洋紫荊胰蛋白酶抑制劑對胰蛋白酶抑制作用之動力學研究

Kinetic Studies of the Inhibitory Effects of a *Bauhinia purpurea* Trypsin Inhibitor on Trypsin

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摘要：植物蛋白酶抑制劑是一種天然的抗蟲防禦性蛋白，藉由抑制昆蟲消化道絲胺酸蛋白酶的活性，抑制幼蟲的生長和發育。在腫瘤抑制，抗寄生蟲和抗生素方面，植物蛋白酶抑制劑具有潛在的應用價值。本研究是從豆科植物洋紫荊(*Bauhinia purpurea*)種子中，利用硫酸銨分(v)(70-90%)、Sephadex G-50 膠體分離管柱、DEAE cellulose 陰離子交 換樹酯及 Trypsin-Sepharose 親和性色層分析法，可純化出洋紫荊胰蛋白酶抑制劑(*Bauhinia purpurea* trypsin inhibitor, BPTI)，以 12% SDS-PAGE 分析，由單一條多肽鏈組成，分子量約 20 kDa，屬於 Kunitz-type 胰蛋白酶抑制劑；對胰蛋白酶活性的抑制作用莫耳數比為 1:1。利用 Lineweaver-burk double reciprocal plot 及 Dixon plots 研究其動力學特性，結果顯示 BPTI 對胰蛋白酶活性的抑制是屬於競爭性抑制作用，抑制常數(inhibition constant，Ki)為 3.82×10^{-8} M。

關鍵詞：洋紫荊、Kunitz-type 蛋白酶抑制劑、抑制常數

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Abstract: Plant protease inhibitors have been studied to determine their mechanism of action against serine proteinases. Such inhibitors also participate in diverse biological activities, including plant storage, cancer protection, parasite inhibition, and bacterial inhibition. Moreover, they form a critical group of defense proteins in plants because of their ability to inhibit serine proteinase digestive enzymes from insects, thereby suppressing larval growth and development. This study presents a Kunitz-type trypsin inhibitor purified from *Bauhinia purpurea* seeds. The purification procedure involved by 70%– 90% ammonium sulfate precipitation, Sephadex G-50 column, DEAE ion-exchange column chromatography,and trypsin-Sepharose 4B affinity chromatography. A molecular weight of 20 kDa and a single polypeptide chain were estimated by 12 % sodium dodecyl sulfate polyacrylamide gel electrophoresis. Kinetic studies demonstrated that the inhibitory effect of BPTI on trypsin can be categorized as competitive inhibition, with the inhibition constant Ki being 3.82×10^{-8} M.

降低供應中心手術盤包不完整率

Project to improved the rate of incomplete surgical apparatus at Central Supply Center

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摘要：手術器械管理不當會影響手術之進行，也影響病人安全同時也降低單位工作效率。專案小組經現況分析發現問題為有器械相似度高、人員經驗不足、字跡潦草、空間狹小造成工作區域混淆，故成立專案小組進行改善，以降低手術盤包不完整情形。本專案旨在提升手術器械管理成效，降低手術盤包不完整率由 5.37%降至 0.84%。於 2012 年 9 月至 10 月執行改善策略，包括：(1)建立器械圖檔資料庫(2)規劃手術盤包相關在職教育(3)向資訊室提出建置 Barcode 系統申請(4)重新規劃工作檯面配置。改善後手術盤包不完整率由 5.37%降至 0.75%，目標達成率為 101.99%。此專案有效降低手術盤包不完整，持續性的品質改善達到零風險的醫療服務，確保病人安全。

關鍵詞：手術器械管理、成效、病人安全

Abstract: Improper surgical apparatus management not only affects the progress of surgical procedures, but also threatens patient safety and reduces the efficiency of the unit. Reasons include high similarity of equipment inexperience staff, scribbled writing and work area confusion caused by narrow apace. Our team developed a project to solve these problems so surgical apparatus management can be improved. This project aimed to increase the effectiveness of

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management of surgical apparatus in order to reduce the incomplete rate of surgical apparatus from 5.37% to 0.84%. The plan, implemented between September and October 2012, included the following components: established a database of drawing instruments, provided surgical apparatus education for staff, proposed the establishment of Barcode Systems to the Information Technology Department, and replannedg the operation desk configuration. After the improvement the incomplete rate of surgical apparatus rate dropped from 5.37% to 0.75%, target achievement rate of 101.99%. The project goal was thus achieved. This project effectivelydrease theincomplete rate of surgical apparatus at our hospital, continuous quality improvements achieve zero risk of medical services and ensure patient safety.

Key words: management of surgical apparatus , effectiveness , patient safety

利用受挫式內部全反射法搭配 Otto 組態激發表面電漿波對花生油之共振角檢測

Using the Optical Frustrated Total Internal Reflection Method with Otto Configuration to Study the Resonance Angle of the Plasma Wave to Peanut oil

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摘 要：本篇論文是利用受挫式內部全反射法搭配 Otto 組態(磷化鎵稜鏡-花生油-銀金屬薄膜層)激發表面電漿波對花生油的量測，並藉由不同銀金屬薄膜層厚度變化進行電腦模擬，找出 Otto 組態激發表面電漿波時之最佳化銀金屬薄膜層厚度，並對整個模擬結果作分析與探討。本研究結果顯示，量測物質花生油在本 Otto 組態的銀金屬薄膜層厚度 330(nm)時，具有最佳化檢測響應;即本研究組態在銀金屬薄膜層厚度 330(nm)時，所產生的表面電漿波具有深且窄的表面電漿波共振角。

關鍵詞：Otto 組態、受挫式內部全反射法、表面電漿波、花生油

Abstract: This paper used frustrated total internal reflection configuration with Otto (gallium phosphide prism-peanut oil-silver metal film layer) excitation surface plasma wave measurements for peanut oil by different silver metal film layer thickness changes in computer simulation to find this Otto machine through a silver metal film layer optimal configuration film thickness of the surface plasma wave. This paper also completed the entire simulation results for in-depth analysis and discussion. The results of this study show the measuring of substances peanut oil of Otto configuration with silver metal film layer thickness of 330 (nm) has the best detection response. Namely, the present study configured in silver metal film layer thickness of 330 (nm) surface plasma waves produced deep and narrow optimal resonance angle of surface plasma wave.

Keywords: Otto configuration, frustrated total internal reflection method, surface plasma waves, peanut oil **.**

聲音刺激下大腦不同區域之自動處理機制反應之研究

A Study of Brain Responses in Automatic Processing Mechanism for Sound Stimuli on Different Regions

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摘要：自從腦電圖(Electroencephalogram, EEG)的發展以來，使得人類瞭解到大腦會因受到外在的刺激影響使大腦有自發電位的變化，人類大腦受到聲音刺激後對於刺激進行不同任務行為之反應，大腦會因為任務產生的行為的不同在大腦電位之波動也產生差異。事件相關電位(event-related potentials, ERP)的運用已成為深入研究大腦心理活動層面的主要方式，運用不同事件刺激方法來獲得多種不同性質的 ERP 成份。在 ERP 成分中的 MMN 失匹配負波是利用標準 Oddball 實驗模式下進行，將所擷取到的偏差刺激 ERP 減去標準刺激 ERP 所獲得之差異波，過去 MMN 被認定為一種對刺激的自動處理的機制。為了解大腦在聲音刺激過程中接受不同任務下，大腦對於聲音刺激之振幅反應會有何種表現。因此本研究設計一套聲音刺激實驗，針對 15 位(平均年齡 23.1 歲)的身心健康的受測者，各別對實驗區段 1 (Inattention)、實驗區段 2 (Attention Button)、實驗區段 3 (Attention Memory)與實驗區段 4 (Attention Button

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Memory)等四種不同任務的實驗，以頻率 1000Hz，60 分貝(dB)的標準聲音刺激，與頻率
1500Hz，60dB 的偏差聲音刺激之條件來對雙耳聲音刺激。結果顯示，在聲音刺激實驗中，
是否對於聲音刺激有無專注狀況下均會有 MMN 之振幅表現。在單純的記憶任務下，使得大
腦在對偏差刺激辨識的參與感受程度降低，而任務過程中配合按按鈕動作反而提升了大腦參
與辨識的感受程度，但會使得按鈕動作反應變慢。

關鍵詞：腦電圖、事件相關電位、失匹配負波、自動處理

Abstract ： The development of the electroencephalogram (EEG) assists in understanding
spontaneous potential change of brain from stimulation. The different brain response generated by
task behavior induces a difference of potential fluctuation in the brain, and the behavior reaction of
the different tasks is created from the brain stimulated by the sound stimulus. The event-related
potentials (ERPs) have become the main way of psychological activity level of brain in depth
research, and they used this method from different event stimuli to obtain a variety of different
types of ERP components. The mismatch negativity (MMN) components of ERPs could be
acquired from the differential wave between deviation stimuli and standard stimuli of ERPs in
standard oddball experiment, and the MMN has been identified as a mechanism of automatic
processing from stimuli in the past research. In order to understand brain mechanism induced by
different tasks, the brain amplitude responses of the sound stimuli react what will be reflected
during the sound stimulation. Thus, the sound stimulus experiments were designed in this study. A
total of 15 healthy participants (the average age of 23.1 years) executed a series of sections in these
experiments. Each experiment includes four different stimuli sections which are inattention section,
attention button section, attention memory section, and attention button memory section. The
standard sound stimulus is the 1000Hz frequency with 60dB, and the deviation sound stimuli is the
1000Hz frequency with 60dB. The results showed that MMN amplitudes were presented obviously
when inattention or attention was included in the sound stimulation experiments. In the task of
attention memory, the brain will be reduced the identification of the extent of sensation. The brain
will be enhanced the identification of the extent of sensation during the action of task with the
pressing button (attention button memory), but it will make the button action slow response.

Keywords: electroencephalogram (EEG), event-related potentials (ERPs), mismatch
negativity (MMN), automatic processing

鑭(Ⅲ)金屬在含吡啶–3,5–雙羧酸根自我組裝三維配位結構：合成及結構

Self-assembly of 3-D Lanthanum(Ⅲ) coordination frameworks based on pyridine-3,5-dicarboxylate: synthesis and structure

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摘　要：高分子聚合物 $[La_2(C_7H_3NO_4)_3(H_2O)_3]_n$ ，包含兩個獨立 La(Ⅲ)離子，三個吡啶-3,5-雙羧酸根陰離子及配位三個水分子，兩個 La(Ⅲ)離子使用吡啶雙羧酸根陰離子當橋鍵形成雙核單元體。每個吡啶-3,5-雙羧酸根陰離子顯示四種連結模式。La1 離子連接九個氧原子分別來自六個吡啶-3,5-雙羧酸根陰離子及兩個水分子，形成九配位四面平方帽四方稜柱形的幾何結構。另一個 La2 離子連接七個氧原子分別來自六個吡啶-3,5-雙羧酸根陰離子及一個水分子，形成七配位 4,4'-雙帽三角錐形的幾何結構。結構中含有典型氫鍵(O—H…O、O—H…N)作用力及非典型的分子(內)間氫鍵作用(C—H…O)，以及吡啶環之間的 π-π 吸引力，[其中心最近距離為 3.7749 (15)Å ，兩芳香環的雙面角為 5.78 (12)°]。

關鍵詞：水熱合成、吡啶-3,5-雙羧酸、鑭(Ⅲ)-錯合物、氫鍵

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Abstract：The polymer compound, $[La_2(C_7H_3NO_4)_3(H_2O)_3]_n$, contains two independent La^{III} ions, three pyridine-3,5-dicarboxylate anions and three coordinated water molecules in which two La(III) ions are bridged by carboxylate and forms dinuclear unit. Each pyridine-3,5-dicarboxylate anion affords a four-connecting nodes. Around nine-coordinated La_{III} cation (La1) is completed by nine oxygen atoms from six pyridine-3,5-dicarboxylate and two aqua, forming a square-face capped square antiprism. Other seven-coordinated La_{III} cation (La2) is coordinated with seven oxygen atoms from six pyridine-3,5-dicarboxylate and one aqua, forming a 4,4'-bicapped trigonal prism. There are classical hydrogen bondings (O—H···O and O—H···N) and weak non-classical hydrogen bondings (C—H···O) is observed in the crystal structure. The crystal structure is further consolidated by π···π stacking between nearly parallel pyridine rings of adjacent pyridine-3,5-dicarboxylate ligands [shortest centroid–centroid distance between π···π is 3.7749 (15)Å , dihedral angle = 5.78 (12)°].