NEW

THERMAL GRADIENT RING

The most sensitive and robust method to study THERMAL SENSITIVITY AND NOCICEPTION

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Increased thermal test sensitivity and accuracy

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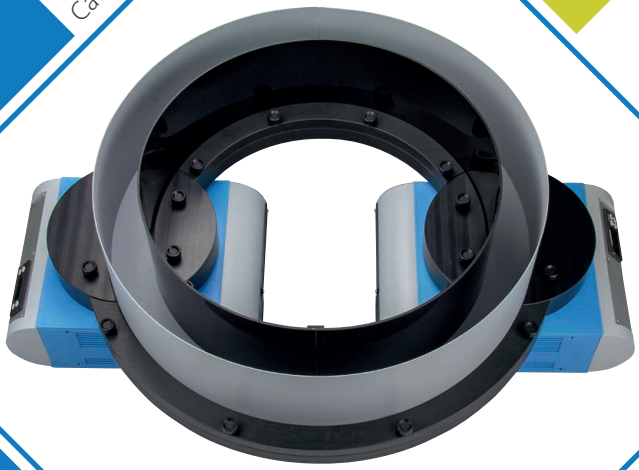

Faster and fully automated thermal preference and pain studies

ugo basile®
TRANSFORMING IDEAS INTO INSTRUMENTS

Ugo Basile SRL
Via Giuseppe Di Vittorio, 2 - 21036 Gemonio (VA) ITALY - Tel. +39 0332 744574 - sales@ugobasile.com

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What does it do: overview

Current devices such as linear temperature gradients do not allow to discriminate between exploration-driven behaviour and thermal-driven behaviour. The limitations are especially severe when it comes to quantifying normal cold sensitivity, cold hypersensitivity and cold hyperalgesia knock-out and double knock-out mice cold transducers such as TRMP8-, TRPA1- and TRPM(/A1- mice (Touska et al. 2016). Beyond these specific transducers a very large number of Pain research areas do require enhanced sensitivity and robustness versus confounding factors such as exploration and thigmotaxis.

With these objectives and limitations of currently available devices in mind, Dr. Zimmermann (University of Erlangen-Nuernberg and her team dopo "Dr. Zimmermann", had a brilliant idea and created a fully working prototype, which Ugo Basile then transformed and validated into a reliable and industrialized device for scientists' benefit worldwide.

In practice, the double hot/cold plate or the corridor thermal gradient approaches (which unavoidably exposes mice to instinctive tendency to explore and prefer the edges and walls of the device) were replaced by a **thermally calibrated ring, where the animal faces no edge and which has no start/ end points, being completely symmetrical, spatially and thermally.**

NEW

Features and Benefits

- **Discriminate thermal-driven behaviour** from exploratory/motory/emotional-driven behaviour
- **Boost sensitivity** thanks to the discrimination above and to the accurate thermal gradient with duplicate thermal zones. The result isa thermally symmetrical arena, whose temperature can be adjusted according to the experimental needs in duplicate "slices" of temperature zones
- **Sturdy and seamless to use** with very broad ranges of temperatures for the most diverse supraspinal pain studies, yet avoiding exploration, anxiety and other non-thermally driven disturbances
- **Ready-made and comprehensive results** collected and analysed by video-tracking software across temperature and time dimensions (e.g. preferred temperature, time spent in each zone, number of entries, thermal preference in different time windows of the experiment, etc.)

Less is more: less manpower, less animals needed, less experimenter bias

Increased thermal test sensitivity and accuracy

Faster and fully automated thermal studies

The technology behind the Thermal Gradient Ring

With more than 2,600 papers published with the Ugo Basile Hot-Cold Plate, the industrialization of Dr. Zimmermann's prototype started with the confidence that the ring could be set at the desired temperature and that by setting a high and a low temperature (min and max are 4°C and 65°C respectively) at two extremes of the ring, the temperature over the metal corridor would correspond to the desired gradient. This flexibility and robustness is attained thanks to special sensors and conductive material.

The second step was the automation of the mouse behaviour and the automated calculation and display of the thermal preference data. This is achieved using an IR sensitive camera, visible and IR lights above the arena, an inner IR-transparent corridor, a special paint for the corridor to maximize contrast and the use of the best in class video-tracking software ANY-maze. To make it even simpler for the user, a special ANY-maze protocol was developed, so that the system is literally plug and play. Only 1 USB connection from the TGR to your PC and Anymaze will do the rest for you!

Specifications

Heating unit temperature range:	from room temperature to 65°C
Cooling unit:	from 4°C to 35°C
Temperature feedback:	thermocouples monitored in real time by the video-tracking software
Animal position detection:	through video-tracking
Power:	univ. input 85-264 VAC, 50-60Hz

Physical

Aluminum Runway:	ID 45cm, OD 57cm
Circular Enclosures:	24cm high
Dimensions:	87x64x64(h)cm
Weight:	39Kg
Shipping Weight:	57Kg
Packing:	87(W)x64(D)x64(H) (wooden box)

Bibliography

♦ F. Touska Z. Winter, A. Mueller, V. Vlachova, J. Larsen and Katharina Zimmermann: "Comprehensive thermal preference phenotyping in mice using a novel automated circular gradient assay" J.Temperature, Vol 3 (1) **2016**

♦ Z. Winter, P. Gruschwitz, S. Eger, F. Touska and Katharina Zimmermann: "Cold Temperature Encoding by Cutaneous TRPA1 and TRPM8-Carrying Fibers in the Mouse" Front. Mol. Neurosci., **2017**