

***Obesity-dependent Structural and Functional Changes in Different Inbred Obese Mouse Lines of Gonadal and Inguinal Adipose Tissues: a Fourier Transform Infrared Imaging Study***

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Obesity is a metabolic disorder resulting in elevated levels of free fatty acids and triglycerides in the blood circulation together with accumulation of lipids within various tissues. The Berlin fat mouse inbred line (BFMI) is an important new model for obesity which has a complex genetic background and generates spontaneous obesity while they are fed with a rodent standard breeding diet (SBD). These lines are not generated by knock-out mutations as a causative effect for the generation of spontaneous obesity phenotype. That is why, according to their polygenic nature underlying obesity phenotypes, the BFMI lines are excellent models for the study of obesity induced changes in humans. These lines contain two different adipose tissues; inguinal fat (IF) which is SCAT (Subcutaneous adipose tissue), gonadal fat (GF) which is VAT (Visceral adipose tissue)

This current study aims to characterize BFMI male and female mice having gonadal and inguinal adipose tissue. For this purpose, Fourier transform infrared microspectroscopic imaging has been used to investigate obesity-induced changes on macromolecular content in gonadal and inguinal adipose tissue of male and female control and BFMI mice, namely BFMI852, BFMI856, BFMI860 and BFMI861. Sections of adipose tissue were transferred onto BaF<sub>2</sub> slides, spectral maps were collected using FTIR microspectroscopy and data analyses were performed. FTIR microspectroscopy is a rapid and effective technique to monitor of molecular alterations induced by different conditions such as disease, chemicals and environmental in biological tissue components.

The results revealed that the highest lipid/protein ratio is found in BFMI860 and BFMI861 lines in gonadal and inguinal adipose tissue. The amount of unsaturated lipids which is indication of lipid peroxidation were found to be the lowest in BFMI860 and BFMI861 lines in gonadal adipose tissue. The results of the characterization revealed that BFMI860 and BFMI861 lines are convenient models for the study of spontaneous obesity.