



Revolutionizing
Behavior Research



IVC-RackScan

Features:

- **NEW!! IVC Rack Integration with HomeCageScan!!**
- Fully automated complete Home Cage Analysis inside an IVC Rack.
- Full IVC Rack featuring air-circulation pump mechanism and cages with filters
- Rack fully fitted with video-analysis equipment such as cameras and day/night lighting.
- By displacing this equipment into an animal holding facility, it saves valuable lab space that could instead be used for other dedicated equipment
- All traditional HomeCageScan features preserved
- Real-time or offline, full color-analysis
- Continuous 24-hour or greater recording capable
- No user intervention required during experiment
- Detailed statistics about behaviors that occurred during the experiment
- Grooming Behavior Classification (Paw-lick, Head-wash, & Body Wash)
- Automated Binned Data and Advanced Behavior Sequencing Analysis
- Validated to be more than 90% accurate with respect to human scoring
- Automatic adaptation to changing environment, day/night changes
- Result review, Visualization of Acquired Experiments
- Batch-mode allows user to run multiple videos successively without human intervention

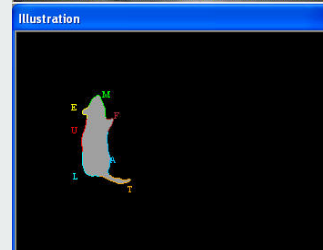
Behaviors HomeCageScan can detect:

- | | | |
|-------------|----------|-----------|
| • Rear Up | • Eat | • Groom |
| • Come Down | • Drink | • Stretch |
| • Walk/Run | • Chew | • Sleep |
| • Hang | • Sniff | • Twitch |
| • Jump | • Dig | • Pause |
| • Land | • Forage | • Awaken |
| • Turn | • Circle | • Urinate |

Clever Sys provides the first of its kind in the world of an IVC (Individually Ventilated Cages) Rack that is capable of performing 24-hr video based Behavior Recognition Analysis in realtime.

The **IVC-RackScan** system from Clever Sys is a turn-key solution for animal husbandry in labs where animals are also required to be analyzed for their activity and behavior. Heretofore, these two solutions were separate – IVC racks exist in the market but due to their density, there was no room to perform any kind of behavior analysis, and our traditional HomeCageScan automated Home Cage Behavior Analysis was done on passive racks only. With **IVC-RackScan**, you can satisfy the requirements of cleanliness, separation and High-Throughput that is asked from an IVC system, while simultaneously performing 24h home-cage behavior analysis. If you are a scientist looking to run long-term behavior analyses in home cages, you don't need to allocate valuable lab space for this equipment. Instead, the home cage behavior analysis could be performed in the animal facilities themselves. If you are an animal facility manager, you can now offer behavior analysis services to your scientist colleagues as an added feature.

HomeCageScan is the flagship product in PhenoScan Suite for automatically studying unconstrained rodent behaviors in a home cage. Our premise for developing HomeCageScan is that behavioral phenotypes are often best detected when the rodent is unconstrained by experimenter manipulation. Thus, automated high throughput analysis of behaviors in the home cage would be a powerful tool for performing phenotyping for gene manipulations, disease monitoring, drug administration studies, etc.



The **IVC-RackScan** Rack comes fitted with dual lighting panels (White + IR light) for continuous automated 24-hr analysis, and associated filters, isolation and air circulation required from an IVC system. The included cameras auto-switch between day mode and night mode, hence, no user intervention is required.



IVC-RackScan

(Continued from front)

Applications:

- Disease Progression Studies
- Stereotypic Behavior Studies
- Genetic Research
- Toxicology Studies
- Foot/Liquid Intake Studies
- Obesity/Metabolism Studies
- Pain & Motor Deficiency
- Aging/Longitudinal Studies

Results:

- Objective Behavior Recognition Results
- Automatic Export to Excel
- Complete Experiment Database Management
- Summary of All Occurred Behaviors and their Durations
- Circadian Plots and Binned data for each behavior and at user-defined bin intervals
- Second-order Behavior Sequencing Analysis!

Product Options:

- High-Throughput Option (H Option)
- Realtime Option (R Option)
- Training Option (T Option)
- Any combinations of these 3 options are available!

Requirements:

- Windows-based PC
- Intel High-speed Processor
- Special Videocard for realtime analysis
- Large HDD space for storage
- Good lighting conditions
- IR-switchable camera or red-light for night
- Video-multiplexer for multi-camera feed

Automation of analysis would allow quantification of all behaviors and their circadian rhythms over extended periods of time, yielding a behavior profile for each animal and their ability to be compared against other subjects for a detailed study in any kind of behavior research.

The automated system is also able to detect abnormal behaviors that do not normally occur and present the investigator with video clips of such behavior. Abnormalities may also result from a deviation from the regular circadian rhythm of normal behaviors. That is, detection of novel abnormal behaviors is achieved by detecting segments of behavior that do not fit the standard profile for a particular strain of rodent whereas detection of abnormal amounts of a normal behavior is detected by comparing the statistical properties of the standard profile.



IVC- RackScan is a perfect fit for longitudinal studies where several animals are studied and tested over long periods, and they require clean-air and isolation from each other. For example, HomeCageScan can be used in communicable and other special types of disease and disease progression studies by analyzing several animals one day every week for several weeks. The behavior profile for each week can then be compared with other weeks' data to see what behaviors are altered over the course of the study.

The techniques for automation of the categorization and quantification of all home-cage behaviors throughout the daily cycle will be a powerful tool for detecting phenotypic effects of gene manipulations or drug administration in rodents. These techniques have been applied to achieve high throughput drug screening as well. Each copy of HomeCageScan software is capable of analyzing up to 4 cages simultaneously. Each IVC-RackScan rack can hold up to 12 cages. Multiple copies of the HomeCageScan software can be purchased to increase the throughput via the optional Realtime analysis feature, or multiple video streams can be recorded in parallel and analyzed serially on a separate offline analysis station. Clever Sys will work with you to design your optimal setup within your budget.

All advanced features from traditional HomeCageScan software systems are incorporated here, including supporting full color analysis, automatic adaptation to changing environment, automated handling of day/night transitions, variable speed playback of specific video segment for specific detected behavior, etc. **IVC-RackScan** is marketed as a Complete Turn-key system including all necessary Hardware and Software. Custom design of your setup, including customized lighting condition setup, IR/red light setup, cage enclosures, video integration, and video-feed to computer is also available.

IVC-RackScan Rack Specs:

- Arrangement: 2 columns, 6 shelves
- Dimensions (HxWxD): 1.82m x 1.1 m x 0.6m
- Built-in programmable White and IR lighting
- Includes Day/Night Cameras for each cage

IVC-RackScan Air Circulator Specs:

- Dimensions (HxWxD): 1.65m x 55 cm x 31 cm
- Noise: 55 dB(A)
- Air circulation Freq: 0-70 (Adjustable)
- Pressure Gradient: 0-50 Pa (Adjustable)
- Max Air Speed: 18 cm/s