行政院所屬各機關因公出國人員出國報告書

（出國類別：開會考察）

參加「美國微生物學會第103屆年會」報告

服務機關：衛生署藥物食品檢驗局

出國人　職　稱：薦任技士

姓　名：黃翠萍

出國地區：美國華盛頓特區

出國期間：九十二年五月十六日至五月二十八日

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主辦機關:

行政院衛生署藥物食品檢驗局

聯絡人／電話:

陳婉麗／02-26531300

出國人員:

黃翠萍　行政院衛生署藥物食品檢驗局　第五組　薦任技士

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關鍵詞: 美國,美國微生物學會,食品中毒原因菌

內容摘要: 摘 要 美國微生物學會第 103 屆年會自 92 年 5 月 18 日至 22 日，於華盛頓特區（Washington, D.C.）的會議中心（Washington Convention Center）舉行，該會規模龐大歷史悠久，會員遍佈全球，從 1899 年 59 位科學家創立至今會員超過 42000 名，且其中有百分之三十爲國際性會員。大會分成學術論文發表及儀器設備、書籍、試劑及相關基金會之展示等兩大部份。學術論文發表又分口頭及壁報兩類，討論主題分爲：一、診斷微生物學暨流行病學（包括 C、F、L、U、Y 分組）；二、致病力與宿主反應機制（包括 A、B、D、E、G、V、Z 分組）；三、一般暨應用微生物學（包括 I、N、O、P、Q、R、W 分組）；四、分子生物學、生理學、病毒學（包括 H、J、K、M、S、T、X 分組）等四組(Group)。所有與會者提出之論文，全部安排在壁報論文中發表，依專長領域及研究興趣細分爲 26 組(Division): A-抗生素化學(Antimicrobial Chemistry)173 篇；B-微生物的致病性(Microbial Pathogenesis)457 篇；C-臨床微生物(Clinical Microbiology)446 篇；D-一般醫學微生物(General Medical Microbiology)262 篇；E-免疫學(Immunology)121 篇；F-醫用黴菌學(Medical Mycology)122 篇；G-黴漿菌學(Mycoplasmology)30 篇；H-遺傳與分子生物學(Genetics and Molecular

Physiology and Metabolism)144 篇；L-院內感染(Nosocomial infections)17 篇；M-噬菌體(Bacteriophage)41 篇；N-微生物生態學(Microbial Ecology)388 篇；O-發酵與生物技術(Fermentation and Biotechnology)133 篇；P-食品微生物(Food Microbiology)135 篇；Q-環境與一般應用微生物(Environmental and General Applied Microbiology)535 篇；R-新興的遺傳的微生物學(Evolutionary and Genomic Microbiology) 63 篇；S-去氧核糖核酸病毒(DNA Viruses)13 篇；T-核糖核酸病毒(RNA Viruses)34 篇；U-分枝桿菌學(Mycobacteriology)95 篇；V-臨床診斷免疫學(Clinical and Diagnostic Immunology)21 篇；W-微生物教育(Microbiology Education)31 篇；X-真核生物的分子、細胞及普通生物學(Molecular, Cellular and General Biology of the Eukaryotes)27 篇；Y-公共衛生(Public Health)53 篇；Z-動物健康微生物學(Animal Health Microbiology)58 篇，其中環境與一般應用微生物(Q)、微生物的致病性(B)、臨床微生物(C)、微生物生態學(N)等組發表的壁報論文篇數最多，約佔五成。壁報論文之外，大會另外以各領域之熱門題材，邀請專家做專題演講或座談會。本屆年會所發表的壁報論文共三千七百多篇，而專題演講則有四百多場，包括近年來來熱門題目『生物恐怖主義』。此行藉由參加大會相關活動，除自發表之成果中更加了解目前執行業務所涉及之重要食品中毒原因菌，並吸收相關研究之精華拓展視野，同時蒐集參展廠商多方面資訊，對於未來業務推動及處理新興議題均有很大的幫助。第 104 屆美國微生物學會年會將於 93 年 5 月 23 日至 27 日，在洛杉磯紐澳良的 Ernest N. Morial 會議中心舉行，新增一項分組主題爲 Free-Living, Symbiotic, and Parasitic Protists，投稿期限自今年 10 月 4 日至 12 月 11 日。

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摘　要

美國微生物學會第 103 屆年會自 92 年 5 月 18 日至 22 日，於華盛頓特區（Washington, D.C.）的會議中心（Washington Convention Center）舉行，該會規模龐大歷史悠久，會員遍佈全球，從 1899 年 59 位科學家創立至今會員超過 42000 名，且其中有百分之三十為國際性會員。大會分成學術論文發表及儀器設備、書籍、試劑及相關基金會之展示等兩大部份。學術論文發表又分口頭及壁報兩類，討論主題分為：一、診斷微生物學暨流行病學（包括 C、F、L、U、Y 分組）；二、致病力與宿主反應機制（包括 A、B、D、E、G、V、Z 分組）；三、一般暨應用微生物學（包括 I、N、O、P、Q、R、W 分組）；四、分子生物學、生理學、病毒學（包括 H、J、K、M、S、T、X 分組）等四組(Group)。所有與會者提出之論文，全部安排在壁報論文中發表，依專長領域及研究興趣細分為 26 組(Division): A-抗生素化學(Antimicrobial Chemistry)173 篇；B-微生物的致病性(Microbial Pathogenesis)457 篇；C-臨床微生物(Clinical Microbiology)446 篇；D-一般醫學微生物(General Medical Microbiology)262 篇；E-免疫學(Immunology)121 篇；F-醫用黴菌學(Medical Mycology)122 篇；G-黴漿菌學(Mycoplasmology)30 篇；H-遺傳與分子生物學(Genetics and Molecular Biology)161 篇；I-一般微生物(General Microbiology)137 篇；J-超微構造與功能(Ultrastructure and Function)26 篇；K-微生物生理與代謝(Microbial Physiology and Metabolism)144 篇；L-院內感染(Nosocomial infections)17 篇；M-噬菌體(Bacteriophage)41 篇；N-微生物生態學(Microbial Ecology)388 篇；O-發酵與生物技術(Fermentation and Biotechnology)133 篇；P-食品微生物(Food Microbiology)135 篇；Q-環境與一般應用微生物(Environmental and General Applied Microbiology)535 篇；R-新興的遺傳的微生物學(Evolutionary and Genomic Microbiology) 63 篇；S-去氧核糖核酸病毒(DNA Viruses)13 篇；T-核糖核酸病毒(RNA Viruses)34 篇；U-分枝桿菌學(Mycobacteriology)95 篇；V-臨床診斷免疫學(Clinical and Diagnostic Immunology)21 篇；W-微生物教育(Microbiology Education)31 篇；X-真核

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壹、 目的

時代變遷快速，國際間交流頻繁，對於未來應更積極規劃因應的措施，針對本局職掌的食品安全議題，WHO 已經將食品安全列為重要的公共衛生問題，也擬定了『全球食品安全戰略』，證明此議題的重要性與急迫性，目前全球已有許多食品安全相關的監控系統，我們需要更積極的參與，蒐集相關資訊並建立本土的背景值與資料庫。美國微生物學會為歷史最悠久、會員人數最多的單一生命科學性學會，該會會員遍佈全球，在 42000 多名會員中有百分之三十為國際性會員。大會除舉辦學術性的壁報論文及專題討論發表會，並有儀器設備、材料試劑、書籍及相關基金會之參展。與會專家來自世界各地，參展單位也涵蓋全球，藉此機會可汲取世界各地科學工作者的研究心得、蒐集食品中毒微生物及其毒素之最新檢驗資訊及未來技術發展之趨勢，並建立國際資訊技術交流之管道。另一目的為順道拜訪本局國外科技顧問，並參觀美國藥物食品管理署(Food and Drug Administration)及美國食品安全聯合監管各單位於 DC 所在的機關，增進彼此之了解與互信，建立本局與該單位溝通及聯絡的國際管道，有助於未來食品中毒之監測、防治及法規研訂。

貳、行程及紀要

美伊戰爭於 3 月 20 日開戰，接著國內暴發 SARS 疫情，台北市立和平醫院於 4 月 22 日封院更引起全球矚目，國內外許多大型的集會活動均延期或取消，國際間更瀰漫戰爭與瘟疫的緊張恐懼氣氛，原本僅賴 E-mail 與我國農委會駐外人員張瀛福博士及服務於美國食品藥物管理局的本局科技顧問馮寄新博士聯絡的參訪活動增加了許多的變數，由於美伊戰況及我國疫情的節節高升，美國微生物學會年會舉行的地點又位於首都華府，是否因此易地或改期？美國 CDC 對於台灣的警戒隨疫情惡化而提高，對於台灣的出入境管制政策更有多種非官方的說法，許多的不確定因素終於在局務會議明確的政策下無論如何仍然繼續進行。

國際航班異動所有直飛美國的班次均取消，因轉機時間耗費加上飛航距離增加，為趕上 5 月 17 日於聾啞學校舉辦的研習會(workshop)，提前一天於 5 月 16 日上午出發，去程經東京新羽田機場轉機，由美國舊金山 SFO 機場入境，再轉機至華盛頓 IAD 機場時已經是 5 月 16 日晚上，抵達住宿旅館馬里蘭 Bethesda 的 American Inn，更是夜深時刻，雖然獨自長途旅程、時差、氣候變化，加上國際機場氣氛緊張盤查十分仔細等種種問題，幸而已事先安排友人接機並預訂旅館，總算順利抵達。

美國微生物學會第 103 屆年會自 92 年 5 月 18 日至 22 日舉行，年會議程如表一，此次美國微生物學會於會議前兩天亦舉辦 21 場研習會(Workshop)，半天的研習會有 2 場，一天的研習會共有 16 場，兩天的研習會有 3 場，其中有 6 場除演講外另含實際操作，內容主要針對臨床微生物之篩選鑑別及其抗藥性之檢測，原預定之 WS-05、WS-08、WS-21、WS-23、WS-24 等五場研習會因故取消，而新增之 WS-00 研習會則因 WS-01. Rapid Cycle, Real-Time PCR for the Clinical Microbiology Laboratory 場次報名踴躍而加開，但刪除實際操作的部份，各研習會場次如表二。考量經費及業務需要僅報名 WS-11. The Gram-Positive Challenge: Clinical Importance of Aerobic Catalase-Negative Gram-Positive Cocci (Laboratory) ，為半天之研習會並含實驗室操作。已預先繳費報名

的研習會 5 月 17 日(星期六)上午八點半在位於華府城東的聾啞學校舉行，幸而華府地鐵四通八達交通十分便利（附件一），但一大早步行至地鐵才發現該站假日開放時間是八點，雖然因此上課略遲，但講師另準備完整的講義(附件二)可以參考。本研習班共12位成員3位指導老師(圖一），除了專題演講外並借用該校的微生物實驗室進行實務操作，包括選擇性培養基上菌落的型態、鏡檢、生化試驗結果、抗生素敏感試驗結果等之觀察記錄，因老師已事先做好準備工作(接種、培養、染色、生化試驗等)，所以輪流觀察記錄的過程井然有序，而參與者報名時即限定為經驗豐富的微生物或臨床微生物實驗室的技術人員或督導，因此更引起熱烈的討論與心得交換。

大會於 5 月 18 日下午六時舉辦開幕典禮，包括會員大會、特別演講及頒獎。由於會場大、參加人數多，大會於會場前面特別準備了兩個大銀幕，現場將典禮進行情形直接播映，使所有參加者均能清楚的看到整個過程。參與此次年會者有來自世界各國的微生物學家。雖名為美國微生物學會年會，實際上比一般國際會議有過之而無不及。會後還安排盛大的歡迎接待晚會，與會者可借此機會互相熟悉共同迎接未來四天的豐富之旅。

壁報論文、專題演講於 5 月 19 日至 22 日同步進行，學術論文發表分兩大部份，所有與會者提出之論文，全部安排在壁報論文中發表，為使能對微生物各領域之重要性有所瞭解，特將各分組研究範疇及此次年會發表之個別論文數目列於表三、表四，不管主題及對象之差異，切入觀點大多由遺傳及分子生物角度著手。大會另外以各領域之熱門題材，邀請專家做專題演講或座談會。本屆年會所發表的壁報論文共三千七百多篇，而專題演講則有四百餘場，同時間內常有多個演講進行，詳如表五，故只能選擇較有興趣之題目聽講。

相關廠商機關單位展示期間為 5 月 19 日至 21 日，展示場地約與臺北市信義路世貿中心相當，共有三百二十六個展示攤位，幾乎在微生物範圍可能用到的儀器設備、試劑等均可在展示場內看到，國內也有廠商派員參觀，以掌握最新產品趨勢。在此可找到最新的實驗器材等資料，

有助於研究工作的進行。另外。為方便參觀者索取資料，大會為每位參加者準備了參觀卡 (Expocard) ，只要在廠商攤位的電腦刷卡，並告知個人需求，參觀者的基本資料，包括姓名、住址、工作單位及工作性質等資料就進入電腦中，日後廠商即可據以寄資料給參觀者。

在會場展示攤位尚包括相關領域之圖書出版社，因此可收集到最新產品資料以及最新出版書籍資料，尤其很多在國內代理商無法解決的問題，原廠專家均能完滿回答。另外美國微生物學會也出版了十一種期刊，均為極優良之期刊。對於國內的研究極俱參考價值，表六除條列各期刊之名稱外，尚包括洽詢電話及電郵網址，與國內一種學會只出刊一兩種期刊，且常缺稿源相比，可見美國微生物學會領域含概廣、會員眾多、機構歷史悠久。

除了廠商外，很多與微生物有關之機構亦設有攤位。如美國菌株保存中心 (American Type Culture Collection, ATCC)、美國農業部食品安全研究資訊機構(USDA，National Food Safety Research Information Office，FSRIO)、美國疾病管制局（Centers for Disease Control and Prevention，US-CDC)、美國食品藥物管制局(Food and Drug Administration，FDA)、美國國家衛生組織 (National Institute of Health, NIH)、美國國家科學院(National Academy of Science, NAS)等，均在展示場設有攤位，使參觀者對其有所瞭解。

另外會程期間亦同時進行參訪事宜之聯繫，曾多次科技顧問電話上討論，駐美台北經濟文化代表處張瀛福博士也曾與 FDA 國際關係合作處聯絡，結果認為非經官方正式申請手續，不宜個人前往拜會本局之科技顧問及參觀美國其他官方單位，尤其當時國際局勢緊張，美伊戰爭雖已暫告段落，但全球恐怖活動頻傳，美國國防安全警戒亦節節高升，在一週內由黃色（YELLOW）達橘色（ORANGE），加上國內 SARS 疫情嚴重，距離我進入美國境內時間也尚未達檢疫隔離之 14 天安全期，只好取消參觀拜會行程，此部分雖不如預期順利，但 5 月 21 日與服務於美國 FDA 之本局科技顧問周家璜博士會面，周博士對本局因公出國同仁向來熱心招待，除代訂旅館外並提供許多 DC 交通治安方面的資訊，

一大早專程來探望我、關切我抵美後的生活起居，並婉轉傳達拜訪 FDA 時機不理想，但贈與乙冊 FDA 科學家公會年度最新會報（內容目錄如附件三），本人雖無法親自前往 FDA，卻可藉此一窺該局目前業務的重點。至於原訂會後(5 月 23 日)拜訪 FDA 食品安全暨應用營養中心(Center for Food Safety and Applied Nutrition，CFSAN）馮寄新國外科技顧問則改為電話上交談，馮顧問在將近一小時的討論中提供許多資訊及適當的網站予我們參考（附件四、五），也趁機了解目前本組的業務運作情形，職並遵照組長囑咐邀請馮顧問安排適當時機回國進行專題講座，馮顧問也口頭應允。

在返國回程順道至洛杉磯拜訪過去的老同事鄭崇明博士，因其任職美國 FDA 洛杉機分部，目前負責業務與本組關係密切，藉此機會請教美國國內對於進口產品的管制措施及病原菌檢驗情形及分型技術，同時針對其發表之沙門氏桿菌檢測方法及檢出率交換心得，並應允帶領至七月才開幕之 FDA 洛杉機分部新的辦公室（因舊的辦公室已打包準備搬家，而新居尚未開張無法進入，僅拍照留念如圖二），大會期間又經其介紹多位任職於 FDA 的同事及目前從事肉毒桿菌研究的旅美校友林維真博士，因肉毒桿菌已被列入生物戰劑之最可能應用材料，各研究單位均採保守方式秘密進行研究，且官方也嚴加管制，此行很幸運的得到她的同意，利用假日在鄭博士的陪同下私下參觀其任教之加州州立大學 POMONA 分校研究室（圖三）及動物實驗中心，經此深感本局多年來因此菌發生率不高，送驗檢體不多，且多未檢出該菌，對於此菌之重視程度不如其他病原菌，但依目前生物恐怖主義瀰漫，除了食品中毒案方面的考量外更需防範生物性的恐怖攻擊。

此次購置與本組業務相關圖書：

1. Gram-Positive Pathogens (CD-ROM)
2. Manual of Clinical Microbiology, 8th Edition (Volume 1)
3. Manual of Clinical Microbiology, 8th Edition (Volume 2)

4.Performance Standards for Antimicrobial Disk Susceptibility Tests; Approved Standard-Eight Edition.
5.NCCLS Disk Diffusion Supplemental Tables.
6.103th General Meeting of the American Society for Microbiology, Abstract (CD-ROM).
7.103th General Meeting of the American Society for Microbiology, Program.
8.103th General Meeting of the American Society for Microbiology, Exhibit Guide.

參、心得與建議

感謝局裡給予職參加美國微生物學會年會的機會，雖然此次出國期間正值美伊戰後，恐怖份子活躍於國際舞臺，美國國防安全警戒節節高升在我入境美國本土一週內由黃色（YELLOW）達橘色（ORANGE），美國對於國內各項安全措施之執行非常嚴格，又逢國內 SARS 疫情擴張，非但由北至南，加上媒體報導的案例均屬死亡，美國 CDC 將臺灣列入疫情嚴重地區警告其國人非必要者不要前往，而國際衛生組織（WHO）更曾宣佈全世界 SARS 疫情除了臺灣均已控制，所以此次遠赴異國感觸特別深刻，對於所見所聞之專業新知及異國風俗民情也深感『讀萬卷書、行萬里路』的重要。

行前做好各項準備工作是必要的，出發前局務會議主席提示：因 SARSA 疫情之故，同仁因公出國行前應先確認欲前往國家之相關通關規定。乃洽詢 ASM 大會規定，確定其如期舉行，且未禁止來自台灣的人民與會，又徵詢馮寄新博士等將參加 ASM 的科技顧問，回覆的答案均一致為未聽說有頒布任何新的措施，在 US-CDC 之網路公告已將台灣列入旅遊限制區，建議監測維護個人健康情況，但卻有旅美的台灣親友，因曾經回到台灣疫區而被公司隔離 10 天的事實，因此特別預備量體溫之貼片及 N95 口罩、感冒藥、腸胃藥、喉糖、維他命等，另準備我國駐外單位聯絡電話住址，便於發生突發或緊急狀況之需，同時更注意維護身體之健康狀態及保持良好的體適能，如此即使最差的情況也僅是不幸於美國或日本轉機途中遭遇隔離罷了。

專業及語言能力的養成需日積月累，尤其國際共通語言-英語，精通外語不僅在專業知識的吸收方面有所助益，關於此行公務出國更深感其重要性：1.便於事前資訊蒐集，尤其網際網路資訊發達，舉凡交通航線選擇、當地旅館之地點、價位及設備、服務項目，參訪機關及其任務，或機票附帶之各種套裝旅遊...等琳瑯滿目，若用心搜索可以規劃出更完美的行程；2.便於個人於非母語國家從事除食衣住行外之各項活動，如旅遊、購物、參觀博物館等；3.與國際組織或國外友人之通訊，主要仍

依賴英語的溝通，尤其此行充分發揮 E-mail 便利迅速的優點，雖規劃期間變數很多，終於透過頻繁的 E-mail 互動而一一迎刃而解。

關於參加定期舉辦的 ASM 年會，研究成果的發表有助於研究團隊士氣的鼓舞，而且不但可以提昇個人工作成究感，達到學術交流的目的，更可以展現本局在專業方面的實力，除了參與壁報論文、專題討論之外，各專業領域的分組會議及聯誼會也值得鼓勵，因為可以發表意見的機會較多，影響力也較直接，又可趁機結交活躍於國際各專業領域的人士，當然要同時達到這些目的除在專業領域、語文能力需精通外，還需俱備樂觀、積極、進取的心態及精湛的談話技巧，職報名 Y 組(Public Health)作為分組活動標的，因本局未來的規劃將逐漸朝行政管理方面著手，而這一方面的訓練卻是注重檢驗工作之技術層面的我們所欠缺的，此行雖未達預期目標，但自分組報名至今 Y 組的網路通訊負責人 Brian D. Sauders (Cornell University, Department of Food Science, Food Safety Laboratory; 405 Stocking Hall, Ithaca, NY 14853. Phone: (607) 255-1266 Fax: (607) 254-4868; Email: bds26@cornell.edu; WWW:http://www.foodsci.cornell.edu)至今仍善盡職守，不斷的寄給我各項活動、資訊或徵詢意見，可惜其中許多需俱會員資格方可參與，關於此，另一建議為加入會員。以藥物食品檢驗局的名義加入美國微生物學會可以本局身份發表意見，藉此登上國際舞臺，同時參與所屬各項國際會議或研討會的費用也較省，同仁也有較多的機會參與國際性的活動。

另外，對於所辦理之終身教育學分(Continuing Education Credit，CE Credit)，需在大會結束前付費($ 25)，出席證明則可自行到會場 E-central 登錄後列印或 6 月 9 日起上網（www.asm.org）登錄產生列印，此制度可以提高參與者的意願，並提昇參與者在職教育機會，近年來國內許多研討會亦採此方式進行，消費者付費及榮譽感、自律性的觀念也漸為國人所接受。其中包含實驗操作的研習會（workshop）其所需費用雖然較高，但在技術面的收獲卻遠比僅有演講來得深刻易了解吸收。

除了年會外，在 ASM 的網站上尚有許多遠距教學進修的機會，有心者可上網瀏覽，其中有許多俱有參考價值的網站，可惜多數限定會員

才可以登錄，另外有幾個屬於開放給一般非會員的廣大民眾如www.Microbe.org 專為小孩設計，www.MicrobeLibrary.org 乃針對推動微生物方面的教育者，www.MicrobeWorld.org 則範疇較大，而asm.org.較偏重於專業人員或科學家。

另外，由於聆聽生物恐怖主義相關議題，此行對於食品維安(security)及食品安全(safety)有更深的體認，一般就食品自生產原料、加工製造、輸送、販售至消費者手上考量的食品安全，著重於防止意外污染，可以利用科學的方法或風險評估的方式來確保，情況較單純容易管制，但食品維安則需要防範有心人士刻意的破壞，著力關注的重點不同，但終極目標均是確保消費者食的安全及因其引發的人民健康、社會經濟等相關問題。

同時也領悟出門在外靠朋友的真諦。駐美國台北經濟文化代表處經濟組張瀛福博士賢伉儷考慮周詳，行政組邱陳煜博士夫婦熱情招待，周家璜博士在非常靠近會期時代訂旅館，深夜來接機的章姐姐也不避嫌伸出援手。另外經由鄭崇明博士熱心的幫忙，林維真學姐的信任，得以參觀實際進行肉毒桿菌相關研究之實驗室，並了解CDC目前對此類實驗室的相關要求，如研究人員列管、研究室實施門禁、毒素及菌株凍存冰箱要另加鐵箱並固定於冰箱內至少三道防衛鎖(如圖四)，實驗時要至少兩人共同進行，過去較考量實驗者的安全問題，現在則惟恐外流引起食品維安的問題。因肉毒桿菌雖屬絕對厭養產孢菌，培養該菌也需要特殊條件及技術，但肉毒桿菌毒素是目前生物性毒中毒性最強的，致死率很高，所以名列生物戰劑排行榜。

今年因台灣地區遭逢SARS襲擊，參加ASM年會者較往年少，台大、陽明、成大、國衛院均有預訂發表的壁報論文臨時取消的情形，中興大學賴美津教授與海洋大學劉秀美教授此行也是決定得十分匆促，在開幕晚會中僅遇見中央研究院的鄭國展博士，壁報論文發表會場有陽明大學蔡文城教授、新竹食品工業發展研究所副研究員林明志及王維章等，很高興我能排除萬難順利成行，除在見識上有所增長外，有幸與台灣大學潘子明教授及所率研究生邱秋霞、蔡宗佑、陸茲喻在與會期間數日投宿

同一家旅館，也共同參與許多新奇的事務（圖五）。更感謝此行曾經幫助我或為我祈福的朋友們，藉此也表達我的感謝。

表一、美國微生物學會第一〇三屆年會議程

General meeting Program-at-a-Glance

	Saturday May 17	Sunday May 18	Monday May 19	Tuesday May 20	Wednesday May 21	Thursday May 22
Workshop Registration	7:30 am - 12:00	7:30 am - 12:00				
Attendee Registration		12:00 6:00 pm	7:00 am - 5:00 pm	7:00 am - 5:00 pm	7:00 am - 5:00 pm	7:00 am -12:00
Workshops	8:30 am - 4:30 pm	8:30 am - 4:30 pm				
Exhibit Hours			9:00 am - 4:00 pm	9:00 am - 4:00 pm	9:00 am - 4:00 pm	
Sunrise Seminars			6:30 - 7:45 am	6:30 - 7:45 am	6:30 - 7:45 am	
Scientific Program			8:00 - 10:30 am 2:30 - 5:00 pm	8:00 - 10:30 am 2:30 - 5:00 pm	8:00 - 10:30 am 2:30 - 5:00 pm	8:00 - 10:30 am
General Sessions		Special Session 5:00 - 6:00 pm ASM Lecture 6:00 - 7:30 pm	President's Address 5:30 - 6:30 pm		President's Forum 5:30 - 7:00 pm	
Lunch Time Award Presentations						
Poster Sessions			9:00 am - 12:00 noon 1:00 - 4:00 pm	9:00 am - 12:00 noon 1:00 - 4:00 pm	9:00 am - 12:00 noon 1:00 - 4:00 pm	9:00 am - 12:00 noon

表二、研習會場次及時刻表(5/17)

	Session Date	Session
1.	May 17, and 18 2003 8:30am - 4:30pm	WS-01. Rapid Cycle, Real-Time PCR for the Clinical Microbiology Laboratory (Laboratory)
2.	May 17, 2003 8:30am - 4:30pm	WS-02. Concepts for Establishing and Operating a Microbial Culture Collection
3.	May 17, 2003 8:30am - 4:30pm	WS-03. Introductory Clinical Mycology: Help for the Beginner
4.	May 17, 2003 8:30am - 4:30pm	WS-04. Mycobacteriology 2003: What is Old, Still Used and New? (Laboratory)
5.	May 17, 2003 8:30am - 4:30pm	WS-05. Laboratory Information Systems: Nuts and Bolts of Making it Work for Clinical Microbiology
6.	May 17, 2003 8:30am - 4:30pm	WS-06. Anaerobic Bacteriology for the Clinical Laboratory
7.	May 17, 2003 8:30am - 4:30pm	WS-07. Pulsed-Field Gel Electrophoresis and DNA Fingerprinting
8.	May 17, 2003 8:30am - 4:30pm	WS-08. GMP Series: Quality and Productivity in a GMP Microbiology Lab - Survival in a "More with Less" Environment
9.	May 17, 2003 8:30am - 4:30pm	WS-09. Rapid, Cost-Effective Identification of Gram Negative Rods (Laboratory)
10.	May 17, 2003 8:30am - 4:30pm	WS-10. Regulatory Update on Changes in Coding and Reimbursement
11.	May 17, 2003 8:30am - 12:00pm	WS-11. The Gram-Positive Challenge: Clinical Importance of Aerobic Catalase-Negative Gram-Positive Cocci (Laboratory)

表二、研習會場次及時刻表 (5/18)

	Session Date	Session
1.	May 18, 2003 8:30am - 4:30pm	WS-12. Microbiology 2003: More for Less
2.	May 18, 2003 8:30am - 4:30pm	WS-13. Bacterial Resistance: Mechanisms, Detection, Pharmacology, and Molecular Epidemiology
3.	May 18, 2003 8:30am - 4:30pm	WS-14. Microarrays: Designing, Performing, and Analyzing Experiments
4.	May 18, 2003 8:30am - 4:30pm	WS-15. Microorganisms in Foods: Now What?
5.	May 18, 2003 8:30am - 4:30pm	WS-16. Verification of Training and Ongoing Competency in the Clinical Microbiology Laboratory
6.	May 18, 2003 8:30am - 4:30pm	WS-17. In Vitro and In Vivo Test Methods Used to Assess the Efficacy of Topical Antimicrobial Products
7.	May 18, 2003 8:30am - 4:30pm	WS-18. Computer and Software in Microbiology
8.	May 18, 2003 8:30am - 4:30pm	WS-19. The Coryneform Challenge: Clinical Importance of Corynebacteria and Related Species (Laboratory)
9.	May 18, 2003 8:30am - 4:30pm	WS-20. Meeting Today's Clinical Microbiology Challenges Head-On: Look to Your LIS
10.	May 18, 2003 8:30am - 4:30pm	WS-21. Manufacturing and Quality Control of Standard Microbial Cultures for Use in Food, Drug and Cosmetic Industries
11.	May 18, 2003 8:30am - 4:30pm	WS-22. Microbial Source Tracking Using Indicator Organisms
12.	May 18, 2003 8:30am - 4:30pm	WS-23. Medical Biofilms III: Practical Techniques for Clinical Laboratory Detection and Interpretation
13.	May 18, 2003 8:30am - 12:00pm	WS-24. Interactive Workshop on How to Get a Job: Resume Writing, Interview Skills, and Secrets on Hiring
14.	May 18, 2003 8:30am - 12:00pm	WS-25. Staphylococcal Small Colony Variants (SCVs)

表三、美國微生物學會第一零三屆年會各領域發表壁報論文篇數

領域	發表壁報論文篇數
Division A: Antimicrobial Chemistry	173
Division B: Microbial Pathogenesis	457
Division C: Clinical Microbiology	446
Division D: General Medical Microbiology	262
Division E: Immunology	121
Division F: Medical Mycology	122
Division G: Mycoplasmology	30
Division H: Genetics and Molecular Biology	161
Division I: General Microbiology	137
Division J: Ultrastructure and Function	26
Division K: Microbial Physiology and Metabolism	144
Division L: Nosocomial Infections	17
Division M: Bacteriophage	41
Division N: Microbial Ecology	388
Division O: Fermentation and Biotechnology	133
Division P: Food Microbiology	135
Division Q: Environmental and General Applied Microbiology	535
Division R: Evolutionary and Genomic Microbiology	63
Division S: DNA Viruses	13
Division T: RNA Viruses	34
Division U: Mycobacteriology	95
Division V: Clinical and Diagnostic Immunology	21
Division W: Microbiology Education	31
Division X: Molecular, Cellular and General Biology of the Eukaryotes	27
Division Y: Public Health	53
Division Z: Animal Health Microbiology	58

表四、美國微生物學會依專長領域或興趣分組（A-Z）

Division Descriptions :

- Division A

  Division A is concerned with the discovery, mode of action, development and use of antimicrobial agents, and the mechanisms by which infective agents develop resistance to these compounds.

- Division B

  Division B is concerned with understanding (i) the genetic, biochemical, and structural basis of the pathogenesis of bacterial and protozoan diseases (including toxins, colonization, invasion, immunity avoidance, and other virulence mechanisms) and (ii) host factors in the infectious process.

- Division C

  Division C is involved with methods for detection, isolation, identification, characterization, and antimicrobial susceptibility testing of clinically significant microbial pathogens or their products of diagnostic significance, e.g., toxins, antigens, nucleic acids. Also involved with diagnosis-oriented investigations of these microorganisms.

- Division D

  Division D is concerned with in vitro studies of medically-important bacteria including the genetics and physiology of pathogens (their surface structures and antigens), mechanisms of adherence, phagocytes and phagocytosis, and the etiology and classification of new agents.

- Division E

  Division E is interested in immunity to bacteria, fungi, parasites and viruses, cellular and molecular mechanisms of humoral and cellular immunity, phagocytic cells and constitutive host defenses, cytokines, immunomodulation by microbes, microbial products

and other factors (e.g. stress, nutrition), adjuvants and vaccine development.

Division F

Division F encompasses the biochemistry, molecular biology, genetics, morphogenesis, pathogenesis, immunology, epidemiology, laboratory identification, in situ detection, and taxonomy of fungi, especially those known to cause disease in man and other animals, and the therapy of those diseases.

- Division G

  Division G encompasses the genetic, pathogenic, immunogenic, taxonomic, biochemical, and clinical aspects of the animal, human, plant and insect mycoplasmas (Mollicutes).

- Division H

  Division H encompasses genetic and molecular biological studies of the regulation and detailed mechanisms of transcription, translation, and replication in microbial systems.

- Division I

  Division I encompasses a diverse range of interests including the growth, development, behavior and ecology of the entire spectrum of microorganisms.

- Division J

  Division J is concerned with ultrastructural analyses of microbial cells and of communities of microbial cells adherent to surfaces using biochemical, genetic, and microscopical techniques which yield information concerning organization on the molecular, cellular, and community levels.

- Division K

  Division K encompasses the integration of biophysical, biochemical, molecular biological, genetic and other approaches to understanding structure/function relationships of diverse microorganisms. Microbial physiology includes the study of

microbial metabolism, enzymology, cell envelopes, transport, responses to environmental fluctuations, growth, differentiation, and other related processes.

- Division L

  Division L encompasses the microbiology and epidemiology (including pathogenesis, diagnosis, control and treatment) of hospital and institutionally related infections and all levels of basic through applied research and clinical trials of interventions to reduce the occurrence or provided prompt diagnosis and treatment of such infections.

- Division M

  Division M is composed of researchers dedicated to the study of bacterial viruses. Current topics of interest are: assembly and structure, genome structure, initiation of infection, regulation of transcription and translation, replication, recombination, repair, viral-host interactions, new phage systems and molecular cloning technology.

- Division N

  Division N encompasses the ecology of natural microbial assemblages and laboratory approaches that help us understand microorganisms in natural environments, such as water, soils and in higher organisms.

- Division O

  Division O serves members with interests in the molecular biology, genetics, biosynthesis, and bioconversions of natural products including antibiotics, xenobiotics, and macromolecules produced by procaryote and eucaryote microorganisms and animal cell cultures. Programming is directed toward modern molecular aspects of biotechnology and industrial microbiology.

- Division P

  Division P is concerned with fundamental and applied microbiology on food-associated organisms: their growth,

identification, biosyntheses, control, interaction with hosts, genetics, toxin production, influence on food quality and safety, and application in food fermentations.

- Division Q

  Division Q serves microbiology from both applied and environmental fields, including the traditional fields (public health microbiology; disinfection; environmental virology; water and wastewater microbiology) and developing fields (biodegradation of xenobiotics; corrosion; microbial interactions with metals; biofouling; aerosolized microorganisms; environmental considerations for genetically engineered microorganisms; soil and subsurface microbiology).

- Division R

  Division R is a forum for the study of microbial diversity and systematics, and development of the laboratory, bioinformatic and conceptual tools required to characterize and understand the evolution of genes, genomes and organisms.

- Division S

  Division S is concerned with basic and applied microbiology of animal viruses with DNA genomes.

- Division T

  Division T represents all ASM members interested in the structure replication, pathogenesis, and epidemiology of RNA-containing viruses of prokaryotic and eukaryotic cells.

- Division U

  Division U is composed of members involved with mycobacteria and its diseases, on a research, diagnostic, public health, or teaching basis.

- Division V

  Division V (i) promotes research toward understanding the processes involved in the host immune system and its responses;

encourages development and application of antibody, antigen, and molecular-based diagnostic procedures to assess the integrity and functioning of components of the host immune system, and supports clinical approaches to immune-mediated diseases; (ii) promulgates information on antibody, antigen and molecular-based diagnostic procedures, including the significance, interpretation and limitations of these assays; and (iii) encourages standardization and quality control of procedures and reagents used in clinical and diagnostic immunology laboratories.

- Division W

  Division W provides a forum for members interested in microbiology education at all levels, including pre-college, college and university, and health professional curricula.

- Division X

  Division X encompasses researchers dedicated to the study of nucleated cells of both microbial and higher organisms. Current topics of interest include molecular mechanisms of basic cellular processes, structure and function of subcellular oganelles, and evolutionary biology and ecology of eukaryotic microbes.

- Division Y

  Division Y serves members with a primary interest in public health practice and infectious diseases. Involves the contributions of microbiology to surveillance, epidemic investigations and other public health activities.

- Division Z

  Division Z is the forum for investigators whose interests encompass the diseases of animals (e.g. companion, food and exotic) and the control or treatment of those diseases using antimicrobial agents, vaccines, probiotics, etc. Current topics of interest include animal pathogen diagnostics, veterinary or zoonotic pathogen antimicrobial susceptibility testing, surveillance/ epidemiological studies, new technologies to reduce on farm zoonotic pathogens, immunology and pathogenesis.

表五、年會相關議程及時刻表(5/19 標題、時間、場地)

	Session Date	Session
1.	May 19, 2003 6:30am - 7:45am	Sunrise Symposium 002. Practical Guidelines for Testing and Working Up of Respiratory, Stool, CSF, and Urine Cultures 103
2.	May 19, 2003 6:30am - 7:45am	Sunrise Symposium 003. Reimbursement and Compliance Issues for the Clinical Lab 102
3.	May 19, 2003 6:30am - 7:45am	Sunrise Symposium 004. Diagnosis of Respiratory Viruses: What's Best for your Lab? 101
4.	May 19, 2003 8:00am - 10:30am	Colloquium 005. Using Genomics to Understand Bacterial Pathogenesis 146
5.	May 19, 2003 8:00am - 10:30am	Colloquium 006. Quality Control of Defective RNA 103
6.	May 19, 2003 8:00am - 10:30am	Colloquium 007. Towards More Representative Models for the Study of Infection 143
7.	May 19, 2003 8:00am - 10:30am	Colloquium 008. Novel Organisms and Novel Metabolisms: What More Can We Expect to find? 201
8.	May 19, 2003 8:00am - 10:30am	Symposium 009. Cell Biology of the Host-Pathogen Interactions 202
9.	May 19, 2003 8:00am - 10:30am	Symposium 010. Clinical Microbiology: Today and Tomorrow Ballroom A
10.	May 19, 2003 8:00am - 10:30am	Symposium 011. Polymorphisms within the Human Genome that Modulate Infectious Diseases Outcomes and Affect Response to Vaccine and Therapeutic Interventions 206
11.	May 19, 2003 8:00am - 10:30am	Symposium 012. Fungal Immunology: Value of Animal Models versus Clinical Studies 140
12.	May 19, 2003 8:00am - 10:30am	Symposium 013. What's New in the Study of Magnetotactic Bacteria 209
13.	May 19, 2003 8:00am - 10:30am	Symposium 014. Microbial Expropriation of the Actin Cytoskeleton

13 .	May 19, 2003 8:00am - 10:30am	Symposium 014. Microbial Expropriation of the Actin Cytoskeleton 151
14 .	May 19, 2003 8:00am - 10:30am	Symposium 015. Sensing Envelope Stresses 204
15 .	May 19, 2003 8:00am - 10:30am	Symposium 016. Getting More Information Out of Complex Systems: Mathematical Modeling of Community Interactions 144
16 .	May 19, 2003 8:00am - 10:30am	Symposium 017. Metabolic Engineering of Industrially Significant Microbes 152
17 .	May 19, 2003 8:00am - 10:30am	Symposium 018. Probiotic and Prebiotic Modulation of the Intestinal and Vaginal Microflora: Impact on Pathogens, Host Response and Health 150B
18 .	May 19, 2003 8:00am - 10:30am	Symposium 019. RNA Viruses as Therapeutic Vectors 101
19 .	May 19, 2003 8:00am - 10:30am	Symposium 020. Salmonella: Where Does It Come From? 147
20 .	May 19, 2003 8:00am - 10:30am	Special Interest 021. Microbial Forensics: Reality and Potential 145
21 .	May 19, 2003 8:00am - 10:30am	Special Interest 022. Impact of Bioterrorism on Biomedical Research 102
22 .	May 19, 2003 9:00am - 12:00pm	Poster 023. Surveillance of Antimicrobial Resistance - I Poster Hall
23 .	May 19, 2003 9:00am - 12:00pm	Poster 024. Microbial Interactions with Host Cells - I Poster Hall
24 .	May 19, 2003 9:00am - 12:00pm	Poster 025. Microbial Interactions with Host Cells - II Poster Hall
25 .	May 19, 2003 9:00am - 12:00pm	Poster 026. Toxins - I Poster Hall
26 .	May 19, 2003 9:00am - 12:00pm	Poster 027. Regulation of Virulence Determinants of Pathogenic Microorganisms - I Poster Hall
27 .	May 19, 2003 9:00am - 12:00pm	Poster 028. Diagnostic Bacteriology Non-Molecular Automated and Kit Systems

		Poster Hall
28.	May 19, 2003 9:00am - 12:00pm	Poster 029. Sexually Transmitted Diseases - I Poster Hall
29.	May 19, 2003 9:00am - 12:00pm	Poster 030. Specimen Collection, Transportation and Processing Poster Hall
30.	May 19, 2003 9:00am - 12:00pm	Poster 031. Genomic and Proteomic Approaches to Study Virulence Poster Hall
31.	May 19, 2003 9:00am - 12:00pm	Poster 032. Pseudomonas and Burkholderia Poster Hall
32.	May 19, 2003 9:00am - 12:00pm	Poster 033. Innate Immunity in Host Defense Against Pathogens - I Poster Hall
33.	May 19, 2003 9:00am - 12:00pm	Poster 034. Vaccines Against Microbial Pathogens - I Poster Hall
34.	May 19, 2003 9:00am - 12:00pm	Poster 035. Gene Expression I: Responses to the Environment Poster Hall
35.	May 19, 2003 9:00am - 12:00pm	Poster 036. DNA Transactions and Gene Expression Poster Hall
36.	May 19, 2003 9:00am - 12:00pm	Poster 037. Phage-Host Interactions and Pathogenesis Poster Hall
37.	May 19, 2003 9:00am - 12:00pm	Poster 038. Soil Microbiology - I Poster Hall
38.	May 19, 2003 9:00am - 12:00pm	Poster 039. Subsurface Microbiology Poster Hall
39.	May 19, 2003 9:00am - 12:00pm	Poster 040. Virulence Factors and Toxins Poster Hall
40.	May 19, 2003 9:00am - 12:00pm	Poster 041. Control Mechanisms Poster Hall
41.	May 19, 2003 9:00am - 12:00pm	Poster 042. Biodegradation of Chlorinated Compounds - I Poster Hall
42.	May 19, 2003 9:00am - 12:00pm	Poster 043. Biodegradation of Lignin and Polyaromatic Hydrocarbons Poster Hall
43.	May 19, 2003 9:00am - 12:00pm	Poster 044. Biodegradation of Petroleum and Petroleum By-Products Poster Hall
44.	May 19, 2003 9:00am - 12:00pm	Poster 045. Physiology and Genetics of Biodegradation

			Poster Hall
45.	May 19, 2003	9:00am - 12:00pm	Poster 046. Microorganisms in Water Poster Hall
46.	May 19, 2003	9:00am - 12:00pm	Poster 047. Starvation, Survival of Microorganisms Poster Hall
47.	May 19, 2003	9:00am - 12:00pm	Poster 048. DNA Viruses Poster Hall
48.	May 19, 2003	9:00am - 12:00pm	Poster 049. Structure, Replication and Pathogenesis of RNA Viruses Poster Hall
49.	May 19, 2003	9:00am - 12:00pm	Poster 050. Mycobacterial Virulence and Pathogenesis Poster Hall
50.	May 19, 2003	9:00am - 12:00pm	Poster 051. Enhancing Student Learning in Microbiology Poster Hall
51.	May 19, 2003	1:00pm - 2:00pm	Lecture 057. History of Microbiology Lecture 146
52.	May 19, 2003	1:00pm - 4:00pm	Poster 059. Clinical and Experimental Therapeutics Poster Hall
53.	May 19, 2003	1:00pm - 4:00pm	Poster 060. Microbial Adherence - I Poster Hall
54.	May 19, 2003	1:00pm - 4:00pm	Poster 061. Microbial Interactions with Host Cells - III Poster Hall
55.	May 19, 2003	1:00pm - 4:00pm	Poster 062. Regulation of Virulence Determinants of Pathogenic Microorganisms - II Poster Hall
56.	May 19, 2003	1:00pm - 4:00pm	Poster 063. Antimicrobial Susceptibility Testing Methods: Non-Automated Poster Hall
57.	May 19, 2003	1:00pm - 4:00pm	Poster 064. Laboratory Management and Quality Assurance Poster Hall
58.	May 19, 2003	1:00pm - 4:00pm	Poster 065. Sexually Transmitted Diseases - II Poster Hall
59.	May 19, 2003	1:00pm - 4:00pm	Poster 066. Campylobacter Poster Hall
60.	May 19, 2003	1:00pm - 4:00pm	Poster 067. Helicobacter Poster Hall
61.	May 19, 2003	1:00pm - 4:00pm	Poster 068. Innate Immunity in Host Defense Against Pathogens - II

Poster Hall

62. May 19, 2003 1:00pm - 4:00pm Poster 069. Cytokines and Intracellular Pathogens
Poster Hall

63. May 19, 2003 1:00pm - 4:00pm Poster 070. Cellular Biology, Biochemistry, Physiology and Proteomics
Poster Hall

64. May 19, 2003 1:00pm - 4:00pm Poster 071. Molecular and Cellular Biology of Mycoplasmas
Poster Hall

65. May 19, 2003 1:00pm - 4:00pm Poster 072. Regulatory RNA's, Post-Transcriptional Regulation and Protein Processing
Poster Hall

66. May 19, 2003 1:00pm - 4:00pm Poster 073. Gene Structure Local Organization and Evolution
Poster Hall

67. May 19, 2003 1:00pm - 4:00pm Poster 074. Transport
Poster Hall

68. May 19, 2003 1:00pm - 4:00pm Poster 075. Cell Envelopes and Stress Responses
Poster Hall

69. May 19, 2003 1:00pm - 4:00pm Poster 076. Nosocomial Infections & Epidemiology
Poster Hall

70. May 19, 2003 1:00pm - 4:00pm Poster 077. Soil Microbiology - II
Poster Hall

71. May 19, 2003 1:00pm - 4:00pm Poster 078. Freshwater Microbiology
Poster Hall

72. May 19, 2003 1:00pm - 4:00pm Poster 079. Isolation and Detection - I
Poster Hall

73. May 19, 2003 1:00pm - 4:00pm Poster 080. Isolation and Detection - II
Poster Hall

74. May 19, 2003 1:00pm - 4:00pm Poster 081. Biodegradation of Chlorinated Compounds - II
Poster Hall

75. May 19, 2003 1:00pm - 4:00pm Poster 082. Microbial Evolution
Poster Hall

76. May 19, 2003 1:00pm - 4:00pm Poster 083. Molecular Biology of Eukaryotic Microorganisms
Poster Hall

77. May 19, 2003 1:00pm - 4:00pm Poster 084. Public Health and Molecular Epidemiology
Poster Hall

78. May 19, Poster 085. Pathogenic Mechanisms and

. 2003 1:00pm - 4:00pm Disease, Host Immune Responses, Vaccines and Novel Therapeutics
Poster Hall

79 May 19,
. 2003 2:30pm - 5:00pm Colloquium 086. Regulating with RNA
102

80 May 19,
. 2003 2:30pm - 5:00pm Colloquium 087. Gas-Based Ecologies: Methane and Hydrogen
147

81 May 19,
. 2003 2:30pm - 5:00pm Divisional Group Symposium 088. The West Nile Epidemic in the United States: A Prelude of Things to Come?
Ballroom A

82 May 19,
. 2003 2:30pm - 5:00pm Divisional Group Symposium 089. The Generation of Diversity by Microorganisms
202

83 May 19,
. 2003 2:30pm - 5:00pm Symposium 090. Attacking the Bacterial Armamentarium
201

84 May 19,
. 2003 2:30pm - 5:00pm Symposium 091. Microbial Specimen Transport: Overlooked and Under Appreciated
146

85 May 19,
. 2003 2:30pm - 5:00pm Symposium 092. Microbial Interactions with Polarized Epithelia
207

86 May 19,
. 2003 2:30pm - 5:00pm Symposium 093. Antifungal Drugs in Combination: From Test Tube to Patient
140

87 May 19,
. 2003 2:30pm - 5:00pm Symposium 094. Gram-Negative Type IV Secretion Systems: Conjugation and Beyond
143

88 May 19,
. 2003 2:30pm - 5:00pm Symposium 095. Rust Never Sleeps
144

89 May 19,
. 2003 2:30pm - 5:00pm Symposium 096. Molecular Basis of the Architecture of Bacterial Biofilms
204

90 May 19,
. 2003 2:30pm - 5:00pm Symposium 097. Plant-Rhizosphere Interactions: Applications to Phytoremediation
209

91 May 19,
. 2003 2:30pm - 5:00pm Symposium 098. Lifestyles of Unusual DNA Viruses
206

92 May 19,
. 2003 2:30pm - 5:00pm Symposium 099. Advances in Leprosy Research 2003 and Beyond: Following in Shepard's Foot Pads

			103
93	May 19, 2003	2:30pm - 5:00pm	Special Interest 100. ASM's Education Programs for Students: Learn About Submitting a Successful Application and Hear from Previous Participants 101
94	May 19, 2003	5:30pm - 6:30pm	President's Address 101. President's Address Ballroom A

表五、年會相關議程及時刻表(5/20 標題、時間、場地)

	Session Date	Session
1.	May 20, 2003 6:30am - 7:45am	Sunrise Symposium 102. Antimicrobial Susceptibility Tests: Challenges to Reporting Results Effectively 102
2.	May 20, 2003 6:30am - 7:45am	Sunrise Symposium 103. Practical Guidelines for Testing and Working Up of Blood Cultures, Catheter Tips, Genital, and Wound Specimens 103
3.	May 20, 2003 6:30am - 7:45am	Sunrise Symposium 104. Parasitology Update 101
4.	May 20, 2003 8:00am - 10:30am	Colloquium 105. Fungal Biocontaminants in Indoor Environments 102
5.	May 20, 2003 8:00am - 10:30am	Colloquium 106. Expanding the Genetic Code 147
6.	May 20, 2003 8:00am - 10:30am	Colloquium 107. Global Analysis of Host Responses to Infection 140
7.	May 20, 2003 8:00am - 10:30am	Symposium 108. Leveraging Crystal Structures to Combat Bacterial Pathogens 209
8.	May 20, 2003 8:00am - 10:30am	Symposium 109. Topics in Bacillus anthracis Pathogenesis Ballroom A
9.	May 20, 2003 8:00am - 10:30am	Interactive Symposium 110. Case Studies in Clinical Microbiology 146
10.	May 20, 2003 8:00am - 10:30am	Symposium 111. Novel Strategies for Vaccine Design and Delivery 202
11.	May 20, 2003 8:00am - 10:30am	Symposium 112. Microbial Causes of Chronic Arthritis 150B
12.	May 20, 2003 8:00am - 10:30am	Symposium 113. Generating a Systems View of Microbial Lifestyles 143
13.	May 20, 2003 8:00am - 10:30am	Symposium 114. Still Growing After All These Years: A Tribute to "Physiology of the Bacterial Cell" 151
14.	May 20, 2003 8:00am - 10:30am	Symposium 115. Phages 201: Cool Things You Can Do With Phages

103

15. May 20, 2003 8:00am - 10:30am Symposium 116. What Are Those Bugs Doing?: Advances in Studying Microbe-Microbe Interactions
152
16. May 20, 2003 8:00am - 10:30am Symposium 117. Astromicrobiology: Interplanetary Transfer of Microbes by Natural and Man-Made Processes
206
17. May 20, 2003 8:00am - 10:30am Symposium 118. New Insights into Mycobacterium tuberculosis Virulence
201
18. May 20, 2003 8:00am - 10:30am Symposium 119. Emerging Infectious Diseases: 2002-2003
207
19. May 20, 2003 8:00am - 10:30am Special Interest 120. Microbial Communities: Advantages of Multicellular Cooperation
145
20. May 20, 2003 8:00am - 10:30am Special Interest 121. Curriculum Guidelines for Microbiology Majors: The Rationale behind Them and How to Use Them
101
21. May 20, 2003 9:00am - 12:00pm Poster 122. Surveillance of Antimicrobial Resistance - II
Poster Hall
22. May 20, 2003 9:00am - 12:00pm Poster 123. Antimicrobial Resistance
Poster Hall
23. May 20, 2003 9:00am - 12:00pm Poster 124. Microbial Adherence - II
Poster Hall
24. May 20, 2003 9:00am - 12:00pm Poster 125. Microbial Interactions with Host Cells - IV
Poster Hall
25. May 20, 2003 9:00am - 12:00pm Poster 126. Genetic Basis of Virulence of Pathogenic Bacteria - I
Poster Hall
26. May 20, 2003 9:00am - 12:00pm Poster 127. Secreted Proteins of Pathogenic Microorganisms - I
Poster Hall
27. May 20, 2003 9:00am - 12:00pm Poster 128. Molecular Typing, Epidemiology, and Surveillance: S. pneumoniae and Streptococcus spp.
Poster Hall
28. May 20, 2003 9:00am - 12:00pm Poster 129. Diagnostic Bacteriology - Molecular Identification Methods - I
Poster Hall
29. May 20, Poster 130. Diagnostic Bacteriology -

2003 9:00am - 12:00pm Molecular Identification Methods - II
Poster Hall

30. May 20, Poster 131. Haemophilus and Moraxella
2003 9:00am - 12:00pm Poster Hall

31. May 20, Poster 132. Yersinia and Enteric Pathogens
2003 9:00am - 12:00pm Poster Hall

32. May 20, Poster 133. Fungal Pathogenesis, Virulence
2003 9:00am - 12:00pm and Morphogenesis - I
Poster Hall

33. May 20, Poster 134. Transcriptional Control
2003 9:00am - 4:00pm Poster Hall

34. May 20, Poster 135. Microbial Metabolism and
2003 9:00am - 12:00pm Products
Poster Hall

35. May 20, Poster 136. Marine Microbiology - I
2003 9:00am - 12:00pm Poster Hall

36. May 20, Poster 137. Molecular Microbial Ecology - I
2003 9:00am - 12:00pm Poster Hall

37. May 20, Poster 138. Industrial Enzymes and
2003 9:00am - 12:00pm Fermentations
Poster Hall

38. May 20, Poster 139. Genetics and Gene Expression
2003 9:00am - 12:00pm Poster Hall

39. May 20, Poster 140. Foodborne Pathogens - I
2003 9:00am - 12:00pm Poster Hall

40. May 20, Poster 141. General Food Microbiology - I
2003 9:00am - 12:00pm Poster Hall

41. May 20, Poster 142. Biodegradation of Heterocyclics
2003 9:00am - 12:00pm and Aromatic Compounds - I
Poster Hall

42. May 20, Poster 143. Biofilms, Biofouling, and Corrosion
2003 9:00am - 12:00pm Poster Hall

43. May 20, Poster 144. Microbiology of Wastes and Waste
2003 9:00am - 12:00pm Treatment - I
Poster Hall

44. May 20, Poster 145. Pathogens in Environmental
2003 9:00am - 12:00pm Sources - I
Poster Hall

45. May 20, Poster 146. Classification and Novel
2003 9:00am - 12:00pm Organisms
Poster Hall

46. May 20, Poster 147. HIV and Other Retroviruses
2003 9:00am - 12:00pm Poster Hall

47. May 20, Poster 148. Assessment of Immunoassays
2003 9:00am - 12:00pm Poster Hall

48. May 20, 2003 9:00am - 12:00pm Poster 149. HIV, Hepatitis Viruses, Other Viral and Mycoplasma Infections Poster Hall

49. May 20, 2003 1:00pm - 4:00pm Poster 157. Antimicrobial Susceptibility Poster Hall

50. May 20, 2003 1:00pm - 4:00pm Poster 158. Mechanisms of Antimicrobial Resistance Poster Hall

51. May 20, 2003 1:00pm - 4:00pm Poster 159. Toxins - II Poster Hall

52. May 20, 2003 1:00pm - 4:00pm Poster 160. Regulation of Virulence Determinants of Pathogenic Microorganisms - III Poster Hall

53. May 20, 2003 1:00pm - 4:00pm Poster 161. Genetic Basis of Virulence of Pathogenic Bacteria - II Poster Hall

54. May 20, 2003 1:00pm - 4:00pm Poster 162. Genetic Organization of Pathogens Poster Hall

55. May 20, 2003 1:00pm - 4:00pm Poster 163. Physiology and Metabolism of Pathogenic Microorganisms - I Poster Hall

56. May 20, 2003 1:00pm - 4:00pm Poster 164. Microbial Interactions with Phagocytes Poster Hall

57. May 20, 2003 1:00pm - 4:00pm Poster 165. Diagnostic Bacteriology - Molecular Identification Methods - III Poster Hall

58. May 20, 2003 1:00pm - 4:00pm Poster 166. Diagnostic Mycobacteriology - All Methods and Susceptibility Poster Hall

59. May 20, 2003 1:00pm - 4:00pm Poster 167. Antimicrobial Susceptibility Automated Testing and ESBL Detection Poster Hall

60. May 20, 2003 1:00pm - 4:00pm Poster 168. Immune Responses to Pathogenic Microorganisms Poster Hall

61. May 20, 2003 1:00pm - 4:00pm Poster 169. Oral, Respiratory and Other Mucosal Pathogens Poster Hall

62. May 20, 2003 1:00pm - 4:00pm Poster 170. Spirochetes and Zoonotic Diseases Poster Hall

63. May 20, 2003 1:00pm - 4:00pm Poster 171. Antibodies, B Cells and Microbial Immunity Poster Hall

64. May 20, 2003 1:00pm - 4:00pm Poster 172. Vaccines Against Microbial Pathogens - II Poster Hall

65. May 20, 2003 1:00pm - 4:00pm Poster 173. Fungal Pathogenesis, Virulence and Morphogenesis - II Poster Hall

66. May 20, 2003 1:00pm - 4:00pm Poster 174. Genome Structure and Cell Division Poster Hall

67. May 20, 2003 1:00pm - 4:00pm Poster 175. Anaerobes Poster Hall

68. May 20, 2003 1:00pm - 4:00pm Poster 176. Microbial Interactions Poster Hall

69. May 20, 2003 1:00pm - 4:00pm Poster 177. Marine Microbiology - II Poster Hall

70. May 20, 2003 1:00pm - 4:00pm Poster 178. Biogeochemistry Poster Hall

71. May 20, 2003 1:00pm - 4:00pm Poster 179. Molecular Microbial Ecology - II Poster Hall

72. May 20, 2003 1:00pm - 4:00pm Poster 180. Renewable Chemicals from Biomass Poster Hall

73. May 20, 2003 1:00pm - 4:00pm Poster 181. Biotechnology Poster Hall

74. May 20, 2003 1:00pm - 4:00pm Poster 182. Aerosols and Air Quality Poster Hall

75. May 20, 2003 1:00pm - 4:00pm Poster 183. Microbial Inhibitors, Biocontrol and Microbial Toxins Poster Hall

76. May 20, 2003 1:00pm - 4:00pm Poster 184. Biodegradation: Methodology and Miscellaneous Poster Hall

77. May 20, 2003 1:00pm - 4:00pm Poster 185. Microbiology of Wastes and Waste Treatment - II Poster Hall

78. May 20, 2003 1:00pm - 4:00pm Poster 186. Pathogens in Environmental Sources - II Poster Hall

79. May 20, 2003 1:00pm - 4:00pm Poster 187. Disinfection and Sterilization Poster Hall

80. May 20, 2003 1:00pm - 4:00pm Poster 188. Detection and Molecular Epidemiology of Mycobacteria Poster Hall

81. May 20, 2003 1:00pm - 4:00pm Poster 189. Bioterrorism Preparedness Poster Hall

82. May 20, 2003 2:30pm - 5:00pm Colloquium 191. Combating Agents of Bioterrorism Through Novel Technologies, Vaccines and Therapeutic Approaches
202

83. May 20, 2003 2:30pm - 5:00pm Colloquium 192. Molecular Biology for Clinical Microbiologists: Recent and Future Advances
146

84. May 20, 2003 2:30pm - 5:00pm Colloquium 193. The Winged Helix Family of Transcription Factors in Prokaryotes and Eukaryotes
201

85. May 20, 2003 2:30pm - 5:00pm Colloquium 194. Strategies and Technologies for Bringing Culture to the Uncultured
206

86. May 20, 2003 2:30pm - 5:00pm Divisional Group Symposium 195. Emerged Emerging Pathogens
147

87. May 20, 2003 2:30pm - 5:00pm Divisional Group Symposium 196. Biological Responses to DNA Damage: From Bacteria to Human
103

88. May 20, 2003 2:30pm - 5:00pm Symposium 197. Laboratory Diagnosis of Infections in Long Term Care Facilities
Ballroom A

89. May 20, 2003 2:30pm - 5:00pm Symposium 198. Strategies of Bacterial Pathogens
207

90. May 20, 2003 2:30pm - 5:00pm Symposium 199. Diagnostic Mycology: Yesterday, Today and Tomorrow
145

91. May 20, 2003 2:30pm - 5:00pm Symposium 200. Phototrophic Prokaryotes: The Genomic Perspective
143

92. May 20, 2003 2:30pm - 5:00pm Symposium 201. Genetic Analysis of Archaeal Metabolism and Physiology
150B

93. May 20, 2003 2:30pm - 5:00pm Symposium 202. Biofilms and Biomaterial-Associated Infections
144

94. May 20, 2003 2:30pm - 5:00pm Symposium 203. Emerging Foodborne Pathogens: Enterobacter sakazakii
151

95. May 20, 2003 2:30pm - 5:00pm Symposium 204. Sustainable Approaches for Preventing Infectious Disease
140

			101
98.	May 20, 2003	2:30pm - 5:00pm	Symposium 207. The Laboratory Response to Bioterrorism: Real Life Experiences and Future Challenges 152
99.	May 20, 2003	2:30pm - 5:00pm	Symposium 208. How Are Antibiotic Selection and Use Decisions Made for Food Animals? 209
100.	May 20, 2003	2:30pm - 5:00pm	Special Interest 209. The Pervasive Role of Microbiology in Government 102
101.	May 20, 2003	5:15pm - 7:45pm	Special Interest 210. DNA, Microbiology and the Genetic Revolution Ballroom A

表五、年會相關議程及時刻表(5/21 標題、時間、場地)

	Session Date	Session
1.	May 21, 2003 6:30am - 7:45am	Sunrise Symposium 211. Competency Testing for the Microbiology Laboratory 103
2.	May 21, 2003 6:30am - 7:45am	Sunrise Symposium 212. Communicating Laboratory Results to Clinicians 102
3.	May 21, 2003 6:30am - 7:45am	Sunrise Symposium 213. Bioterrorism: Surge Capacity and the Role of Level A Laboratories 101
4.	May 21, 2003 8:00am - 10:30am	Colloquium 214. Biology of Selected "Select Agents" 145
5.	May 21, 2003 8:00am - 10:30am	Colloquium 215. Systems Microbiology: Beyond Genome Sequencing 151
6.	May 21, 2003 8:00am - 10:30am	Colloquium 216. Metagenomics 103
7.	May 21, 2003 8:00am - 10:30am	Symposium 217. Is There Sensitivity to Antimicrobial Susceptibility Testing (AST)? The Importance of Verifying Results and Communicating Them Effectively Ballroom A
8.	May 21, 2003 8:00am - 10:30am	Symposium 218. Microbial Infection and Cholesterol-Rich Rafts 202
9.	May 21, 2003 8:00am - 10:30am	Symposium 219. Advances in Host Innate Immunity and Effect on Pathogens 152
10.	May 21, 2003 8:00am - 10:30am	Symposium 220. Fungal Mating and Virulence 140
11.	May 21, 2003 8:00am - 10:30am	Symposium 221. Novel Regulators of Transcription 143
12.	May 21, 2003 8:00am - 10:30am	Symposium 222. Protein Trafficking and Secretion 102
13.	May 21, 2003 8:00am - 10:30am	Symposium 223. Big Fleas Have Little Fleas: Pathogen-Phage Interactions 207
14.	May 21, 2003 8:00am - 10:30am	Symposium 224. Nutritional Aspects of Lactic Acid Bacteria: Nutraceuticals and Intestinal

Delivery
206

15. May 21, 2003 8:00am - 10:30am Symposium 225. Genome Diversification and Evolution in Food-Borne Microorganisms
144

16. May 21, 2003 8:00am - 10:30am Symposium 226. Environmental Restoration Microbiology: Bridging the Gap from Laboratory to the Field
204

17. May 21, 2003 8:00am - 10:30am Interactive Symposium 227. The Challenge of Nontuberculosis Mycobacterial Diseases: Case Studies
146

18. May 21, 2003 8:00am - 10:30am Symposium 228. Microbiologists as Educational Researchers: Going from "Knowing That It Works" to "Showing That It Works"
150B

19. May 21, 2003 8:00am - 10:30am Symposium 229. The Metastable Genome
209

20. May 21, 2003 8:00am - 10:30am Special Interest 230. Career Development Forum
101

21. May 21, 2003 9:00am - 12:00pm Poster 231. Novel Approaches to Antibiotics and Antibiotic Resistance Mechanisms
Poster Hall

22. May 21, 2003 9:00am - 12:00pm Poster 232. Surveillance of Antimicrobial Resistance - III
Poster Hall

23. May 21, 2003 9:00am - 12:00pm Poster 233. Diagnostic Mycology and Parasitology
Poster Hall

24. May 21, 2003 9:00am - 12:00pm Poster 234. Diagnostic Virology - Molecular Methods - I
Poster Hall

25. May 21, 2003 9:00am - 12:00pm Poster 235. Diagnostic Virology-Molecular Methods - II
Poster Hall

26. May 21, 2003 9:00am - 12:00pm Poster 236. Pathogenesis and Immunology of Mycoplasma Diseases
Poster Hall

27. May 21, 2003 9:00am - 12:00pm Poster 237. Plasmids and Transposons
Poster Hall

28. May 21, 2003 9:00am - 12:00pm Poster 238. Microbial Responses to Stress and Environmental Stimuli - I
Poster Hall

29. May 21, 2003 9:00am - 12:00pm Poster 239. Microbial Development , Cell Division, Cell Cycle and Behavior
Poster Hall

30. May 21, 2003 9:00am - 12:00pm Poster 240. General Microbiology Poster Hall

31. May 21, 2003 9:00am - 12:00pm Poster 241. Techniques Poster Hall

32. May 21, 2003 9:00am - 12:00pm Poster 242. Carbon, Nitrogen and Sulfur Metabolism Poster Hall

33. May 21, 2003 9:00am - 12:00pm Poster 243. Cell-Cell Communication Poster Hall

34. May 21, 2003 9:00am - 12:00pm Poster 244. Complex Molecules and Pathways Poster Hall

35. May 21, 2003 9:00am - 12:00pm Poster 245. Structure and Morphogenesis Poster Hall

36. May 21, 2003 9:00am - 12:00pm Poster 246. Ecology and Evolution Poster Hall

37. May 21, 2003 9:00am - 12:00pm Poster 247. Microbe-Microbe Interactions Poster Hall

38. May 21, 2003 9:00am - 12:00pm Poster 248. Microbial Interactions with Plants or Animals - I Poster Hall

39. May 21, 2003 9:00am - 12:00pm Poster 249. Molecular Microbial Ecology - III Poster Hall

40. May 21, 2003 9:00am - 12:00pm Poster 250. Biodegradation of Heterocyclics and Aromatic Compounds - II Poster Hall

41. May 21, 2003 9:00am - 12:00pm Poster 251. Bioreduction of Metals and Bioremediation of Metal-Contaminated Soils - I Poster Hall

42. May 21, 2003 9:00am - 12:00pm Poster 252. Indicators of Fecal Pollution - I Poster Hall

43. May 21, 2003 9:00am - 12:00pm Poster 253. Methods in Environmental Microbiology - I Poster Hall

44. May 21, 2003 9:00am - 12:00pm Poster 254. General Environmental Microbiology - I Poster Hall

45. May 21, 2003 9:00am - 12:00pm Poster 255. BioInfoData and Their Analyses Poster Hall

46. May 21, 2003 9:00am - 12:00pm Poster 256. Cellular Immunity of Mycobacterial Infections/Antigens - Vaccines Poster Hall

47. May 21, 2003 9:00am - 12:00pm Poster 257. Emerging Infectious Diseases Poster Hall

48. May 21, 2003 9:00am - 12:00pm Poster 258. Animal-Origin Pathogenic, Foodborne and Zoonotic Pathogens

Poster Hall

49. May 21, 2003 9:00am - 12:00pm Poster 259. Antimicrobial Diagnostics, Resistance, Monitoring, and Epidemiology
Poster Hall

50. May 21, 2003 10:45am - 11:45am Lecture 260. Microbiology - from Ecosystem Science to Sustainable Development
149

51. May 21, 2003 1:00pm - 4:00pm Poster 262. Efflux and Uptake of Antimicrobials
Poster Hall

52. May 21, 2003 1:00pm - 4:00pm Poster 263. Regulation of Virulence Determinants of Pathogenic Microorganisms - IV
Poster Hall

53. May 21, 2003 1:00pm - 4:00pm Poster 264. Genetic Basis of Virulence of Pathogenic Bacteria - III
Poster Hall

54. May 21, 2003 1:00pm - 4:00pm Poster 265. Physiology and Metabolism of Pathogenic Microorganisms - II
Poster Hall

55. May 21, 2003 1:00pm - 4:00pm Poster 266. Secreted Proteins of Pathogenic Microorganisms - II
Poster Hall

56. May 21, 2003 1:00pm - 4:00pm Poster 267. Diagnostic Bacteriology - Non-Molecular Miscellaneous
Poster Hall

57. May 21, 2003 1:00pm - 4:00pm Poster 268. Diagnostic Virology - Non-Molecular Methods and Susceptibility
Poster Hall

58. May 21, 2003 1:00pm - 4:00pm Poster 269. Enteric Bacteriology, Unusual Organisms and Case Studies
Poster Hall

59. May 21, 2003 1:00pm - 4:00pm Poster 270. Animal Models and Vaccine Approaches
Poster Hall

60. May 21, 2003 1:00pm - 4:00pm Poster 271. Intracellular Pathogens
Poster Hall

61. May 21, 2003 1:00pm - 4:00pm Poster 272. Physiology and Iron Uptake of Pathogenic Microorganisms
Poster Hall

62. May 21, 2003 1:00pm - 4:00pm Poster 273. Molecular Biology, Taxonomy, Genetics and Genomics
Poster Hall

63. May 21, 2003 1:00pm - 4:00pm Poster 274. Clinical Mycology, Antifungal Agents, Epidemiology, and Diagnosis
Poster Hall

64. May 21, Poster 275. Gene Expression II: Regulatory

2003 1:00pm - 4:00pm Networks
Poster Hall

65. May 21, Poster 276. Microbial Responses to Stress and
2003 1:00pm - 4:00pm Environmental Stimuli - II
Poster Hall

66. May 21, Poster 277. Microbial Cell Surfaces, Proteomics
2003 1:00pm - 4:00pm and Ultrastructure
Poster Hall

67. May 21, Poster 278. Biofilm Structure and Function
2003 1:00pm - 4:00pm Poster Hall

68. May 21, Poster 279. Microbial Interactions with Plants or
2003 1:00pm - 4:00pm Animals - II
Poster Hall

69. May 21, Poster 280. Molecular Microbial Ecology - IV
2003 1:00pm - 4:00pm Poster Hall

70. May 21, Poster 281. Ecological Genomics
2003 1:00pm - 4:00pm Poster Hall

71. May 21, Poster 282. Novel Organisms and Novel Products
2003 1:00pm - 4:00pm Poster Hall

72. May 21, Poster 283. Biotransformations, Microbial
2003 1:00pm - 4:00pm Degradation and Bioremediation
Poster Hall

73. May 21, Poster 284. Foodborne Pathogens - II
2003 1:00pm - 4:00pm Poster Hall

74. May 21, Poster 285. General Food Microbiology - II
2003 1:00pm - 4:00pm Poster Hall

75. May 21, Poster 286. Bioreduction of Metals and
2003 1:00pm - 4:00pm Bioremediation of Metal-Contaminated Soils - II
Poster Hall

76. May 21, Poster 287. Indicators of Fecal Pollution - II
2003 1:00pm - 4:00pm Poster Hall

77. May 21, Poster 288. Methods in Environmental
2003 1:00pm - 4:00pm Microbiology - II
Poster Hall

78. May 21, Poster 289. General Environmental Microbiology
2003 1:00pm - 4:00pm - II
Poster Hall

79. May 21, Poster 290. Comparative Genomics
2003 1:00pm - 4:00pm Poster Hall

80. May 21, Poster 291. Genetics and Biochemistry of
2003 1:00pm - 4:00pm Mycobacteria
Poster Hall

81. May 21, Poster 292. Strategies for Improving the
2003 1:00pm - 4:00pm Undergraduate Laboratory Experience
Poster Hall

82. May 21, 2003 2:30pm - 5:00pm Colloquium 293. (Re)Emerging Biothreats and Protection of Public Health: State of the Art Sampling, Detection and Remediation of Pathogens in the Environment
146

83. May 21, 2003 2:30pm - 5:00pm Colloquium 294. The Interplay between Replication and Recombination in Prokaryotes
145

84. May 21, 2003 2:30pm - 5:00pm Symposium 295. Protein Secretion Across the Bacterial Outer Membrane
206

85. May 21, 2003 2:30pm - 5:00pm Symposium 296. Evolving Infections in Immunocompromised Patients: Challenges for the Microbiology Laboratory
204

86. May 21, 2003 2:30pm - 5:00pm Symposium 297. From Outside to Inside: Ways Environmental Bacteria Become Pathogens
202

87. May 21, 2003 2:30pm - 5:00pm Symposium 298. Chronic Mycoplasma Disease and Persistence of Infection
150B

88. May 21, 2003 2:30pm - 5:00pm Symposium 299. Metal Ion Homeostasis and Its Regulation
143

89. May 21, 2003 2:30pm - 5:00pm Symposium 300. Soil: A Reservoir of Prokaryotic Diversity
152

90. May 21, 2003 2:30pm - 5:00pm Symposium 301. The Physiology of Bacterial Biofilms
151

91. May 21, 2003 2:30pm - 5:00am Symposium 302. Antimicrobial and Antiseptic Resistance
Ballroom A

92. May 21, 2003 2:30pm - 5:00pm Symposium 303. Assemblages for Assembly in the dsDNA Viruses
101

93. May 21, 2003 2:30pm - 5:00pm Symposium 304. Using Whole Genome Sequences to Understand Phylogenetic Relationships
144

94. May 21, 2003 2:30pm - 5:00pm Symposium 305. Vaccines and Public Health: Real World Issues
103

95. May 21, 2003 2:30pm - 5:00pm Special Interest 306. So You Thought Uncultivated Microorganisms Were Uncultivatable....
102

96. May 21, 2003	2:30pm -	5:00pm	Special Interest 307. Alternative Careers in Microbiology 140
97. May 21, 2003	5:30pm -	7:00pm	President's Forum 308. Communicating Microbiology to the Public: Fact, Fiction, and Uncertainty Ballroom A

表五、年會相關議程及時刻表(5/22 標題、時間、場地)

	Session Date	Session
1.	May 22, 2003 8:00am - 10:30am	Colloquium 309. Colonization of Mucosal Surfaces 147
2.	May 22, 2003 8:00am - 10:30am	Colloquium 310. Life Is Redox Chemistry: The Sulfate-Reducer Paradigm 102
3.	May 22, 2003 8:00am - 10:30am	Symposium 311. Omics and Pathogens: Genes, Proteins and Metabolites 140
4.	May 22, 2003 8:00am - 10:30am	Symposium 312. Immunopathogenesis of Infectious Diseases: Organ-Specific Aspects 146
5.	May 22, 2003 8:00am - 10:30am	Symposium 313. Nutrition and Susceptibility to Infectious Diseases: A Genomics Approach 145
6.	May 22, 2003 8:00am - 10:30am	Symposium 314. DNA Uptake in Bacteria 103
7.	May 22, 2003 8:00am - 10:30am	Symposium 315. Spores of Bacillus anthracis and B. subtillis: Formation and Pathogenesis 151
8.	May 22, 2003 8:00am - 10:30am	Symposium 316. Surf and Turf Phages: Environmental and Genetic Processes in Bacterial-Bacteriophage Interactions 152
9.	May 22, 2003 8:00am - 10:30am	Symposium 317. New Insights into Microbial Toxin Production 101
10.	May 22, 2003 8:00am - 10:30am	Symposium 318. Microbial Proteomics: Environmental and Evolutionary Perspectives 143
11.	May 22, 2003 8:00am - 10:30am	Symposium 319. Differences Between Clinical M. tuberculosis Strains and Their Relevance to Virulence 150B
12.	May 22, 2003 8:00am - 10:30am	Special Interest 320. Bioterrorism Against Plants, Animals and Foods 144
13.	May 22, 2003 9:00am - 12:00pm	Poster 321. Mechanisms of Antimicrobial Action Ballroom B
14.	May 22, 2003 9:00am - 12:00pm	Poster 322. Microbial Adherence - III Ballroom B
15.	May 22,	Poster 323. Molecular Typing, Epidemiology and

2003 9:00am - 12:00pm and Surveillance: Enterobacteriaceae
Ballroom B

16. May 22, Poster 324. Molecular Typing, Epidemiology
2003 9:00am - 12:00pm and Surveillance: Staphylococcus and
Enterococcus
Ballroom B

17. May 22, Poster 325. Molecular Typing. Epidemiology
2003 9:00am - 12:00pm and Surveillance: Other
Ballroom B

18. May 22, Poster 326. Streptococci, Enterococci and
2003 9:00am - 12:00pm Staphylococci
Ballroom B

19. May 22, Poster 327. Cell Surface Structures of
2003 9:00am - 12:00pm Pathogenic Microorganisms
Ballroom B

20. May 22, Poster 328. Immune Responses to Microbial
2003 9:00am - 12:00pm Toxins and Cellular Immunity to Infection
Ballroom B

21. May 22, Poster 329. Host-Response and Molecular
2003 9:00am - 12:00pm Immunology
Ballroom B

22. May 22, Poster 330. Genetic Tools, Gene Cloning and
2003 9:00am - 12:00pm Protein Function
Ballroom B

23. May 22, Poster 331. Archaea
2003 9:00am - 12:00pm Ballroom B

24. May 22, Poster 332. Microbes from Diverse
2003 9:00am - 12:00pm Environments
Ballroom B

25. May 22, Poster 333. Functional Genomics and the
2003 9:00am - 12:00pm Biology of the Archaea
Ballroom B

26. May 22, Poster 334. Extreme Environments - I
2003 9:00am - 12:00pm Ballroom B

27. May 22, Poster 335. Extreme Environments - II
2003 9:00am - 12:00pm Ballroom B

28. May 22, Poster 336. Populations and Communities
2003 9:00am - 12:00pm Ballroom B

29. May 22, Poster 337. Indicators of Fecal Pollution - III
2003 9:00am - 12:00pm Ballroom B

30. May 22, Poster 338. Methods in Environmental
2003 9:00am - 12:00pm Microbiology - III
Ballroom B

31. May 22, Poster 339. General Environmental
2003 9:00am - 12:00pm Microbiology - III

2003 9:00am - 12:00pm Susceptibility/Resistance
Ballroom B

表六、美國微生物學會所出刊之期刊

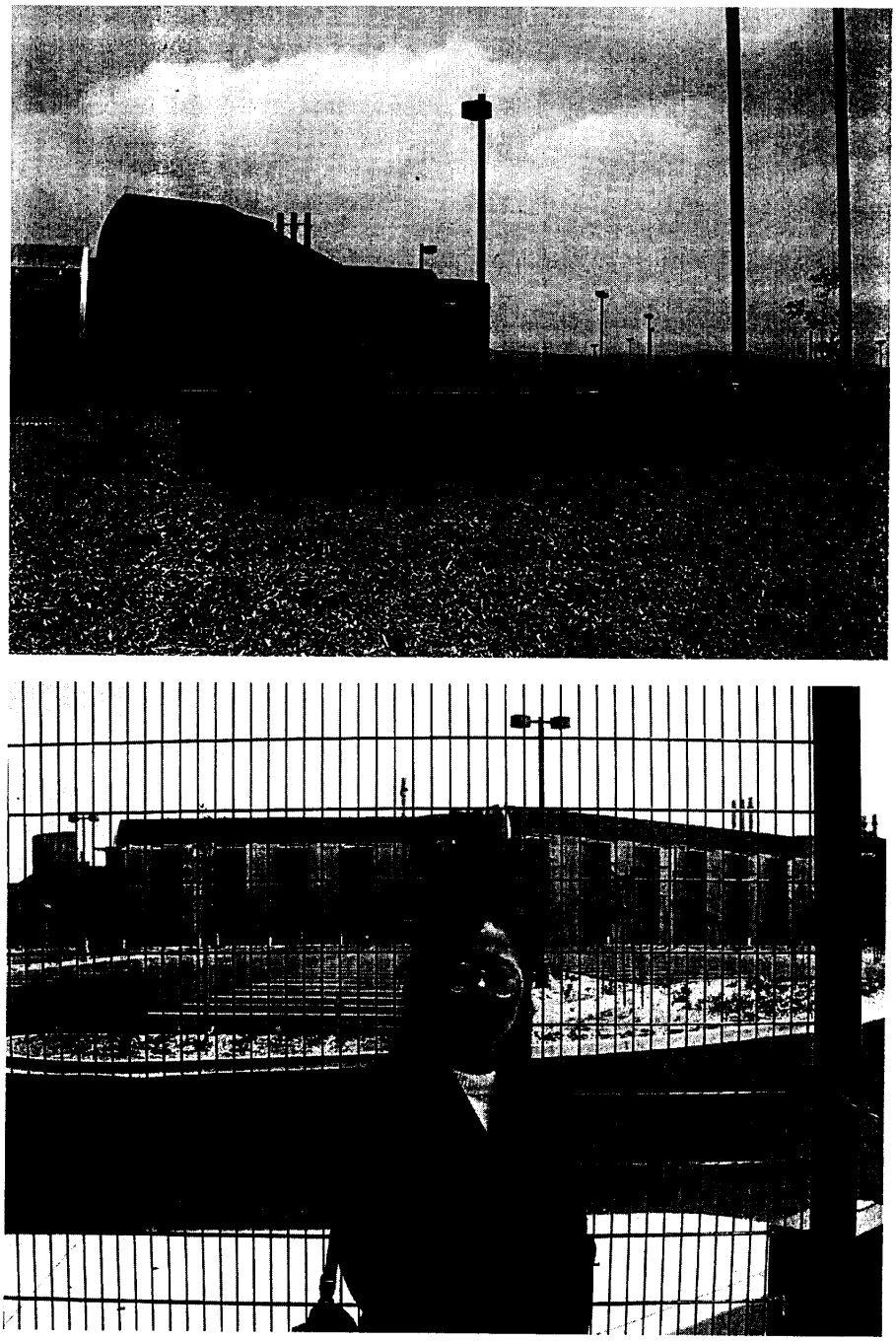
Journal	Production Editor	Phone No. & E-Mail
Antimicrobial Agents and Chemotherapy	Arthur Gelmis	(202)-942-9231 agelmis@asmusa.org
Applied and Environmental Microbiology	Barbara Slinker	(202)-942-9219 bslinker@asmusa.org
Clinical and Diagnostic Laboratory Immunology	Anastacia Thomasian	(202)-942-9215 tthomasian@asmusa.org
Clinical Microbiology Reviews	Arthur Gelmis	(202)-942-9231 agelmis@asmusa.org
New Journal in 2002 -- Eukaryotic Cell	Arthur Gelmis	(202)-942-9231 agelmis@asmusa.org
Infection and Immunity	Diane Smith	(202)-942-9288 dsmith@asmusa.org
International Journal of Systematic Bacteriology (* No longer published by ASM)		
Journal of Bacteriology	Jack Kenney	(202)-942-9243 jkenney@asmusa.org
Journal of Clinical Microbiology	Anastacia Thomasian	(202)-942-9215 tthomasian@asmusa.org
Journal of Virology	Judith Nedrow	(202)-942-9234 jnedrow@asmusa.org
Microbiology and Molecular Biology Reviews (formerly Microbiological Reviews)	Arthur Gelmis	(202)-942-9231 agelmis@asmusa.org
Molecular and Cellular Biology	Becky Zwadyk	(202)-942-9214 bzwadyk@asmusa.org

*Now Published by the Society for General Microbiology

圖一、參加研習會於聾啞學校實驗室留影。

上圖：筆者與研習會指導老師們(後排: Dr. Ruoff, K. & Hinnebusch, C.

前排: 筆者 & Glenn, D.)；下圖：同學與研習會老師們



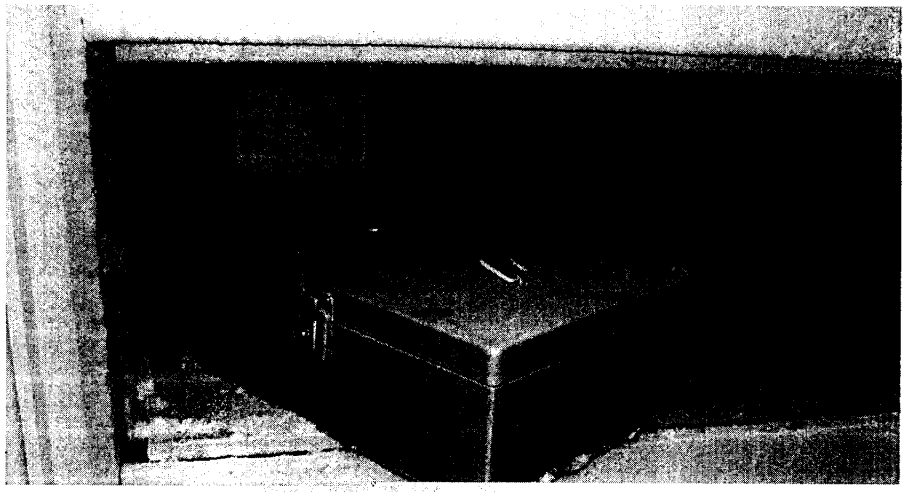
圖二、FDA 洛杉磯分部七月將啟用之新辦公室留影。

上圖：FDA 洛杉磯分部招排及門號；下圖：筆者於上鎖的大門

圖三、加州州立大學 POMONA 分校生物技術研究室留影。

上圖：楊維真博士、筆者；下圖：鄭崇明博士、筆者、楊維真博士

(a)



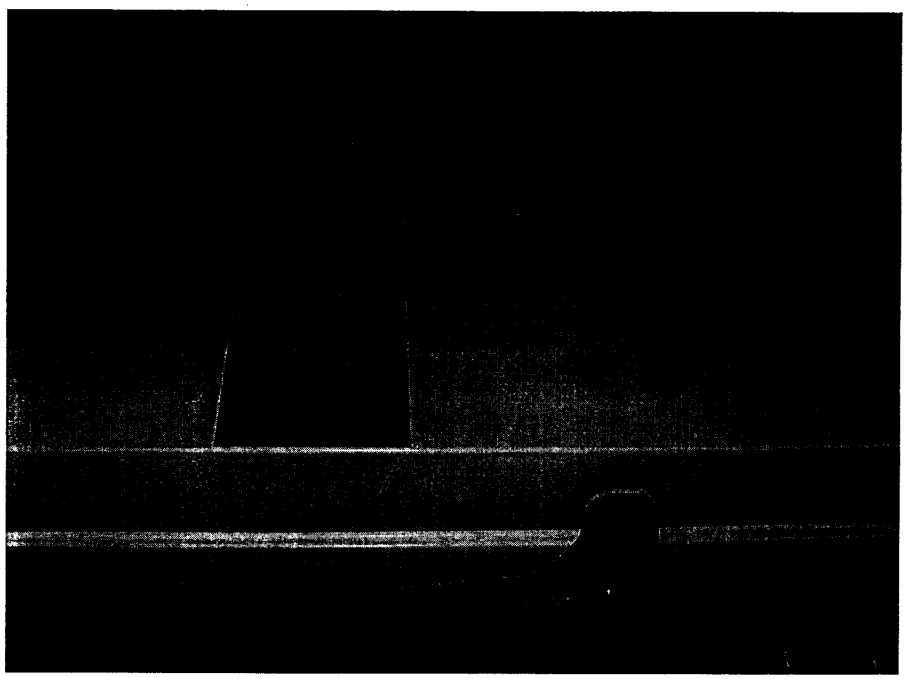
(b)

圖四、肉毒桿菌實驗室相關規定。

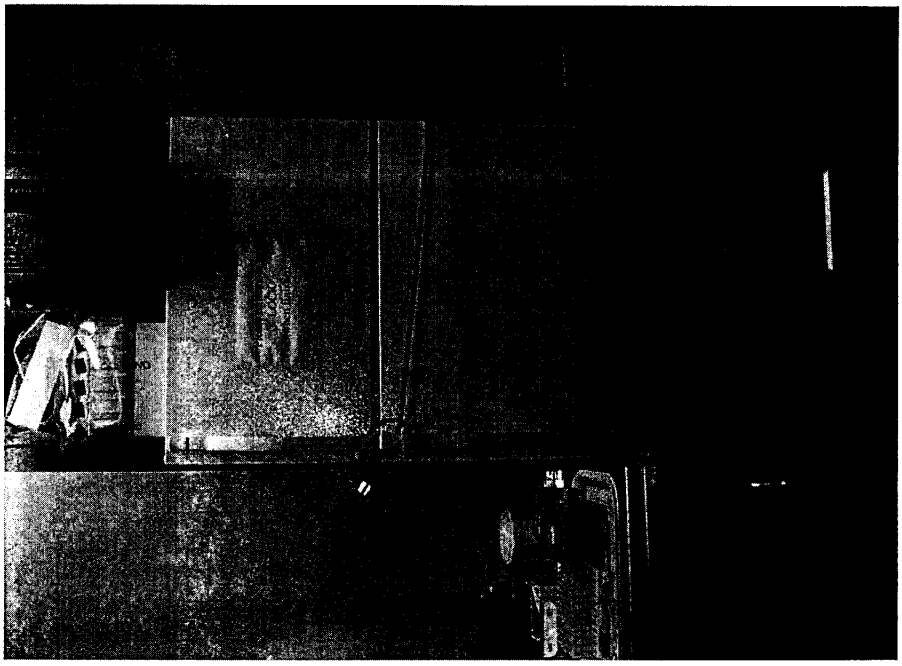
圖(a)：裝毒素與菌種之保險箱加鎖並以鋼索固定於冷凍櫃；

圖(b)：保險箱加鎖置於冰箱中（未固定待改善）

(c)



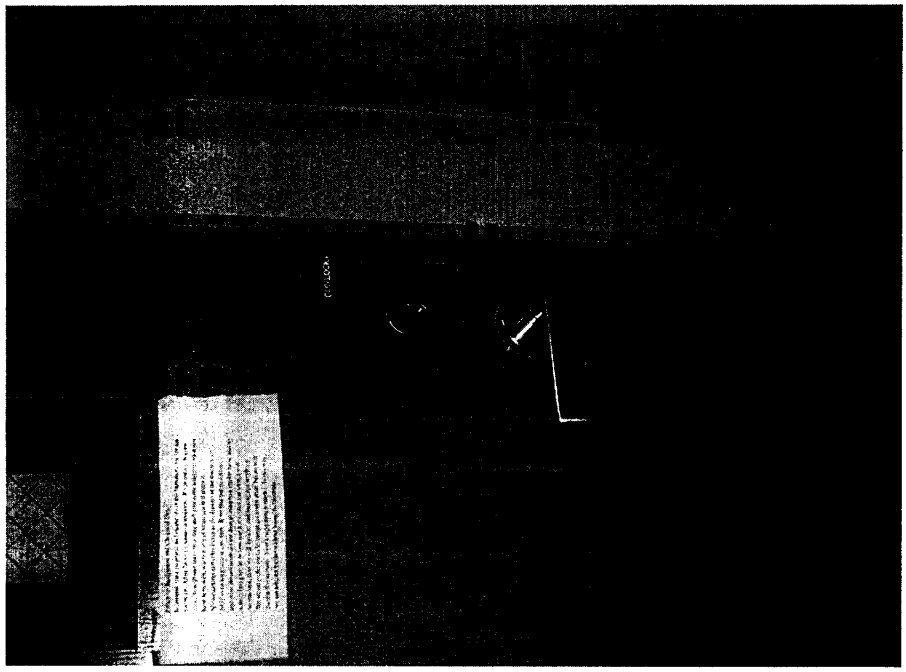
(d)



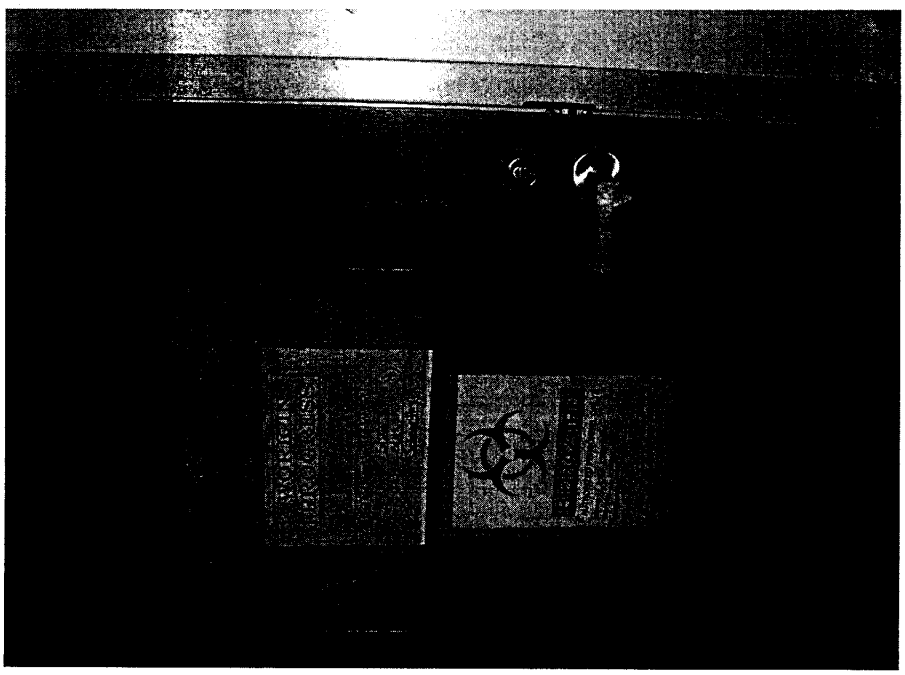
圖四、肉毒桿菌實驗室相關規定。

圖(c)：冷凍櫃加鎖；圖(d)：冰箱加鎖

(e)



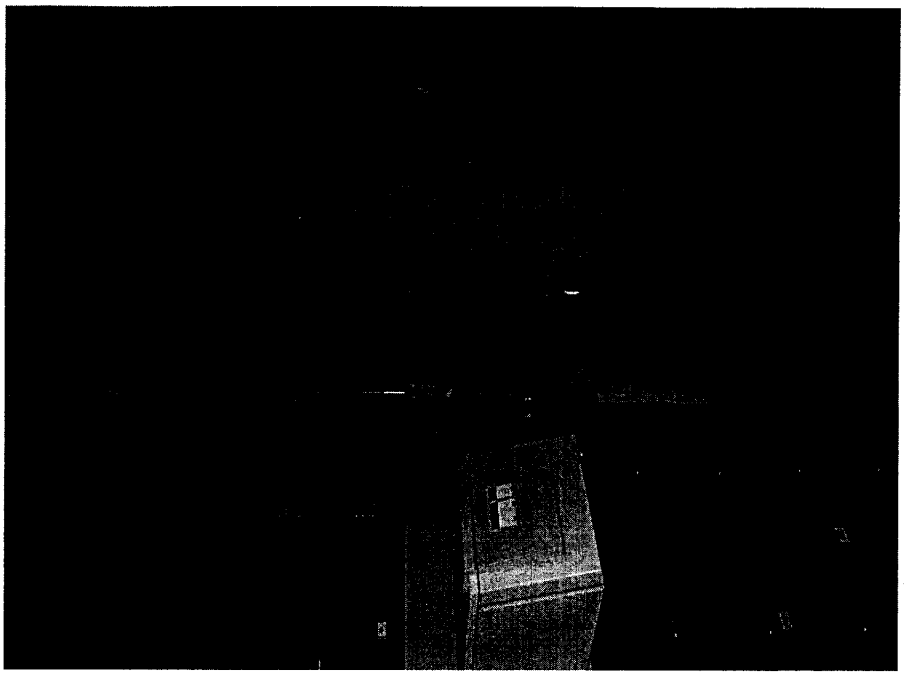
(f)



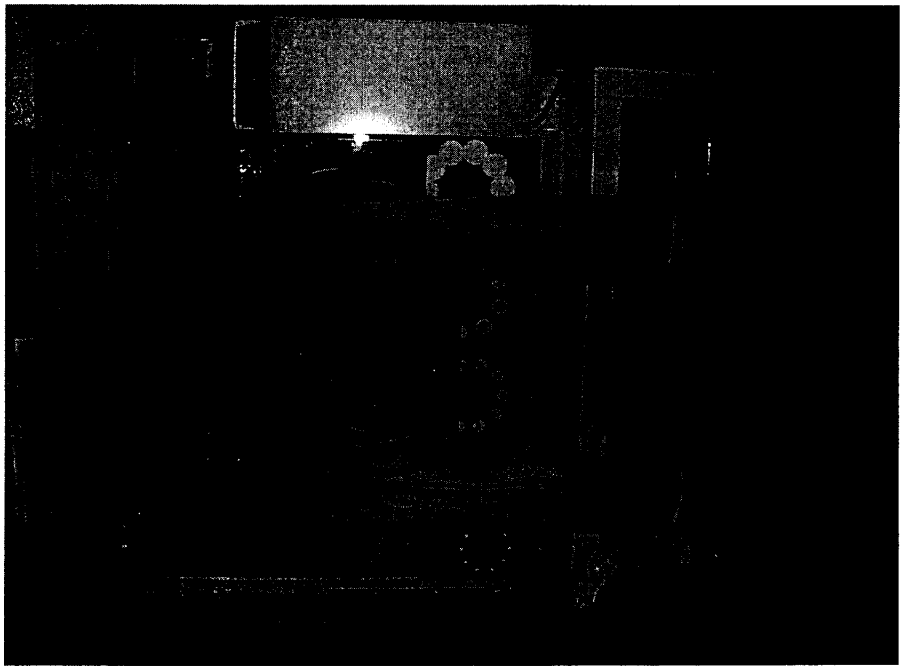
圖四、肉毒桿菌實驗室相關規定。

圖(e)：研究實驗室門禁鎖；圖(f)：實驗室入口貼危險標示

(g)

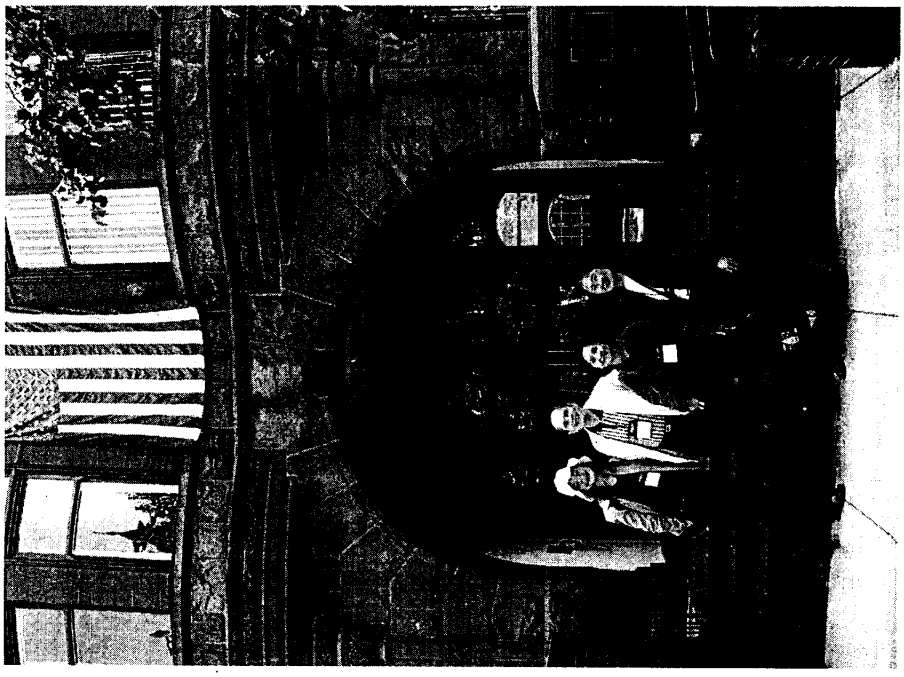


(h)



圖四、肉毒桿菌實驗室相關規定。

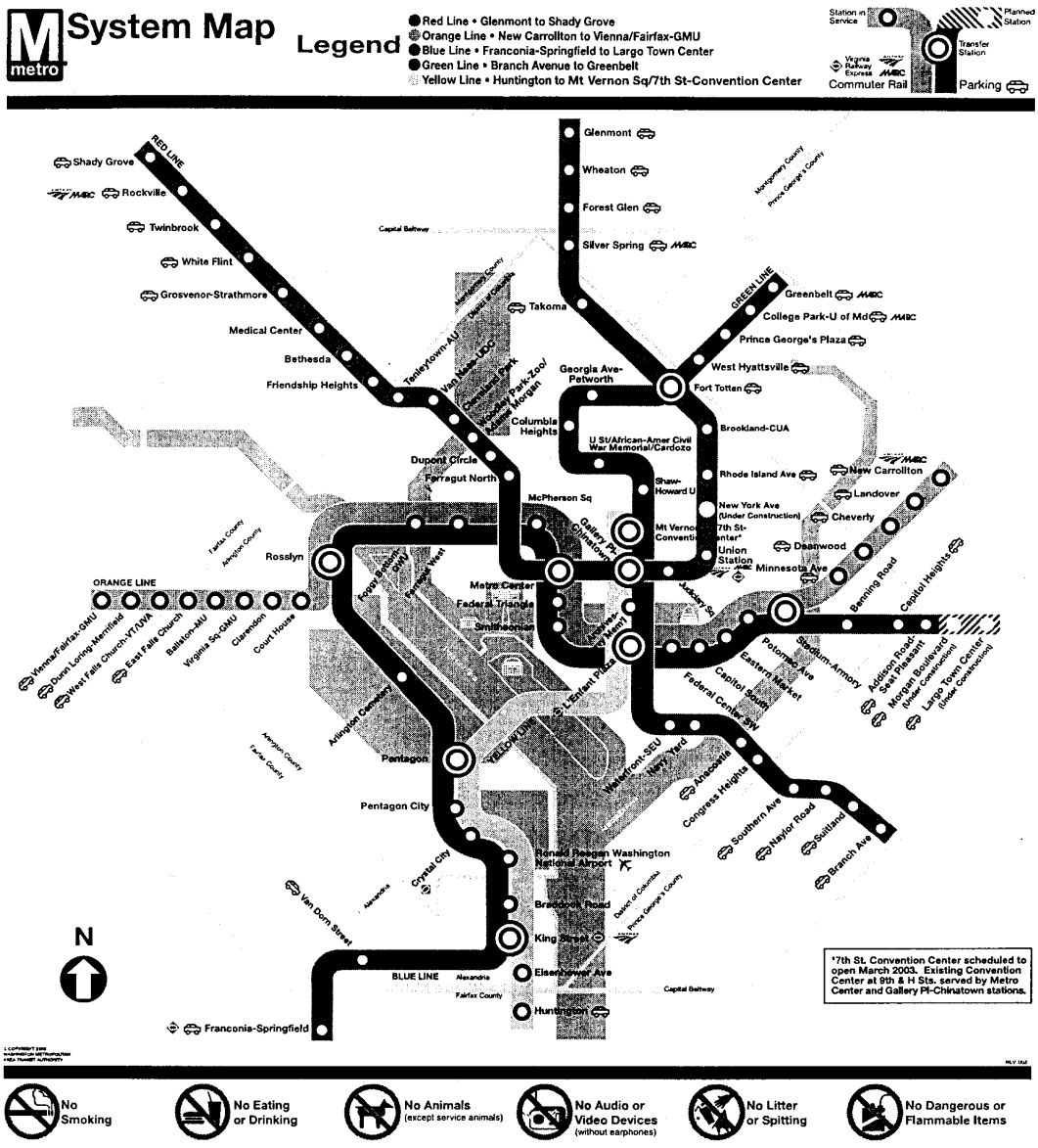
圖(g)：實驗室內淋浴設施；圖(h)：小型厭氧操作檯



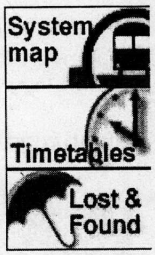
圖五、與潘教授師生之會後活動留影。

上圖：在 DC 市區發現美國微生物學會總部(左至右：陸茲喻、潘子教授、邱秋霞、筆者)；下圖：博物館結束營業時間（右一：蔡宗佑)

附件一、華盛頓特區的地鐵系統



General Metrorail information



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7 days a week

Metrorail opens 5:30 a.m. weekdays and 7 a.m. weekends as of 6/29/03. It closes at midnight Sunday to Thursday. On Friday and Saturday nights, it stays open until 3 a.m.

Finding a Metro station

Look for the tall brown column with the large "M." It identifies the Metro station by name. The color stripes show each Metrorail line that serves the station — blue, green, orange, red and yellow. If you're driving, look for the large Metro signs. Pylons also have the name of the station and line in Braille and raised letters.

For the location of stations, see the system map or the stations page.

Metro-operated lots offer free weekend and holiday parking. Daily parking rates vary by station.

Entering the system

A farecard, Metrorail pass, Metrochek or Smartrip card are needed to enter and leave the system. Farecards and some passes can be purchased at vending machines in the station mezzanine (Information on using vending machines). Enter through the faregates (Information on using faregates).

Navigating the system

Maps in the stations near the farecard machines and inside the trains can help you

find your way. Note the name of the last stop of the line going in the direction you are traveling and the stations where you want to transfer. Transfer stations are identified on the map with a double black circle.

Waiting for the train

Signs in the station will tell you which platform to use for your destination. Once you are on the platform, please stand on the red tiled area. Flashing lights at the platform's granite edge will alert you that a train is entering the station.

Identifying the train

Check the destination of the train before you board. Destinations are displayed over the train's front and side windows. The color of the line is displayed on the front and back of the train.

Electronic display signs will assist persons who are hearing impaired.

Boarding the train

Stand clear of the train car doors and let passengers get off before you board. Allow persons with disabilities or special needs to board first. Be sure to step over the gap between the platform and the train. Chimes signal that the car doors are closing. Once the chimes have sounded, step back and wait for the next train. Unlike elevator doors, the train doors do *not* reopen automatically.

Need help?

See the station manager at the kiosk. In emergencies, you can press the red button on the callbox located on some of the station's pylons. Farecards are not refundable, but exchanges will be made for malfunctioning farecards. (Refund policy for farecards)

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華盛頓特區

Washington, D.C.

旅遊名勝

1. Arlington National Cemetery阿靈頓國家公墓
2. Library of Congress國會圖書館
3. Lincoln Memorial林肯紀念堂
4. Smithsonian Institution史密斯松協會
5. Thomas Jefferson Memorial傑佛遜紀念堂
6. US Capitol美國國會大廈
7. Vietnam Veterans Memorial越戰紀念碑
8. Washington Monument華盛頓紀念碑
9. White House白宮

簡介 Introduction

當筆者從維吉尼亞州緣山開進特區時，剎時豁然開朗，之前的荒山野地不再，有種到了世外桃源的感覺。形狀有如菱形的華盛頓特區，位在美國東海岸大約中間的部位，被包圍在馬里蘭州裡，Anacostia貫穿城市東南方，西南以波多馬克河(Potomac)與維吉尼亞州相隔，往東則距離大西洋約九十哩。整個城市沿著河岸在山丘上綿延著，南北向距離最長有十九公里，總面積約一百七十九平方公里。市內畫分爲四個區域：西北(NW)、西南(SW)、東北(NE)、東南(SE)。西北區的海拔最高，約一百二十公尺，最低爲海平面。波多馬克河的支流岩溪(Rock Creek)在市中心縱向流過，形成一個蒼翠的小河谷。

華盛頓特區是世界上少數的計畫性都市之一。美國獨立後，先是以紐約爲首都，一年後遷至費城，同年國會授權喬治華盛頓選擇一個地方作爲首都。隔年，他選了波多馬克河東岸之地作爲所在地，並由法國的名建築師皮埃爾・朗法(Pierre L'Enfant)來負責規畫的工作，使他成爲全世界最美的都市之一，據說其規劃還融入了中國的風水。國會裡的三位委員將此地命名爲哥倫比亞之領土(The Territory of Columbia)，將首都命名爲華盛頓市(The City of Washington)。

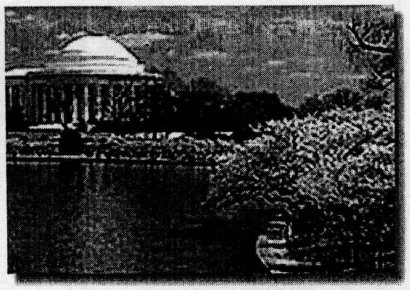
1792年開始興建總統府，次年開始興建國會大廈。至1800年時，國會大廈的北翼已興建完成，國會因此將總部從費城遷移到此運作。興建完成的總統府面向維吉尼亞州，在裡面日理萬機的第一個美國總統不是華盛頓，而是約翰亞當；然而，完善規畫的華盛頓市並沒有從此欣欣向榮的成長。不久英美戰爭爆發，華盛頓市包括尚未完成的國會大廈和民房，均受到嚴重的破壞，而總統府更被英軍一把火燒得面目全非。戰後總統府重建，原本被火薰黑的牆面被刷成了白色，於是此後的美國總統府就被稱爲白宮了。

外患雖然遠離了，內憂卻在暗中醞釀成長。林肯執政後，美國國內的南北對立情勢日益惡化，最後終於在1861年爆發南北戰爭。戰火再一次的襲擊了華盛頓市，北方政府在波多馬克河沿岸建立了一連串的碉

相關網站

1. Metro運輸
2. DCA/IAD機場
3. BWI國際機場
4. 華盛頓指南
5. 華盛頓郵報
6. 華盛頓櫻花節

堡，市區的發展只好暫時停頓了下來。戰爭結束之後，華盛頓市終於開始有了穩定的發展。都市建設中必要的公園、柏油路面、人行道、現代化的下水道、路樹都是這個時期的產物。華盛頓重要的景觀，如華盛頓紀念碑、林肯紀念堂、史密斯松博物館也都在戰後陸續完成。



春天是首都華盛頓最美麗的季節，櫻花怒放，放眼望去一片花海，很多遊客遠從各地前來賞花，據統計多達70萬人。每年的三月底四月初，首都華盛頓舉行多彩多姿的櫻花節活動，其中又以櫻花節大遊行最引人注目。櫻花源於1912年東京市長贈送首都華盛頓3千株櫻花樹，美國政府以花開滿叢的山茱萸回贈日本。1935年華盛頓一些民間團體舉行第一屆櫻花節活動。日本政府於1965年又送給美國3千8百株櫻花樹，櫻花也就成了兩國友誼的象徵。

今日的華盛頓市以地鐵、公路和臨近的維吉尼亞州、馬里蘭州緊密連結，不再是初期那一個自給自足的華盛頓市。不同的民族融合爲這個美國首都添加了不同的色彩，光是看看市內的各式建築便可略知一二。希臘式的博物館、維多利亞式的民房、聯邦政府機關、巴洛克式教堂均可在同一個街道上發現。這樣的多元文化色彩只有紐約可以比擬。儘管各式的建築林立，你永遠可以在街上抬頭望見華盛頓特區無垠的天空，無所阻擋，因爲美國國父華盛頓在建城之初便立下一個原則：所有的建築均不得超過十三層樓高。

交通概況 Transportation

航空方面

搭飛機到華盛頓有三個機場可以選擇：雷根華盛頓國內機場(Ronald Reagan Washington National Airport/DCA)、華盛頓達拉斯國際機場(Washington Dulles International Airport/IAD)以及巴爾的摩華盛頓國際機場(Baltimore Washington International Airport/BWI)。雷根華盛頓國內機場位在波多馬克河對岸，出了機場便有地鐵、公車和計程車前往維吉尼亞州、馬里蘭州或市區，相當方便。華盛頓達拉斯機場位在維吉尼亞州北邊的赫登(Herndon)附近，搭計程車到華盛頓市，大約四十五分鐘的車程，車資約四十五美金。若搭地鐵，最近的一站是在大約二十分鐘車程外的West Falls Church，機場有公車可以轉乘，每三十分鐘一班。若選擇搭公車到特區，有Washington Flyer Express可坐到15th.和K Street NW兩街的交叉口，大約四十五分鐘的車程。一趟爲十六美金，來回二十六美金。巴爾的摩華盛頓國際機場有A~E五個登機口，國際線班機全部集中在E登機口。到特區可以選擇SuperShuttle的直接送達、火車和計程車。計程車車資45美金。

地下鐵

搭乘Metro地鐵在華盛頓特區裡觀光是個經濟、方便的選擇。地鐵分爲五種路線：紅、黃、藍、橘、綠，從華盛頓中心往外散開如蜘蛛網一般。紅線的起點和終點都在馬里蘭州，從Glenmont到Shady Grove，途中經過華盛頓市區；黃線從市中心的Gallery Place (7th和G Street交叉口)開始往南行，到維吉尼亞州的Huntington一站，途經雷根華盛頓機場；藍線從馬里蘭州的Addison Road到維吉尼亞州的亞歷山卓(Alexandria)，途經華盛頓市區；橘線從馬里蘭州的New Carrollton起始，仍在華盛頓市區和其他線會集，然後往西到維吉尼亞州的維也納市(Vienna)；綠線從馬里蘭州北邊的Greenbelt出發，經過特區後回到本州南邊的Branch Ave。路線圖

每個地鐵車站和車廂靠近車門的地方都貼有路線圖。票價在車站入口管理員室窗口下均有明列，通常在$1.10~$3.25之間。販賣車票的機器接受一元鈔票和硬幣。鈔票的放入有一定的方向，而且如果放進皺巴巴的鈔票，機器可是不接受的。建議遊客購買一日通行票(One Day Pass)，只要$5，無限制乘坐。但是平時要上午九點半以後才可使用。

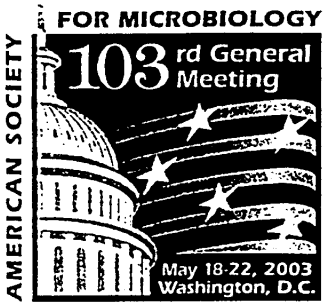
乘坐地鐵有一些事項須注意，例如不能抽煙和飲食，否則可能會被處以罰款。上下車均有語音提醒什麼時候開門、什麼時候關門。地鐵的營業時間爲平日早上五點半至午夜，星期五至半夜一點；星期六早上八點至半夜一點，星期日早上八點至午夜；國定假日營業時間同週六或週日。地鐵班次的間隔時間隨著路線的不同而異，但是大約三分鐘至十二分鐘一班。

公共汽車

搭乘Metro公車，只要$1.10就可以走遍特區大小地方。若是到特區以外的地方，費用則較高。公車有多種通行票，一日票票價$2.50，週票$10，均可以無限制乘坐，但乘坐快捷線需補差額。其餘請自行參考Metro通行票網頁。

Workshop 103-11

The Gram-Positive Challenge: Clinical Importance of Aerobic Catalase-Negative Gram-Positive Cocci



May 17, 2003
8:30 a.m. – 12:00 p.m.

Gallaudet University
Washington, DC

American Society for Microbiology 1752 N Street, NW, Washington, DC 20036

American Society for Microbiology
103rd General Meeting

18-22 May, 2003
Washington, DC

Date: May 17,2003

Workshop Title: **The Gram Positive Challenge: clinical importance of aerobic catalase-negative Gram Positive Cocci**

Faculty:

Kathryn Ruoff, PhD
Assistant Supervisor, Microbiology Laboratory
Dartmouth Hitchcock Medical Center
Lebanon, NH

Claudia Hinnebusch, MT(ASCP)
Clinical Microbiology Laboratory
UCLA Center for the Health Sciences
Los Angeles, California

Diane Glenn, MT, SM(ASCP)
Clinical Microbiology Laboratory
UCLA Center for the Health Sciences
Los Angeles, California

Lecture

Disclosure Statements

1. The following speakers indicated that there were no financial relationships to be disclosed:

Speaker
Claudia J. Hinnebusch
Diane M. Glenn
Kathryn L. Ruoff

2. The following speakers disclosed financial relationships:

Speaker	Entity

CATALASE-NEGATIVE GRAM-POSITIVE COCCI

K. L. Ruoff, Ph.D.

INTRODUCTION

Until the 1980's, catalase-negative Gram-positive cocci isolated from clinical specimens were identified as streptococci or rarely as aerococci. Currently, however, there are close to 20 genera included in this group. How did this explosion in varieties of catalase-negative Gram-positive cocci occur? Advances in both microbiology and medicine have led to the appearance of most of these "new" bugs. Techniques of molecular taxonomy have revealed new genera and species and in some cases have rearranged old classification systems for the Gram-positive cocci. Medical procedures and treatments that alter natural defenses against infection coupled with the emergence of diseases that suppress immune function have created a growing population of compromised hosts. Gram-positive bacteria are emerging as opportunistic pathogens in this patient population. Neutropenia and the widespread use of treatments that breach the integument (e. g., intravascular catheters) or destroy oral mucous membranes (e. g., anti-cancer chemo- or radiotherapy) have been implicated as predisposing factors for infection by Gram-positive cocci that are otherwise well-behaved members of normal flora.

CATALASE-NEGATIVE GRAM-POSITIVE COCCI: DESCRIPTIONS OF THE GENERA

Streptococcus

Enterococci and lactococci (see descriptions of these organisms below) were formerly classified as streptococci, but now occupy separate genera. The classification and identification of group B streptococci and pneumococci remains unchanged, but new ideas on other streptococci appear below. See Table 1 for a summary of characteristics of β-hemolytic streptococci.

β-hemolytic group A: Most clinical isolates are *S. pyogenes* (bacitracin-susceptible and PYR-positive). Occasionally small colony-forming non-*S. pyogenes* (bacitracin-resistant and PYR-negative) group A β-hemolytic strains are isolated. These belong to the anginosus or *"S. milleri"* species group of viridans streptococci described below.

β-hemolytic group C and G: Like group A streptococci, there are two basic types of strains with C or G antigen. Small colony-forming strains belong to the anginosus or *"S. milleri"* group. Large colony-forming group C and G strains isolated from humans are similar to each other physiologically and genetically, in spite of their different Lancefield antigens. These bugs are now thought to belong to the same subspecies, for which the name *S. dysgalactiae* subspecies *equisimilis* has been proposed, although not commonly used. Most human strains of large colony group C and G streptococci are VP-negative and β-glucuronidase-positive, in contrast to the VP-positive, β-glucuronidase-

negative *"S. milleri"* small colony strains. It has been proposed that some group C and group L large colony streptococci of animal origin be named *S. dysgalactiae* subsp. *dysgalactiae* and that other group C animal strains be classified in the species *S. equi* subsp. *equi* and *S. equi* subsp. *zooepidemicus*. Animal strains with the group G antigen are called *S. canis*.

β-hemolytic group F: Part of the anginosus or *"S. milleri"* group (see below).

***Streptococcus urinalis*:** A new species described by Collins, et. al., (2000), on the basis of one isolate from urine of a patient with cystitis. This streptococcus is related to the pyogenic strains like *S. pyogenes*, and the large colony-forming group C and G streptococci. It is, however, non-hemolytic. *S. urinalis* could be confused with enterococci because it is PYR and bile esculin-positive and salt tolerant, but displays a negative reaction when tested with the Accuprobe *Enterococcus* test.

Viridans streptococci: Isolated from the oral cavity, alimentary and respiratory tracts, these organisms cause endocarditis and other infections. The major groups are described below; see Table 2 for a summary of characteristics of the viridans streptococci.

Mutans group: *S. mutans* and *S. sobrinus* are two of the seven species in the *S. mutans* group, and account for the predominant *S. mutans* group strains found in the human mouth. They produce extracellular polysaccharides (dextrans) that may contribute to pathogenicity.

Salivarius group: *S. salivarius* also produces an extracellular polysaccharide (levan). The new species *S. vestibularis* and *S. thermophilus* are close relations.

Mitis group: *S. mitis* and *S. oralis* are negative for arginine hydrolysis, while the other species (with the exception of some *S. crista* strains), are positive. *S. mitis* is negative for dextran production and *S. oralis* is variable. *S. sanguis* and *S. gordonii* are dextran producers; *S. parasanguis* is negative and *S. crista* variable for this trait. *S. sanguis*, *S. gordonii* and *S. oralis* are common isolates from cases of viridans streptococcal endocarditis. Strains identified as *S. mitis* (which may have also included some misidentified *S. oralis* strains) have been observed to display increased levels of penicillin resistance and have been found as agents of serious infection in neutropenic hosts. Recently, *S. peroris* and *S. infantis*, 2 new mitis group species isolated from human clinical specimens have been described.

Anginosus (*"S. milleri"*) group: Composed of α-, β-, and non-hemolytic strains that may have Lancefield's A, C, F, or G antigen, or no detectable antigen, *"S. milleri"* organisms can cause endocarditis but are better known for their participation in abscesses and other pyogenic infections. Previously thought to belong to a single species (more recently called *S. anginosus*), current taxonomic research supports splitting these organisms into 3 species, *S. anginosus*, *S. intermedius*, and *S. constellatus*. The division of *S. constellatus* into 2 subspecies, *S. constellatus* subsp. *constellatus* and *S. constellatus* subsp. *pharyngis*, has been proposed recently (Whiley et al., 1999. IJSB 49:1443-1449).

See Table 3. for the phenotypic criteria defining these 3 species. β-hemolytic "*S. milleri*" group strains in respiratory specimens (throat, sputum) are most likely normal flora. We should probably differentiate between β-hemolytic large colony-forming group C and G strains and small colony "*S. milleri*" with the same hemolytic and serological reactions when we encounter them in respiratory cultures.

Bovis group: *S. bovis* and related species were formerly classified as non-enterococcal group D streptococci, but are really closely related to the viridans streptococci. The group D antigen is nonspecific, occurring in multiple genera, and therefore is not very valuable for identification. Bacteremia with *S. bovis* has been linked to the presence of colonic cancer. The taxonomy of the bovis group is still being refined, and DeVriese and coworkers (1998) presented evidence that most clinically significant *S. bovis* isolates from humans really belong to the species *Streptococcus gallolyticus*, a bovis group species also isolated from animals. Other biotypes of *S. bovis* strains isolated from human infection have also been recently renamed. Consult Table 4 for the current nomenclature of the bovis species group.

Streptococcus pneumoniae: We traditionally think of the pneumococcus as a virulent alpha-hemolytic streptococcus that is very different from the viridans streptococci. However, *S. pneumoniae* is closely related to the viridans streptococci and is considered a member of the viridans division.

***Streptococcus sinensis*:** A new viridans species based on a single isolate from a case of endocarditis, *S. sinensis* produces small alpha-reacting colonies, is bile-esculin-positive, fails to grow in 6.5% NaCl, and is PYR-negative and LAP-positive. (Woo, P.C.Y., D.M.W. Tam, K-W. Leung, S.K.P. Lau, J.L.L. Chen, M.K.M. Wong, and K-Y. Yuen. 2002. *Streptococcus sinensis* sp. nov., a novel species isolated from a patient with infective endocarditis. J C.in. Microbiol. 40:805-810).

Other Streptococci:

Although primarily a pathogen of swine, ***Streptococcus suis*** has been noted in serious human infections such as meningitis. *S. suis* strains are alpha-hemolytic on sheep blood agars and may display Lancefield group R, S or T antigen.

Streptococcus porcinus, another pathogen of swine that is isolated infrequently from human infections, may produce Lancefield group E, P, U or V antigen and is β-hemolytic on sheep blood agars. Although *S. porcinus* is PYR-positive, it is bacitracin-resistant, which distinguishes it from *S. pyogenes*. *S. porcinus* also produces a positive reaction in the CAMP test, but is distinguished from group B streptococci by a positive PYR reaction.

Recent reports have documented cellulitis and invasive infection in humans due to ***Streptococcus iniae***. This organism is a pathogen of fish, and is presumably acquired by humans via cutaneous injury during preparation of infected fish, notably tilapia. The name *Streptococcus shiloi* is a junior synonym of *S. iniae*, originally described as an isolate from porpoises. *S. iniae* is reported to be β-hemolytic on sheep blood agar, but α-hemolytic on human

or bovine blood agar. Isolates are unreactive with Lancefield grouping sera, are variable in their susceptibility to bacitracin, and are PYR and LAP-positive.

Nutritionally variant streptococci: See "*Abiotrophia*"and "*Granulicatella*," below.

Enterococcus

The genus *Enterococcus* contains numerous PYR-positive species, with more than a dozen isolated from human clinical specimens. The majority of human isolates are *E. faecalis*, and most of the remainder are *E. faecium*. The other species account for a small percentage of clinical enterococcal isolates. Species identification may be of importance because of susceptibility differences. For example, *E. faecium* is more resistant to penicillin and certain synergistic drug combinations than *E. faecalis*. *E. gallinarum* and *E. casseliflavus* (motile species) seem to display low level resistance to vancomycin.

Species that have been isolated from humans include *E. faecalis*, *E. faecium*, *E. avium*, *E. raffinosus*, *E. malodoratus*, *E. pseudoavium*, *E. solitarius*, *E. gallinarum*, *E. casseliflavus*, *E. mundtii*, *E. durans*, *E. hirae*, *E. dispar*, and *E. cecorum* (see Table 5). Reliable methods for identification of all of these species are not commercially available at this time. Two new species, each based on a single strain isolated from human sources, were identified in 2002. *E. gilvus* produces a pale yellow pigment and is Enterococcus Accuprobe test-positive. *E. pallens* produces bright yellow pigment and is Accuprobe test-negative. Both new species are non-motile (Tyrrell, G.J., L. Turnbull, L.M. Teixeira, J. Lefebvre, M. da Goria, S. Carvalho, R.R. Facklam, and M. Lovgren. 2002. Enterococcus gilvus sp. nov. and Enterococcus pallens sp. nov. isolated from human clinical specimens. J. Clin. Microbiol. 40:1140-1145).

In addition to high level aminoglycoside resistance and beta-lactamase production, vancomycin resistance has been noted among enterococci and could be a serious problem if it becomes widespread. High level and low level vancomycin resistance has been described, and in some cases is transferable.

***Abiotrophia* (formerly called Nutritionally Variant Streptococci)**

These "pyridoxal-dependent" or "satelliting" organisms were formerly thought to be nutritional mutants of various viridans species. Work by Bouvet and colleagues in the 1980's, however, suggested that these bacteria belonged to novel species of the genus *Streptococcus* (*S. adjacens* and *S. defectivus*). These organisms differ from viridans streptococci in that they are PYR-positive. [Some, but not all *S. pneumoniae* strains are the only non-β-hemolytic streptococci known to be PYR-positive.] More recent molecular taxonomic studies of nutritionally variant streptococci (1995) suggested that these bacteria are not closely related to streptococci and a proposal was made to transfer them to a new genus, *Abiotrophia*, as *Abiotrophia adiacens* and *Abiotrophia defectiva*. Eventually additional species, *Abiotrophia elegans* (1998), *A. balaenopterae* (1999, isolated from the minke whale) and *A. para-adiacens* (2000) were described. The latest taxonomic studies suggest that *A. defectiva* is the only species that belongs in the genus; the other *Abiotrophia* species comprise a separate genus, *Granulicatella* (described below).

***Granulicatella* (formerly members of *Abiotrophia*)**

Described by Collins and Lawson in 2000 (IJSEM 50:365-369), this genus accommodates former members of the genus *Abiotrophia*. *Granulicatella* species (*G. adiacens*, *G. elegans* and *G. balaenopterae*) are differentiated phenotypically from *Abiotrophia* by their inability to produce α-galactosidase.

Lactococcus

This *Lactococcus* genus contains non-β-hemolytic strains formerly classified as Lancefield group N streptococci. These organisms were previously referred to as "dairy streptococci" because of their presence in milk and dairy foods. Lactococci are isolated occasionally from clinical specimens, and may function as opportunistic pathogens. They can easily be confused with enterococci or streptococci on the basis of their physiological reactions.

Vagococcus

Motile *Lactococcus*-like strains with Lancefield's group N antigen have been classified as members of this genus. These organisms also share some phenotypic traits with enterococci. Since vagococci are rarely isolated from human clinical material, their clinical significance is not well-documented. The fact that isolates of this genus have been reported to give positive reactions in a commercially available probe test for the genus *Enterococcus* makes their accurate identification difficult.

Leuconostoc

Leuconostocs are Gram-positive coccobacilli occurring in pairs and chains. Their microscopic and colonial morphologies strongly resemble those of viridans streptococci. Vancomycin resistance and the formation of gas as an endproduct of glucose metabolism are characteristics that differentiate leuconostocs from streptococci. Commonly isolated from vegetation and certain foods, leuconostocs were recognized in clinical specimens in the mid-1980's. Isolated from cases of bacteremia, meningitis, and other infections, these bugs appear to be opportunistic pathogens. Some former members of the genus *Leuconostoc* have more recently been reclassified in the genus *Weissella*.

Pediococcus

Pediococcus is another vancomycin-resistant genus that, like *Leuconostoc*, is isolated from vegetation and foods. Cells of this genus are arranged in clusters, but colonial morphology resembles that of viridans streptococci. Most isolates of pediococci from blood have been of doubtful clinical significance, but these organisms have been occasionally documented as an opportunistic pathogens. *Pediococcus halophilus* has been reclassified as *Tetragenococcus halophilus*, a vancomycin-susceptible species, unlike other pediococci. Tetragenococci have not yet been described in human clinical specimens.

Globicatella

Globicatellas are salt-tolerant, viridans streptococcal-like organisms (α-hemolytic, coccobacilli in pairs and chains), that are PYR-positive and LAP-negative, unlike viridans streptococci. The single species in the genus, *Globicatella sanguis*, has been isolated from blood cultures.

Dolosicoccus

The genus *Dolosicoccus* currently consists of one species, *D. paucivorans*, isolated from human blood. Cells are arranged singly, in pairs or short chains. Dolosicocci are phenotypically similar to *Globicatella* (PYR-positive, LAP-negative), but are salt-intolerant. *Dolosicococcus* strains are hippurate-negative, which distinguishes them from strains of *Facklamia* and *Globicatella*.

Aerococcus

Infrequent clinical isolates, these α-hemolytic organisms may cause endocarditis. In contrast to streptococci and enterococci, aerococcal cells are arranged in clusters. They may show very weakly positive catalase reactions and grow poorly under anaerobic conditions, unlike streptococci, enterococci, and lactococci. *A. viridans* (PYR[+], LAP[-]) has been joined by 4 additional recently described species. *A. sanguicola* (PYR[+], LAP[+]) was described by Lawson, et al (2001) and has been isolated from blood cultures. Three PYR[-] species, isolated from urine or genitourinary sites can be separated by their β-glucuronidase (BGUR) and LAP reactions. *A. christensenii* is BGUR[-] (Collins, et al. 1999. IJSB 49:1125-1128). The BGUR[+] species *A. urinae* (Aguirre and Collins, 1992) and *A. urinaehominis* (Lawson, et al, 2001) are distinguished by their LAP reactions: *A. urinae* is LAP[+] and *A. urinaehominis* is LAP[-]. An API 20Strep biotype number of 2440300 was reported in a sudy of 43 isolates identified as *A. urinae* (Seward, K.E., et al. 1999. Abstract 2278, p. 271, Abstracts of the 39th ICAAC Meeting). See Table 8 for a summary of features of species of the genus *Aerococcus*.

Gemella

Gemella strains are similar in colonial morphology to viridans streptococci and are found in the same habitats. One species, *G. haemolysans*, forms easily decolorized *Neisseria*-shaped cells and was in fact originally thought to be a member of the genus *Neisseria*. A second *Gemella* species, *G. morbillorum*, forms cells that are more similar to those of streptococci; this species was previously classified as a member of the genus *Streptococcus*. *G. bergeriae* and *G. sanguinis* have been more recently described from human specimens. *Gemella* strains have been isolated from cases of endocarditis, wounds and abscesses, and *Gemella* infection accompanied by septic shock has also been reported. See Table 9 for a summary of the species of the genus *Gemella*.

Dolosigranulum

Dolosigranulum, a new genus with phenotypic similarities to *Gemella*, forms ovoid cells in pairs and groups, and is PYR, LAP, and arginine-hydrolysis-positive. A positive arginine hydrolysis reaction distinguishes this bacterium from *Gemella* species. *Dolosigranulum pigrum*, the sole species of the genus, has been isolated from blood cultures, eye, nasopharyngeal and other body sites (LaClaire and Facklam, 2000).

Rothia mucilaginosa (formerly Stomatococcus mucilaginosus)

Although previously included with staphylococci in the catalase-positive *Micrococcaceae* family, *R. mucilaginosa* strains often lack or show only very weak catalase activity. *R. mucilaginosa* forms non-hemolytic colonies that are adherent to agar surfaces and usually have a rubbery consistency. Cells are encapsulated and arranged in pairs, tetrads and clusters. *R. mucilaginosa*

strains are unable to grow on nutrient agar supplemented with 5% NaCl, which distinguishes them from the more salt-tolerant staphylococci and micrococci. Part of normal oral flora, this organism has been implicated in endocarditis and peritonitis in CAPD patients.

Helcococcus

Helcococci form gram-positive cocci, sometimes displaying pleomorphic shapes, that are arranged in short chains and irregular groups. These organisms form tiny non-β-hemolytic gray colonies on blood agar, and may require more than 24 hours of incubation to be easily visible. Helcococci are lipophilic, and growth is stimulated by serum or Tween 80. *H. kunzii*, named for Lawrence J. Kunz, has been isolated from wound cultures, often foot ulcers, and is thought to be a member of normal skin flora. A second species, *H. ovis* has been described as an isolate from polymicrobial infections in sheep (Collins, et al., 1999. IJSB 49:1429-1432).

Facklamia

Clinical isolates of the genus *Facklamia* (first described in 1998) have originated from genitourinary, blood and wound specimens. *F. hominis* strains form spheroid cells arranged in pairs and groups and are PYR-variable. *F. ignava* and *F. languida* (PYR-positive) strains form ovoid cells in pairs and short chains. A fourth species, *F. sourekii*, has recently been documented in human specimens, while *F. tabacinasalis* has been described as an isolate from powdered tobacco. LaClaire and Facklam (2000) recently noted that *Fackalmia* species display varied antimicrobial susceptibility patterns, with some strains showing reduced susptibilities to beta-lactams, erythromycin, clindamycin, trimethoprim-sulfamethoxazole and tetracycline.

Ignavigranum

Ignavigranum is a recently described PYR-positive genus of gram-positive cocci arranged singly and in pairs or groups, isolated from human wound cultures. Colonies of some strains display growth enhancement when located near colonies of other bacterial species. A single species, *I. ruoffii*, has been described to date.

Alloiococcus, a new **catalase-positive** genus

The large cells of this obligately aerobic coccus are arranged in pairs and tetrads. The organism forms tiny, slowly growing α-hemolytic colonies on T-soy sheep blood agar. *Alloiococcus otitidis*, the sole species of the genus, has been isolated from middle ear infections. *Micrococcus*, also a catalase-positive obligate aerobe, is oxidase-positive in contrast to alloiococci.

Table 1. Differentiating characteristics of beta-hemolytic streptococci.

Species	Lancefield Antigen(s)	PYR	BGUR	CAMP	Treha-lose	Sorb-itol	Comments
S. pyogenes	A	+		-			
S. agalactiae	B	-		+			
S. dysgalactiae subsp. *equisimilis*	C,G	-	+	-	+	-	Humans are the usual host. Positive for streptokinase activity on human plasminogen and proteolytic activity on human fibrin
"*S. milleri*" group	A,C,G,F or non-group-able	-	-	-			"Small colony-forming" beta-hemolytic strains. VP-positive in contrast to other beta-hemolytic group A, C and G streptococci. **Other members of this group may be non-beta-hemolytic**
S. dysgalactiae subsp. *dysgalactiae*[2]	C,L	-	+		+	-[1]	Animals are the usual hosts. May be β, α, or γ-hemolytic. Negative for streptokinase activity on human plasminogen and proteolytic activity on human fibrin
S. equi subsp. *equi*[2]	C	-	+		-	-	Animals are the usual hosts
S. equi subsp. *zooepidemicus*[2]	C	-	+		-	+	Animals are the usual hosts
S. canis[2]	G	-	-[1]				Animals are the usual hosts
S. porcinus[2]	E,P,U, V	+[3]		+[1]			Bacitracin-resistant. Animals are the usual hosts. May cross-react with commercially available group B reagents
S. iniae[2]		+					Bacitracin susceptibility variable. While some isolates may resemble *S. pyogenes* phenotypically, no Lancefield antigen is detectable. My appear α-hemolytic during first 18h of incubation. Fish are the usual hosts

[1]Exceptions can occur. [2]Rarely isolated from human infections [3]Reactions produced by some strains may be weak.

Table 2. Differentiation of commonly isolated "viridans" streptococci.

Species	VP	Arginine	Esculin	Mannitol	Sorbitol	Urease
Mutans group	+	-[1]	+	+	+[2]	-
Salivarius group	+[3]	-	+	-	-	+/-
Bovis group	+	-	+	+/-[4]	-	-
Anginosus or "*S. milleri*" group	+	+	+/-	+/-	-	-
Mitis group: *S. sanguis*, *S. gordonii*, *S. parasanguis*, *S. crista*	-	+[5]	+[6]	-	-[7]	-
Mitis group: *S. mitis* *S. oralis*	-	-	-[8]	-	-	-

Information in this table is based on the data of Whiley and Beighton. +, positive; -, negative; +/-, variable results may occur.

[1] *S. rattus* is arginine-positive.

[2] *S. sobrinus* is variable

[3] *S. vestibularis* is VP variable. *S. vestibularis* is also alpha-hemolytic, unlike the non-hemolytic *S. salivanus*.

[4] *S. bovis* biotype I is positive; biotype II is negative.

[5] *S. crista* may be arginine negative.

[6] *S. crista* is esculin-negative; *S. parasanguis* may be negative.

[7] Some S. *sanguis* strains may be positive.

[8] *S. oralis* may be positive

Table 3. Current Classification of the Anginosus or "*S. milleri*" species group.

	S. anginosus	*S. constellatus* subsp. *constellatus*	*S. constellatus* subsp. *pharyngis*	*S. intermedius*
β-D-fucosidase	-	-	+	+
β-N-acetylglucosaminidase	-	-	+	+
β-N-galactosaminidase	-	-	+	+
sialidase	-	-	-	+
β-galactosidase	v[1]	-	+	+
β-glucosidase	+	-	+	v[1]
hyaluronidase	-	+	+	+

[1]v, variable

Based Whiley and Beighton (1991) and Whiley et al., (1999). *S. constellatus* subsp. *constellatus* strains are frequently β-hemolytic and group F or non-hemolytic and ungroupable, but some strains group in A, C or G. *S. constellatus* subsp. *pharyngis* strians are ususally β-hemolytic and group C.

Table 4. Current taxonomy of the bovis species group.

Current name	Former name(s)	Mannitol fermentation	Starch hydrolysis	Dextran production
S. gallolyticus	*S. bovis* I	+	+	+
S. pasteurianus	*S. bovis* II/2	-	-	-
S. infantarius	*S,. bovis* II/1, *S. infantarius* subpecies *infantarius*	-	+	-
S. lutetiensis	*S. infantarius* subspecies *coli*	-	V	-
S. equinus (isolated from animals)	*S. bovis*	-	-	-

+, positive; -, negative; V, variable

Table 5. Enterococcal species isolated from human clinical specimens.

Species	Acidification of: Mannitol	Sorbose	Arabinose	Hydrolysis of: Arginine	Additional traits
E. avium	+	+	+	-	raffinose(-)
E. raffinosus	+	+	+	-	raffinose(+)
E. malodoratus	+	+	-	-	raffinose(+)
E. pseudoavium	+	+	-	-	raffinose(-)
E. faecalis	+	-	-	+	lactose(+)[1]
E solitarius	+	-	-	+	lactose(-)
E. gallinarum	+	-	+	+	raffinose(+), non-pigmented, may be motile
E. faecium	+[1]	-	+	+	raffinose(-)
E. casseliflavus	+	-	+	+[1]	pigmented, motile,
E. mundtii	+	-	+	+	pigmented, non-motile
E. durans	-[1]	-	-	+	raffinose(-), sucrose(-)
E. hirae	-	-	-	+	raffinose (+), sucrose(+)
E. dispar	-	-	-	-	raffinose(+), sucrose(+) glycerol (+)
E. cecorum	-	-	-	-	raffinose (+) sucrose (+) glycerol (-)

[1] Reaction exhibited by majority of strains.

Vancomycin - Resistant Enterococci
V-A V-B V-C

Table 6. Characteristics of infrequently isolated gram + cocci that grow aerobically.

Genus	Catalase	Relationship to oxygen	Appearance of Gram stain[1]
Leuconostoc	-	facultative	cb, pr, ch
Lactococcus	-	facultative	cb, pr, ch
Vagococcus	-	facultative	cb, pr, ch
Globicatella	-	facultative	cb, pr, ch
Dolosicoccus	-	faculatative	c, pr, ch
Pediococcus	-	facultative	c, pr, tet, cl
Aerococcus	- or w[2]	microaerophilic	c, pr, tet, cl
Gemella[3]	-	aerobic or facultative[4]	c, pr, ch, cl[5]
Abiotrophia[6]	-	facultative	pleomorphic: c, cb, r, ch
Granulicatella[6]	-	facultative	pleomorphic: c, cb, r, ch
Helcococcus,	-	facultative	c, pr, ch, cl
Facklamia	-	facultative	c, cl, pr, ch
Ignavigranum	-	facultative	c, cl
Dolosigranulum	-	facultative	c, pr, cl
R. mucilaginosa	-, +, or w[2]	facultative	c, pr, cl
Micrococcus	+	aerobic	c, cl, tet
Alloiococcus	+	aerobic	cb, pr, tet

[1] c, cocci; cb, coccobacilli; r, rods; pr, pairs; ch, chains; cl, clusters; tet, tetrads.

[2] w, weak

[3] *G. haemolysans* is easily decolorized and may appear Gram-variable or Gram-negative.

[4] *G. haemolysans* prefers an aerobic growth atmosphere, while *G. morbillorum* prefers anaerobiosis.

[5] *G. haemolysans* cells usually occur as diplococci with adjacent sides flattened, while *G. morbillorum* cells are found in pairs, sometimes with cells of unequal sizes in a given pair, and chains.

[6] Some *Abiotrophia* species have been reclassified as members of the genus *Graniculatella*.

Table 7. Differentiating features of gram + cocci with negative or weakly positive catalase reactions.

Organism	PYR	LAP	Gram Stain	Vanco mycin	Gas from glucose [1]	Esculin hydrolysis	Growth in 6.5% NaCl
Streptococcus	V[2]	+	pr, ch	S	-	V	V[3]
Pediococcus	-	+	cl	R	-	V[4]	V
Aerococcus urinae[5]	-	+	cl	S	-	V	+
Leuconostoc	-	-	pr, ch	R	+	V	V
Aerococcus viridans	+	-	cl	S	-	V	+
Helcococcus	+	-	cl	S	-	+	V
Globicatella	+	-	pr, ch	S	-	+	+
Dolosicoccus	+	-	pr, ch	S	-	-	-
Gemella	+	V	pr, cl	S	-	-	-
Enterococcus	+	+	pr, ch	V[6]	-	+	+
Lactococcus	+	+	pr, ch	S	-	V	V[4]
Vagococcus	+	+	pr, ch	S	-	+	V
Abiotrophia[7]	+	+	pr, ch	S	-	V	-
Granulicatella[7]	+	+	pr, ch	S	-	-	-
R. mucilaginosa	+[4]	+	pr, cl	S	-	+	-
Dolosigranulum	+	+	cl	S	-	-	-
Facklamia	V	+	cl, pr, ch	S	-	-	V
Ignavigranum	+	+	cl, pr	S	-	-	+

Abbreviations: +, positive; -, negative; V, variable; S, susceptible; R, resistant; PYR, pyrrolidonyl arylamidase; LAP, leucine aminopeptidase

[1] Gas production from glucose in sealed MRS broth; [2] *S. pyogenes* and some strains of pneumococci are PYR positive.

[3] Viridans and group D streptococci are negative; group B streptococci may be positive. [4] Most strains are positive.

[5] *A. christensenii* is a newly described additional PYR-negative *Aerococcus* species.

[6] Vancomycin-resistant enterococcal strains have been described, but currently most isolates are susceptible.

[7] Some species of *Abiotrophia* have been reclassified in the new genus *Granulicatella*

Table 8. Differentiating features of species of the genus *Aerococcus*.

Species	PYR	LAP	BGUR	Comments
A. viridans	+	-	+/-	Endocarditis, sepsis
A. urinae	-	+	+	UTI, sepsis
A. christensenii	-	?	+	Female GU tract (2 strains)
A. sanguicola	+	+	+	Blood culture (1 strain)
A. urinaehominis	-	-	+	Urine (1 strain)

+, positive; -, negative; ?, no published data for this characteristic in *A. christensenii*

Table 9. Differentiating features of species of the genus *Gemella* isolated from humans.

Species	Cellular morphology	Alkaline phosphatase	Acid from		Comments
			Sorbitol	Sucrose	
G. haemolysans	Easily decolorized gram-positive, variable or negative diplococci resembling neisserias; cells also arranged in tetrads or clusters	+	-	V	Prefers an aerobic growth atmosphere; formerly named *Neisseria haemolysans*; PYR-positive
G. morbillorum	Gram-positive cocci in short chains and often in pairs with cells in a given pair of unequal sizes	-	-(+)	+	Prefers an anaerobic growth atmosphere; formerly called *Peptostreptococcus morbillorum* and *Streptococcus morbillorum*; PYR-positive
G. bergeriae	Gram-positive cocci that are sometimes elongated, occuring singly, in pairs, or short chains	-	-	-	Some strains are beta-hemolytic on horse blood agar; PYR-positive
G. sanguinis	Gram-positive cocci that are sometimes elongated, occuring singly, in pairs, and short chains	+	+	+	Some strains are beta-hemolytic; some strains are PYR-positive

+, positive; -, negative; -(+), a few strains positive; V, variable. Data from Collins, M.D., et al. 1998. J. Clin. Microbiol. **36**:3090-3093.

IDENTIFICATION TIPS FOR HARD TO DIFFERENTIATE ORGANISMS

ENTEROCOCCUS / LACTOCOCCUS / AEROCOCCUS VIRIDANS:
Strains of lactococci and *Aerococcus viridans* may have positive PYR, bile esculin, and 6.5% NaCl reactions, like enterococci. Close attention to susceptibility profiles may clue you in to the true identity of these organisms: enterococci are methicillin and clindamycin-resistant, but the other genera may not be (extensive data are lacking on this.). LAP (leucine aminopeptidase) is positive for enterococci and lactococci, but negative for *Aerococcus viridans*. Aerococcal cells are arranged in clusters, and these organisms grow better aerobically, in contrast to the other 2 genera. Nucleic acid probes for *Enterococcus* could be helpful in sorting out these organisms.

DIFFERENTIATION OF CERTAIN ENTEROCOCCAL STRAINS
Presumptive differentiation of enterococci recovered from VRE surveillance cultures can be performed with tests for motility, pigment production, and for acidification of methyl-α-D-glucopyranoside (Mgp) as illustrated below. See section on Methods - Enterococcal Identification for information on performance of these tests.

Species	Mgp	Pigment	Motility
E. faecalis	-	-	-
E. faecium	-	-	-
E. casseliflavus	+	+	+
E. gallinarum	+	-	+

VIRIDANS STREPTOCOCCI / NUTRITIONALLY VARIANT STREPTOCOCCI (*Abiotrophia* and *Granulicatella*)/ *GEMELLA* / *LEUCONOSTOC / PEDIOCOCCUS / LACTOBACILLUS*:
Vancomycin resistance distinguishes *Leuconostoc*, *Pediococcus* and SOME, BUT NOT ALL *Lactobacillus* strains from *Gemella*, streptococci and *Abiotrophia/Granulicatella* (NVS). All of these organisms form α or non-hemolytic colonies on blood agar. Vancomycin-resistant organisms are distinguished as follows:

Genus	Cell Morphology	Gas from Glucose	Arginine Hydrolysis
Leuconostoc	coccobacilli	+	-
Pediococcus	cocci in pairs, tetrads	-	+ or -
Lactobacillus	rods	+ or -	+ or -

Close attention to Gram stain reaction and morphology, the PYR test, and nutritional requirements may help distinguish *Gemella* and *AbiotrophialGranulicatella* (NVS) from viridans streptococci:

Organism	Cell Morphology	PYR	Pyridoxal Requirement
Viridans strep.	coccobacilli in pairs, chains	-	-
(NVS) *Abiotrophia/ Granulicatella*	like streptococci, or pleomorphic and gram-variable	+	+
Gemella	like streptococci, or gram-variable *Neisseria*-like cocci	+ or weak+	

ROTHIA MUCILAGINOSA (STOMATOCOCCUS) / STAPHYLOCOCCUS: Although strains of both *R. mucilaginosa* and staphylococci form Gram-positive cocci in clusters, *R. mucilaginosa* is usually catalase-negative or only weakly positive. *R. mucilaginosa* is also unable to grow in the presence of 5% NaCl (added to nutrient agar), while staphylococci (and micrococci) grow well in this salt concentration.

* Good judgement comes from good experience
* Good experience comes from bad judgement
(Never trust the VITEK system for non-

METHODS: SHORT DESCRIPTIONS OF, OR REFERENCES FOR USEFUL TECHNIQUES

ACCUPROBE: Nucleic acid probes for identifying enterococci and pneumococci. This product is more specific than physiological tests, and is designed for culture confirmation, not for direct detection of bacteria in specimens.

ANTIMICROBIAL SUSCEPTIBILITY TESTING:
Vancomycin resistance for identification purposes (rule out *Leuconostoc*, *Pediococcus*): Ruoff, K.L. 1999. Chapter 19, p.310. In: Manual of clinical microbiology, 7th edition, ASM, Washington, D.C.
See latest NCCLS guidelines for recommendations on testing streptococci and enterococci.

ARGININE UTILIZATION: see VANCOMYCIN-RESISTANT "LACTIC ACID BACTERIA"

β-GLUCURONIDASE: Commercially available disk tests, or use MacConkey agar containing MUG (methyl-umbelliferyl-β-D-glucuronide). See Kirby, R., and K.L. Ruoff, J. Clin. Microbiol. **33:**1154-1157 (1995).

ENTEROCOCCAL IDENTIFICATION: Motility test (motility test medium, incubated at 30°C for 48h) and pigment production test (T-soy agar with 5% sheep blood, 35°C, 24h: observe growth that has been removed with a swab). For acidification of methyl-α-D-glucopyranoside (Mgp), inoculate and incubate the organism (35°C, for up to 7 days) in heart infusion broth supplemented with 1% Mgp and 0.006% bromcresol purple. A color change to yellow indicates a positive reaction. See Carvalho, M.D.S., et al. 1998. J. Clin. Microbiol. **36:**1584-1587, and Lauderdale, T., K.C. Chapin and P.R. Murray. 1999. Chapter 128, p. 1669, Manual of clinical microbiology, 7th edition, ASM, Washington, D.C.

ESCULIN HYDROLYSIS: See VIRIDANS STREPTOCOCCI

IDENTIFICATION SYSTEMS: Hinnebusch, C.J., D.M. Nikolai, and D.S. Bruckner. 1991. Am. J. Clin. Pathol. 96:459-463, and Kikuchi, K., T. Enari, K. Totsuka, and K. Shimizu. 1995. J. Clin. Microbiol. **33:**1215-1222.

Commercially available identification systems have updated their databases since publication of the reference cited above. However, these products still lack accuracy for identification of infrequently isolated genera and species.

LAP TEST: For determination of leucine aminopeptidase activity. Rapid test: Carr-Scarborough, Stone Mountain, Georgia.

MITIS SALIVARIUS AGAR: see VIRIDANS STREPTOCOCCI

MOTILITY TEST: see ENTEROCOCCAL IDENTIFICATION

MRS BROTH: see VANCOMYCIN-RESISTANT "LACTIC ACID BACTERIA"

NUTRITIONALLY VARIANT STREPTOCOCCI (*ABIOTROPHIA/GRANULICATELLA*):
Pyridoxal supplementation of media: Use 0.001% pyridoxal-HCl. See Ruoff, K.L. 1991. Clin. Microbiol. Rev. **4:** 184-190.

PIGMENT PRODUCTION TEST: see ENTEROCOCCAL IDENTIFICATION

PYRIDOXAL: see NUTRITIONALLY VARIANT STREPTOCOCCI

SALT TOLERANCE (6.5% NaCl): Heart infusion broth with 6.5% NaCl, , 0.1% dextrose and brom-cresol purple as an acid-base indicator (commercially available).

***ROTHIA MUCILAGINOSA (STOMATOCOCCUS)* IDENTIFICATION:**
I use nutrient agar to which 5% NaCl has been added. A control staphylococcus strain will grow in 5% salt, but stomatococci will not. For other tests see: Mitchell, P.S., et al. 1990. Diagn. Microbiol. Infect. Dis. **13:**521-525.

UREASE: Use Christensen's urea agar.

VANCOMYCIN-RESISTANT "LACTIC ACID BACTERIA" (*LEUCONOSTOC, PEDIOCOCCUS* and certain strains of *LACTOBACILLUS*):
Arginine degradation: Moeller's decarboxylase medium containing arginine is suitable. Incubate at 35^{0}C for 48hr before making a final interpretation. *Leuconostoc* is always negative.

Gas from glucose: (MRS broth): MRS (Mann, Rogosa, Sharpe) broth must be used, because it supports luxurious growth of the organisms to be tested. Three to five ml of broth is inoculated and overlaid with melted petrolatum. Overnight incubation at 35^{0}C is usually sufficient to reveal gas production by *Leuconostoc* or certain *Lactobacillus* strains. Dehydrated MRS broth is available from Difco.
Morphology determination: for accurate determination of cellular morphology, Gram stains should be made from 24 to 48h old thioglycollate broth cultures.

VIRIDANS STREPTOCOCCI:
VP, arginine, esculin, mannitol, sorbitol and urease tests: See Facklam, R. and J.A. Elliott. 1995. Clin. Microbiol. Rev.8:479-495, and Facklam, R.R., and J.A. Washington II. 1991. Chapter 29. In: Manual of clinical microbiology, 5th ed. ASM, Washington, D.C.
Mitis Salivarius agar: This medium is used to determine the presence and type of extracellular polysaccharide produced by viridans strains. Determination of this trait is useful as an extra test for the API 20 Strep kit. Plates can be purchased, or made in-house from dehydrated media. Different species have characteristic appearances on Mitis Salivarius agar. See the following for more information: Graham, L., F.A. Meier, and H.P. Dalton. 1987. J. Clin. Microbiol. **25:**1027-1028, and Ruoff, K.L., R.A. Whiley and D. Beighton. 1999. Chapter 17. In: Manual of clinical microbiology, 7th edition, ASM, Washington, D.C.

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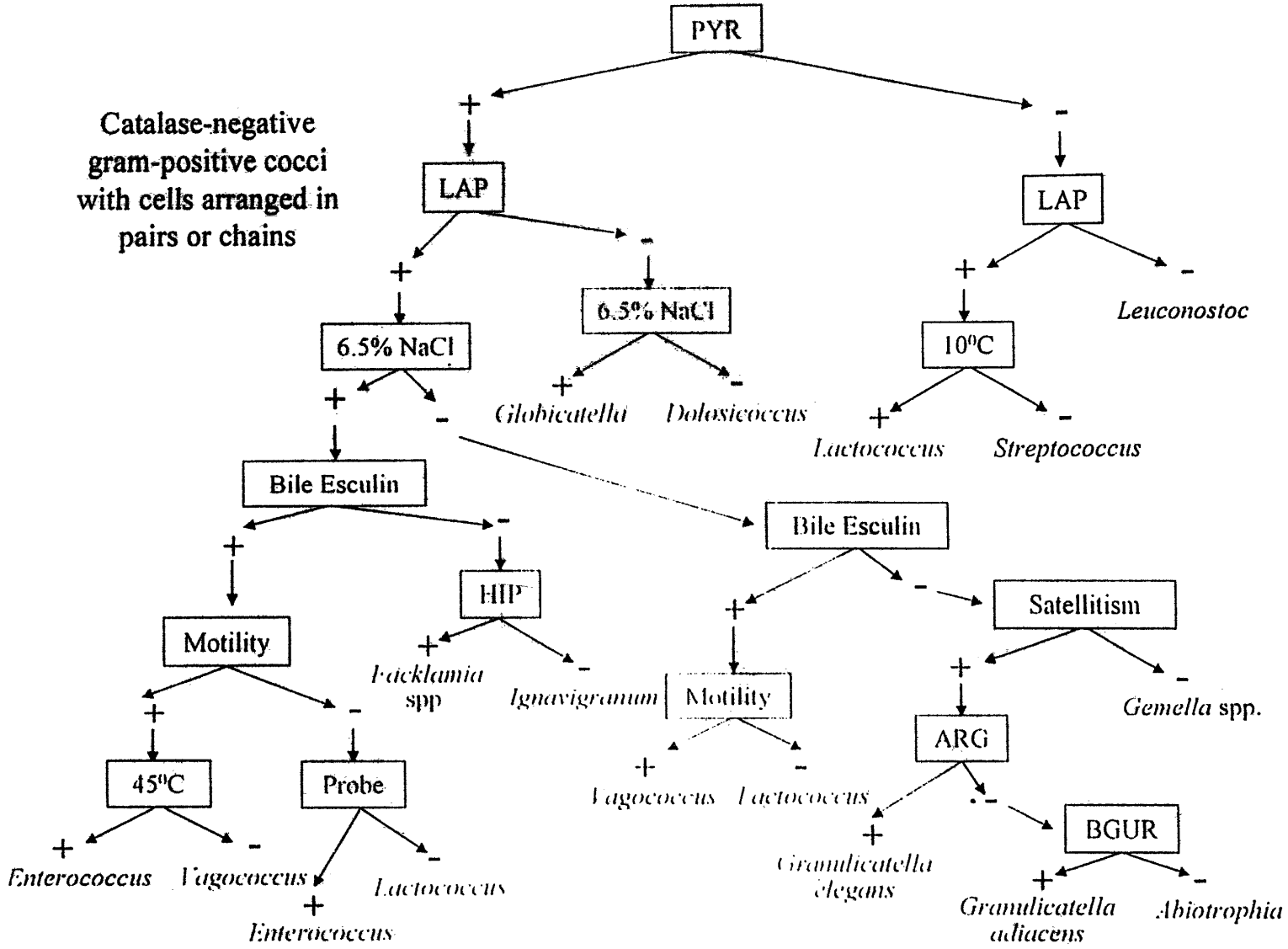
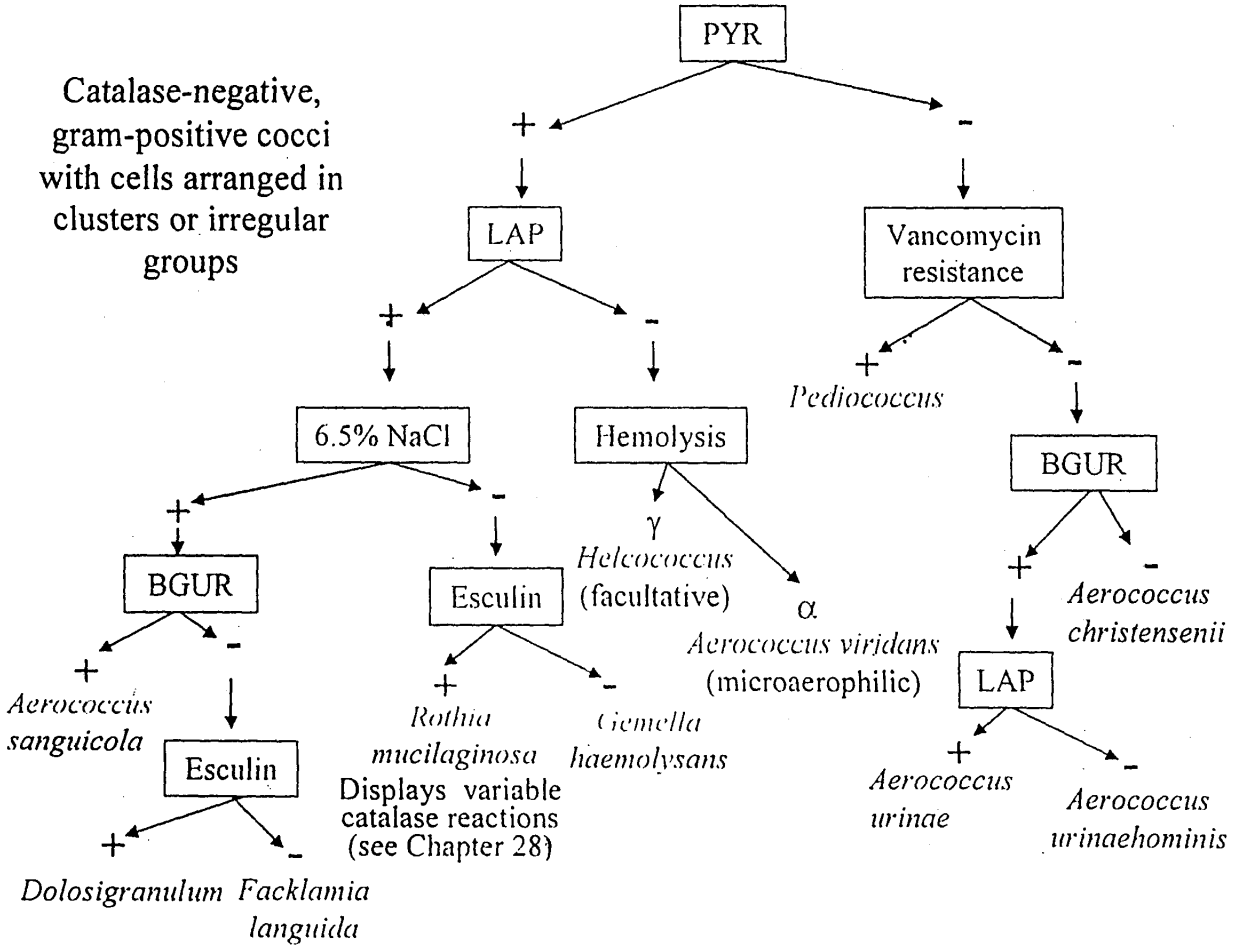

Catalase-negative gram-positive cocci with cells arranged in pairs or chains
PYR
LAP
LAP
6.5% NaCl
6.5% NaCl
10°C
Leuconostoc
Globicatella
Dolosicoccus
Lactococcus
Streptococcus
Bile Esculin
Bile Esculin
HIP
Motility
Satellitism
Facklamia spp
Ignavigranum
Motility
Gemella spp.
ARG
45°C
Probe
Vagococcus
Lactococcus
BGUR
Enterococcus
Vagococcus
Lactococcus
Granulicatella elegans
Granulicatella adiacens
Abiotrophia
Enterococcus

Catalase-negative, gram-positive cocci with cells arranged in clusters or irregular groups



附件三、FDA 科學家公會年度最新會報目錄

April 24-25, 2003

2003 FDA SCIENCE FORUM

FDA SCIENCE: PROTECTING AMERICA'S HEALTH

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附件四、食品安全機構聯合監管方法網路資訊

Selected Highlights

- Consumer Advice: Food Safety in a Disaster
- September is Food Safety Education Month: Store It, Don't Ignore It.
- USDA Announces Initiatives to Improve Food Safety July 10, 2003
- Food Safety News from CDC / EPA / FSIS / FDA

- Recent Additions to the FoodSafety.gov web site

- Partnership for Food Safety Education (Fight BAC!)
- Food Safety Training and Education Alliance
- International

Privacy | Accessibility | Site Description/Webmaster
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U.S. Food and Drug Administration
FDA Backgrounder
September 24, 1998

(This document in English)

食品安全：機構聯合監管方法

一九九八年九月二十四日

美國的食品供應是世界上最安全的，這主要是由於美國實行機構聯合監管制度，在每一個層面（地方、州和全國）監督食品生產與流通。

各市縣衛生局、各州衛生機構以及聯邦政府的許多部門和機構，都雇用食品檢查員、微生物學家、流行病學家及其他食品科學家，執行持續監管。地方、州和聯邦法律、準則及其他法令對這些監管人員的權限有明確的規定。有些人員只監管一種食品，例如牛奶或海鮮。有些人員的權限只限於某個特定的地理區域。有些人員只負責監管某一類食品企業，例如飯店或肉品加工廠。這些工作人員攜手合作，則形成美國食品安全監管系統。

柯林頓政府於一九九七年發起「食品安全運動」，加強全國食品安全監管人員的工作，進一步防止由食品傳染的疾病。這類疾病每年影響到六百五十萬至三千三百萬美國人。一九九八年五月，食品安全運動開始實施一項重要計劃 -- 美國衛生部（包括其下屬機構FDA，即食品與藥物管理局）、農業部和環境保護總署聯合簽署一份備忘錄，決定建立「食品傳染疾病發生反應協調組」，英文簡稱爲FORC-G。這個新機構的職責是：

- 加強聯邦、州和地方食品安全機構之間的協調與聯絡。
- 在疾病發生時引導資源和技術力量的有效使用。
- 採取措施防止危害美國食品供應的新的和潛在的威脅。

除了聯邦政府官員之外，FORC-G還包括食品與藥物官員協會、全國市縣衛生官員協會、州與領地公共衛生實驗室主任協會、州與領地流行病學家委員會以及全國各州農業局協會。

下面的表格詳細地列出美國食品安全監管體制的組織結構。表格所列的各機構還與其他政府部門合作，例如，與消費產品安全委員會共同執行防毒包裝法，與聯邦調查局（FBI）共同執行聯邦防止私拆包裝法，與運輸部共同執行衛生食品運輸法，以及與美國郵政總局共同執行反郵件欺詐法。

美國衛生部*

(U.S. Department of Health and Human Services)

食品與藥物管理局 (FDA) (Food and Drug Administration)

監管

- 各州際貿易中出售的國內生產及進口食品，包括帶殼的蛋類食品，但不包括肉類和家禽。
- 瓶裝水。
- 酒精含量低於7%的葡萄酒飲料。

食品安全權限

執行與國內生產及進口食品（肉類和家禽除外）有關的食品安全法律，具體方式如下:

- 檢查食品生產企業和食品倉庫，並且採集和分析樣品，以確定是否有物理、化學或細菌污染。
- 在市場行銷之前檢查食品添加劑和色素之安全性。
- 檢查動物藥物對接受藥物的動物之安全性，以及對食用此類動物食品的人類之安全性。
- 監管食用類動物所用飼料的安全性。
- 制定指導性規程、法規、準則及法律解釋，協助各州共同執行，以便監管牛奶、貝殼類海鮮和食品零售業，例如飯店和雜貨店。指導性「食品規程」即是一個具體例子。該規程向零售店、護理所和其他機構提供參考資訊，指導如何烹調食品以防止食品傳染疾病。
- 制定切實有效的食品生產方式和其他生產標準，例如工廠衛生、包裝要求、以及危險分析及關鍵控制點計劃等。
- 與外國政府合作，確保某些進口食品之安全性。
- 要求生產商回收某些不安全的食品，並監管回收計劃之執行。
- 採取適當的實施行動。
- 進行食品安全研究。
- 教育食品廠商和消費者瞭解食品安全使用方法。

詳情請洽

消費者:
FDA Headquarters（食品與藥物管理局）
Office of Consumer Affairs
HFE-88
5600 Fishers Lane
Rockville, MD 20857

各地的FDA辦事處，列在電話簿藍頁「美國政府」欄下

媒體採訪: 202-205-4144

www.cfsan.fda.gov/list.html

疾病控制與防治中心 (Centers for Disease Control and Prevention)

監管

- 所有食品。

食品安全權限

- 與地方、州和其他聯邦官員一起調查由食品傳染的疾病之病源。
- 管理全國食品傳染疾病監視系統：設計和部署食品傳染疾病快速電子報告系統。與其他聯邦和州機構一起監視食品傳染疾病的發病率和趨勢。發展能使州和地方各級快速識別食品傳染病原體之先進技術。
- 制定和宣傳旨在防止食品傳染疾病的公共衛生政策。
- 進行研究以防止食品傳染疾病。
- 訓練地方和州的食品安全監管人員。

詳情請洽

Centers for Disease Control and Prevention（疾病控制與防治中心）
1600 Clifton Rd., N.E.
Atlanta, GA 30333

媒體採訪：404-639-3286

公眾：404-639-3311

www.cdc.gov

* 衛生部下屬的國立衛生研究院也進行食品安全研究。

美國農業部**

(U.S. Department of Agriculture)(USDA)

食品安全與檢查局 (Food Safety and Inspection Service)

監管

- 國內生產與進口的肉類、家禽及相關產品，例如含肉類或家禽肉的湯料、皮薩餅及冷凍食品。
- 蛋類加工產品（通常爲液態、冷凍和乾燥消毒的蛋類產品）

食品安全權限

執行與國內生產和進口的肉類及家禽產品有關的食品安全法律，具體方式如下:

- 在屠宰之前和之後，檢查食用類動物是否染有疾病。
- 檢查肉類加工廠和家禽屠宰廠。
- 與農業部農業市場行銷服務局共同監視和檢查蛋類加工產品。
- 採集和分析食品樣品，檢查是否有細菌、化學污染物、傳染病菌及毒性物質。
- 制定生產標準，用於監管肉類和家禽產品生產與包裝中食品添加劑和其他成分之使用、工廠衛生、熱處理工序以及其他工序。
- 檢查並確定向美國出口的所有外國肉類和家禽加工廠都達到美國標準。
- 要求肉類和家禽加工廠商自願回收不安全的產品。
- 資助肉類和家禽安全研究工作。
- 教育食品廠商和消費者瞭解食品安全使用方法。

詳情請洽

FSIS Food Safety Education and Communications Staff（食品安全與檢查局食品安全教育與通訊處）
Room 1175, South Building,
1400 Independence Ave., S.W.
Washington, DC 20250

媒體採訪: 202-720-9113

消費者
肉類與家禽熱線電話1-800-535-4555
(首都華盛頓地區，請撥202-720-3333)
聽力殘障者專線: 1-800-256-7072

www.fsis.usda.gov

各州研究、教育與擴展服務合作處 (Cooperative State Research, Education, and Extension Service)

監管

- 所有國內生產的食品以及某些進口食品。

食品安全權限

- 與美國各大學合作，制定以農民和消費者爲對象的食品安全研究與教育計劃。

詳情請洽

各地的擴展服務合作處，列在電話簿藍頁「縣政府」欄下

Cooperative State Research, Education and Extension Service（各州研究、教育與擴展服務合作處）
U.S. Department of Agriculture
Washington, DC 20250-0900
202-720-3029

www.reeusda.gov

國立農業圖書館 (National Agricultural Library) 美國農業部/食品與藥物管理局食品傳染疾病教育資訊中心 (USDA/FDA Foodborne Illness Education Information Center)

監管

- 所有的食品。

食品安全權限

- 管理一個關於防止食品傳染疾病的資料庫，包括電腦軟體、錄音和錄影材料、宣傳招貼、遊戲、教師指南及其他教育資料。
- 幫助教育工作者、食品服務訓練員和消費者尋找防止食品傳染疾病的教育資料。

詳情請洽

USDA/FDA Foodborne Illness Education Information Center（美國農業部/食品與藥物管理局食品傳染疾病教育資訊中心）
Food and Nutrition Information Center
National Agricultural Library/USDA
Beltsville, MD 20705-2351

301-504-5719

www.nal.usda.gov/fnic/

** 美國農業部下屬的其他許多機構也從事食品安全活動。

美國環境保護總署 (U.S. Environmental Protection Agency)

監管

- 飲用水。

食品安全權限

用植物、海鮮、肉類和家禽生產的食品。

- 制定飲用水安全標準。
- 監管毒性物質和廢物，防止它們進入環境和食品鏈。
- 幫助各州監視飲用水品質及尋找防止飲用水污染的方法。
- 測定新殺蟲劑的安全性，制定食品中可容許的殺蟲劑殘餘量標準，並公佈殺蟲劑安全使用指示。

詳情請洽

Environmental Protection Agency（環境保護總署）
401 M St., S.W.
Washington, DC 20460

202-260-2090

各地的EPA辦事處，列在電話簿藍頁「美國政府」欄下

www.epa.gov

美國商業部 (U.S. Department of Commerce)

全國海洋和大氣管理局 (National Oceanic and Atmospheric Administration)

監管

- 魚類和海產品。

食品安全權限

- 經由收費的「海鮮檢查計劃」，檢查漁船、海鮮加工廠和零售商店是否符合聯邦衛生標準，並頒發檢查證書。

詳情請洽

Seafood Inspection Program (海鮮檢查計劃)
1315 East-West Highway
Silver Spring, MD 20910

1-800-422-2750

seafood.nmfs.noaa.gov

美國財政部 (U.S. Department of the Treasury)

菸酒與火器管理局 (Bureau of Alcohol, Tobacco and Firearms)

監管

- 含酒精飲料，但不包括酒精含量低於7%的葡萄酒飲料。

食品安全權限

- 執行與含酒精飲料之生產和流通有關的食品安全法律。
- 調查含酒精產品摻假案件，有時和食品與藥物管理局一起辦案。

詳情請洽

Bureau of Alcohol, Tobacco and Firearms（菸酒與火器管理局）
Market Compliance Branch
650 Massachusetts Ave., N.W.
Room 5200
Washington, DC 20226

202-927-8130

www.atf.treas.gov/alcohol/index.htm

美國海關總署 (U.S. Customs Service)

監管

- 進口的食品。

食品安全權限

- 與聯邦管制機構合作，確保所有貨物在進入和離開美國時都符合美國法規條例的要求。

詳情請洽

U.S. Customs Service（美國海關總署）
P.O. Box 7407
Washington, DC 20044

媒體採訪：202-927-1770

公眾：請接洽當地進口港，列在電話簿藍頁「美國政府，海關」欄下

www.customs.ustreas.gov

美國司法部 (U.S. Department of Justice)

監管

- 所有的食品。

食品安全權限

- 起訴有違反食品安全法律嫌疑的公司及個人。
- 透過美國聯邦保安局，根據法院命令，扣押尚未進入市場的不安全食品。

詳情請洽

美國聯邦檢察官辦公室，列在電話簿藍頁「美國政府」欄下

www.usdoj.gov

聯邦貿易委員會 (Federal Trade Commission)

監管

- 所有的食品。

食品安全權限

- 執行各種法律，保護消費者，防止不公平的、虛假的或欺詐性的行爲，包括虛假和不實的廣告。

詳情請洽

FTC（聯邦貿易委員會）
Consumer Response Center, CRC-240
Washington, DC 20580

媒體採訪: 202-326-2180
聽力殘障者專線: 202-326-2502

消費者: 202-FTC-HELP
(202-382-4357)

www.ftc.gov

州與地方政府

監管

- 其司法管轄區域內的所有食品。

食品安全權限

- 和食品與藥物管理局及其他聯邦機構合作，對本州境內生產的魚類、海鮮、牛奶和其他食品實施食品安全標準。
- 檢查本地司法管轄區域裡的飯店、雜貨店和其他食品零售店，以及奶牛場和牛奶加工廠、穀物加工廠和食品生產廠。
- 禁售（停止銷售）本州境內生產或流通的不安全的食品。

詳情請洽

市、縣和州的衛生、農業及環保機構，列在電話簿藍頁「市、縣和州政府」欄下

(BG 98-7)

附件五、食品安全暨應用營養中心網路資訊

U. S. Food and Drug Administration
Center for Food Safety and Applied Nutrition

美國食品藥物管理局
食品安全暨應用營養中心

食品安全暨應用營養中心

(This document in English) | (Help with Asian Fonts)

概述

食品安全暨應用營養中心 (簡稱CFSAN) 是 FDA 六個分管不同產品的中心之一，與全美國範圍內的地區分支一起共同履行 FDA 的宗旨。FDA是一個科學管理機構，負責全美國內銷和進口食品、化妝品、藥物、生物製品、醫療設備和放射性產品的安全。這個機構是歷史最悠久的聯邦機構之一，主要任務在於保護消費者。FDA 的工作與全美國民眾息息相關，並且對每個人的生活產生直接的影響。該機構是世界公認的食品和藥物領導管理機構，許多國家在改善和監控食品安全時，都曾要求 FDA 提供協助。FDA是美國政府的衛生暨社會福利部 (DHHS) 和公共衛生服務處 (PHS) 的行政分支機構。 *若需要有關 FDA 和 HHS 的詳細資訊，請至：FDA網站，和 HHS網站。*

任務

CFSAN 和 FDA 的現場人員除了共同確保全國食品供應的安全性、衛生、健康性和誠實標示外，還負責確保化妝品的安全正確標示，以期促進和維護民眾的健康。

責任範圍

消費者每消費 1 元，就有 25 分錢是花在 FDA 管理的產品上，而其中用來購買食品的支出就佔了大約 75%。

本中心負責管理銷售於美國各州的 2 ,400 億美元內銷食品、150 億美元進口食品和 150 億美元的化妝品。這樣的管理從產品輸入美國或運至銷售地點時就已開始，範圍遍及大約 50,000 個食品營業所 (包括超過30,000家的美國食品製造商和加工廠，以及 20,000 座以上的食品倉庫) 和 3,500 家化妝品公司。這些數字不包括大約 600,000 家餐廳和公共團體的食品服務單位及 235,000 家超級市場、雜貨店，和其他由州和地方政府機構管理的食品通路商。這些機構都受到 FDA 的指導、適用其標準規範，並且接受 FDA 的其他技術協助，而 FDA 也透過訓練和指導等方式來支援州和地方政府機構，期使 FDA 的計劃更爲落實，貫徹對食品營業所和零售商的各項管理工作。

美國食品工業的產值約佔國民生產毛額的 20%，雇用了 1,400 萬名員工，並且提供相關產業 400 萬個額外的工作機會，在經濟上具有舉足輕重的地位。

在 2000 會計年度裏 (1999 年 10 月 1 日到 2000 年 9 月 30 日)，FDA花在食品和化妝品安全業務上的經費超過2.8 億美元。本中心的主要職責包括：

- 確保食品中各類添加物的安全性，例如食品添加劑 (包括電離輻射) 和色素添加劑。
- 確保利用生物科技開發出來的食品和原料的安全 。

- 海鮮危險分析和重要控制點 (HACCP) 的管理。
- 擬定與食品內化學物質和生物污染物的防治有關的衛生法令及研究計劃。
- 擬定與食品和化妝品的正確標示 (例如成份、營養健康說明等) 有關的法令，並且落實管理工作 。
- 擬定補充食品、嬰兒配方和醫療食品安全等相關管理法令和政策
- 確保化妝品的成份和產品受到安全而且正確的標示。
- 對食品業進行售後監督，以確保符合相關規範。
- 消費者教育與產業升級。
- 擬定與州和地方政府的合作計劃。
- 國際食品標準和安全協調事宜。

雖然美國的食品供應是全世界最安全的，但隨著食品種類和速食產品的增加，關心公眾健康的人士仍然非常注意美國食品供應的安全性。食品業的複雜性更甚於以往，食品製造商也在食品的生產和包裝上運用了更多的科技。由於美國的食品進口比例日益增加，因此 CFSAN 不但與國際組織 (WHO、FAO、Codex) 合作，而且偶而還會直接和外國政府溝通，以便與出口國就國際標準事務進行協調，並且確保這些國家都能瞭解美國的要求。

食品污染源幾乎和污染物本身的數量和變化一樣多，其來源甚至可追溯至收割前的環境，以及在加工、包裝、運輸和備製過程中造成的污染。茲就 CFSAN 目前負責的部分食品安全業務說明如下：

- 生物病原體 (例如細菌、病毒、寄生蟲)
- 自然產生的毒素 (例如黴菌毒素、甲藻魚毒素、麻痺性甲殼類毒素)
- 飲食補充物 (例如麻黃素)
- 殺蟲劑殘留物 (例如戴奧辛)
- 有毒金屬 (例如鉛、水銀)
- 分解和污物 (例如昆蟲殘骸)
- 食品過敏原 (例如蛋、花生、小麥、牛奶)
- 營養品問題 (例如維他命D服用過量、幼兒鐵中毒)
- 飲食成份 (例如脂肪、膽固醇)
- 物理放射性核種
- TSE型疾病 (例如麋鹿的慢性消耗性疾病)
- 產品填充物

法律授權

FDA 的食品和化妝品管理權的法源如下：

- 1906 年聯邦食品藥物管制法
- 1927 年聯邦牛奶進口法
- 1938 年聯邦食品、藥物及化妝品修正法
- 1944 年公共衛生服務法
- 1966 年完整包裝標示法
- 1980 年幼兒配方修正法
- 1990 年營養標示與教育法
- 1994 年補充食品衛生與教育法
- 其他相關法令

有關上述法令的詳細資訊，請至：

- *美國食品安全制度*
- *FDA 執行的法律及其他相關法令*
- *美國食品藥物管制法的歷史里程碑*
- *1906年立法的艱辛奮鬥史*
- *標籤背後的法律典故，第一部*
- *標籤背後的法律典故，第二部*

FDA 在食品方面的管理職責涵蓋所有內銷和進口食品，但肉類、禽肉及冷凍、乾燥和液態蛋由美國農業部 (也就是美國農業部食品安全檢驗處 [USDA]) 負責管理，酒精飲料 (酒精濃度超過 7%) 和菸草的標示由美國財政部煙酒槍砲管理局 (ATF) 管理，而食品中殺蟲劑殘留物的容忍值和飲用水的安全則由美國環保署 (EPA) 負責管理。

FDA 和這些管理機構及美國商業部的國家海洋漁業署、疾病管理防治中心 (CDC)、美國財政部的海關、聯邦貿易委員會 (FTC)、美國運輸部 (DoT)、消費者產品安全委員會 (CPSC) 和美國司法部 (DoJ) 等其他聯邦機構均保持密切的聯繫。FDA 曾多次與上述機構簽訂協議，明確規範各機構之間的職權。*如需有關上述聯邦機構和各州在食品安全方面的詳細職權資訊，請至：*

- *食品安全：團隊途徑*
- *www.FoodSafety.gov*
- *聯邦/州食品計劃*

FDA 負責管理州與州之間販賣的食品，而完全由某一州在其境內製造和販賣的食品則由該州自行管理。食品中心人員與各州的農業和衛生部門合作，共同解決食品安全問題和經濟詐欺案件，例如。*如需有關州管理機構的詳細資訊，請至：*

- *食品安全：團隊途徑 - 州和地方政府*
- *www.FoodSafety.gov：政府機構*

越來越多的國際組織希望與本中心合作，例如食品暨農業組織 (FAO) 和世界衛生組織 (WHO) 轄下的一個國際食品標準建立組織「食品準則委員會」(CAC) 和外國政府，都希望本中心能協助建立獲得國際認可的進口食品安全標準、準則和法令。本中心以往在建立標準時，通常都以美國產品作爲對象，但隨著近幾年來國際條約簽約次數的日益增加，這種情況已有所改變。現在有越來越多的食品在國際市場上交易流通。*如需有關食品準則的詳細資訊，請至：*

- *食品和化妝品的國際活動*
- *FDA的食品準則活動*
- *美國食品準則處*

如需有關 FAO 和 WHO 的詳細資訊，請至： FAO 網站, 和 WHO 食品安全計劃。

雖然 CFSAN 的任務在於保護和促進民眾的健康，但這仍然需要其他機構或相關人員的配合才能有所成效。雖然學術界、健康食品供應商、其他政府機構、受法令規範的業界，以及消費者本身一直在扮演著自己的角色，但今日社會的需求和複雜性更加突顯了這樣的角色配合關係。協作、聯盟、合作或夥伴關係對本中心來說已不陌生。本中心正積極進行具有前瞻性的合作計劃，例如與馬里蘭大學共同成立的食品安全暨應用營養聯合研究所 (JIFSAN)，以及與伊利諾科技研究所共同成立的國家食品安全暨科技中心 (NCFST)。這個中心是在產官學界共同努力下成立的機構，旨在提供重要資訊，使食品的管理更具成效，進而確保食品的安全。*如需有關 JIFSAN 和 NCFST 的詳細資訊，請至：JIFSAN 網站 和 NCFST 網站。*

- *給消費者的資訊*

- *給兒童、青少年和教育工作者的資訊*
- *給老年人的資訊*
- *更多關於婦女健康的資訊*

此外，與各州有關檢查措施的正式協定亦強化了本中心執行公共衛生任務的能力。

FDA 用來確保食品安全的工具

- 檢查營業所
- 樣品的收集與分析
- 進口監控
- 上市前的複檢 (例如食品和色素添加劑)
- 公告計劃 (例如食品接觸物質、幼兒配方)
- 法令/協定 (例如諒解備忘錄)
- 消費者研究、重點團體
- 實驗室研究
    - 研發/改良偵測食品中的病原體和化學污染物的方法
    - 確定食品污染物對健康的影響
    - 確定加工對食品成份的影響
    - 確定飲食因素對健康的影響
    - 研究調查造成生物污染物中毒的因素
- 指導工廠從事食品加工、包裝和生物科技的研究
- 合作行動/技術協助
- 資訊的收集與分析
- 透過教育和公開會議提升相關人員的瞭解程度
- 提供有關中心活動的資訊和發展資料

有關 CFSAN 關於化妝品的職責與活動的詳細資訊

組織

CFSAN 的理事長是 Joseph A. Levitt。Levitt 先生以優異的成績畢業於康乃爾大學，接著又以優異的成績取得波士頓大學法學博士學位。Levitt 先生是 FDA 的專業人員，曾多次獲頒獎項，包括 1992 和 1999 年的最佳經理人獎。Levitt 先生自 1998 年起擔任本中心理事長一職。

本中心員工人數超過 800 名，包括秘書和其他後勤人員，以及化學家、微生物學家、毒物學家、食品科技專家、病理學家、分子生物學家、藥理學家、營養學家、傳染病學家、數學家和公共衛生學家等具有高度專業素養的專家。

本中心的其他部門除了提供消費者、國內外業界和其他外部團體有關現場規劃、機關行政業務、科學分析與支援的服務外，還針對重大食品議題提供政策擬訂、規劃和處理等服務。本中心的大部份員工都在位於華盛頓特區的總部工作，但自 2001 年的秋季開始，大部份的總部員工將調至馬里蘭大學學院園分校 (College Park) 的新辦公室上班。本中心在馬里蘭州的勞瑞爾 (Laurel) 和阿拉巴馬州的多芬島(Dauphin Island) 設有研究機構，其他單位還包括位於馬里蘭大學學院園分校的 JIFSAN 和伊利諾州芝加哥附近的 NCFST。

如需有關 CFSAN 的詳細資訊，請至：CFSAN 網站。

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