

CH-628

Chemosensory receptors: Applications for biosensors and medical therapies

Pick Horst

Cursus	Sem.	Type
Chemistry and Chemical Engineering		Opt.

Language of teaching	English
Credits	1
Session	
Exam	Oral
Workload	30h
Hours	14
Courses	14
Number of positions	12

Frequency

Every year

Remark

Next time Fall semester 2025

Summary

The course aims at providing insight into the cellular and molecular basis of smell and taste with specific emphasis on how molecules are detected by these chemosensory systems.

Content

- 1) Introduction to the cellular and molecular architecture of the olfactory and gustatory chemosensory system. Presentation of receptors and signaling cascades with specific emphasis on molecule detection and signal processing.
- 2) Genomics of vertebrate olfactory receptors and taste receptors. Insight into the diversity of the OR gene superfamily and the genomic organization and expression of taste receptors
- 3) Steps towards the localization and characterization of the putative ligand binding site of ORs and taste receptors: Molecular mechanisms for recognizing and discriminating an enormous number of odors and flavors.
- 4) Bioassays for quantitative measures of taste and olfactory responses. Evaluation of flavor- and odor-active molecules and compound screenings. Steps towards artificial chemosensory systems and industrial applications.
- 5) Taste and odorant receptors in non-chemosensory tissues: New therapeutic options for disease treatments.
- 6) Additional functions of odorants as chemical signals: How specific odorant molecules can regulate gene expression and cellular functions.
We are continuously exposed to molecules released into our environment. Through the senses of smell and taste these molecules provide us with important information to inform us about the availability of foods and potential pleasure or danger derived from them.

The course aims at providing insight into the cellular and molecular basis of smell and taste with specific emphasis on how molecules are detected by these chemosensory systems. Examples will be discussed how taste- and olfactory receptors may be used as biosensors for food or fragrance industrial applications. Furthermore chemosensory receptors seem to be involved in additional body functions opening possibilities for novel medical therapies. Multifaceted functions of taste- and olfactory receptors and their activating molecules will be discussed requiring the active participation of the students.

Expected student activities

Several lecture presentations given by the teacher will elaborate the topics of the course in detail.

Then each student can choose a certain subject, (e.g. publication on a topic of interest) for a short presentation in front of the class.