Characterization of the afferent gustatory responsiveness of the Chorda Tympani nerve to tastants with and without linoleic acid in obesity-prone and obesity-resistant rat strains

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Genetic influences on fatty acid sensitivity?

Fatty-Acids and the Gustatory System

• Behavioral Research
  – Detection: Conditioned Taste Aversions
  – Innately Prefer: 2 bottle preference tests
  – A role for the taste system?
    • Eliminating the chorda tympani or glossopharyngeal taste nerves impairs the detection of fatty-acids

CT Responses in OM & S5B Rats

• Purpose
  – Characterize the afferent neural responses to a variety of taste stimuli including the effect of linoleic acid on taste responses in the two strains
• Expectations based on behavioral research
  – S5B rats would demonstrate a greater responsiveness to the sweet stimuli
  – Linoleic acid would produce increased chorda tympani responses when added to the tastants
  – OM rats would demonstrate a greater responsiveness to the tastants when mixed with 200 uM linoleic acid

Methodology

• Surgery
• Stimuli
  – NaCl, KCl, Citric Acid, MSG, Quinine-HCl, Glucose, Saccharin, G+S
  – 200 uM linoleic acid
• Stimulus Delivery System
Methodology

Example of CT response to Salt

CT Response to Tastants with and without Linoleic Acid

OM rats S5B rats

Overall Effect of Linoleic Acid

CT Response to Sweet

Summary of Findings

• First study to measure taste responses in OM and S5B rats found similar concentration-dependent responses for all taste categories
• Unexpectedly, linoleic acid did not produce robust increases in taste responses
• Linoleic acid did produce subtle enhanced responses in some stimuli
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