Sweet taste and beyond: Research at the Christian Doppler Laboratory for Taste Research

Speaker: Barbara Lieder
Email: barbara.lieder@univie.ac.at
Institute: Institute for Physiological Chemistry

Excessive consumption of foods containing sugar is a major cause of the increasing prevalence of obesity and its comorbidities. One way to avoid increased energy intake from sweetened foods and beverages is the usage of so-called "light" or "diet" products containing sweeteners with a very low or no caloric value. In this context, the seven-year third party funded research project "CDL for Taste Research" located at the Faculty of Chemistry, University of Vienna, researches structural aspects of novel and already known alternative sweeteners, their receptor-based taste profiles and their effects on metabolism.

Sweet taste perception is mediated by the sweet taste receptor, a heterodimeric GPCR with the two subunits T1R2/T1R3. A variety of sweet tasting compounds is known, however, all of them have a sensory profile distinct from sugar. Some sweeteners have a metallic or bitter sidetaste, others show differences in the onset of sweetness perception, its duration and its decay. These differences may be due to structure-specific receptor binding and activation of additional receptors and/or ion channels. However, a clear structure-activity relationship and suitable models for predicting a sweet taste or a sweet taste modulating effect do not exist, yet. In addition, the sweet taste receptor T1R2/T1R3 does not only occur in the oral cavity, but also in peripheral tissues like the gastrointestinal tract or adipose tissue. However, the role of those extraoral taste receptors in the development of obesity and diabetes remains controversial.

Using a combined approach of sensory, computational and molecular-biological methods in vitro and in vivo, the research carried out at the CDL for Taste aims to (I) establish a structure-activity relationship for substances relevant for sweetness perception and (II) to investigate their physiological effects beyond their sweet taste. In addition, first results on structural determinants of sweet and side tastes will be discussed.