New insights into link between taste and behavior

December 7 2015

Evolutionary conserved brainstem circuits are the first relay for gustatory information in the vertebrate brain. While the brainstem circuits act as our life support system and they mediate vital taste related behaviors, the principles of gustatory computations in these circuits are poorly understood. Researchers at NERF (VIB/KU Leuven/imec) studied how the evolutionary conserved brainstem circuits of zebrafish encode gustatory information.

They showed that taste categories are represented by dissimilar brainstem responses and generate different behaviors. They also showed that the concentration of sour and bitter tastes are encoded by different principles and with different levels of sensitivity.

Nuria Vendrell Llopis (NERF): "Our results suggest that these interactions in early brainstem circuits can result in non-linear computations, such as dynamic gain modulation and discrete representation of taste mixtures, which can be utilized for detecting food items at broad range of concentrations of tastes and rejecting inedible substances."

Emre Yaksi (NERF): "This is the first study focusing on the gustatory computations in brainstem circuits, at such an exhaustive level, combining functional brain imaging, applied mathematics and animal behavior. Our results propose a central role for encoding category, concentration and mixtures of taste in evolutionary conserved brainstem circuits of vertebrates. These kind of computations were up to now

thought to be unique to higher centers at the level of gustatory cortex, mainly due to the difficulty of studying these questions in mammalian brainstem that is hard to access for in vivo physiology. At NERF we have the tools to do so leading to these new insights."

More information: Nuria Vendrell-Llopis et al. Evolutionary conserved brainstem circuits encode category, concentration and mixtures of taste, *Scientific Reports* (2015). DOI: 10.1038/srep17825

Provided by VIB (the Flanders Institute for Biotechnology)