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with Depression

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憂鬱症患者尿中新喋呤與生喋呤之分析

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## Original Article

### Urinary Neopterin and Biopterin Levels in Patients with Depression

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This study was designed to test the hypothesis that depression is related to tetrahydrobiopterin (BH<sub>4</sub>) dysregulation, and to determine if the activity of depression is associated with changes in urinary neopterin levels. Metabolites of BH<sub>4</sub>, neopterin and biopterin were determined by reverse-phased high-performance liquid chromatography with fluorometric detection to evaluate the metabolism of BH<sub>4</sub>. Urine from 26 patients with active depressive symptoms and 45 normal control subjects were determined. The results showed that the urinary biopterin level in depressed patients ( $635 \pm 281$  nmol/mmol creatinine) was similar to that in controls ( $614 \pm 267$ ) ( $p < 0.05$ ), while the neopterin level was significantly lower in acutely depressed patients ( $441 \pm 261$ ) compared with controls ( $604 \pm 318$ ); ( $p < 0.05$ ). Twelve of the depressed patients also had their urine analyzed when they returned to a remission phase. The urinary neopterin level tended to increase along with the improvement of depressive symptoms ( $360 \pm 203$  vs.  $576 \pm 181$ , paired t test,  $p < 0.02$ ). The significance of changes in the urinary neopterin level in depression deserves further exploration.

Key words: depression, tetrahydrobiopterin, neopterin, biopterin  
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#### Introduction

Tetrahydrobiopterin (BH<sub>4</sub>) metabolism in patients with depression has been studied by various groups of investigators in an attempt to identify its relationship with depression. BH<sub>4</sub> is a cofactor of the aromatic amino acid hydroxylases which catalyze the initial and rate-limiting reactions in the synthesis of biogenic

amines—serotonin, norepinephrine and dopamine<sup>(1,2)</sup>. Thus BH<sub>4</sub> is of considerable importance in regulating synthesis of these biogenic amines<sup>(3)</sup> which are proposed as important neurotransmitters in the pathogenesis of affective disorders<sup>(4,5)</sup>. After reports that BH<sub>4</sub> was effective in the treatment of some depressives<sup>(6,7)</sup> and that the BH<sub>4</sub> concentration was reduced in the post-mortem brain samples of depressive patients<sup>(8)</sup>, the issue of the

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## 憂鬱症患者尿中新喋呤與生喋呤之分析

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四氫生喋呤 ( $BH_4$ ) 是環狀胺基酸水解酶的輔因子，而此水解酶又是合成生物胺 (biogenic amines)：5-羥色胺 (serotonin)，正腎上腺素 (norepinephrine) 與多巴胺 (dopamine) 的速率決定酵素，所以，依“生物胺代謝失調為憂鬱症病因之一”的假說推論，四氫生喋呤之代謝亦可能與憂鬱症的病理相關。本研究以高效液相層析法 (HPLC) 測定尿液中四氫生喋呤之代謝物新喋呤 (neopterin) 與生喋呤 (biopterin) 之濃度，以探究憂鬱症患者之喋呤類化合物代謝是否與正常人不同。本研究共收集45個正常人與26個有憂鬱症狀之患

者的尿液，其中12個患者在憂鬱症狀緩解後再次接受尿液分析。結果顯示尿液中之生喋呤濃度與憂鬱症狀不相同，但憂鬱症患者 ( $441 \pm 261$  nmol/mmol creatinine) 尿中之新喋呤濃度則顯著比正常人 ( $604 \pm 318$ ) 低 ( $P < .05$ )，且在憂鬱症狀緩解後明顯回升 ( $P < .02$ , paired t test,  $n = 12$ )，這個現象無法以原始的假設解釋。本文在討論中嘗試探討憂鬱症，免疫功能與新喋呤間的可能關係，並提示進一步之研究方向。(中華精神醫學1991；5：20~8)

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