

DIVERGENT EFFECTS OF OMEGA-6 AND OMEGA-3 FATTY ACIDS ON MAMMARY TUMOR DEVELOPMENT IN C₃H/HESTON MICE TREATED WITH DMBA.

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ABSTRACT

The effects of Omega-6 and Omega-3 fatty acids on breast cancer incidence have been examined in female C3H/Heston mice. Two consecutive experiments were performed. In the first study, 300 mice were randomized into groups of 50, and each group was fed a modified standard mouse chow. Standard mouse chow contains 6 percent of fat supplied by coconut oil. This diet was first modified to contain only 3 percent coconut oil, plus 3 percent of the test oils under study; these were lard as a regulatory control, and corn oil, safflower oil, linseed oil, fish oil, and oil of evening primrose. The appearance of breast tumors was accelerated by the administration of DMBA (1mg intragastrically each week for six weeks) following a standard protocol. The results of this first study were quite inconclusive due to tumor multiplicity affecting all groups. The study was then repeated omitting the coconut oil and with the dietary proportion of the same test oils increased to 6 percent (providing the only source of fat in the diet), and, at the same time, the dose of carcinogen was reduced by 50 percent (1mg intragastrically every two weeks for six weeks). The results of this second study demonstrated that oils of the predominantly Omega-6 group (safflower oil and corn oil) had a significant tumor promoting effect, whereas oils of the predominantly Omega-3 group (linseed oil and fish oil) had a significant preventive effect, relative to each other. Oil of evening primrose appeared to have an intermediate effect. The significance of these findings and their possible relevance to human cancer epidemiology is briefly discussed.

Key Words: Oils, fats, diet, breast cancer, mice.

INTRODUCTION

Breast cancer is a major cause of female morbidity and mortality in North America and Western Europe, and its incidence is slowly increasing . Despite considerable efforts to improve treatment strategies, the age-adjusted death rates from this form of cancer have remained essentially unchanged over the last two decades (1). In view of this depressing record, many authorities have advocated that research should be directed towards prevention rather than therapy of established disease (2). Human epidemiological evidence, supported by a wealth of animal experimentation, suggests that relatively simple dietary changes could offer some promise of disease control.

While it is true that heredity influences susceptibility to breast cancer in a few families, the

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