ARACHIDONIC ACID TO EICOSAPENTAENOIC ACID RATIO IN BLOOD CORRELATES POSITIVELY WITH CLINICAL SYMPTOMS OF DEPRESSION

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Major depression is occurring at a younger age and at a higher incidence than prior to 1913 (Klerman 1988; Klerman and Weissman 1989). In epidemiological studies reviewed by Klerman (1988) these findings, primarily for Westernised societies, were not explained by changing diagnostic criteria, changing attitudes of health professionals and societies, reporting bias differential mortality, institutional or other artefacts. Smith (1991) and Hibbeln and Salem (1995) have hypothesised that the sharp rises in depression and other neurological disorders this century have been fuelled by increased consumption of LA-rich vegetable oils. Consistent with this hypothesis are the substantially elevated levels of prostaglandin E_2 and thromboxane B_2 (both derived from AA, a metabolite of LA) reported in patients with both unipolar and bipolar depression (Lieb et al. 1983).

In this study of 20 moderate to severely depressed patients, diagnosed using current research diagnostic criteria (DSM IVR 1995) and excluding known bipolar affective disorder and reactive depression, we investigated the relationships between severity of depression and levels and ratios of n-3 and n-6 long-chain polyunsaturated fatty acids (PUFA) in plasma and erythrocyte phospholipids (PL). Severity of depression was measured using the 21 item Hamilton Depression Rating Scale (1960) (HRS) and a second linear rating scale (LRS) of severity of depressive symptoms which omitted anxiety symptoms. There was a significant correlation between the ratio of erythrocyte PL arachidonic acid (AA) to eicosapentaenoic acid (EPA) and the severity of depression as rated by the HRS ($p<0.05$) and the LRS for depression ($p<0.01$). There was also a significant negative correlation between erythrocyte EPA and the LRS ($p<0.05$). The AA/EPA ratio in the plasma PL and the ratio of erythrocyte long-chain (C20 and C22 carbon) n-6 to longchain n-3 PUFA were also significantly correlated with the LRS ($p<0.05$). These findings do not appear to be simply explained by differences in dietary intake of EPA. We cannot determine whether the high ratios of AA/EPA in both plasma and erythrocyte PL are the result of depression or whether the tissue PUFA changes predate the depressive symptoms. However, we suggest that our findings provide a basis for studying the effect of the nutritional supplementation of subjects with depression which is aimed at reducing the AA/EPA ratio in tissues and the severity of depression.

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