



Bruker minispec Body Composition Analyzer

Bruker's Whole Body Composition Analyzer is based on Time Domain Nuclear Magnetic Resonance (TD-NMR) technology which provides a precise method for in vivo measurement of Lean Tissue, Body Fat, and Body Fluid in live mice and rats. The key feature is: longitudinal studies become possible, because the animal is carefully handled without anesthesia.



LF90 offers horizontal insertion of live rats or other larger animals.

Since its first launch in the beginning of 2001, [the minispec Live Mice Analyzer \(LF50\)](#) has quickly gained market acceptance as a powerful, non-destructive and non-invasive tool for characterizing, screening and phenotyping mouse models in research laboratories. It has become the industrial standard for fat and lean measurement in live mice with installations in major pharmaceutical companies, diabetes and obesity research institutes and universities.

Nuclear Magnetic Resonance (NMR) methods are among the most useful non-destructive techniques of material analysis. Non-invasive examination of the body by means of NMR is extensive and has many important applications, particularly with Magnetic Resonance Imaging (MRI) and Magnetic Resonance Spectroscopy (MRS). TD-NMR uses similar NMR technology, providing analysis of fat tissue, lean tissue and free fluid by the same physical selection rules that give rise to contrast in MRI. Tissue contrast is high between fat and muscle based on relative relaxation times.

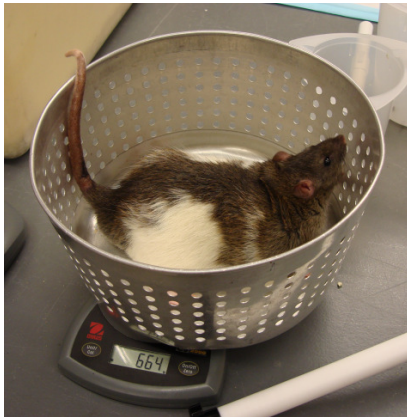


the minispec Body Composition Analyzer is based on Time Domain NMR . It acquires and analyzes TD-NMR signals from all protons in the entire sample volume and can provide 3 components of interest: Fat, Free Body Fluid and Lean Tissue values. This Magnetic Resonance technology allows the researchers the opportunity to make multiple measurements during the life of the animal with the following benefits:

- Rapid analysis: measurement takes less than 2 minutes; no sample preparation;
- Economical method: no consumables, retain expensive lab animals for entire study;
- LF90II for both mice and rats analyzing animals up to ~ 800g;
- Reduced animal stress: no need for anesthetics; animals are measured "as-is";
- Allows more frequent testing because of negligible risk to animal health;

The actual animal analysis involves in the following simple steps:

- Take an animal out of its cage, get its body weight.

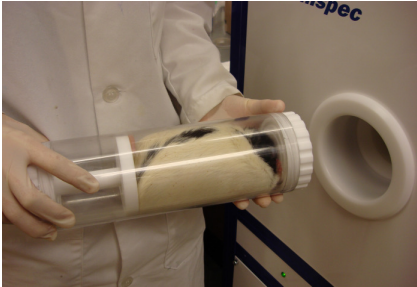


- Load the animal into the sample holder (animal restrainer), and carefully push the restraining disc so to limit movement of the animal.

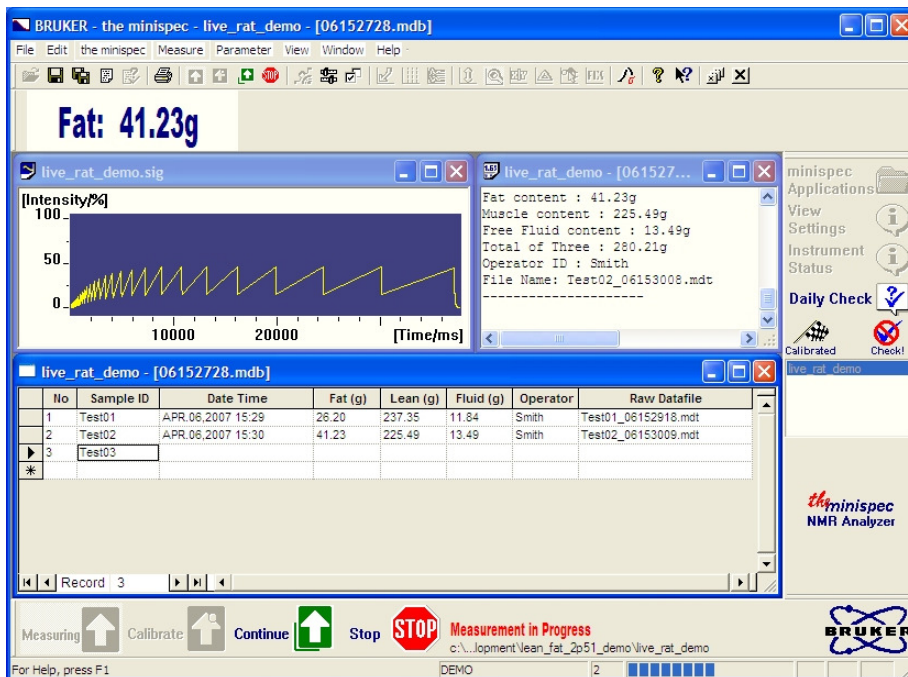




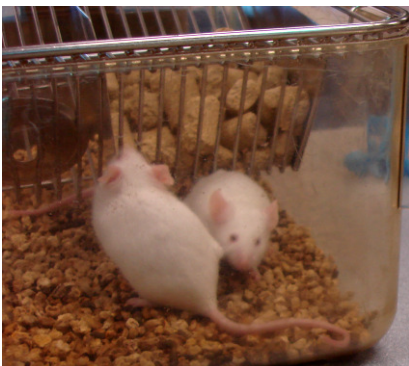
- Insert the animal holder into the instrument for analysis.



- Results are displayed and stored on a PC



- Return the animal to its cage, and start a new measurement.





Key users of LF90 analyzers include:

- Merck
- Johnson & Johnson
- Solvay
- Banyu Pharmaceutical
- Eli Lilly
- Boehringer-Ingelheim
- Roche Pharmaceutical
- Janssen Pharmaceutical
- Acceleron
- Metabasis
- Metabolex
- Develogen
- Sankyo Co.
- University of Graz
- University of Colone
- DIFE Deutsches Institut für Ernährungsforschung
- Ecole Normale Superieure
- CERBM-GIE
- Louisiana State University
- University of Florida
- NIH-NIA
- Penn State University
- University of Michigan
- Oklahoma University
- Laval University, Canada
- Guanjo University, Korea

A list of recent publications where Bruker LF90 instrument were used to generate data:

[Behavioural Brain Research](#)

[Volume 189, Issue 1](#), 16 May 2008, Pages 202-211

Calorie restriction alters physical performance but not cognition in two models of altered neuroendocrine signaling

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Am J Physiol Regul Integr Comp Physiol 293: R1102-R1109, 2007. First published July 18, 2007;
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0363-6119/07 \$8.00

Effects of chronic spinal cord injury on body weight and body composition in rats fed a standard chow diet

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Am J Physiol Endocrinol Metab 295: E964-E973, 2008. First published August 19, 2008;

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0193-1849/08 \$8.00

Skeletal and cardiac myopathy in HIV-1 transgenic rats

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Hepatology

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Steatohepatitis/Metabolic Liver Disease

Reduction of hepatic steatosis in rats and mice after treatment with a liver-targeted thyroid hormone receptor agonist

Edward E. Cable^{*†}, Patricia D. Finn, Jeffrey W. Stebbins, Jinzhao Hou, Bruce R. Ito, Paul D. van Poelje, David L. Linemeyer, Mark D. Erion

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J. Nutr. First published February 25, 2009; doi:10.3945/jn.108.100081

Journal of Nutrition, doi:10.3945/jn.108.100081

Vol. 139, No. 4, 715-719, April 2009

Nutrition and Disease

Leucine Supplementation of Drinking Water Does Not Alter Susceptibility to Diet-Induced Obesity in Mice¹⁻³

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J Neurophysiol 100: 2145-2157, 2008. First published June 11, 2008; doi:10.1152/jn.01359.2007

0022-3077/08 \$8.00



Altered Pontine Taste Processing in a Rat Model of Obesity

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Submitted 17 December 2007; accepted in final form 6 June 2008

Am J Physiol Regul Integr Comp Physiol 295: R1370-R1375, 2008. First published August 13, 2008; doi:10.1152/ajpregu.00195.2008

0363-6119/08 \$8.00

APPETITE, OBESITY, AND DIGESTION

Fructose-induced leptin resistance exacerbates weight gain in response to subsequent high-fat feeding

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0363-6119/08 \$8.00

APPETITE, OBESITY, AND DIGESTION

Prolonged hyperphagia with high-fat feeding contributes to exacerbated weight gain in rats with adult-onset obesity

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Activator of G Protein Signaling 3 Null Mice: I. Unexpected Alterations in Metabolic and Cardiovascular Function

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TECHNICAL SPECIFICATIONS

Instrument name: NMR Lean/Fat Analyzer for small animals
NMR Frequency: 6.2MHz
Magnet Type: Rare earth permanent magnet
Magnet Temperature: Controlled to 0.01°C precision or better
NMR Console:
Modulator: 0, 90, 180 and 270 degree RF phase channels with 0.2 degree or better accuracy
Pulse Programmer: 12 pulse channels, resolution 20nsec
Digitizer: 12-bit, 32K points per single shot
NMR transmitter: Broadband, 220W, linear power attenuation
NMR receiver: Temperature regulated, adjustable gain range 80dB in 1dB steps

Sample size: up to 800g
Parameters Analyzed: Body Fat, Body Lean and Body Free Fluid
Sample Holders: 51mm OD for mice, 89mm OD for rats
Analysis Time: ca. 2 minutes per animal
Analysis repeatability: better than 0.5g for each component
Short Term Stability: STDEV < 0.3 for each component within 2 hours
Long Term Stability: STDEV < 0.5 for each component within 100 hours
Results data format: Microsoft Access and Excel data files
Dimensions: 62 x 48 x 122 cm (D x W x H)
Weight: ca. 380kg
Sitting: Sealed enclosure on wheels
Power requirement: 115 or 220VAC, 700W
Host PC: Any Pentium PC running Microsoft Windows XP
NMR software: Runs with Windows XP Pro
Instrument GLP:
Automatic logging of system status and state of all major components
Daily Check and Automatically logging system parameters
Extensive diagnostics for all major components

Calibration: Pre-calibrated by factory
Calibration Tools: Available with the system
Calibration by User: Available (optional)