

Orofacial Stimulation Test

Fehrenbacher, Henry and Hargreaves Method

Cat. No. 31300

- Mechanical Nociception
- Thermal Nociception

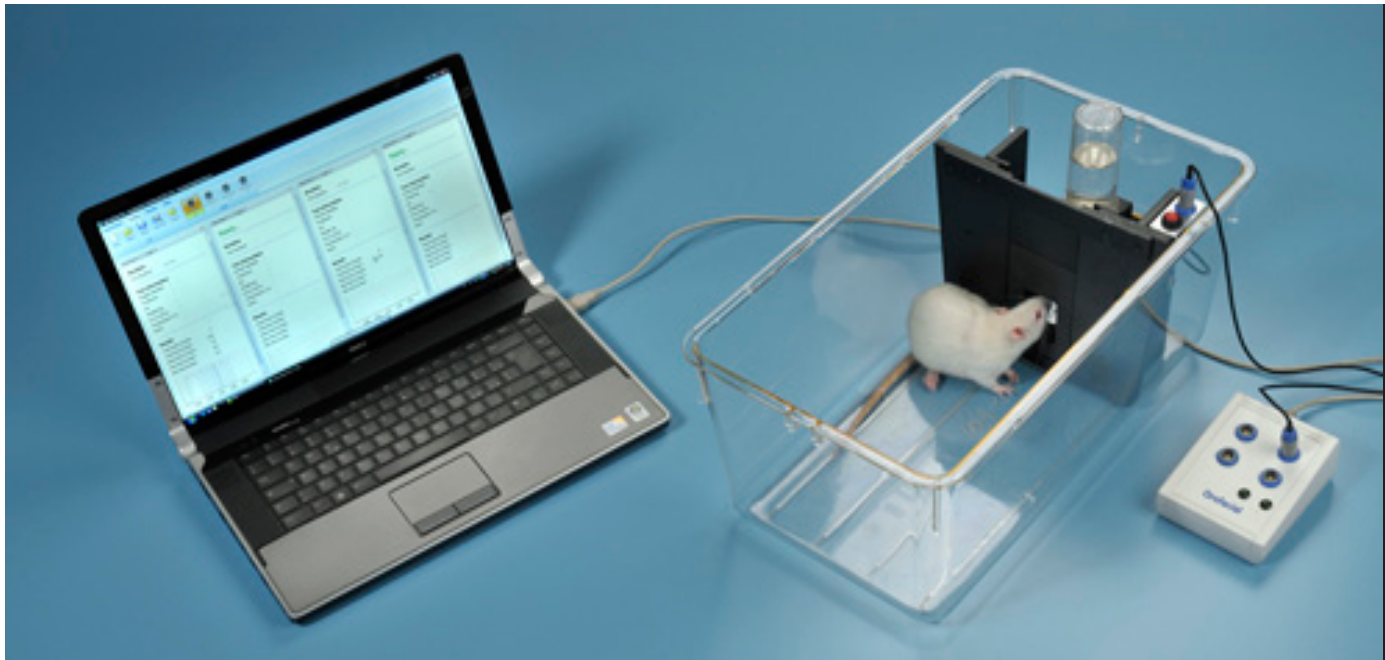
Trigeminal
hyperalgesia

General

The **Orofacial Stimulation Test** by **Ugo Basile** measures hypersensitivity to thermal or mechanical stimulation of the trigeminal area.

Rats voluntarily contact a thermal or a mechanical stimulator with their *unshaved vibrissal pad* in order to access a food reward. Metrics obtained are (1) the duration of feeding and (2) the number of feeding attempts, measured by interruption of an infrared beam traversing the opening to the reward.

Feeding duration and number of attempts are strongly dependent on changes in the applied thermal or mechanical stimulus.



Main Features

- Mechanical and thermal nociception assays within the same experiment
- High throughput: up to 16 animals can be tested simultaneously
- Intact vibrissal pad, as the test does not require any vibrissal shaving

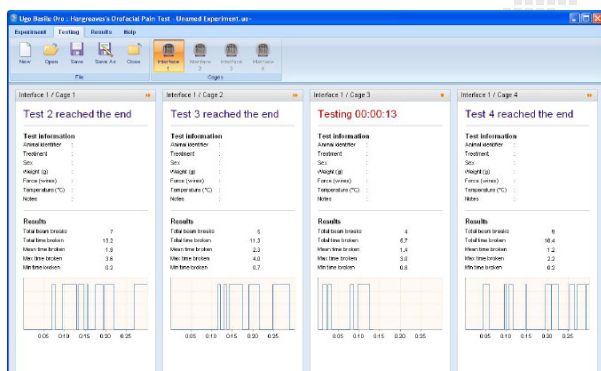
Instrumentation and Methodology

Orofacial pain problems are common and involve structures and mechanisms unique to the trigeminal nerve. Few methods are currently available for orofacial pre-clinical research, and none incorporates parallel measurement of mechanical or thermal stimulation within the same experiment. Moreover, while most of the current assays measure unlearned behaviors, such as flinching or withdrawal reflexes, the new **Orofacial Stimulation Test**, developed by Hargreaves and colleagues, integrates higher-order brain functions into measurements of orofacial nociception.

This innovative approach permits the parallel measurement of highly integrated nociceptive responses to thermal or mechanical stimulation.

Animals are trained & tested in standard home cages. The snout is inserted through an opening to lick the reward bottle. Tests are performed in the presence of thermal and / or mechanical stimuli contacting the vibrissal pad. Following treatment to induce hypersensitivity, (e.g., trigeminal ligation or injection to induce inflammation) trials are repeated to determine the effect of treatment on feeding behavior / reward. Assay sensitivity (inflammation-induced decreases in feeding behavior and reversal of hypersensitivity by local and systemic administration of analgesics) has been proven (Hargreave's et al., ms in prep.)

The **Ugo Basile Orofacial Stimulation Test** quantifies feeding behavior by measuring the beam-break number and duration. The measured feeding behavior is strongly correlated to mechanical or thermal orofacial nociception, as rats must contact a thermal or a mechanical stimulator in order to access the food reward.



Orofacial Software: testing window

The **Oro Software** collects and records beam-break numbers and duration (including min, max and mean) from up to 16 cages simultaneously.

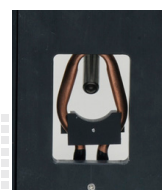
Data are shown in real-time both as numeric summary results and in a graphic format. Data are automatically analyzed across time according to an adjustable time window, independently viewable for each of the 16 cages. The results of all the tests are available in a spreadsheet format which can easily be copied to other programs for further analysis.

Either the thermal or the mechanical stimulator is mounted onto a **stimulation/detection "wall"**, which also incorporates a drinking bottle and fits inside standard rat home cages (e.g. Tecniplast or Allentown).

Stimulus / detection "walls" mounted into standard home cages



The **thermal stimulator** relies on a copper tubing loop and a circulating water bath, whose temperature can be adjusted from ambient to 70°C, to reach hot nociceptive thresholds.



Thermal Stimulator

The **mechanical stimulator** relies on thin metal wires attached to a mounting plate. The system comes with several plates, each with a different number of wires in order to apply different force levels to the animal vibrissal pad.



Mechanical Stimulator

The "System and Method for Assessing Hypersensitivity to Orofacial, Thermal and Mechanical Stimulation" (U.S. Provisional Patent Application 61/235,590) was invented by K. Hargreaves, J. Fehrenbacher and M. Henry in the Laboratory of Dr. Hargreaves at UT San Antonio and developed commercially by Ugo Basile R&D. Dr. Fehrenbacher is now at IUPUI, Indianapolis.

Ordering Information

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|------------------|---|
| 31300 | Complete system for one animal |
| 31320 | Complete system for two animals |
| 31340 | Complete system for four animals |
| 31300-001 | Electronic unit (four channels) |
| 31300-002 | Additional cage assembly (includes thermal and mechanical stimulators and feeding detector) |
| 31300-003 | Circulating water bath |
| 31300-010 | ORO-Software, for data acquisition and analysis from up to 16 cages. |

Bibliography

- Fehrenbacher, J.C. et al. 2010. "Characterization of a novel orofacial behavioral assay to assess hyperalgesia to thermal and mechanical stimulation". (submitted).