
ECRO Newsletter

European Chemoreception Research Organization

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Is there also human chemical communication?

Contributions to the ECRO Newsletter

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Comments from the ECRO President

Dear ECRO members,

Fall is here and we are in the middle of the ECRO term, between two conferences. These periods are often long and so far very low in activity within ECRO. In the board we are right now trying to remedy this inactivity by creating funds to allow ECRO courses and symposia to be held at any time, not only in conjunction with the conference. Hopefully these activities can commence during 2004 and be a normal occurrence after the ECRO meeting in Dijon next year.

The local and scientific organisers are well under way with preparations to make the next meeting as successful as our previous ones. Many of our disciplines are represented among the organisers, promising an interesting and varied program. For young participants it is time to start thinking about applying for funding to be able to participate. One of the possible sources is our own ECRO travel grants. These will be announced shortly.

The possibility for young scientists to move between laboratories and to conferences abroad is very important, and within the field of chemosensation ECRO plays an important role in facilitating this mobility. Just as we are striving to raise funds for inter-conference activities, significant work is also spent on attracting financial means to allow an increase in our travel grants. Conditions look very favorable, and we hope to be able to realize these increases during the coming years.

Finally, a short story reminding me of the potency of odours in evoking memories, and how an intrinsically quite disgusting odour can evoke pleasant memories. Presently it is goose season in Sweden, and yesterday I was removing all the feathers from a goose shot a week ago. The final step in the process is burning off the final remnants of feathers and hair with an alcohol flame. This creates, as you can imagine, quite a repulsive stench, but instantaneously I was transported to my grandfathers house in the 1960's, watching (and smelling) the same activity being performed in a socially very pleasant environment. Now, 40 years later, the foul odour provided me with an intense feeling of familiarity and safety. So much for odours and memories.

In four days I am leaving to do research on Christmas Island, so what can be more appropriate than to wish you all a pleasant winter and holiday season.

Bill Hansson

Summer School on Human Olfaction, July 27 – August 2, 2003, Dresden, Germany

Brief Report

Summer School is back in business! After 12 years of silences it finally happened. Nineteen participants from ten countries (including the US and Canada) and 17 lecturers gathered on a hot summer evening at a social reception in Dresden. However, the party mood had the following day turned to

anxious anticipation – with a hunger for more knowledge about human olfaction.

After short presentations of the participants' ongoing research, a series of lectures and related demonstrations were given throughout the week on the topics of odor mixtures, odor memory, chemosensory discrimination, chemosensory psychophysics, human pheromones, chemosensory development, functional MR imaging of olfactory induced activation, retronasal olfaction, source imaging from MEG and EEG data, evoked potential olfactometry and recordings from the mucosa, olfaction in Parkinsonian syndromes, morphology of human olfaction, molecular bioinformatics of olfaction, and a journey from odor perception to cognition. Furthermore, practical demonstrations were given which included endoscopy of the nasal cavity, rhinomanometry, blood flow, and acoustic rhinometry.

The campus of the University of Dresden Medical School was quite impressive, and offered, within walking distance, all the facilities and expertise needed for the practical demonstrations. The organizer of the Summer School, **Thomas Hummel**, and his collaborator **Stefan Heilmann** made sure that the crowd was satisfied by providing interesting and challenging sight seeing and delicious food. Thus, the leisure program included an excursion to beautiful Saxonian Switzerland, with a boat trip and mountain hiking, as well as dinner at the impressive, 150 year-old Eckberg Castle, and an excursion to the Max-Planck-Institute in Leipzig.

The Summer School week was definitely a great success that met a con-

siderable need. Consequently, this evokes the question we all have in mind: *Who will accept the challenge of organizing the next Summer School?*

Editor

Words of Gratitude

The Summer School on Human Olfaction was held for a week in the beautiful city of Dresden. The heart and soul of the Summer School was devoted to the diversity and richness of the olfactory sensory system. This was reflected in the truly wide range of topics covered: from basic molecular processes, via anatomy and perception, to cognitive aspects of olfactory processing.

The lectures and demonstrations were all examples of cutting edge research given by some of the most distinguished names in the olfactory community. Altogether the Summer School was a tremendous success on every level, both with regard to lectures and the social environment.

It is with our deepest gratitude we - the participants - would like to thank the organisers of the Summer School. In particular, Dr **Thomas Hummel** (without whom this Summer School would never had seen daylight) and Dr **Stefan Heilmann**. Also warm thanks to Drs **Basile Landis**, **Johannes Frasnelli** and to all of the lecturers.

Thank you very much!

John Behan, Julie Boyle, Daniel Broman, Linas Buntinas, Simon Chu, Beverly Colley, Camille Ferdenzi, Sabine Frey, Eva Heuberger, Fredrik Jönsson, Johan Lundström, Sandra

Pouliot, Philippe Rombaux, Petra Sacher, Mark Sergeant, Mussadiq Shah, and Johan Willander

Why should Humans Communicate via Pheromones?

– A Personal Commentary on the Methods in Human Pheromone Research

The power of human chemosensory communication attracted the attention of famous philosophers decades and centuries ago. For example, Friedrich Nietzsche (1844-1900) stated that human body odour contains information about the depth of the soul, conveying psychological secrets, which would not be observable otherwise. On the contrary, Sigmund Freud (1856-1939) rejected any influence of body odour on the communication between humans. Instead, he concluded that the acquired meaninglessness of body odours was a necessary condition for the development of human culture. As far as these philosophical opinions are apart from each other, are those from recent scientists studying human pheromones. Whereas a number of working groups suggest to have proven the existence of human pheromones, some authors even doubt the existence of mammalian pheromones (see Doty, 2003; Schaal et al., 2003).

Karlson and Lüscher (1959) originally introduced the term pheromone in the context of insect research, they stated: "Pheromones are defined as substances which are secreted to the outside by an individual and received

by a second individual of the same species, in which they release a specific reaction, for example, a definite behaviour or a developmental process." This definition might have led the attention to the following questions: 1. What kind of chemical substances have pheromonal properties? 2. Is there a special organ for the perception of pheromonal information? 3. What kind of specific reactions can be triggered by pheromones?

Whereas all of these questions are undoubtedly of empirical importance, I believe, however, that so far the strongest evidence for chemical communication in humans has been received by investigating the original complex body odour instead of single components (examples are the effects of body odour samples on the menstrual cycle phase, chemosensory kin recognition and HLA-associated body odour preferences). As it is well known that a number of pheromonal responses are mediated by the olfactory system (e.g., mating stance in the female pig in response to androstenone, maternal aggression in lactating rats, nipple-search behaviour in new-born rabbits), I further believe, that it does not seem to be of exceptional importance whether pheromones are perceived by a special organ (VNO), in order to demonstrate pheromone effects in humans (see Meredith, 2001, for a review). The third question, on the type of response, seems to be the most important to me. However, in accordance with Meredith (2001), I propose that the main feature of the response should be its biological meaning, in other words, that the chemosensory communication in ques-

tion should contribute to the evolutionary fitness for the sender and the receiver. By trying to catch the biological meaning of pheromones, in the following, I will focus my considerations on the olfactory system:

All terrestrial and marine metazoans detect and react to external chemicals. The examination of the olfactory receptor gene family across species suggests, that only minor modifications appeared since the development of teleosts. Moreover, it is assumed that the bilateral telencephalon was originally an olfactory structure that was invaded by other sensory systems over the course of vertebrate evolution. In the hedgehog, an example of ancient mammals, about 50% of the brain consists of palaeocortical structures (olfactory bulb, anterior olfactory nucleus, olfactory tubercle, amygdala, piriform cortex, septal area), most of these are structures of the primary olfactory cortex. But why should chemosensory processing be of such importance during vertebrate phylogenesis? In fact, some philosophers (e.g., Johann Gottfried Herder), early (e.g., Hendrik Zwaardemaker and Hans Henning) and recent chemosensory scientists (e.g., John G. Hildebrand) speculated that chemical signals are the most important for survival and reproductive success in animals (hereby, probably rather acting as warning than as attracting signals).

I consider two features of the olfactory system to be responsible for the success of chemosignals in the regulation of onto- and phylogenetic survival: the innate activation of basic motivational systems and the specific characteristics of olfactory learning and

memory. Behavioural adaptations (approach or withdrawal) to odours seem to be activated by those brain structures (e.g., amygdala and orbitofrontal cortex) which are also responsible for emotional adaptations (Pause et al., 2003). Thereby, odours and emotions have a similar capacity to activate behaviour on two dimensions, namely arousal and valence (Anderson et al., 2003). Importantly, the action of odours and emotions on behaviour occurs primarily automatically and implicitly (Jellinek, 2003). Therefore, I guess that pheromone studies on implicit behavioural effects might be highly successful, especially if the basic motivational dimensions (valence and arousal) were taken into account. Accordingly, measures could include physiological recordings (e.g., event-related potentials, electrodermal activity or recording of the startle-reflex) or behavioural observations.

Secondly, the olfactory system seems to be highly adaptive to environmental changes and to keep information in memory for an unusually long time (extinction resistance). Plasticity can be shown on a neuronal level (NMDA-dependent plasticity and neurogenesis) and on a behavioural level (e.g., induction of androstenone sensitivity by repeated exposure). Olfactory memory seems to be very long lasting (Garcia effect) and even to be responsible for simple feature differentiation (Wilson & Stevenson, 2003). In fact, some argue that memory systems such as the hippocampus still have the main function to relate motor behaviour to biological meaningful chemosignals (Vanderwolf, 2001). In pheromone research, it should

be considered that, in many instances, an adaptive response to body odour may depend on former experiences during a sensitive period (e.g., the pregnancy block effect in mice, the nipple search phenomenon in rabbits, and MHC-associated body odour preferences in mice).

Besides those innate features of the olfactory systems, I additionally consider the context of odour presentation to be of special importance in pheromone research (see also Jacob et al., 2001). The context may refer to expectations (cognitive level) about the odour (source) as well as to the endocrine status (physiological level) of the perceiving subject. For example, it is known that sexual impulses are inhibited in treating situations. Thus, pheromones might not only change the endocrine status of perceiving subjects but their effect might also be primed by a specific endocrine status of the perceiver. However, the context of pheromone production (e.g., sexual arousal or dominance/aggression) may also be worth considering, e.g., if it is chosen to investigate the behavioural response to a certain substance (e.g., axillary androstenes).

With the opinions of Freud and Nietzsche at the beginning of this commentary, it may be concluded that Freud was probably not correct in his supposition that olfaction plays no role in sexual attraction. This is indicated by the studies showing the influence of the HLA system on mate preferences. The statement of Nietzsche, on the contrary, still attracts my attention. The search for different emotional states expressed as olfactory signals, might reveal that

people in fact can face the mysteries of the soul by incorporating the other's smell.

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Bettina Pause

Christian-Albrechts-University in Kiel

ECRO 2004, Dijon, France

First Announcement

The 2004 Congress of The European Chemoreception Research Organization (ECRO) will be held in Dijon, the exquisite historical capital of Burgundy (France), on **September 12–15**. It is organized by the Centre Européen des Sciences du Goût (CESG), Dijon, in connection with the Board of ECRO and other local academic partners (Uni-

versity of Burgundy, Inra). The scientific content of the Congress will be in conformity with the goal of ECRO that is the promotion of research in OLFACTION and TASTE and related themes.

The International Advisory Committee will be composed of B. Schaal (F, Chairman), A. Faurion, (F), J.-F. Ferveur (F), T. Hummel (G), J. Mennella (US), J. Strotmann (G), and R. Sullivan (US).

If you want to receive regularly updated information about this meeting, visit our website at www.ecro2004.com or send an e-mail with your name and address to info@ecro2004.com. Information about the conference is also available at **CESG-ECRO Congress, 15 rue Hugues Picardet, F-21000 Dijon, Fax: 33 (0)3 80 68 16 01.**

The scientific programme will consist of an introductory plenary lecture on Sunday 12, followed the other days by keynote addresses, symposia, oral communications and poster presentations.

The complete announcement, including scientific programme, names of invited speakers, social programme, information on accommodation and registration fee will be available on our website www.ecro2004.com by the beginning of December 2003 and sent to anyone who requested it.

Important dates: Submission deadline for abstracts: **April 1, 2004.** Registration deadline: **May 15, 2004.**

New Books

Handbook of Olfaction and Gustation (2nd edition)

Edited by R.L. Doty. Marcel Dekker. 2003.

Pheromones and Animal Behaviour: Communication by Smell and Taste

T.D. Wyatt. Cambridge University Press. 2003.

Disorders of Smell and Taste: The most Common Complaints

C.F Hawkes. Elsevier Science & Technology. 2002.

Olfaction, Taste, and Cognition

Edited by C. Rouby, B. Schaal, D. Dubois, R. Gervais & A. Holley. Cambridge University Press. 2002.

Insect Chemoreception - Fundamental and Applied

Edited by M.F. Ryan. Kluwer Academic Pub. 2002.

Handbook of Machine Olfaction: Electronic Nose Technology

Edited by T.C. Pearce, S.S. Schiffman, H.T. Nagle & J.W. Gardner. Wiley-VCH. 2002.

Home Pages

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About ECRO

ECRO seeks to promote and support research and to assist the exchange of information on all aspects of the chemical senses. It was inaugurated in 1970 at the International Summer Course on Odour Perception, in Utrecht, with the aim of promoting and coordinating research in chemoreception. It was officially registered in Paris in 1971 and although it began as a European venture, it now has members from outside Europe and sees its function as world-wide. It encourages a multi-disciplinary approach to research in chemoreception. Since 1978 ECRO has been affiliated with UNESCO.

ECRO activities include (see www.ecro-online.org/ for further information):

- Congresses
- Mini-symposia
- Summer Schools
- Meetings for national groups
- Promotion of research in chemoreception through scholarships, fellowships and awards.

ECRO is financed by individual members' subscriptions and by donations from industry and research institutions. Its activities are administered by a Board of up to nine members responsible to the General Assembly, which is convened biennially. Currently, ECRO has over 400 members from 29 countries.

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Dr. E.P. Köster (Utrecht)
Late Dr. J. Le Magnen (Paris)
Late Dr. D. Ottoson (Stockholm)
Dr. J. Solms (Zurich)
Late Dr. E. Sundt (Geneva)

Forthcoming Meetings

Olfactory Bioresponse III
Dresden, Germany, December 2-5, 2003.
www.tu-dresden.de/medkhno/riechen_schmecken/bioresponse_3.htm

XXVIth Annual AChemS Meeting
Sarasota, FL, USA, April 21-25, 2004.
www.achems.org/

XIIIth International Symposium on Olfaction and Taste/JASTS
Kyoto, Japan, July 5-9, 2004.
www.epn.hal.kagoshima-u.ac.jp/ISOT2004/

7th Sensometrics Meeting
Davis, CA, USA, July 28-30, 2004.
www.statistik.uni-dortmund.de/sensometrics/

XVIth ECRO Congress
Dijon, France, September 12-15, 2004.
www.ecro2004.com

6th Pangborn Sensory Science Symposium
North Yorkshire, UK, August 7-11, 2005
www.pangborn2005.com