Improving biomedical research by automated behaviour monitoring in the animal home cage

COST TEATIME

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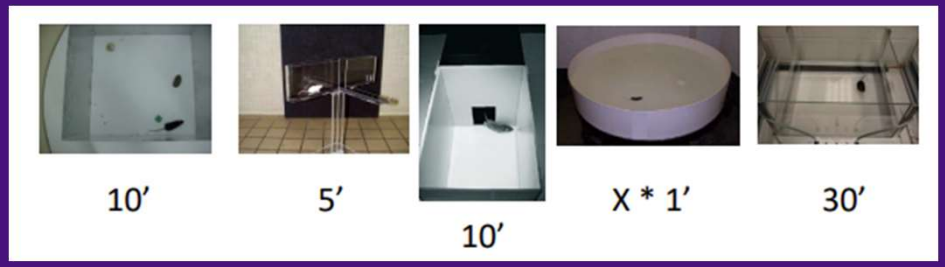
Focus on novel approaches: home-cage monitoring of mice

Traditional, sporadic, snapshot ”out-of-cage” testing – unspecific stressors, bias, (ir)reproducibility

VS

Long-term, 24/7 automated collection of behavioural and physiological parameters in ”home” environment, undisturbed by human experimenter



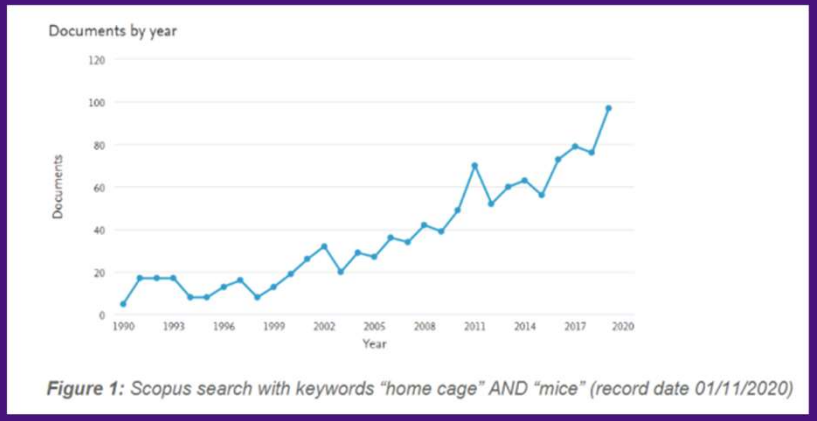


Figure 1: Scopus search with keywords “home cage” AND “mice” (record date 01/11/2020)

Challenges regarding home-cage monitoring systems:

- Many different systems (none all-in-one)
- Different data collection requirements
- Large, complex and difficult datasets
- Cost
- Resistance to change, open questions on construct & translational validity

COST Action CA20135 - TEATIME (2021-2025)

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TEATIME

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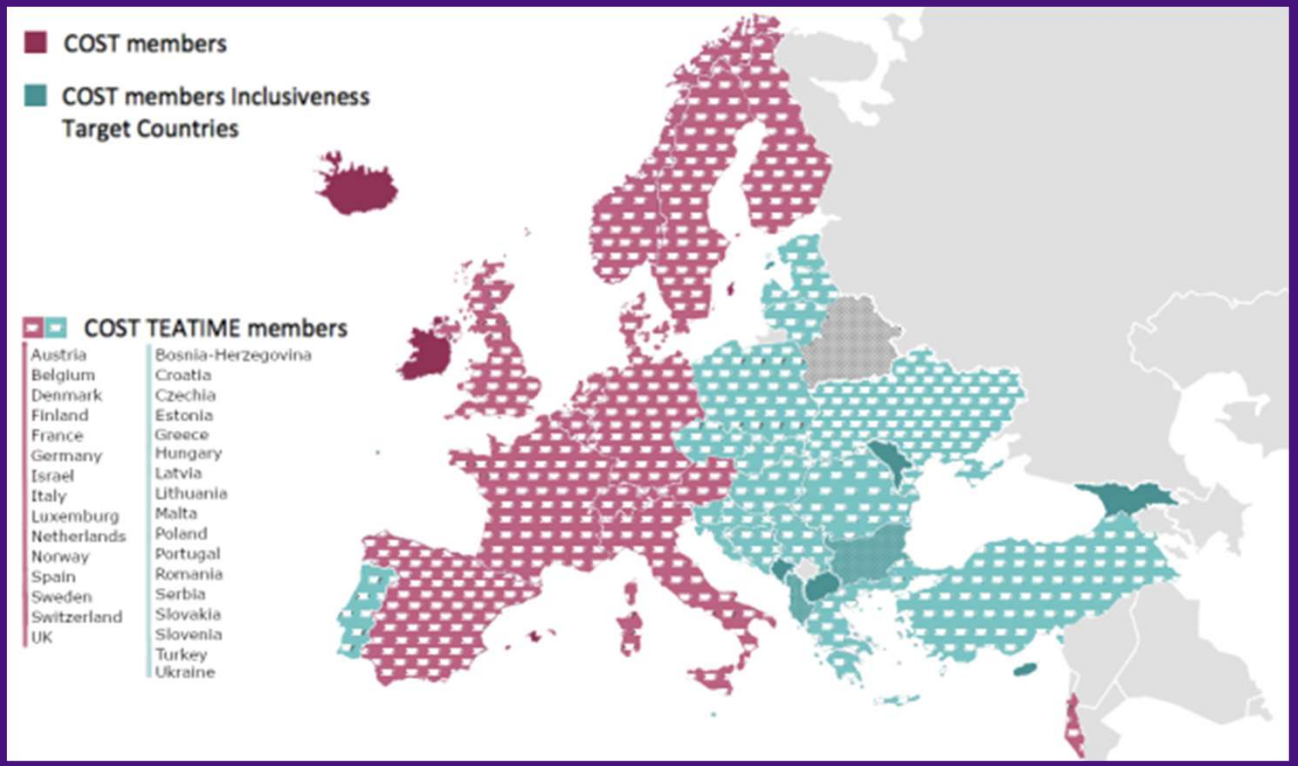
TEATIME - Improving biomedical research by automated behaviour monitoring in the animal home-cage

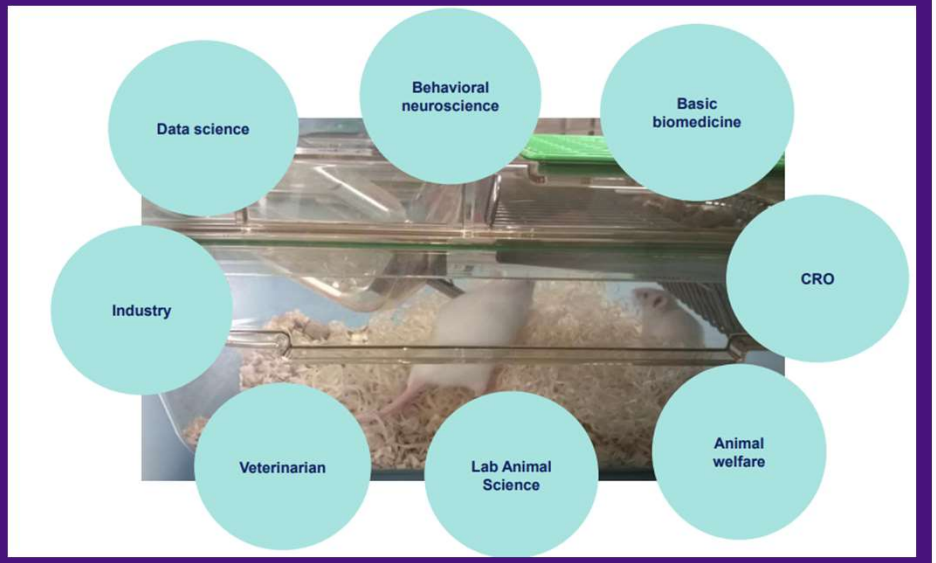
Currently with ~150 participants from 34 countries (19 ITC)

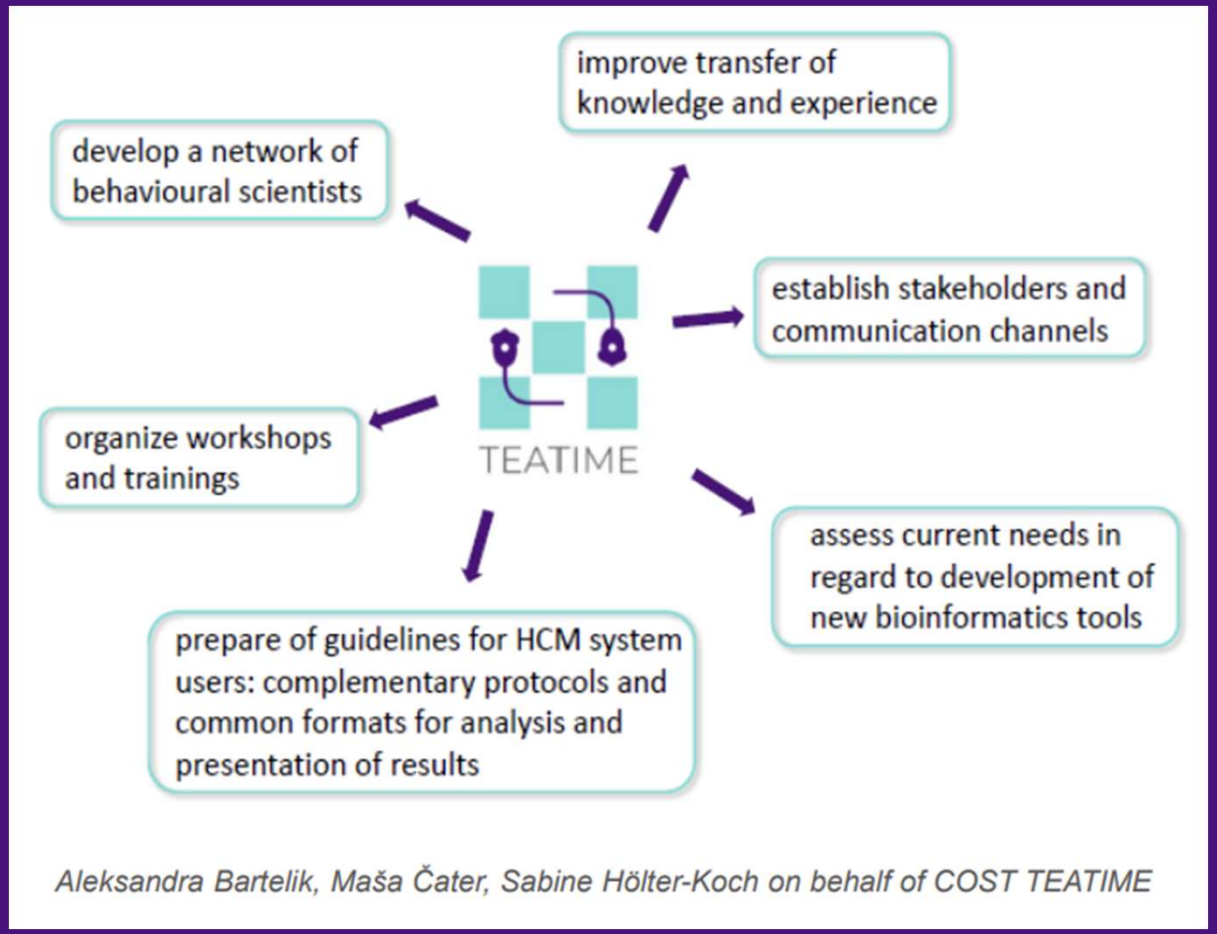
Behavioural neuroscientists, laboratory animal scientists, animal welfare specialists, data analysis professionals, industry representatives



Overarching goals - Research coordination and capacity building

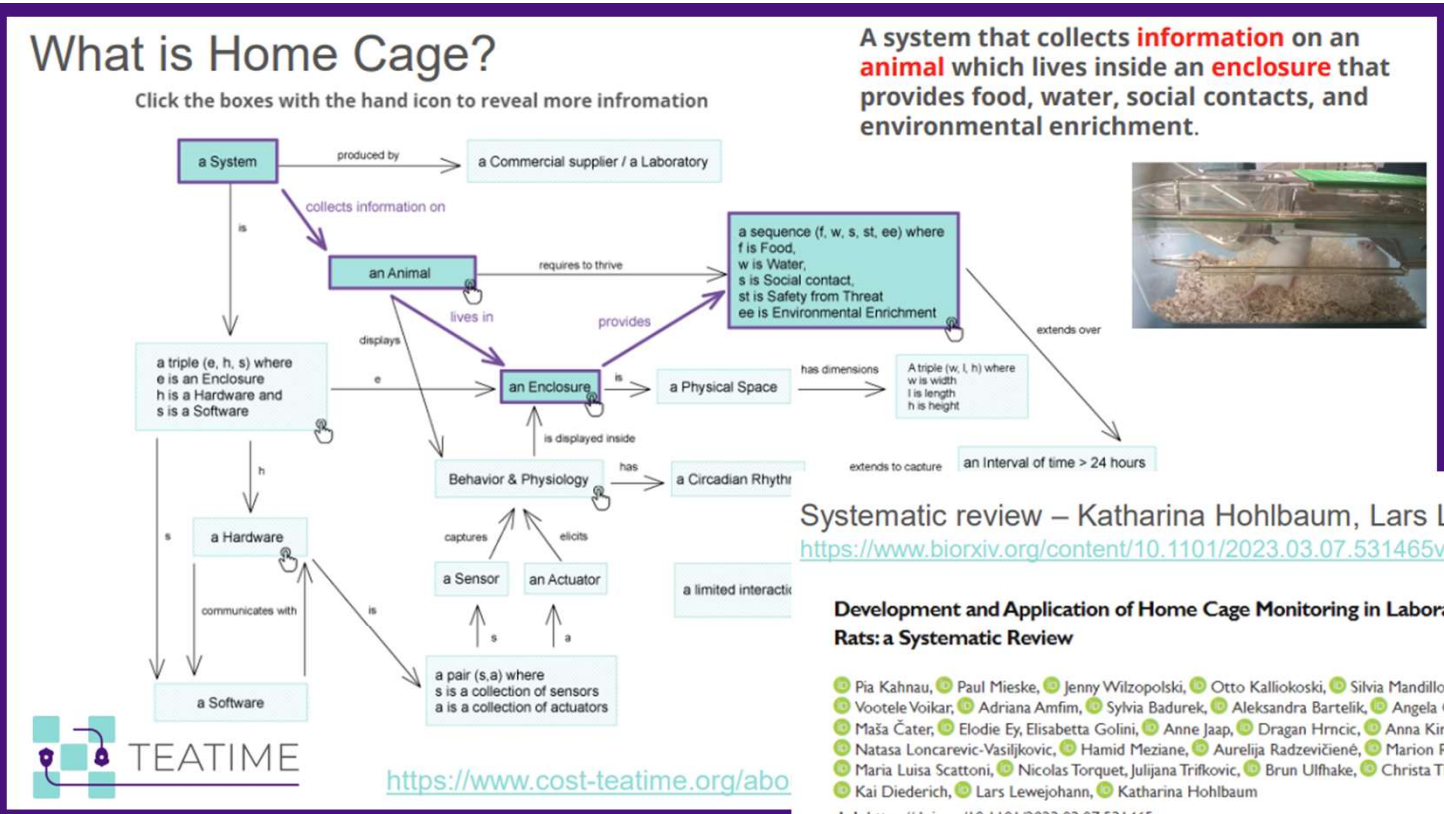
1. Develop a framework to enhance the sensitivity, reliability, and reproducibility of behavioural measures from laboratory rodents.





Aleksandra Bartelik, Maša Čater, Sabine Hölter-Koch on behalf of COST TEATIME

behaviour.sc forum



3. Improve data relevance and reproducibility in compliance with animal welfare and ethical considerations.

2. Strengthen pan-European preclinical research by establishing standards and guidelines to promote emerging tools.

Systematic review – Katharina Hohlbaum, Lars Lewejohann et al.
https://www.biorxiv.org/content/10.1101/2023.03.07.531465v2

Development and Application of Home Cage Monitoring in Laboratory Mice and Rats: a Systematic Review

Pia Kahnau, Paul Mieske, Jenny Wilzopolski, Otto Kalliokoski, Silvia Mandillo, Sabine M. Hölter, Vootele Voikar, Adriana Amfim, Sylvia Badurek, Aleksandra Bartelik, Angela Caruso, Maša Čater, Elodie Ey, Elisabetta Golini, Anne Jaap, Dragan Hrncic, Anna Kiryk, Benjamin Lang, Natasa Loncarevic-Vasiljkovic, Hamid Meziane, Aurelija Radzevičienė, Marion Rivalan, Maria Luisa Scattoni, Nicolas Torquet, Julijana Trifkovic, Brun Ulfhake, Christa Thöne-Reineke, Kai Diederich, Lars Lewejohann, Katharina Hohlbaum

doi: https://doi.org/10.1101/2023.03.07.531465

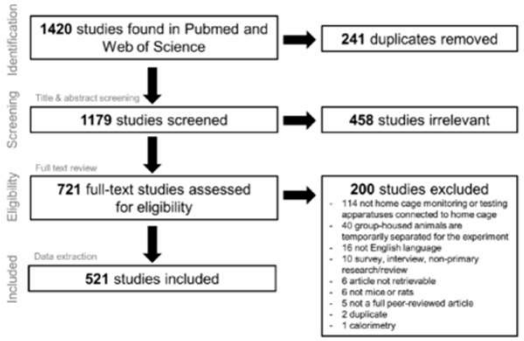
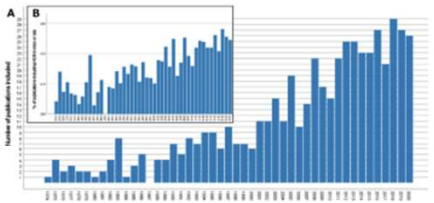
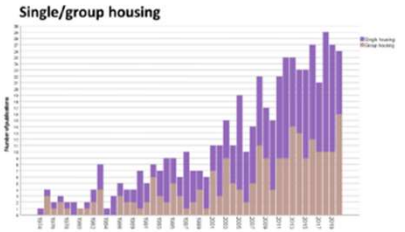
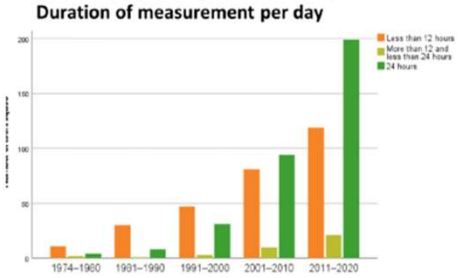


Figure 1. PRISMA flow diagram.







CATALOGUE

Available Technologies

Members of the TEATIME Action have compiled the following list of devices and some associated software that falls **under our definition of homecage monitoring.**

Our aim is to create a useful and accurate resource for people interested in exploring the use of home-cages.

We would be grateful for any input on its structure and content. If you have comments or there are any inaccuracies or omissions, please email us at

Show entries Search:

SYSTEM	TECHNOLOGY	PRODUCED BY	SPECIESTESTED	CAGE	SINGLE/GROUP	BEHAVIORALCONSTRUCTS	BEHAVIORALMEASU
Feeding Experimentation Device (FED)	Stepper motor/IR sensors	Kravitz Lab	mouse	s/m	single		pellet delivery; pell retrieval; nose pok
Figure-8 Maze	Customized hardware and tracking software	August B. Smit Lab/Biobserve	mouse	s (connected to operant box)	single	spatial learning (delayed spatial alternation)	correct responses double incorrect responses (%); rea time/choice (s); act
Home Cage Analyser (HCA)	Video/RFID	Actual Analytics	mouse/rat	s	group		Distance travlled a time spent climbin timeline. Pairwise separation betwee animals over light Dark Phases. Body temperature over
HomeCageScan	Video	CleverSys Inc	mouse	s	single		
InfraMot	IR thermosensor	TSE	mouse/rat	s	single	locomotor activity	activity count (arbi unit) per defined ti interval

Showing 16 to 20 of 45 entries

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19.-23.9.2022 Italy

10.-14.7.2023 Portugal

2024 - to be determined

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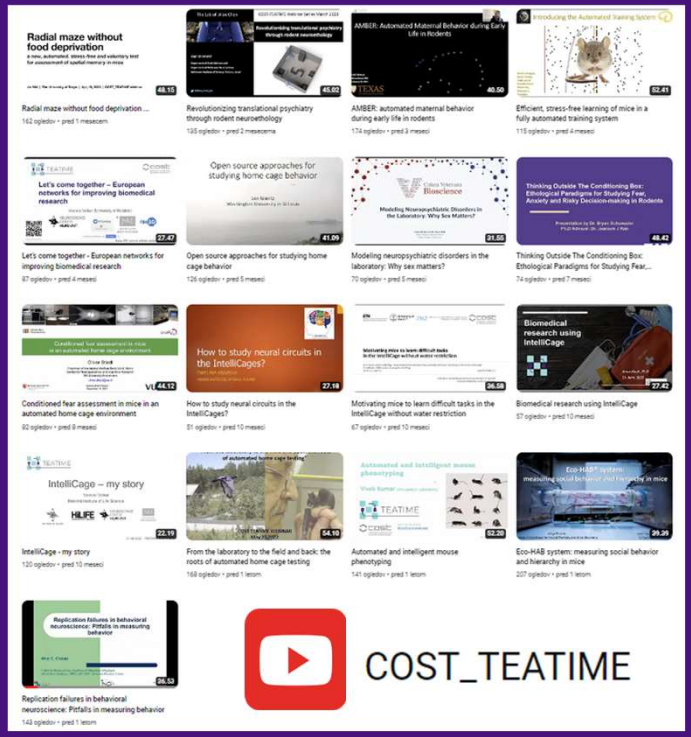

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