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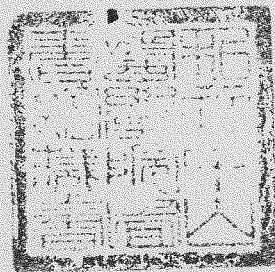
私立中山醫學院
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腦下腺前葉同種移植誘發慢性血泌乳素過高症
在雄性大白鼠對低溫束縛條件下引發胃潰瘍之保護效應

Protective Effect of Chronic Hyperprolactinemia
Produced by Pituitary-Homografts on Cold-Restraint
Stress induced Gastric Ulceration in Male Rats

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本論文為中山醫學院授與理學碩士學位必備條件之一，
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中文摘要

本實驗係利用同窩動物提供的腦下腺前葉而接種到另一同性別的大白鼠腎被膜內以誘導成慢性血泌乳素過高症 (Chronic hyperprolactinemia) 之實驗模式，來探討其對於低溫束縛壓力條件下所造成胃潰瘍程度。選用體重為 240 ± 20 g 之 Wistar 品系雄性大白鼠，將其分為兩組：一組動物乃在其腎被膜內接種來自同一窩另二隻動物之腦下腺前葉當作實驗組，另一組動物則在其腎被膜接種若干肌肉片當作對照組。移植後之動物繼續飼養於人工照光環境 (14 小時光，10 小時暗) 及室溫 $24 \pm 2^\circ\text{C}$ 之調控室內，並讓其自由進食及飲水。

實驗 I：不論實驗組和對照組動物，在移植時和移植之後每隔 5~10 天，分別以乙醚輕度麻醉並經由頸靜脈採血。利用放射免疫法測定血清中泌乳素 (Prolactin; PRL) 濃度，結果實驗組在移植後第 5 天到第 40 天期間與對照組相比較，實驗組血清泌乳素含量呈現顯著的增加 ($p < 0.05$ 或 $p < 0.01$)。

實驗 II：同上處理方式一樣分為實驗組與對照組，不同的就是移植後之期間不採血而繼續飼養到第 40 天再做如下處理，即將移植後第 40 天之大白鼠先令其絕食 24 小時，再以仰

臥姿勢固定於木板上並暴露於低溫（5°C）環境中約3小時。結果發現實驗組與對照組胃潰瘍出血點數分別為12.5±1.2和23.0±2.9，統計上呈顯著差異（ $p < 0.05$ ），胃潰瘍總長度則分別為3.03±0.4 mm和5.98±1.0 mm，統計上呈顯著差異（ $p < 0.01$ ）。

實驗III：將移植後第40天之大白鼠，應用Shay氏幽門結紮法，結紮6小時後即進行兩組有關胃液各種資料之分析，就以每百克體重胃液分泌量、胃液內游離鹽酸度及總酸度含量計之，在實驗組與對照組比較，結果無顯著之差異。

根據上述之結果而推測，腎被膜接種有腦下腺前葉之大白鼠，暴露於低溫束縛壓力環境中所造成輕微的潰瘍程度與胃酸分泌量似無關連性。在文中曾對胃黏膜保護作用與潰瘍程度減輕之關連性有所討論，至於詳細的作用機轉尚有待更進一步探討。

關鍵字：血泌乳素過高症；低溫束縛壓力；多巴胺；胃潰瘍

Abstract

An investigation was undertaken to study the effect of Chronic hyperprolactinemia induced by pituitary homograft underneath the kidney capsule on the induction of gastric ulceration in standard model using cold-plus-restraint stress. Male Wistar strain rats weighing $240 \pm 20\text{g}$ were divided into two groups: one received two pieces of anterior pituitary gland from its littermates, the other grafted with several pieces of muscle served as control. Rats were housed in a temperature-controlled room ($24 \pm 2^\circ\text{C}$) with a regular lighting schedule (14 hrs on; 10 hrs off). Laboratory chow and tap water were available at all times.

Experiment I : For both pituitary-grafted group and control group, blood samples were withdrawn from jugular vein before transplantation and at an interval of 5 ~ 10 days after transplantation under light ether anesthesia. Serum prolactin was measured by radioimmunoassay. From the 5th day to the 40th day after transplantation, the level of serum prolactin in the pituitary-grafted group was higher than those

of control ($p < 0.05$ or $p < 0.01$)

Experiment II : Rats were also divided into two groups as above, except that no blood samples were collected during the period of 40 days after grafts transplantation. On the fortieth day after transplantation, all rats in this experiment II were fastened overnight. All rats were restrained and placed supine in a ventilated refrigerator with an ambient temperature of 5°C for 3 hrs. Gastric ulceration was induced. These results showed that the number of ulcers was lower in pituitary grafted group (12.5 ± 1.2) than that in control group (23.0 ± 2.9) ($p < 0.05$), and the total ulcer length (mm) was lower in pituitary grafted group (3.03 ± 0.4 mm) than that in control group (5.98 ± 1.0 mm) ($p < 0.01$).

Experiment III: On the fortieth day after transplantation, the pylorus of rats had been ligated for 6 hours with modified Shay's method, in order to analyze various data concerning their gastric juice. According to our finding, the data of gastric secretion, free HCl and total acidity of gastric juice were not significantly different in both groups.

According to these findings, we could say that hyperprolactinemia induced by grafting two pieces of anterior pituitary glands beneath the kidney capsule might be related to the reduction of gastric ulceration, but the attenuated degree of ulceration was not directly related to the inhibitory action of gastric acid secretion. Hyperprolactinemia related to the protection of gastric mucosal was also discussed in this study. More detailed mechanism for such relation remains to be clarified.

Key Words: Hyperprolactinemia; Cold-restraint stress; Dopamine;
Gastric ulcer

前言

成熟雄性大白鼠之腎被膜內植入外源的腦下腺前葉，經飼養一段時間，體內循環血液中泌乳素（Prolactin, PRL）呈現出增加的情形^(2,3,13,14,17,36,41,58,60,62)，此種過程乃是一種有效誘導體內生成慢性血泌乳素過高症（Chronic hyperprolactinemia）之實驗模式⁽¹⁾。泌乳素是由腦下腺前葉所分泌，一般認為其受下視丘釋放的多巴胺（Dopamine, DA）所調節。有實驗結果指出，多巴胺由下視丘管狀漏斗神經元（Tuberoinfundibular Neurons, TIDA）分泌，進入腦下腺門脈系統（Hypophysial portal system）直接抑制腦下腺前葉泌乳素之分泌^(19, 35)。早期之研究證明多巴胺⁽¹⁷⁾或多巴胺催動劑（DA agonist）⁽⁶⁾可直接作用腦下腺抑制泌乳素釋放。還有將多巴胺直接灌注於腎動脈，可使腎被膜移植片釋放之泌乳素減少⁽¹²⁾。由上述之證據指出下視丘神經元所釋放的多巴胺，被認定是泌乳素抑制素（Prolactin inhibitory Factor, PIF）之最有力因子^(7,42)。

Boyd等人⁽⁸⁾於1976年最先以低溫束縛方法誘導大白鼠產生胃潰瘍為動物實驗模式，往後甚多學者^(11,22,29,33,39,46)即應用此種模式於生理病理和藥理上探討胃潰瘍之成因。針對壓力形成

之胃傷害與多巴胺居中之角色探討亦有多位學者提出報告，諸如，在缺氧束縛壓力（Hypoxia-immobilization stress）之條件下，小劑量多巴胺給予靜脈注射則胃黏膜糜爛的情形呈現出有意義的降低⁽³⁸⁾，類似的報告指出動物處於束縛之壓力環境中，多巴胺催動劑亦具有抗胃潰瘍之效應⁽²⁰⁾。經由大腦腦室予以注射微量之多巴胺或多巴胺催動劑均可降低因低溫束縛壓力（Cold-Restraint stress）造成之潰瘍嚴重程度^(53, 54)。相對的研究報告指出，利用多巴胺拮抗劑（DA antagonist）如Haloperidol 不論是中樞微量注射或腹腔注射時會加劇潰瘍之發生⁽²⁰⁾。另外又有學者^(53, 63)由實驗結果推論，中樞存有之多巴胺接受體（DA receptor）具有調節胃黏膜完整之功能。

從這些報告乃暗示腦內多巴胺在動物面對低溫束縛壓力條件下對胃壁執行保護作用上乃扮演重要之任務，而本研究之動物在腎被膜接受腦下腺前葉之移植，待血中泌乳素升高時，其下視丘腹內側核處多巴胺神經元活性（DA activity）大增，已有若干文獻^(5, 25, 30)獲得證明。據此推測該動物除在腦內該區域之外，其他部位^(26, 49, 52, 53, 54)，尤其是後基底外側杏仁核（Posterior Basolateral amygdala）⁽⁵⁰⁾多巴胺神經元活動性亦可能有變動，而此區域多巴胺神經元運作乃參與胃黏膜維持

完整性有關。

本實驗嘗試利用腎被膜下接種腦下腺前葉來誘發雄性大白鼠使其體內有較長時間維持血泌乳素過高狀態，先建立這種動物模式，然後研究此種內分泌環境改變之雄性大白鼠暴露在低溫束縛之環境中，是否會改變胃潰瘍發生之效應，若有所改變，再對胃液內所含的酸性成分加以分析以檢討其與高泌乳素血症之動物發生胃潰瘍改變之可能關係。

材 料 與 方 法

一、動物移植

本實驗使用的動物體重為 240 ± 20 g 之 Wistar 品系雄性大白鼠，將其分成兩組：實驗組動物是在其腎被膜接受同窩 2 隻雄鼠提供之腦下腺前葉移植片；對照組動物則在其腎被膜接受肌肉片移植。茲將移植全程步驟敘述如下：兩組動物均在輕度乙醚麻醉下，切開左側脊柱與最後一根肋骨對角線下皮膚及肌肉層，暴露出左腎，接著用小鉤針將局部腎被膜撕成一小裂隙，同時亦自 2 隻同窩雄鼠斷頭後所剝離出的腦下腺前葉或肌肉片藉用鈍頭小鑷子經該裂隙推擠到腎被膜下之遠心夾層，爾後，小心地將腎臟滑至腹腔中，待縫合肌肉及皮膚後移植手術即告完成。接受移植後之兩組大白鼠飼養於人工光照時間即 14 小時光照，10 小時黑暗（照光時間為上午 5 時到下午 7 時），室溫為 $24 \pm 2^\circ\text{C}$ 之環境中給予自由進食及飲水，直到進行下一步各項實驗為止。

動物腎被膜內額外腦下腺前葉移植成功與否之判斷，乃依據移植後第 40 天犧牲動物之同時摘取之左腎，於實體顯微鏡下檢視腦下腺移植片之生長情況，做為實驗動物最後數據

之取捨。

二、血中泌乳素測定之前處理

移植手術前及移植後之兩組動物每隔5~10天（早上0930到1130），各別在輕度乙醚麻醉下，經由頸靜脈抽血一次直到第40天。每次採血量為0.5 ml，抽取之全血隨即在室溫下靜置待其自然凝固後，轉置於低溫（15℃）調控的離心機（CHERMLE model ZK380）3000 rpm離心30分鐘，分離出之血清則保存於-70℃冷凍櫃中，直到使用放射免疫檢定法（RIA）來定量泌乳素時才取出。

三、血清泌乳素濃度測定（放射性免疫檢定法）

將血清與 0.1 % Gelatine-PBS 混合，再與第一抗體（Anti-Rat PRL-S-8）及放射性碘標幟物的泌乳素在4℃共同培養48小時後，加入第二抗體（Sheep Anti-Rabbit-Gamma-Globulin, ARGG）繼續培養48小時，再加入2 ml磷酸鹽緩衝液（PBS,pH 7.0），2500 rpm離心30分鐘，捨棄上清液，利用自動伽瑪計數儀（PHARMACIAA model 1277 Gamma-Master）檢測管內的放射性。最後經Log-Logit轉換，計出泌乳素之濃度。



註：1.血清泌乳素放射免疫測定係在陽明醫學院生理所王錫崗教授實驗室完成。有關測定所需材料包括高純度泌乳素（Rat PRL-I-5），標準泌乳素（Rat PRL -RP-3）及第一抗體（Anti-Rat PRL-S-8）[由美國NIDDK（National Institute of Diabetes, Digestive and Kidney Disease之National Hormone and Pituitary Program）提供]。

2.第二抗體（Sheep Anti-Rabbit-Gamma-Globulin，ARGG）係王錫崗教授實驗室自製。

四、胃潰瘍誘發之處理（低溫束縛法）

移植後飼養到第40天之各組大白鼠，經24小時絕食後，再令該動物依仰臥姿勢將四肢固定於木板上（見圖1），然後置入保持在5°C之低溫調控箱（Forma Scientific inc. USA. Model 3920）（見圖2）中3小時，爾後犧牲動物摘出全胃，接著以37°C生理食鹽水沖潤後，再浸入10%福馬林（Formalin）溶液中2分鐘，然後用剪刀沿胃大彎切開並以生理食鹽水沖洗之，最後置於濾紙上以實體顯微鏡（Nikon SMZ-1 JAPAN）（圖3）進行胃潰瘍部位之檢測並加以記錄。

五、潰瘍指標之測定

以實體顯微鏡檢視記錄胃壁之出血點數及測量每一潰瘍點之長度。

六、胃液分泌之測定法

將實驗組與對照組動物，分別在移植後第40天，令其絕食24小時後（水分則自由攝食），依Shay氏幽門結紮法⁽⁵⁵⁾，剝開腹部裸出幽門部位，以縫合線將幽門結紮，隨即縫合腹部，放置6小時之後（禁水）再將腹部剝開，以夾子夾住賁門取出全胃，將胃內容液傾入燒杯內並以量筒測量其容量，（胃液分泌量以ml/100g體重表示）。取得之胃液以離心機2000rpm 15分鐘離心，將離心所得上清液10ml放置於燒杯內，先滴入2滴下列試劑：A) 0.5% Dimethyl aminoazobenzene alcohol solution. B) 1% Phenolphthalein alcohol solution, 接著再用1/10 N的NaOH來滴定。當溶液變成橙黃色時記錄其滴定量為A ml，再繼續滴定至溶液變成黃色時，記錄其總滴定量為B ml，然而再繼續滴定至溶液變成薔薇色時，記錄其總滴定量為C ml。 $A \times 10 =$ 游離鹽酸度 (Free HCl)。 $[B + (C - B) / 2] \times 10 =$ 總鹽酸度 (Total HCl)。 $C \times 10 =$ 總酸度 (Total acidity)。酸度的單位為mEq/ml。

七、統計方法

本研究之實驗組和對照組所測得各項資料，包括血清泌

乳素濃度、潰瘍指標、胃液分泌量、游離鹽酸度和總酸度，均以平均值加減標準誤差（Mean±SE）表示，兩組間之比較乃使用Student's t-test統計， $p < 0.05$ 或 $p < 0.01$ 即為統計上顯著性差異。

結果

一、血清泌乳素濃度在整個實驗期間之變動情況

接受腦下腺前葉移植之實驗組動物，在移植前，從其頸靜脈採得之血清泌乳素濃度為 17.1 ± 2.9 ng/ml($n=7$)，與對照組之血清泌乳素濃度 12.8 ± 1.7 ng/ml($n=8$) 相比較無顯著的差異。移植後第 5 天，對照組泌乳素濃度即上升為 29.0 ± 4.4 ng/ml，此濃度一直到第 40 天皆維持於一定水平。實驗組動物在移植後第 5 天測得血清泌乳素濃度為 63.5 ± 11.5 ng/ml，與對照組比較則有統計上的差異出現 ($p < 0.05$)。移植後第 10 天則循環血液中泌乳素含量遽增且為對照組之 7 倍，爾後一直保持於高血泌乳素之狀態。實驗組在移植後第 10、15、20、30、40 天之期間均較對照組呈現顯著的增加，統計上呈顯著差異 ($p < 0.01$ 或 $p < 0.05$) 見圖 4。

二、潰瘍指標之測定

潰瘍指標包括胃出血點數和潰瘍總長度。實驗組與對照組動物分別置於 5°C ，3 小時所造成胃黏膜損傷，由表 1 中顯示出實驗組與對照組之胃出血點數分別為 12.5 ± 1.2 ($n=12$) 和 23.0 ± 2.9 ($n=11$)，兩者在統計上呈現顯著差異 ($p < 0.05$)，潰瘍

總長度則分別為 $3.03 \pm 0.4 \text{ mm}$ ($n=12$)和 $5.98 \pm 1.0 \text{ mm}$ ($n=11$)，兩者統計上亦呈現顯著差異 ($p < 0.01$)。從實驗組較對照組之潰瘍指標為低觀之，實驗組潰瘍程度確有減輕的現象。

三、胃液之分析 (利用 Shay 氏幽門結紮法)

移植後第40天之動物，經幽門結紮，6小時後摘出全胃進行胃液分析，結果如表 2 所示，每百克體重胃液分泌量 ($\text{ml}/100\text{g B.W.}$)，胃液中游離鹽酸度和總酸度 (mEq/ml)，在移植實驗組及對照組之間並沒有顯著差異。

討 論

引發動物血中長時間維持高泌乳素濃度之途徑不外乎包括內分泌操縱法 (Endocrinological manipulation) 和藥理操縱法 (Pharmacological manipulation)⁽⁴³⁾，前者誘導法乃採用腦下腺移植或注射泌乳素 (Prolactin, PRL)，後者誘導法乃利用藥物注射，如多巴胺拮抗劑 (Dopamine antagonists)。從以上數種可誘導出血泌乳素過高症 (Hyperprolactinemia) 之實驗模式中；①大白鼠腦下腺摘除之自體移植 (Autograft)，雖可避免排斥之發生，但在實驗進行中動物正常之生長會受到阻礙⁽¹⁶⁾，並且一些其他的腦下腺激素亦見減少^(24, 48)。②採用腦下腺腫瘤 (pituitary tumor) 移植法⁽⁹⁾，不僅會有泌乳素過度分泌之顧慮，亦影響到動物正常生長⁽¹⁸⁾。③外源性羊之泌乳素 (Ovine PRL) 進行較長時間注射，可能引起免疫排斥現象發生⁽³²⁾。④使用藥物誘導方法，如 Haloperidol (為多巴胺拮抗劑) 處理，雖可誘發動物形成高泌乳素血狀態，但藥物本身具有引發胃損傷之效應^(53, 56)，此與本實驗探討之目的相違背。⑤正常大白鼠之腎被膜接受同窩大白鼠腦下腺前葉之同種移植 (Homograft)，此模式誘導血清泌乳素濃度增加之同時，實驗動物之成長、生長激素分泌和甲狀腺功能皆

不受影響，可謂為誘導動物形成血泌乳素過高症之有效實驗模式⁽¹⁾。居於上述模式中各種情況之考慮以及避免移植片之排斥現象發生，唯腦下腺同種移植乃為本實驗所採用。

腦下腺前葉移植到腎被膜一段時間後，該移植片能分泌相當可觀的泌乳素，此乃眾所周知。由圖4得知接受同窩兩隻雄鼠腦下腺前葉移植之雄鼠，在40天實驗期間，其血中呈現出高濃度泌乳素之變動。從這變動中得知，移植後第5天起就可測得血清泌乳素含量，與對照組相較呈現有意義的增加——此結果和Chang⁽¹⁰⁾的報告相類似，自此以後一直到第40天為止，循環血中泌乳素含量皆保持在高濃度狀態（約為對照組之7~8倍），這充分表示本實驗正常雄鼠之腎被膜接受腦下腺同種移植後在40天實驗期間，體內呈現出慢性血泌乳素過高症（Chronic hyperprolactinemia），此發現又與過去McNeilly等人⁽⁴⁰⁾所觀察的幾乎有一致性。

動物置於低溫束縛條件下所形成胃潰瘍之實驗模式，從最初Boyd等人⁽⁸⁾建立至今已有多數年，並常為其他許多學者應用於探討其生理病因。本研究模擬其法採用5°C低溫加上束縛3小時之條件，可讓正常的動物同樣產生顯著胃潰瘍模式。現本研究將得有慢性血泌乳素過高症動物置於前所設定低溫束

縛條件下來觀察其胃壁所遭受的腐蝕程度究竟如何？由表1結果顯示，移植實驗組之潰瘍指標，不管是胃黏膜出血點數或潰瘍總長度皆較對照組呈現有意義顯著的降低，據此推論雄性大白鼠體內處於慢性泌乳素高血症狀態下具有減輕胃潰瘍發生之作用。接著爲了探討減輕胃潰瘍作用是否起因於胃液分泌減少，本研究再利用幽門結紮式方法採集兩者的胃液分泌量以作比較，從表2結果得知實驗組潰瘍程度之減輕作用並非由胃液分泌減少之所致。

Ray 和 Henke⁽⁵⁰⁾ 已證實在大白鼠腦內雙側杏仁核複合體 (amygdaloid complex)，〔尤其在後基底外側杏仁核 (posterior basolateral amygdala)〕施予微量多巴胺或多巴胺催動劑 (如 Bromocryptine) 注射後，對於低溫束縛之壓力 (4°C, 3小時) 所誘發的胃潰瘍乃具有減輕作用，由此推測在腦內後基底外側杏仁核區域，多巴胺神經元運作機轉在動物遭受低溫束縛壓力期間乃負有保護胃壁完整的任務。另外僅應用束縛壓力造成胃潰瘍當做實驗模式，並以多巴胺所居的角色作爲探討的研究報告茲簡述如下，例如將腹腳蓋區 (Ventral tagmental area) 和部分黑質 (Substantia nigra) 予以毀損，會加劇壓力所造成的潰瘍⁽⁵¹⁾。有報告指出杏仁核複合體 (因

接受來自前述兩處多巴胺神經元之投射) 含有甚多的多巴胺接受體，在腦內杏仁核中內側 (centromedial nuclei of amygdala) 施予多巴胺注射，對於壓力所形成潰瘍具有減輕作用，然而多巴胺拮抗劑注射則會有加劇潰瘍的效應發生^(53,54)。基於上述各種報告，腦內多巴胺在遭受低溫束縛或束縛壓力期間，的確是一種保護胃黏膜完整之重要關鍵物^(28,57,59)，所以有學者言之，多巴胺在調節胃潰瘍病生理上是一種重要的神經修飾物 (neuromodulator) ^(21,23,27)。

血中泌乳素增高，對腦內多巴胺神經元活性影響有若干文獻之報告^(5,25,30)，但在腦內所影響部位僅限於下視丘腹內側之管狀漏斗多巴胺神經元 (Tuberoinfundibular dopamine neurons of ventromedian hypothalamus)，諸如全身性重複注射泌乳素^(4,34)或腦室內注入微量泌乳素⁽⁴⁵⁾或是腦下腺移植到腎被膜內^(15,31,37,44,45,47,61)後均可增高血中泌乳素的濃度，並在正中隆凸—弓狀核 (Median eminence- arcuate nucle) 增加多巴胺之轉變率 (turnover rate) 及提高酪氨酸水解酶 (Tyrosine hydroxylase) 活性。同時亦有學者⁽⁵⁰⁾在該等條件下，發現下視丘垂體門脈血管內多巴胺濃度亦呈顯著的增加，此等結果乃表示血中泌乳素濃度提高會引發下視丘腹內側弓狀核內加

強多巴胺神經元活動性，但這只是內分泌—神經迴饋系統（Hormonal-Neural feedback system）爲了達成調控血中泌乳素濃度，儘可能保持於適當範圍所擔負的任務，然而與胃腸壁機能並無關連性。

今依據本研究，實驗組動物可發現其血中維持有高濃度之泌乳素乃有一段較長的時間，突然間令其面對低溫束縛壓力條件下，所顯現胃壁潰瘍程度確有明顯的減輕，雖然無法證明高泌乳素血症與潰瘍程度減輕之間有任何直接的關係，但從腦內有些區域多巴胺神經元機制在低溫束縛壓力期間對胃壁保護作用所扮演的角色來看，本實驗組有必要進一步找出其間關係。換言之，去探討腦內各分區，尤其是在杏仁核複合體內多巴胺神經元運作的情形。

總結：內因性血泌乳素過高狀態之動物，確實具有減緩低溫束縛壓力造成潰瘍發生之效應，其保護作用可能經由體內多重的保護機制進行調節，詳細之作用機轉尚有待更進一步的探討。

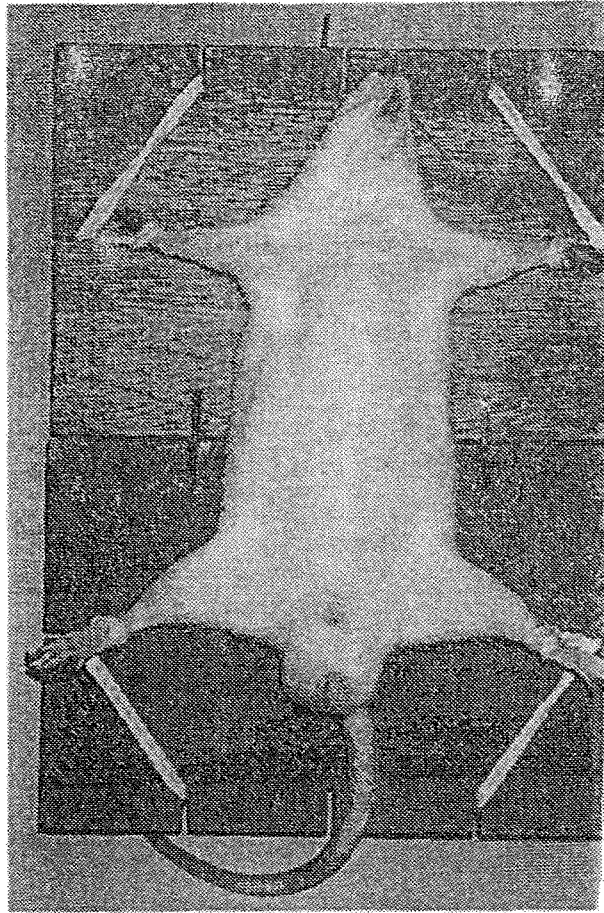


圖 1：大白鼠仰臥姿勢束縛之情形。

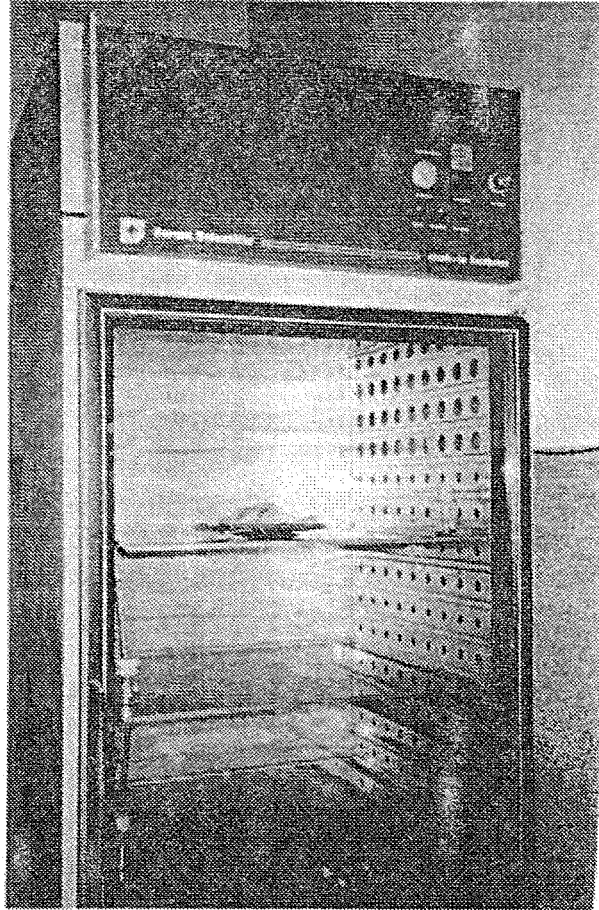


圖 2：大白鼠置於溫度調控 (5 °C)
箱內誘發胃潰瘍發生之實驗情形。

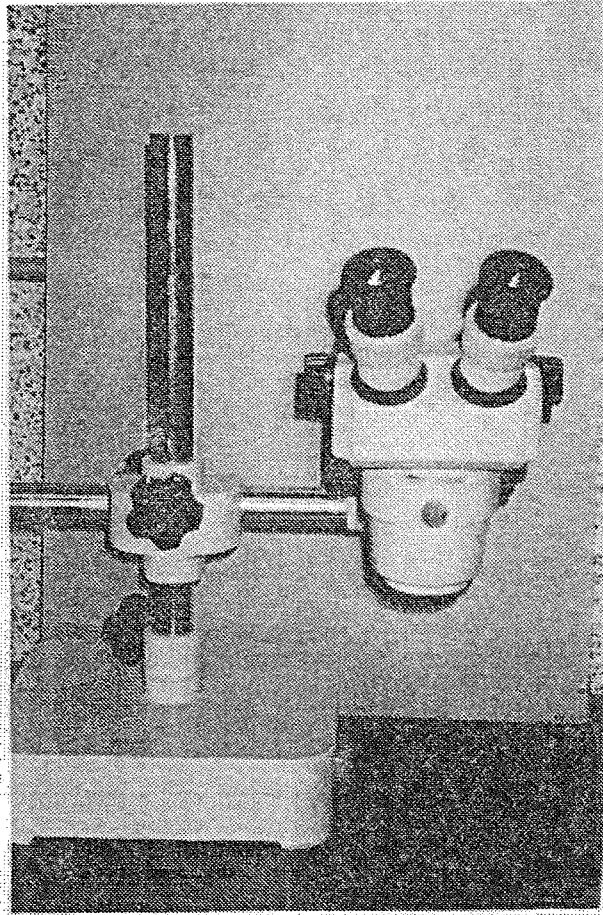


圖 3： 檢測胃潰瘍用之實體顯微鏡外觀。

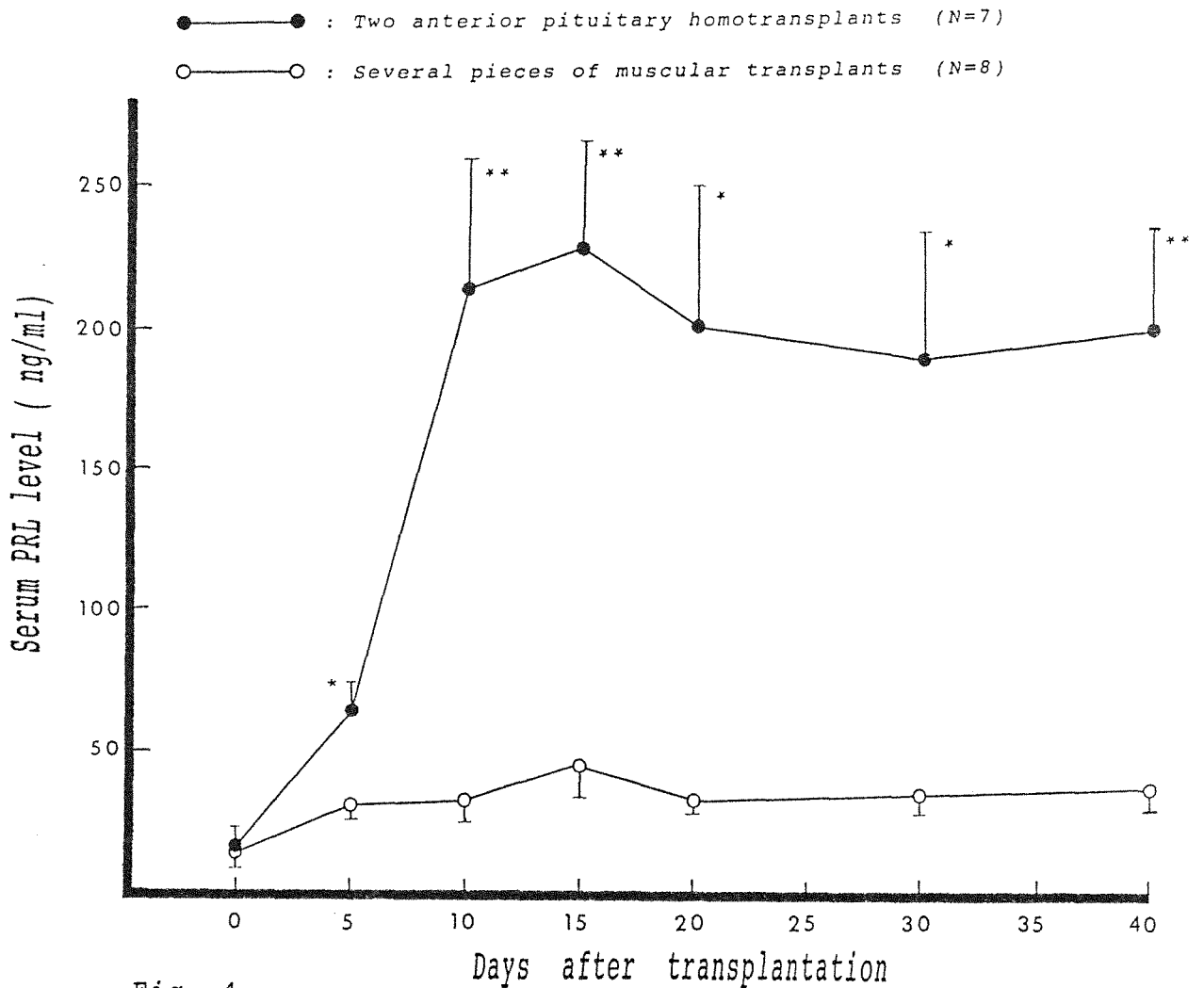


Fig 4.

Changes in serum prolactin (PRL) level in both intact mature male rats bearing two anterior pituitary homografts and several pieces of muscle underneath renal capsule during the period of 40 days after transplantation. Blood sample were collected from jugular vein at prior to and during 5-10 days interval after transplantation with under light ether anesthesia between 0930-1130 h. Each point and vertical bar represents the MEAN and SE, respectively. Numbers in parentheses indicate the number of rats in each group.

* $p < 0.05$ vs control

** $p < 0.01$ vs control

圖 4：
接受腦下腺前葉移植之實驗組和接受肌肉片移植之對照組，其血清泌乳素濃度在整個實驗期間之變動情況。

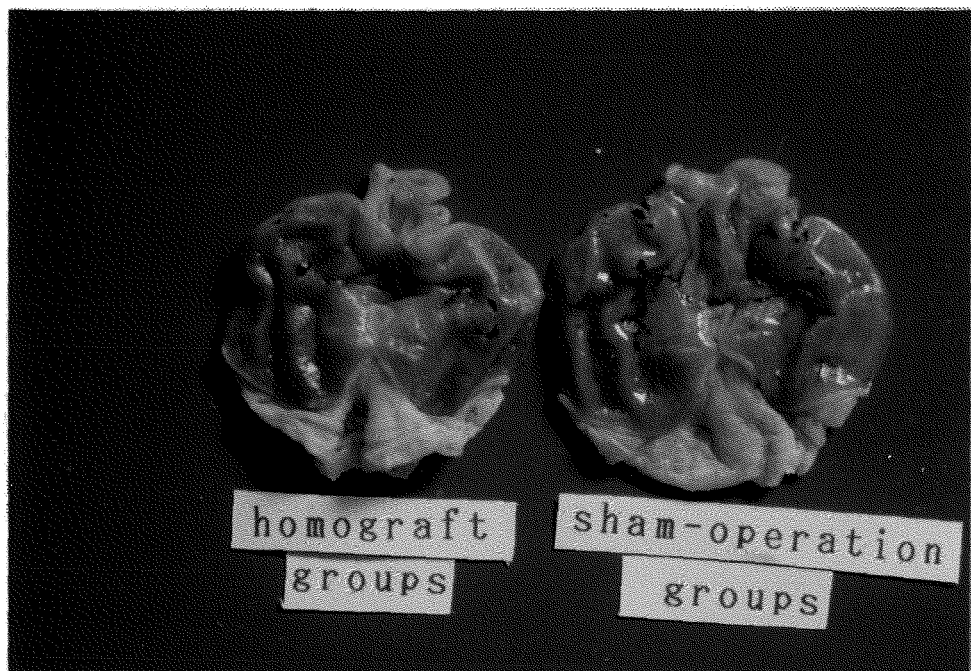


圖 5：
腦下腺移植實驗組與肌肉片移植對照組置於
低溫(5 °C)束縛條件下產生胃潰瘍外觀之比較。

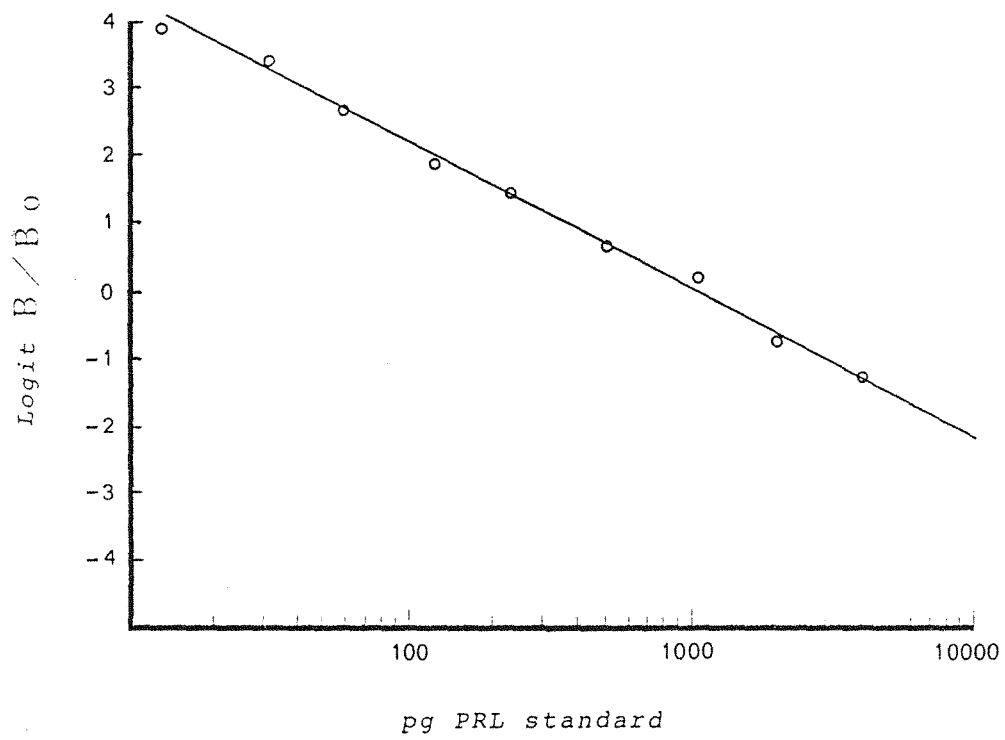


Fig 6. Dose-response curve for rat PRL standard after a logit-logarithmic transformation

圖 6：經對數轉換之標準大白鼠泌乳素之劑量—反應圖。

Table 1 :Comparison of gastric ulceration index between sham-operated and two pituitary-homografted rats induced by cold-restraint stress

Gropus	No. of rats	No. of Ulcers	Total ulcer length (mm)
Sham grafts	11	23.0±2.9	5.98±1.0
2 AP grafts	12	12.5±1.2 *	3.03±0.4 **

The values are the means \pm SE

A P : Anterior pituitary

** p <0.01 when compared with Sham-operated rats.

* p <0.05 when compared with Sham-operated rats.

表 1 : 移植實驗組和對照組在低溫束縛壓力條件下胃潰瘍指標之比較。

Table 2: Comparison of secretory volume, Free HCl and Total acidity in the Gastric juice of pylorus Ligated rats bearing two pituitary homografts or several pieces of muscle under the renal capsule.

Groups	No. of rats	volume of Gastric secretion (ml/100gm B.W.)	Free HCl (mEq/ml)	Total acidity (mEq/ml)
Sham grafts	9	# 3.30 ± 0.39	60.4 ± 4.9	105.8 ± 6.3
2 AP grafts	8	3.27 ± 0.36	59.2 ± 5.3	100.5 ± 6.4

: Mean ± SE

B.W.: Body Weight

gm : gram

A P : Anterior pituitary

表 2 : 移植實驗組和對照組胃液分泌之比較

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論文摘要
Abstracts

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241 PITUITARY HOMOGRAFTS MAY ALLEVIATE THE GASTRIC
ULCERATION INDUCED BY COLD-PLUS- RESTRAINT
STRESS IN THE MALE RATS. J.-C. Shyu^{*}, J.-M.
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and Dental College, Taichung, Taiwan, R. O. C.

An investigation was undertaken to study the effect of elevated serum prolactin level sustained by pituitary Homograft underneath the kidney capsule on induction of gastric ulceration in a standard model using cold-plus-restraint stress. Male wistar rats weighing 230-250 g, were divided into two groups: one received a pituitary gland from its littermates, the other grafted with several pieces of muscle served as control. On 40th day after transplantation, all rats (an average body weight of 325gm) were restrained and placed supine in a ventilated refrigerator with an ambient temperature of 5°C for 3 hrs. Then, rats were immediately sacrificed and stomachs were removed and fixed in formalin. They were cut along the greater curvature and rinsed with a saline solution at 37°C, pinned to a cork board. The ulcer indexes (including total number and length of gastric mucosal ulceration) showed lower in pituitary-grafted group (12.5 ± 1.28 , 3.03 ± 0.49) than in control group (23.0 ± 2.91 , 5.98 ± 1.05). There was significant difference of ulcer indexes between two groups ($p < 0.05$). It has been well-established that the anterior pituitary gland, which was transplanted under the kidney capsule, could secrete greater amount of prolactin. These results suggest that elevated serum PRL level may be related to the reduction of gastric ulceration. More detailed mechanism for such relation remains to be clarified.