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To whom it may concern:
Letter of recommendation for
Dr. Julien Colomb

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To whom it may concern: Letter of recommendation for Dr. Julien Colomb

I am very pleased to write a letter of recommendation on behalf of Dr. Julien Colomb, a former doctoral student in my group. He completed his Ph.D. thesis on November 26, 2006 and is actually a postdoctoral fellow in Dr. Thomas Préat's team in Paris.

Mr. Colomb did already his diploma thesis in my group, under the supervision of Dr. Ariane Ramaekers. In his diploma work, he studied the central projections of the major chemosensory organs of the *Drosophila* larva. These organs are intriguing because they exhibit a tight association of smell and taste function, probably related to the constantly feeding life style of the larva. As major tools, he used a number of Gal4 enhancer trap lines that show expression in chemosensory neurons. The Gal4/UAS method allowed him to analyze the central target regions of these neurons and – by genetic silencing – to test their function in taste- and smell-driven behavior. His excellent diploma thesis was completed in summer 2002.

Mr. Colomb started his Ph.D. studies in fall 2002, under my direction and supervised by Drs. Ariane Ramaekers and Nicola Grillenzoni. He continued to investigate the larval chemosensory system, focusing on three different issues. He first studied behavioral plasticity in the larva, a field which was treated so far only marginally in larvae. In particular, he studied modulation of larval odor attraction after pre-exposure with the same odorant. His data confirmed that larval attractive responses diminish after such pre-exposure, a phenomenon that was previously interpreted as sensory adaptation. However, in critical experiments, i.e., by increasing the number of pre-exposure cycles, Mr. Colomb was able to show that the larval responses can change from attraction to repulsion. This evidence demonstrated that pre-exposure induces a change in the hedonic value of the odor, rather than reducing olfactory sensitivity. While he could not elucidate the exact nature of the underlying mechanism, he was able to reject sensory adaptation as an explication of the observed behavioral changes. A

paper entitled "*Complex behavioural changes after odour exposure in* Drosophila *larvae*" with J. Colomb as a first author is in press in the journal "*Animal Behaviour*".

In the second and third parts of his Ph.D. work, Mr. Colomb focused on organizational aspects of the larval chemosensory system. While the larval olfactory system has recently become a new focus in research, the larval taste system has not received much attention. Mr. Colomb's main goal was to investigate whether the *Drosophila* larva could serve as a gustatory model system of general importance. To this end, he analyzed both the gustatory projection patterns in the brain and their potential target neurons. Taste projections were studied by using various Gal4 driver lines, mainly insertions into gustatory receptor gene promoters. A crucial tool was the Flp-out technique, which allowed him to label individual neurons. Possible overlap of the projections of different taste neurons was analyzed by studying combinations of Gal4 driver lines. In his work, he described about one third of the estimated 90 larval taste neurons individually and the rest more globally. His major observation was that the gustatory target regions are correlated primarily with the sensory organ of origin. However, apart from this topographic pattern, he also found evidence for a subtle functional division of the target regions. A paper entitled "*Architecture of the primary taste centre of* Drosophila melanogaster *larvae*" by J. Colomb, A. Ramaekers, N. Grillenzoni and myself is in press in *"Journal of Comparative Neurology".*

Until recently, evidence for second order taste neurons in the larva was missing. Thanks to the studies of Mr. Colomb and a group in Karlsruhe, interesting candidates have now been identified. One example is an interneuron that arborizes in taste centers and sends a process in two higher brain centers which are involved in olfactory discrimination and learning. Other candidates are among a genetically defined set of 20 neurons expressing the *hugin* gene. *hugin* encodes two neuropeptides which were shown to modulate feeding behavior. By generating Flp-out clones, he and the colleagues in Germany investigated the anatomy of these *hugin* neurons at a single cell level. They showed that each *hugin* cell projects to one of four target regions and that the projections of the different classes of cells are correlated with the different target regions of gustatory afferents. All *hugin* cells arborize in a specific brain region, which could be a site for neuropeptide release. Hence, this study may have important implications for the regulation of feeding behavior. A paper describing these data entitled "*Genetic dissection of a neural circuit underlying feeding behavior in* Drosophila*: distinct classes of* hugin *expressing neurons*" is in press, in the same journal as the previous one (*J. Comp. Neurol.*). In this paper, R. Bader from the German group and J. Colomb are joint first authors. Other interneuron data are included in the paper mentioned above.

The investigations presented in Mr. Colomb's thesis work have clearly moved *Drosophila* ahead as a model system in chemosensation and behavior and will certainly be used as a reference for future work in the field. Mr. Colomb's intellectual and personal qualities are beyond any doubt. During his thesis work, he turned out to be an enthusiastic, motivated and brilliant student. He was always a very active participant in scientific discussions, be it in my group, at departmental seminars or in conferences abroad. Concerning his research activities, he worked accurately and reliably and was able to complete a given task within reasonable time limits. The work summarized here was for the most part his own project, i.e., it was essentially him who designed and organized the work. Moreover, apart from collecting and evaluating the data, he also wrote two of the three papers. For the third paper, he spent a lot o time discussing with the German colleagues. In his Ph.D. defense, Mr. Colomb convinced both local and external referees of his expertise in the field of insect chemosensation.

During his diploma and Ph.D. work, Mr. Colomb was trained in many methods and techniques. He became expert in modern neuroanatomical and behavioral experimentation in *Drosophila,* in particular for the larval stage. These studies involved genetic, immunocytochemical, confocal and image processing techniques and – to a minor extent – methods in molecular

biology. Other tasks that Mr. Colomb accomplished during his Ph.D. work were the supervision of a diploma student, the presentation of lectures for master's students, the organization and assistance in practical courses and the co-organization of a 4-day international conference in 2004.

In summary, I consider Dr. Colomb as a highly qualified, independent and original biologist. Without any hesitation I can recommend him as a promising postdoctoral fellow. Clearly, he has a very good potential for a scientific career. I am convinced that he gives his best at his actual postdoctoral place, where he focuses on learning and memory processes in *Drosophila*. I was very happy to hear that the Swiss National Funds supported his actual postdoctoral stay for a first period, and I do hope that other sources will allow him to extend his stay in Dr. Préat's lab. Supporting Dr. Colomb by a postdoctoral grant would be a good investment, for himself as well as for the host lab, which will certainly profit from his neuroanatomical expertise.

For his future activities I wish him all the best and full success.

Reinhard F. Stocker

(Prof. associé)