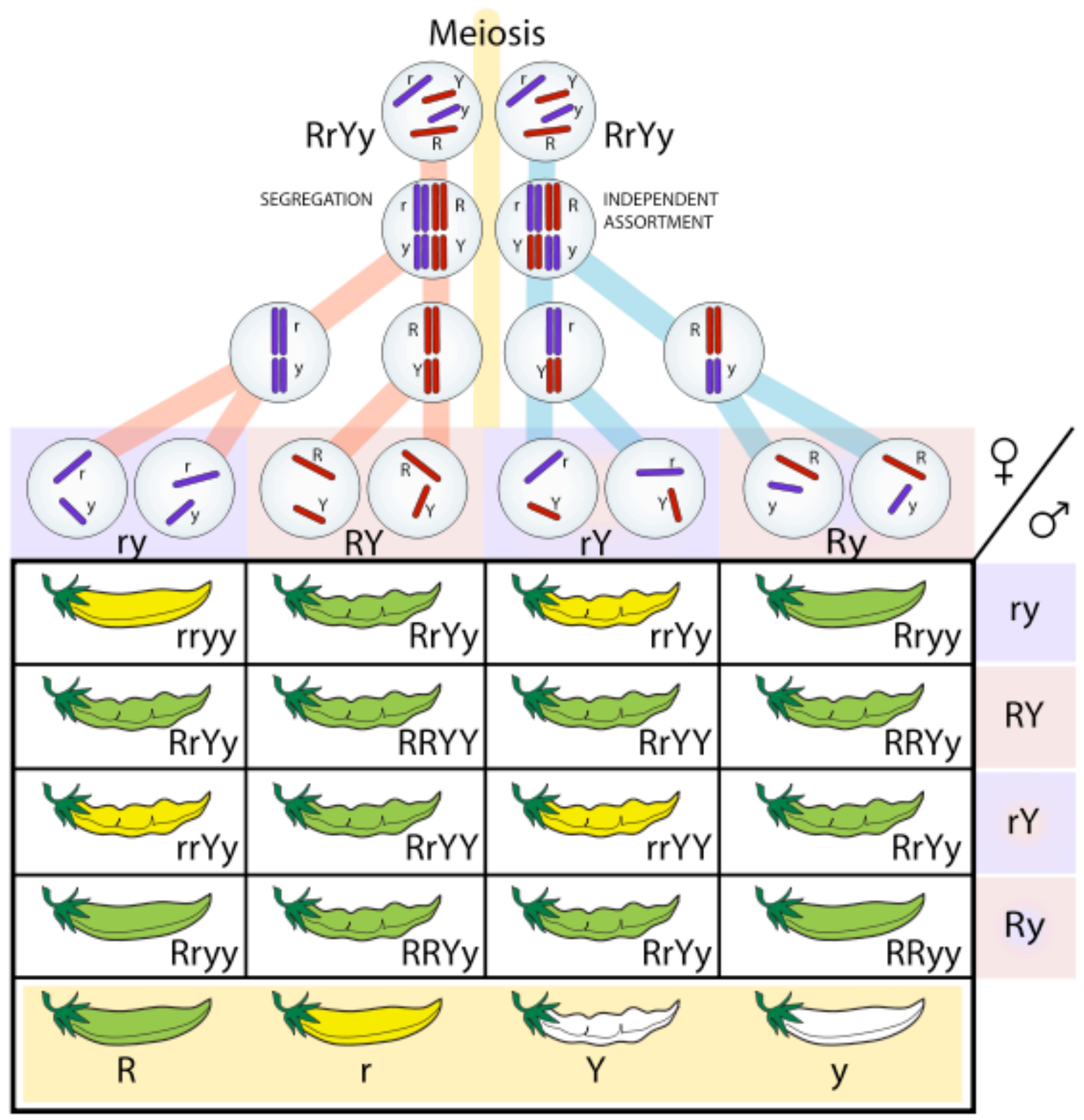
artemisinin-based combination therapies (ACTs)

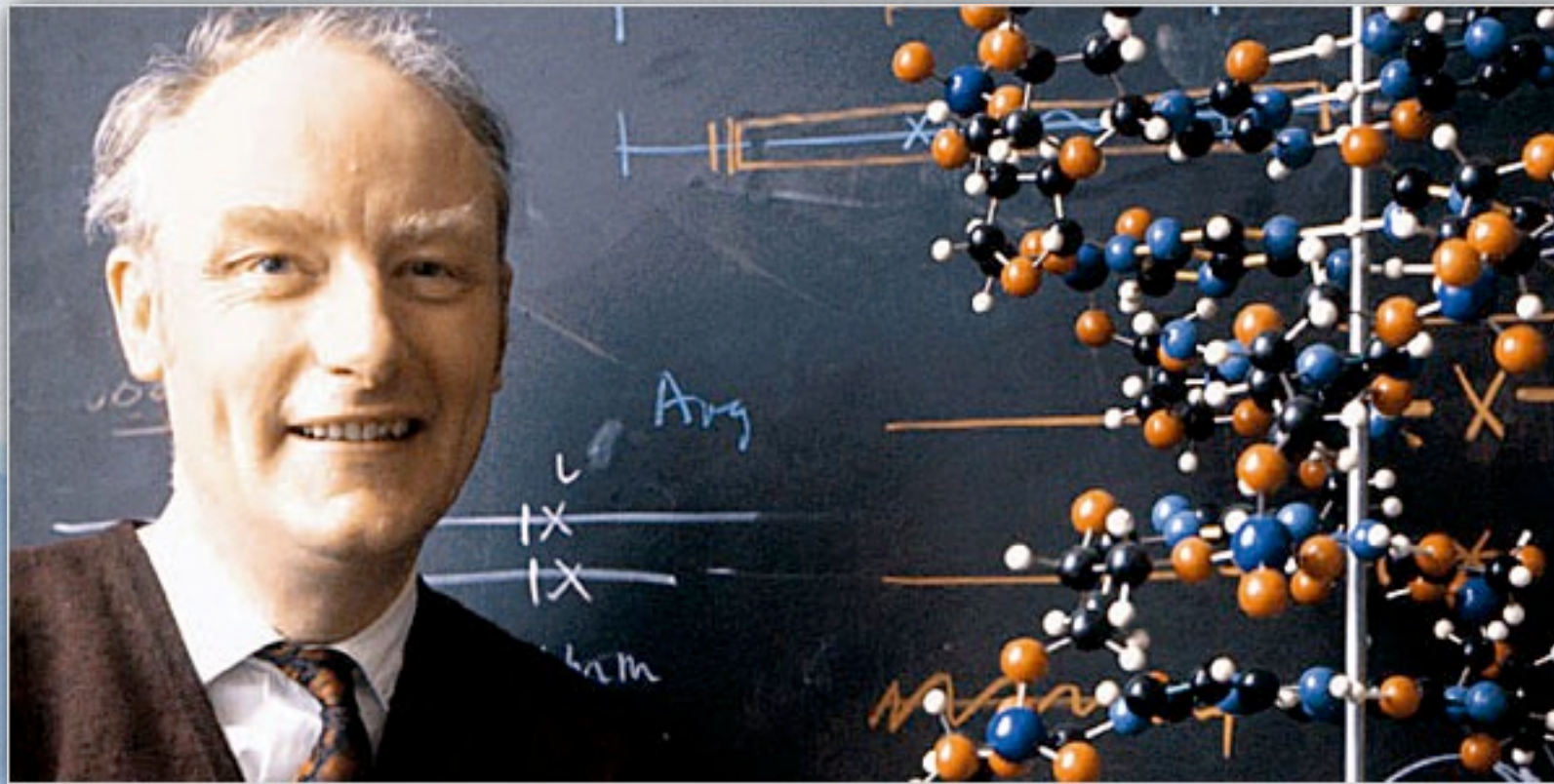
US\$ 1 per dose

Bill & Melinda Gates Foundation (US\$ 42.6 M)

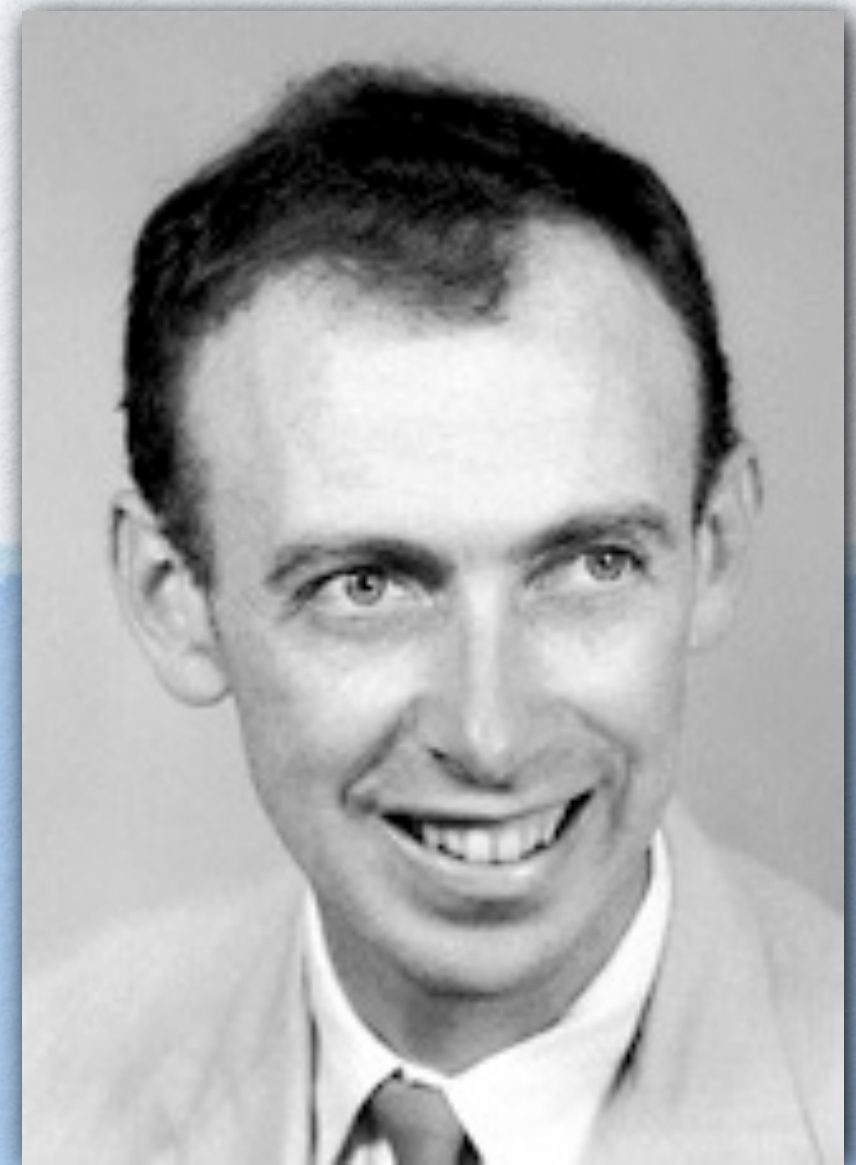
Gregor Mendel (1822.7.20 ~ 1884.1.6)







Francis Crick

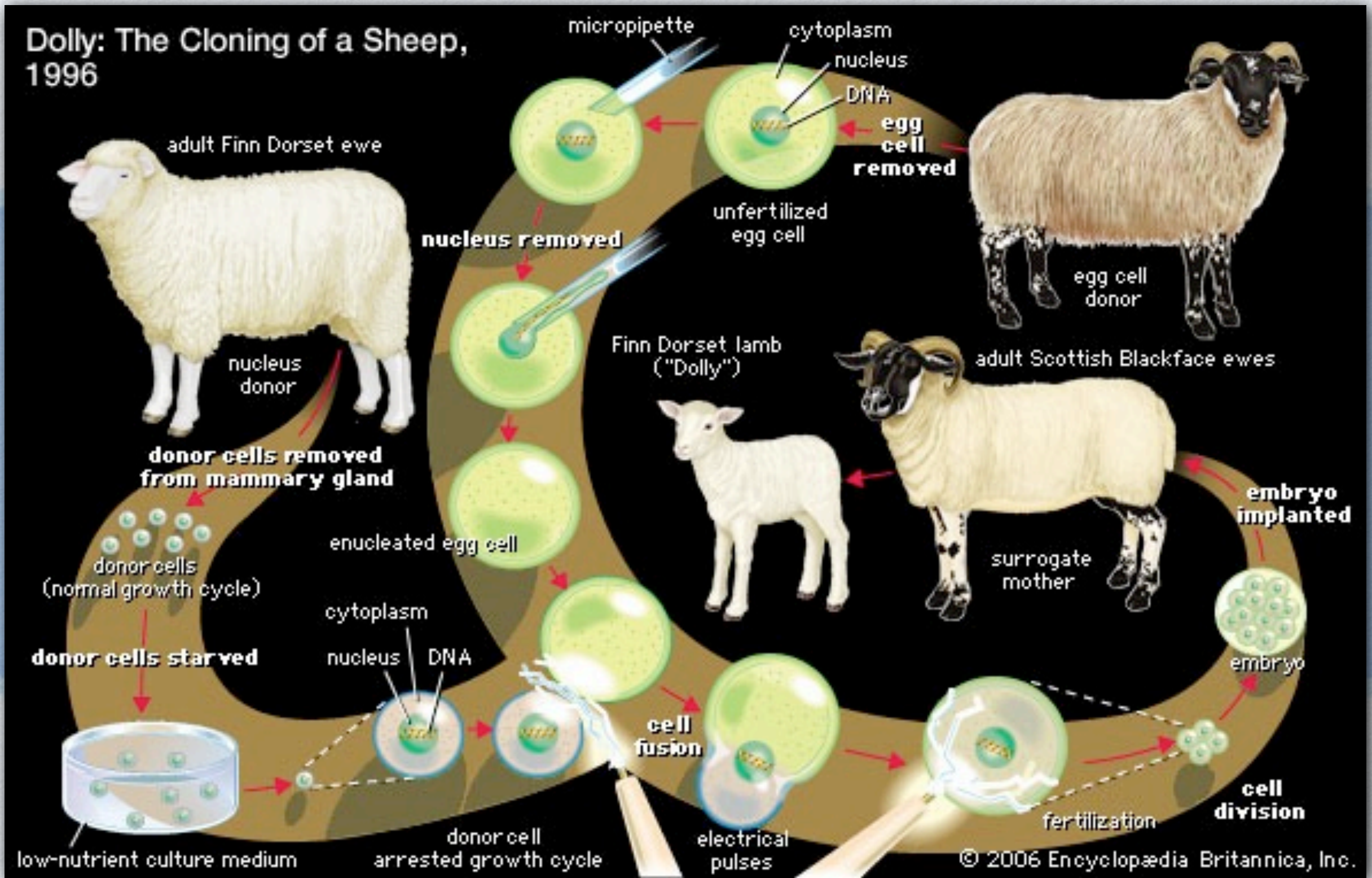


James Watson



Maurice Wilkins

Dolly: The Cloning of a Sheep, 1996

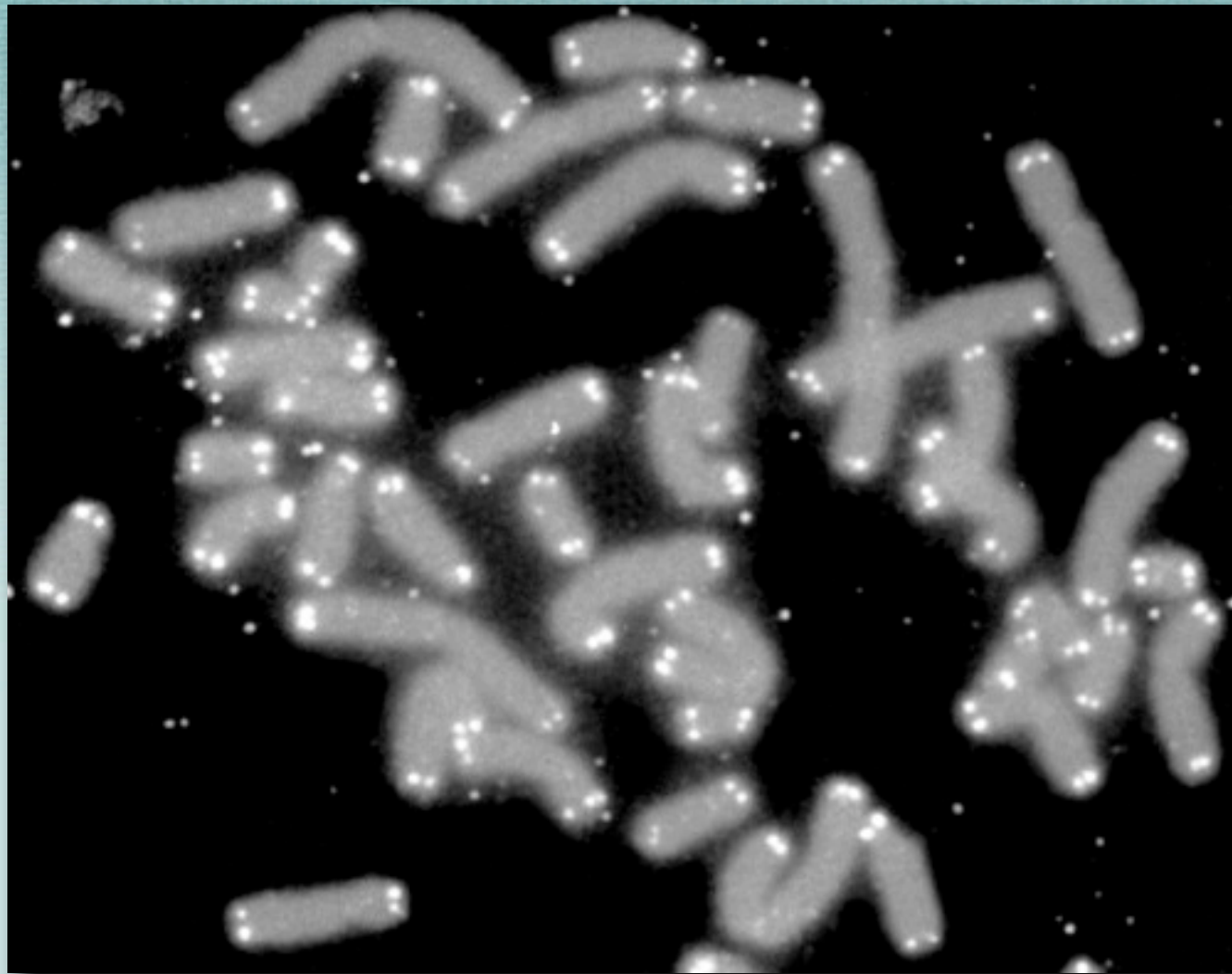


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?

1996.7.5-2003.2.14 (died half regular age)



telomere (端粒)



Elizabeth Blackburn



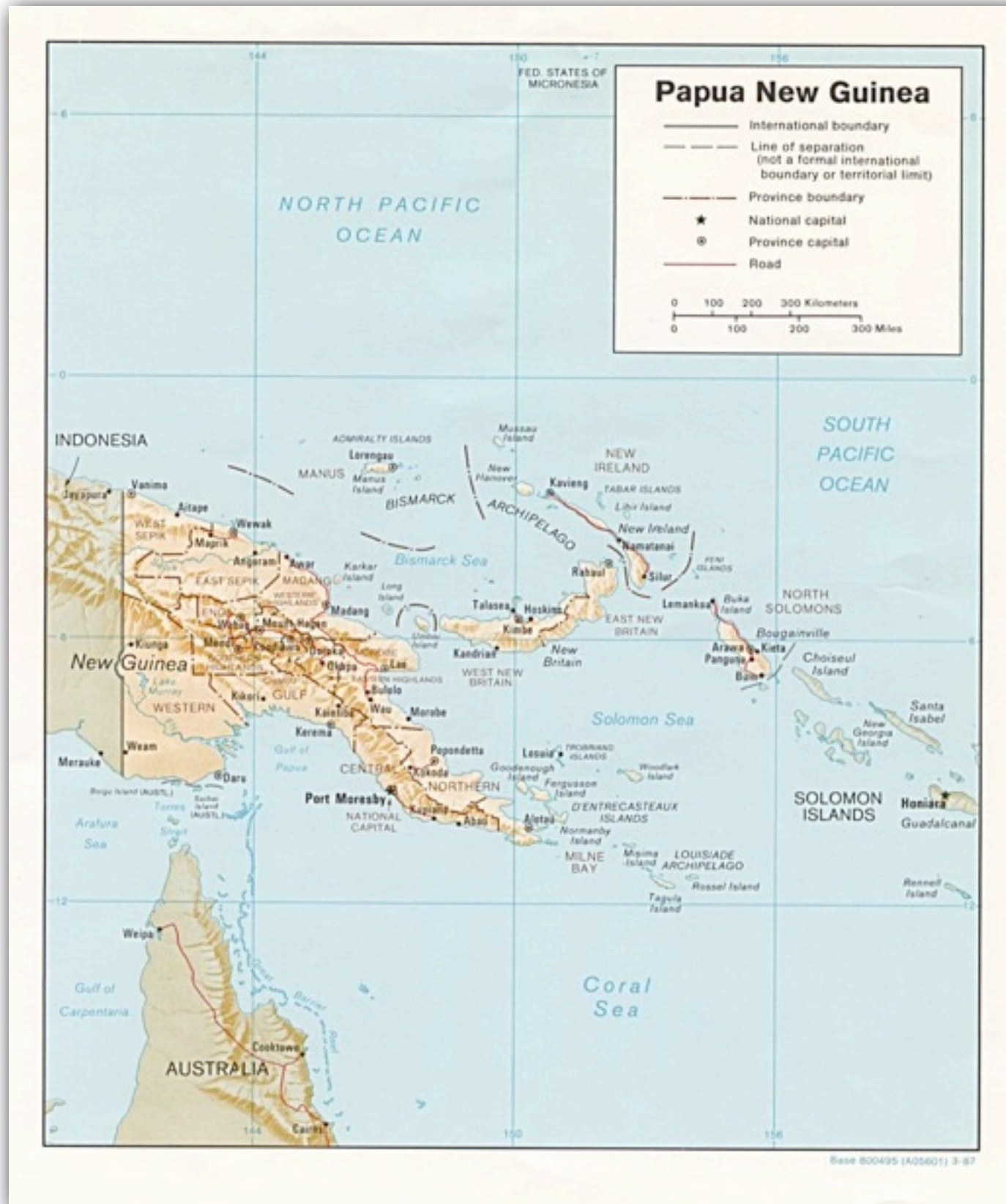
Carol W. Greider



Jack W. Szostak

2009 N.P.

Daniel Carleton Gajdusek (1923.9.9~2008.12.12) 1976 Nobel Prize



**South Fore,
Papua New Guinea**

**Kuru disease
(trembling)**

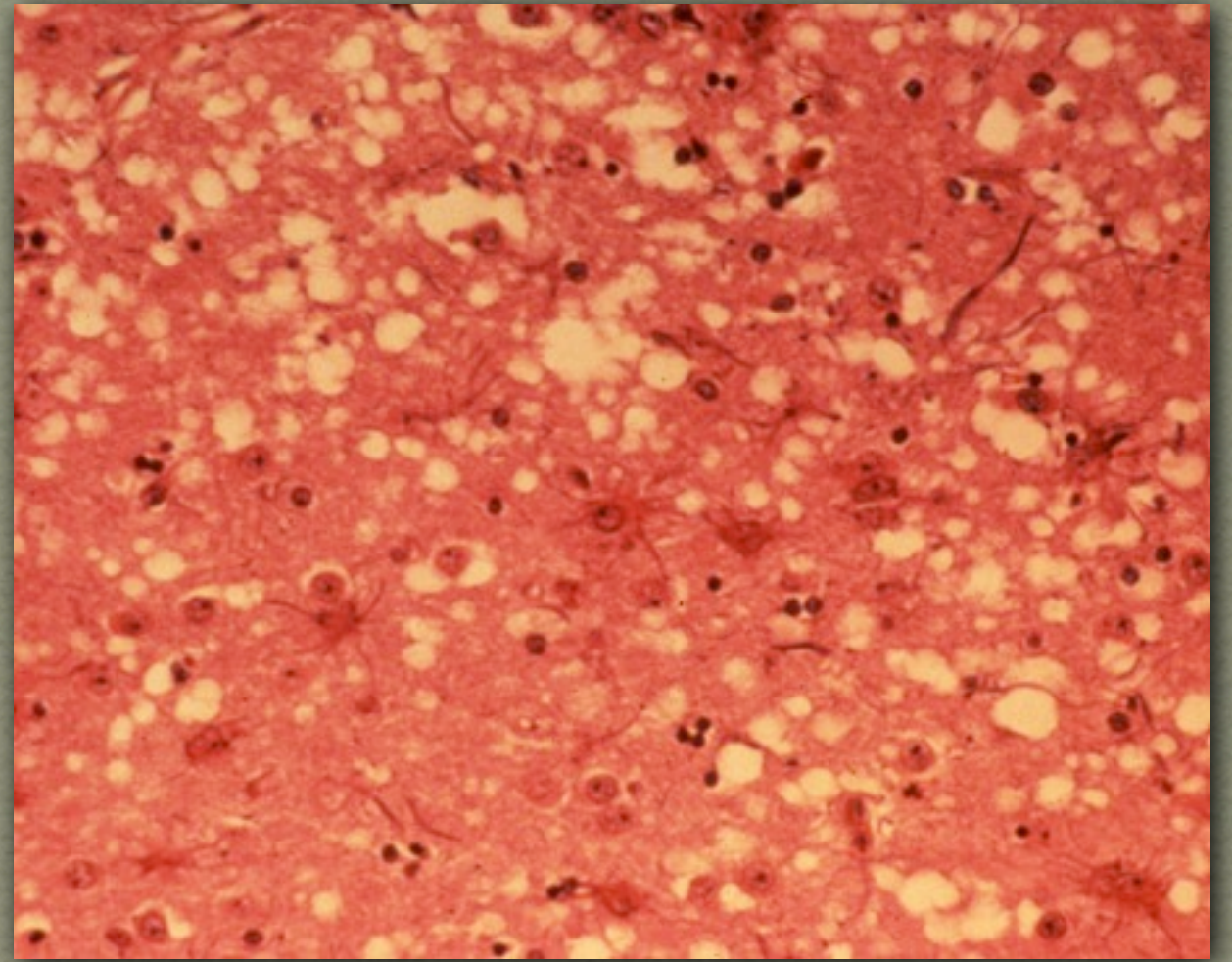


?



Bovine spongiform encephalopathy
(BSE, mad cow disease)

牛海綿狀腦病

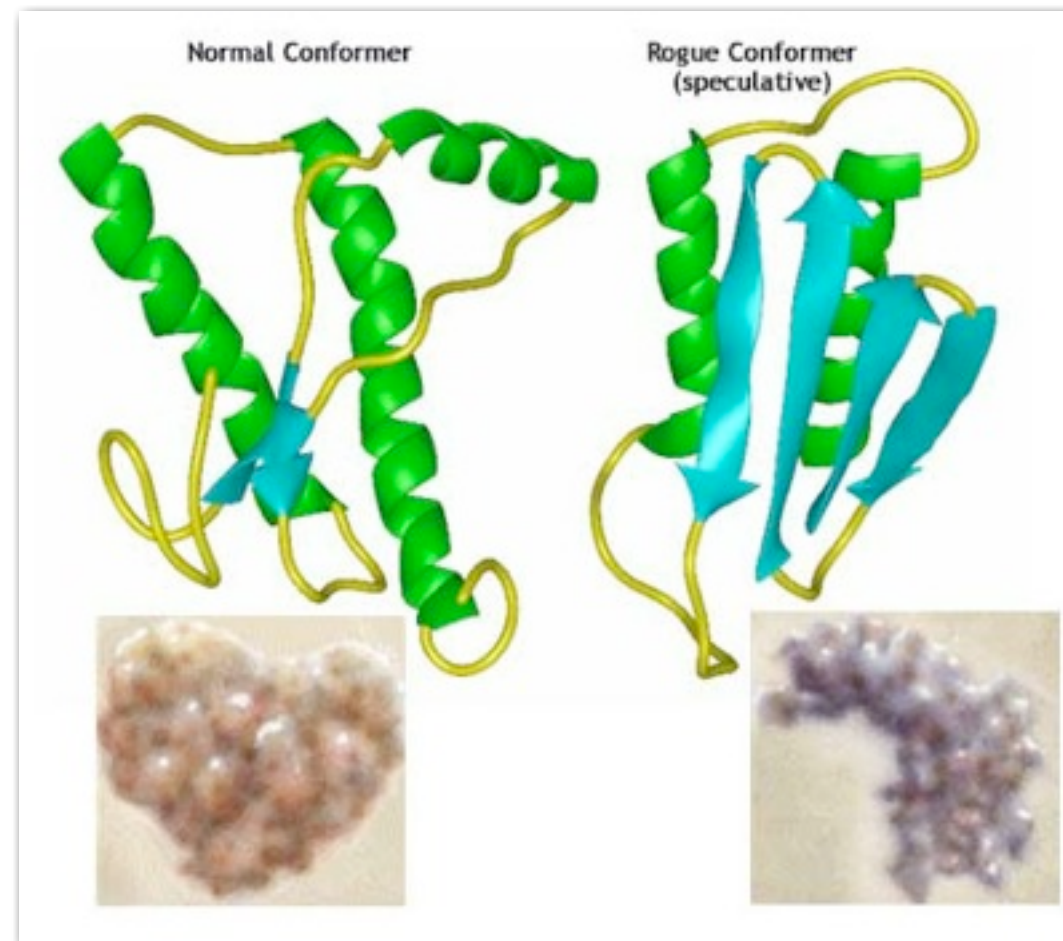


Stanley B. Prusiner (1942.5.28~) 1997 N.P.



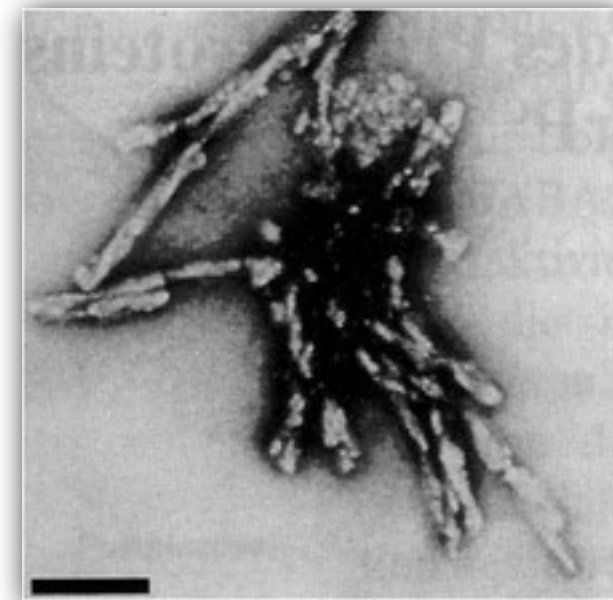
Prion

proteinaceous infectious particle that lacks nucleic acid

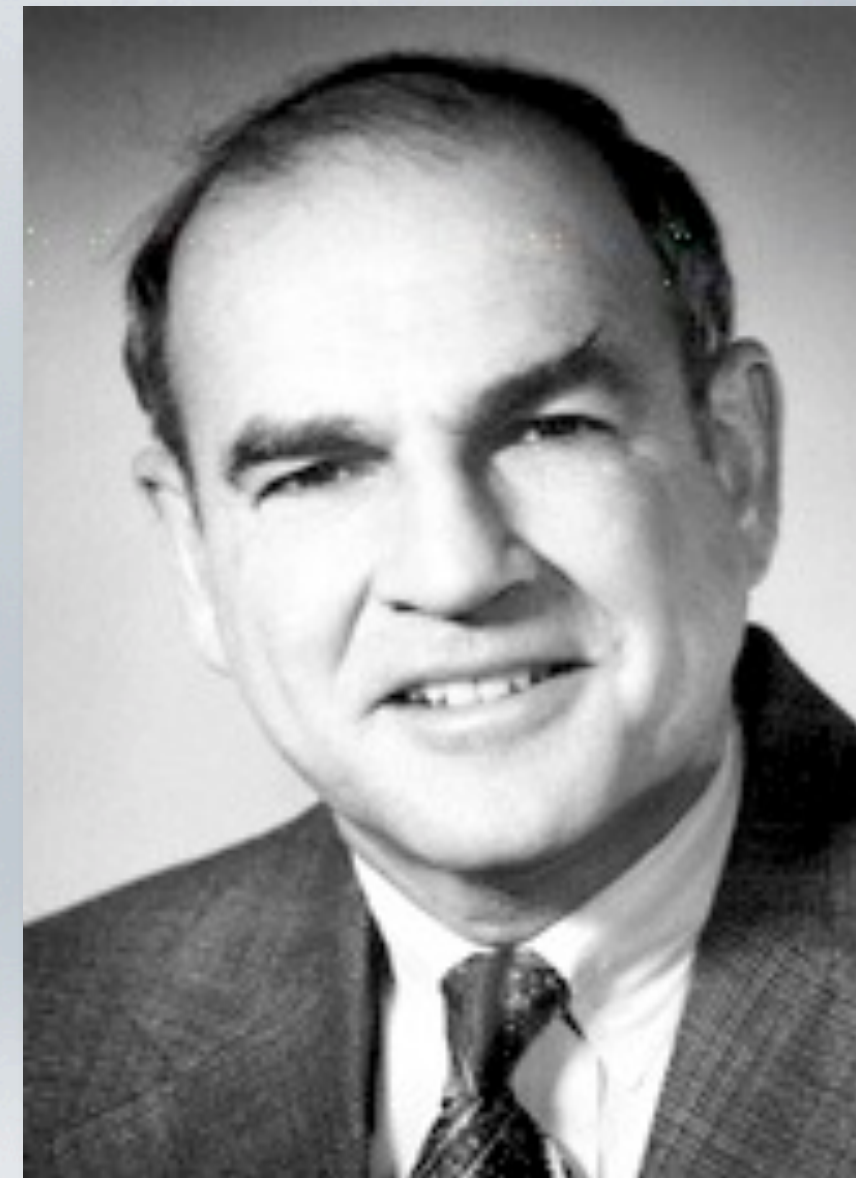
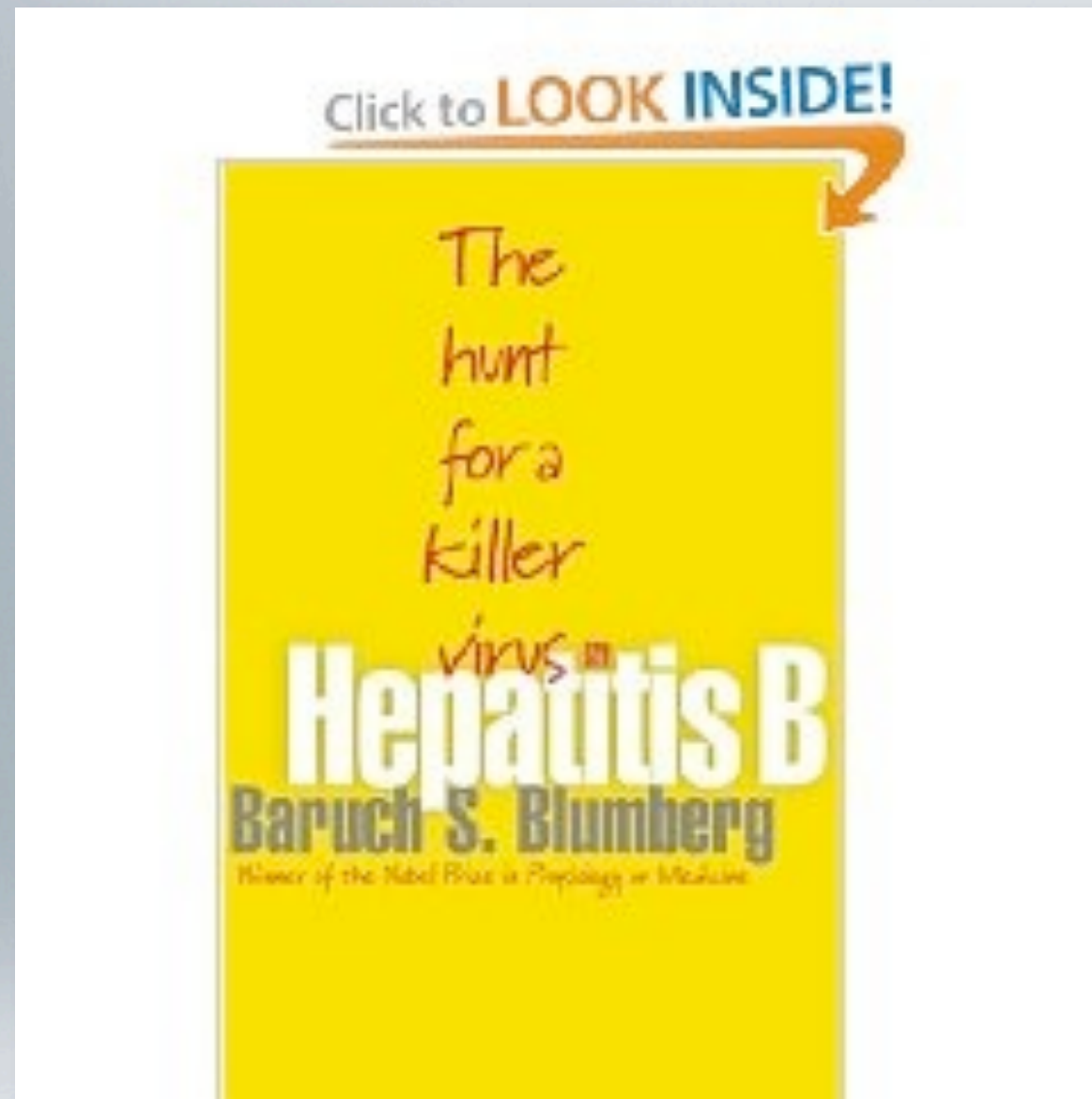


PrP^C

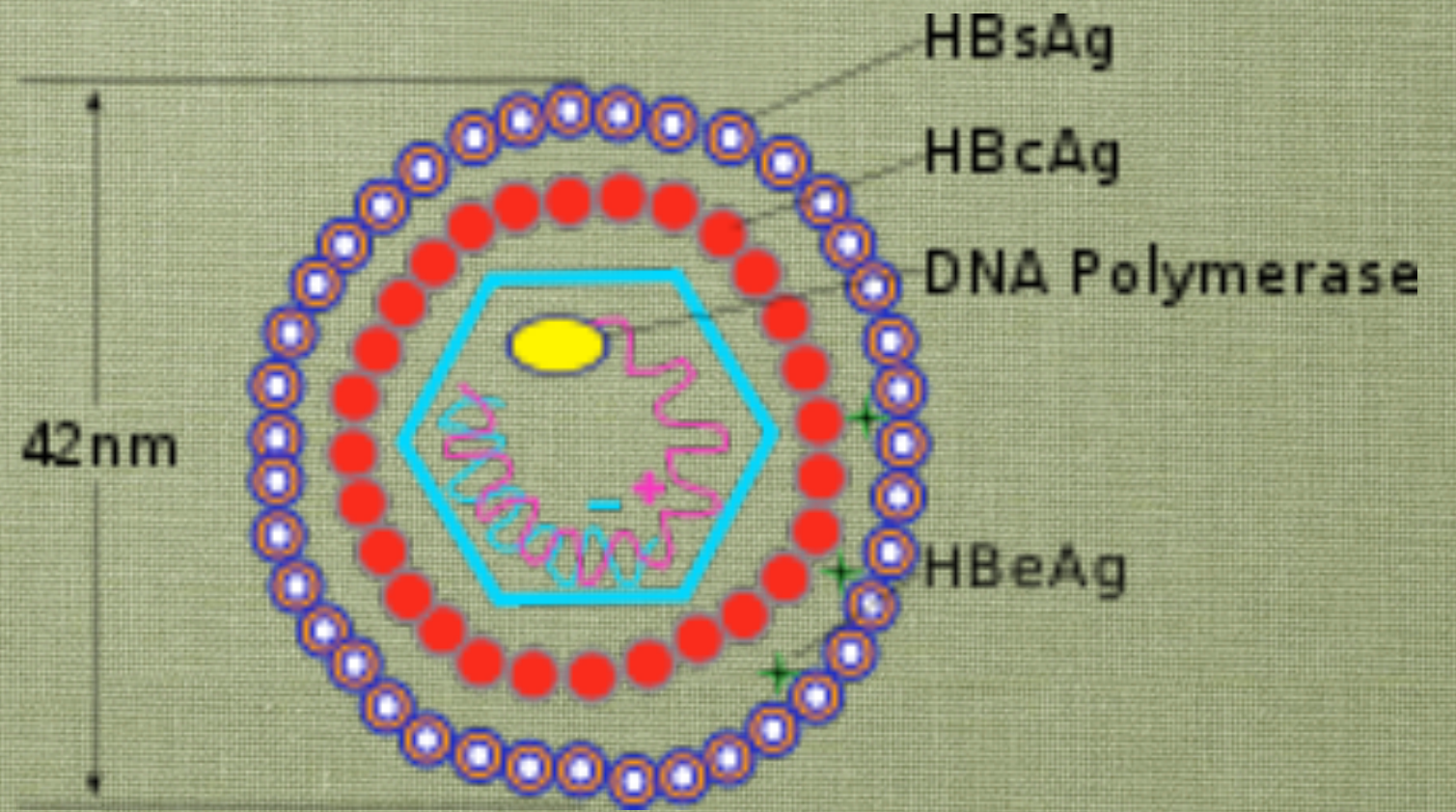
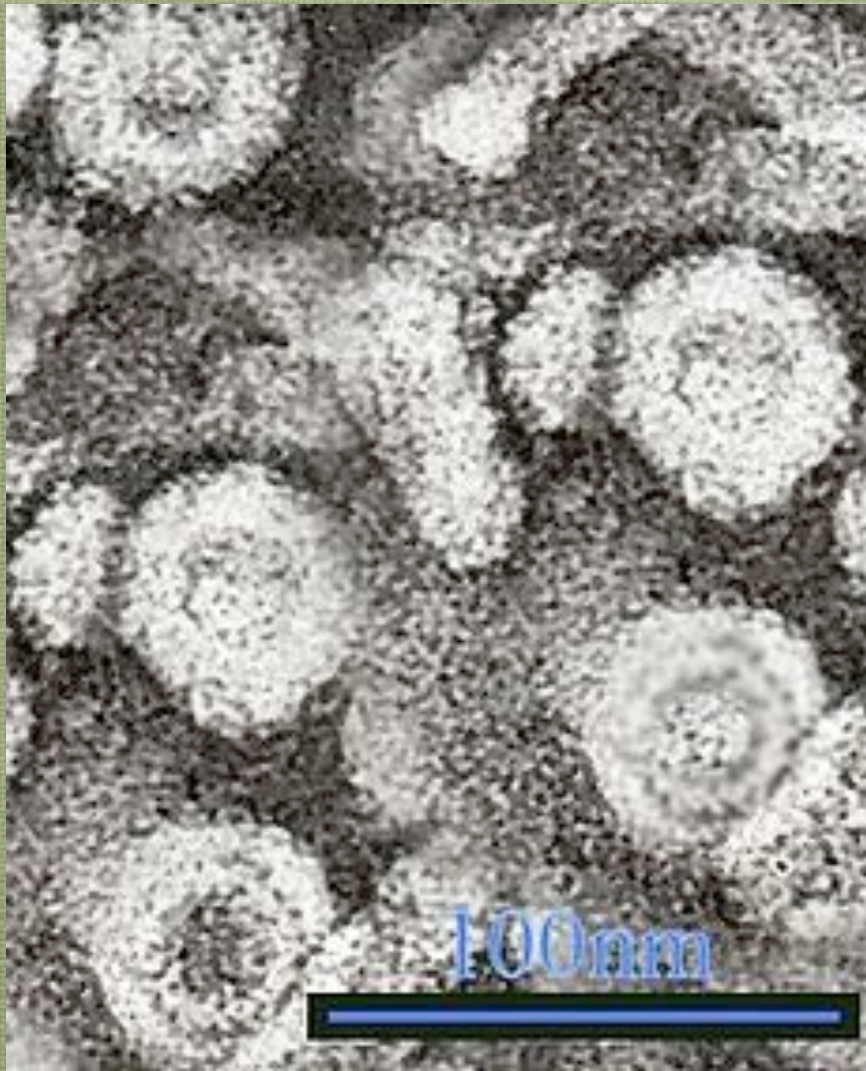
PrP^{Sc}



prion crystal rod



**Baruch S. Blumberg (1976 Nobel Prize)
Hepatitis B**



Hepatitis B (blood or body fluids)

1981 (22707) (台灣公保體檢)

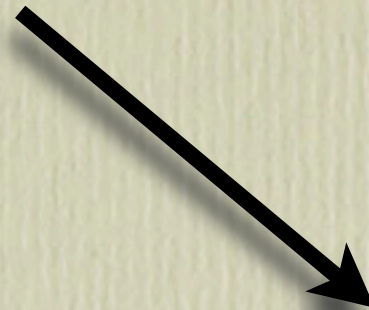
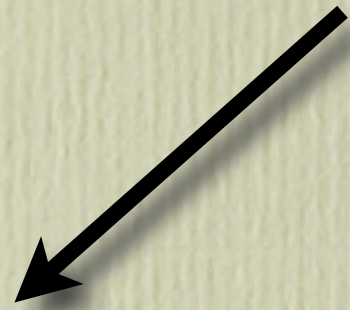


3000+ (H-B+)

19000+



1981 (22707) (台灣公保體檢)



3000+ (H-B+)

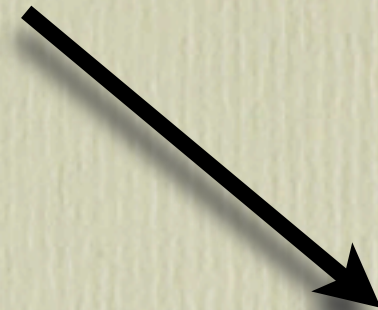
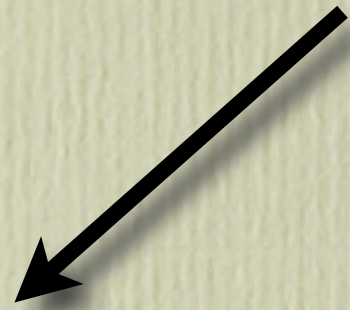
19000+



1984 (49; liver cancer)

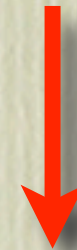
1.63% (A)

1981 (22707) (台灣公保體檢)



3000+ (H-B+)

19000+



1984 (49; liver cancer) (1; liver cancer)

1.63% (A)

0.00526% (B)

1981 (22707) (台灣公保體檢)



3000+ (H-B+)

19000+



1984 (49; liver cancer) (1; liver cancer)

1.63% (A)

0.00526% (B)

A/B = 310 X

1981 肝炎防治委員會

1984 全國性十年B型肝炎疫苗接種 計劃

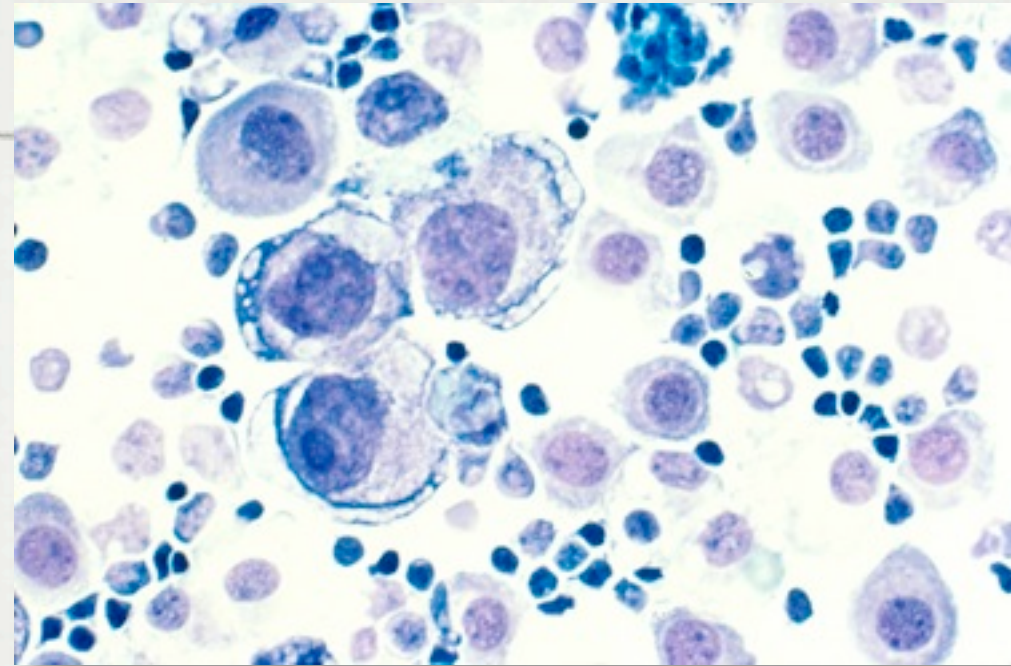
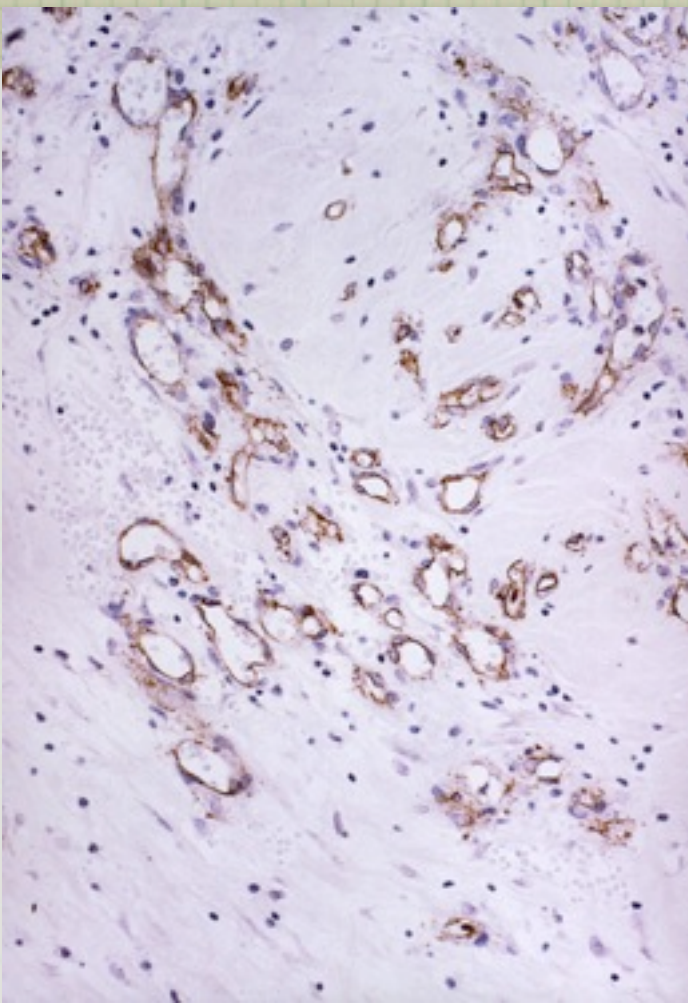
6~14 兒童

1981~1986 (0.70/10萬)

1986~1990 (0.57/10萬)

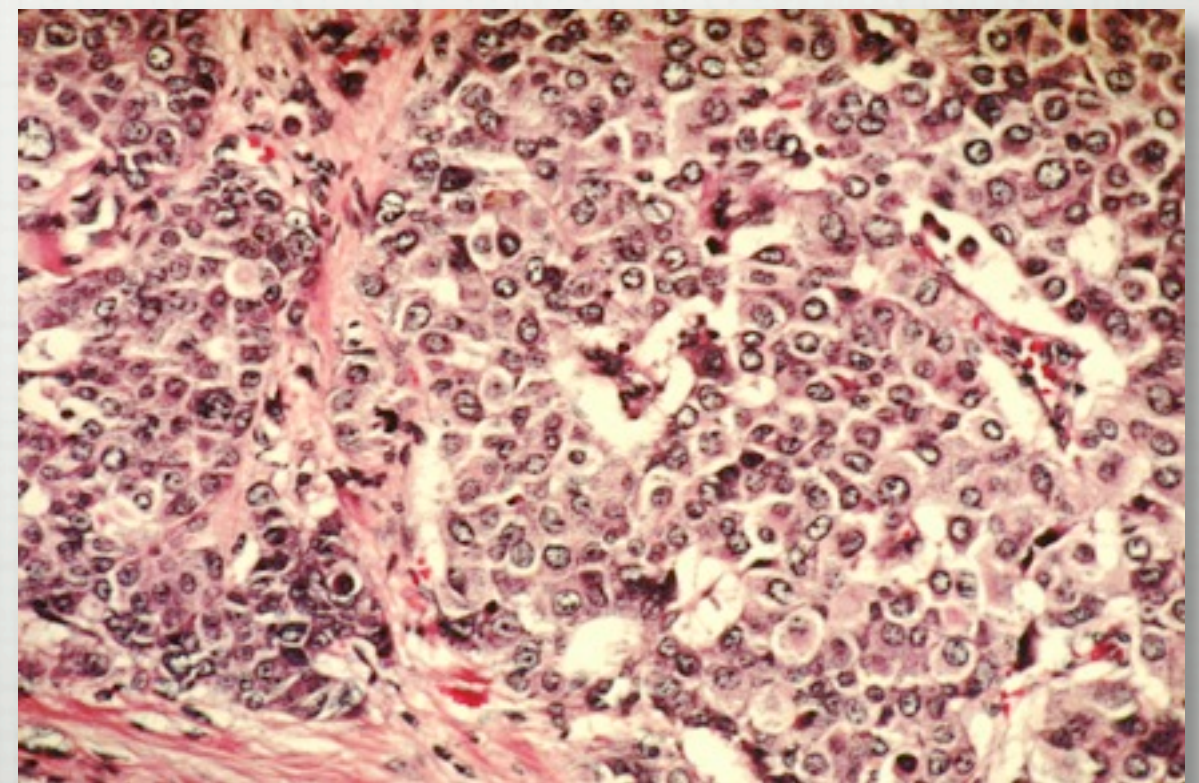
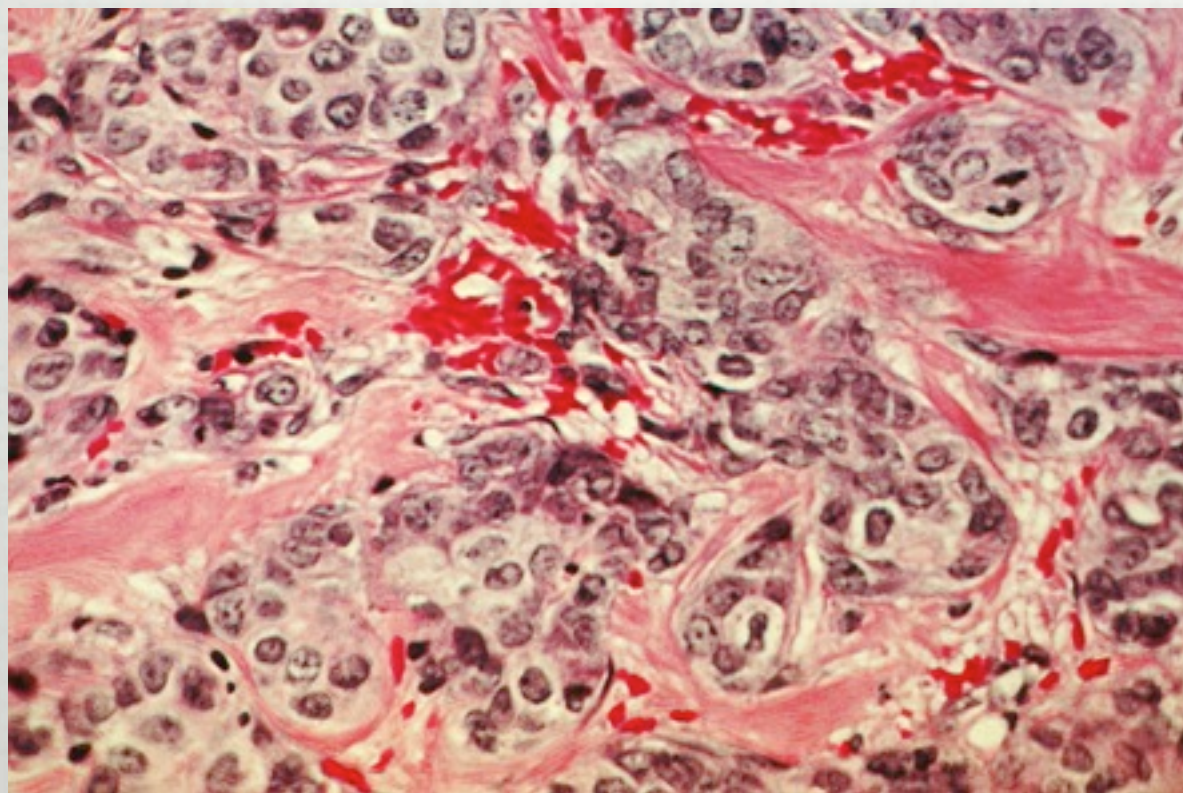
1990~1994 (0.36/10萬)

BREAST CANCER

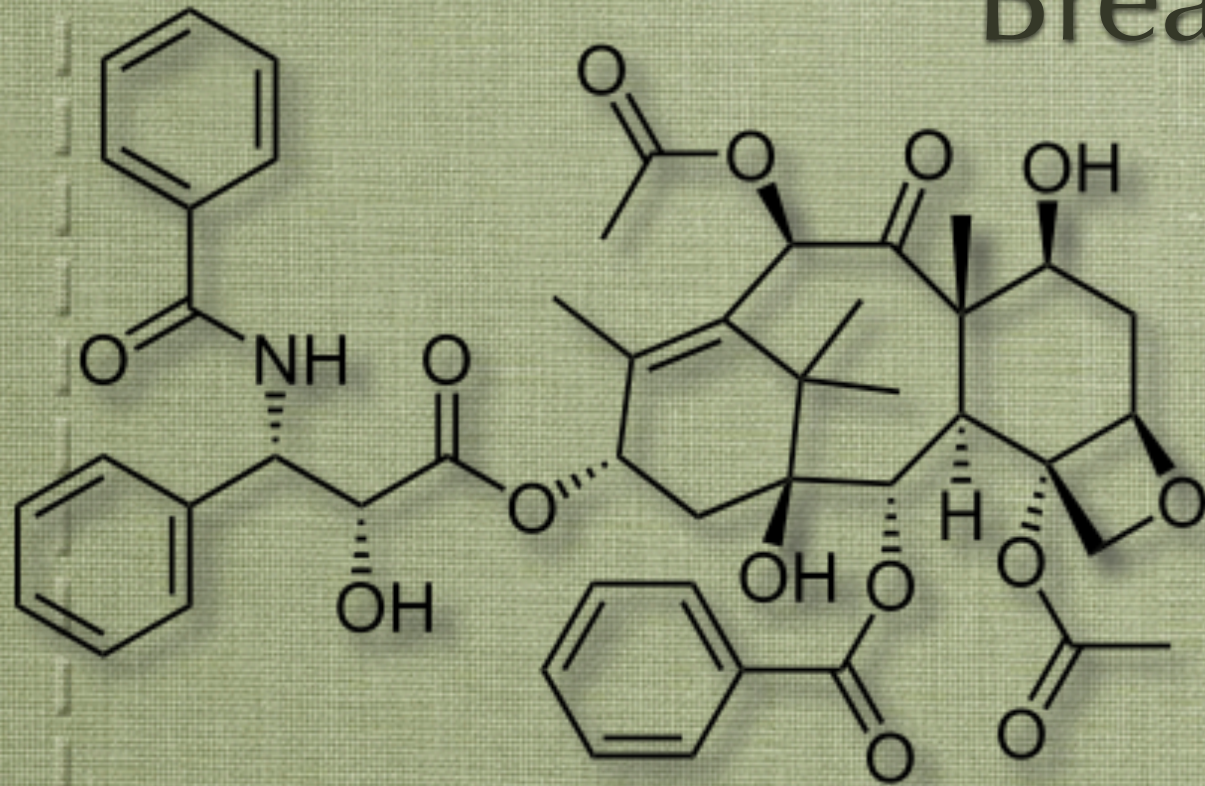


5500+/年

NO. 1 KILLER



Breast Cancer



Taxol (1967) 汰癌勝

抑制細胞分裂



Pacific Yew (bark)

太平洋紫杉

Monroe Wall



Mansukh Wani

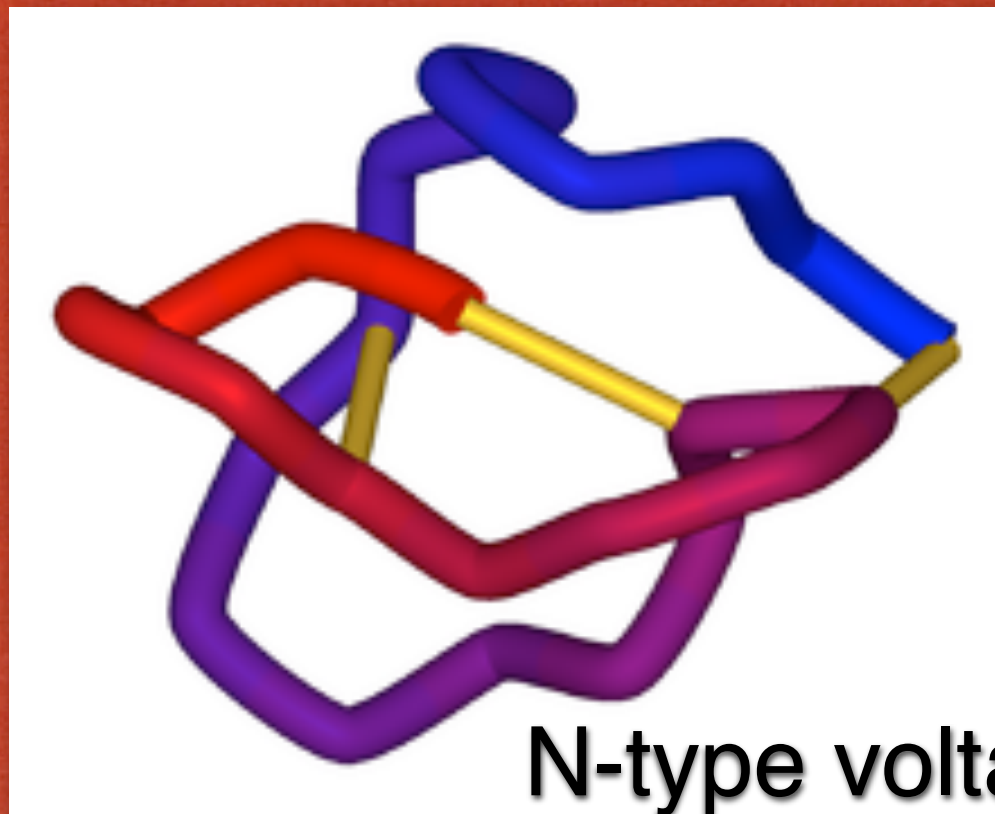


Baldomero Olivera



芋螺 Cone Snail

Ziconotide (Prialt) 2004-12-21



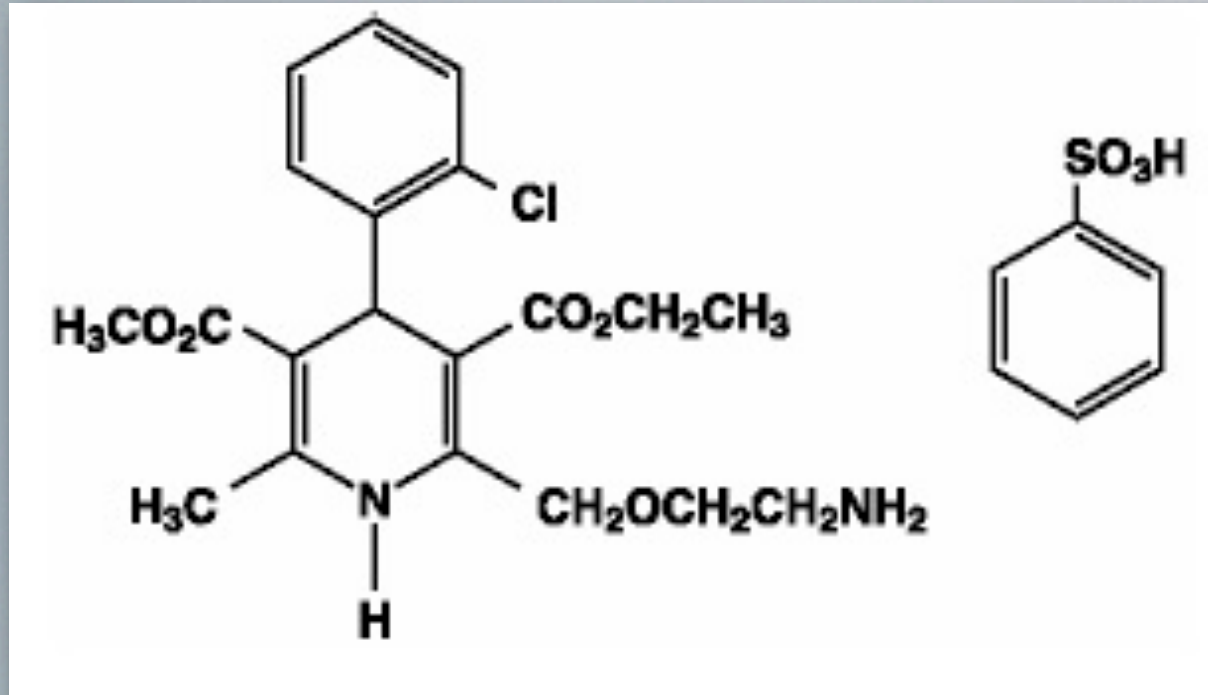
N-type voltage-gated calcium channel blocker

高血壓併發症

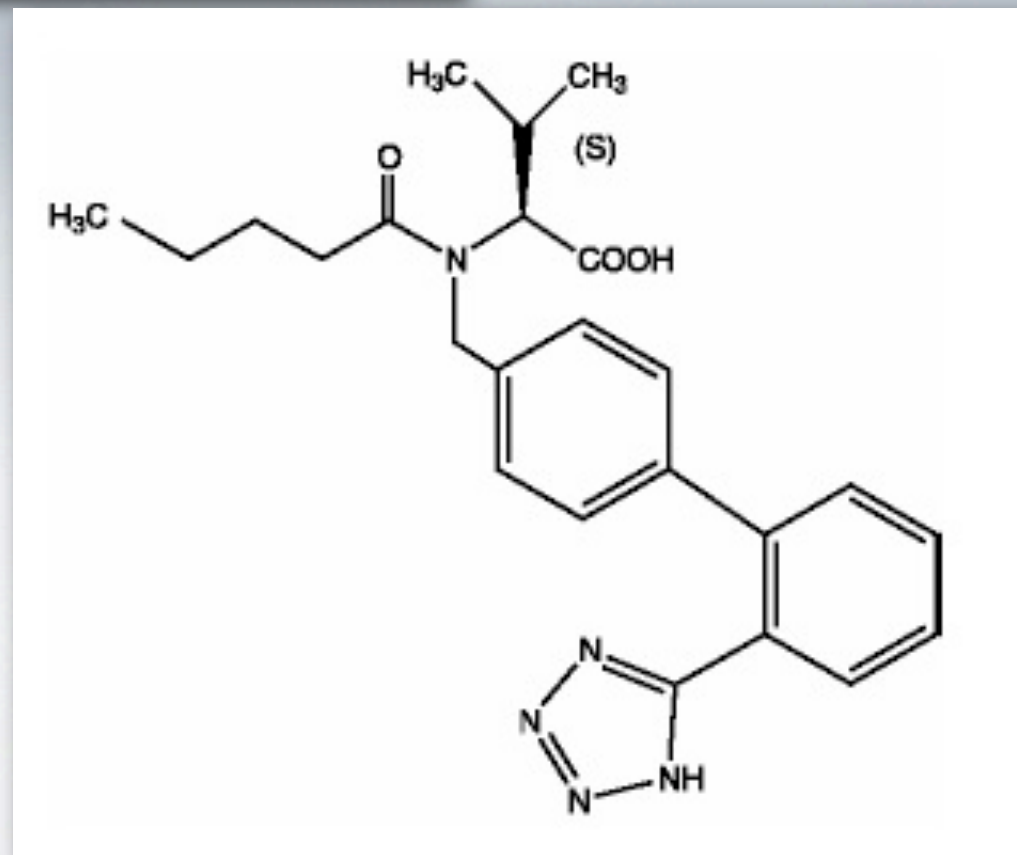
- 1.眼底病變：**如血管痙攣，血管硬化，眼底出血。
- 2.心臟病變：**如左心室擴大，心肌纖維化，心臟衰竭，冠動脈不全症及心肌梗塞。
- 3.大動脈及其分支的病變：**如大動脈硬化，動脈粥狀硬化，血管瘤及剝離性大動脈瘤。
- 4.腦病變：**如腦循環，腦病，腦栓塞，腦內出血及蜘蛛膜下出血
- 5.腎病變：**如腎硬化症，腎功能不全，腎衰竭。
- 6.心臟方面**會有心臟擴大、心肌梗塞情況。
- 7.腎臟方面**會有腎衰竭的情況。
- 8.腦中風、半身不遂。**

Exforge (calcium channel blocker + Angiotensin II antagonist)

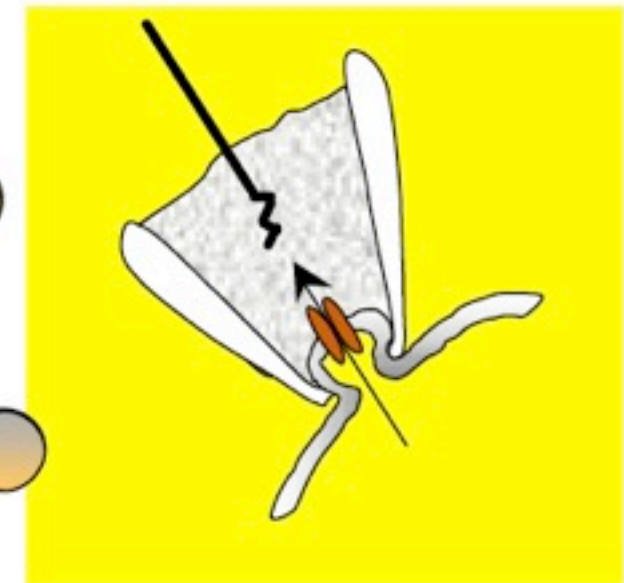
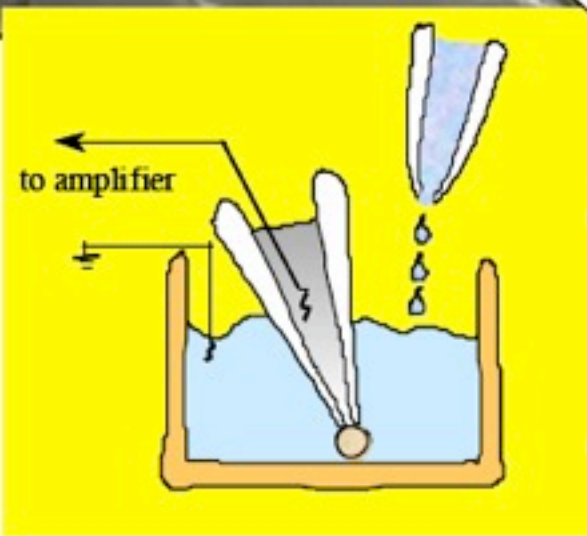
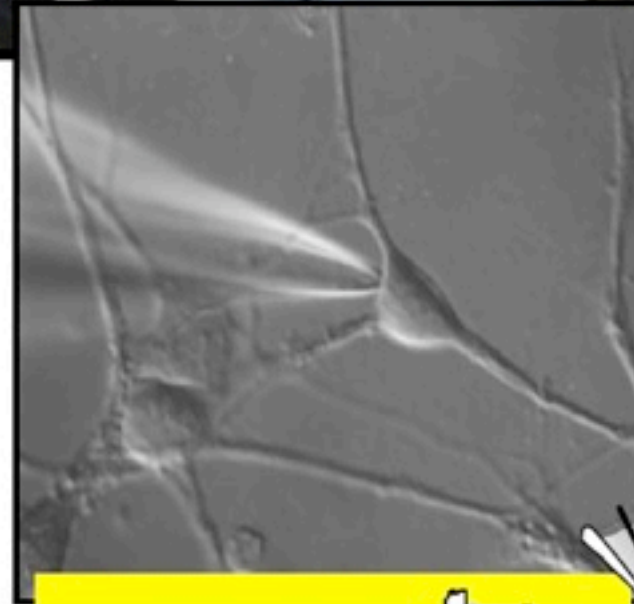
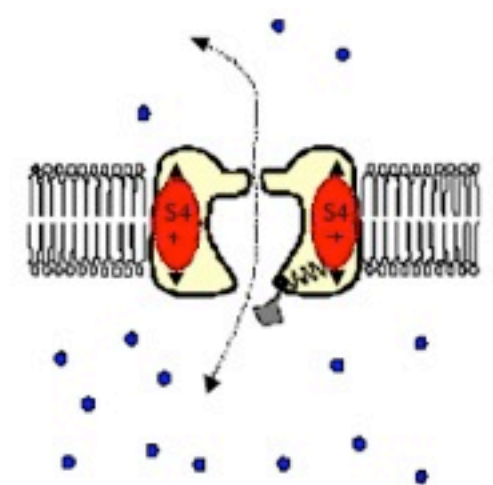
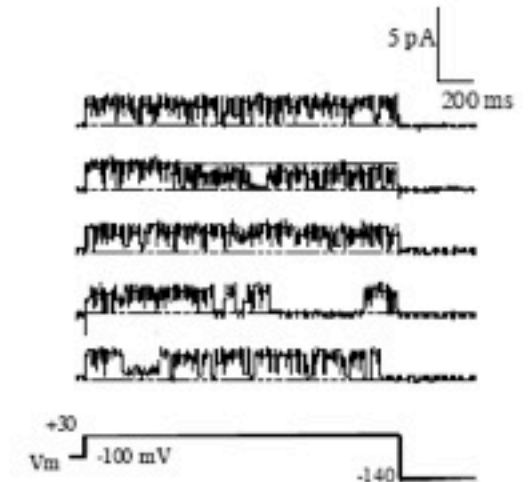
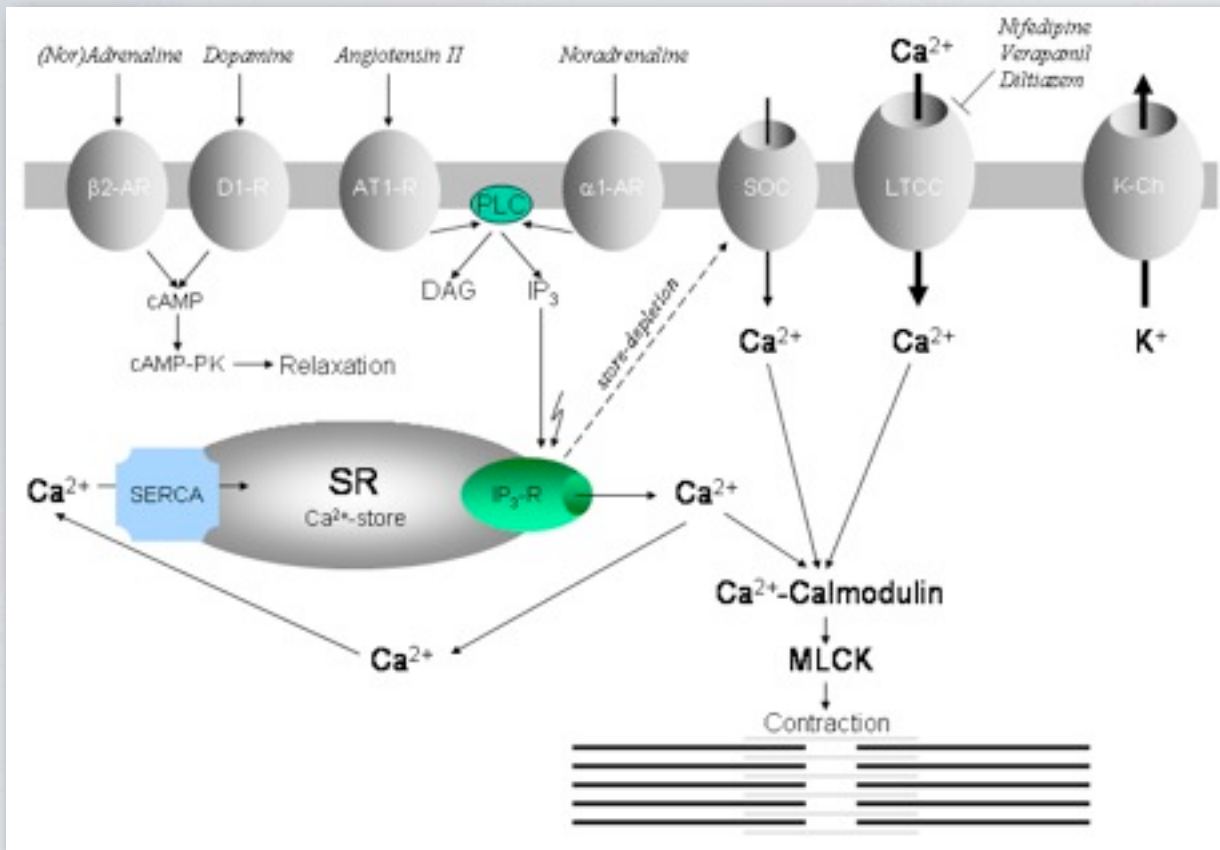
血管收縮素拮抗劑



**Amlodipine
besylate**



Valsartan



Patch-Clamp Technique

「膜片箝制」

Parkinson's Disease

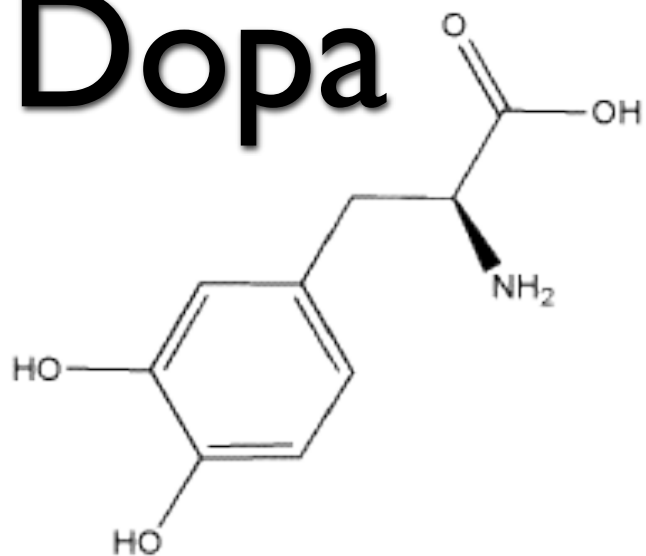
帕金森氏病

肌強直或肌僵直

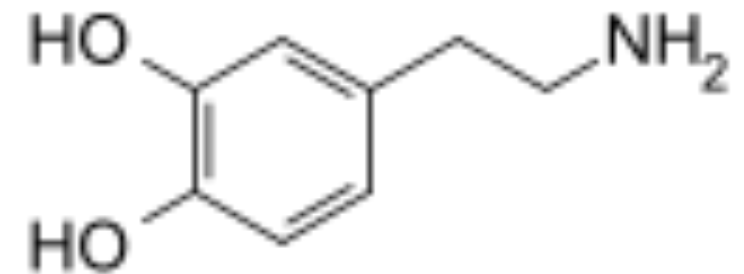
震顫

運動減慢（運動徐緩），無法運動
（運動不能）

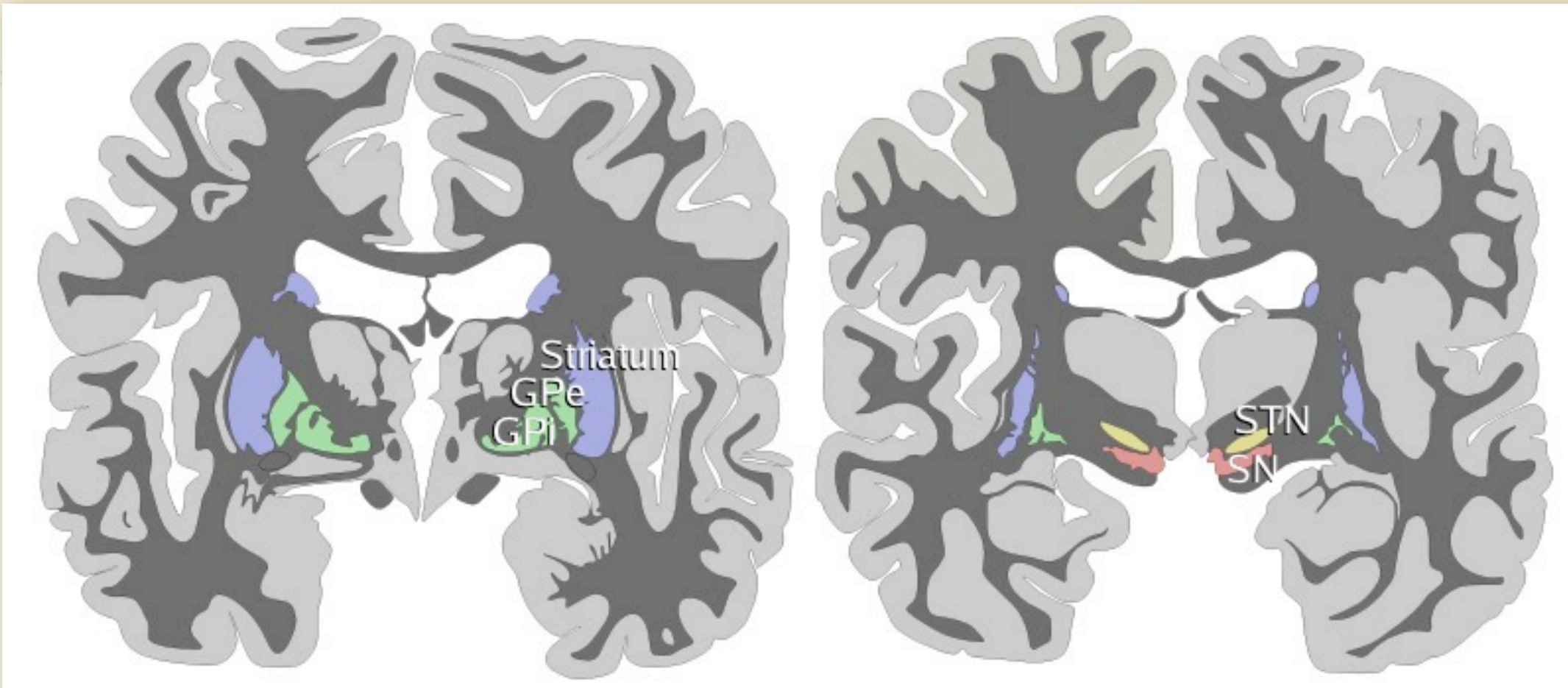
Dopa



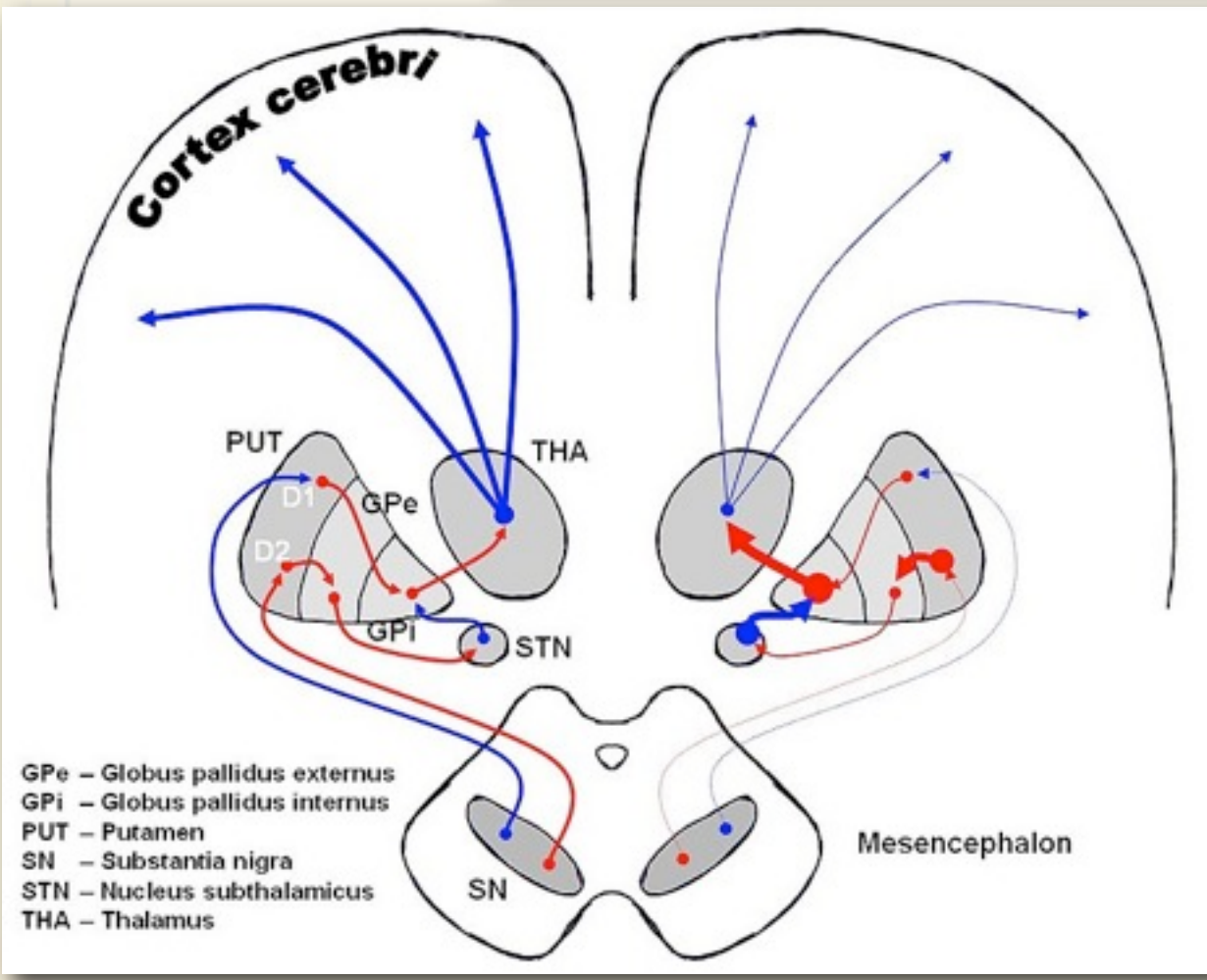
平衡及行走障礙



Dopamine



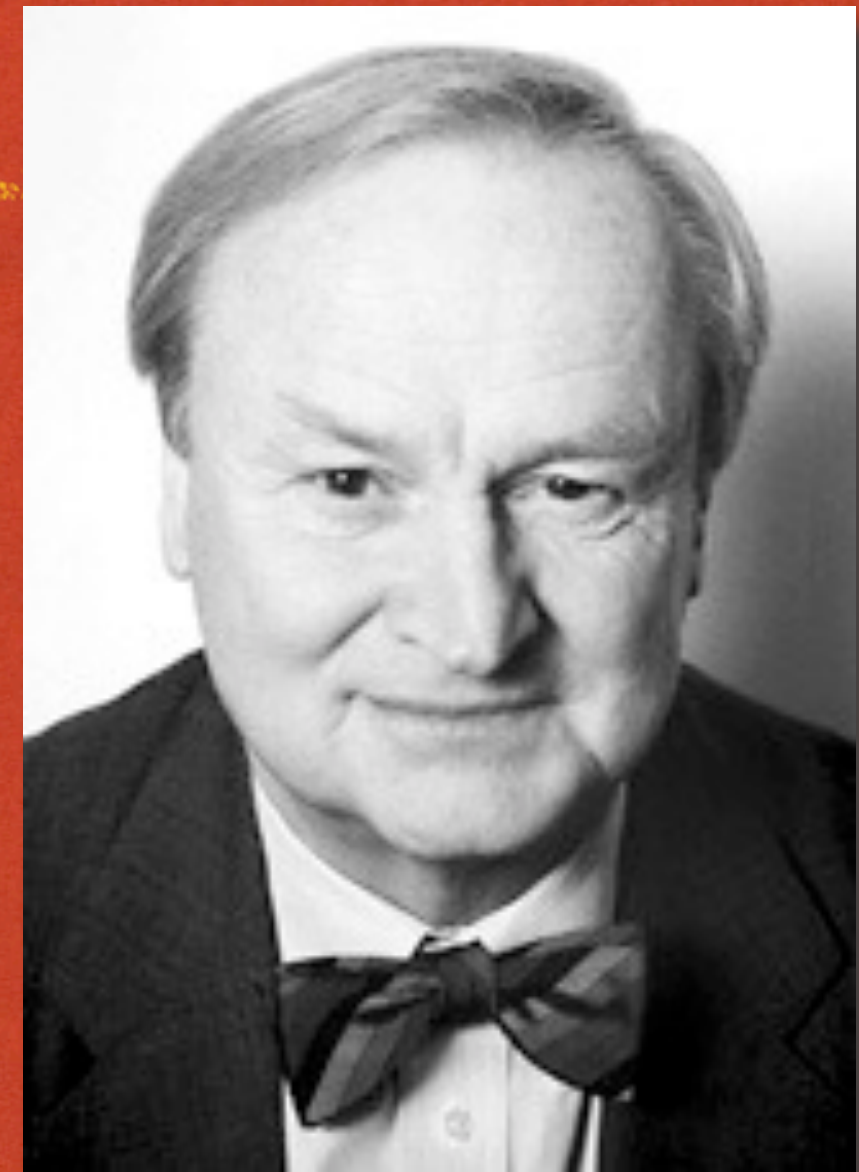
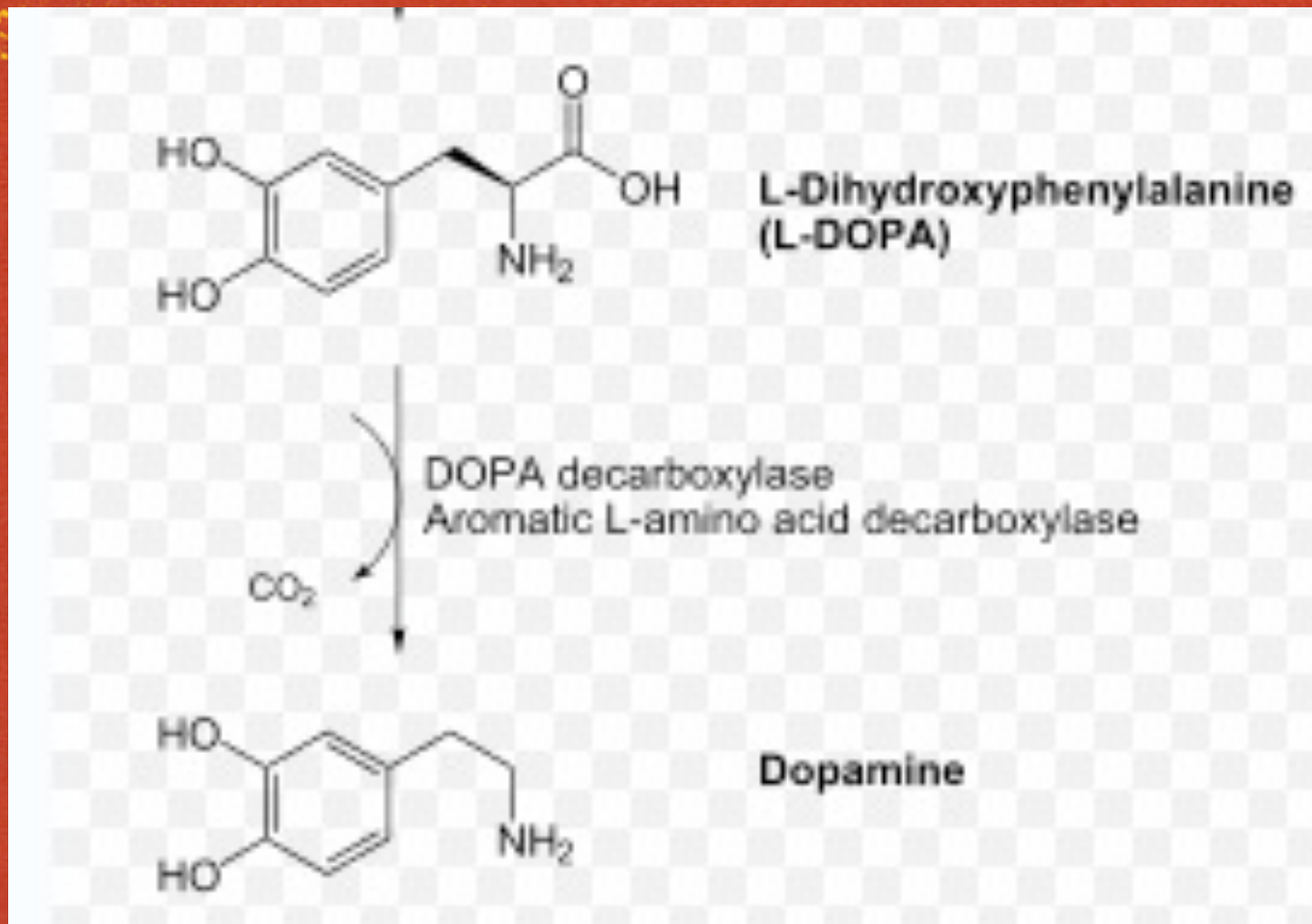
Normal



PD

suppression

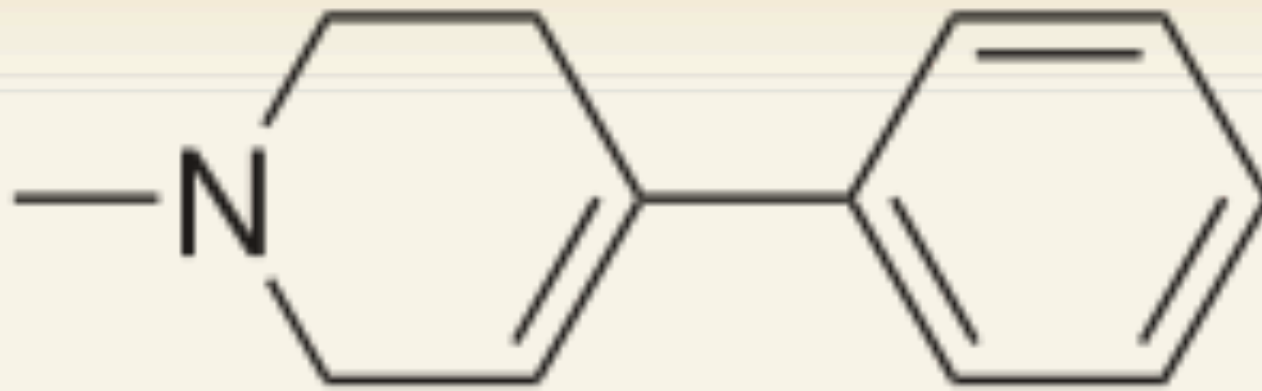
stimulation



(1957)

Arvid Carlsson
2000 N.P.

Swedish



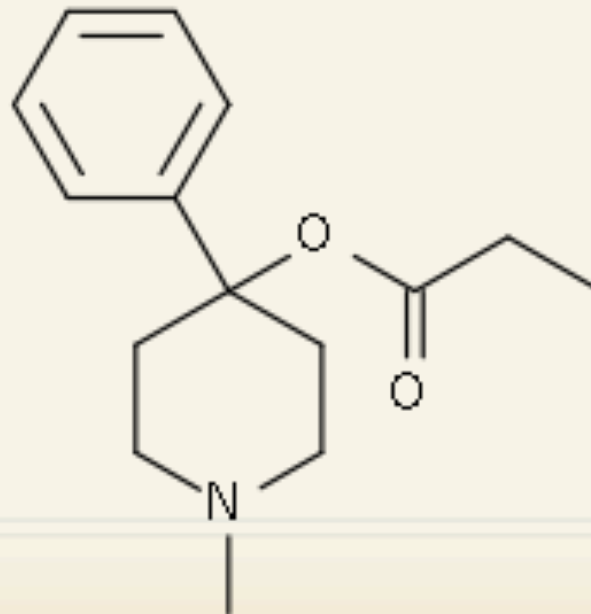
MPTP (1-methyl-4-phenyl-1, 2, 3,6-tetrahydropyridine)



Dr. J. William Langston

1982 Santa Clara County, 7 patients

MPPP (opioid analgesic)

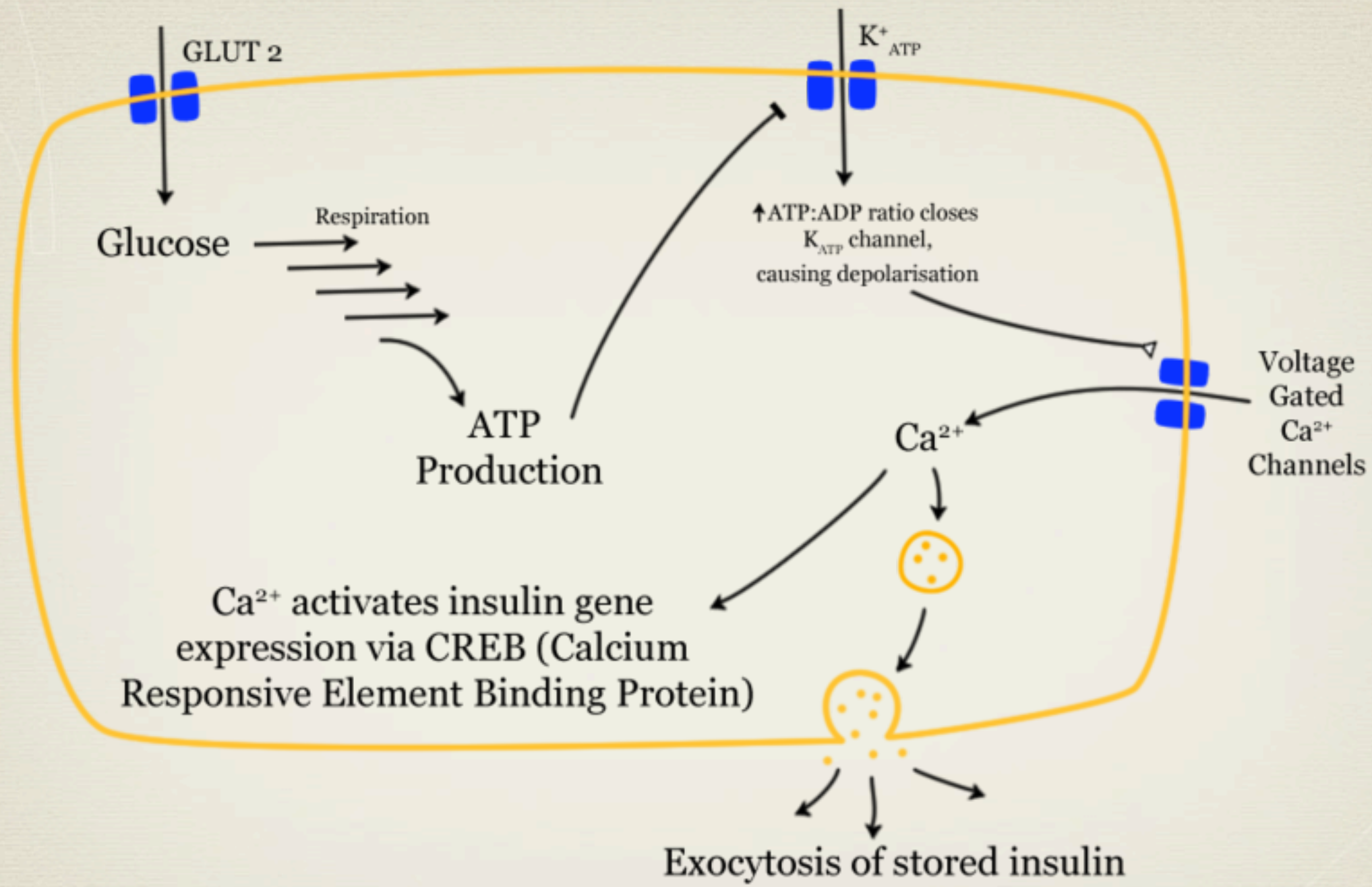


Diabetes

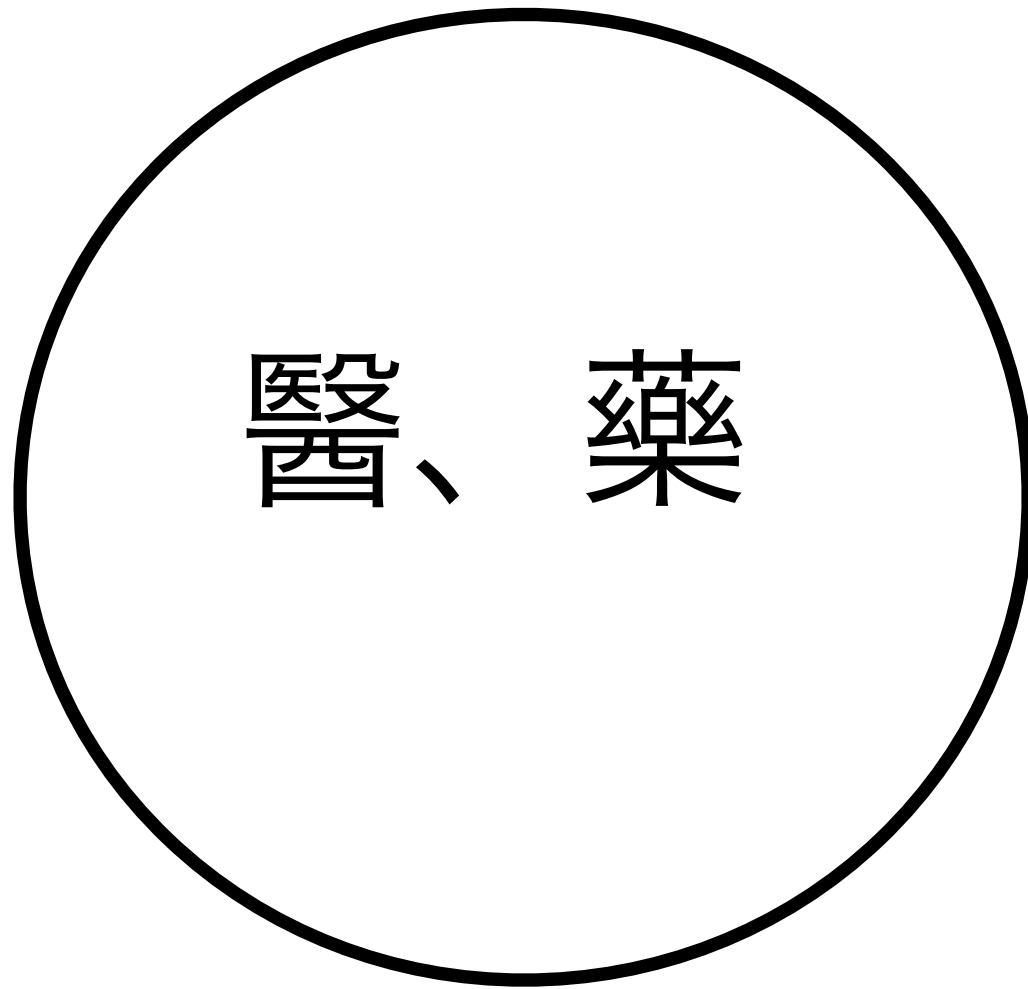
Insulin

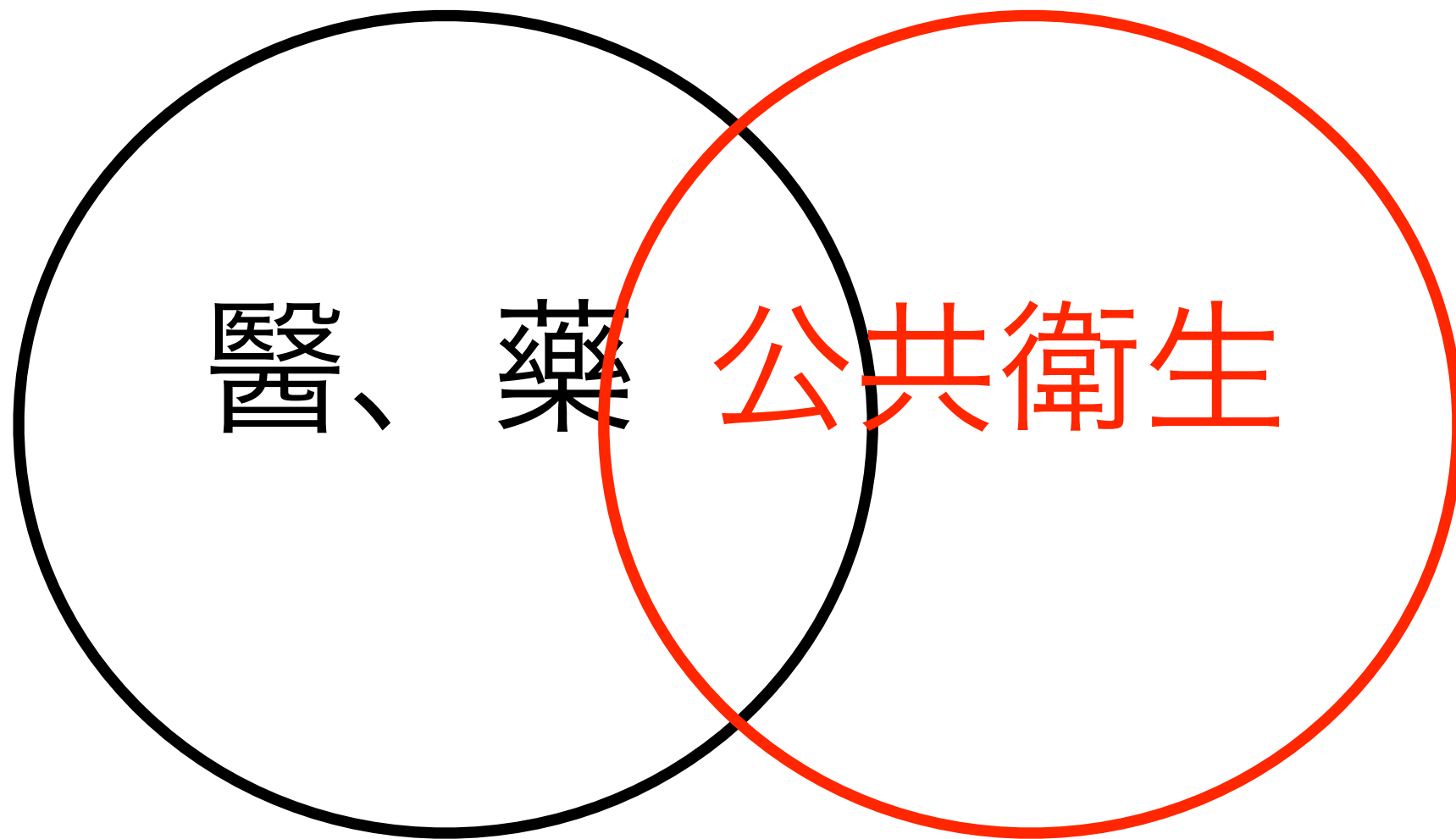


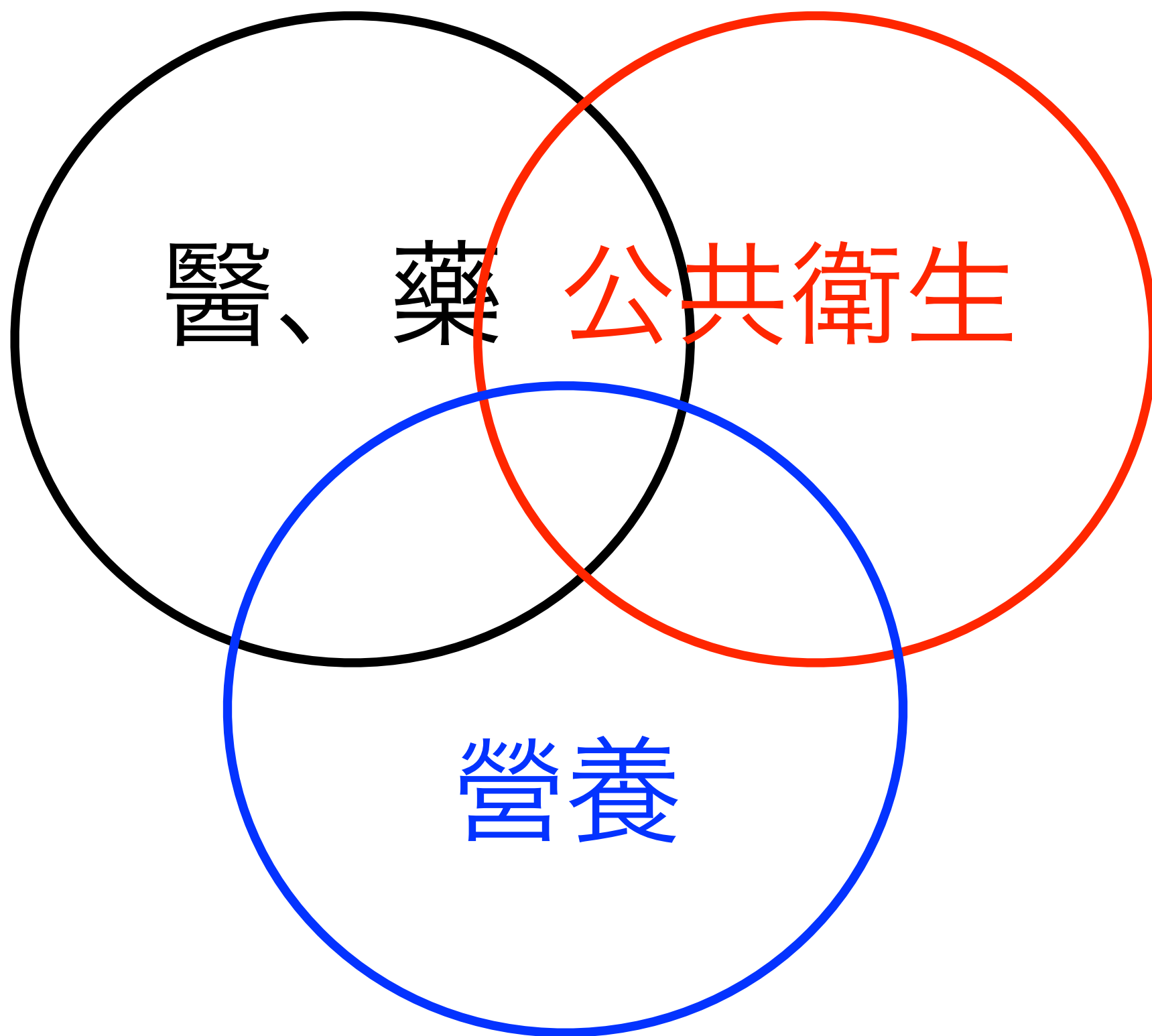
Frederick Grant Banting, 1923 NP



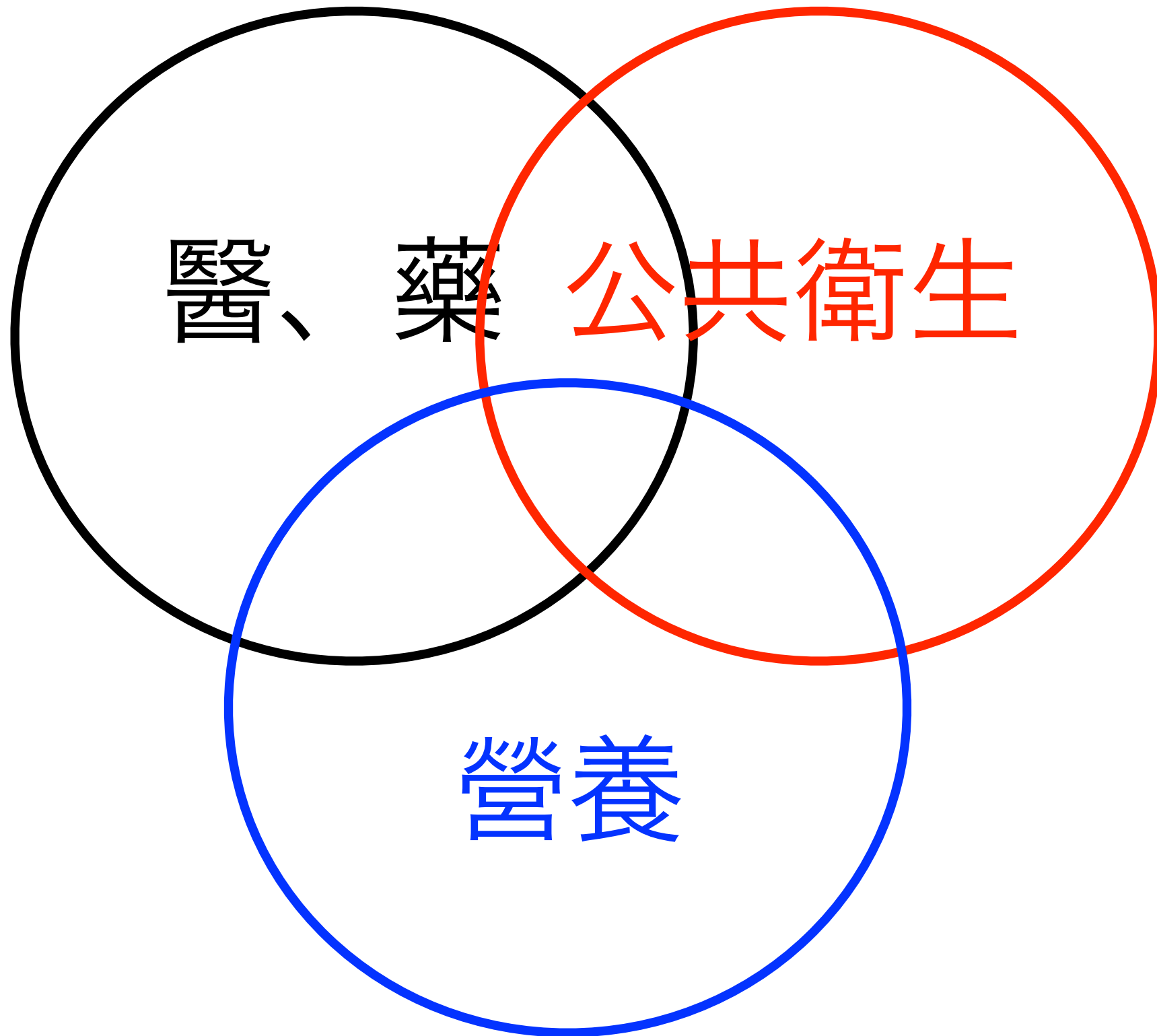
pancreatic beta cells





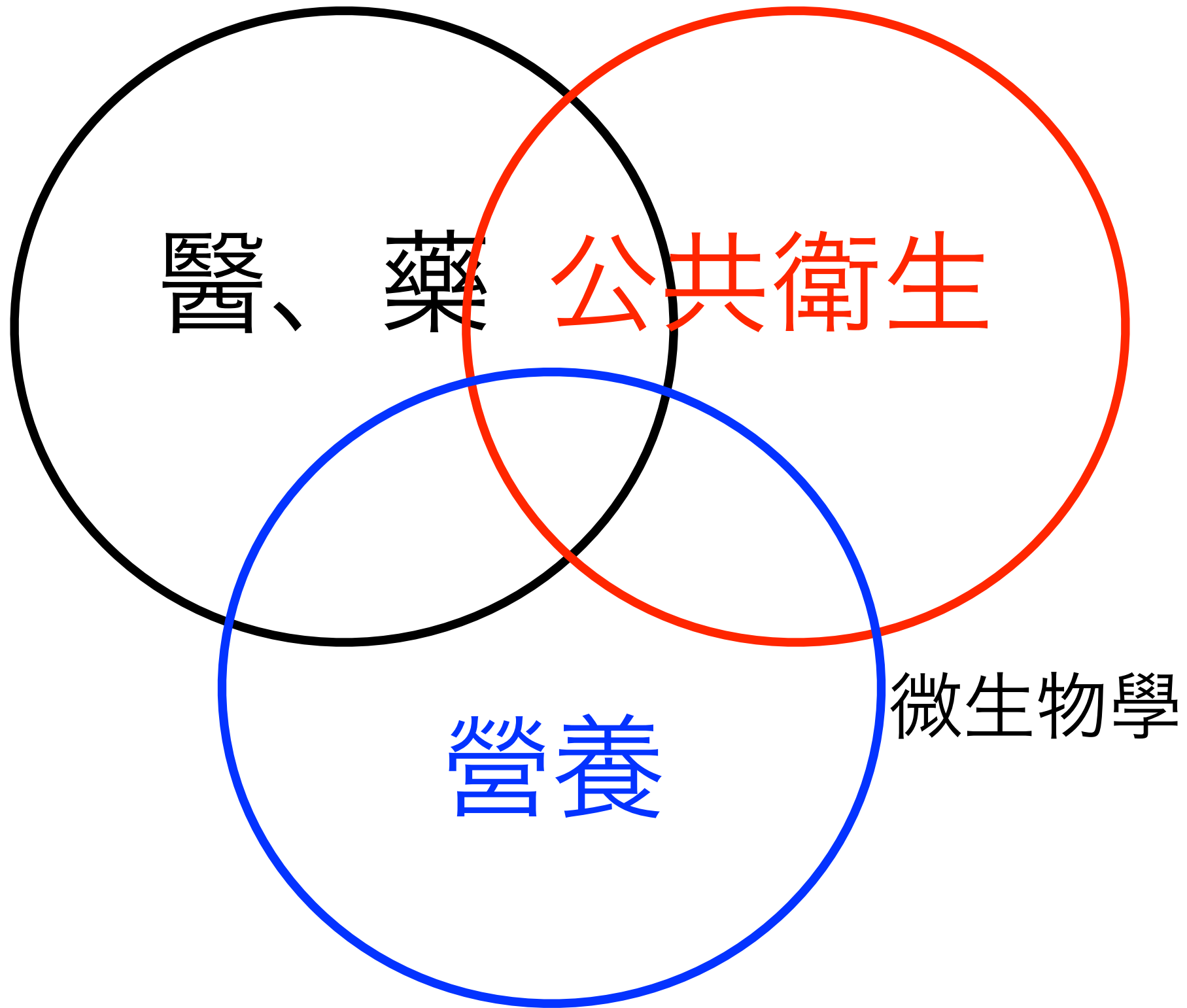


細胞學



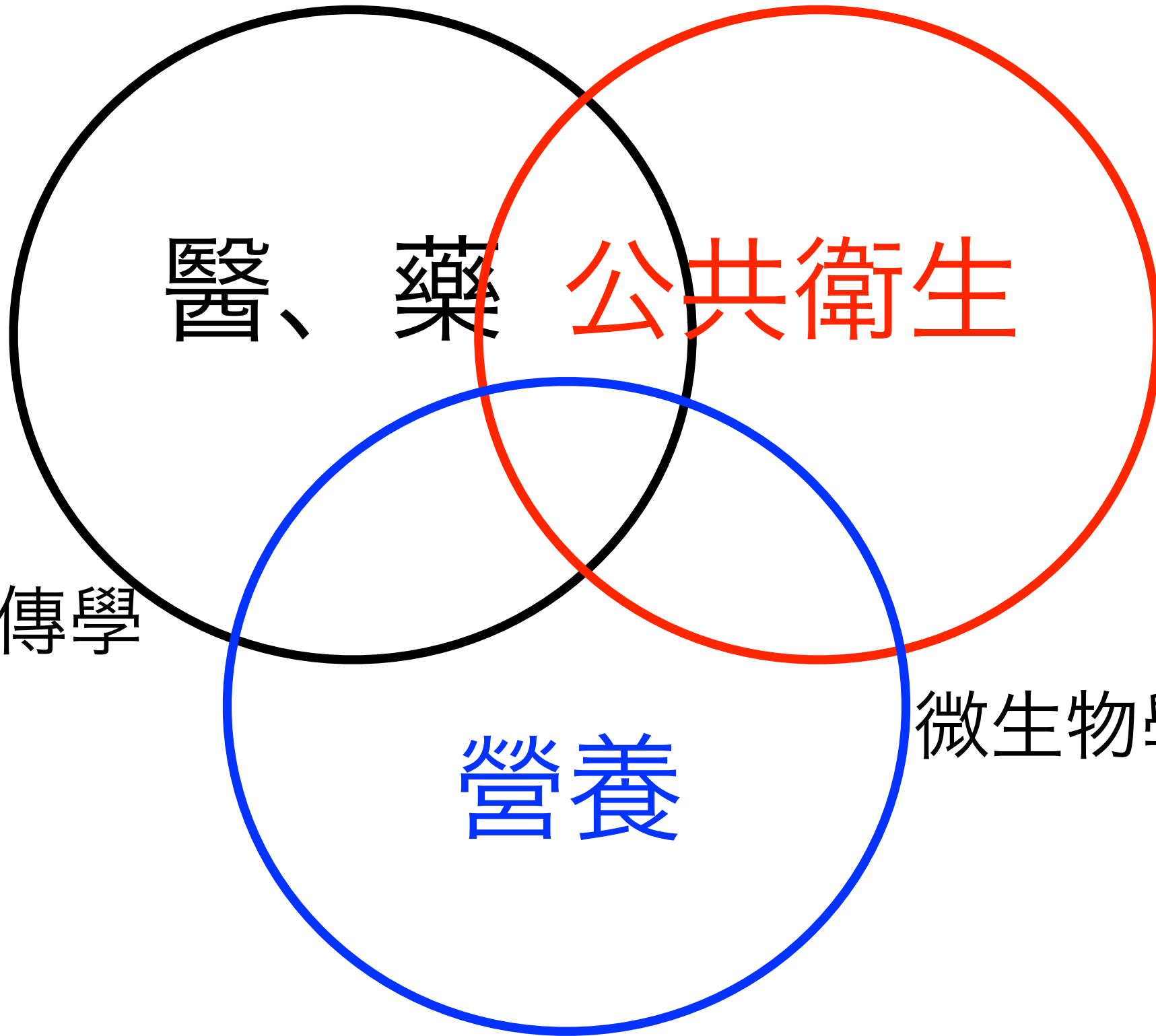
營養

細胞學



微生物學

細胞學



醫學、藥

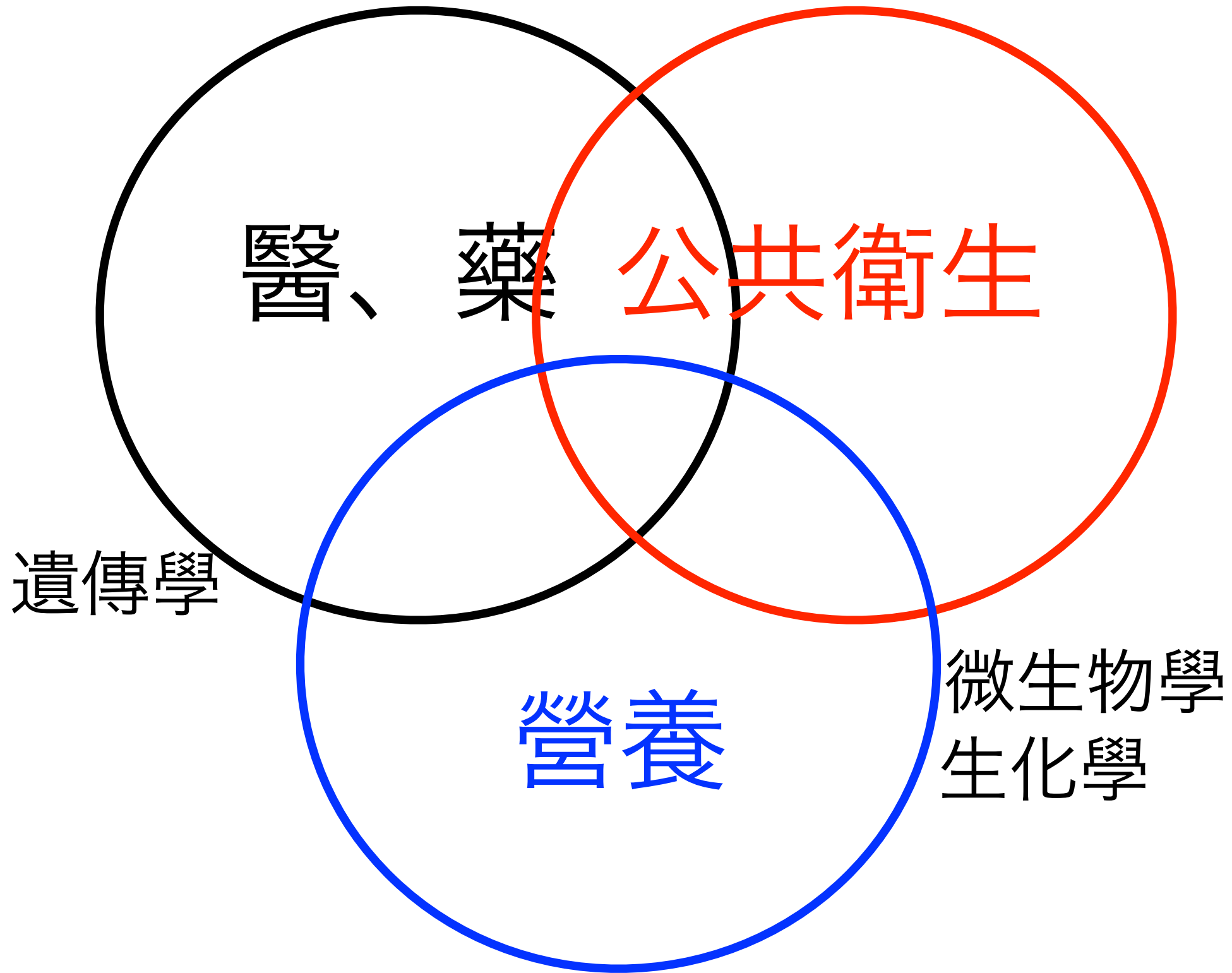
公共衛生

遺傳學

營養

微生物學

細胞學



醫、藥

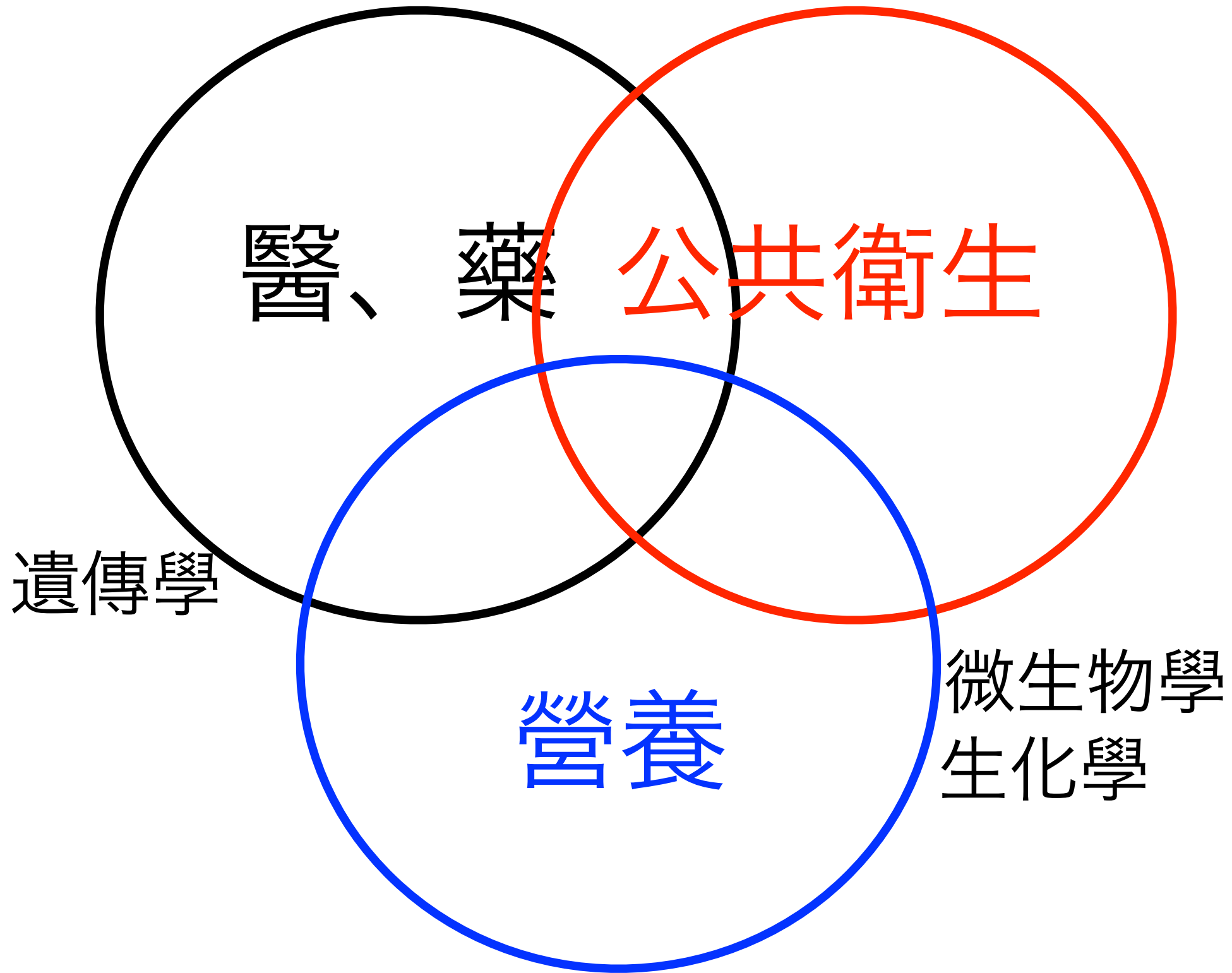
公共衛生

遺傳學

營養

微生物學
生化學

細胞學 藥理學



遺傳學

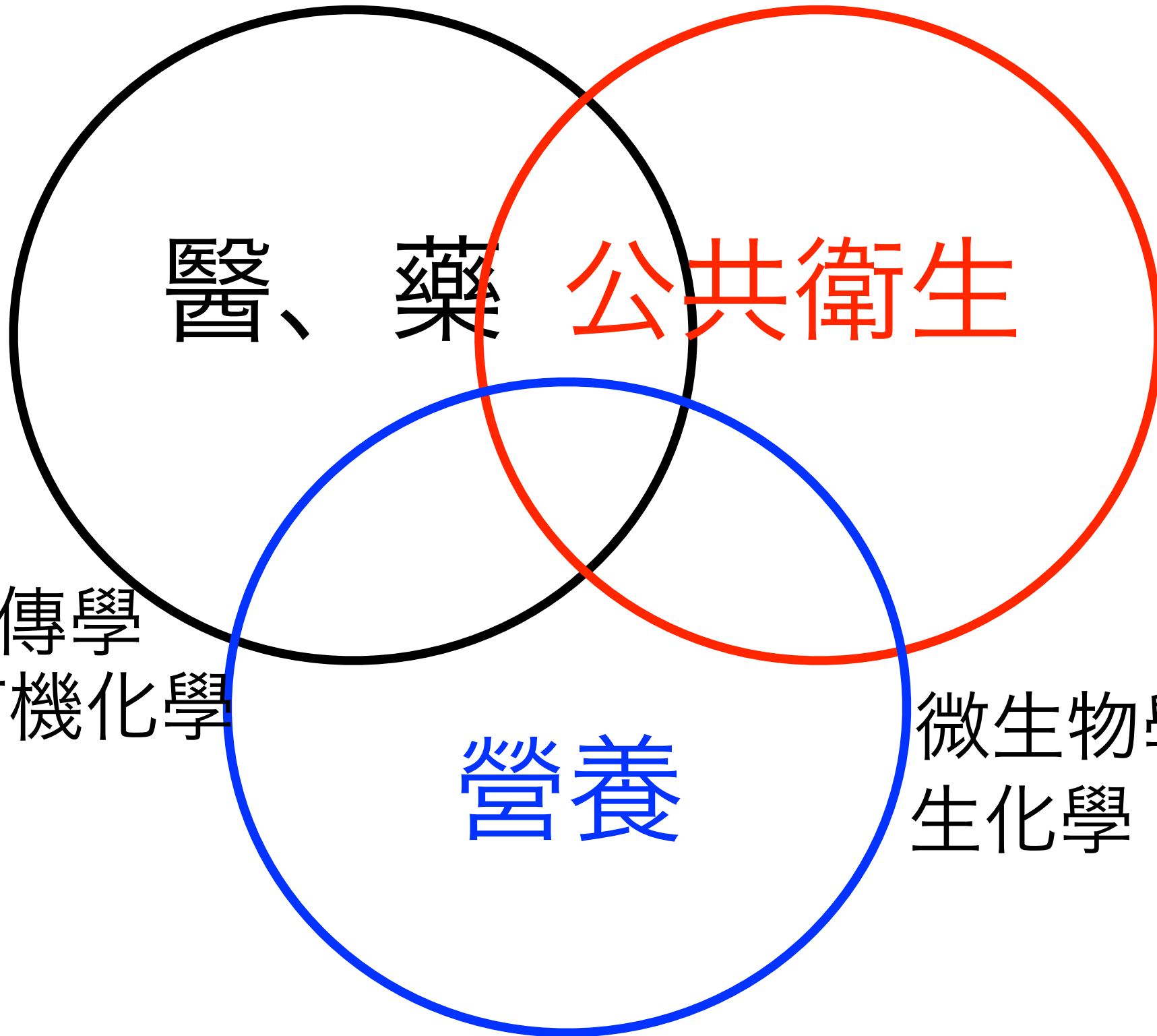
醫、藥

公共衛生

營養

微生物學
生化學

細胞學 藥理學



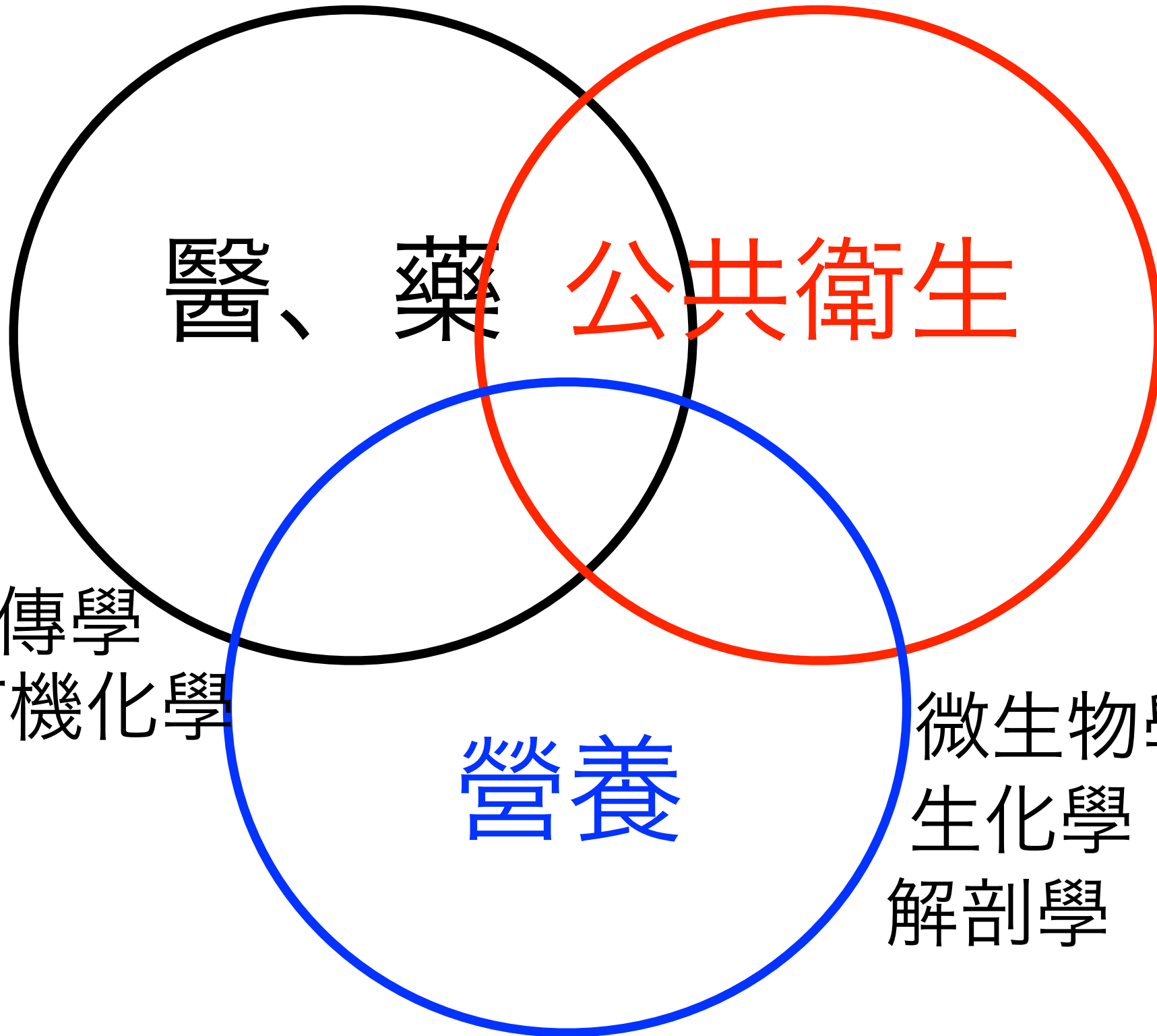
遺傳學
有機化學

微生物學
生化學

營養

醫、藥 公共衛生

細胞學 藥理學



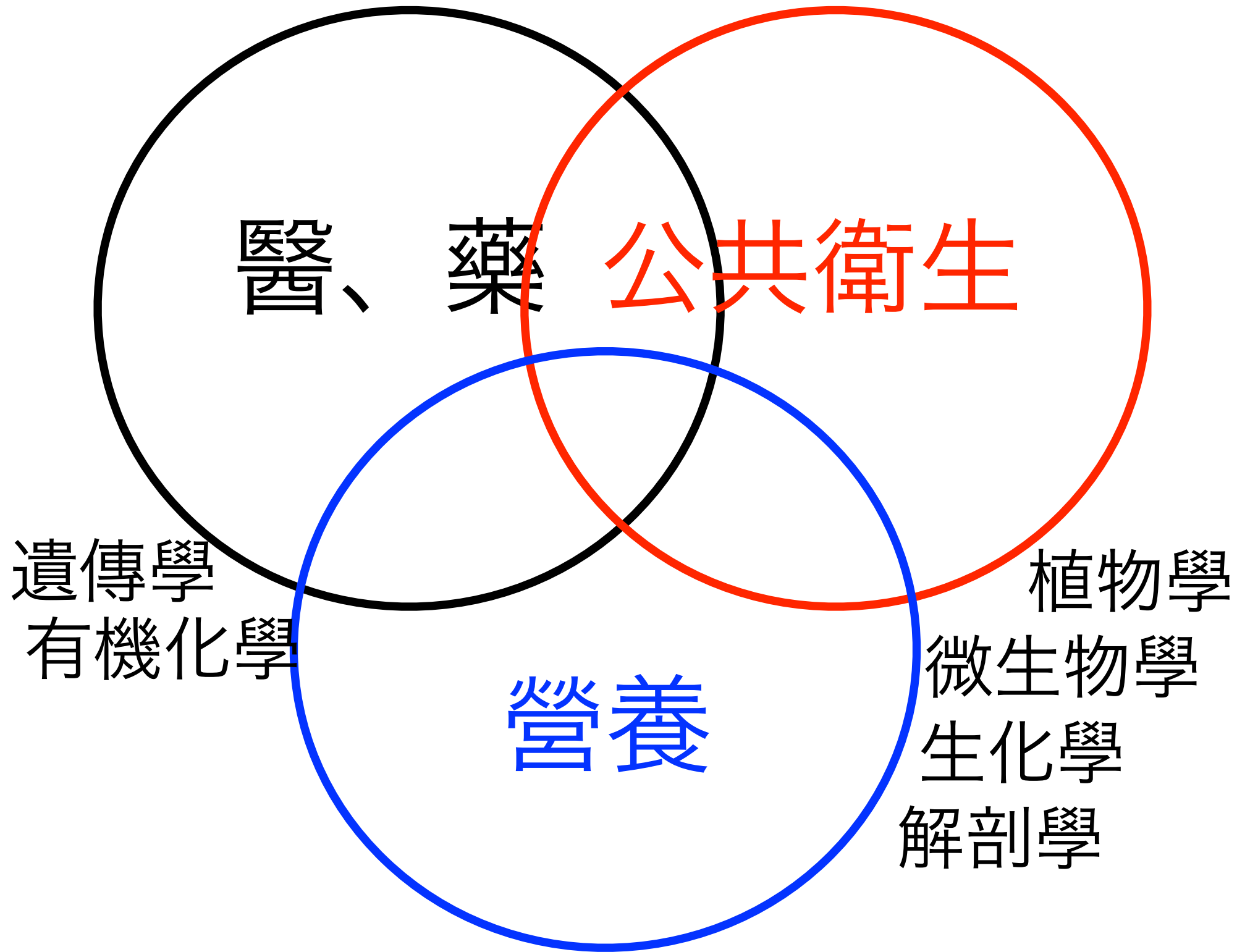
遺傳學
有機化學

微生物學
生化學
解剖學

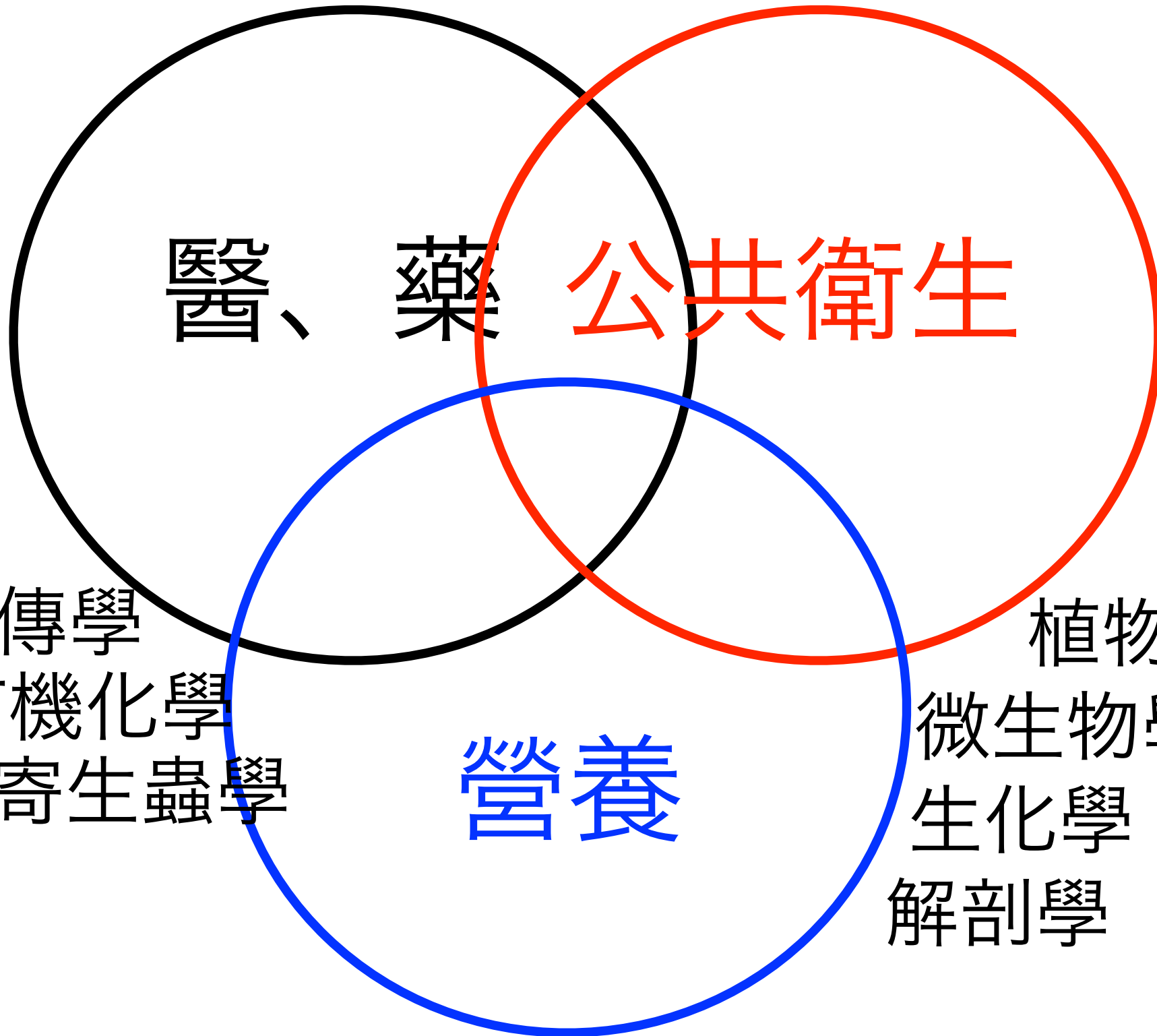
營養

醫、藥 公共衛生

細胞學 藥理學



細胞學 藥理學

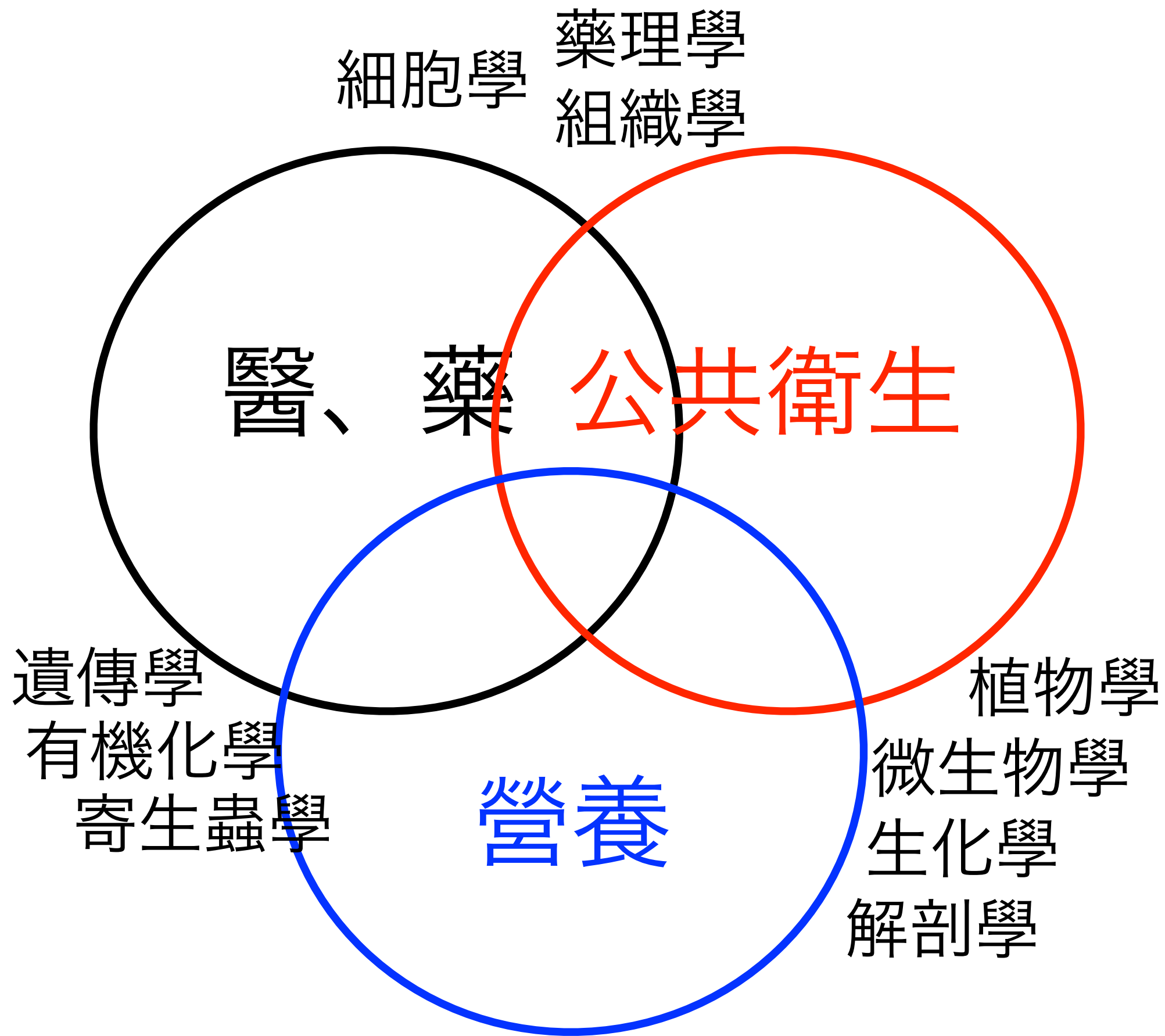


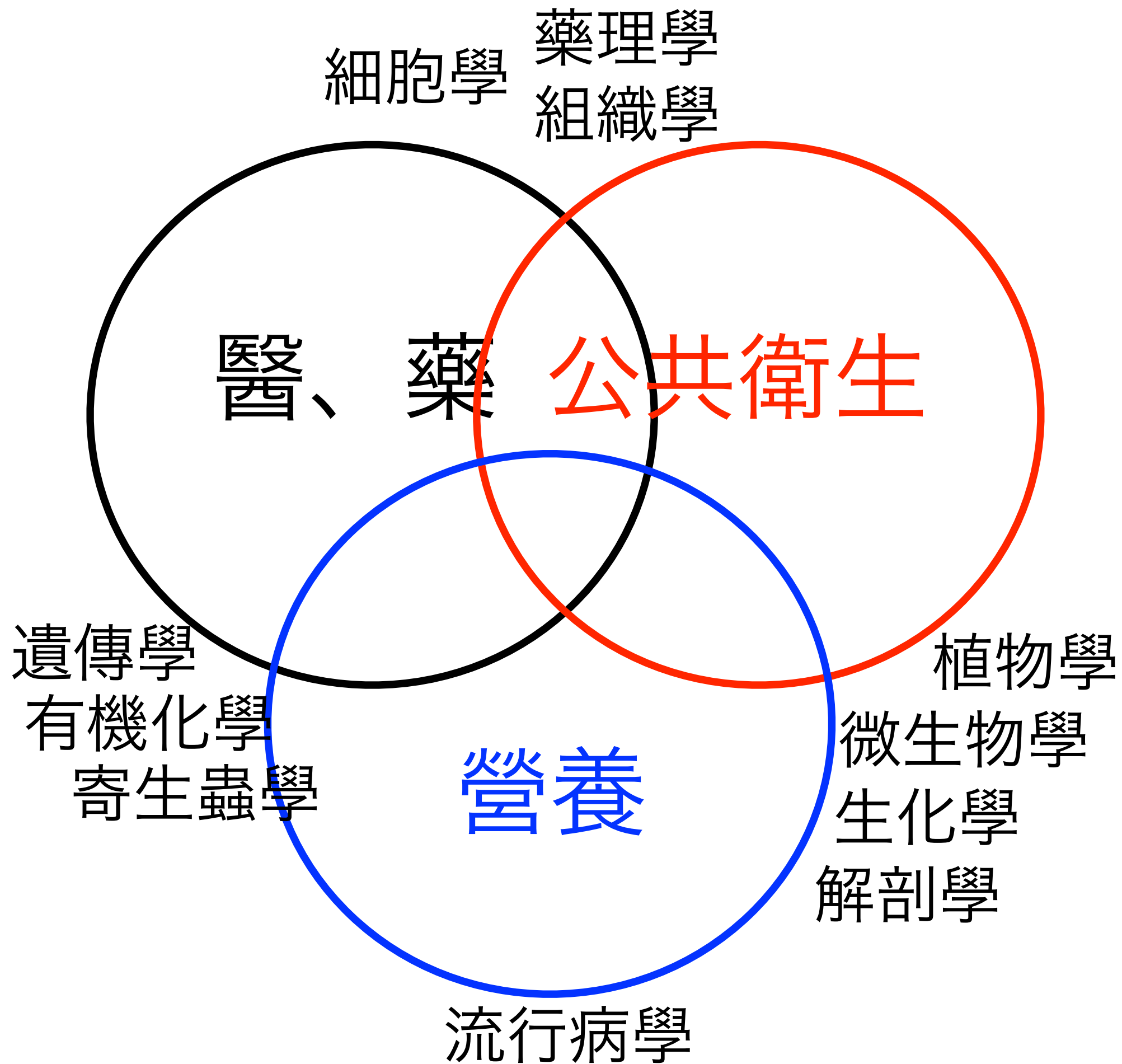
遺傳學
有機化學
寄生蟲學

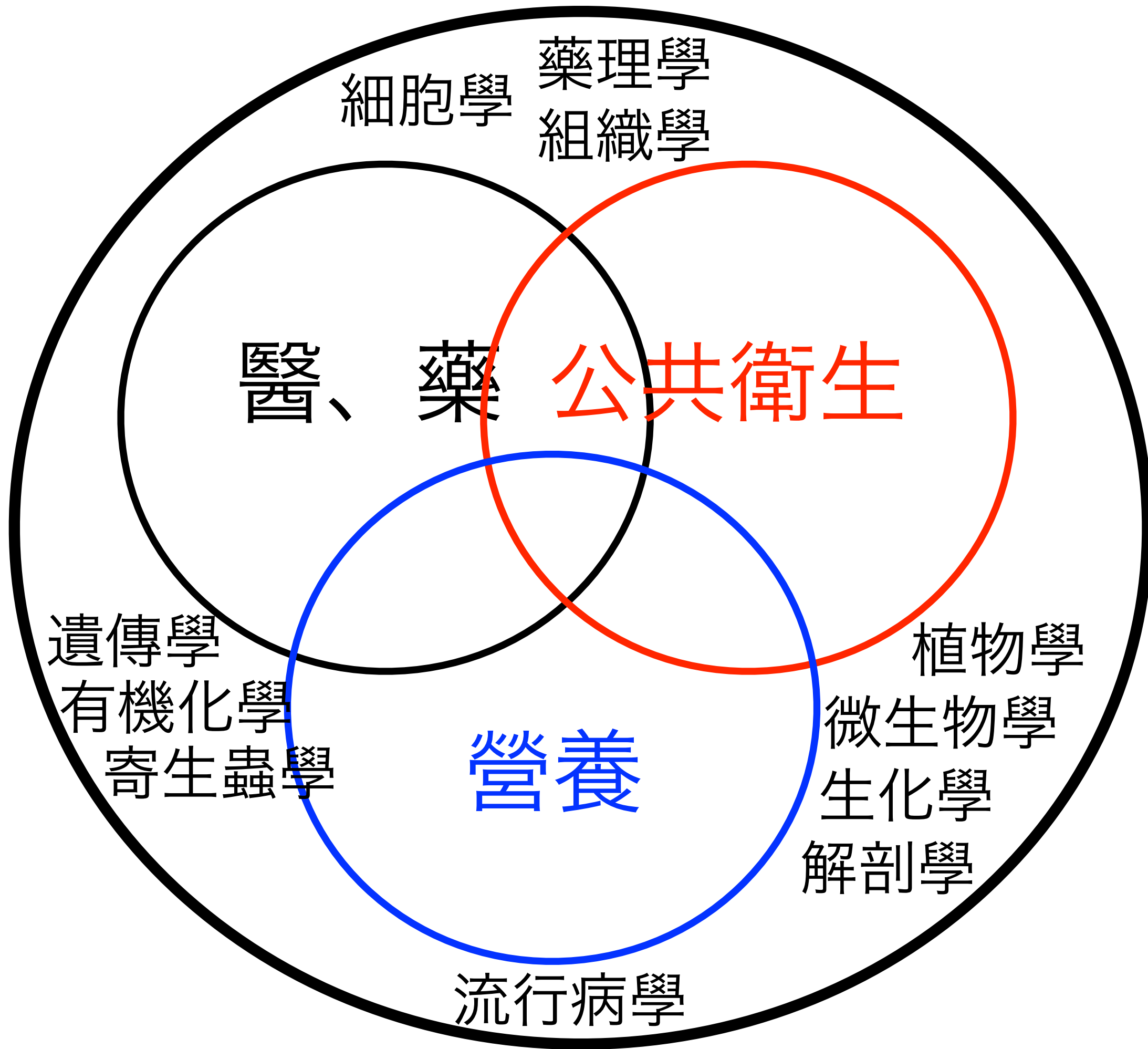
植物學
微生物學
生化學
解剖學

營養

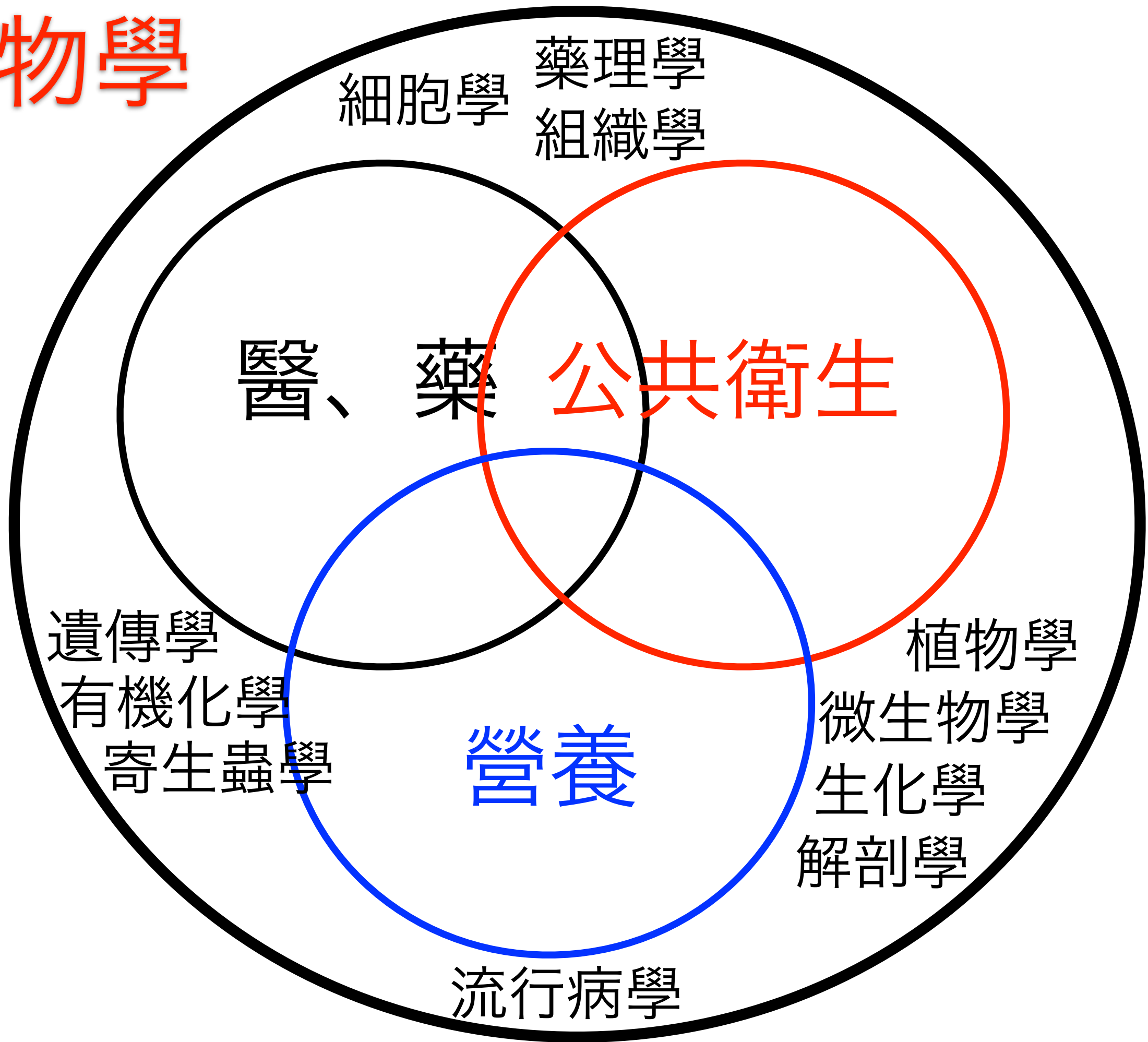
醫、藥 公共衛生







生物學



共同點在哪兒？

？

nanos gigantum humeris insidentes

nanos gigantum humeris insidentes

Standing on the shoulders of giants

nanos gigantum humeris insidentes

Standing on the shoulders of giants

站在巨人的肩膀上

nanos gigantum humeris insidentes

Standing on the shoulders of giants

站在巨人的肩膀上

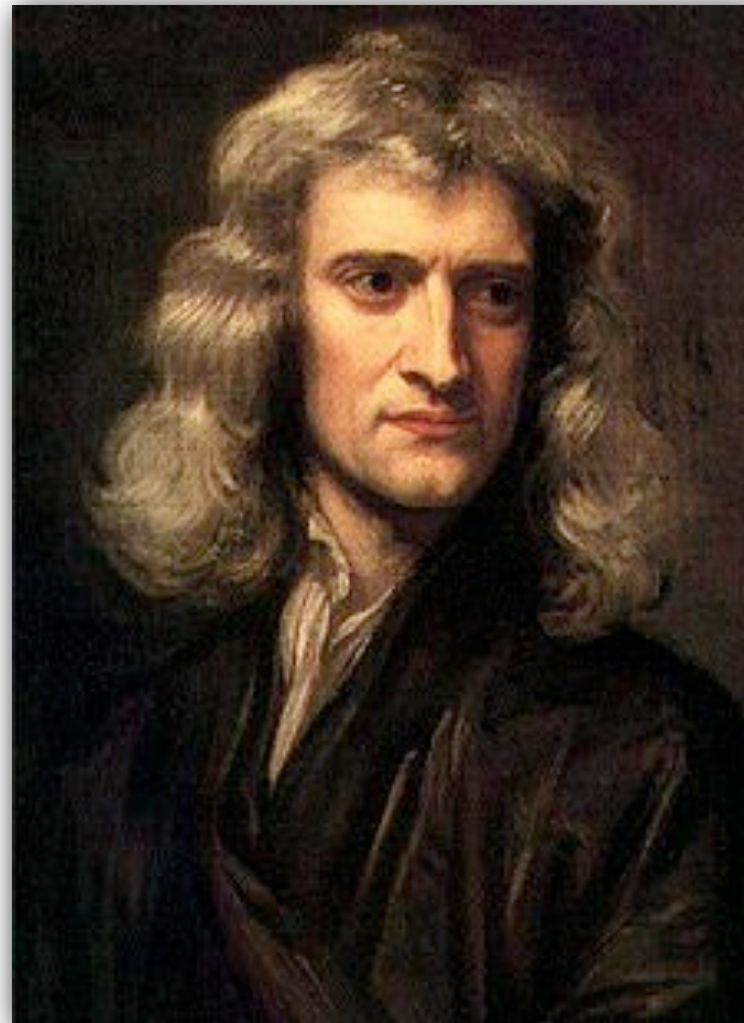
?

nanos gigantum humeris insidentes

Standing on the shoulders of giants

站在巨人的肩膀上

?

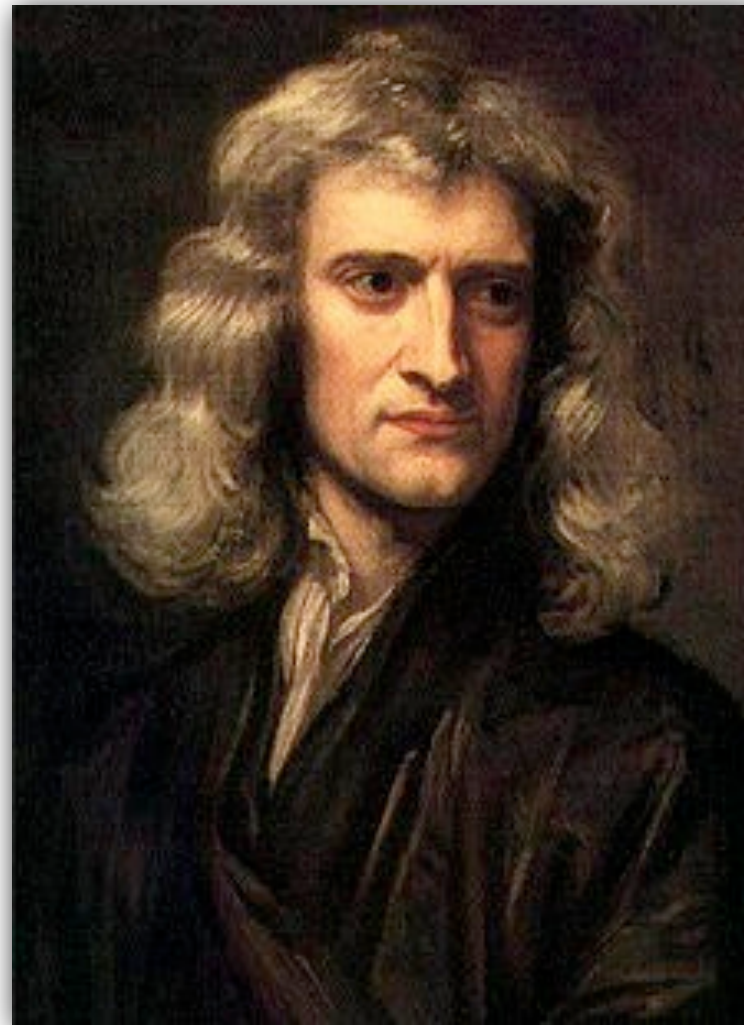


nanos gigantum humeris insidentes

Standing on the shoulders of giants

站在巨人的肩膀上

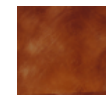
?



Isaac Newton

Changes of Taiwanese Life Expectancy

公共衛生



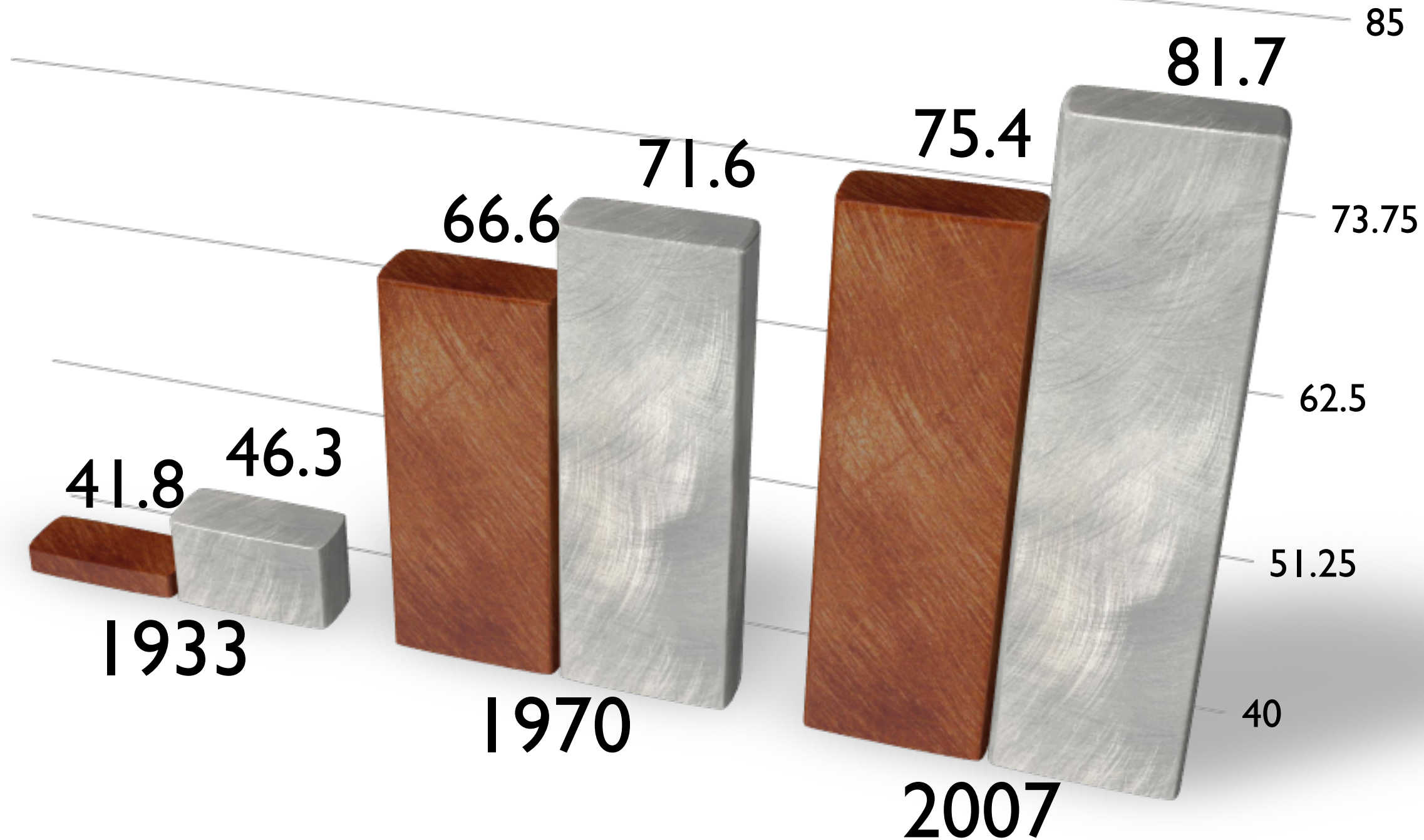
Male



Female

醫藥

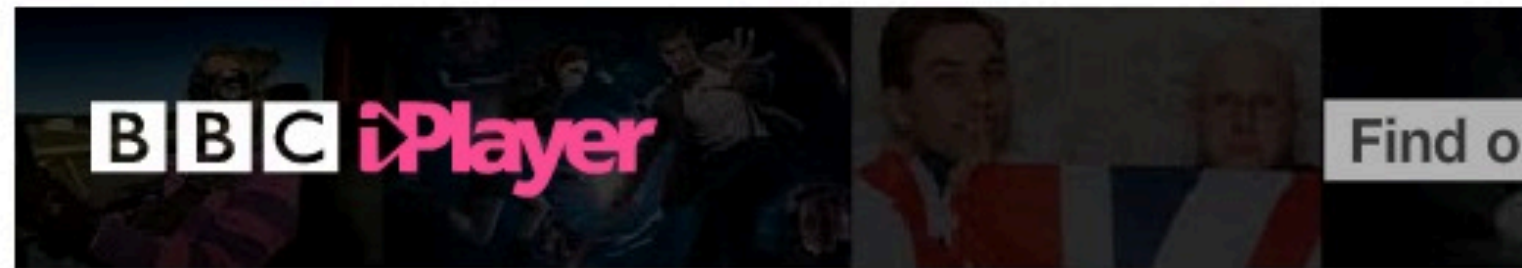
營養



台灣地區十大死因

順位	九十七年 死因別	九十六年 死因別	九十五年 死因別	九十四年 死因別	九十三年 死因別	九十二年 死因別	九十一年 死因別	九十年_死 因別	八十九年 死因別	八十八年 死因別	八十七年 死因別	八十六年 死因別	八十五年 死因別	八十四年 死因別
1	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤	惡性腫瘤
2	心臟疾病	心臟疾病	腦血管疾病	腦血管疾病	心臟疾病	腦血管疾病	腦血管疾病	腦血管疾病	腦血管疾病	意外事故及 不良影響	腦血管疾病	腦血管疾病	腦血管疾病	腦血管疾病
3	腦血管疾病	腦血管疾病	心臟疾病	心臟疾病	腦血管疾病	心臟疾病	心臟疾病	心臟疾病	心臟疾病	腦血管疾病	心臟疾病	意外事故及 不良影響	意外事故及 不良影響	意外事故及 不良影響
4	肺炎	糖尿病	糖尿病	糖尿病	糖尿病	糖尿病	糖尿病	事故傷害	事故傷害	心臟疾病	意外事故及 不良影響	心臟疾病	心臟疾病	心臟疾病
5	糖尿病	事故傷害	事故傷害	事故傷害	事故傷害	事故傷害	事故傷害	糖尿病	糖尿病	糖尿病	糖尿病	糖尿病	糖尿病	糖尿病
6	事故傷害	肺炎	肺炎	肺炎	肺炎	慢性肝病及 肝硬化	慢性肝病及 肝硬化	慢性肝病及 肝硬化	慢性肝病及 肝硬化	慢性肝病及 肝硬化	慢性肝病及 肝硬化	慢性肝病及 肝硬化	慢性肝病及 肝硬化	慢性肝病及 肝硬化
7	慢性下呼吸 道疾病	慢性肝病及 肝硬化	慢性肝病及 肝硬化	慢性肝病及 肝硬化	慢性肝病及 肝硬化	肺炎	肺炎	腎炎.腎微候 群及腎變性 疾病	腎炎.腎微候 群及腎變性 疾病	肺炎	肺炎	肺炎	肺炎	肺炎
8	慢性肝病及 肝硬化	腎炎.腎微候 群及腎變性 疾病	腎炎.腎微候 群及腎變性 疾病	腎炎.腎微候 群及腎變性 疾病	腎炎.腎微候 群及腎變性 疾病	腎炎.腎微候 群及腎變性 疾病	腎炎.腎微候 群及腎變性 疾病	肺炎	肺炎	腎炎.腎微候 群及腎變性 疾病	腎炎.腎微候 群及腎變性 疾病	腎炎.腎微候 群及腎變性 疾病	肺炎	肺炎
9	自殺	自殺	自殺	自殺	自殺	自殺	自殺	自殺	自殺	自殺	高血壓性疾 病	高血壓性疾 病	高血壓性疾 病	高血壓性疾 病
10	腎炎.腎微候 群及腎變性 疾病	高血壓性疾 病	高血壓性疾 病	高血壓性疾 病	高血壓性疾 病	高血壓性疾 病	高血壓性疾 病	高血壓性疾 病	支氣管炎.肺 氣腫及氣喘	高血壓性疾 病	自殺	自殺	支氣管炎.肺 氣腫及氣喘	支氣管炎.肺 氣腫及氣喘

資料來源：行政院衛生署編印「台灣地區死因統計結果摘要」



1 June 2011 Last updated at 17:51 GMT

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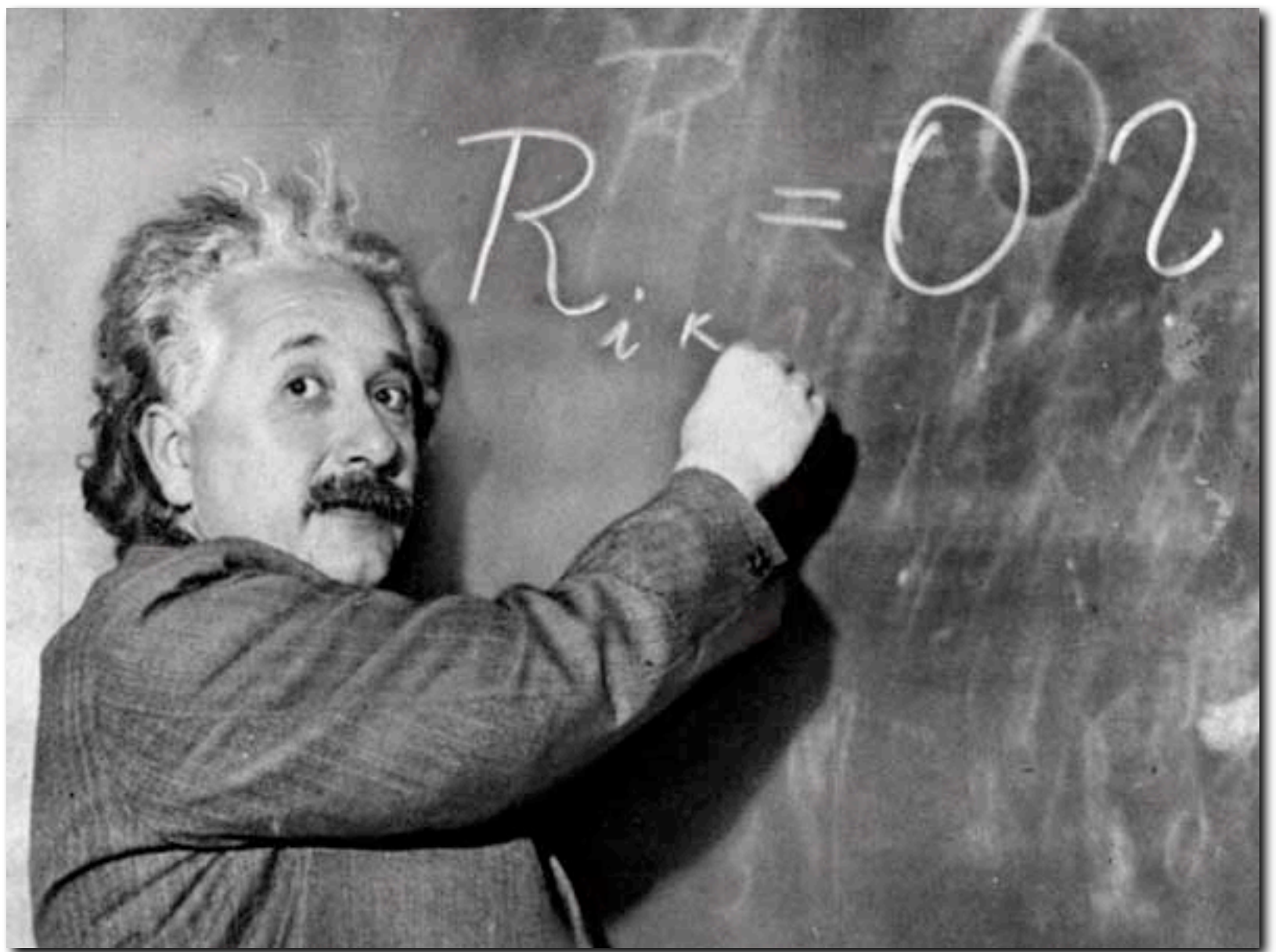
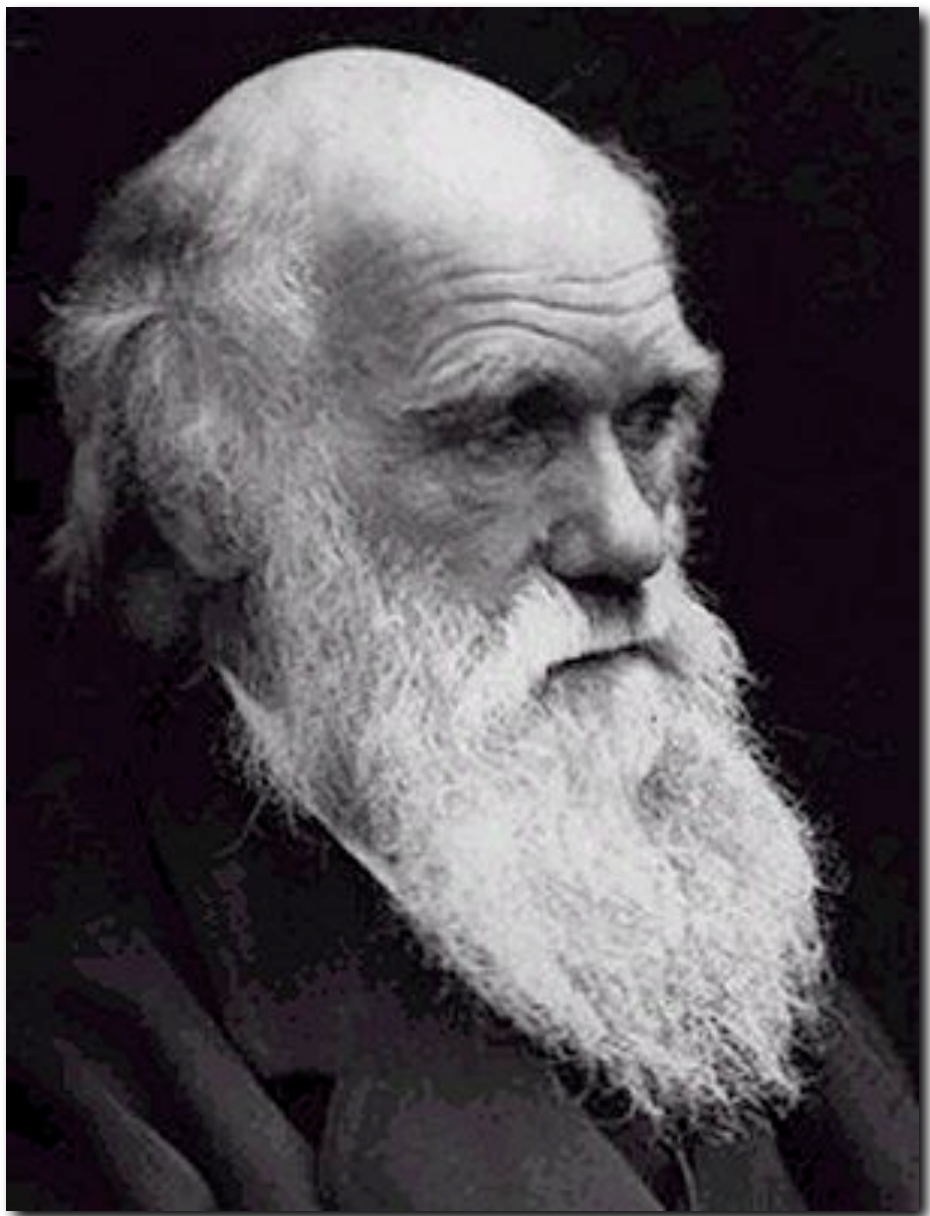
E. coli infections in Germany see significant rise

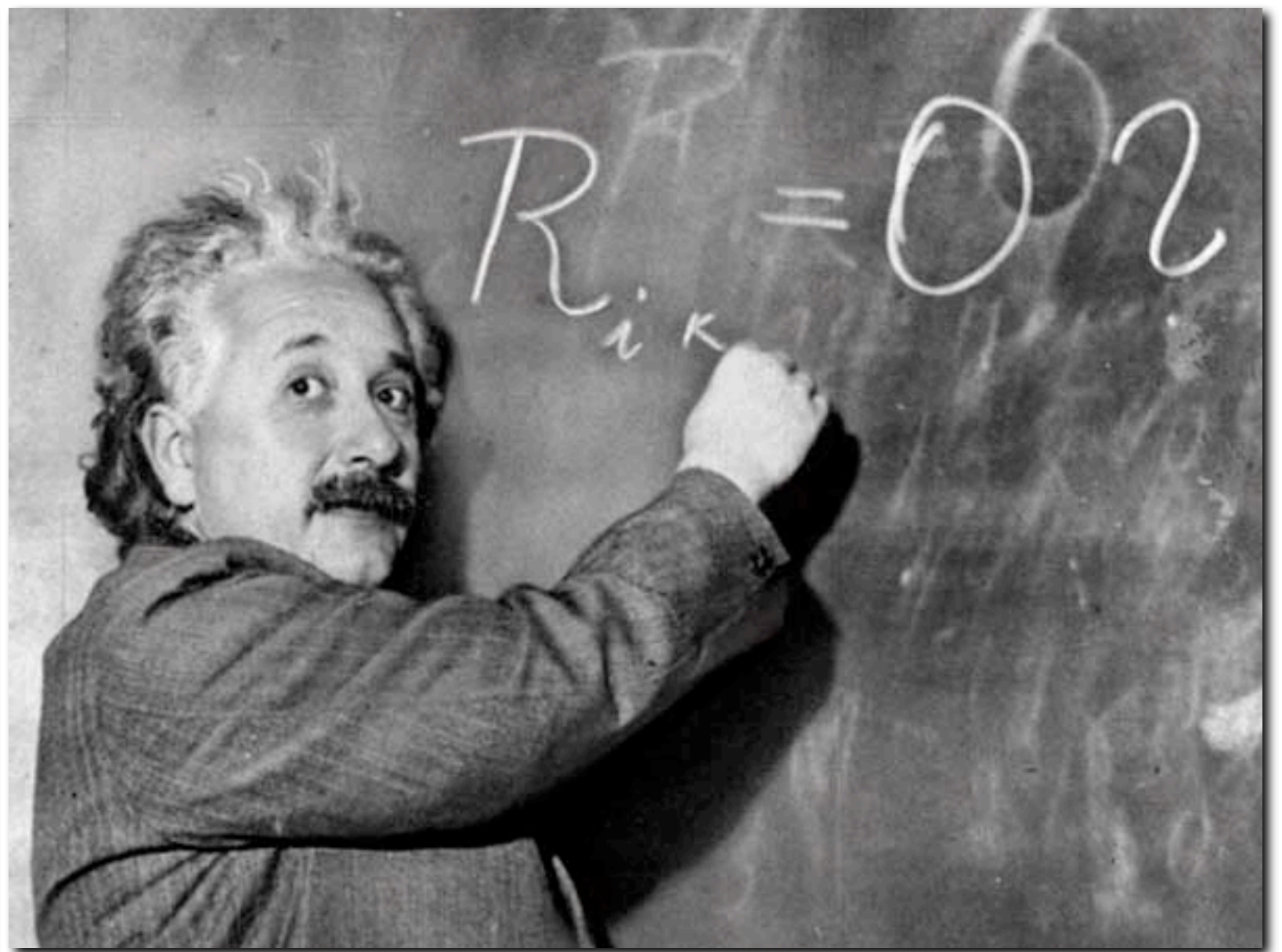
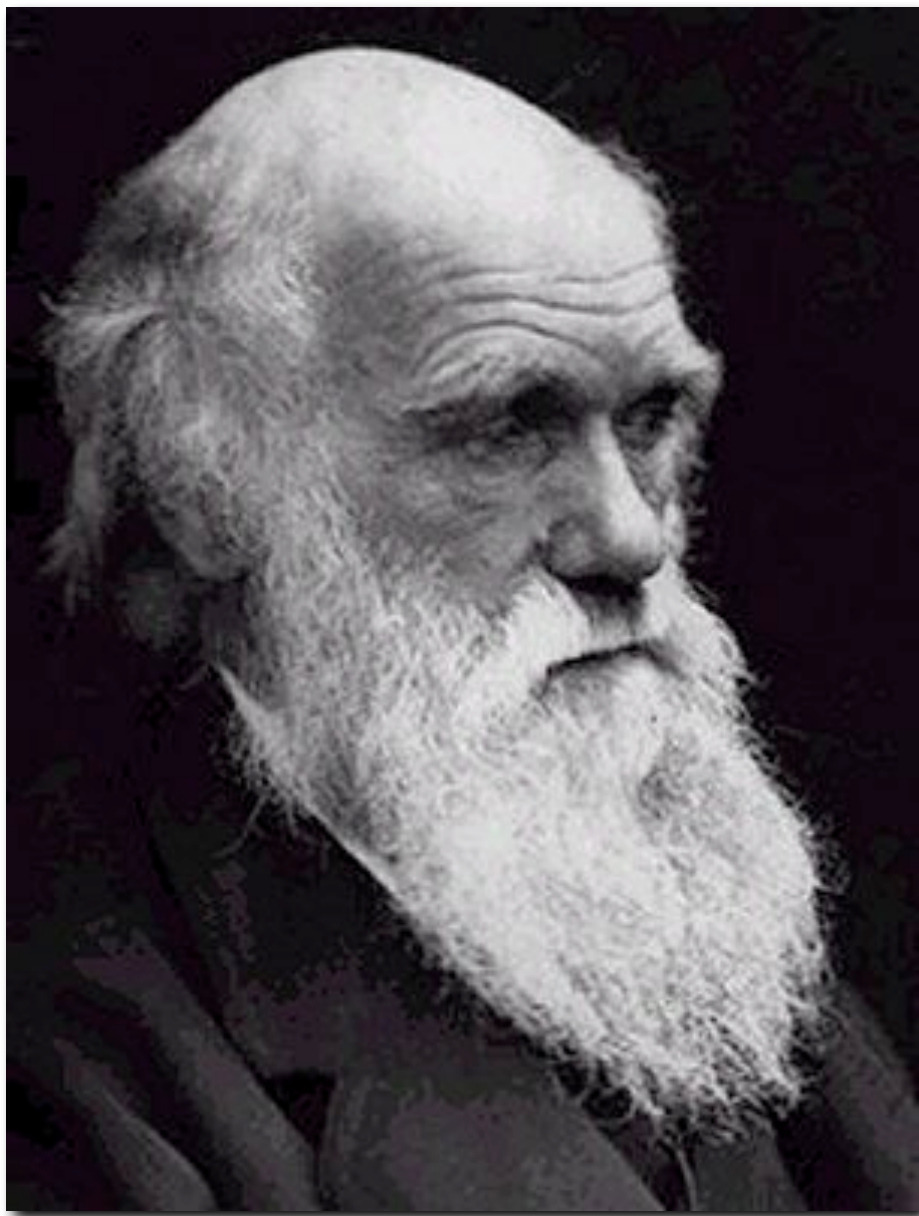
There has been a significant rise in the number of people in Europe infected by a strain of E. coli which has led to the deaths of 17 people, officials say.

More than 1,500 people in nine nations - though mostly in Germany - have been infected by enterohaemorrhagic E.coli (EHEC), which can cause the deadly haemolytic-uraemic syndrome (HUS).



The infections have made German shoppers wary of

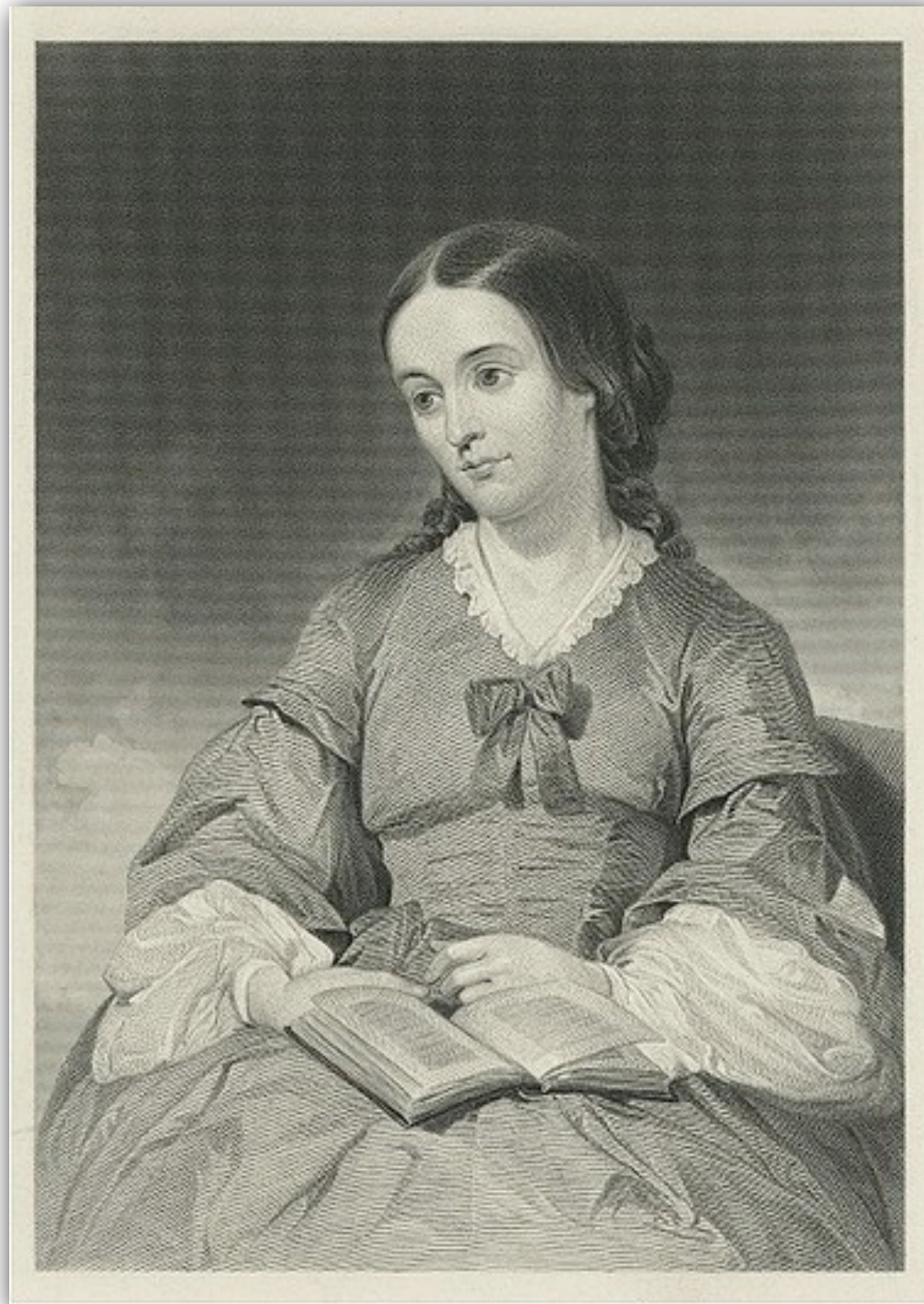




**Darwin was a decidedly mediocre
(平庸) student....**

Einstein was an erratic (古怪) university student

Gary Stix, Sci.Amer. 2009, 1, 24~29.





Margaret Fuller (1810.5.23~1850.7.19)

If you have knowledge, let others light their candles at it.



Margaret Fuller (1810.5.23~1850.7.19)

If you have knowledge, let others light their candles at it.



假如你有知識的話，就讓其他人用來點燃他們的蠟燭

Margaret Fuller (1810.5.23~1850.7.19)