

# Tissue remodeling of the adrenal gland, testis, visceral adipose tissue, liver during obesity

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## Abstract

**Statement of the Problem:** Obesity arises from an imbalance between energy intake and energy expenditure. This study aims to determine the mechanism of cooperation and harmonization between energy homeostasis and tissue homeostasis to maintain a stable body weight variable orchestrated by the immune system.

**Methodology and Theoretical Orientation :** Two groups of local adult male rabbits (n = 16) were fed a high calorie diet: HCD (4538 Kcal/kg DM) and a finishing diet (FD: 3964 Kcal/kg DM). After fifteen weeks of feeding, the animals were sacrificed according to Algerian legislation. Blood glucose, insulin, leptin, total cholesterol, high-density lipoprotein (HDL), low-density lipoprotein (LDL) and triglyceride were determined. The heart, the kidneys, visceral adipose tissue (VAT) from the abdominal cavity, mesentery and retroperitoneal fat, liver, adrenals and testis were dissected, removed and fixed in 4% formalin. These removed organs were divided between histology (for structural and morphometric analysis cells) and immunohistochemistry (to determine apoptosis and cell proliferation) by analysis of CD45 and Ki67 expression. The body weight, a total weight (g tissue) and relative weights (g tissue/body weight) for VAT, testis and adrenals were then estimated. The Image J program (Image J, Version 1.52v) using for quantitative analyses of digital images whereas R programming language version (4.1.0) was used for statistical analysis.

**Findings:** It has been shown that HCD-received rabbits have developed visceral obesity, dyslipidemia and insulin resistance (IR) by dramatically increasing body weight, visceral fat tissue, testis and adrenal weight. HCD also causes the process of inflammatory fibrosis in the adrenal gland and adipose tissue, also a microvesicular steatosis in liver, hyperplasia and hypertrophy of adipose tissue, testis and adrenal gland with angiogenesis in heart. The surplus calorie in fed rabbits caused them too, disorganization of structural architecture of testis and adrenal gland.

In our study, we found that the CD45 antibody could be immunoreacted with the adipose tissues in the membrane significantly in HCD fed animals. Thus, in this practice, we determined if Ki-67 and CD45 expression would be useful for calculating apoptosis and cell proliferation as well as a morphometric analysis of cells.

**Conclusions :** Tissue remodeling either by hypertrophy or hyperplasia compensates for the energy imbalance as a defense mechanism against this imbalance. This study gives a new concept to obesity so th calorie in excess of the body's need, represented an stimulus, whereby the system immune and Stem cell progeny of some organs colabored to maintain a balance : energy homeostasis- tissue homeostasis

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## Biography

Mokrani Zoulikha is an associate professor in physiology and pathophysiology at Tahri Mohammed university, faculty of natural and life sciences, bechar, Algeria. She has been teaching various courses, such as biophysics, embryology and statistics in this university for over 10 years; and a PhD in endocrine and metabolic physiology and pathophysiology under my professor Dr Soltani Yacine, laboratory of Endocrinology at university of science and technology Houari Boumediene, Algiers, Algeria. She has over 10 years of

experience in histology and immunohistochemistry technique at cancer center. Mokrani Zoulikha is also a student in data science, interested in statistics, language R and python. Her main interest lies in the search for mechanisms and systems of balance between cells and fluids on the one hand and on the other hand between nutrition and hormones. She is also interested in connecting data science to understanding cell division and death in immunohistochemistry technique.