# *ATR-FTIR spectroscopy reveals genomic loci regulating the tissue response in high fat diet fed BXD recombinant inbred mouse strains*

Ayca Dogan[1], Peter Lasch[2], Christina Neuschl[1], Rudi Alberts[3], Dieter Naumann[2] and Gudrun A. Brockmann[1]

[1] Humboldt-Universität zu Berlin, Department for Crop and Animal Sciences, Invalidenstraße 42, 10115 Berlin, Germany
[2] Robert Koch-Institute, P25, Nordufer 20, 13353 Berlin, Germany
[3] Helmholtz-Zentrum für Infektionsforschung, Inhoffenstrasse 7, 38124 Braunschweig, Germany

**Abstract**

In the present study, the analytical method of ATR-FTIR spectroscopy has been combined with a genetic approach to characterize and identify genetic differences responsible for gross-compositional alterations in adipose, liver and muscle tissues in 29 BXD recombinant inbred mouse strains. We used ATR-FTIR spectroscopy as a sensitive molecular phenotyping method to assess the relative contents of fat, protein, collagen and glycogen as well as the lipid to protein ratio and collagen integrity in the target tissues of fat deposition in 20 weeks old mice. A genome wide scan revealed significant quantitative trait loci (QTL) on chromosome 12 for the content of fat and collagen, collagen integrity, and the lipid to protein ratio in adipose tissue and on chromosome 17 for lipid to protein ratio in liver. For the chromosome 12 effect, we suggest *Rsad2* and *Colec11* and for chromosome 17 *Mdfi* as most likely candidate genes. The results demonstrate that the analytical method of ATR-FTIR spectroscopy effectively contributed to decompose the macromolecular composition of tissues that accumulate fat and to link this information with genetic determinants for the identified differences.