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## Epigenetics, inflammasomes and low back pain: The metabolic root cause of low back pain and its treatment

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Persistent low back pain (LBP) is the most common form of chronic illness in patients age 60 and under, affecting 15% of the population. In addition to be a major health problem, it also has serious economic consequences. Current diagnostic and therapeutic approaches to chronic back pain are limited by our narrow understanding of the underlying biological mechanisms. As a consequence, treatment is not always effective, and individuals may suffer for years without relief. LBP is often associated with signs of degeneration in the intervertebral discs. LBP encompasses a wide spectrum of pain disorders including axial pain in the low back region and radiating pain down one or both legs. The extracellular matrix protein *SPARC* (Secreted Protein, Acidic, Rich in Cysteine) has been linked to degeneration of the intervertebral discs and chronic low back pain (LBP). In humans, *SPARC* protein expression is decreased as a function of age and disc degeneration. In mice, inactivation of the *SPARC* gene results in the development of accelerated age-dependent disc degeneration concurrent with age-dependent behavioral signs of chronic LBP. DNA methylation is the covalent modification of DNA by addition of methyl moieties to cytosine's in DNA. DNA methylation plays an important role in programming of gene expression, including in the dynamic regulation of changes in gene expression in response to aging and environmental signals. DNA methylation down-regulates *SPARC* expression in chronic LBP in pre-clinical models and in patients with chronic LBP. There is evidence that DNA methylation of a single gene plays a role in chronic pain in humans and animal models. This has important implications for understanding the mechanisms involved in chronic pain and for pain therapy. The metabolic effects of obesity have made this highly prevalent disease one of the most common risk factors for diabetes, hypertension, arthritis, and atherosclerosis, the leading causes of end-stage renal failure. Moreover, adipose tissue is now recognized as an immune organ that secretes numerous immunomodulatory factors and seems to be a significant source of inflammatory signals known to cause insulin resistance. Therefore, inflammation within white adipose tissue may be a crucial step contributing to the emergence of many of the pathologic features that characterize the metabolic syndrome and result in arthritis, low back pain, diabetes and atherosclerosis. This presentation will describe the role of proinflammatory cytokines and hormones released by adipose tissue in generating the chronic inflammatory profile associated with visceral obesity. Epigenetic factors contributing to hyper methylating promoter areas of certain genes that provoke degenerative disc disease, we will also discuss therapeutic interventions to prevent and treat such conditions, utilizing life style changes, nutritional interventions, supplements, and herbals.

## Nutritional value of edible termites *Macrotermes falciger* collected from Lusaka district, Zambia

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Edible insects are valuable alternative sources of animal protein for Zambia's low income and rural population. Roasted winged termites (*Macrotermes falciger*) were nutritionally evaluated with a view of revealing any possibility of its use for the formulation of new food products as possible means of combating malnutrition. Minimum sized lab samples of 2 kg of dry roasted termites were collected from Lusaka and used for proximate, mineral, vitamin and fatty acid composition. The termite samples were analyzed according to official methods of analysis recommended by the Association of Official and Analytical Chemist (AOAC). Results obtained from roasted *Macrotermes falciger* showed that the carbohydrate content, crude protein and lipid content were high. The ash content (5.7%), moisture (6.0%) and crude fiber (2.2%) were low. Major macrominerals were potassium and sodium, while the microminerals were iron, zinc, manganese, magnesium and selenium. The samples had high amounts of vitamins C and A. The high fat content of the termite was made up mainly of unsaturated fatty acids (60.3%). These values suggest that the winged termite, *Macrotermes falciger* has nutritional and pharmaceutical values. The above results suggest that the winged termite, *Macrotermes falciger* has nutritional potential and can be used to combat protein energy related malnutrition prevalent in Zambia, if used as part of complementary foods.