

**LMU**

LUDWIG-  
MAXIMILIANS-  
UNIVERSITÄT  
MÜNCHEN

BIOMEDICAL CENTER MUNICH  
BIOMEDIZINISCHES CENTRUM MÜNCHEN



# Redefining Lab Rabbit Housing: „The Mobile-R-Pen“

**Team**

**Core facility Animal Models**

**Dana Matzek**

# Why are improvements in rabbit housing important?

- 350.000 rabbits were used in the EU in 2020
  - Rabbits are the 3rd most used mammal species
- Important model organism with human-relevant physiology
  - Used in preclinical studies for drug development and beyond
  - Crucial for studies on atherosclerosis and stent development

**We have an ethical responsibility to implement the 3Rs principle!**

# Cage housing



advantages	disadvantages
hygienic	fewer movement possibilities
utilization of room height	generally only single housing
flexible use of space	paw injuries more common
standardized	stereotypies
easy (animal) handling	fewer enrichment possibilities
time saving care	expression of natural behaviors diminished



<https://nc3rs.org.uk/>



Photo by Natasha Down, York University, Toronto, Canada

# Floor housing

advantages	disadvantages
group housing	permanently installed
more natural behaviors	increased care effort
no/ rarely any paw injuries	lower hygiene
various enrichment options	not standardized
more movement possibilities	more difficult animal handling
rarely stereotypes	not commercially available

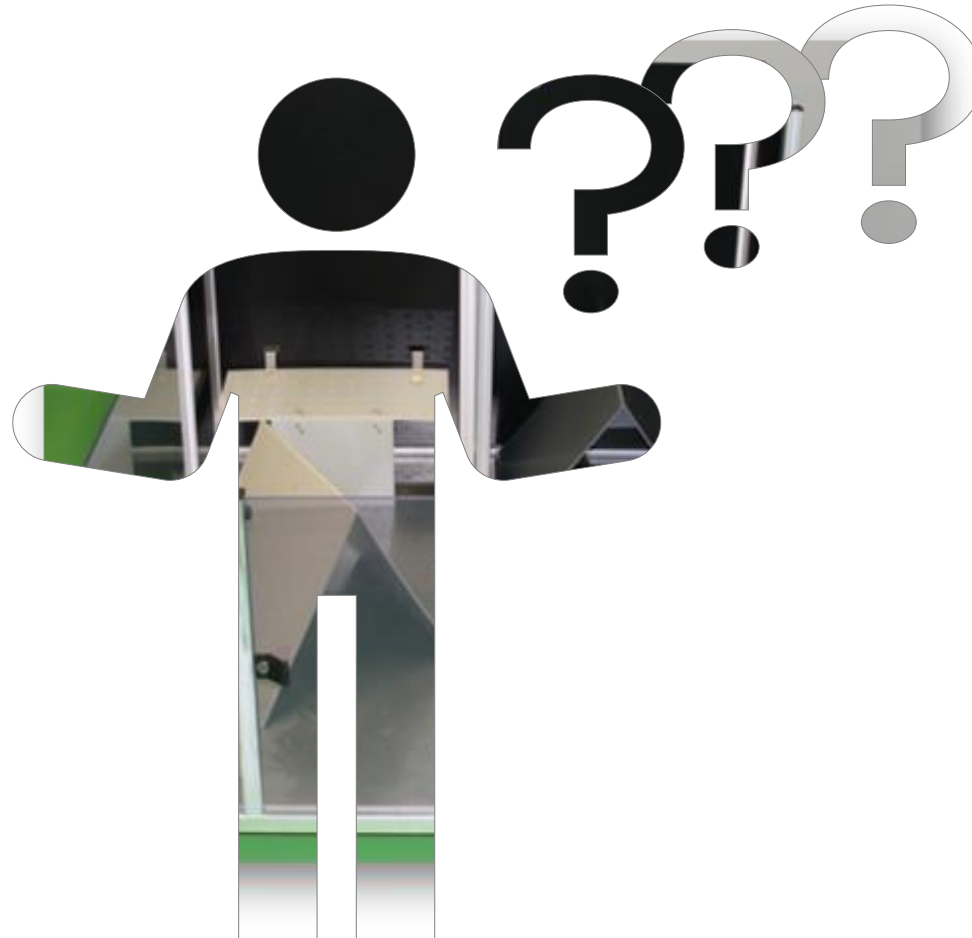


# Compromise: Flatdecks

advantages	disadvantages
group housing	permanently installed
more hygienic than floor husbandry	paw injuries more common
reduced care requirements compared to floor husbandry	natural behavioral patterns not fully expressed
more enrichment options	not standardized
Increased freedom of movement	difficult (animal) handling

Rottler et al.(2018). Berliner und Münchener tierärztliche Wochenschrift. 10.2376/0005-9366-18070.

# Is there a better solution?



core facility animal models

# Our desire for a new system



example CAM mouse IVC room

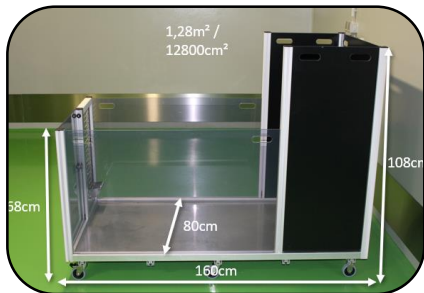
- newly constructed animal facility building
- housing system within a mouse SPF barrier needed
- room planned for IVCs
- no water connections and floor drains in the room

our framework/ requirement	cage	floor housing	flat- deck
species-appropriate husbandry	×	✓	(✓)
no damage to the room	✓	×	×
room still usable for other species	✓	×	×
functional for different numbers of rabbits, group sizes, genders, ages	×	✓	(✓)
breeding possible	(×)	✓	×
easy cleaning	✓	×	×
low-cost	×	✓	×
desired by regulatory authority	×	✓	(✓)

→ no existing system that meets all of our criteria

# Mobil-R-Pen

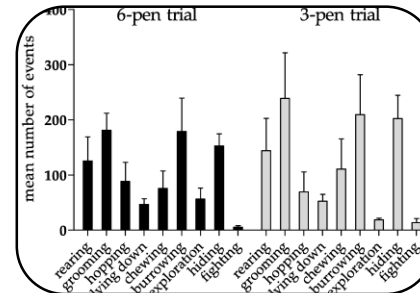
“R” for **R**abbit and **R**efinement



**innovative and flexible design**



**animal and user friendly**



**refinement in animal housing**



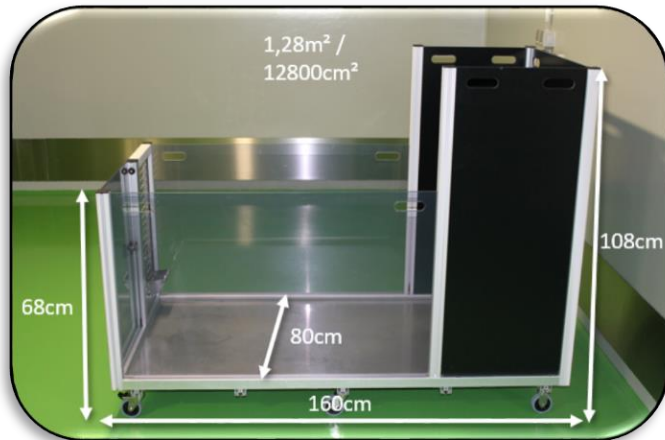
**developed for science**



# Innovative and flexible construction



- modular design for adaptability
- seamless integration in any room
- customizable in various colors and heights
- in-house production, installation, replacement
- compatible with conventional rack washers, H<sub>2</sub>O<sub>2</sub> locks, autoclaves
- easy accessibility for staff



core facility animal models

# Animal- and user-friendly husbandry environment

- improvements in animal health
- freedom to choose bedding depth or use other materials
- allows for extensive digging
- three-dimensionality trains cognitive skills
- countless combination possibilities allow for an ever-changing posture environment
- more natural movement sequences



## Refinement in animal housing

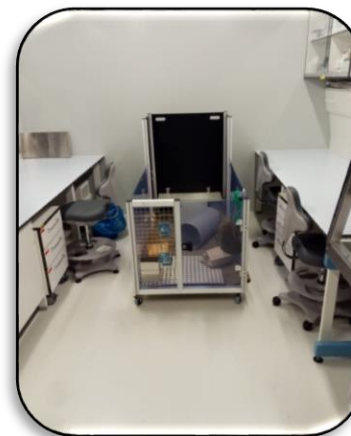
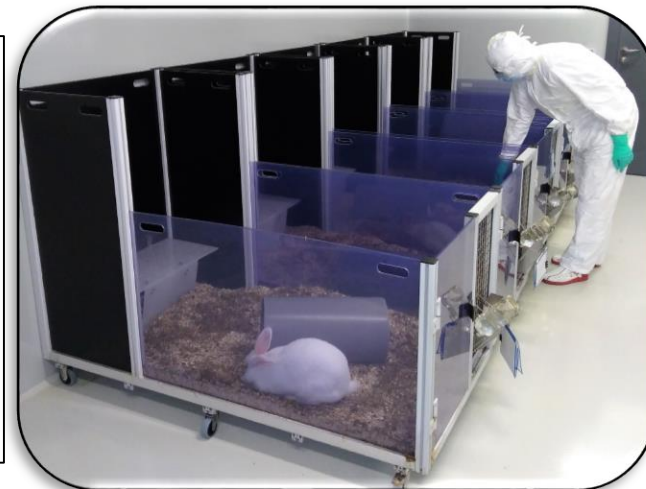


- reduction of anxiety and stress-induced behaviors
- easy removal - no forced measures necessary
- reduces fears
- strengthening of human-animal relationship during daily care
- no unfamiliar surroundings during cleaning measures
- quick and easy separation without handling



## Developed for science

- adapted to needs of laboratory animal science
- quickly and easily adapted to changing regulatory directives/ requirements
- in-house transport to surgery room in home cage
- easy monitoring and post OP care
- easy behavioral observations with camera systems
- one system fits all



core facility animal models



Communication

# Evaluation of a Configurable, Mobile and Modular Floor-Pen System for Group-Housing of Laboratory Rabbits

Dana Matzek <sup>1</sup>, Hanna-Mari Baldauf <sup>2</sup> , Rico Schieweck <sup>3</sup> and Bastian Popper <sup>1,\*</sup>

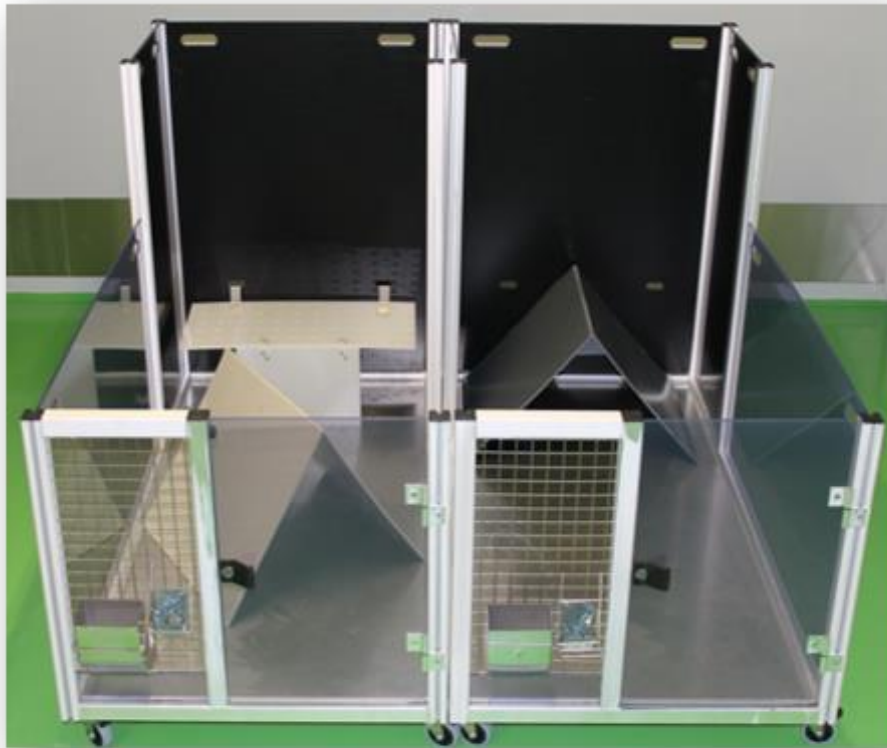
- <sup>1</sup> Biomedical Center, Core Facility Animal Models, Faculty of Medicine, Ludwig-Maximilians-Universität Munich, Großhaderner Straße 9, 82152 Planegg-Martinsried, Germany; Dana.Matzek@med.uni-muenchen.de
  - <sup>2</sup> Max von Pettenkofer Institute & Gene Center, Virology, National Reference Center for Retroviruses, Faculty of Medicine, Ludwig-Maximilians-Universität Munich, 80336 Munich, Germany; Baldauf@mvp.lmu.de
  - <sup>3</sup> Biomedical Center, Anatomy and Cell Biology, Faculty of Medicine, Ludwig-Maximilians-Universität Munich, Großhaderner Straße 9, 82152 Planegg-Martinsried, Germany; Rico.Schieweck@med.uni-muenchen.de
- \* Correspondence: Bastian.Popper@bmc.med.lmu.de; Tel.: +49-89-2180-71996

**Citation:** Matzek, D.; Baldauf, H.-M.; Schieweck, R.; Popper, B. Evaluation of a Configurable, Mobile and Modular Floor-Pen System for Group-Housing of Laboratory Rabbits. *Animals* **2021**, *11*, 977. <https://doi.org/10.3390/ani11040977>

# Is there a better solution?

## We think so!

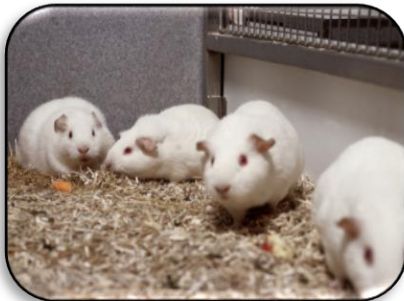
### The Mobile-R-Pen!



our framework/ requirement	Mobile-R- Pen
species-appropriate husbandry	✓
no damage to the room	✓
room still usable for other species	✓
functional for different numbers of rabbits, group sizes, genders, ages	✓
breeding possible	✓
easy cleaning	✓
low-cost	✓
desired by regulatory authority	✓

## What's next?

- **“R - BOX”**
- evaluation for use with guinea pigs
- use as a playground for rats
- evaluation for other species
- addition of a weighing module
- addition of a transport module



<https://www.understandinganimalresearch.org.uk/>

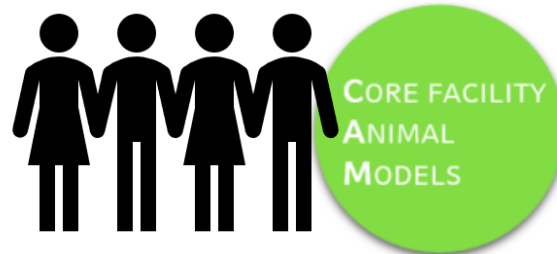


<https://www.tierversuche-verstehen.de/>

# Acknowledgements



**BIOMEDICAL CENTER MUNICH**  
BIOMEDIZINISCHES CENTRUM MÜNCHEN





# Interested in the „Mobile-R-Pen“ or in research collaborations?

**contact us!**

**[cam@bmc.med.lmu.de](mailto:cam@bmc.med.lmu.de)**

[dana.matzek@bmc.med.lmu.de](mailto:dana.matzek@bmc.med.lmu.de)

[bastian.popper@bmc.med.lmu.de](mailto:bastian.popper@bmc.med.lmu.de)

**or visit our website**

[www.cam.bmc.med.uni-muenchen.de](http://www.cam.bmc.med.uni-muenchen.de)

