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## WHY HOME CAGE SYSTEMS?

Recording, interpreting, and understanding physiological behavior and its variability across the species population is essential to determine which behaviors are pathological, and thus to assess the effects of genetic changes, environmental changes, or the effectiveness of therapeutic interventions [1] [2]. Classic behavioral tests, based on different paradigms, are used to evaluate specific behaviors. Due to their nature, they only reflect a specific life moment in the experimental animal [3]. Therefore, over the past 20 years, many home cage monitoring systems (HCM) have been developed based on different technologies, enabling long-lasting observation of animals in a stabilized social and in their familiar environment (Fig. 1) [4]. The automatic monitoring systems also minimize the experimenter's intervention.

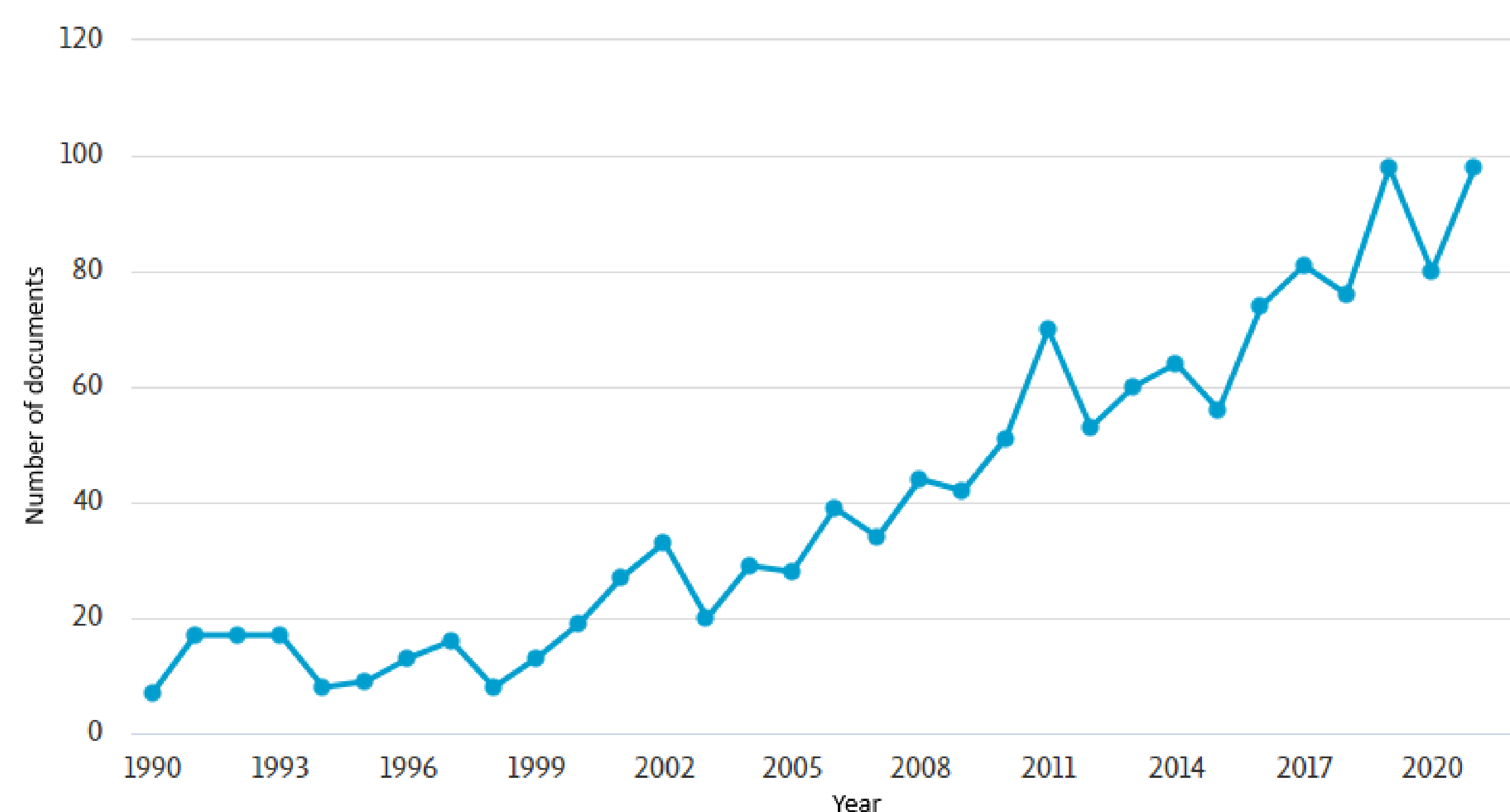


Figure 1: Number of publications issued in the years 1990-2021 on research on mice with the use of HCM. Scopus search with keywords "home cage" AND "mice" (record date 08.04.2022).

Sophisticated technologies (weight sensors, infrared systems, electromagnetic detection, RFID system, telemetry, thermal imaging, etc.) that are in use in HCM systems, enable automatic monitoring systems that limit human intervention to a minimum, minimizing a significant factor affecting the repeatability and reproducibility of experiments. Automated HCM systems provide us with a complex pool of additional data, such as social behavior, abnormal behavior, learning and memory, locomotor activity, heart rate, food and water intake, and are in use in various scientific areas (Fig. 2).

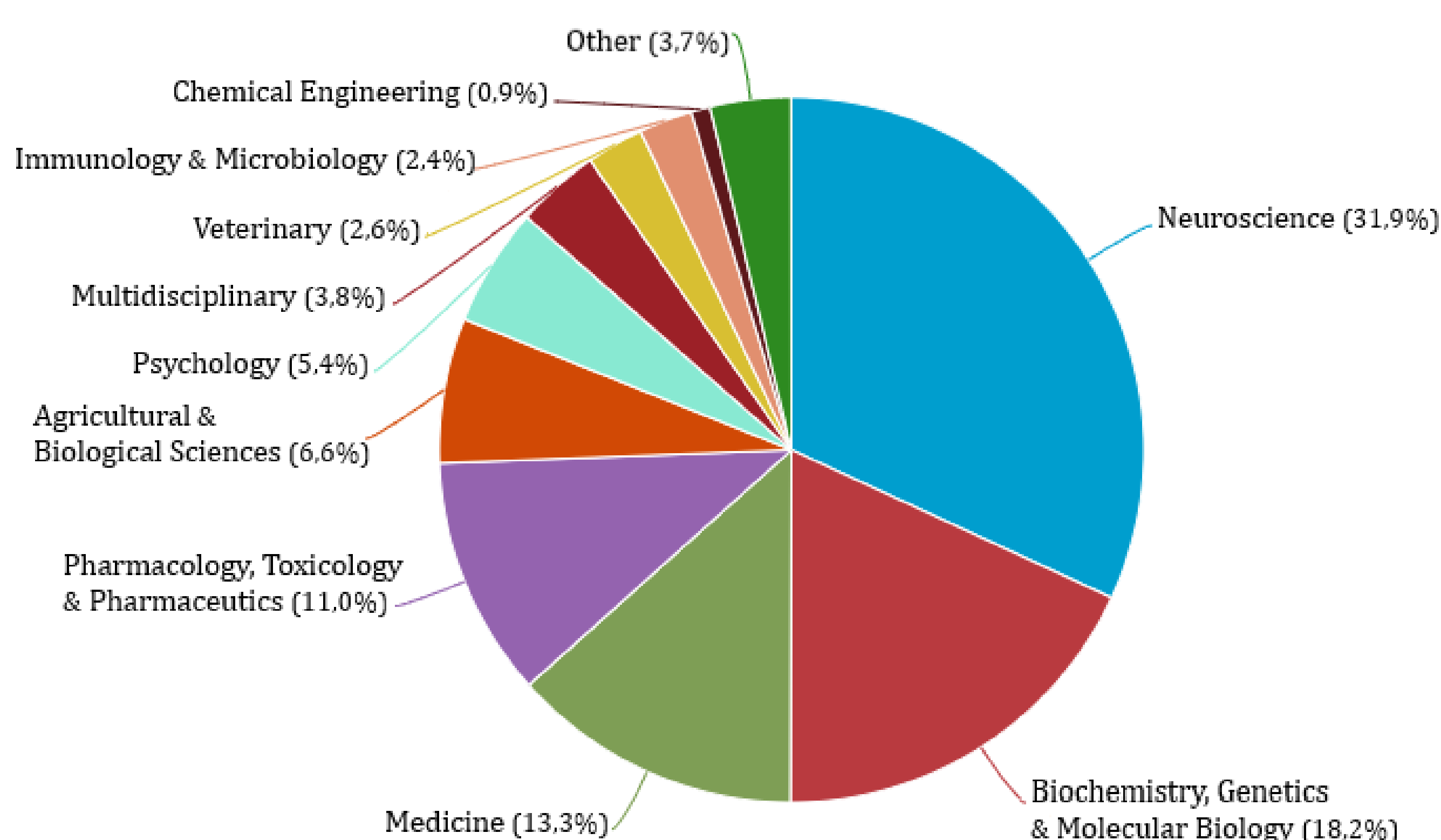


Figure 2: Percentage of documents published in the years 1990-2021 in various subject area regarding research on mice with the use of HCM. Scopus search with keywords "home cage" AND "mice" (record date 08.04.2022).

## HOW TO JOIN TEATIME?

Scientists from 23 European countries already participate in the Action, and thanks to the openness of the project, new members are welcome to join:

<https://cost-teatime.org/>

## TEATIME ACTION

Each of HCM technologies has strengths and limitations and currently, no existing single system fits all needs. Additionally, interpreting the large amount of complex data collected is a demanding task. Therefore, we have set up a COST Action connecting European behavioral scientists (Fig. 3). COST (European Cooperation in Science and Technology) is an organization that supports researchers to connect initiatives and develop their innovative ideas. TEATIME activities are aimed at examining the current state of the HCM systems and technologies, identifying the needs for automatic animal monitoring systems, and finding solutions that will help interpret the large amount of data more accurately, improving the reproducibility and validity of the research, reducing the number of laboratory animals used for scientific purposes, and improving animal welfare, which is the basis of modern laboratory animal research as well as aligns with the principles of Replacement, Reduction and Refinement ("3Rs").

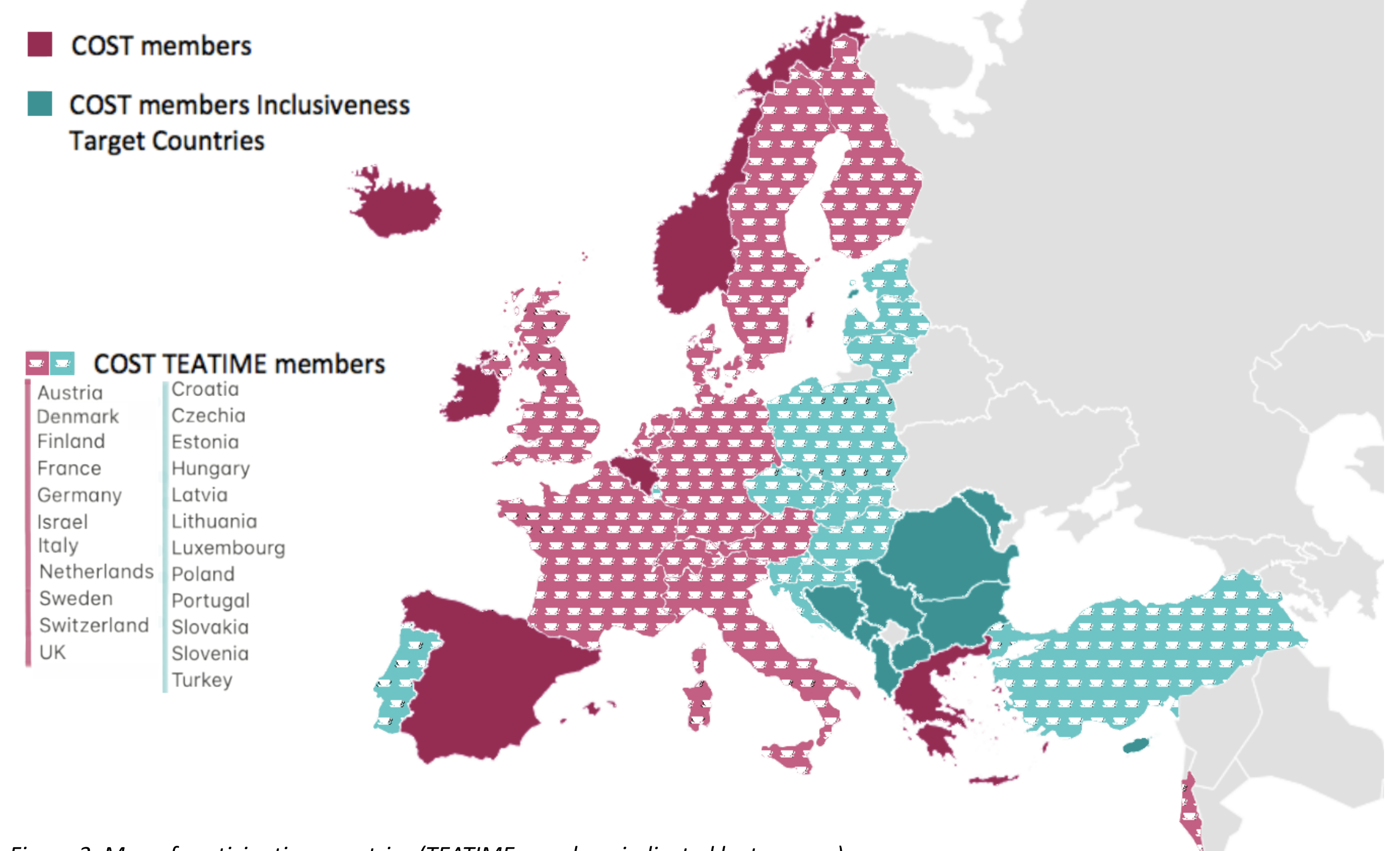


Figure 3: Map of participating countries (TEATIME members indicated by tea-cups).

TEATIME main goals are:

- to compare the currently available technologies,
- to identify the needs and find solutions to help interpret the results,
- to improve the reproducibility and validity of the research by home cage automatic behavioral monitoring systems in order to reduce the number of experimental animals and improve their welfare
- other knowledge sharing and networking activities (Fig. 4)

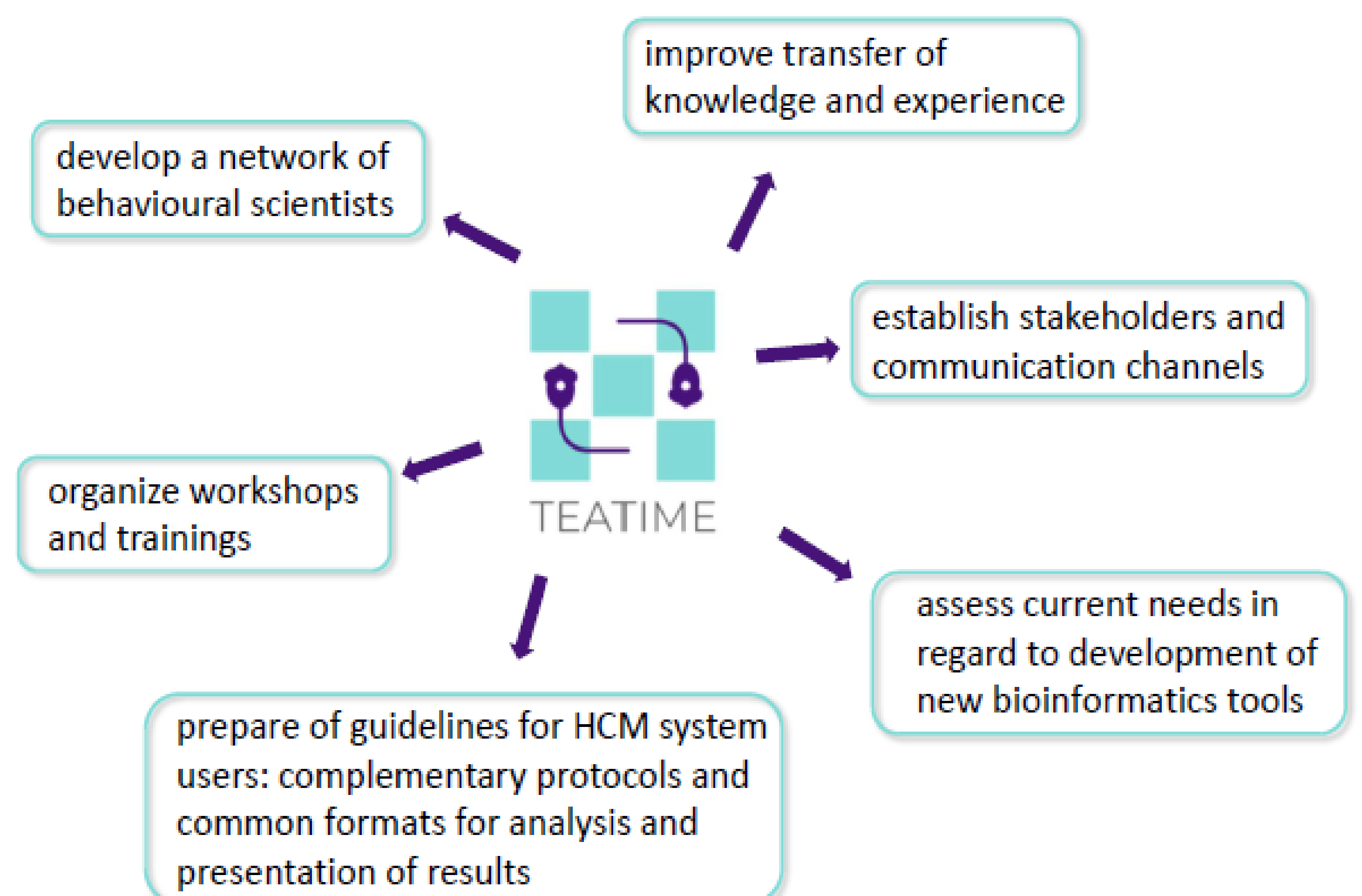


Figure 4: TEATIME Action main activities planned for 2021-2025.

**The aim of COST\_TEATIME is to bring together European organizations developing and using automated home-cage monitoring technologies, and jointly improving refined experimental conditions that can substantially improve animal welfare and, importantly, data reproducibility and translational value.**