

Week #5 (Feb 27 and March 3) Olfactory System

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Wednesday's lecture will focus on sensory processing in the olfactory bulb. We will begin by very briefly reviewing the gross anatomy of the olfactory system, the properties of olfactory receptor neurons, and the basic organization of the olfactory bulb. (These should be reasonably familiar from HST-130.) The rest of the lecture will focus on (1) spatial representation of odor information in the olfactory bulb, and (2) dynamical aspects of sensory processing in the olfactory bulb.

There is no assigned reading for Wednesday's lecture. (If you did not take HST-130, you should read C.I. Bargmann (2006) Comparative chemosensation from receptors to ecology, *Nature* 444:295-301.)

On Monday we will discuss two papers:

1. T. Bozza et al. (2004) In vivo imaging of neuronal activity by targeted expression of a genetically encoded probe in the mouse. *Neuron* 42:9-21.
2. J. McGann et al. (2005) Odorant representations are modulated by intra- but not inter-glomerular presynaptic inhibition of olfactory sensory neurons. *Neuron* 48:1039-1053.

These are two studies by the same lab. The first is a methods paper, and the second applies this method to ask a specific question about the olfactory bulb. Regarding the first paper (2004), we will discuss only Figures 1-5.

As you are reading, please think about the following questions:

- What exactly does the synaptopfluorin sensor measure?
- What might be the advantages and disadvantages of this sensor as compared to other sensors you might use in a functional imaging experiment?
- Regarding the second paper (2005), how was each image processed, step-by-step, to produce the images printed in the paper? What exactly does the "false color" scale mean?
- The basic result of the second paper (2005) is a negative one. Does this affect the significance of this study? Do you find this negative result surprising or not?

The written assignment (due Monday March 7 *before* class) concerns only the second paper, published in 2005 (*Neuron* 48:1039-1053). This week, I'm asking you to write a referee's report, as if you were reviewing this paper for *Neuron*. Address your report to the editor of this journal. Please see the syllabus for detailed instructions on writing this type of assignment (see "Homework", part A).