ECRO

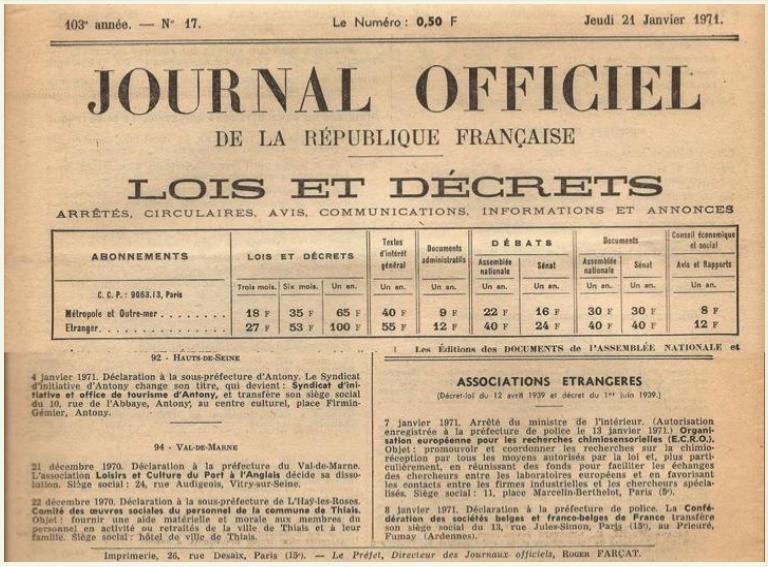
Newsletter 90

Spring 2016

in this issue...

ECRO 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. The goal of ECRO is to promote fundamental and applied research in chemosensory sciences, especially olfaction and taste. ECRO is financed by individual member subscriptions and by donations from industry and research institutions. Since 1978 ECRO has been affiliated with UNESCO.



103e année. — N° 17. Le Numéro : 0,50 F Jeudi 21 Janvier 1971.

JOURNAL OFFICIEL

DE LA RÉPUBLIQUE FRANÇAISE

LOIS ET DÉCRETS

ARRÊTÉS, CIRCULAIRES, AVIS, COMMUNICATIONS, INFORMATIONS ET ANNONCES

ABONNEMENTS	LOIS ET DÉCRETS			Textes d'intérêt général	Documents administratifs	DÉBATS		Documents		Conseil économique et social
						Assemblée nationale	Sénat	Assemblée nationale	Sénat	Avis et Rapports
C. C. P. : 9063-13, Paris	Trois mois.	Six mois.	Un an.	Un an.	Un an.	Un an.	Un an.	Un an.	Un an.	Un an.
Métropole et Outre-mer	18 F	35 F	65 F	40 F	9 F	22 F	16 F	30 F	30 F	8 F
Etranger	27 F	53 F	100 F	55 F	12 F	40 F	24 F	40 F	40 F	12 F

92 - HAUTS-DE-SEINE

4 janvier 1971. Déclaration à la sous-préfecture d'Antony. Le Syndicat d'initiative d'Antony change son titre, qui devient : **Syndicat d'initiative et office de tourisme d'Antony,** et transfère son siège social du 10, rue de l'Abbaye, Antony, au centre culturel, place Firmin-Gémier, Antony.

94 - VAL-DE-MARNE

21 décembre 1970. Déclaration à la préfecture du Val-de-Marne. L'association **Loisirs et Culture du Parc à l'Anglais** décide sa dissolution. Siège social : 24, rue Audigeois, Vitry-sur-Seine.

22 décembre 1970. Déclaration à la sous-préfecture de L'Haÿ-les-Roses. **Comité des œuvres sociales du personnel de la commune de Thiais.** Objet : fournir une aide matérielle et morale aux membres du personnel en activité ou retraités de la ville de Thiais et à leur famille. Siège social : hôtel de ville de Thiais.

Les Éditions des DOCUMENTS de l'ASSEMBLÉE NATIONALE et

ASSOCIATIONS ETRANGERES

(Décret-loi du 12 avril 1939 et décret du 1er juin 1939.)

7 janvier 1971. Arrêté du ministre de l'intérieur. (Autorisation enregistrée à la préfecture de police le 13 janvier 1971.) **Organisation européenne pour les recherches chimiosensorielles (E.C.R.O.).** Objet : promouvoir et coordonner les recherches sur la chimioréception par tous les moyens autorisés par la loi et, plus particulièrement, en réunissant des fonds pour faciliter les échanges des chercheurs entre les laboratoires européens et en favorisant les contacts entre les firmes industrielles et les chercheurs spécialisés. Siège social : 11, place Marcelin-Berthelot, Paris (5e).

8 janvier 1971. Déclaration à la préfecture de police. La **Confédération des sociétés belges et franco-belges de France** transfère son siège social du 13, rue Jules-Simon, Paris (13e), au Prieuré, Fumay (Ardennes).

Imprimerie, 26, rue Desaix, Paris (15e). — *Le Préfet, Directeur des Journaux officiels,* ROGER FARÇAT.

The birth certificate of ECRO, 1971

The ECRO Board (2014-2016)

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Editorial

This is the 90th issue of the ECRO newsletters and marks the 45th anniversary of ECRO, which was founded back in 1971. At that time, research on chemoreception was largely performed by chemists busily synthesising hundreds of new molecules, trying to arrange their smells within numberical matrices, and building theories. This research was almost completely focused on human olfaction and related to perfumery and food science. On the other side, electrophysiological measurements were used to obtain responses from mice and insects to olfactory stimuli. Ten years later, in 1981, the first OBPs were identified and the focus of research in olfaction shifted to biochemistry. Ten years more and the olfactory receptors were discovered. From then, chemoreception has experienced an exponential growth, thanks to the application of molecular biology techniques, and then an explosion with the advent of the genomic era and the availability of enormous amounts of data.

Where shall we go next? Despite the wide knowledge acquired and the detailed information on a very large number of species collected in particular during the last decade, we have not witnessed any major breakthrough discovery. A large number of published papers present collections of data, mainly sequences obtained through transcriptome projects (thanks to their actual low cost), mainly in insects. Very useful data, that enrich our database and represent the basis for applied research in agriculture or in general with insects of economical importance, but what have we learned?

From the pioneering studies of the 1970s based on theories and blind wandering in a region still shrouded in mystery, the identification of olfactory receptors and their wiring to the brain was like the discovery of a new continent. After, we have been exploring this continent in detail and certainly made many exciting discoveries.

Are there new frontiers still waiting to be crossed and new lands to be explored?

Plants probably still represent the major neglected field in terms of chemoreception. It is now accepted that plants can *smell* and can send chemical signals, and one of the articles reported in the present issue just adds evidence.

But how do they *sense*? Where and how are chemical signals detected? Do plants have a *nose*? Certainly not a nose or an antenna or some other structure that we can identify as a piece of anatomy, a structure that we can sever from the plant and verify if the chemosensing capacity is lost.

Probably we should better regard plants as superorganism, as nicely suggested by Stefano Mancuso in his book “Brilliant Green”, reviewed in the last issue of these ECRO Newsletters. Most likely, plants have hundreds of noses… but where? In their leaves, in their roots or elsewhere?

Well, there is a lot to be discovered, chemoreception is still a very fascinating field.

Another exciting aspect of olfactory receptors to be explored is their role in cross-talking between cells of the body, in particular cancer cells. Already a number of papers have provided convincing evidence of this phenomenon opening new potential approaches to control the proliferation of tumours.

On a completely different topic we might observe that the proliferation of papers in olfaction sometimes reminds us of the spreading to tumour. An increasing number of papers with dubious scientific value are constructed on a fixed template: find a little studied insect species, perhaps with impact on agriculture (most of them do have), extract RNA from antennae, send it for sequencing and arrange the results by protein families. If you want to add an extra flavour, do a series of quantitative PCR experiments to measure the expression of OBPs or CSPs in different organs. Is this enough for a paper? It depends on what you find and how accurate your experiments are. Most of the times you just find what you expected, and your data might still be valuable, but only as an information basis on which to design a research project. In other cases, contamination and inaccuracies make the published data partial and unreliable.

Occasionally, papers, like the one published in BMC genomic and reported in this issue, report on experiments wrongly designed and erroneous results.

This phenomenon has been alimented by the recent sprouting and multiplication of journals ready to accept anything, provided you pay the fee. While proclaiming the otherwise noble aim of providing *Open Access*, some journals have become *Open Markets*, where scientific quality is only one of the requisites for publication.

To cite only two of the most common examples, *Plos One* publishes about 30,000 papers a year, and *Scientific reports* has already published in 2016 more than 10,000 papers, doubling the number each year since the *meagre* 800 in 2011.

At the fee of more than 1,000 euros per paper, you can easily calculate the fortune entering the safes of these journals. Where does all this money go? No printing and postage costs and little editorial expenses, judging from the poor service provided. A very large number of unpaid editors and reviewers support a continuous output of cheap information and a corresponding input of good cash.

Of course, to guarantee an impact factor high enough to attract customers, these journals have to publish (and do publish) good papers, together with a large amount of cheap stuff.

How to counteract this tendency and avoid that science is governed by the laws of economy? Don’t send your manuscripts to these journals and decline their invitations to review.

In several high level Research Institutions in China already scientists are discouraged from publishing in journals that, however endowed with high impact factor, are regarded as of dubious reputation, based on their reviewing policies.

Perhaps it is time to stop measuring the quality of a journal by its impact factor, if, based on such criterion, we end-up rating JBC lower than Sci. Rep.

Paolo Pelosi

From the President

Dear ECRO community,

The first half of 2016 has passed and we have already seen two important scientific events for the chemosensory field, i.e. the annual AChemS meeting in Bonita Springs, Florida, USA, in April, and the 17th International Symposium on Olfaction and Taste in Yokohama, Japan, in June. Certainly, ISOT meetings are the most important ones as they take place only every four years. It is alternately organized and hosted by the three chemosensory societies, The Japanese Association for the Study of Taste and Smell (JASTS), Association for Chemoreception Sciences (AchemS), and the European Chemoreception Research Organization (ECRO). The other two chemosensory societies, Australasian Association for ChemoSensory Sciences (AACSS) and Korean Society of Chemoreception and Ingestive Behavior (KoSCI) feel themselves too small to host ISOT but have their representatives in the steering committee (ICOT). Whereas previous ISOT meetings have been organized by small groups of people for ISOT2016 the organizing and program committees had balanced international compositions. It was agreed by ICOT members to maintain this trend in the future. The resulting program consisting of plenary talks, presidential symposium, parallel symposia and poster sessions was versatile, attractive and of high quality. Most of the lively scientific discussion took place at the posters. Our Japanese hosts took every effort to make their guests feel welcome and comfortable. And I wish to take this opportunity to congratulate and thank them, in particular Yuzo Ninomiya (president) and Kazushige Touhara (program chair), very much for organizing such a great meeting. Obviously, their efforts were rewarded by good attendance. Eight hundred twenty two participants were there in total, coming from 28 countries from 4 continents. Europe was represented by 14 countries, yet honestly, I missed some of our colleagues whom I had expected to meet there. The next ISOT meeting, 2020, will most likely take place in the Northwest of the United States with Seattle as one option and Jay Gottfried (Chicago) is the incoming chair.

As always and supported by the nice Florida sun, it was a pleasure to attend this year's AChemS conference. With Julie Menella as program chair an interesting program has been developed. A new twist applied to presidential symposium where the four major AChemS merit awardees were given the opportunity to speak and present their research.

In the meantime organization of this year's ECRO meeting, September 7-10, Athens, Greece progressed. Marika Kapsimali (Paris) set up the program featuring 5 plenary talks covering smell, taste and extraoral taste as well as vertebrate and invertebrate systems. Moreover, 7 symposia discuss broad aspects of chemosensation across systems. Since April 18 until July 14 the abstract submission system is open. Let me take the opportunity to invite you cordially to submit your abstract; don't miss the opportunity to present and discuss your research in Athens.

A regrettable trend seen at previous AChemS, ECRO, and ISOT meetings is the decreasing attendance of researchers studying invertebrates. I am thoroughly convinced that research in these systems is enrichment for our field and we can learn a lot from them including methodology and precision of putting and answering research questions. Therefore, I want to call for papers from the 'insect community' and invite them to join us in Athens.

During the upcoming ECRO meeting the composition of the ECRO board will change. Peter Brennan (Bristol) will take over as president and Anna Menini (Trieste) will leave the board. She has served for six years as president-elect, president, and past-president and already now I wish to express my thanks for her contribution to the ECRO community. Most importantly we will have elections of new board members. Please note that the poll starts July 9 and goes until August 9 and take part in it. The new ECRO board will be presented at the general assembly, September 9, Athens.

I hope to be able to see many of you there.
Take care and enjoy your summer,

Wolfgang Meyerhof

Treasurer's report

The year 2015 was a strange year regarding ECRO membership. Only 172 paid up members were recorded bucking the trend over the last few years where we have been recording over 200 members every year. The ECRO Congress 2015 in Istanbul was well attended, but a number of eminent European scientists who were there elected to pay the full congress fees rather than paying their subscriptions to ECRO and being eligible for reduced fees. On talking to a few of these scientists, it seems that many seem to forget to pay their subscriptions at the beginning of the year despite the email reminders, some would like to pay for several years in advance and not be bothered to pay a yearly subscription. The impact of this is that the contribution from the Polak foundation which is weighted according to the paid up members for AChemS and ECRO will be diminished this year, and the consequence is that the number of grants to students given by ECRO may diminish.

Having said this, ECRO finances are good this year, with a total balance of 101621 Euro in the bank at the end of March 2016. This is because due to the good management of the ECRO Congress 2015 in Istanbul by Stefan Fuss, a profit was made that was returned to ECRO. This is being used to support the organisation of ECRO Congress 2016 in Athens, and to support grants to young scientists.

After just returning from Japan from ISOT 2016, it was a good experience to reflect on the 25 years that have passed by since the seminal paper of Buck and Axel, a theme that was present at the meeting. Research in chemoreception has gone from strength to strength, and it has been a wonderful experience to see the number of new young researchers also entering in the field.

We hope that this will translate into burgeoning science in Europe and future expansion of ECRO.

We invite young researchers to apply for grants from ECRO and we shall have a number available for attendance at the ECRO 2016 Congress in Athens. We are looking forward to seeing you there.

Recent Grants Awarded

Franz Schoeps to attend the AChemS meeting 2016.

Stefanie Henkel to attend the UK Semiochemical Network meeting July 2016.

Krishna Persaud (ECRO Treasurer)

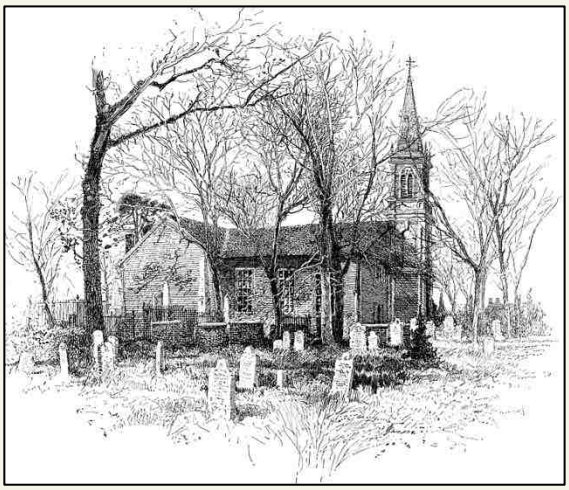
Smelly news and curiosities

Plenty of stories and anecdotes about smell can be found in old newspapers. The Internet provides a great help in fishing out these interesting aspects of the life of our fathers. Here are a couple of reports.

Paolo Pelosi

From graveyards to out of town cemeteries

When George Walker (1807-84) set up in medical practice at 101 Drury Lane in 1837 he discovered he was surrounded by some of the most overcrowded graveyards in London, including Enon Chapel in St Clement's Lane, where around 12,000 people were buried. Convinced that the smell coming from these yards was harming public health he founded the National Society for the Abolition of Burials in Towns. After the cholera epidemic of 1848 Walker's advice was taken and most burials were moved out of town to new private cemeteries.



The smell of rotten bodies

Puritan recluse Edward Greswold (c. 1594-1633) locked himself and his family in his house in an attempt to remove them from the corruption of the outside world, while servants were instructed to deliver food through the windows. When one of his children died he refused to have the body buried, locking it in the next room and using moss to stop up the cracks around the door to prevent the smell of decay filling the rest of the house. Eventually a Justice of the Peace ordered the house broken open and Greswold and his family were found 'with their haire, and nailes growne very long, [and] their clothes almost rotten on their backes'.

A good smelly excuse

Natural philosopher Robert Hooke (1635-1703) began his career as an apprentice to the painter Sir Peter Lely, but complained that the smell of oil paint gave him headaches and cut the apprenticeship short. John Aubrey claims his departure was actually due to the realisation that he could teach himself to paint just as well and hence save the apprenticeship fee.

Chemists like the smell of their creatures

Organic chemist John Read (1884-1963) ruined a number of Cambridge garden parties in honour of the centenary of the birth of Charles Darwin in 1909 when he synthesised a substance--the offensively smelly methyl ethyl selenide--on the roof of the chemistry department.

An interesting account on smells from a popular science magazine

Don't be discouraged by the length of this text, you are not going to get bored. Instead it is very exciting not just for giving a glimpse on how odours were regarded only about a century ago, but most interestingly, for providing a scenario of the chemical knowledge and the current ideas at the end of the 19th century.

Paolo Pelosi

Popular Science Monthly
Volume 41 September 1892

Odors and the Sense of Smell

by M. Charles Henry

A considerable number of mineral compounds are odorous. It is enough to mention, as illustrations of the fact, the sulphureted hydrogen odor of rotten eggs, and the scent of hydrocyanic acid which emanates from bitter almonds. Although perfumes, or pleasant smells, are organic or carbon compounds, the distinction between organic and inorganic may be considered artificial, since the principal organic bodies can be obtained by the combination of such simple mineral elements as carbon, oxygen, hydrogen, and nitrogen.

On the gradual complication of syntheses of this kind M. Berthelot, who has made more of them than any other chemist, has based a classification of organic compounds into eight categories. We have first, hydrocarbons, formed of the two elements—acetylene, formene, benzene, turpentine, styrolene, etc. The bodies composed of three elements—carbon, hydrogen, and oxygen—are divided among four categories. We distinguish between the alcohols, which are capable of uniting directly with acids to form ethers with the elimination of the elements of water; the aldehydes, which are formed at the expense of the alcohols, with the loss of hydrogen, among which are the essence of bitter almonds and the essence of cinnamon; the acids, like acetic and benzoic acids, which, can unite with bases and form salts; and the ethers, the results of the association of alcohols, acids, or other alcohols, among which are the oils of the onion and of mustard.

Among quaternary compounds we have the alkaloids formed by the union of the alcohols with ammonia or other alkalies, amides formed by the union of ammonia and acids with the separation of the elements of water; and the metallic radical compounds which are obtained by the reaction of metals on some of the ethers.

Perfumes are, in general, binary or ternary compounds characterized by the fact that the proportion of equivalents of hydrogen to those of carbon diminishes at the same rate as those of another class of products very rich in hydrogen which are called the fatty series, while this class of products, less rich in hydrogen, is called the aromatic series. Is there any relation between odor and chemical composition?

An English physiologist, Mr. John Berry Hay craft, in his studies of the savors and odors, and savors of the principal compounds of each natural family of bodies, particularly of compounds of the family oxygen, sulphur, chromium, selenium, molybdenum, tellurium, didymium, tungsten, and uranium, has observed modifications in odor corresponding with increase in atomic weights.

For example, sulphureted hydrogen, hydrogen selenide, and hydrogen telluride smell like rotten eggs. The compounds of elements of this family with methyl and ethyl have an alliaceous odor. So with the family chlorine, bromine, and iodine; the acids which these bodies form with hydrogen and their compounds with methyl, ethyl, and ethylene have similar odors, so that some among them seem to share them with their neighbors; bromoform, for example, having a similar odor with chloroform and iodoform.

Passing to the organic series, Mr. Haycraft observes in the monatomic alcohols a modification of odor corresponding with variations in atomic weight. Methyl alcohol, for instance, has a weak odor of alcohol; ethyl alcohol has the typical alcoholic odor; propylic alcohol has both an alcoholic odor and a special smell; isobutylic, amylic, and octylic alcohols progressively lose the alcoholic odor and acquire as against it a special scent. The same facts are remarked in the fatty acids and hydrocarbons.

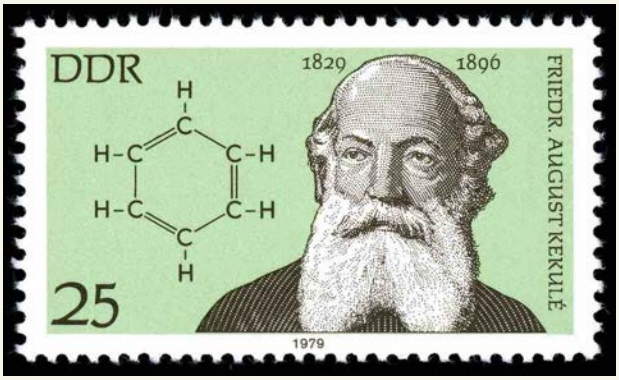
Sulphuric acid, cortibined with distilled water, disengages a pungent odor resembling that of musk. The odor of musk is brought out in a great many reactions. The nitrate derivatives of aromatic substances smell of it; artificial musk and natural musk have no chemical resemblance. So alcohols chemically identical, but of different derivation, do not behave alike with essential oils.

***As odor is thus in a great measure independent of the chemical constitution, it must depend upon the disposition of the particles, a property which it is evidently impossible to discover by any known chemical processes**.*

A few eminent chemists, following Dalton, Avogadro, and Ampère, have tried to make up for this impossibility by hypothesis, and have taken up the great problem of predicting and explaining chemical combinations and isomerics. Their theories, called atomic, have been adopted in most of the original memoirs and taught in most of the text-books. Whatever may be their scientific value, the aids they give him in retaining and recollecting the formulas present incontestable advantages to the student. The applications of them to the study of the aromatic series are famous.

The radical of the hydrocarbons of this series and of all the other compounds is benzene, a body composed of six atoms of carbon and six atoms of hydrogen; when it is attacked by a reagent, and we substitute for an atom of hydrogen another simple body or a group of atoms, whichever of the atoms of hydrogen the substitution may bear upon, we obtain a single product; whence it is concluded that each atom of carbon is united to an atom of hydrogen, and that a symmetrical exchange can take place of the atoms of carbon among their valencies.

A German chemist, Herr Kekulé, has tried to express these peculiarities by a hexagonal scheme which has still some lack of symmetry, and M. Ladenbourg has substituted a prismatic scheme for it. In this figure the six atoms of carbon of the benzene occupy the summits of a triangular prism, each one being united with an atom of hydrogen and exchanging the three valencies that are left it with the three next atoms of carbon by the three edges which meet at the summit. The perfect symmetry of this scheme is well expressed in the simple construction of the figure. But usually, for greater convenience, the hexagonal construction is adopted, and the reciprocal relations of the atoms of carbon and hydrogen are represented by figures in which the more or less complex lateral chains are joined, and which offer the remarkable characteristic of being closed chains—that is, of always returning to their starting point.



What the atomic theories have taught us concerning odor is limited to this singular and so far unfruitful representation; it is evident that they are still mute concerning the real structure of the molecular edifice. The efforts which have been recently made to fill this void are more difficult to expound and follow than

Six methods of extracting perfumes are known: The first is expression, by means of a special press, which is applicable without too great loss to fruit-skins rich in essential oils, such as orange and citron peel, previously grated. Another method is that of distillation, which consists in heating flowers with water in a boiler. The essential oil is volatilized and is condensed with the vapor of water in a worm and a Florentine receiver. The water usually goes to the bottom and the oil floats. The oils of neroli, rose, patchouli, geranium, lavender, caraway, etc., are obtained in this way. This process is not applicable to the delicate perfumes of the mignonette and the violet; and for them recourse is had to maceration of the flowers in animal fats or mineral oils, which have the property of absorbing odorous substances, and are then washed in alcohol. The flowers are usually heated in the fat or the oil for a variable number of hours. For perfumes which can not endure a high temperature the petals are placed between two frames of glass coated with fat. This is the process of enfleurage. The pneumatic process, which consists in causing a current of perfumed air or carbonic acid to be absorbed by coatings of lard on glass plates, appears not to have given satisfactory results. Another process consists in dissolving perfumes in very volatile liquids like sulphuret of carbon, chloroform, naphtha, ether, or chloride of methyl, and volatilizing the solvents, which can be done at a low temperature in a vacuum. The last method has given very satisfactory results in the extreme delicacy and great accuracy of its returns.

Numerous classifications of odors have been proposed. It is, of course, impossible to quote any rational classification. The natural way is to group around a type, in successive series, odors which resemble one another. Eugene Rimmer has tried to do this in the accompanying table.

The author observes that it would be hard to arrange in any of these series certain peculiar odors like that of wintergreen, or salicylate of methyl and magnolia. Notwithstanding the uncertainties attending the arrangement, we must apparently depend upon classifications based upon this principle for a guide in the study of odors.

Similar odors may be furnished by bodies without likeness in chemical composition. Arsenic in oxidizing disengages vapors that have the odor of garlic. Nitrobenzene, benzoic aldehyde, and prussic acid smell much alike. It has been asserted that emeralds pounded and ground several hours a day for three weeks had emitted a well-defined odor of violets. The fact has been verified; but it has yet to be determined whether it is due to the manipulation or to organic substances that have been released by the trituration.

All that we know concerning the propagation of an odor is that it consists in an emission of solid, liquid, or gaseous particles. This emission is allied for these three states of matter to the property called diffusion, which consists in the reciprocal penetration at the end of a certain time of the particles of two or more bodies among one another; and also for solids and liquids to the property called volatility, or the rapidity of evaporation.

But little is known concerning the diffusion of solids. If we heat to a high temperature a porcelain crucible within a crucible of plumbago, the plumbago will penetrate the porcelain to a depth varying according to the duration of the experiment. M. Pellat has shown, by delicate measures of quantities of electricity, that metallic surfaces placed parallel to one another a few tenths of a millimetre apart, reciprocally exchange their outer surfaces, as if they emitted a little of their own substance to each other. When the influence ceases, the surfaces gradually lose their foreign coatings, and return slowly to their primary condition.

The diffusion of liquids is easily observed. It can be witnessed by introducing, with a pipette, into a vessel under water a colored liquid, red wine, for example. The wine, being lighter than water, rises to the surface, and does not color the deeper layers of the water till after one or two days. There is doubtless in the complicated diffusion of liquids a kind of chemical action related to the movements on water of camphor and a considerable number of diffusible substances.

If we put a bit of camphor on the surface of water, it at once turns round and moves in every direction. If a drop of oil is let fall on the same surface, the movements will cease immediately. The motion arises from the diffusion of camphor in a liquid form on the surface of water. When, after the surface is saturated, there is no more diffusion, the motions cease. They also cease when two currents are produced by different bodies in opposite

So, if a bit of camphor is put into a large saucer covered with a thin layer of water, the water immediately retires, sometimes for several centimetres, before the odorous substance. The laws of the diffusion of liquids may be summarized by saying that the rapidity depends on the nature of the substance, increases in proportion to the degree of concentration of the solution, and augments as the temperature rises. Graham's dialyzer is based on the very feeble diffusibility of certain substances, like the gums, and the great diffusibility of certain crystalline substances, like salt. It is simply a vessel, the bottom of which is formed of a leaf of parchment paper, that lets the diffusible substances pass into the water around it and holds the others.

The diffusion of gases and vapors, which is more important in questions of smell, is subject to laws which have been only approximately determined. A glass tube about a metre long is used, divided perpendicularly to its length by a thin metallic partition, which can be made to slide between two perforated glasses. A gas is introduced into each of the separated halves of the tube; the supply-cocks are closed, the partition is lifted out, and the two halves of the tube are put in communication; a half-hour later the partition is shut, and the gaseous mixture contained in each of the compartments is analyzed. Mr. Loschmidt has in this way found the mathematical rule for the measure of the diffusion of different gases, one within the other.

The volatility of a liquid is expressed by the weight of that liquid which evaporates per second and per square millimetre at a given temperature. All that is known of it is that this weight is proportioned to the excess of the maximum tension of the vapor at that temperature over the tension which it has in the air; and this weight varies inversely as the atmospheric pressure according to a law special for each liquid. Evaporation may, therefore, give us valuable information concerning the purity of the odor, and spare us, in many cases, the delicate problem of determining the maximum tension which is so important a characteristic of substances. A special apparatus has been devised for the rapid measurement of volatility.

Tables have been prepared showing the relative volatility of different perfumes, of the substances used for adulterating them, and of the adulterations, by means of which a convenient method is afforded for the detection of frauds.

The influence of different physical forces on the disengagement of odor has been studied; and possible relations between the colors of flowers and the intensity of their perfumes have been inquired into. It has been found that white flowers represent the largest number of odoriferous species, and after them come red, yellow, green, and blue. The order corresponds with that of the emission of calorific force. Flowers which by their color emit the most heat, also emit the most perfume.

The results of the study of the influence of the color of substances on their power of absorbing odors differ a little from these: white, yellow, red, green, and blue absorb odors in a decreasing order, or rather emit them in an increasing one. These colors represent decreasing luminous powers.

Ozone develops the energy of essential oils, and perfumes in turn determine by their oxidation in the air the production of ozone. This is a matter of hygienic significance, for the presence of ozone being favorable to health, we have a means at hand of increasing the supply of it by surrounding ourselves with fragrant substances and flowers.

Heat favors the volatilization of perfumes, and to such an extent that beds of flowers are sometimes inodorous in the bright sunlight which are fragrant in the shade. Some essences need a high temperature for the production of their full effect; while others, to have their delicacy fully appreciated, require the coolness of the evening. This principle may account for appir-fnt differences of tastes among the people of different countries. The odors of many substances are not of equal strength in different climates. Prof. Tyndall believes that there are considerable differences in the absorbing power of different odorous vapors for radiant heat. He perfumed small paper cylinders by dipping them by one end in an aromatic oil, and then placed them in a glass tube, which communicated, through a stop-cock, with a tube in which a vacuum is produced. The air, according as it has been perfumed with one substance or another, discloses to the galvanometer an absorbing power, which, air at the usual pressure being taken as one, varies from thirty for patchouli, to three hundred and seventy-two for anise-seed. These results are, unfortunately, not exact, for no account is taken in them of the tensions of the odorous vapors, which certainly vary, though they are probably of very small absolute value.

Messrs. Nichols and Bailey have compared the smelling powers of men and women. Having made measured solutions of a number of essential oils, a series of flasks was prepared so that the solution in each succeeding one should be only half as strong as that in the preceding one. The flasks were "shuffled," and the subjects of the experiment were called upon to rearrange them in the order of concentration of the solutions. The smelling power of women appeared to be on the whole less delicate than that of the men. The extreme delicacy of the scent of the dog is well known. Mr. Romanes has shown that, by fastening a sheet of paper to the shoes, the odor may be masked, and the dog prevented from following the track of his master; but that a contact with the ground of a few square millimetres is enough to enable the dog to follow the scent. In birds, the sense of smell appears to be little developed; in mollusks and insects the smelling apparatus has been located in the antennæ. Below the group of worms, no olfactory reactions have been, so far as I know, definitely established.

The mechanism of the olfactory apparatus is, as a whole, simpler than that of sight and hearing; but the sensation is subordinated to many individual anatomical peculiarities. As much can be said of touch and taste, which require contact of the excitant, while sight and hearing merely register the vibrations transmitted by a medium. It is easy to conceive how the condition of the membranes, the form of the nasal passages, etc., may affect the sensation.

A distinction is made in medicine between respiratory anosmias which depend on the formation of the organs and the condition of the connective tissues, and essential anosmias which result from atrophy of the nerves. Anosmias are frequent; some are congenital, many are senile and temporary, and connected with traumatisms, hemianesthesia, aphasia, and hemiplegia. We can not expect to find as concordant reactions for the smell as for the sense of color or the sense of form. It is nevertheless a matter of interest to investigate, on as good subjects as we can get, the influence of different odors on sensibility; or, in other words, to determine the weight of odorous vapor which it is necessary to breathe and accumulate in the nasal fosses to make a perfume perceptible. That is the purpose of olfactometers. The olfactometer gives, besides this, the intensity of a perfume. The larger the perceptible minimum of a perfume, the less intense the perfume is, and it is this intensity which determines the price of a perfume, the delicacy of its odor being the same.

The olfactory sense is followed by effects of different kinds of intensity from those of sight and hearing, and may be accompanied by a kind of poisoning. The old medical books are full of stories of it. There are those of a girl killed by the exhalations of violets; of a woman seized with a violent headache from sleeping on a bed of roses; and of a girl who lost her voice by smelling of a bouquet. Ancient medicine attributed curative properties to perfumes, particularly to those of the rose, musk, and benzoin. The intensity of the effects of perfumes makes a rapid succession of sensations almost impossible; for consecutive odors cause a rapid anæsthesia of the sense; on the other hand, if the times separating two successive sensations are too long, it becomes impossible to combine them, and the anticipated effect is disturbed by strange feelings. In short, smell is rather the complement of other excitations than an artistic excitation like a melody or a picture. Its function is, nevertheless, very important. By virtue of its volatility it is a valuable prophylactic; by the great intensity of its effects it can bring about salutary modifications of physiological functions, particularly of the amplitude of respiration; and it possesses in the highest degree the luxurious character of every artistic enjoyment. Flavor has an essential part in nutrition; so has touch. Hearing and sight are indispensable to relations with other persons; but smell, necessary to the animal for finding its prey and avoiding danger, has become, under normal conditions, an almost useless sense to man, since the refinements of civilization tend to prevent the production of miasms and the pestilential odors from which he has to protect himself. It is therefore becoming more and more a sense of luxury for civilized man; and that, perhaps, is the reason why poets, from the author of the Song of Songs down, have associated all kinds of beauty and joy with perfumes.

The Human Pheromone Myth seems to be endowed with magic life, like the Phoenix, the mythical bird reported to come back to life from its own ashes. It remind us a little of another myth, the vibrational theory of olfaction, although we should admit the existence of human pheromones is not an absurd idea, just there is no experimental evidence to support the hypothesis.
Without experimental evidence, we cannot make science. However, the appeal is so strong and the commercial implications so important that many want to believe and invest their intellectual resources in such research. Of course, searching for human pheromones, as long as we do not have definite evidence against, is legitimate and worth pursuing. But, designing projects on the basis that human pheromones do exist and then in the end using the results to support the existence of such pheromones seems a bit crooked.
The state of the art is that there is no evidence from chemistry, biochemistry nor physiology or anatomy, but plenty of data seem to be sprouting from psychological studies.

Here we want to report about one representative paper, among the latest, published in the prestigious journal eLife, which however left us not fully convinced about the conclusions.

Paolo Pelosi

Frumin et al., A social chemosignaling function for human handshaking eLIFE, 2015; 4:e05154

In this paper, the Authors start from the assumption that "***Social chemosignaling is a part of human behavior***", and ask the question of "***whether handshakes are used to sample conspecific social chemosignals***".

To answer the question and prove their thesis, they recruited a number of volunteers and greeted them with or without a handshake. Then, they recorded the behavior of the volunteers for 80 seconds, during most of which time they were left alone, but watched by a camera. Well, as predicted, those who experienced a handshake spent more time with their right hand on their face, close to the nose and sniffed more intensely than the controls.
Let's have a look at the data and see how convincing are they.
First the Authors measure a "baseline" behaviour by measuring how long the subject who did not receive a handshake, spend touching their face with the left or the right hand. It turns out that the left hand is used for about twice the time with respect to the right hand, without significant difference between male and female subjects (**Figure 1**).

Figure 1. Time spent in touching face with either hand in the absence of a potential odour from handshake.

Now, you would expect a similar analysis and a similar graph provided for subjects who were greeted with a handshake… too simple! The Authors provide you with more information by showing also differences between subjects who shook hands with experimenters of the same or the opposite sex (**Figure 2**). To make the presentation more complicated, only variations relative to baseline values are shown, not actual values.

But we can try to extract and recalculate values that could be comparable with those of Figure 1. The figure we obtains do not show any trend: for the left hand (not involved in handshaking), males spent about 10 seconds longer and females only 2 seconds longer with respect to baseline values. For the right hand, the values were -1 and +4 seconds compared to controls. Are such values significant?

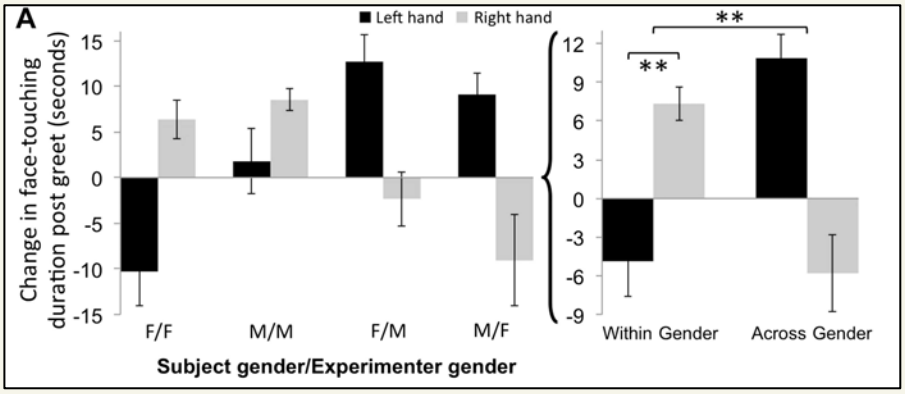


Figure 2. Time spent in touching face with either hand after shaking hand with a person of the same or the opposite sex.

But, let's assume for a moment that the experiments really demonstrate that after handshaking people are more likely to put their hands near the face and sniff. The real question is: WHY they do this? The thesis of the Authors is that they are trying to get information regarding the experimenters by analyzing their odours.

First, let us observe, as the Authors themselves have pointed out, that putting a hand near the face, close to the nose, is a normal behaviour assumed in situations producing a certain stress or embarrassment, or else, Sometimes, while waiting, we just make some trivial movements with our hands, like caressing our chin (or beard, for those we have one), touching our nose or rubbing our eyes. During these actions, we might become aware of some faint odours on our hands and spend more time investigating.

Second, it is likely that, after receiving a handshake, some people, particularly fussy about hygiene, might voluntarily smell their hands, concerned about the cleanliness of the person they have just met. This behaviour is certainly more pronounced if the other person looks (without necessarily being) rather unclean or untidy, or else we can feel a trace of sweat on our hand after the shake.

Is this the kind of information the Authors claim that the subjects tried to learn after a handshake? In such case, we would agree with the work, although we are still not convinced that the data show any significant effect.

But the goal of the Authors is different: they want to support the thesis that during a handshake we exchange "chemosignals", in other words human pheromones.

This leading idea becomes more clear in another experiment, where they tainted the hands of the experiments with some artificial odours. Three groups were used "*one where women experimenters were tainted with the putative male social chemosignal* ***4,16-androstadien-3-one*** *(AND) (Savic et al., 2001; Huoviala and Rantala, 2013) (n = 22), one where women experimenters were tainted with the putative female social chemosignal* ***estra-1,3,5(10), 16-tetraen-3-ol*** *(EST) (Savic et al., 2001; Huoviala and Rantala, 2013) (n = 20), and one where women experimenters were tainted with a commercial unisex perfume (CKbe)(n = 21)*".

What did they find? Of course some variations (not so impressive, anyway) of the times spent in touching face or sniffing hands. As we know, the first compound smells horrible (stale urine), no wonder that olfaction can be summoned in such situations to understand what is going on. But we can expect a similar behaviour with any foreign or unexpected odour being present on the hand.

Besides, the Authors overlook the fact that anosmia to androstenone and related compounds occurs in almost half of the human population. As a result, quite likely half of their subjects were not able to smell the first compound. We wonder what is the significance of the data.
The Authors conclude, among other elements of discussion that: "Thus, this finding implies that humans are not only passively exposed to social chemosignals, but rather actively search for them. This was further evident in the tainting experiment where putative chemosignals and an ordinary perfume drove opposite effects". We would be really surprised if this was not happening! An ordinary perfume smells nice, the "chemosignals" they used smell disgusting (to those who can detect them).

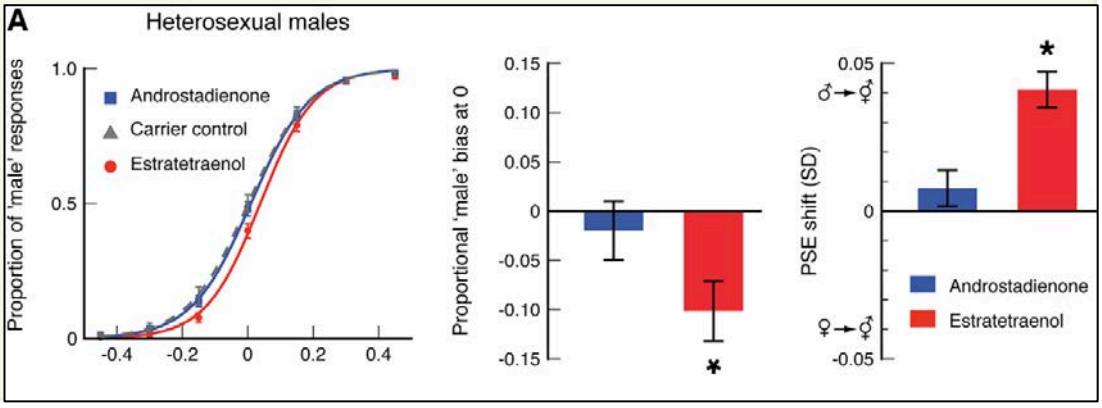
This paper assumes that human pheromones do exist, that they have been identified and that their action has been clearly documented. To this construction built on muddy foundations they add one more brick, to provide stronger evidence towards the thesis of human pheromones, but in fact making the all building more unstable and prone to collapse.
One of the recent papers they cite in support to their project has been published in Current Biology by a group of Chinese psychologists. They adopted a technique where subjects are asked to recognize the sex of a walker on the basis of the movement of 15 fixed points on the body. This method allows to identify the sex with a high degree of accuracy.

Zhou et al., Chemosensory Communication of Gender through Two Human Steroids in a Sexually Dimorphic Manner Current Biology 24, 1091–1095, 2014

The Authors of this paper asked their subjects to identify the sex of a number of walking frames, while they were presented with different odours.
What they found was that the responses of heterosexual men were biased towards "female" identification, when smelling the "female pheromone" estratetraenol, while heterosexual females showed an opposite behaviour in the presence of the "male pheromone" androstadienone. Moreover, homosexual males behaved similarly to females, while homosexual females did not show any bias.
The effects are very small, as we can appreciate from the graphs reported (one of them reproduced here as an example), but the statistical analysis seems to give reliability to the results.

Do these data prove that the two chemicals are the human pheromones? Certainly we need much better evidence to demonstrate a thesis for which a lot of negative evidence exists from different points of view.
Chemical evidence: pheromones (as we know them in insects and in some mammals) are chemicals produced by individuals of a species, which trigger a specific and identical behaviour in all individuals (provided differences between sexes for sex pheromones) of the same species. So far no chemicals endowed with such properties have been reported for human, unless we want to accept the wild claims of perfumer companies selling "magic scents".
Biochemical evidence: in mammals, pheromones target a specific class of olfactory receptors, the vomeronasal receptors. There is a single gene of this family in the human genome, and its function is not clear.
Physiological evidence: in mammals, pheromones are detected through the vomeronasal organ; there is no evidence of such organ in humans, except in newborns. Signals are processed by the accessory bulb, a structure absent in humans. Besides, there is no connection between the vomeronasal organ (or the region where it is supposed to be) and the brain.
Behavioural evidence: pheromones, even in mammals, elicit clear and stereotyped responses. In humans such phenomena have never been documented.
Phylogenetic evidence: higher primates do not produce pheromones, do not have vomeronasal organ.

But the Authors do not question the existence of human pheromones and start their reports stating that: "*Recent studies have suggested the existence of human sex pheromones, with particular interest in two human steroids: androstadienone (androsta-4,16,-dien-3-one) and estratetraenol (estra-1,3,5(10),16-tetraen-3-ol)*" and concluding that: "*The results provide the first direct evidence that the two human steroids communicate opposite gender information that is differentially effective to the two sex groups based on their sexual orientation*".



The Current Biology paper also offers a number of puzzling elements. The Authors present the odours in a solvent containing 1% of clove oil, so that every sample smells very strongly of cloves. This is done with the idea that pheromones are supposed to by-pass the conscious olfactory perception. This view is just a wild hypothesis, that however took wide credit, as there is no way of asking an animal (from insects to mammals) whether they perceive the odour of the pheromonal compound.
In the Supplementary material, the Authors include the results obtained with another odour, isovaleric acid, used at the same concentration as the "pheromones", but in a solvent which was made of 25% of clove oil, a smell able to knock out even an anosmic! Talking about anosmics, the fact that half of the human population cannot smell androstenone and similar steroids did not affect the selection of the judges… well, this is consistent with the idea that we are not supposed to smell our pheromones.

Unfortunately, these accounts are taken by unscrupulous companies selling alleged "human pheromones" to support their frauds, giving their claims a paint of scientific aspect, that often becomes ridiculous, owing to the mass of gross errors and inaccuracies. The problem is that these pitfalls are perceived by scientists in the field, but cannot be appreciated by anyone with a very basic knowledge of chemistry or biochemistry.

The net is full of these sites and it would be fun for anyone interested to find to what extent of imagination can science be twisted by sellers who may have only met science…fiction.
Here are a couple of websites where you can revert to improve your mood in a grey day:
http://pheromones.com
http://www.human-pheromones.net/copulin.html

The first goes as far as warning readers that many sites sell bad products and make fake claims. Of course, Luv is the only reliable source of pheromone (100% money back guarantee). But where they make themselves most ridiculous is while trying to use science (their "science") to support the quality of their products. Sometimes we are reminded of astrologists (the serious ones, not just the card readers), who support their prevision by giving you a complete account on how planets and stars align in the sky and shape your future.
If you go to the website of Luv and then click on "Technology" you will certainly be rewarded.

After a text full of wrong chemical information, you are informed that there are "pheromone signatures" called a, b and so on… is it a vague reference to alpha (or dominant) male in animal behaviour?
But all this is sound science and mathematical formulas can be applied to calculate the characteristics of each pheromonal compound, can it be better sound and convincing? Hurry and buy the stuff before your next visit to disco.
Here below for your pleasure the core of the mathematics behind this new science.

The problem is that there are people who believe all this nonsense and buy the products at inflated prices.

Applied Engineering: (mathematical core logic technology)
α ≈ Alpha Aura (AMA)
β ≈ Beta Aura (BMA))
Δ ≈ Feminine Aura (FA)
γ ≈ Magnitude of change (MC)

Operators:
(minor) = [+1]
(moderate) = [+2]
(major) = [+3]
(minor(-1)) = [-1]
(moderate(-1)) = [-2]
(major(-1)) = [-3]

Summation functions:
AMA = $\sum \alpha_1 + \alpha_2 + \alpha_3 + \ldots \alpha_n$
BMA = $\sum \beta_1 + \beta_2 + \beta_3 + \ldots \beta_n$
FA = $\sum \gamma_1 + \gamma_2 + \gamma_3 + \ldots \gamma_n$
MC = $\sum \Delta_1 + \Delta_2 + \Delta_3 + \ldots \Delta_n$

Behavioral attribute index (truncated):
Androstenone (5alpha-androst-16-en-3-one)
α (major), β (major(-1)), Δ (major), γ (major(-1))
alpha-Androsterone(5alpha-androstane-3alpha-ol,17-one)
α (minor), β (moderate), Δ (minor), γ (moderate)
beta-Androsterone (5alpha-androstane-3beta-ol, 17-one)
α minor(-1)), β (moderate), Δ (minor), γ (moderate)
alpha-Androstenol (5alpha-androst-16-en-3alpha-ol)
α (minor(-1)), β (moderate), Δ (minor), γ (moderate)
beta-Androstenol (5alpha-androst-16-en-3beta-one)
α (minor(-1)), β (major), Δ (moderate), γ (major)
Androstanone (5alpha-androstan-3-one)
α (minor(-1)), β (major), Δ (major), γ (minor)

Can't make sense? Good for you!
This is only meant to convince the stupids!

Paolo Pelosi

good only for the dustbin

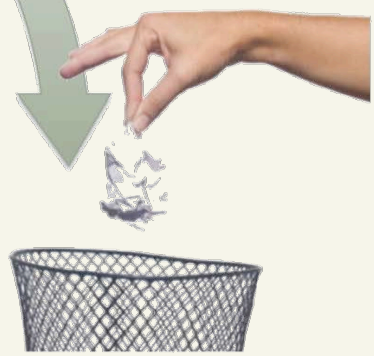
P D et al. BMC Genomics 2014, 15:209
http://www.biomedcentral.com/1471-2164/15/209

BMC Genomics

METHODOLOGY ARTICLE Open Access

Computational reverse chemical ecology: Virtual screening and predicting behaviorally active semiochemicals for *Bactrocera dorsalis*

Kamala Jayanthi P D[*†], Vivek Kempraj[*†], Ravindra M Aurade[1], Tapas Kumar Roy[2], Shivashankara K S[2] and Abraham Verghese[1]



This paper smells RATS! *was the comment accompanying the above reference that was brought to the attention of the Editor, together with the suggestion that could be suitable for a humorous interval for the readers of this Newsletter.*

The title looks serious and appealing: one step forward from reverse ecology into virtual reality! To predict binding constants and even behaviour from computer modelling! It might really be interesting, except for the fact that the *science* behind this study would make an undergraduate student shocked and horrified.

It could be laughing matter, if we manage to forget the energies and public money wasted for publishing such a collection of absurdities and nonsense.

Let's start from the positive aspects. The Authors select an OBP of a serious agricultural pest, the oriental fruit fly (*Bactrocera dorsalis*), make a three-dimensional model of the protein and perform docking simulations with a series of volatile chemicals detected by the fly, according to previous studies. So far nothing to object. The Authors could have stopped here and made a reasonable report. But the *computational reverse chemical ecology* is too appealing and they venture into the poorly explored of biochemistry. What they discover is a pool of quick sands, where the more they try to justify their results, the more they sink.

The first pearl of their story is the discovery (well, the re-discovery) of this OBP, that, just to give a flavour of what they are going to produce, is wrongly named GOBP, a term making sense only when classifying OBPs of Lepidoptera.

But, let us not to be distracted by futile details, and go to the juicy part of the story. The protein is purified by SDS-PAGE on a crude antennal extract and analysed by mass spectrometry. How many OBPs do you expect to find? The Authors forget to inform us on the number of genes encoding OBPs in this species and we are to lazy for counting them, but certainly they come in the order of dozens. Well, from the electrophoretic band they get a single protein with 100% identity with a published sequence, despite the fact that their analysis (not reported in detail) only covers part of the sequence. Then they purify the protein to perform binding experiments. The method, only reported in small rapid flashes, involves separation on SDS-PAGE and elution from the gel. In this simple procedure they managed to cram in as many wrong methodologies as would be possible.

1. If you want to use a protein for functional studies, the last thing you do is to use a denaturation step (SDS-PAGE);
2. If you separate a protein of 14 kDa on a gel, you don't use a low concentration of acrylamide (8%), unless you want to see your protein migrate with the front of the gel;
3. To *purify* their protein, they provide a simple logic: as the molecular weight of the protein is *expected* to be around 10-15 kDa, they use a membrane with a cut-off of 15 kDa… so, where do they find the protein of 14 kDa, inside or outside the membrane?

But these are trivial details, the important fact is that they manage to purify the protein, as shown by a most improbable 8% gel with an arrow marking a clean single band and no indication of molecular weight markers!

Well, the protein was purified and utilised in binding experiments, where the Authors opted for measuring the quenching effects of ligands on the intrinsic protein fluorescence of tryptophan. They used 25 volatile compounds, which left us wondering how many flies they have sacrified and dissected to purify enough protein for 25 experiments (assuming they did not replicate any measurement). The Authors keep silent on this point probably fearing to be condemned by the Flies Tribunal for genocide. But we can try and do the calculations. You need about 30 micrograms of OBP to prepare each mL solution at the usual concentration of 2 microM (assuming this was the concentration used in the work), therefore, for 25 tests you need 750 micrograms. Assuming that losses due to extraction, elution from gel and leaking from a non appropriately chosen membrane would be minimal, at least they needed 2 mg of proteins to start with. How much OBP is contained in the antennae of a fly? Hard to say, but probably not more than 100 ng, in which case the work required the sacrifice of 20,000 flies.

Anyway, the hard work of students sitting for days dissecting antennae has been rewarded by the excellent results obtained in this seminal work. The dissociation constants measured in binding experiments and those calculated in docking simulations agree beyond any expectation! The correlation is an almost perfect straight line, as you can directly verify from the figure that we have reproduced for your enjoyment and astonishment.

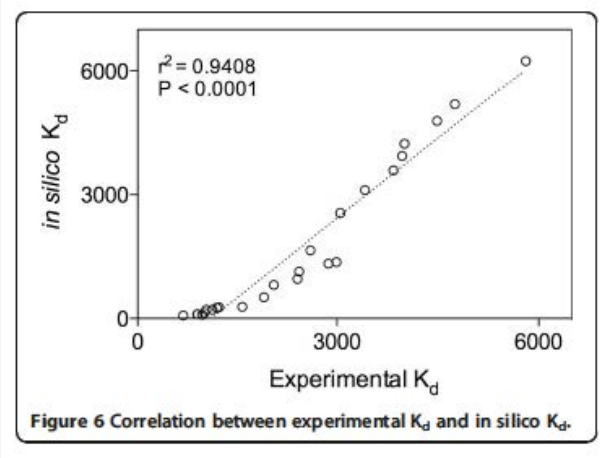


Figure 6 Correlation between experimental K_d and in silico K_d.

Well, these computational methods work really well! You can predict so accurately the behaviour of a proteins, even when you don't even know the identity of the protein! Exactly, because we have no hint that the band purified from the gel is the same OBP used for computer calculations.

But… who cares? If you really want to fall from your chair and roll on the floor laughing for a week, just look at the *binding experiments*. You can learn that the tryptophan fluorescence can be efficiently quenched by any compound passing through the binding pocket. It is absolutely irrelevant whether the chemical can absorb light in the region around 300 nm, even saturated compounds such as methyl butyl ether or 3-methylbutanol can efficiently quench the tryptophan fluorescence. And what to say of heptane and ethanol? Are you incredulous? Then you can better go back to your Organic Chemistry textbook and if you do not find the answer, well re-write the textbook!

All these data were obtained by experiments (probably) with a protein of unknown nature and molecular weight, extracted from a denaturing gel and certainly contaminated by other co-migrating proteins.

Dulcis in fundo: here comes the cherry on the cake. Just look at this graph with its beautiful artistic and very imaginative correlation.

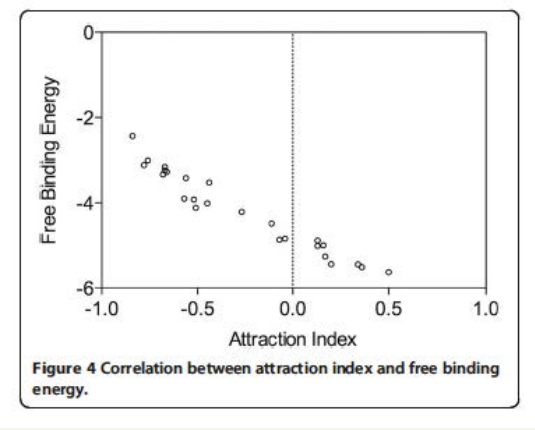


Figure 4 Correlation between attraction index and free binding energy.

You can predict the behaviour of a fly just by calculating dissociation constants for an OBP (which OBP?) without need to do experiments!

How can such nonsense get published by journals of good reputation? Where both the editor and the reviewers completely blind?

Or perhaps the quality of a paper is not an issue any more, as long as it gets published to benefit the career of the authors and the impact factor of the journal?

Paolo Pelosi

Plants release foul odours when disturbed

Next time you approach a plant, please be considerate and use the respect deserved to a sentient being. Plants have senses and scientific evidence is rapidly increasing. Actually we can better say that *we* are becoming increasingly aware of the fact that plants can sense. The facts have been always clear before our eyes. Nobody can deny that plants can detect and measure light, can produce and respond to smells, and react to physical stimuli.
Probably the most familiar example of plants reacting to touch is the *Mimosa pudica*, that rapidly closes its leaves when we lightly brush them with our hand.

Interestingly, the same plant has been reported to react to other physical stimuli. This time it is the roots responding when disturbed, and the response is not an act of defence, as is the case with the leaves, but an open and direct attack in the form of strong disgusting odours. These molecules include the most disgusting putrid smells, generally sulphur derivatives, such as methanesulfinic acid, 2-aminothiophenol, S-propyl propane 1-thiosulfinate, phenothiazine, and thioformaldehyde. With such a cocktail of selected fragrances, no wonder that the Authors described the smell as "…someone has broken wind", according to a report in New Scientist last January.

Most likely, it is just a coincidence that such smells are offensive for us, as certainly they are directed to other types of intruders.

It is remarkable that the roots can distinguish between different types of mechanical stimuli. For instance, tapping the roots on the soil surface did not produce the odour, but dragging them across the surface released a strong smell. Also, a gentle touch with a finger was enough to produce a smelly reaction, while the plant did not respond when stimulated with glass or metal object.

It would be interesting to understand if such volatile compounds are only used as weapons against enemies and intruders or perhaps also as chemical signals to warn other plants of a potential danger.

Paolo Pelosi

THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association
NZMA New Zealand Medical Association

Flatulence on airplanes: just let it go

Hans C Pommergaard, Jakob Burcharth, Anders Fischer, William E G Thomas, Jacob Rosenberg

The scientific paper we refer to in this page has something in common with the one discussed in the previous pages… in terms of smell, but not in terms of scientific quality.

This article is reported here for the pure enjoyment of the reader, who, already too exhausted by serious topics, wants to relax and have an earthy good laugh. Unfortunately, such paper is not suitable as candidate for an IgNobel Prize, because after making you laugh it does not make you think (a requisite for the Prize), but can still be used as waste paper or… for applications better related to its content.

We cannot think of a better way of amusing the reader than faithfully reporting passages from the published work with its colourful and immediate language.

Paolo Pelosi

"The release of intestinal gases (i.e. flatulence) can constitute an embarrassing problem both for the person farting and for persons in the near presence due to sound and odour."

*"Studies have not been able to prove that men produce larger amounts of flatus than women, while in contrast it has been shown that **women's flatulence odour is significantly worse** compared to that of men."*

***"Phonetically, there are roughly two different kinds of flatulence**: "sneaking a fart" which is a silent method where the person in a very controlled manner minimises the amount of intestinal gas passed by the anus per time unit, in contrast to a "loud fart"*

*"It is known that **burning intestinal gas** (e.g. use of fire) may reduce the odour however this **is not practical or recommended** either on land or **on an airplane**."*

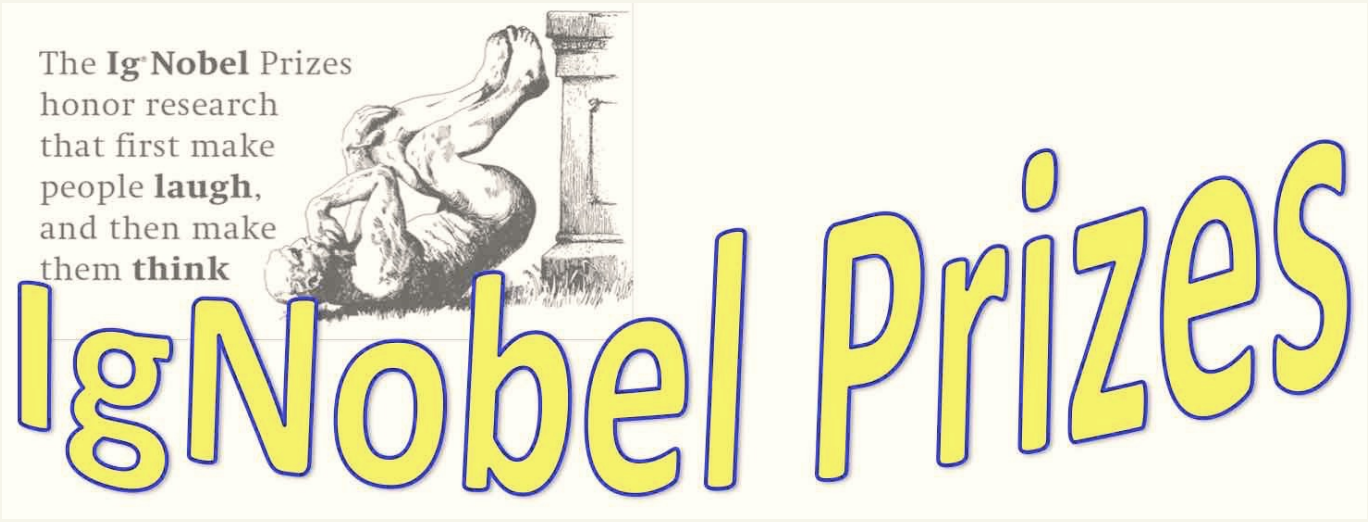
*"Active charcoal has the ability to absorb odours from intestinal gases. Therefore, airline companies can enhance comfort for passengers on airplanes **by installing active charcoal in the passenger seats**. It has been shown, that charcoaled lined cushions effectively limit the escape of sulphur containing gasses (odour) into the environment."*

*"When wearing textiles of low fart permeability (e.g. leather pants), the fart cannot escape through the textiles and a "**tunnel effect**" will be created, when the fart escapes either by the legs of the trousers or at the waist."*

*"Secondly **the half-life (T1/2) of the fart** may require significant time in the seat of the flatulent person."*

*" …to provide **restrictions for flatulent people** since they are responsible for obnoxious smells on board airplanes."*

*"In line with CO2 quotas, as the flatulence contains large amounts of CO2, passengers may be allowed to buy **'flatus quotas' to be allowed to produce this gas** on board the airplane, and thus have similar rights as non-flatulent co-passengers."*



As usual we present a concise report of the IgNobel Prizes assigned last September at the 25th First Annual Ig Nobel Prize Ceremony, at Harvard's Sanders Theatre.

Last year IgNobel Prizes were assigned to pieces of research not particularly impressive in terms of originality and imagination. However, some of the works that were selected show to what extent researchers are ready to endure and suffer in order to get a paper, as is the case for one of the Entomology Awards.
As for last year, no prize rewarded works in olfaction. Does it mean that we osmologists are getting more serious or perhaps that we are losing imagination? Or perhaps, on the contrary, it is a sign that the IgNobel Committee is selecting more serious works, paying more attention to the second part of their motto (…think) and leaving behind those that would better qualify for the first part (…laugh…).
Here is a summary of prizes assigned for different categories.

The **CHEMISTRY PRIZE** was assigned to scientists from Australia and USA for a chemical recipe to partially un-boil an egg. In practice this looks like a serious work where the Authors propose a novel method to renaturate proteins of the egg white.
REFERENCE: "Shear-Stress-Mediated Refolding of Proteins from Aggregates and Inclusion Bodies," Yuan, Ormonde, Kudlacek et al. (2015) ChemBioChem, 16, 393–396.

PHYSICS PRIZE — This work, despite looking a bit unusual, is far from being laughing matter and was published in PNAS. The Authors found that it takes about the same time (21 seconds on the average) for mammals different in size, from cats to elephants, to empty their bladders. Well, it does not not appear so astonishing when you take into account a range of plus or minus13, which gives a range from 8 to 34 seconds, not quite the same!
REFERENCE: "Duration of Urination Does Not Change With Body Size," Patricia J. Yang, Jonathan Pham, Jerome Choo, and David L. Hu, (2014) PNAS, 111 11932–11937.

LITERATURE PRIZE — Assigned for discovering that the word "huh?" (or its equivalent) seems to exist in every human language. Actually this is part of an interesting research on the origin of human language. There is pretty good evidence that our languages had a single common origin, around 200,000 years ago, and words we share in different tongues represent a strong support to this theory. “Huh” could be second word, the first obviously being “Mama”.
REFERENCE: "Is 'Huh?' a universal word? Conversational infrastructure and the convergent evolution of linguistic items," Mark Dingemanse, Francisco Torreira, and Nick J. Enfield, (2013) PLOS ONE.

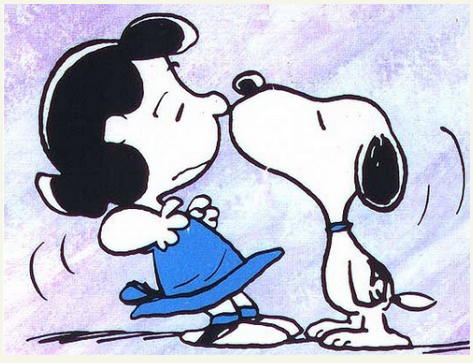
MANAGEMENT PRIZE — This Prize rewarded the discovery that many business leaders developed during childhood a fondness for risk-taking, when they experienced natural disasters (such as earthquakes, volcanic eruptions, tsunamis, and wildfires) that — for them — had no dire personal consequences.

We can add that some Italian leaders (former Prime Minister Berlusconi & Friends) learned how to exploit natural disasters (such as earthquakes… the historical city of L'Aquila is still waiting to be restored after 7 years) to their personal advantage. It would be interesting to check if these people experienced earthquakes and the like during their childhood.
REFERENCE: "What Doesn't Kill You Will Only Make You More Risk-Loving: Early-Life Disasters and CEO Behavior," Gennaro Bernile, Vineet Bhagwat, and P. Raghavendra Rau, The Journal of Finance, 2015.

ECONOMICS PRIZE — The Bangkok Metropolitan Police [THAILAND], for offering to pay policemen extra cash if the policemen refuse to take bribes.
REFERENCE: Numerous news reports.

MEDICINE PRIZE — Awarded jointly to two groups for experiments to study the biomedical benefits or biomedical consequences of intense kissing (and other intimate, interpersonal activities).
REFERENCE: "Kissing Selectively Decreases Allergen-Specific IgE Production in Atopic Patients," Hajime Kimata, Journal of Psychosomatic Research (2006), 60, 545– 547.
REFERENCE: "Prevalence and Persistence of Male DNA Identified in Mixed Saliva Samples After Intense Kissing," Natália Kamodyová, Jaroslava Durdiaková, Peter Celec, Tatiana Sedláčková, Gabriela Repiská, Barbara Sviežená, and Gabriel Minárik, Forensic Science International Genetics (2013), 7, 124–128.

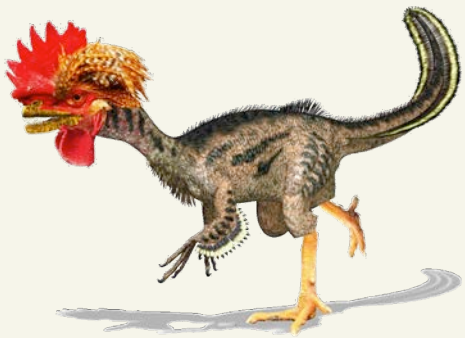
MATHEMATICS PRIZE - For trying to use mathematical techniques to determine whether and how Moulay Ismael the Bloodthirsty, the Sharifian Emperor of Morocco, managed, during the years from 1697 through 1727, to father 888 children.
REFERENCE: "The Case of Moulay Ismael-Fact or Fancy?" Elisabeth Oberzaucher and Karl Grammer, PLOS ONE (2014), 9, e85292.
Do you need mathematics to solve the problem? A simple arithmetic operation (30 x 365/888) should be enough to calculate that he was active on the average every 12 days… well, it is a little bit more complex, but not much, anyway. We rather wonder whether he could remember the name and the birthday of each of them.



BIOLOGY PRIZE —For a crazy experiment: observing that when you attach a stick to the rear end of a chicken, it walks like a dinosaur. In fact, chickens are direct descendants of dinosaurs, aren't they?
REFERENCE: "Walking Like Dinosaurs: Chickens with Artificial Tails Provide Clues about Non-Avian Theropod Locomotion," Bruno Grossi, José Iriarte-Díaz, Omar Larach, Mauricio Canals, Rodrigo A. Vásquez, PLoS ONE (2014), 9, e88458.

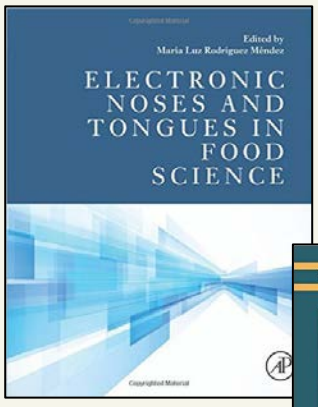
DIAGNOSTIC MEDICINE PRIZE — This really sounds like a joke: to accurately diagnose acute appendicitis, drive the patient over speed bumps and measure the pain.
REFERENCE: "Pain Over Speed Bumps in Diagnosis of Acute Appendicitis: Diagnostic Accuracy Study," Helen F. Ashdown, Nigel D'Souza, Diallah Karim, Richard J. Stevens, Andrew Huang, and Anthony Harnden, BMJ, (2012), 345, e8012.

PHYSIOLOGY and ENTOMOLOGY PRIZE —

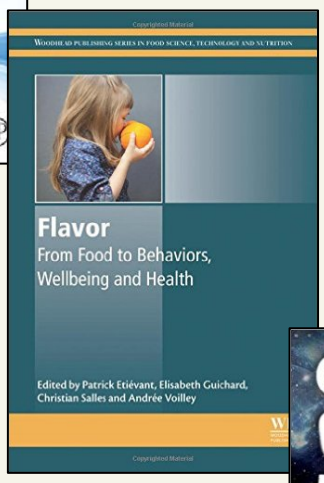


Publish or perish! Some people are ready to suffer anything to get a paper published. The Prize was awarded jointly to two individuals: Justin Schmidt [USA, CANADA], for painstakingly creating the Schmidt Sting Pain Index, which rates the relative pain people feel when stung by various insects; and to Michael L. Smith [PANAMA, US, UK, THE NETHERLANDS], for carefully arranging for honey bees to sting him repeatedly on 25 different locations on his body, to learn which locations are the least painful (the skull, middle toe tip, and upper arm). and which are the most painful (the nostril, upper lip, and penis shaft).
REFERENCE: "Hemolytic Activities of Stinging Insect Venoms," Justin O. Schmidt, Murray S. Blum, and William L. Overal, Archives of Insect Biochemistry and Physiology, (1983), 1, 155-160.
REFERENCE: "Honey Bee Sting Pain Index by Body Location," Michael L. Smith, PeerJ, (2014), 2:e338.

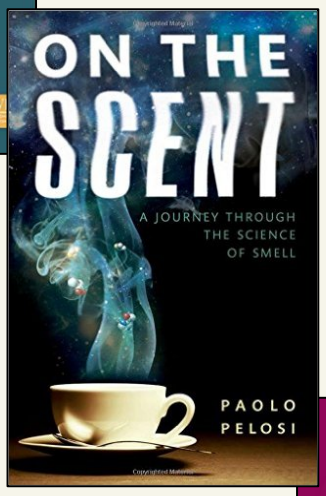
Paolo Pelosi



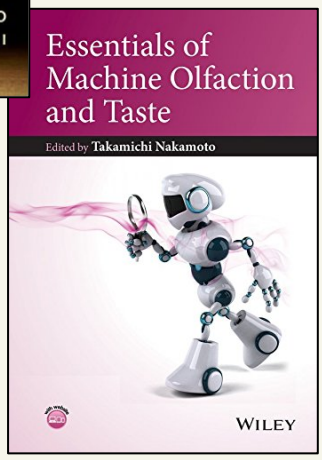
Electronic Noses and Tongues in Food Science
12 Feb 2016
by Maria Rodriguez Mendez (Editor)
Hardcover: £ 94.99; Kindle: £ 90.24



Flavor: From Food to Behaviors, Wellbeing and Health
1 Jun 2016
by Elisabeth Guichard (Editor)
Hardcover: £ 190.00; Kindle: £ 180.50



On the Scent:
A journey through the science of smell
24 Mar 2016
by Paolo Pelosi (Author)
Hardcover: £ 15.90;
Kindle: £ 12.35



Essentials of Machine Olfaction and Taste
3 May 2016
by Takamichi Nakamoto (Editor)
Hardcover: £ 109.33; Kindle: £ 103.86

Students' reports

Every year ECRO offers many students and young scientists the opportunity of attending Conferences or visit other labs for short periods, providing them with grants.
In this space, they report on their experiences, both scientific and human.

Please, go to the end of this section for some advices and suggestions on how to write your report ★★★

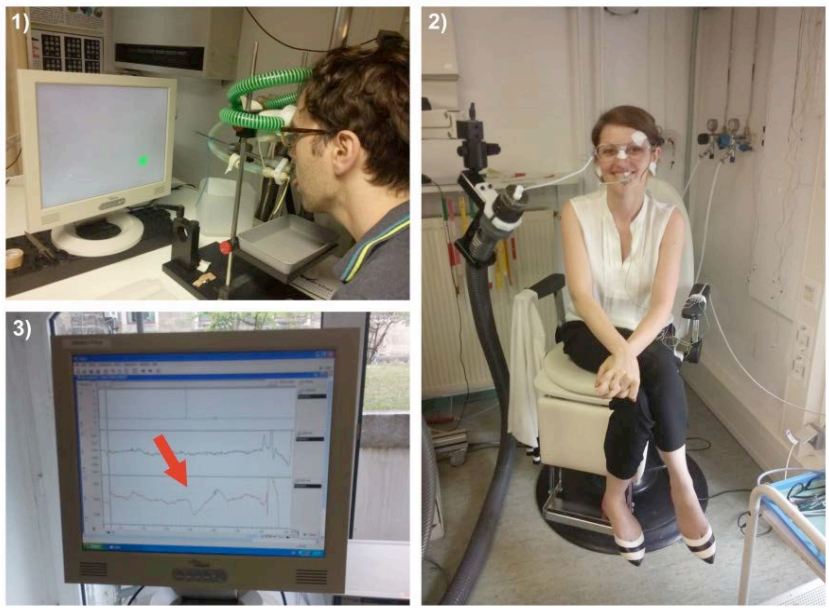
Johanna Reichert reports from the Summer School on Human Olfaction Dresden, July 26-31, 2015

How many odors can humans discriminate? What is so special about the human sense of smell compared to other senses? How much mucus is produced each day in the nose? … - these and many more questions were answered in the course of the Summer School on Human Olfaction in Dresden that I attended with support of an ECRO travel grant.

The summer school started off on Sunday with a barbecue in the sun-bathed garden of the guesthouse right nearby the medical campus, offering a perfect opportunity to meet and greet the other participants. After the long way I came from University of Graz to Dresden, this was also a perfect opportunity to gain energy for the week ahead full of lectures, workshops and social activities. In the course of the following days, we explored the olfactory sense from different perspectives: The lecturers, many of whom are experts in the field with years of research experience, covered psychological, cell molecular, medical and biological aspects of the topic, offering us a well-rounded view of the current state of research.

As I am quite new to the field of olfaction research, I benefitted a lot from these diverse views and information on the topic.

I was especially fond of the hands-on workshops that introduced us to a variety of psychophysical and medical measurement techniques.



Picture 1. 1) A participant testing the gustometer (receiving a taste on the tongue) 2) demonstration of the measurement of electro-olfactograms (EOG) and nasal mucosa potentials (NMP) 3) EOG recording (red arrow indicates the observed EOG).

As shown in part 2 of the first picture, in one of these workshops we observed the measurement of electro-olfactograms (EOG), electrical potentials occurring after olfactory stimulation. During the challenging and complex procedure, a hair-fine electrode is inserted in the nose, near the olfactory epithelium.

When the electrode is inserted near the respiratory epithelium, the procedure allows the measurement of negative mucosa potentials (NMPs), which are believed to reflect peripheral trigeminal activation.

For both approaches, an olfactometer is used for controlled odor presentation. As shown in part 3 (red arrow), we could observe an EOG shortly after odor presentation. We also learned that participants have to be well trained and control their breathing to avoid artifacts on the signal. In another workshop, we were introduced to the measurement of event-related potentials by electroencephalography (EEG) during stimulation with an olfactometer and a newly developed gustometer (see part 1, first picture). Further, the psychophysical measurement of olfactory abilities using different tests (SniffinSticks test battery, University of Pennsylvania Smell Identification Test (UPSIT)) was demonstrated as well as the assessment of trigeminal activation and sensitivity (see parts 4 and 5, second picture). In another session, we could watch a live endoscopy (see part 3) and rhinomanometry (see part 2).

Besides the workshops, each day we had several lectures, for example on olfactory memory, social chemosignals, olfactory disorders and the plasticity of the olfactory sense. On Thursday, in a lecture on the neuroanatomy of the olfactory system we could see real skull and brain preparations (part 1, second picture), and many of us were surprised by the small size of the olfactory bulbs that still enable us to smell such a variety of odors - although there is still no definite consensus on the number of smells humans can distinguish.

Overall, the Summer School was a great experience for me that I can strongly recommend to everybody interested in olfaction research. The range of topics covered will benefit my future research on neuronal plasticity after olfactory loss and on olfactory memory. Also, the week made me more conscious of the peculiarities of the sense of smell: Compared to other senses, the plasticity of the olfactory sense, the poor odor-language integration as well as its tight connection to memory and emotions are remarkable and offer fascinating research opportunities. Besides that, some facts we learned just left me astonished: How can such a small body part like the nose produce 7 liters of mucus a day?

Picture 2. 1) Neuro-anatomy lecture 2) Rhinomanometry demonstration 3) Nasal endoscopy 4) trigeminal threshold measurement 5) measurement to assess whether a substance causes trigeminal activation.

Insects by the beach – ESITO 2015 in Sardinia

Florencia Campetella

Someone once told me that many of the mathematical theorems we know, were once thought of in the quietness of a church. Apparently, mathematics and quietness get along well. I must admit that despite my scientific background I never actually checked if this was actually true. And I know sun and beach are far from resembling a church, but one could say it somehow shares the quietness that fore-comes great scientific thinking. And for me that was ESITO 2015, in Villiasimus, Sardinia.

I come from Buenos Aires, Argentina, where the opportunity to attend scientific meetings is often limited, both by time and money. So when I first heard of ESITO, it didn't ring any bell. Some months ago I had moved to Jena, Germany to start my graduate studies at the Max Planck for Chemical Ecology. I work on blood-sucking insects, kissing bugs to be more specific. These haematophagous insects, which are distributed from the Northern parts of Argentina and Uruguay up to the Southern regions of the United States, are the vectors of a chronic disease known as American trypanosomiasis or Chagas' disease, after its discoverer Carlos Chagas back in 1909. It was previously shown that these insects rely, among other sensory modalities, in their olfactory system in order to detect and infect their vertebrate hosts with the protozoan *Trypanosoma cruzii*, the etiological agent of the disease. My work at the Olfactory Coding Group at the Max Planck for Chemicial Ecology has been focusing on the identification of behaviorally attractive and aversive olfactory cues, and how this information is processed at the periphery and in higher brain centers. Having started my PhD project some months ago, being able to attend what I then knew was the European Symposium for Insect Taste and Olfaction (ESITO) meant having the chance to meet all the people I once heard about or whose papers had read. It meant learning about the different aspects of insect chemoreception.

And, of great importance for my current studies, it meant also discussing my project and preliminary results and have the input, at this early stage -where everything is about to be, of scientists of the field. These reasons motivated my participation at ESITO, and thanks to the generous support of ECRO, I must say that my expectations were not only fulfilled but exceeded.

The meeting was great! They were five days of intense scientific learning and discussion. It was impeccably organized into different sessions that ranged from 'Evolution of Olfaction' to 'Development' passing through 'Insect Vectors', 'Receptor function', 'Olfactory Coding', 'Gustation', 'Modulation of Plasticity', 'Odor-guided behavior', 'Olfactory Circuits', 'Olfactory Chemistry' and 'Chemical Ecology'. Each session was moderated by an invited speaker and it consisted of three to five talks of fifteen to thirty minutes. There were several remarkable characteristics that I would like to point out. First, within each topic the different model organisms were well represented. Oftentimes in insect meetings *Drosophila melanogaster* stands out as the main character, possibly reflecting the fact that *Drosophila* is the model of choice for a greater number of researchers, compared to other insects species. However, in ESITO, different insect species, such as *Heliothis vicenis*, *Anopheles gambiae*, *Manduca sexta*, *Rhodnius prolixus*, among others, were well represented in outstanding talks. As an insect researcher, having phylogeny always in mind gives another perspective to your work, and having the possibility to hear, learn and interact with people from different insect backgrounds, can only be positive. I hope in the future more and more insects researchers, working with different insect model and non-model-(yet) species, will be encouraged to attend meetings such as ESITO. The second aspect I would like to point out is the quality of the talks and discussions.

To say it plain, it was excellent. Being able to tell you about your research in a time constrain is always a challenge, but without hesitation, all of the exposers did a wonderful job.

And, as a graduate student, I equally learned from the talks as well as from the questions and discussions that came after.

Another remarkable aspect of the meeting was that both senior, junior and student scientist were all given the chance to talk about their work. For a scientist at the graduate or postdoc level ESITO is a great place to be, as you are both able to listen to the work of senior scientists as well as present your work to the whole attendance, as there are no overlapping sessions. Moreover, as we all stayed at the same hotel for the duration of the meeting, there were plenty of chances to informally interact with other scientists. In that direction it also helped the limited number of participants: we were around 90 participants, coming from all over the world.

In addition to the talk sessions, there were also two evening poster sessions, where I presented my work "Odor-guided behavior in kissing bugs". Sometimes it happens that when you attend a poster session you don't know which poster to visit and which ones to skip, relying most of the times on the title of the poster to make this decision. In ESITO I found it helpful that each participant had to advertise his or her own poster in a two-minute talk. In this way, I could narrow down which poster I definitely wanted to visit and still got to know a little bit about the ones I knew I hadn't the time to see. From everybody visiting my poster I received great input, which will certainly contribute to shape my ongoing project. All in all, attending ESITO was a fruitful, motivating and fun experience and I encourage insect scientists from different backgrounds to attend the next symposium to be held in Sardinia in September 2017 (*Attenti*: be prepared to sing!).

IMPORTANT NOTICE

How to submit your reports

Students and young scientists who have received a grant from ECRO to meet the expenses for a Conference, a course or a visit to another lab are requested to submit a short report, which will be published in these pages of the next issue of the ECRO Newsletters.

Purpose of the report

Such reports are mainly intended for other ECRO members and readers, who might get interesting information from the experiences of their colleagues. They should not be regarded as polite and formal duties to thank ECRO for the help received.

Length and style

Therefore, reports should be useful, written in a simple, concise, but informative style with facts and data, rather than just emotional feelings (although personal experiences and their impact on the scientific formation of the reporter are welcome). Some information about home institution, type of scientific background and personal interests are important to complete the report.

As an indication, a length of 500-600 words could be appropriate, corresponding to about one page of the ECRO Newsletter, but this is not a strict rule and longer reports are welcome, provided they are written in concise and fluent style.

One or two pictures, even if not related to scientific events, can make the report more attractive and are strongly encouraged.

Reports are NOT edited and get published *as they are*.

PLEASE: send your text in plain Word (no PDF!) without any formatting and do NOT embed your pictures in the text.

IMPORTANT DEADLINE: July 15
early registration and Abstract submission

The next ECRO Congress is being organised by Marika Kapsimali in Athens. You can find all information and many attractive pictures at the address: http://symvoli.gr/ECRO2016/
Here is the invitation of Marika:

On behalf of ECRO and IBENS, I am pleased to invite you to attend the XXVIth meeting of the European Chemoreception Research Organization. The 2016 meeting will take place right by the Athenian Acropolis, at Divani Palace Acropolis in Athens, Greece. I am particularly honoured to serve this year as organizer of this event and together with ECRO and Symvoli, our local contributor, we will do our best for an inspiring scientific meeting and a flavour of local hospitality. You may wish to bookmark this webpage as it will be constantly updated with all the scientific, cultural and useful information about the meeting. We will also be very happy to help you exploring Greece beyond the ECRO meeting, from its ancient sites to the islands.

What sustains health, is the isonomy of dry, liquid, cold, sweet, bitter, sour and salty within the body (Hippocrates, 460-370 bc).

Looking forward to meeting you at the Athens ECRO 2016.

Marika Kapsimali
IBENS, Paris

Particularly interesting is the design of the logo, apparently just a piece of graphic… but there is much more, as Marika explains:

The design of the ECRO conference's logo is inspired both by the destination and the scientific field. It is based on the way olive oil was depicted in Linear B, the syllabic script that was used for writing in the Mycenaean Greek times, the earliest attested language form of Greek (17th-13rd century BC).