

考試科目	微積分	所別	智慧財產學 501	考試時間	4月20日 上午第一節 星期日
------	-----	----	-----------	------	--------------------

1. Given that an estimate of a certain knowledge piracy rate function as follows:

$$PR(t) = \frac{1000e^t}{1+e^t}$$

- (a) Please find and explain the rate of change of $PR(t)$ over time t .
[10 points]
- (b) Given everything else unchanged, how long would it take to allow the piracy rate grows over 100 times? Please use calculus technique to solve this problem.
[10 points]

2. Suppose that a certain government policy for preventing knowledge piracy is implemented, and given effective rate function is as follows:

$$EF(t) = \frac{3t}{2t^2 + 5}$$

- (a) Please find and explain the rate of change of $EF(t)$ over time t .
[10 points]
- (b) Given everything else unchanged, how long do you think would cut down this piracy rate to 20%? Please use calculus technique to solve this problem.
[10 points]

3. If given the two functions as above, do you think our government is capable of cutting that particular knowledge piracy rate in half at any given time? When if so? Why not if otherwise? Please use calculus technique to solve this problem.
[20 points]

4. Given cost x , the effective rate of implementing a piracy prevention policy as follows:

$$ER(x) = \frac{1}{2}x^2e^{-x}$$

- (a) What would be the most effective cost x to boost the $ER(x)$ rate at its top?
[20 points]
- (b) Given all costs, what would be the best x to allow the aggregate $ER(x)$ rate to be around 80%? (Please use integration technique here.)
[20 points]

備 考 試 題 隨 卷 繳 交

命題委員：

-221-

(簽章) 92年4月3日

考試科目	生命科學	所別	智慧財產研究所	考試時間	4月20日(上)午第1節 星期日(下)午第1節
------	------	----	---------	------	----------------------------

生命科學試題 (每一大題各佔 20 分)

(一). Astwood JD. Leach JN. Fuchs RL. Stability of food allergens to digestion in vitro. Nature Biotechnology. 14(10):1269-73, 1996.

An integral part of the safety assessment of genetically modified plants is consideration of possible human health effects, especially food allergy. Prospective testing for allergenicity of proteins obtained from sources with no prior history of causing allergy has been difficult because of the absence of valid methods and models. Food allergens may share physicochemical properties that distinguish them from nonallergens, properties that may be used as a tool to predict the inherent allergenicity of proteins newly introduced into the food supply by genetic engineering. One candidate property is stability to digestion. We have systematically evaluated the stability of food allergens that are active via the gastrointestinal tract in a simple model of gastric digestion, emphasizing the major allergens of plant-derived foods such as legumes (peanuts and soybean). Important food allergens were stable to digestion in the gastric model (simulated gastric fluid). For example, soybean beta-conglycinin was stable for 60 min. In contrast, nonallergenic food proteins, such as spinach ribulose bis-phosphate carboxylase/oxygenase, were digested in simulated gastric fluid within 15 sec. The data are consistent with the hypothesis that food allergens must exhibit sufficient gastric stability to reach the intestinal mucosa where absorption and sensitization (development of atopy 特異體質) can occur. Thus, the stability to digestion is a significant and valid parameter that distinguishes food allergens from nonallergens.

- (a)以遺傳工程改造的植物為何無法預期是否具有 allergenicity?
- (b)一個蛋白質無法被我們的胃液消化,它可能具有哪些特性?
- (c)由上述文章中,我們可以得到一個結論:不能被我們胃液消化的食品一定具有 allergenicity. 請說明之.
- (d)food allergens 如何在腸道引起 atopy?
- (e)你覺得白鳳豆容不容易消化? 它有什麼成份可能對生體產生作用? 假如你根據你的生化基礎否定它的效用,也請說明你的理由?

國立政治大學圖書館

備考	試題隨卷繳交
----	--------

考試科目	生命科學	所別	智慧財產研究所	考試時間	4月20日 上午第1節 星期日
------	------	----	---------	------	--------------------

國立政治大學圖書館

(二). Bowyer P. Clarke BR. Lunness P. Daniels MJ. Osbourn AE.
Host range of a plant pathogenic fungus determined by a saponin detoxifying enzyme.
Science. 267(5196):371-4, 1995.

Antifungal saponins occur in many plant species and may provide a preformed chemical barrier to attack by phytopathogenic fungi. Some fungal pathogens can enzymatically detoxify host plant saponins, which suggests that saponin detoxification may determine the host range of these fungi. A gene encoding a saponin detoxifying enzyme was cloned from the cereal-infecting fungus *Gaeumannomyces graminis*. Fungal mutants generated by targeted gene disruption were no longer able to infect the saponin-containing host oats but retained full pathogenicity to wheat (which does not contain saponins). Thus, the ability of a hytopathogenic fungus to detoxify a plant saponin can determine its host range.

- a. 植物能生合成 saponin 有何好處？
- b. saponins (皂素) 為植物的一次代謝產物還是二次代謝產物？請說明你的看法。
- c. fungi 擁有 saponin detoxification 系統的目的何在？
- d. a gene encoding a saponin detoxifying enzyme 被 clone 出來，你想想著者怎麼把它找到的？
- e. 著者怎麼確認這個基因就是他要找的基因？

(三). Perl A. Lotan O. Abu-Abied M. Holland D.
Establishment of an Agrobacterium-mediated transformation system for grape (*Vitis vinifera* L.): the role of antioxidants during grape-Agrobacterium interactions.
Nature Biotechnology. 14(5):624-8, 1996.

Very short exposures of embryogenic calli of *Vitis vinifera* cv. Superior Seedless grape plants to diluted cultures of *Agrobacterium* resulted in plant tissue necrosis and subsequent cell death. Antibiotics used for *Agrobacterium* elimination or as plant selectable markers were not responsible for this necrotic response. Rather, cell death seemed to be oxygen-dependent and correlated with elevated levels of peroxides. Therefore, we studied the effects on necrosis of various combinations of antioxidants during and after grape-*Agrobacterium* cocultivation. The combination of polyvinylpolypyrrolidone and dithiothreitol was found to improve plant viability. Tissue necrosis was completely inhibited by these antioxidants while *Agrobacterium* virulence was not effected. These treatments enabled the recovery of stable transgenic grape plants resistant to hygromycin.

- (a) *Agrobacterium* 如何會造成 grape 的感染？
- (b) 可以抑制 *Agrobacterium* 的抗生素為何無法阻止其感染？
- (c) polyvinylpolypyrrolidone 及 dithiothreitol 是什麼物質？
- (d) 生物體中需要抗氧化的系統有何理由？是舉例說明。
- (e) 看完這篇研究論文，你可有心得想辦法不讓 *Agrobacterium* 感染植株？

備考	試題隨卷繳交
----	--------

考試科目	生命科學	所別	智慧財產研究所	考試時間	4月20日(上)午第1節 星期日
------	------	----	---------	------	---------------------

(四). Ma JK. Hein MB.

Immunotherapeutic potential of antibodies produced in plants.
Trends In Biotechnology. 13(12):522-7, 1995 Dec.

Plants are capable of synthesizing and assembling virtually every kind of antibody molecule, ranging from the smallest antigen-binding domains and fragments, to full-length, and even multimeric, antibodies. A number of plant hosts can be used, and because this is a versatile expression system that can be scaled-up to agricultural proportions, a cheap and plentiful supply of antibodies could be made available. Immunotherapy is one of the many potential uses for bulk quantities of antibody. In particular, passive immunotherapy of mucosal surfaces may be possible, because functional secretory antibodies can be engineered in plants.

- 舉例說明人類在何種情況下需要使用抗体？
- 一般而言，取自人體的抗體會有何種問題產生？
- 由動物來的抗體又有何問題？
- 以植物產生抗體有何好處？其問題點又是什麼？
- 植物中含有我們需要的抗體，我們吃了它就可以得到所要的免疫力？

(五). Jang M. Cai L. Udeani GO. Slowing KV. Thomas CF. Beecher CW. Fong HH. Farnsworth NR. Kinghorn AD. Mehta RG. Moon RC. Pezzuto JM.
Cancer chemopreventive activity of resveratrol, a natural product derived from grapes.
Science. 275(5297):218-20, 1997.

Resveratrol, a phytoalexin found in grapes and other food products, was purified and shown to have cancer chemopreventive activity in assays representing three major stages of carcinogenesis. Resveratrol was found to act as an antioxidant and antimutagen and to induce phase II drug-metabolizing enzymes (anti-initiation activity); it mediated anti-inflammatory effects and inhibited cyclooxygenase and hydroperoxidase functions (antipromotion activity); and it induced human promyelocytic leukemia cell differentiation (antiproliferation activity). In addition, it inhibited the development of preneoplastic lesions in carcinogen-treated mouse mammary glands in culture and inhibited tumorigenesis in a mouse skin cancer model. These data suggest that resveratrol, a common constituent of the human diet, merits investigation as a potential cancer chemopreventive agent in humans.

- Science 是一個怎樣的期刊？
- Resveratrol 是如何被發現的？純屬偶然嗎？
- 假設葡萄柚中也有類似物質存在，可否請你設計實驗來發現此一物質？
- Resveratrol 的 anti-inflammatory effect 的機轉是什麼？
- Resveratrol 具有抗氧化作用，與其具有的生物活性有何種關連？

備 考 試 題 隨 卷 繳 交

命 題 委 員 :

- 224 -

(簽章) 92 年 4 月 7 日

國立政治大學圖書館

考試科目	經濟學	所別	智財所 501	考試時間	4月10日(上) 星期 日 下午第一節
<p>經濟學(智財所)</p> <p>1、請儘量輔以圖表或方程式來說明需求函數與供給函數是如何導出來的。(20%)</p> <p>2、</p> <p>(1) 請解釋以下名詞：(18%) 進入障礙，套牢，轉換成本，網路外部性，規模經濟，搭售</p> <p>(2) 微軟一再投入重金以更新並擴充 WINDOW 系統軟體的功能，甚至要把 IE 瀏覽器也納入系統軟體的一部份。請用以上名詞解釋微軟採取這種策略行爲的原因。(12%)</p> <p>3、沒有鑽石不會怎麼樣，沒有水我們卻活不下去。但是，爲什麼鑽石卻比水來得貴呢？(10%)</p> <p>4、在經濟學中，如何定義「技術」？如果有全自動紡紗機，半自動紡紗機及手動紡紗機等三種生產的方法可供選擇，廠商該如何選擇最有經濟效率的生產方法呢？(20%)</p> <p>5、我國那些法律和科技發展有關？請用經濟學的原理分別討論這些法律的作用。(20%)</p>					
備考	試題隨卷繳交				
命題委員：	-225- (簽章) 92年4月3日				

考試科目	民法	所別	智慧財產研究所 5011	考試時間	4月20日上午 星期日下午	第一節
------	----	----	-----------------	------	------------------	-----

國立政治大學圖書館

- 一、國內線航空公司機票網路訂票須知草案中規定：「機票效期：自開票日起算一年有效。退票期限：自開票日起算二年內均可辦理退票。」請問這個規定，與民法第 147 條：「時效期間，不得以法律行為加長或減短之。並不得預先拋棄時效之利益。」有無牴觸，請說說你的看法（34%）
- 二、表意人故意使其意思與表示不一致者，依據民法第 86 條規定：「表意人無欲為其意思表示所拘束之意，而為意思表示者，其意思表示，不因之無效。但其情形為相對人所明知者，不在此限。」可是在表意人非故意使意思與表示不一致，而其情形為相對人所明知者，第 88 條第 1 項僅規定：「意思表示之內容有錯誤，或表意人若知其事情即不為意思表示者，表意人得將其意思表示撤銷之。但以其錯誤或不知事情，非由表意人自己之過失者為限。」這時候應該發生怎樣的法律效果？（33%）
- 三、商人甲因股票套牢心力憔悴，入醫院診治，經醫生乙囑咐，須住院療養三個月，為使其經營之指南雜貨店能永續經營，乃授與其惟一親人十八歲之子丙以概括全權代理，為其處理一切事務，並准許丙經營指南雜貨店。不數日丙深覺厭煩，乃將指南雜貨店之經營權以新臺幣 150 萬元讓與丁。事為甲所悉，立即否認出讓之法律行為，試析其法律關係。（33%）

備考 試題隨卷繳交

命題委員：

-226-

(簽章) 2003 年 3 月 22 日