

# Housing and care of laboratory animals



Ping Ping Tsai  
Judith Kirchner  
Anke Schraepler  
Anja Schlichting  
Martina Schmook  
Hansjoachim Hackbarth

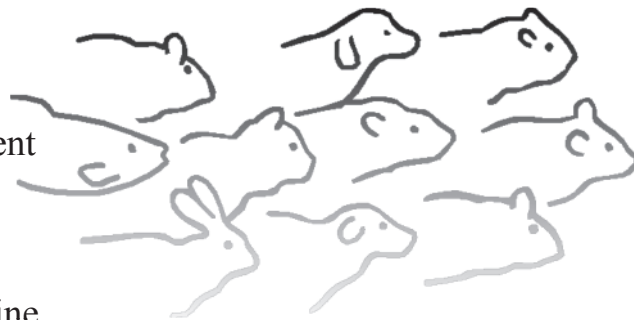
Institut für Tierschutz und Verhalten  
(Heim-, Labortiere und Pferde)  
Tierärztliche Hochschule Hannover

Berlin 2011



## Housing and care of laboratory animals

- Developed empirically
- Housing
  - Space
  - Environment
  - Sociality
- Care
  - Daily routine
  - Experimental adaptation



Berlin 2011

## Standard Animal Cage Makrolon Type III

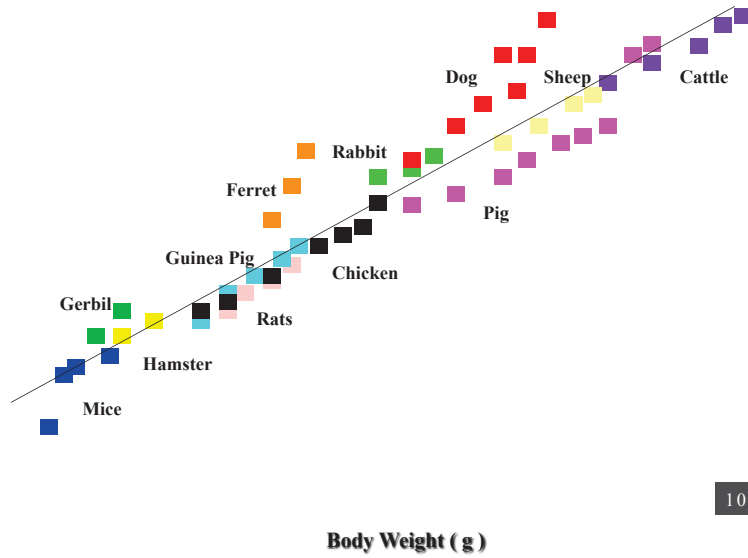


Berlin 2011

$$\text{Space (cm}^3\text{)} = 0,87 \times \text{Body Weight (g)}$$

Space (cm<sup>3</sup>)

Data from 2010/63/EU



DFG Deutsche Forschungsgemeinschaft

**SFB 146**

Qualitätskriterien  
der Versuchstierforschung

**Laboratory Animal  
Research**

Ergebnisse aus dem Sonderforschungsbereich  
„Versuchstierforschung“ der Medizinischen und der  
Tierärztlichen Hochschule Hannover

**1973-1989**

Herausgegeben von Klaus Gärtner

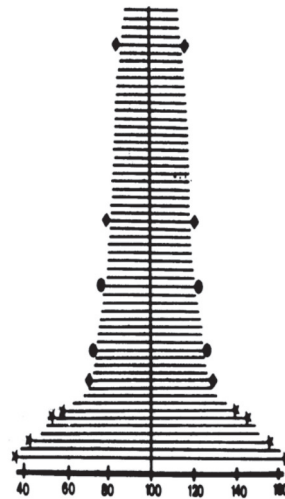
Sonderforschungsbereiche



Berlin 2011

# Standardisation

- **Reduction of inter-individual variation**
- **Reduction of animals needed**
- **Reproducibility and comparability of results**

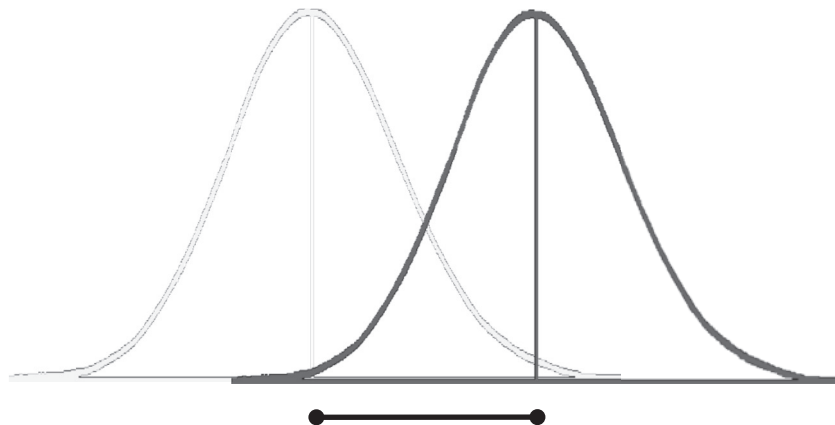


**Genetic**  
**Hygiene**  
**Nutrition**  
**Environment**

Berlin 2011

# Zero-Hypothesis (large variance)

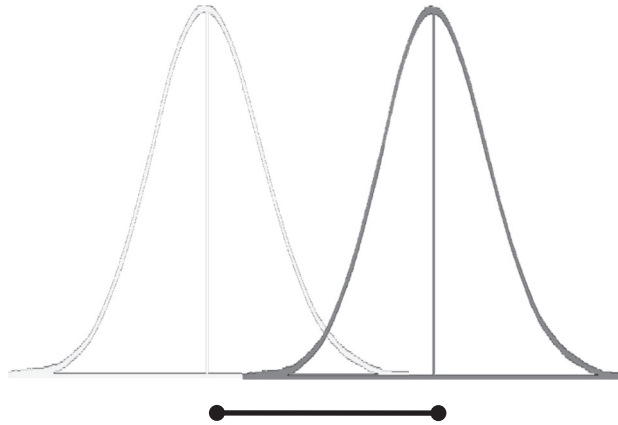
Control Group      Test Group



Berlin 2011

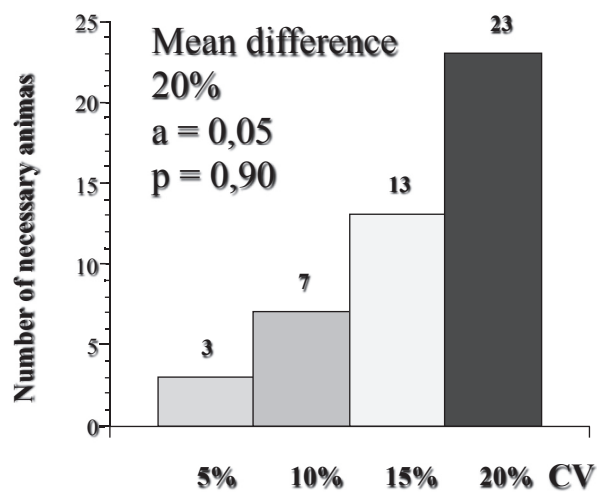
## Zero-Hypothesis (small variance)

Control Group    Test Group

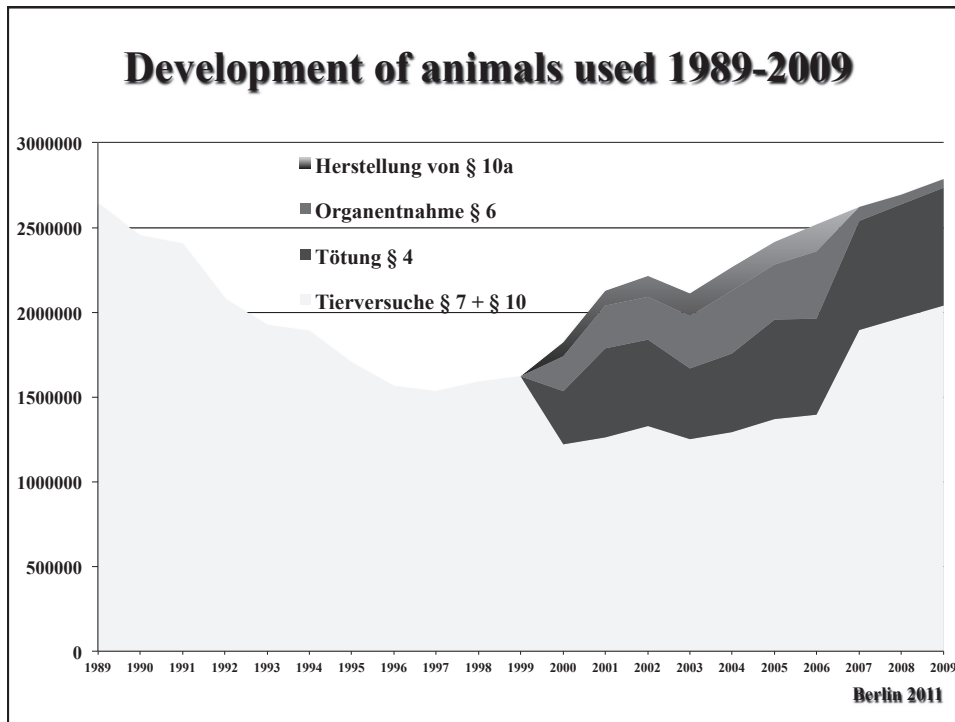


Berlin 2011

## Number of necessary animals depends on the variance



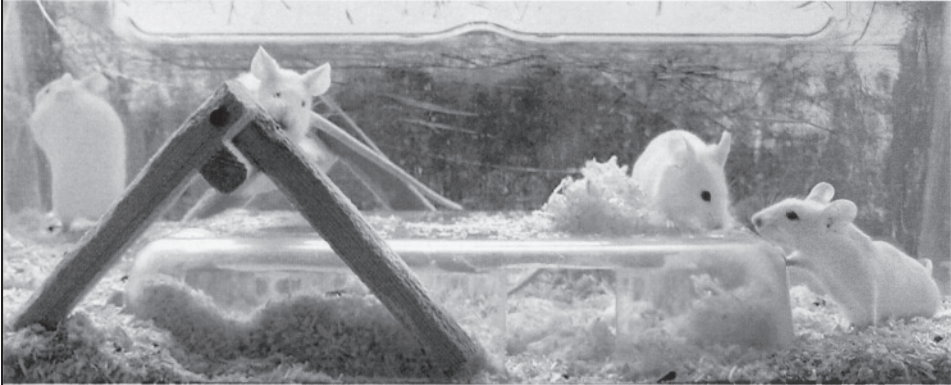
Berlin 2011



Consideration should be given to the potential impact of the type of accommodation, and that of the environmental and social enrichment programmes, on the outcome of scientific studies, in order to avoid the generation of invalid scientific data and consequential animal wastage.

(ETS 123, 15. 6. 2006)

Berlin 2011



LABORMÄUSE im  
Tierschutzzentrum der  
Universität Hannover

Schöner wohnen für Labortiere

Berlin 2011

# Wellbeing

**Wellbeing is present, when an animal is free of negative feelings. Characteristics for wellbeing are health, contentment, fulfillment of social and ethological needs and normal behaviour.**

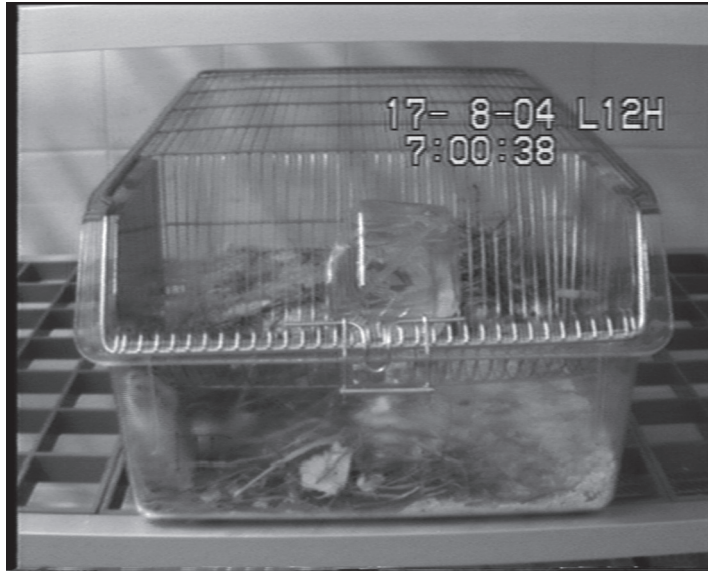
- **supply of needs – avoidance of harm**

**Tschanz 1993**

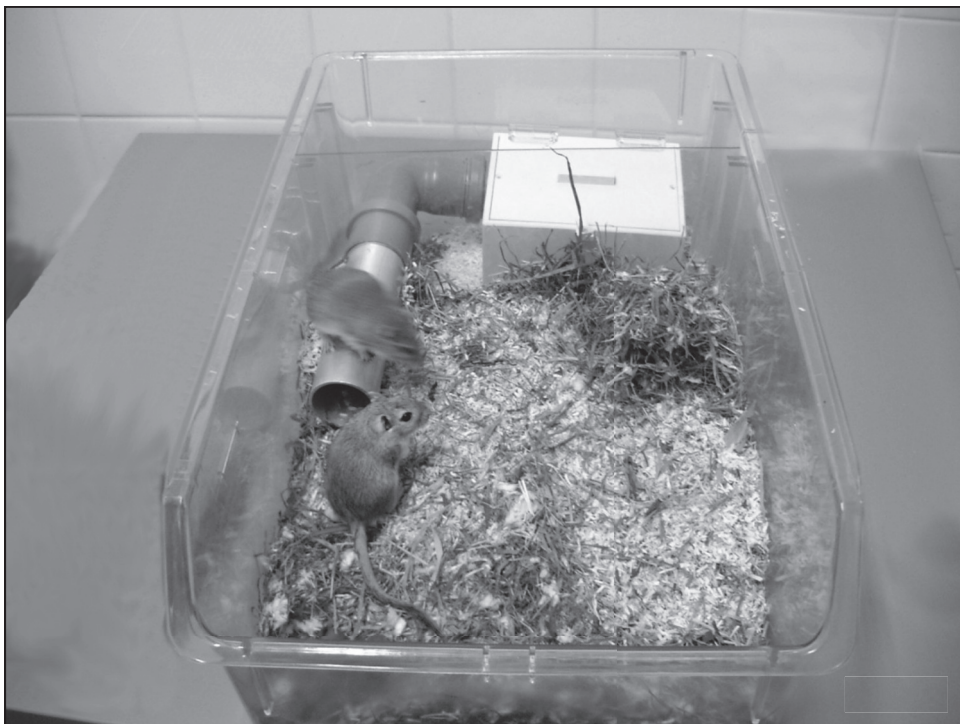
- **Demand - Desire**

Berlin 2011

## Stereotype digging in Gerbils

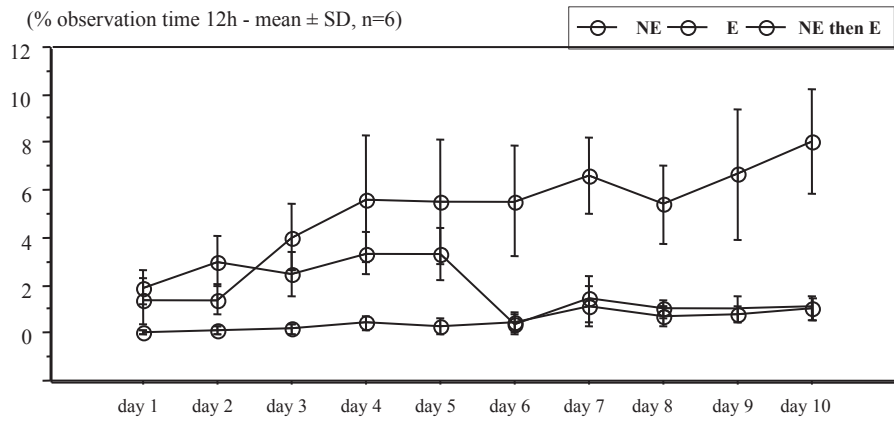


Berlin 2011





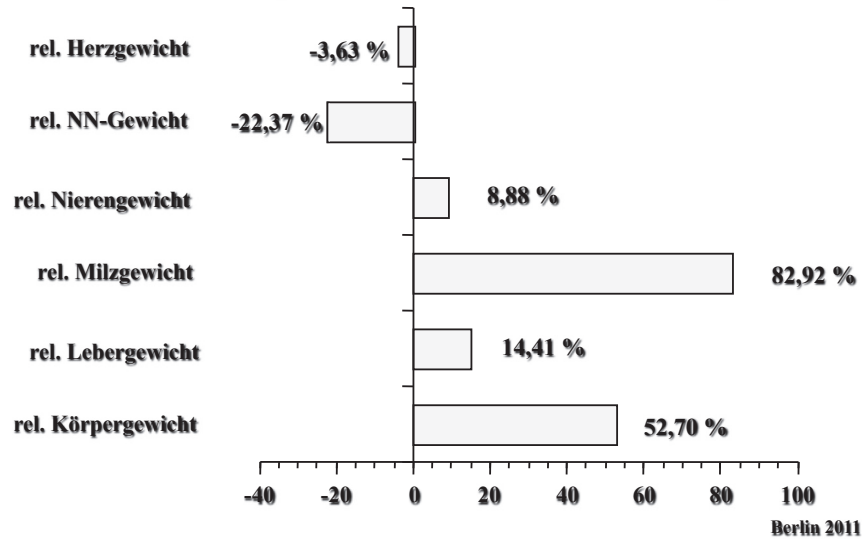
## Development of stereotype digging in Gerbils



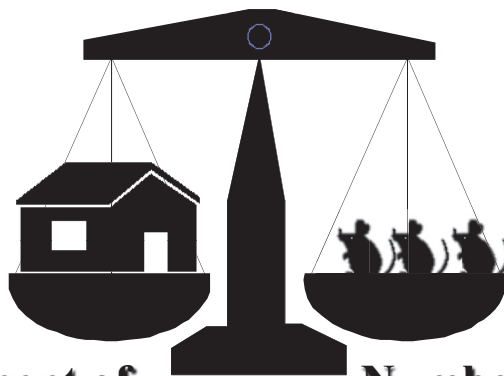
Berlin 2011



## Zunahme des Variationskoeffizienten unter angereicherter Haltung



## Balance

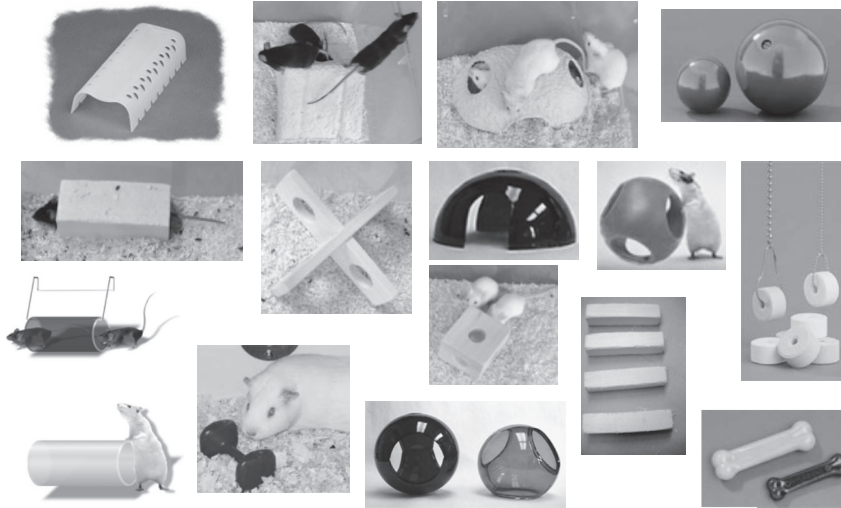


**Refinement of  
housing**

**Number of  
necessary animals**

Berlin 2011

## Commercially available Enrichments



Berlin 2011

## Environmental Improvement

COST B24 Reduction & Refinement

- **Improvement of Wellbeing must be proven**
- **Effects on the animals must be known**
- **Effects on the experimental results must be known**
- **The importance of the enrichment for the animals must be known (Demand/Desire)**

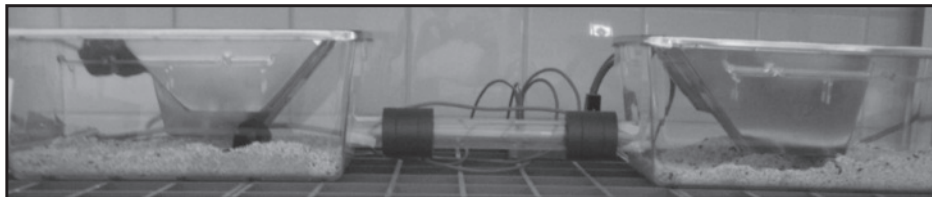
Berlin 2011

## Bedding



Berlin 2011

## DoubleCage-System



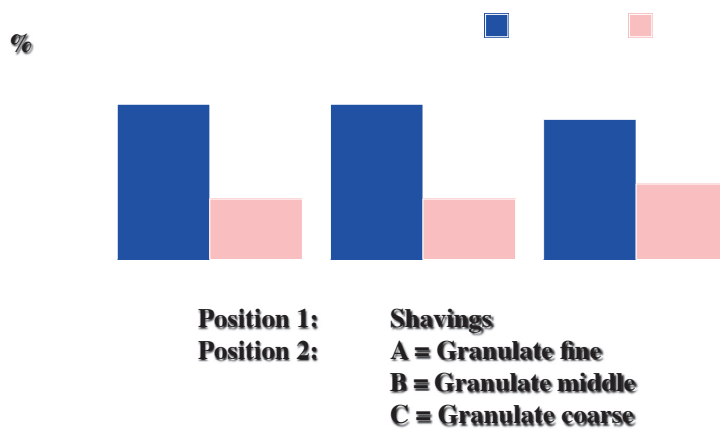
Berlin 2011

# Bedding Experiment Structure

Combination	Position 1 (Pine-Wood)	Position 2 (Pine-Wood)
A	Shavings	Granulate fine
B	Shavings	Granulate middle
C	Shavings	Granulate coarse

Berlin 2011

# Bedding Experiment Structure



Berlin 2011

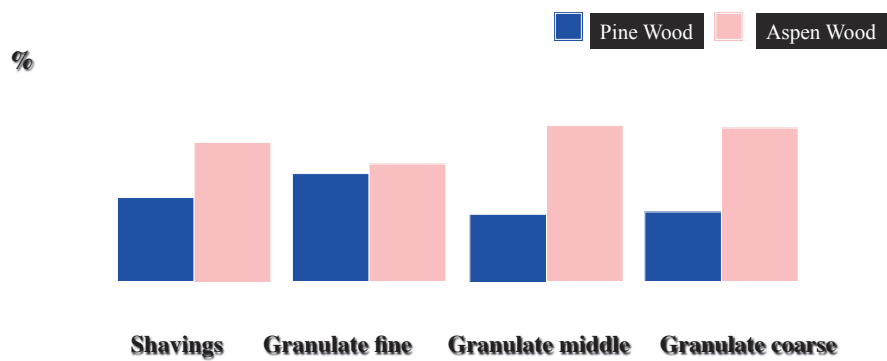
# Bedding Experiment Wood

Combination	Position 1 (Pine-Wood)	Position 2 (Aspen-Wood)
A	Shavings	Shavings
B	Granulate fine	Granulate fine
C	Granulate middle	Granulate middle
D	Granulate coarse	Granulate coarse

Each Combination 12 cages à 3 animals = 144 totally

Berlin 2011

# Bedding Experiment Wood



Berlin 2011

**Laboratory Animal Science is a basic science of biomedical research, the knowledge of which is made use of by experimental researchers of various disciplines. Animal welfare officers in institutions and authorities can equally rely on this experience. The information provided by Laboratory Animal Science assigns responsibility for the animals and the general obligation to act on behalf of the requirements and the need for protection of our fellow creatures in research and teaching.**

**(GV-SOLAS 1995)**

**Berlin 2011**

## **The Aims of Laboratory Animal Science are**

- **Development of standardized methods for the housing and care of Laboratory Animals**
- **Giving advice to researchers for the choice of species and experimental design**
- **Optimizing experimental methods for animal research**
- **Proper accomplishment of animal experiments according to medical, biological and animal welfare standards**

**GV-SOLAS 1995**

**Berlin 2011**

## Care of Laboratory Animals



**Animal technician**

**Researcher**  
**academic**  
**non-academic**

**Laboratory Animal  
Scientist**

**Berlin 2011**

## Education in Laboratory Animal Science

- **FELASA**
- Category A – 3 years of training
- Category B – 40 h Course  
– Seminars / Practicals
- Category C – Category B  
+ 40 h Course–Seminars
- Category D – 4 years of practical experience

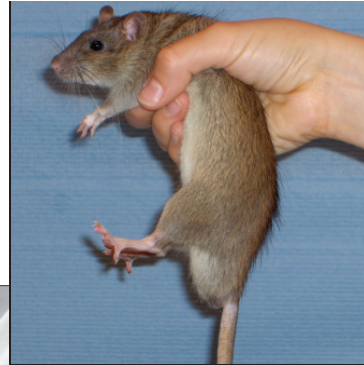
**Berlin 2011**



## Adaptation to experimental procedures

Hurst, J. L. and R. S. West  
Taming Anxiety in Laboratory Mice  
Nature Methods 7, 825-826 (2010)

Baturaite et al.  
Comparison of and Habituation to four  
common Methods of Handling and  
Lifting of Rats with Cardiovascular  
Telemetry.  
Scand. J. Lab. Anim. Sci. 32, 137-147  
(2005)



Berlin 2011

## The 4th R Responsibility




Berlin 2011

**You are responsible  
for the Welfare of  
Your Laboratory Animals!**

The Society of Laboratory Animal Science  
supports your research by:

- Education and training laboratory animal science
- Breeding and supply of suitable laboratory animals
- Optimizing the housing conditions
- Information on the right animal models  
and alternative methods


**Society of Laboratory Animal Science**  
 Gesellschaft für Versuchstierkunde  
 (GV-Solas)

Secretariat of GV-Solas  
 c/o Prof. Dr. Hansjoachim Hackbarth  
 Inst. f. Tierschutz u. Verhalten  
 Tierärztliche Hochschule Hannover  
 Bischofsweg 2 • D-30559 Hannover

**Berlin 2011**

**Wissen schützt  
Tiere**

**Tierschutzzentrum**  
**Tierärztliche  
Hochschule  
Hannover**

**www.tierschutzzentrum.de**

**Berlin 2011**