INTRODUCTION

Depression has been associated with both psychosocial stress and an activation of the inflammatory response (1). The maternal separation paradigm is an animal model that seeks to take advantage of the former association, with a stressful early life intervention thought to produce a depressive phenotype in the adult rodents. Characterisation of the maternally separated rodents has demonstrated alterations in both endocrine measures and the response to an immune challenge (2). Fewer studies have established links between baseline immune alterations in the model and the altered immune signature that is evident in clinical depression. Polyunsaturated fatty acids (PUFAs) have recently attracted attention as being altered in a variety of diseases. It has been postulated that an altered PUFAs profile, resulting in an increased dominance of the proinflammatory ω-6 fatty acids over their ω-3 counterparts, might lead to elevations in proinflammatory mediators in depression. This theory was recently validated by a study showing elevated arachidonic acid (AA) levels in depressed subjects compared to healthy controls (3). AA belongs to the ω-6 family of PUFAs and is the precursor for a number of important immunomodulatory eicosanoids produced along the AA cascade.

STUDY HYPOTHESIS AND METHODS

- We hypothesised that the early life stress of maternal separation would result in an altered proinflammatory PUFAs profile in the adult rodents.
- The rodent pups were separated from their mothers for 3 hours a day from days 2-12.
- Adult rodents were sacrificed and plasma taken for PUFAs analysis.
- Gas chromatography coupled to flame ionisation detection was used to establish the PUFA profile of the maternally separated rodents compared to their non-separated controls.
- Fatty acids were quantified as their fatty acid methyl ester (FAME) derivatives.

ASSAY RESULTS

- Total ω-3
- ω-6:ω-3 ratio
- Arachidonic acid (20:4n-6)

CONCLUSIONS

- Our data indicates a shift towards a proinflammatory ω-6 fatty acid profile in maternally separated rodents compared to control animals.
- Early-life stress of maternal separation has persistent effects on circulating PUFAs concentrations.
- Alterations suggest a phenotype that is primed for immune activation.
- Disrupted PUFA supply to the brain can have important structural consequences for CNS regions.
- Findings may pave the way for new avenues of investigation in stress-related disorders such as major depression, anxiety, and irritable bowel syndrome.

REFERENCES


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