

23rd International Conference on

Cancer Research & Pharmacology

March 26-27, 2018 Edinburgh, Scotland

Influence of dietary fats on circulating amino acid profile in experimental breast cancer

José Manuel Martínez-Martos and María Jesús Ramírez-Expósito
University of Jaén, Spain

Plasma amino acid levels depend of all factors that affect the body's amino acid flow and are tightly regulated through a continuous cycle of protein formation/degradation in order to maintain neutral protein balance. Different pathologies, including cancer, have frequently been associated with an alteration in protein metabolism and are characterized by an increase in protein exchange. In fact, the tumor cells require a greater amount of amino acids for the synthesis of new proteins and nucleic acids; therefore, changes in the circulating amino acid profile may be detected. Many studies have suggested the possibility of establishing a specific amino acid profile for each type of cancer. In addition, the influence of different compounds of diet has also been described in cancer. In the present work, we analyzed the influence of several normolipidic dietary fats (extra virgin olive oil, sunflower oil and sunflower oil enriched with oleic acid) on plasma amino acids in rats with N-Methyl-nitroso Urea (NMU)-induced breast cancer. It allowed us to know the changes in plasma amino acid levels in this animal model, if a specific profile of amino acid exists in this type of tumor and if dietary fat modified this profile. Our results showed significant increases in several amino acids, including aspartic acid, glutamine, glycine, 1-methyl-histidine, 3-methyl-histidine, ornithine, taurine and alanine in rats with NMU-induced breast cancer. Furthermore, pooled non-essential and basic amino acids were also increased in these animals. The analysis of dietary fats showed that plasma amino acid levels did not change in animals with NMU-induced breast cancer fed with extra virgin olive oil and sunflower oil, but those animals fed with oleic acid-enriched sunflower oil showed plasma amino acid levels similar to control group. These results may indicate that the establishment of a specific plasma amino acid profile for breast cancer could be influenced by external factors such as dietary fat.

jmmartos@ujaen.es

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