

# 4<sup>th</sup> World Congress on Cancer Science & Therapy

October 20-22, 2014 DoubleTree by Hilton Hotel Chicago-North Shore Conference Center, USA



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### Effects of obesity on serum methylation and oxidative stress biomarkers following DMBA treatment

The obesity epidemic in the US grows as the number of overweight and obese adults continues to rise. Obese women have higher mortality rates from all cancers including breast cancer. Obesity is capable significantly affects the metabolic profile in animals and humans. We reported earlier, obese rats have a significantly lower level of S-adenosylmethionine (SAM) in serum, a universal methyl group donor, and lower methylation ratio compare to lean animals. Results from our laboratory showed that obesity increased DMBA-induced mammary tumor development using obese zucker rat model. The objective of this study was to investigate the effects of obesity on serum concentration of oxidative stress metabolites 24 hrs following 7,12-dimethylbenz(a)anthracene (DMBA) treatment. Forty day-old, obese (n=20) and lean (n=20) Zucker rats were placed on AIN-93G diet and 10 days later were orally gavaged with either with sesame oil (control) or with 65 mg/kg DMBA in sesame oil. All rats were sacrificed 24 hours post-DMBA treatment and serums were collected. Serum concentrations of total Glutathione reduced (tGSH), free reduced Glutathione (fGSH), oxidized glutathione (GSSG) and Methionine were measured by HPLC method with electrochemical detection or LC-MS method. Combination of the obesity with DMBA treatment leads to the lower concentration of fGSH ( $P<0.05$ ), higher concentration of oxidized GSSG ( $P>0.05$ ) and lower of fGSH/GSSG “oxidative stress” ratio compare with obese animals. At the same time, concentration of total reduced GSH was not effected and was on the same level in both groups. The DMBA-treated obese rats had significantly ( $P>0.05$ ) higher concentration of methionine compare to non-DMBA treated obeserats. In summary, obese DMBA-treated rats were had twice higher oxidative stress than to non-DMBA treated obese rats. Higher level of methionine (critical amino acid in methylation reaction and synthesis of glutathione) in treated obese rats compare to obese can be consequences of a blocking of methylation reaction by oxidative stress and lower utilization of methionine in treated animals.

### Biography

Reza Hakkak, PhD, is Nutritionist and Professor and Chairman of the Department of Dietetics and Nutrition in the College of Health Professions, Professor of Pediatrics in the College of Medicine, and Professor of Department of Health Policy and Management in the College of Public Health at the University of Arkansas for Medical Sciences. His research includes Nutritional toxicology, Influence of diet and nutrition on cancer prevention or promotion, Obesity and Breast Cancer prevention or promotion, Animal modeling for Cancer Research. He has published more than 45 research articles and more than 170 abstracts and presentations. He is the Editor in Chief for Obesity and Weight Loss Therapy and Vitamins and Minerals and also serves as Senior Editor for Journal Cancer Science and Therapy. He also serves on another 10 editorial boards of other journals.

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