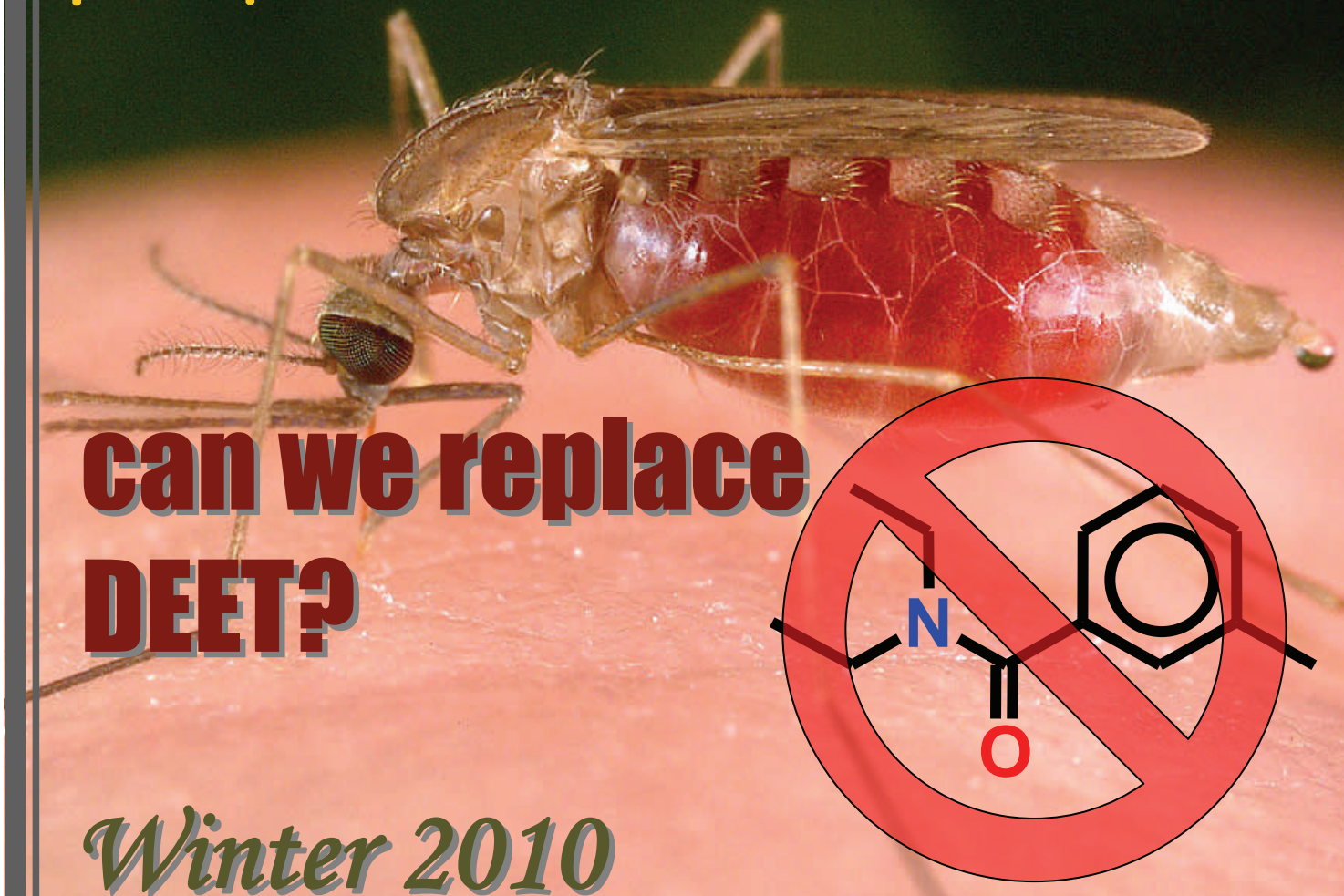
ECRO

XX ECRO Congress

Avignon, 14-16 Sept. 2010

Newsletter 80



can we replace DEET?

Winter 2010

About ECRO

ECRO is the European Chemoreception Research Organisation and represents a link between scientists working in the field of chemical communication. Although most of the members are Europeans, ECRO welcomes scientists from all parts of the world.

To become a member, follow the instructions at the ECRO website:
www.ecro-online.info

Annual fees are from 20 (for students) to 184 euros, according to your options.

Membership may include subscription to the journal "Chemical Senses" and entitles you to:

- benefit from discounted registration rates at ECRO and ISOT Conferences
- receive the on-line version of ECRO Newsletters
- post positions and other advertisements in the ECRO Newsletters
- be regularly informed of scientific publications by other ECRO members
- obtain grants for your students (who must also be ECRO members) to attend Conferences or visit other laboratories

ECRO Newsletters are published twice a year. Material for inclusion in the Newsletter can be sent to the Editor at any time and will be included in the next issue.

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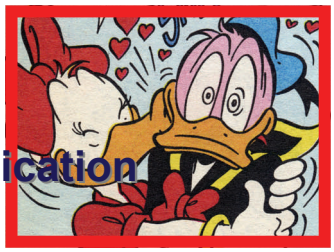
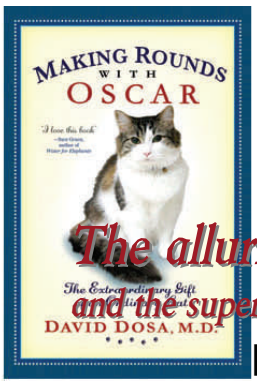
ECRO Board and Coopted Members

in this issue





Editorial

The big news is that DEET is toxic. Of course we never felt comfortable when spraying our body with a concentrated solution of a strange chemical, an aromatic compound, although of rather simple structure. Aromatic reminds us of carcinogenic or in any case of stable chemicals, difficult to degrade and eliminate. However, we had no choice and wanted to believe what the manufacturer stated about the absolute safety of this compound. It was the same story with cyclamate, then with saccharin and other food additives. We knew that soon or later the toxicity of DEET would be demonstrated. And now this discovery has stimulated a quest for substitutes, searching through the essential oils of many different plants, exotic as well as very familiar species. This is certainly hot field and we shall learn much more in the near future. However, so far, DEET seems to remain unbeaten. The strange thing is that we do not really understand how it works!

Another interesting piece of news is that finally we are getting reliable and convincing data supporting a sort of chemical communication between humans. Two papers published at about the same time in PloS One, the first by Bettina Pause (reported in this issue), the second by Mujica-Parodi (reported ECRO Newsletter 79), support each other and provide scientific evidence for chemical signals conveying stress and anxiety between human subjects.

You will find also an article dealing with sensing, but not strictly olfaction. The fresh sensation of menthol and other "cooling agents" has often been mistaken for an olfactory note to the point of having terms such as "cool", "fresh", "refreshing" included in the list of descriptors for the odour of perfumes of food flavours. This is still a new field awaiting exploration by chemists and biochemists in the search for a rationale among the different structures that are able to stimulate our "cold" receptors.

There are also curious stories and news, dealing with odours, that I hope you can enjoy reading. The editor would be extremely grateful to whoever would help him, by contributing with a story, a piece of news or a review of a particularly interesting paper.

From the President

Dear friends and ECRO members,

I hope you all had a good beginning of the New Year 2010; although several of us living in the north of Europe suffer from (or enjoy) the strong winter with a lot of snow.

But as we approach March, spring should be around the corner. Looking back to last year's ECRO activities, our chemosensory community has experienced the first annual meeting, our attempt to overcome the low level activities of our organisation in the year between the biennial conferences. Thus, the 2009 ECRO Meeting in Sardinia was an experiment headed by our board member Prof. Anna Maria Angioy.

The result of this experiment was very encouraging for our community; ECRO 2009 was a perfectly organised and enjoyable conference at a wonderful location in Villasimius. With a large number of participants including several international key figures in the field of olfaction and taste, it provided scientific results of a remarkable standard.

In good tradition of ECRO meetings, the outstanding scientific program as well as unique atmosphere will be kept as a very pleasant memory for all participants.

At this point, I would like to express my special thanks to Anna Maria and her team for the enormous effort to make that all possible.

As most of you know the ECRO 2010 meeting will be at a very distinct location, which has strong and special links not only to European history but also to our field of chemosensation. We are very fortunate that our past-president Prof. Annick Faurion took on the burden to organise this annual ECRO meeting in 2010 in Avignon from September 14th until September 19th. We will have the privilege to gather in the Palace of the Popes in Avignon. This historical city in the typical landscape of southern France is not far from Grasse, the city of perfumers. Annick and her team are currently highly active in organising all the technical details and I can assure you that we can look forward to a scientifically exciting conference in a very interesting location. The congress website will be accessible soon; proposals and suggestions for symposia are being solicited. I urge you all to participate in the organisation of a successful ECRO conference.

The board has met several times discussing and deciding on grants for students to allow them to visit research departments and groups to learn new techniques and approaches but also to participate in international meetings. Besides carefully handling the fiscal aspects of our society, the board has set the course for the upcoming meetings of our community.

This summer we will have an election for the next ECRO board; information about the nomination process as well as the web based voting will be provided in due time.

As I end this short note, I would like to thank my fellow members of the ECRO board

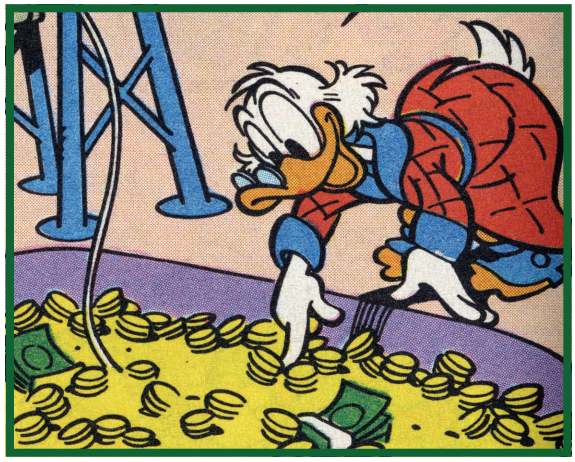
for their effort to initiate and coordinate the activities of our organisation. My special thanks to Otto Belluzzi for his ongoing commitment to maintain and improve our ECRO website as invaluable source for information and tool for communication. Sincere thanks to Paolo Pelosi for his effort but also his humour and creativity to prepare the ECRO Newsletter; it is always a pleasure to read his articles and amusing anecdotes.

I am looking forward to meet all of you at the ECRO meeting in Avignon later this year.

Heinz Breer

ECRO Treasurer's Report February 2010

The year end accounts for 2009 are reported. These are subject to slight adjustments. On 31 December 2009 the assets of ECRO stood at 47274 Euro as compared with December 2008 when the balance was 57779 Euro. The difference is in part due to the upfront monetary commitments involved in hosting yearly ECRO congresses. As reported in September 2009, we are pleased to report that the ECRO board provided grants to 2 students to attend scientific meetings, 6 students to attend the ECRO congress in Sardinia, as well as 4 students to attend the ESITO meeting during 2009, totalling 5,600 Euro. ECRO also provided support to the ESITO meeting in 2009 and substantial support to the ECRO Congress in Sardinia. We received donations from the Polak foundation, Givaudan and Firmenich totalling 10774 Euro and this has helped us to maintain the level of support to ECRO members. While the final accounts are not yet available, a small surplus will arise from the



ECRO conference in Sardinia 2009 that will be used in preparation for the ECRO conference in Avignon. ECRO has already made a down payment for reservation of the venue. For 2010, we have supported so far two students Viola Engelhart and Emmanuelle Courtiol and we have provided a grant of 3000 Euro to support the III JORNADAS OLFATIVAS, LA FRANCA 2010, Spain. As you can see we are active in using our members subscriptions and donations to the best of our ability to promote chemoreception events in Europe, and to support our next generation of scientists.

We look forward to meeting you all again in Avignon in September 2010.

Krishna Persaud

DEET is neurotoxic

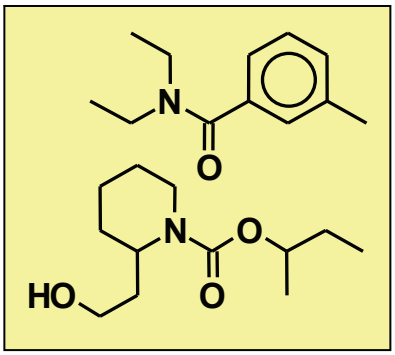
Corbel, Stankiewicz, Pennetier, Fournier, Stojan, Dimitrov, Molgó, Hougard and Lapied

Evidence for inhibition of cholinesterases in insect and mammalian nervous systems by the insect repellent deet

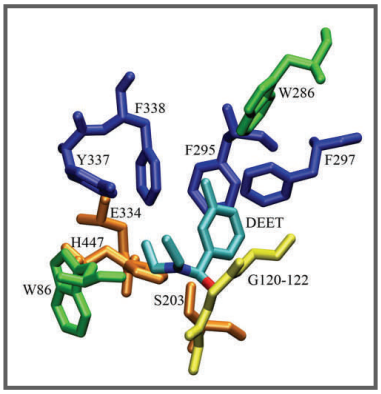
BMC Biology 2009, 7:47

It has been long suspected, but now we have the evidence: DEET is neurotoxic both to insects and mammals.

DEET and Icaridin have established in the past few years their almost unique role in keeping mosquitoes away. They work efficiently, although their mechanism of action is still not clear,as shown by some recent contradicting data. Their safety has been questioned, but it was never carefully investigated, probably on the basis that the benefit of reducing malaria and other diseases could not be counterbalanced by any toxic effect.



Comparison of the structures of DEET (upper) and Icaridin.

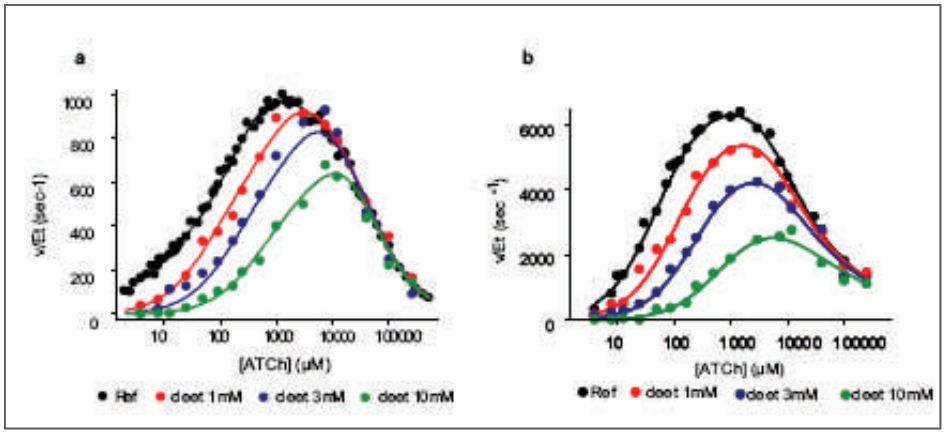


The molecule of DEET nicely fits into the binding site of the enzyme acetylcholine esterase

Well, now the toxicity of DEET is demonstrated. The data are clear and convincing. DEET strongly reduces the activity of acetylcholine esterase, both in insects and in mammals. The figure reports the activity of this important enzyme (left *Drosophila*, right human) at concentrations of DEET up to 10 mM. Another figure in the same paper also models clearly and convincingly the interaction of DEET with the core of the enzyme.

Although this work was only performed with DEET, we feel that the other compound used in insect repellents, Icaridin, is not safer, based on some structure similarities between the two molecules. It is worth recalling that DEET and Icaridin are present in commercial products in very high concentrations, 7.5 and 20%, respectively.

We hope that these worrying results might further stimulate the search for alternative mosquitoes and insects repellents.



DEET at concentrations of 1 to 10 mM strongly inhibits the enzyme acetylcholine esterase both in Drosophila (lefts and in mouse (right).

Recently a number of new mosquito repellents have been discovered... or perhaps rediscovered, after some concern has been raised on the safety of DEET.

N,N-Diethyl-m-toluamide (DEET) and 2-hydroxy-N-carboxy-sec-butylpiperidine (Icaridin) have represented so far the only alternatives to mosquitoes bites. The commercial products based on these two chemicals are sold worldwide as the only efficient insect repellent (see ECRO NL79). The fact that these products are present in the commercial formulations in very high concentrations (7.5 to 20%), has not produced so far any worry among the users. We have been covering every exposed part of our bodies with these chemicals, assuming that they were perfectly safe and walked across armies of aggressive mosquitoes absolutely protected. In fact, these compounds do work, although it is not completely clear how they work.
Now this atmosphere of safety and protection is going to dissolve, as a recent report indicates DEET as neurotoxic (see this issue).
As a consequence, in a very short time a number of new chemicals have been brought to our attention as valuable substitutes. They are all natural compounds, present in essential oils and therefore considered safe... on the wrong assumption that anything natural is safe and anything synthetic is unsafe.

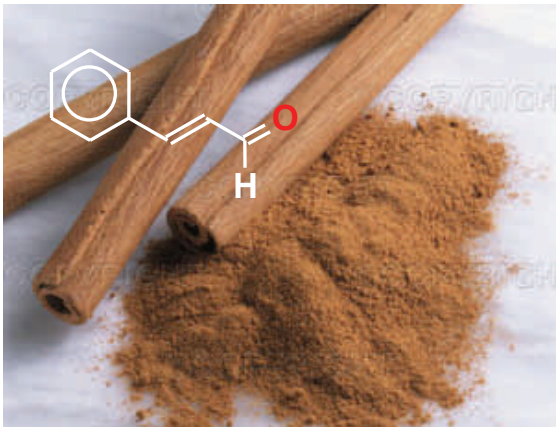
The biological effects of some of these compounds on mosquitoes and other insects have been known before, but perhaps they did not receive much attention, because could not be competitive with DEET and Icaridin on economic ground.

Did you know that the aphid sex pheromone

nepetalactone is also a mosquito repellent? This fact has been known for at least ten years and several companies advertise the oil of the plant *Nepeta cataria* as an efficient product to keep away mosquitoes and other insects. The same compound is a strong lure for cats, as everybody knows who owns a cat and grows this plant in the garden.

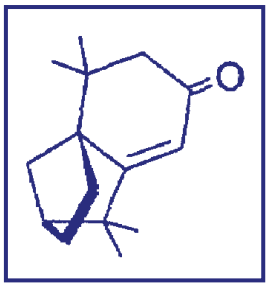
An extract of the fruits of *Feniculum vulgare* contain at least two compounds with repellent effects on mosquitoes, fenchone and (Z)-9-octadecenoic acid (the trans isomer of oleic acid). Oleic acid itself is also a mosquito repellent, however, none of these compounds can efficiently compete with DEET (Kim et al., *J. Agric. Food Chem.*, **50**, 6993-6, 2002).

Cinnamic aldehyde was also reported to be almost as effective as DEET in repelling mosquitoes (Chang et al., *Pest. Manag. Sci.*, **62**, 1032-8, 2006) and even to be letal to larvae of *Aedes aegypti (*Cheng et al., *J. Agric. Food Chem.* **52**, 4395, 2004).



The leaves of a shrub growing in India, *Solanum tribolatum*, also contains chemicals that act as both skin repellents and oviposition deterrents (Rajkumar and Jebanesan, *Journal of Insect Science*, 5, 15, 2005).
Even frog skin can be a source of mosquito repellents, although so far not as efficient as DEET (Williams et al., Biol. Lett. 2, 242–5, 2006).
And, of course, there is still the pleasant odour of lemon grass and lemon leaves, citronellal, the active ingredient of mosquito -repellent candles.

More recently, new compounds have been published or patented as substitutes of DEET.
The oil of *Humiria balsamifera,* a plant commonly found in South America, contains a compound, isolongifolenone (whose structure is here reported) able to repel mosquitoes and ticks more effectively than DEET (Zhang et al., *J. Med. Entomol.*, 46, 100-6, 2009). The new use of this compound, previously knows as an ingredient of cosmetics has been patented (US 7,378,557 B1).



Another paper (Gu et al., *J. Agric. Food Chem.*, **57**, 11127–11133, 2009) reports on the repellent activity of the oil from the conifer *Cryptomeria japonica* towards *Aedes* species. The component responsible for such effect is 4-terpineol, that proved more powerful and effective than DEET. The list of terpenoids and essential oils endowed with the property of keeping mosquitoes away is longer and rapidly increasing.

It is certainly not easy to find out what all these molecules have in common with DEET in terms of molecular structure. But we cannot exclude that different classes of chemical could act as repellents, stimulating different olfactory receptors.

Another question that would be interesting to answer is why mosquitoes try to avoid these compounds. What sort of message is conveyed by such chemical? Answering this

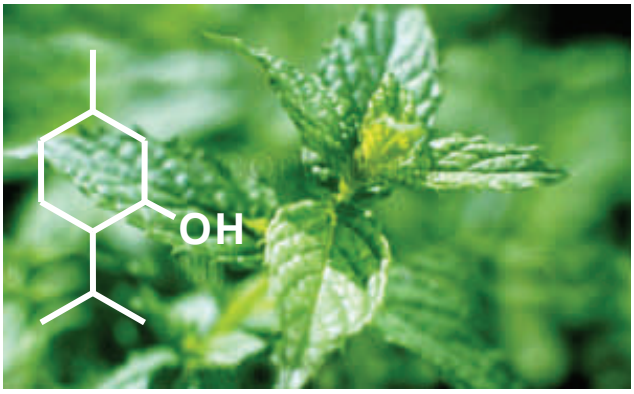
question will greatly help to direct research towards the design of new efficient repellents.
Different is the case of aphids. The best repellent is the alarm pheromone (β-farnesene for most species) that they produce in response to a dangerous situation. It would be easier if also mosquitoes produced an alarm pheromone... but of course they don't.

A whiff of freshness

Cooling agents

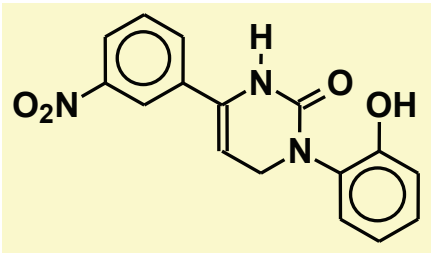
The odour of menthol is traditionally described as "fresh", but olfaction here is not involved.

As there is still some confusion among non-scientists between odour and taste – we commonly talk about the taste of food also when referring to olfactory notes – the cool sensation of menthol is still often regarded as an odour.



Menthol is certainly the best know compound able to elicit a fresh sensation and until recently has remained the best (or perhaps the only) representative of the so-called "cooling agents". The study of such compounds represents a field of high interest in perfumery and cosmetics, and chemists have been trying to develop molecules endowed with the cooling effect of menthol, but devoid of odour, to be incorporated into shower gels, after shave lotions and other hygiene products.

In recent years a number of cooling agents have been described, broadly falling into two separate classes, one comprising menthol and its derivatives, such as esters and amides, the other including chemicals of different structures, such as open-chain amides, enamines and other compounds. One of these molecule stands out qualifying as "supercooler", a chemical appropriately called "icilin" and featuring three linearly connected rings.



Icilin, the most powerful cooling agent

Parallel to this search for new cooling agents, research has been active on the identification of receptors responsible for detecting the presence of such molecules and producing the cooling sensation. It is worth to remember that the cooling effect we feel when smelling menthol or just applying this compound in our skin is not the result of a decrease in the temperature. Evaporation or vasodilation are not the causes of the effect. Although we feel cool, there is no change in temperature.

It has been demonstrated that menthol and other cooling compounds act directly on our temperature sensors.

Thanks to the research of the last decade, we know that we are equipped with two different receptors for cold, both belonging to the TRP (Transient Receptor Potential) family of ion channels. TRPM8 is acivated when the temperature falls below 26ºC, but is also triggered by menthol and some of its derivatives. The result is a cool, rather pleasant feeling. At lower temperatures, below 17-18 ºC, another receptor comes into play, TRPA1, that produces an uncomfortable, painful sensation.

This receptor is also activated by icilin and other compounds. To make things more complicated, it has been reported that icilin can also bind TRPM8, but in region different from the menthol binding pocket.

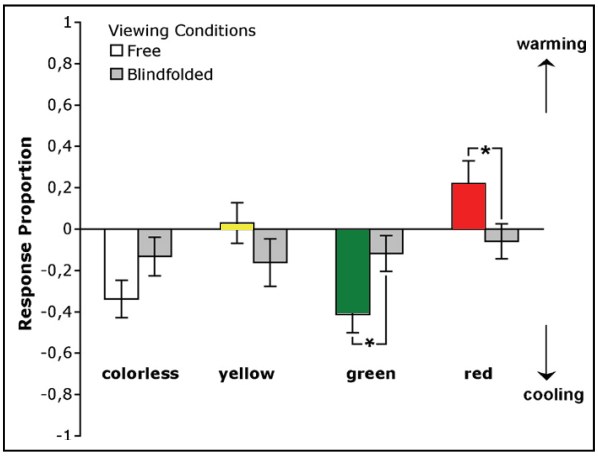
The discovery of these cold-sensitive ion-channels has helped clarifying some aspects of this sensing modality, but several question still remain unanswered.

If we take a structure-activity approach and look at the variety of molecules that have been reported to produce a cooling effect, it is difficult to fit everything within a system endowed with only two types of receptors. It is true that a similar situation can be observed when looking at the sweet taste modality. Sugars, artificial sweeteners very different from each other in size and structure and even proteins all interact with the same single sweet taste receptor. However, such compounds present sweetness intensities spanning several orders of magnitude. The receptor is not very specific and can accommodate molecules of different shapes and sizes.

Can we apply a similar model to menthol and its derivatives? The ion channel TRPM8 seems to be very specific for the structure of menthol, as its geometrical isomers (isomethol, neomenthol and neoisomenthol) and also the enantiomer of natural menthol are all much weaker cooling agents. On the other hand, we can introduce heavy modification in the molecule of menthol (esters and amides) and still retain the cooling effect. Other compounds unrelated to menthol also produce similar feelings on the skin, such as eucalyptol and some enamines discovered in beer. The structures of these chemicals are very different from that of menthol, but also equally unrelated to the other strong cooling compound, icilin.

The beer enamines present particular interest being the only naturally occurring cooling agents besides menthol and eucalyptol. How many other cooling compounds are still hidden in foods that we consume every day? How much of the fresh taste of oranges, cucumbers, water melon and other fruits and vegetables is due to temperature and how much to chemicals present in these foods? But there is still another element to consider: to what extent are we fooled by our senses?

A recent study has addressed the question on how the colour of a drink can influence the perceived temperature. We all expect our drink of mint to be green, although the essential oil of mint is colourless. But a colourless mint is not as refreshing as the green product. Now this study has shown that psychology can have a strong influence on perception. Four drinks of mint differing only in their colour produced the same fresh sensation when the judges were blindfolded. However, when they were allowed to see the colour, the green sample was fresher, while the red was perceived as warmer (George A. Michael, Pauline Rolhion **Cool colors: Color-induced nasal thermal sensations,** *Neurosci. Lett.* **436** (2008) 141–144).



Drinks of mint elicit different fresh sensations according to their colour

Signals of stress

pheromonal communication in humans?

Induction of Empathy by the Smell of Anxiety

Prehn-Kristensen, Wiesner, Bergmann, Wolff, Jansen, Mehdorn, Ferstl and Pause

PLoS One June 2009 | Volume 4 | Issue 6 | e5987

In the last issue we reported about an interesting research on chemical signals released by humans under stress that are perceived as alarming messages by other humans (Mujica-Parodi et al., PLoS ONE 4(7): e6415)

We regret that in citing that paper we overlooked another work on the same subject, at least as interesting as the first and published in the same journal at about the same time, actually, to be accurate, a month earlier. Our sincere apologies to Bettina Pause who led this important and exciting research.

The group of Bettina Pause chose a different approach and a different design for the experiments, but the two papers agree on the conclusions and give mutual credit to this cutting-edge research.

In their experiments the Authors investigated the compounds produced by stress in a more common and familiar situation than the group of Mujica-Parodi. They had subjects who jumped from the height of 4 Km, while Bettina Pause sampled sweat from students waiting for their exams, a condition for many subjects as stressful as the first one. The controls were samples of sweat generated by physical exercise. When presented to other subjects, the odours obtained by the students under stress activated areas in the brain involved in social emotion (fusiform gyrus), and in empathic feelings (insula, precuneus, cingulate cortex).

Quite interestingly, in some of the sweat samples no odour was perceived by the subjects, nevertheless the same areas in the brain were clearly activated.

It is common experience the fact that anxiety can be contagious. We are aware that some persons can communicate their stress, even without speaking and make nervous other persons in their proximity. Now we can confidently assess that chemical signals are involved. Are we dealing with pheromonal communication? The interesting observation that some stimuli could not be perceived as odours, but still produced activation of the same brain areas, seems to give strength to this hypothesis. On the other hand, if we have no vomeronasal organ, these semiochemicals have to be perceived by the olfactory system... therefore should be perceived as odours... what is still missing from this puzzle? In any case, Bettina Pause and Lilianne Mujica-Parodi managed to find one of the corner stones of the puzzle and their findings will strongly stimulate research in this still controversial field.

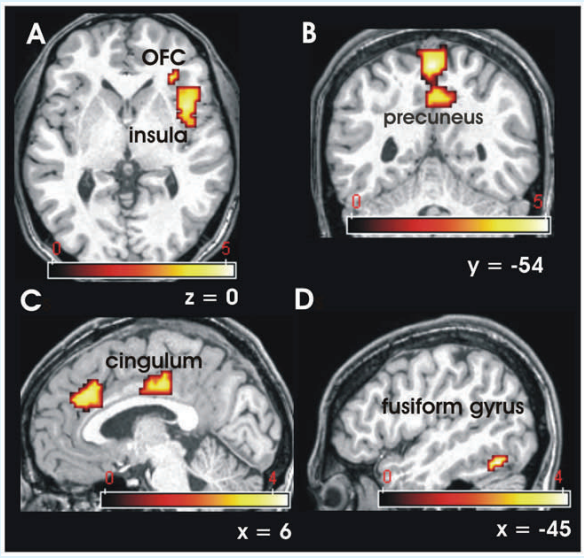


Figure 3. Brain activations of the contrast Anxiety minus Sport in 28 participants (threshold, p,0.001).

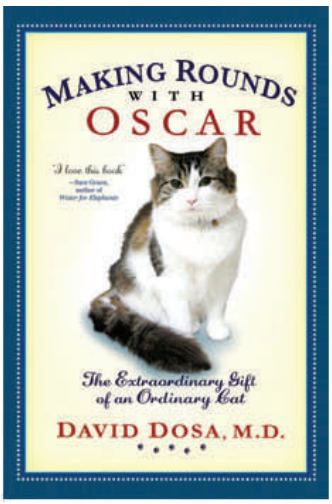
The alluring smell of death

...and the supernatural powers of a cat ...

You never want this cat come close to you, he might announce that our days are over.

His name is Oscar and he lives in Steere House hospital, Rhode Island, where he wanders around the wards, fed and fondled by nurses and doctors. Sometimes he visits patients and sits near the bed for one or two days... until the patient dies. This has happened a number of times and won Oscar the questionable reputation of a death announcer.

Is it just coincidence? or is Oscar an alien cat with supernatural powers? None of these, according to Dr. David Dosa, who works in the hospital and has carrier a systematic study on Oscar's behaviour. He published a report on the highly prestigious journal New England Journal of Medicine, where he relates the facts without coming with a documented explanation. This news of course hit the media and raised a lot of interest. All this happened a couple of years ago, but just now, when the great wave of excitement was going to subside, Dr. Dosa published a book on this extraordinary cat.



The mysterious riddle is still unsolved... well, anyone working in olfaction would not be surprised. The most obvious explanation is that Oscar smells death. Many diseases are associated to particular odours and often these odours increase when the patient is approaching death and there is an extensive degradation of the tissues, as it is often the case with terminal cancer patients. Only a couple of year ago a similar news was reported in all the media. Someone discovered (not really surprising indeed) that dogs can smell cancer and could be used for early diagnosis in this field.

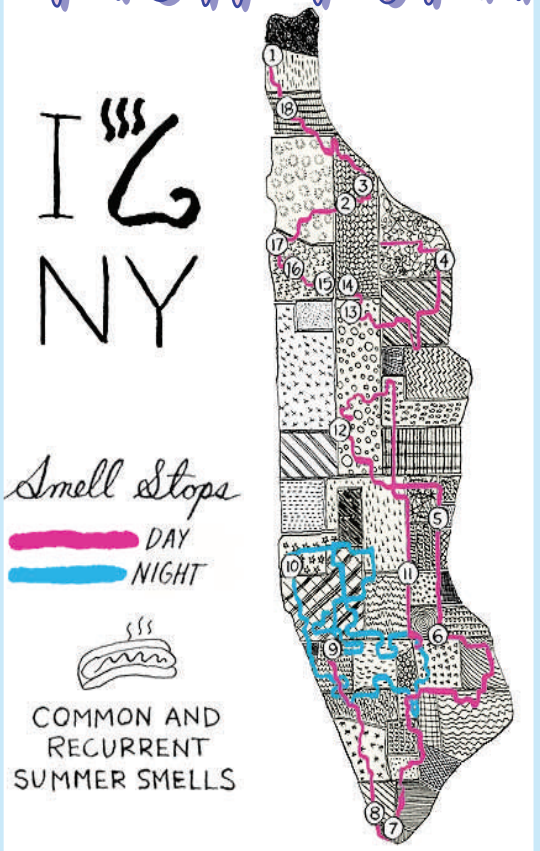
It is not necessary to assume that the same smell is given off from all dying people. The smell that Oscar likes might be a particular one associated with only some special diseases. Although the first report was published in one of the top scientific journals, there is no statistics, nor any scientific approach to interpret the data. After all the peculiar behaviour of Oscar has been observed only in 25 cases during a period of several years preceding the publication of the paper. 25 cases more, observed from 2007 to 2009 then justified the publication of a second report in the form of a book.

We wouldn't be surprised if soon someone will come up with a paper discussing the "mysterious attraction" of flies to the flesh of dying people... or better of those already passed away.

The smells of New York

On August 29, 2009, The New York Times published an interactive olfactory map of the City.
"*Scents and the City*" is the title of the article by Jason Logan, that can be accessed at the website:

On a hot summer day, the Author embarked on an olfactory trip across New York, with the ambition of rediscovering the City through his nose.
If someone thinks that in our technological world we have definitely lost the variety of smells that so vividly bring back our childhood memories, will be surprised at the richness of odours, pleasant as captivating, as well disgusting and repellents that we can still find in a big city.
Each quarter is characterised by its own peculiar smells and you can navigate on the interactive map and discover what each place can offer your nose. Here below are reported some



HARLEM

Aggressively (almost territorially) soapy cologne; rum; peanuts; hot sauce mixed with mayo; pizza mixed with fried chicken; crazy perfume; urine; cat litter; wet wool coat; wet charcoal; vodka mixed with pineapple juice; delicious shrimp grilling; spilled gas; laundry soap; black tea; Chinese food; laundry; cardboard; strawberry drink; ham.

EAST HARLEM

Buffalo-chicken nuggets; cigarettes; exhaust; cherry lip gloss; rotting tangerine; strong floor polish; dry grass; almond perfume; grapefruit rind; gas; diapers (unused); pink roses and Russian sage (very faint); white-Cheddar popcorn (very strong); touch of urine; black locust blossoms; leafy bark; aftershave; fresh laundry; blossoms and grassy perfume; wet cigar; rancid apricot; Polish, Italian and German sausages cooking in water; deep-fried Oreos.

SPANISH HARLEM

Cigarettes; powdered cleanser; sweet fried dough; mildewing towels; car wax; roses; mole sauce; beans going sour, through exhaust fan; green peppers; dill and mint at tiny farmers' market; dog urine; human urine; freshly shaved men; orange drink; garbage.

YORKVILLE

Everything bagels.

UPPER EAST SIDE

Fragrant flowering bush (behind a statue of Samuel Morse); fresh plants; shampoo-y deodorant; soft strawberry ice cream; freshly watered ferns; medicinal-smelling person.

LENOX HILL

Musty, metallic phone booth; cookies mixed with bus exhaust; mildewy towels; soft ice cream; dust; fries; cardboard; garbage; coffee; baby's breath (the flower).

...and the stench of London in 1848

SANITARY RAMBLINGS.

BEING

SKETCHES AND ILLUSTRATIONS,

OF BETHNAL GREEN.

A TYPE

OF THE CONDITION OF THE METROPOLIS

AND OTHER LARGE TOWNS.

BY

HECTOR GAVIN, M.D. F.R.C.S.E.

MEMBER OF THE COMMITTEES OF THE HEALTH OF TOWNS AND OF LONDON ASSOCIATIONS, LECTURER ON FORENSIC MEDICINE, AND PUBLIC HEALTH, CHARING-CROSS HOSPITAL. &c., &c.

LONDON:

JOHN CHURCHILL, PRINCES STREET, SOHO.

1848.

Much more unpleasant and distressing had been the "Sanitary Ramblings" of Hector Gavin across London in 1848. Gavin was a Medical Doctor who described in his book the most distressing living conditions of poor people in the borough of Bethnal Green. There are continuous references to the revolting odours of putrid waters, constantly filled toilets and decomposing corpses.
He describes street by street, house by house, reporting on the people living in those slums and on those dying of diseases and lack of hygiene.
Here are some short excerpts.

You can download a photocopy of the entire book at:

slimy mud and putrefying filth, which extends for 100 feet. The space between Pleasant-row and the central square is, beyond description, filthy; dung-heaps and putrefying garbage, refuse, and manure, fill up the horrid place, which is covered with slimy fœtid mud. The eastern end has likewise its horrid filthy fœtid gutter reeking with pestilential effluvia; the southern alley is likewise abominably filthy: there, the same slime and mud overspreads the broken up, bouldered path; and there, the same most disgusting odours are given off, which are common to this area of putrescence. I do not think that in all my journeyings through the degraded haunts of wretched poverty in this poor parish I have found a scene so distressing. The houses in Pleasant-place are chiefly two-

pig-styes and dung-heaps heightened the foulness of the effluvia, and rendered the place horrible. Towards the end of this street is an opening for the commencement of a new street. A pool of fœtid slime, twenty-three yards long, fills up part of the opening. A gutter, cut in the roadway, conducts the slimy refuse from the filthy street into this pond; two small gutters likewise lead into it from separate houses.

A very special honey

....and an intriguing riddle

Honey is not just honey. It is like with the wine, if you are a connoisseur, you can distinguish honey from honey and appreciate subtle flavour differences. It all depends on the flowers the honeybees have visited, we have acacia honey, the queen of all honeys, the classical one. Then we have citrus honey, chestnut honey and so many others, including the "millefiori", the equivalent of a blended whiskey as compared to single malt whiskeys.

The helichrysum is a plant growing on the sand dunes of beaches. There are many along the coast near Pisa and when they are in blossom make a sort of yellow carpet blending with the yellow of the sand. And, of course, there is also the honey of helichrysum. This honey is quite special because it stores the very peculiar flavour of these flowers, phenolic and spicy notes that make this honey easily recognisable from the others.

But, after all, it is just another kind of honey, what is so special then?

It is special, because there is a mysterious puzzle around this honey. Well, honey is just the nectar of flowers that the bees collect and process.

The extraordinary fact is that the flowers of the helichrysum do not produce any nectar! So, where does the sugar come from? From other flowers, of course. But then, if there is no sugar, why do the honeybees visit these tasteless flowers? Pollen of course! Wrong answer again, the pollen of this plant has never been found in the pollen collected and stored by the bees, nor in the honey they produce. On the other hand, the pollen of helichrysum is only available at the end of the flowering period and, as a matter of fact, the workers always sample with their ligula right in the core of the corolla.

We know that several plants produce in their flowers specific pheromones to attract insect and use them to get pollinated. Well known are the cases of some orchids, that use this trick to attract and deceive solitary bees. But, we are talking about honey bees, workers are insensitive to the pleasures of sex, just like nuns in a convent, you can only attract them with cakes and sugar.

It is still a mystery why the honeybees visit the helichrysum and put its special flavour into this special honey, but there is a theory, that seems quite reasonable. What the bees get from the flower is essential oil, rich in phenolic compounds. Such compounds, apart from their use in preparing delicious indian dishes, are endowed with disinfectant and bacteriostatic properties, quite useful in the bee hive.

Is this a likely explanation? So far no better theories have been produced, in the meantime I strongly recommend that you try this very special honey.

BOOKS

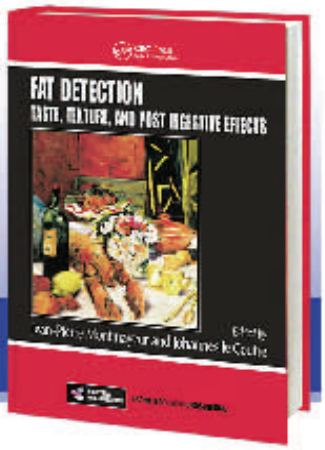
Fat Detection from the Tongue to the Brain

Fat Detection

Taste, Texture, and Post Ingestive Effects

NEW!

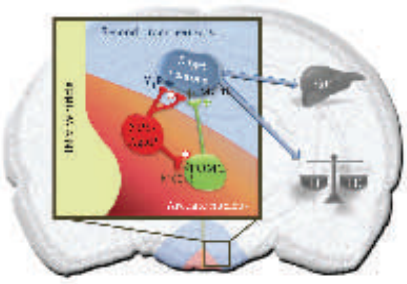
Jean-Pierre Montmayeur, Centre National de la Recherche Scientifique, Dijon, France
Johannes le Coutre, Nestlé Research Center, Lausanne, Switzerland



Presents the State-of-the-Art in Fat Taste Transduction

A bite of cheese, a few potato chips, a delectable piece of bacon – a small taste of high-fat foods often draws you back for more. But why are fatty foods so appealing? Why do we crave them? **Fat Detection: Taste, Texture, and Post Ingestive Effects** covers the many factors responsible for the sensory appeal of foods rich in fat. This well-researched text uses a multidisciplinary approach to shed new light on critical concerns related to dietary fat and obesity.

Outlines Compelling Evidence for an Oral Fat Detection System



Reflecting 15 years of psychophysical, behavioral, electrophysiological, and molecular studies, this book makes a well-supported case for an oral fat detection system. It explains how gustatory, textural, and olfactory information contribute to fat detection using carefully designed behavioral paradigms. The book also provides a detailed account of the brain regions that process the signals elicited by a fat stimulus, including flavor, aroma, and texture.

This readily accessible work also discusses:

- The importance of dietary fats for living organisms
- Factors contributing to fat preference, including palatability
- Brain mechanisms associated with appetitive and hedonic experiences connected with food consumption
- Potential therapeutic targets for fat intake control
- Genetic components of human fat preference
- Neurological disorders and essential fatty acids

Providing a comprehensive review of the literature from the leading scientists in the field, this volume delivers a holistic view of how the palatability and orosensory properties of dietary fat impact food intake and ultimately health. **Fat Detection** represents a new frontier in the study of food perception, food intake, and related health consequences.

FEATURES

- Presents an integrated view on fat taste, fat preference, and nutrition at the molecular level
- Discusses the link between a fatty diet and obesity
- Includes new scientific data on fat detection and metabolism
- Takes a multidisciplinary approach to the many aspects of dietary fat, including psychological, behavioral, and physiological perspectives

CONTENTS

See reverse side for continuation of Contents and ordering information

CRC Press
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Catalog no. 67753, September 2009, c. 642 pp.
ISBN: 978-1-4200-6775-0, $149.95 / £95.00

The Neurobiology of Olfaction

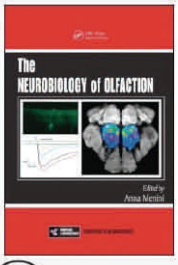
Editors/Affiliations

Anna Menini, S.I.S.S.A, Trieste, Italy

Key Features

- The material presented takes an interdisciplinary approach and includes research from genomics to behavior
- Addresses common principles from nematodes to humans
- Discusses the most recent advances in the understanding of coding of odor information
- Presents the most recent discoveries about neurogenesis in the olfactory epithelium and in the olfactory bulb

Save 15%!



CRC Press
Taylor & Francis Group

About the Book

The common belief is that human smell perception is much reduced compared with other mammals, so that whatever abilities are uncovered and investigated in animal research would have little significance for humans. However, new evidence from a variety of sources indicates this traditional view is likely overly simplistic. **The Neurobiology of Olfaction** provides a thorough analysis of the state-of-the-science in olfactory knowledge and research, reflecting the growing interest in the field. Authors from some of the most respected laboratories in the world explore various aspects of olfaction, including genetics, behavior, olfactory systems, odorant receptors, odor coding, and cortical activity. Highlighting common principles among various species – including humans, insects, Xenopus laevis (African frog), and Caenorhabditis elegans (nematodes) – this highly interdisciplinary book contains chapters about the most recent discoveries in odor coding from the olfactory epithelium to cortical centers. It also covers neurogenesis in the olfactory epithelium and olfactory bulb. Each subject-specific chapter is written by a top researcher in the field and provides an extensive list of reviews and original articles for students and scientists interested in further readings.

Selected Contents

From Odors to Behaviors in *Caenorhabditis elegans*. Odor Coding in Insects. Olfactory Information Processing in Moths. Olfactory Coding in Larvae of the African Clawed Frog *Xenopus laevis*. Development of the Olfactory System. Pheromones and Mammalian Behavior. Odorant Receptors. Signal Transduction in Vertebrate Olfactory Cilia. Multiple Olfactory Subsystems Convey Various Sensory Signals. Feedback Regulation of Neurogenesis in the Mammalian Olfactory Epithelium: New Insights from Genetics and Systems Biology. Neurogenesis in the Adult Olfactory Bulb. Active Sensing in Olfaction. Temporal Coding in Olfaction. Cortical Activity Evoked by Odors. Memory and Plasticity in the Olfactory System: From Infancy to Adulthood. New Perspectives on Olfactory Processing and Human Smell.

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Forthcoming Meetings

Dear Colleagues,

I am very happy to let you know that ***the next ECRO Congress will be held in AVIGNON, France, 14-19 September 2010, in the Palace of the Popes.***

Avignon is a beautiful historical city with old stones, walls, monuments, museums etc. in a typical south of France landscape, not far from the city of perfumers: Grasse. Presentations will take place in the historical part of the Palace, right in the city, with every facility within a walking distance.

It will be a great pleasure to welcome you in such an attractive place!

Deadlines:

Symposia proposals: March 15.

Registration: May 31st (including symposia speakers and organizers)

Hotels: May 31st (compulsory: the city is a very active touristic place)

Request for Student grants: April 30th

Abstracts: June 15th (Please remember to renew your membership for 2010).

Looking forward to seeing you soon in Avignon!

Annick Faurion

Students' Reports

.....some comments and guidelines.... please read!

There are no established rules for students who received a grant on how to write a report. So far, we have received contributions widely ranging in size, style and content. Although there should still be plenty of freedom for everyone to report experiences and feelings, it could be useful to provide few general indications on what we expect to read in these reports.

SIZE ***A reasonable length would be between 300 and 600 words (half to one page as the present one),but longer reports are welcome, provided they are concise and informative***

CONTENT ***It is important to report facts, scientific information, practical aspects, A short self-introduction would also be useful, where is the student working and what is his/her current research, how the information obtained at the Conference or during a stage in another lab have been useful for a progress in the work, if he/she established links and collaborations with other labs, etc. Also, reports onj some important scientific findings of general interest, that the student has learned and consider particularly interesting would be suitable.***

STYLE ***Remember, this is your personal report. Although hard facts and scientific data are the object of the report, it is the personal experience that is mostly important. Therefore, always try to make your report personal, from your own perspective.***

GRAPHICS ***The inclusion of pictures of any kind it is stronly encouraged: scientific data, your own photograph, pictures taken during a moment of relax, funny expression, or whatever stimulated your artistic spirit.***

Simona Gribaudo from ECRO (Villasimius)

As an ECRO granted student, I have attended the XIX ECRO Congress that took place in Villasimiusm from the 24th to the 27th of September 2009.
I presented my poster on Friday 25th, following the symposium organised by Peter Mombaerts and closed with an intriguing communication. The poster session was engaging and produced animate discussions and interesting suggestions for my current and future work.
I found the symposia chaired by Anna Menini and Aldo Fasolo extremely stimulating, in particular the presentations of Mary Claire Broillet and Alan Carleton. I have enjoyed the closing plenary lecture of Tom Finger with beautiful presentation of solitary cells.
It has been a great experience for me and I want to thank ECRO for giving me the possibility to participate.

Simona Gribaudo – Dept. of Animal and Human Biology, University of Torino, Italy

Maria Boschker from ESITO (Villasimius)

Thanks to the student fellowship grant of ECRO, I was able to participate and present some data at the XI ESITO conference in Villasimius this year. I deepened my understanding of insect gustation and olfaction by listening to the different lectures and visiting posters, but also by discussing different topics during the breaks with many researchers. I am grateful that I got the opportunity to give an oral presentation about my master thesis research on morphological, behavioural and electrophysiological aspects of taste in the foretarsi of the moth *Heliothis virescens*.
I enjoyed the welcoming atmosphere where it was easy to make contact with people, which was also promoted by the good food and organisation. Unfortunately the weather was not that good as it is known for Sardinia, but this made the conference not less enjoyable. I can only warmly recommend the ESITO meetings and I am very thankful for getting the possibility to be there.
Maria Boschker – Norwegian University of Science and Technology, Trondheim, Norway

Virginie Briffaud from ECRO (Villasimius)

Thanks to the generous support of an ECRO Fellowship, I had the opportunity to attend the XIX European Chemoreception Research Organization meeting held in Villasimus (Italy) in last September. This was an important step for my scientific experience for many reasons.

First, this meeting gave me a chance to acquire a global view of various fields of taste and olfaction thanks to scientific program of high quality presented by the organization committee. Different aspects of olfaction and gustation were discussed from the behavioral level to the genetic level. The symposia and poster sessions allowed me to get a unique opportunity to learn about our current knowledge on perception and processing of odor molecule and this from Insect to Human and notably in Rodent. This is particularly interesting for me since part of my PhD study involves olfactory processing in mammals.

Furthermore, the social aspects of this congress are also very important. Indeed, the organization around scientist conference facilitates interactions between the participants notably during informal events such as meal and wine tasting.

Finally, this congress gave me the chance to present the results of my PhD research in a poster and to discuss them with confirmed scientists. I was positively surprised that people were showed interested in my research and were a very respectful towards me, inspite of my beginner English level.

The XIX ECRO congress was, for sure, a great and unforgettable scientific and social experience. I would conclude to sincerely thank ECRO Board for its support to young scientists to attend this meeting.

Virginie Briffaud,
Université Claude Bernard, Lyon, France

Roxana Minuz from ECRO (Villasimius)

It was the first time for me at an ECRO Congress, and a great way to exchange and get new ideas on this field of research. I work on chemical ecology of a group of insects, which are vectors of serious diseases of plants, focusing mainly on behavioural assays and electroantennography. Between all the symposia I found particularly interesting those about applications of chemical senses for insect control, and about the plasticity of the olfactory system, which were the most near to my field of research. Nevertheless it was a great surprise what I listened to in the other symposia, and seeing how olfactory structures can be so conservative during evolution. Occasions like this can show to us “applicative researchers” the importance of base research, like the characterization of the olfactory system’s physiology on model organisms, and remind us how huge is the knowledge to be deepen. I’d like to thank the ECRO organization for giving me the economic opportunity to participate to this congress. I wish also encourage other students to take the occasion of these grants for such kind of events, where everybody can get more incomings and stimuli on their work.

Roxana Minuz

Imma Iovinella from ESITO (Villasimius)

I would like to thank the ECRO board for a fellowship, that gave me the opportunity to attend the 11th ESITO (European Symposium of Insect Taste and Olfaction) Congress in Villasimius, Cagliari, Italy from 19 to 24 September 2009. During this international meeting I had the possibility to meet expert scientists working in different fields of chemical senses, and to learn more about this world. I presented the results of my work both as an oral communication and in the form of a poster, that gathered a number of students and scientists. This gave me the opportunity to discuss my data with experts in the field, acquiring interesting ideas and new viewpoints on my work in a really nice and friendly atmosphere. All the lectures that I attended were interesting and addressed various aspects of insect chemoreception. The different topics covered recent progress and advanced techniques in molecular mechanisms of olfactory and taste reception and transduction, peripheral and central coding, higher centres of the chemosensory system and their plasticity. For example Richard Benton, Centre for Integrative Genomics, University of Lausanne, Switzerland, presented a work on a novel family of chemosensory receptors in *Drosophila melanogaster*, named the Ionotropic Receptors (IRs) and their function in mediating odour detection. Giovanni Galizia, from Neuroscience, Universität Konstanz, Germany, created, with his group, a new open access database in which all odour-response profiles are accessible. They present a consensus odour response matrix across odorants and olfactory receptors for *Drosophila*, but the database can also be open to odour responses in other species, integrating other data about combinatorial odour coding. Walter S. Leal, from Department of Entomology, University of California, identified very sensitive ORNs specialized in the detection of host-derived semiochemicals in *Culex* mosquitoes.

The work that I presented was on the olfactory system of honeybee, in particular the study of expression, between castes and ages, as well as between different antennal segments, of soluble proteins (odorant binding protein and chemosensory protein) using a proteomic approach. In my work I have used two dimensional electrophoresis and mass spectrometry to identify the proteins and ligand binding assays for the characterisation the recombinant OBPs with a number of pure organic compounds. Several participants expressed interest for my work and gave me useful suggestions.

Finally, I would like to thank the organizers of this event for the suggestive place that they chose and for the enjoyable social programme.

Imma Iovinella
University of Pisa, Italy