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| 考試科目 | 微積分 | 所別 | 知財研 4201 | 考試時間 | 3月16日 星期日 第 / 節 |
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注意事項：1、請將算式以及推導過程臚列清楚。
2、每題 10 分，注意時間的分配。

一、 某產品的總成本函數是 $y = f(x)$ ，
如果邊際成本函數是 $f'(x) = \frac{dy}{dx} = 5 + 30x - 6x^2$ ，固定成本是 70。請
問總成本函數及平均成本函數分別為何？

二、 請求出 x, y, z 的最佳解：

$$\begin{aligned} \text{Min} Z &= 5x^2 + 6y^2 - xy \\ \text{s.t.} \quad &x + 2y \geq 24 \end{aligned}$$

三、 請微分： $\ln(6x^3 + \cos x)$

四、 求拋物線 $y^2 = 4x$ 與直線 $y = 2x - 4$ 所圍的之區域的面積：

五、 定義 彈性 $e = -\frac{\frac{dQ}{Q}}{\frac{dP}{P}}$ ，試求 $P = Q^{-0.5}$ 的彈性為何？

六、 若 $z = \int_x^y \sin t dt$ ，試求 $\frac{\partial z}{\partial x} - \frac{\partial z}{\partial y} = ?$

七、 試求 $\int_0^1 \int_0^{\ln x} \int_0^{x+y} e^{x+y+z} dz = ?$

八、 已知 $u = e^{ax}(y-z)$ ， $y = a \sin x, z = \cos x$ ，試求 $\frac{du}{dx} = ?$

九、 請運用泰勒(Taylor)展開式求 $\ln(1.02)$ 的近似值至小點後第五位。

十、 何謂「微積分基本定理」？這定理的重要性何在？

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| 備 考 | 試 題 隨 卷 繳 交 |
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| 命 題 委 員： | 年 3 月 7 日 |
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3. 試題由郵寄遞者請以掛號寄出，以免遺失而示慎重。

國立政治大學 九十七學年度 碩士班入學考試命題紙

4201

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|--|------|--------|-------|------|-------------|
| 考試科目 | 生命科學 | 所別 | 智慧財產所 | 考試時間 | 3月16日星期日第一節 |
| 請回答下列問題，每題二十分。 | | | | | |
| <p>1. Ingale S. Wolfert MA. Gaekwad J. Buskas T. Boons GJ. Robust immune responses elicited by a fully synthetic three-component vaccine. Nature Chemical Biology. 3(10):663-7, 2007.</p> <p>The overexpression of saccharides such as Globo-H, Lewis(Y) and Tn antigen is a common feature of oncogenic transformed cells. Endeavors to exploit this aberrant glycosylation for cancer vaccine development have been complicated by difficulties in eliciting high titers of IgG antibodies against classical conjugates of tumor-associated carbohydrates to carrier proteins. We have designed, chemically synthesized and immunologically evaluated a number of fully synthetic vaccine candidates to establish strategies to overcome the poor immunogenicity of tumor-associated carbohydrates and glycopeptides. We have found that a three-component vaccine composed of a TLR2 agonist, a promiscuous peptide T-helper epitope and a tumor-associated glycopeptide can elicit in mice exceptionally high titers of IgG antibodies that can recognize cancer cells expressing the tumor-associated carbohydrate. The superior properties of the vaccine candidate are attributed to the local production of cytokines, upregulation of co-stimulatory proteins, enhanced uptake by macrophages and dendritic cells and avoidance of epitope suppression.</p> | | | | | |
| <p>a. 何謂 Globo-H, Lewis(Y) and Tn antigen. b. 簡介 glycosylation c. 何謂 synthetic vaccine ? d. three-component vaccine 的好處為何 ?</p> | | | | | |
| 備 | 考 | 試卷隨卷繳交 | | | |
| 命題委員： | | | | 3月7日 | |

國立政治大學 九十七學年度 ⁴⁵⁰¹ 碩士班入學考試命題

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|---|--------|----|-------|------|-------------|
| 考試科目 | 生命科學 | 所別 | 智慧財產所 | 考試時間 | 3月16日星期日第一節 |
| <p>2. Smith PA. Romesberg FE. Combating bacteria and drug resistance by inhibiting mechanisms of persistence and adaptation. Nature Chemical Biology. 3(9):549-56, 2007.</p> <p>Antibiotics have revolutionized the treatment of infectious disease but have also rapidly selected for the emergence of resistant pathogens. Traditional methods of antibiotic discovery have failed to keep pace with the evolution of this resistance, which suggests that new strategies to combat bacterial infections may be required. An improved understanding of bacterial stress responses and evolution suggests that in some circumstances, the ability of bacteria to survive antibiotic therapy either by transiently tolerating antibiotics or by evolving resistance requires specific biochemical processes that may themselves be subject to intervention. Inhibiting these processes may prolong the efficacy of current antibiotics and provide an alternative to escalating the current arms race between antibiotics and bacterial resistance. Though these approaches are not clinically validated and will certainly face their own set of challenges, their potential to protect our ever-shrinking arsenal of antibiotics merits their investigation. This Review summarizes the early efforts toward this goal.</p> <p>a. 何以 antibiotic discovery 無法跟上細菌的演化？ b. 寫出三種你所知道的 antibiotic. c. 細菌對抗生素的耐性如何產生。 d. 試述本論文想法的合理性。</p> | | | | | |
| 備考 | 試卷隨卷繳交 | | | | |
| 命題委員： | 3月7日 | | | | |

國立政治大學 九十七學年度 4201 碩士班入學考試命題紙

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|--|--------|----|-------|------|-------------|
| 考試科目 | 生命科學 | 所別 | 智慧財產所 | 考試時間 | 3月16日星期日第一節 |
| <p>3. Rosebrock TR. Zeng L. Brady JJ. Abramovitch RB. Xiao F. Martin GB. A bacterial E3 ubiquitin ligase targets a host protein kinase to disrupt plant immunity. Nature. 448(7151):370-4, 2007 Jul 19.</p> <p>Many bacterial pathogens of plants and animals use a type III secretion system to deliver diverse virulence-associated 'effector' proteins into the host cell. The mechanisms by which these effectors act are mostly unknown; however, they often promote disease by suppressing host immunity. One type III effector, AvrPtoB, expressed by the plant pathogen <i>Pseudomonas syringae</i> pv. tomato, has a carboxy-terminal domain that is an E3 ubiquitin ligase. Deletion of this domain allows an amino-terminal region of AvrPtoB (AvrPtoB(1-387)) to be detected by certain tomato varieties leading to immunity-associated programmed cell death. Here we show that a host kinase, Fen, physically interacts with AvrPtoB(1-387) and is responsible for activating the plant immune response. The AvrPtoB E3 ligase specifically ubiquitinates Fen and promotes its degradation in a proteasome-dependent manner. This degradation leads to disease susceptibility in Fen-expressing tomato lines. Various wild species of tomato were found to exhibit immunity in response to AvrPtoB(1-387) and not to full-length AvrPtoB. Thus, by acquiring an E3 ligase domain, AvrPtoB has thwarted a highly conserved host resistance mechanism.</p> <p>a. 簡述 plant immunity. b. 說明 AvrPtoB 的作用. c. 說明 Fen 的角色. d. 簡述 proteasome.</p> | | | | | |
| 備考 | 試卷隨卷繳交 | | | | |
| 命題委員： | | | | 3月7日 | |

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|--|------|--------|-------|------|-------------|
| 考試科目 | 生命科學 | 所別 | 智慧財產所 | 考試時間 | 3月16日星期日第一節 |
| <p>4. Peer D. Park EJ. Morishita Y. Carman CV. Shimaoka M. Science. 319(5863):627-30, 2008.</p> <p>Cyclin D1 (CyD1) is a pivotal cell cycle-regulatory molecule and a well-studied therapeutic target for cancer. Although CyD1 is also strongly up-regulated at sites of inflammation, its exact roles in this context remain uncharacterized. To address this question, we developed a strategy for selectively silencing CyD1 in leukocytes in vivo. Targeted stabilized nanoparticles (tsNPs) were loaded with CyD1-small interfering RNA (siRNA). Antibodies to beta(7) integrin (beta(7) I) were then used to target specific leukocyte subsets involved in gut inflammation. Systemic application of beta(7) I-tsNPs silenced CyD1 in leukocytes and reversed experimentally induced colitis in mice by suppressing leukocyte proliferation and T helper cell 1 cytokine expression. This study reveals CyD1 to be a potential anti-inflammatory target, and suggests that the application of similar modes of targeting by siRNA may be feasible in other therapeutic settings.</p> <p>a. 簡介 siRNA.</p> <p>b. Nanoparticles 扮演的角色為何?</p> <p>c. CyD1 為何被認為是 anti-inflammatory target?</p> <p>d. 請試著幫本論文摘要取一個題目.</p> | | | | | |
| 備 | 考 | 試卷隨卷繳交 | | | |
| 命題委員： | | | | 3月7日 | |

國立政治大學 九十七學年度 碩士班暨碩士在職專班招生考試

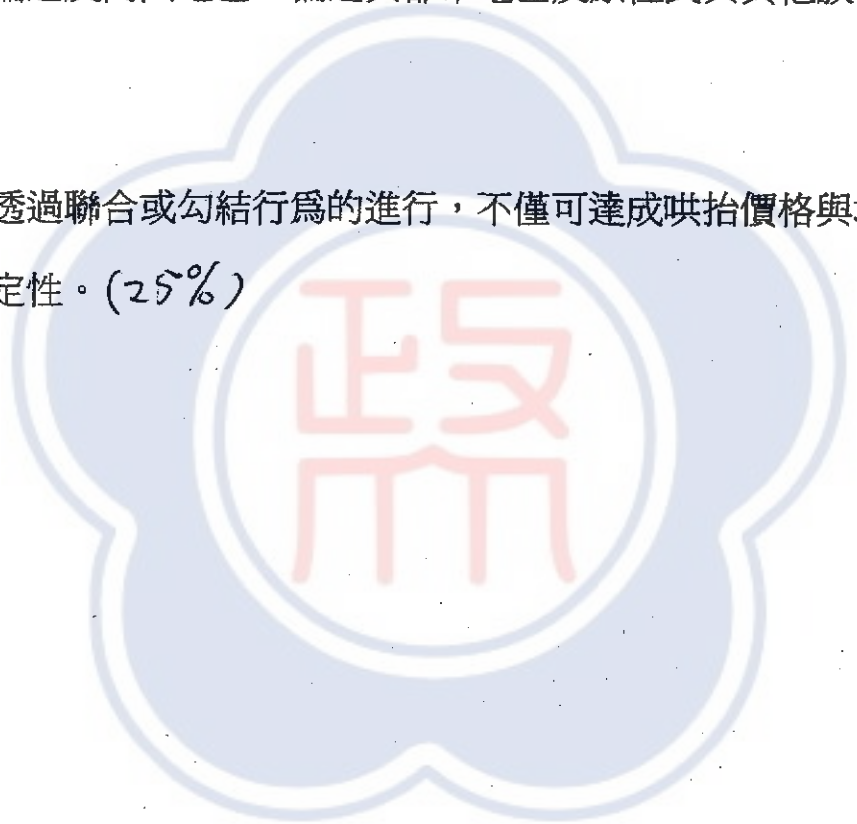
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| 考試科目 | 生命科學 | 所別 | 智慧財產所 | 考試時間 | 3月16日星期日第一節 |
| <p>5. Roberts JN. Buck CB. Thompson CD. Kines R. Bernardo M. Choyke PL. Lowy DR. Schiller JT. Genital transmission of HPV in a mouse model is potentiated by nonoxynol-9 and inhibited by carrageenan. Nature Medicine. 13(7):857-61, 2007.</p> <p>Genital human papillomavirus (HPV) infection is the most common sexually transmitted infection, and virtually all cases of cervical cancer are attributable to infection by a subset of HPVs. Despite the high incidence of HPV infection and the recent development of a prophylactic vaccine that confers protection against some HPV types, many features of HPV infection are poorly understood. It remains worthwhile to consider other interventions against genital HPVs, particularly those that target infections not prevented by the current vaccine. However, productive papillomavirus infection is species- and tissue-restricted, and traditional models use animal papillomaviruses that infect the skin or oral mucosa. Here we report the development of a mouse model of cervicovaginal infection with HPV16 that recapitulates the establishment phase of papillomavirus infection. Transduction of a reporter gene by an HPV16 pseudovirus was characterized by histology and quantified by whole-organ, multispectral imaging. Disruption of the integrity of the stratified or columnar genital epithelium was required for infection, which occurred after deposition of the virus on the basement membrane underlying basal keratinocytes. A widely used vaginal spermicide, nonoxynol-9 (N-9), greatly increased susceptibility to infection. In contrast, carrageenan, a polysaccharide present in some vaginal lubricants, prevented infection even in the presence of N-9, suggesting that carrageenan might serve as an effective topical HPV microbicide.</p> <p>a. 簡介 HPV. b. 何謂 species- and tissue-restricted ? c. 如何建立 HPV 的 animal model ? d. 可以用來抑制 HPV 的藥物機轉為何 ?</p> | | | | | |
| 備考 | 試卷隨卷繳交 | | | | |
| 命題委員 : | | | 97 年 3 月 7 日 | | |

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|------|-----|----|----------|------|--------------|-----|
| 考試科目 | 經濟學 | 所別 | 智財所 4201 | 考試時間 | 2月16日 星期日 | 第一節 |
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※ 此為經濟學考題，不論答案為「是」、「非」或「不一定」，請說明理由或理論基礎。

1. 至目前為止，雖然王永慶先生仍每天到台塑大樓上班，他的勞動供給線跟其他人一樣仍存在往後彎的現象。(25%)
2. 近年來，財政部一直想恢復課徵國中小學老師個人綜合所得稅，因而導致國中小學老師多次的抗議遊行。為了彌補這些人的怨氣，行政院提出了「課多少退多少」的補償政策。雖然如此，國中小學老師必仍不會滿意。(25%)
3. 隨著金融機構普設於偏遠及高山地區，偏遠與都市地區及原住民與其他族群的教育水準差距必會逐漸縮少。(25%)
4. 在寡佔市場裡，廠商透過聯合或勾結行為的進行，不僅可達成哄抬價格與增加利潤之目的，且其行為與效果具有穩定性。(25%)



備 考 試 題 隨 卷 繳 交

命 題 委 員 : (簽章) 2008 年 2 月 29 日

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| 考試科目 | 民法 | 所別 | 智慧財產研究所 | 考試時間 | 3月6日 星期一 第一節 |
|------|----|----|---------|------|--------------|

1. 美國億萬富婆利昂娜·海姆斯利在遺囑中將 1200 萬美元的遺產留給了自己的寵物狗“麻煩”。請問依據台灣的法律，狗能接受遺產嗎？(33%)
2. 2005 年 9 月 7 日中午，陸軍 586 旅戰車部隊進行移防作業時，發生戰車暴衝意外，造成孫吉祥上尉連長不幸被撞及胸部大量出血，送醫不治死亡，得年 29 歲。孫吉祥連長有個相戀 12 年的女友李幸育，李女和家屬希望能取出孫吉祥的精子作試管嬰兒。衛生署表達保守反對立場，請評析衛生署此一態度是否合理。(33%)
3. 瑞士民法第 28 條 f (損害賠償):「1. 當預防性措施所由許可之請求被認定無理由時，原告必須賠償因措施所致的損害；但若原告無過失或只有輕過失，則法院可以駁回賠償的請求或減少損賠。2. 刪除。3. 如果確定沒有損賠訴訟被提起，原提供之擔保歸還；在不確定時，由法院設定起訴期限。」瑞士民法第 28 條 g (反對陳述權):「(基本原則【武器平等原則】) 1. 任何人在定期播送或刊出的媒體，特別是報紙、廣播和電視，直接被影響其人格者，有權要求反對之陳述。2. 若係對於官方公開會議如實指涉，並且所涉之人出席該會議，則無反對陳述權。」瑞士民法第 28 條 h (形式與內容):「1. 反對陳述的內容，限於其所欲反對之言論客體範圍內。2. 若提出之反對陳述明顯不正確，或者若它違反法律，或者違背善良風俗，得拒絕之。」瑞士民法第 28 條 i (向法院請求):「1. 被涉及者必須在得知被指責之事實陳述後，二十天內，但最遲在該陳述發行後三個月內，向媒體業者遞出其反對陳述之內文。2. 媒體業者應立刻通知被影響者，反對陳述何時被公開發表，或者為何被拒絕。」請評論前述規定。(34%)

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| 備考 | 試題隨卷繳交 |
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命題委員： 2008 年 2 月 23 日

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