
IN THIS ISSUE

Articles Highlighted

A New Labeled Hedonic Scale

Page 739

Whereas traditional psychophysics in vision, touch, or audition concentrated primarily on stimulus intensity, in the chemical senses the measurement of hedonic responses is particularly crucial. Although understanding of essential problems such as the establishment of preferences depends on hedonic ratings, precise quantification was difficult to achieve. Based on preexisting knowledge, Lim et al. now developed LHS, a semantically labeled hedonic scale supposed to yield ratio-level data on the magnitude of liking and disliking of sensation. LHS shares some fundamental properties with LMS, the labeled magnitude scale which measures sensory intensities. However, it also has distinct properties such as a bipolar character with “neutral” in the center in order to enable ratings of like and dislike in a continuous manner. Another difference is that data collected with the LHS are normally distributed, whereas data obtained by the LMS approximate a lognormal distribution. Like the LMS, the LHS can be used to measure differences across individuals or groups. The data show that the LHS has significant quantitative, semantic, and statistical advantages over the presently most widely used standard 9-point category scale to measure hedonic responses. See also the commentary article by John Prescott on page 735.

Prenatal Flavor Exposure Affects Flavor Recognition and Behavior of Piglets

Page 775

Exposure to flavor in the uterus or mother’s milk derived from maternal diet affects food preferences of young animals in various species. Oostindjer et al. examined the effect of flavor exposure during pregnancy and lactation on the behavior of piglets during reexposure and under stress in various experimental paradigms. The data indicate that, like other animals, prenatally or pre- and postnatally exposed piglets recognized the familiar flavor. Unlike human, rats, and rabbits, however, exposure to odor during lactation alone did not change behaviors in piglets. The findings also suggest that reexposure of piglets to the familiar odor reduced stress-related behaviors in a novel environment. Moreover, they implicate that analysis of stress-related be-

haviors during reexposure to a familiar odor could be a useful tool for investigations of pre- and postnatal olfactory learning.

Intraoral or Postingestive Detection in P2X2/P2X3 Purinergic Receptor Null Mice

Page 799

P2X2/P2X3 purinergic receptor double knockout mice virtually lack taste responses in the chorda tympani and glossopharyngeal nerves. They also show a substantial but not complete loss of tastant-evoked behaviors in long-term intake experiments raising the question whether the residual responses reflect postingestive or oropharyngeal detection. Using brief-access lickometer tests, Hallock et al. now demonstrate that these mice only slightly avoided classical bitter stimuli at high concentrations, whereas they showed strong avoidance in the long-term two-bottle preference test. Similarly, the animals preferred concentrated sucrose solutions stronger in the long-term than in the brief-access test. In contrast, differences were not seen in lickometer tests with acidic stimuli between knockout and wild-type mice. The data suggest that acids activate oropharyngeal chemoreceptors, whereas bitter substances and sucrose are sensed by postoral or nongustatory mechanisms. Thus, surprisingly, mice can detect high concentrations of taste molecules by oropharyngeal or gut chemosensors with no or minimal gustatory function. For a related topic, see also the companion paper by the same group (Eddy et al.) on page 789.

Glutathione Enhances Taste Responses to Inosine Monophosphate

Page 809

Previous human sensory studies revealed that, when applied in an “umami” solution, glutathione (GSH) enhances sensory attributes related to a mouth feeling referred to as “kokumi” in Japanese. Yamamoto et al. now examined taste interaction between “umami” substances and GSH in mice by means of behavioral and electrophysiological experiments. Mice preferred GSH at low millimolar

concentrations over water. They also preferred a ternary solution containing GSH over a binary solution of monopotassium glutamate (MPG) and inosine monophosphate (IMP) or IMP alone in both long- and short-term tests. However, preference was not seen for a mixture of GSH and MPG. In line with these findings, synergism was seen in taste nerve responses to IMP and GSH but not to MPG and

GSH. In conditioned taste aversion experiments, MPG generalized moderately to GSH, whereas aversions to GSH did not generalize to MPG. Together, the data suggest that GSH enhances the preference for “umami” solutions containing IMP.

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