

## NEWSLETTER

### Medichem 2004

#### New Board of Directors

With the last Newsletter you received the call for candidates for this year's Medichem Board election. Thanks to all of you who answered, and also thanks for the helpful and encouraging comments which I received from many of you.

The following Medichem members were nominated to the secretary and consented to stand as Board candidates: Andreas Flückiger (Switzerland), Koichi Kono (Japan), Michael Nasterlack (Germany), Todor Popov (Bulgaria), Thirumalaj Rajgopal (India), Sergio Salomon (Argentina), Friedrich W. Schmahl (Germany), and Robert Winker (Austria).

Stephen Borron was the only candidate for Chairman.

Board members Oswald Jahn and Konrad Rydzynski decided not to run as candidates again for personal reasons. Thus, there are as many candidates as there are vacancies on the Board, and this year's Board election goes with a "silent vote". All of the above will serve on the Board from September 2004.

According to Article 5 Sect. 4.1 of the Medichem Constitution, each Board member shall be from a different country. This rule does not apply for those holding the offices of Chairman, Vice Chairman, Secretary, Treasurer, and immediate Past Chairman. Because Michael Nasterlack consented to continue as Medichem's

Secretary, both he and Friedrich Schmahl may be on the Board at the same time.

On this occasion I want to thank Oswald Jahn and Konrad Rydzynski on behalf of the Medichem Board and the Membership for their support in the past. We wish them all the best for the future, and we do hope that they will continue to provide their valuable input to Medichem.

Dr. Michael Nasterlack  
(Ludwigshafen, Germany)



### Sunny risks ?

Sunburn results from excessive exposure to the UV radiation from sunlight. UV light is hazardous as it can break the bonds between molecules. The connective tissue, in which living cells are firmly embedded in early life, consists of long fibres of the protein collagen. During life, UV light destroys randomly bonds in the lace of collagen fibres, thus weakening the connective tissue. This shows as wrinkles in your skin, and it is well known that persons who like sunbathing wrinkle earlier than those preferring the shadow. UV light wrecks not only the proteins but also the DNA in our skin. As we are always exposed to UV light, every single cell of our skin will have a few damaged DNA molecules daily. That is no problem, as the cells of our skin are well

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July 2004



MEDICHEM - Occupational and Environmental Health in the Production and Use of Chemicals

**Honorary President:**  
**Prof. Dr. med. Dr. h. c.**  
**Alfred M. Thiess**

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**Treasurer:**  
Dr. Andreas Flückiger (Switzerland)

#### Board Members:

Dr. P.J. Boogaard (Netherlands)  
Dr. R. Garnier (France)  
Dr. J. Ger (Taiwan)  
Dr. S.S. Guirguis (Canada)  
Prof. O. Jahn (Austria)  
Dr. P.S. Nmadu (Nigeria)  
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Dr. F.G. Rose (U.K.)  
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Prof. F.W. Schmahl (Germany)  
Dr. H. van der Merwe (South Africa)  
Dr. Leslie M. Yee (USA)

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equipped with dedicated enzymes to repair this damage. After extensive exposure to sunlight, however, the damage may be so massive that these enzymes cannot cope. The damaged cells will then go into apoptosis, a programmed cell death. Some cells, however, may escape apoptosis and survive. Occasionally, the DNA damage in these survivors makes them unresponsive to normal growth control: a potential cancer cell is formed.

To prevent sunburn and the resulting risk on DNA damage and skin cancer, modern sun creams contain a high concentration of UV screens, molecules that, stuck to the skin, absorb UV radiation and turn it into harmless radiation. Recently, Swiss investigators reported that some widely used UV screens were endocrine disruptors, members of the notorious 'gender-benders' [Schlumpf *et al.*, *Environ. Health Perspect.* 2001; 109: 239-244]. Five out of six tested chemicals increased cell proliferation in human breast cancer cells that are dependent on estrogenic stimulation for growth. Three of these chemicals, 4-methylbenzylidene camphor (MBC), octyl-methoxycinnamate (OMC), and 3-benzophenone (BP), were also uterotrophic, *i.e.* they caused a dose-dependent increase in uterine weight of immature rats that received the chemicals for 4 days in their feed. This study raised quite some concern as the UV screens were alleged to pose a serious risk for women who

had been treated for hormone-dependent breast tumours and for children in early puberty. Endocrine modulation is an issue of high concern and in Denmark the three uterotrophic chemicals were banned for use in sun screens. But is there really reason for concern? Most likely not. First of all, the uterotrophic ED<sub>50</sub> (concentration needed to obtain half of the maximum effect) of MBC, OMC and BP was a million (!) times higher than of estradiol, while the maximum response was less than 40% of that obtained with estradiol. Many chemicals have shown comparable effects at such extremely high concentrations but failed to show any estrogenic effect *in vivo*. Besides, our diet often contains high concentrations of phytoestrogens, chemicals that are naturally present in edible plants and have comparable estrogenic potency. Secondly, oral exposure to UV screens is of little relevance. The investigators, however, also did uterotrophic assay after dermal application and MBC was reported positive after dermal application to immature hairless rats: the uterine weight was 23±3 mg in the controls, and 29±3, 37±4 and 29±4 mg in the rats exposed to 2.5, 5.0 and 7.5% MBC in olive oil, respectively. Although the effect was statistically significant, it's clear that there is no dose-related effect. The investigators also estimated an absorbed dose of 37 mg MBC per kg body weight per day, which seems very high compared to the estimated

dose for humans of only 0.3 mg, but may be explained by the peculiar way of exposure of the rats: repeated dipping in the oil!. In addition, a well-known problem of the uterotrophic assay is the high variability in the uterine weight, that may vary from 20 to 75 mg in unexposed animals.

Another interesting fact is that the authors only report dermal exposure for MBC, while the same study was presented at a scientific meeting earlier last year and according to the abstract, OMC was also tested, however with a borderline result. Apparently, the investigators didn't like this outcome and didn't include it in their final paper. The bottomline is that MBC, OMC and BP as well as some of the other UV screens have been thoroughly tested in various animal and human volunteer studies before they were allowed to be used in consumer products and showed very little or no toxicity. So, for those that like sunbathing as well as for those that to have work outside in sunny regions, the best advice remains to use sun creams with UV screens liberally.

Dr. Peter Boogaard, The Hague (Netherlands)



### A Survey of Semen Indices in Insecticide Sprayers

This study aims at clarifying the semen indices of insecticide sprayers who are exposed mainly to organophosphorus and pyre-

throid insecticides. Eighteen male sprayers out of 54 working for 9 companies in central Japan and 18 age-matched students or medical doctors as unexposed controls participated in detailed reproductive check-ups conducted in summer and the following winter. The sprayers were exposed to insecticides more in summer, the busiest season, than winter, the off-season ( $p < 0.05$ ), and decreased in significant association with the increase in exposure frequency. Testicular volumes in the sprayers was higher than in the controls ( $p < 0.05$ ), though luteinizing hormone and follicle stimulating hormone concentrations were not significantly different. The sperm counts and vitality were comparable between the groups, but detailed sperm motility analysis in summer revealed that the percentages of slow progressive and non-progressive motile sperm were twice as high in the sprayers ( $p < 0.05$ ), and that of rapid progressive sperm tended to be lower ( $p = 0.06$ ). Such differences were not observed in winter. Differential sperm morphology counts showed that interaction of group and abstinence effects were significant in sperm with normal morphology and with head deformity only in the summer check-up. Despite possible inherent differences between the groups, the above season-dependent differences suggested that the observed lower semen quality in the sprayers was associated with pesticide spraying work.

(M. Kamijima, et al., J. Occup. Health 45: 215-222, 2003)

Prof. Alfred Thiess, Ludwigshafen (Germany)



### **Correlation Between Blood Ethylenethiourea and Thyroid Gland Disorders Among Banana Plantation Workers in the Philippines**

Ethylenebisdithiocarbamates (EBDCs) are metabolized into ethylenethiourea (ETU), a possible human carcinogen and an antithyroid compound. In this study our goal was to correlate ETU levels with the incidence of thyroid gland disorders among banana plantation workers exposed to EBDC. We randomly selected 57 directly exposed workers and 31 indirectly exposed workers from four banana plantations and 43 workers from an organic farm; all subjects underwent complete medical examinations and laboratory tests. Results showed a higher mean thyroid-stimulating hormone measurement among exposed workers compared with the control group, although the levels were well within normal range. Nine of the exposed farmers had abnormal thyroid ultrasound findings, consisting mostly of solitary nodules, compared with three among the control group. Analysis of variance showed significantly different blood ETU levels among the directly exposed, indirectly exposed, and control groups ( $p < 0.001$ ), but ETU levels in urine were not significantly different ( $p = 0.10$ ). Environ-

mental ETU levels were below the U.S. Environmental Protection Agency remediation levels. Among farmers with solitary thyroid nodules, we found a very good direct correlation between the size of the nodule and blood ETU level. In this study we showed that blood ETU is a more reliable biomarker for EBDC exposure than urinary ETU; therefore, the determination of blood ETU should be part of medical surveillance efforts among workers exposed to EBDC to detect occurrences of thyroid gland disorders. (L. Panganiban et al., Environ. Health Perspect. 112: 42-45, 2004)

*This is an interesting small study, the results of which shall not be dismissed here but deserve to be re-tested in a different population. Nevertheless, the way these results are presented and interpreted do warrant a second look.*

*"Nine exposed compared to three controls had abnormal ultrasound thyroid findings". This is 10 vs. 7 %, not really a striking difference. The authors quote the 1993 Philippine nutrition survey where the prevalence in the study area for nodular goiters was 0.2 % and for diffuse goiters was 3.2 %, however, they do not report which method was applied to arrive at these figures. In any case, these are unusually small proportions compared with the findings in large sonography surveys from other populations, where thyroid nodules were reported in approximately 15 % of males.*

*Having said this, some of the authors' conclusions leave me uncomfortable: they state that, "because in 95 % of cases thyroid cancer presents as a nodule or lump in the thyroid gland", workers with thyroid gland disorders should be "monitored regularly for the development of cancer in later years". Reported incidence rates for thyroid carcinoma lie between 0.5 and 10 per 10,000 in most countries. Despite these low incidence rates of clinically evident thyroid carcinoma, the prevalence of occult thyroid carcinoma is high in all populations, where occult carcinoma is defined as one with a diameter of less than 10 to 15 mm (Reiners et al. 2003). There are a number of autopsy studies where the prevalence rates of occult papillary thyroid carcinoma in deceased persons without previously known thyroid disease were reported between 1 and 36 %. Thus, extensive screening for thyroid nodules in combination with following invasive diagnostic procedures might well lead to a number of cancer diagnoses and treatment, where otherwise neither harm nor disease would have occurred. I am not aware what the authors of this article told the ETU-exposed workers. I am afraid, however, that some of them might have had some sleepless nights afterwards.*

Dr. Michael Nasterlack  
(Ludwigshafen, Germany)



*Prostate cancer is another type of cancer, where the availability of new screening*

*methods has led to ambiguous results and ongoing discussions. Urologists – please forgive me for my scepticism.*

### **A Nested Case-control Study of Prostate Cancer and Atrazine Exposure**

Elevated prostate cancer incidence was found at a plant producing atrazine that had an intensive prostate screening program. This study tested the relationship among atrazine exposure, prostate cancer, and the screening program. Twelve cases and 130 control subjects were selected from the original cohort. Prostate screening and occupational histories were abstracted from company records and atrazine exposures were estimated. Hire date was comparable for cases and control subjects. Nearly half of the control subjects and no cases left before the prostate-specific antigen (PSA) screening program. Cases had more PSA tests than control subjects (odds ratio for  $>$  or  $=1$  test, 8.54; 95% confidence interval, 1.69-82.20). There was no association between atrazine exposure and prostate cancer when those with  $>$  or  $=1$  test were compared. There was no evidence for an association between atrazine and prostate cancer.

(P.A. Hessel et al., *Occup. Environ. Med.* 46: 379-385, 2004)

Dr. Michael Nasterlack  
(Ludwigshafen, Germany)



*Not a "chemical exposure", but very relevant in the chemical industry, is night and shift work, and are health impacts associated with it. Forward direction of shift rotation has been recommended in many textbooks as preferable to backward rotation, but not many formal studies exist which demonstrate the validity of this recommendation.*

### **Direction of Shift Rotation Among Three-Shift Workers in Relation to Psychological Health and Work-Family Conflict**

The aim of the present study was to investigate whether the direction of shift rotation was related to the need for recovery, fatigue, sleep quality, work-family conflict, and leisure time among three-shift workers. To this end, data of 95 workers in forward-rotating three-shift work and 681 workers in backward-rotating three-shift work, with 32 months of follow-up, in the Maastricht cohort study (N=12,095) were used. Both cross-sectional and longitudinal analyses were carried out. The following results were obtained: A backward rotation schedule was prospectively related to an increased need for recovery [relative risk (RR) 2.88, 95% confidence interval (95% CI) 1.06-7.81] and poor general health (RR 3.21, 95% CI 1.32-7.83), as compared with a forward rotation schedule. Adjustment for demographic and health variables and the characteristics of the work

environment did not alter these relations considerably. Furthermore, a forward rotation schedule was prospectively related to less work-family conflict and better sleep quality over the 32 months of follow-up. Finally, high levels of fatigue, need for recovery, poor sleep quality, poor general health, insufficient leisure time, and work-family conflict at first measurement were associated with an increased risk of leaving shiftwork during the follow-up. The authors came to the following conclusions: Optimization of shiftwork schedules, in terms of shift rotation, seems a promising method for decreasing the negative impact accompanying shiftwork. Future studies should investigate whether these findings for three-shift workers are applicable to other shiftwork schedules as well. Furthermore, this study clearly illustrates the existence of secondary selection processes among shiftworkers and thereby emphasizes the complexity of valid shiftwork research.

(L. van Amelsvoort et al., *Scand. J. Work Environ. Health* 30: 149-156, 2004)

Dr. Michael Nasterlack  
(Ludwigshafen, Germany)



### **IARC Classifies Formaldehyde as**

### **Carcinogenic to Humans**

"Twenty-six scientists from 10 countries evaluated the available evidence on the carcinogenicity of formaldehyde, a widely used

chemical", reports Dr Peter Boyle, Director of the International Agency for Research on Cancer (IARC), part of the World Health Organization. The working group, convened by the IARC Monographs Programme, concluded that formaldehyde is carcinogenic to humans. Previous evaluations, based on the smaller number of studies available at that time, had concluded that formaldehyde was probably carcinogenic to humans, but new information from studies of persons exposed to formaldehyde has increased the overall weight of the evidence.

Based on this new information, the expert working group has determined that there is now sufficient evidence that formaldehyde causes nasopharyngeal cancer in humans, a rare cancer in developed countries. "Their conclusion that there is adequate data available from humans for an increased risk of a relatively rare form of cancer (nasopharyngeal cancer), and a supporting mechanism, demonstrates the value and strengths of the Monographs Programme," emphasized Dr Boyle. The working group also found limited evidence for cancer of the nasal cavity and paranasal sinuses and "strong but not sufficient evidence" for leukaemia. The finding for leukaemia reflects the epidemiologists' finding of strong evidence in human studies coupled with an inability to identify a mechanism for induction of leukaemia, based on the data available at this time. "By

signalling the degree of evidence for leukaemia and cancer of the nasal cavity and paranasal sinuses, the working group identified areas where further clarification through research is needed. This represents a service to Public Health", Dr Boyle concluded. Formaldehyde is produced worldwide on a large scale. It is used mainly in the production of resins that are used as adhesives and binders for wood products, pulp, paper, glasswool and rockwool.

Formaldehyde is also used extensively in the production of plastics and coatings, in textile finishing and in the manufacture of industrial chemicals. It is used as a disinfectant and preservative (formalin) in many applications.

Common sources of exposure include vehicle emissions, particle boards and similar building materials, carpets, paints and varnishes, foods and cooking, tobacco smoke, and the use of formaldehyde as a disinfectant. Levels of formaldehyde in outdoor air are generally low but higher levels can be found in the indoor air of homes.

Occupational exposure to formaldehyde occurs in a wide variety of occupations and industries: for example, it is estimated that more than one million workers are exposed to some degree across the European Union. Short-term exposures to high levels have been reported for embalmers, pathologists and paper workers. Lower levels have usually been encountered during the manufacture of

man-made vitreous fibres, abrasives and rubber and in formaldehyde production industries. A very wide range of exposure levels has been observed in the production of resins and plastic products. The development of resins that release less formaldehyde and improved ventilation has resulted in decreased exposure levels in many industrial settings in recent decades.

*From IARC Press Release No. 153, 15th June 2004.*

Jeffrey Simpson, Ashburton, Vic. (Australia)



### **Cancer Incidence and Mortality of Isocyanate Exposed Workers from the Swedish Polyurethane Foam Industry: Updated Findings 1959-98**

A nested case-control study was carried out to assess whether cancer incidence and mortality in chronic obstructive lung diseases were increased in the Swedish polyurethane foam industry cohort, updated with 11 more years of follow up. The mortality and cancer incidence (1959-98) experienced by a cohort of 4175 male and female employees employed for at least one year in the period 1959-87 at one of nine Swedish polyurethane foaming plants were investigated. Comparisons were based on calendar year, sex, and five-year age group specific mortality and incidence rates for Sweden. Workplaces and job tasks were categorically assessed for exposure to

toluene diisocyanate (TDI) and methylene diphenyldiisocyanate (MDI) by occupational hygienists.

The following results were obtained: Fewer cancer cases than expected were observed, but the lung cancer incidence was enhanced in women. Women with "apparent exposure" to TDI or MDI did not, however, have a higher lung cancer incidence than those with "no or low exposure". Moreover, a nested case referent study did not find that polyurethane dust exposure had been more prevalent among the female lung cancer cases than among referents. No increased mortality in chronic obstructive lung diseases was observed in the cohort. The authors come to the following conclusions: Results support the findings from two other cohort studies of an increased lung cancer risk among female workers in the polyurethane foam manufacturing industry. Chance or confounding from smoking are not obvious explanations for the coherent findings. However, the study was not able to link isocyanate exposed employment with lung cancer risk.

(Z. Mikoczy et al., *Occup. Environ. Med.* 61: 432-437, 2004)

Dr. Michael Nasterlack  
(Ludwigshafen, Germany)



### **Acrylamide – a New Food Carcinogen ?**

Acrylamide (AA) polymers are used as grouting agent for waterproofing of tunnels in rocky areas. Recently, this application led to problems in Sweden when the AA - after a series of mistakes - didn't fully polymerise and was released into surface waters, leading to fish mortality and neurological effects in cattle drinking the water. Peripheral neurotoxicity is indeed the critical effect and also in the tunnel builders some mild, reversible neurotoxicity was observed. AA is highly water-soluble and is rapidly absorbed after oral or dermal exposure and excreted with a half-life of just a few hours. A small fraction, however, is epoxidised to the genotoxic glycidamide (GA). The precise mechanism of AA neurotoxicity is unknown, but AA has been shown to bind to microtubuli and neurofilaments and disturbance of their function would not only explain AA's neurotoxicity but also its reprotoxicity, although the latter only occurs at much higher doses.

The cradle of biomonitoring of epoxide through haemoglobin (Hb) adducts stood in Sweden and it wasn't a surprise that the Swedish authorities asked Margareta Törnqvist and her co-workers to assess the tunnel builders' exposure by determination N-(2-carbamoyl-ethyl)-valine (CEV), the Hb adduct of GA. Although GA is not neurotoxic itself, a good correlation was found between CEV and peripheral neuropathies in the tunnel

builders. Surprisingly, the researchers also found CEV, at levels corresponding to an exposure 1  $\mu\text{g}/\text{kg}/\text{day}$ , in control persons without exposure to AA. Although the no-observed adverse-effect level for neuropathy, the critical effect of AA, is 500  $\mu\text{g}/\text{kg}/\text{day}$ , this discovery caused quite a bit of commotion as AA is suspected to be a human carcinogen and it turned out that the AA is being formed during food preparation. Especially in potato chips and French fries relatively high concentrations of AA were found. That chips and fries are not the healthiest food one can think of is well known, but that one would attract cancer through it was front-page news this summer. Estimates suggest that the carcinogenic potency of AA in the rat is of the same order as for other food carcinogens, but since the intake is much higher the risk would be considerable. The Swedish estimate of the additional lifetime risk when exposed to 1  $\mu\text{g}/\text{kg}/\text{day}$  is 10 per 1000. Since the famous publication by Doll & Peto we are accustomed to the idea that the major cause of cancer is related to diet, nevertheless this estimate seems exaggerated. Although dietary factors are quantitatively even more important than smoking and explain for some 35% (range 10-70%) of all cancers, AA would account on its own for some 10% of all food-related cancer. This estimate is highly improbable, if only because –apart from tobacco-smoking related lung cancer-

there isn't a single cancer which such a high incidence that it could be considered. One of the recommendations by the hastily gathered experts to explore this problem, namely to study the relevant cancer epidemiology in humans is rather bewildering. Especially if one realizes that we don't know whether or not AA is actually a human carcinogen, let alone that we would know which cancer is 'relevant'.

In the mean time, as far as I noticed, the average consumption of chips hasn't changed, nor have the shares in McDonalds tumbled. Apparently, the public at large couldn't care less about the opinions of the experts. Presuming that the average consumer isn't aware of Doll & Peto's work, this fact should perhaps bother toxicologists.

Dr. Peter Boogaard, The Hague (Netherlands)



### Using Human Acute Experimental Data to Derive Acute Exposure Concentrations

Although human experimental data provide a robust scientific basis for deriving human health effect criteria, adequate data for doing so under either chronic or acute exposure scenarios are rarely available. In their absence, procedures involving extrapolation of information from laboratory animals are typically used with uncertainty factors used to compensate for absent human data.

Since 2000, and especially since September 11, 2001, US federal agencies (notably CDC and EPA) have been collecting data from acute exposures of volunteers to chemical warfare agents (including mustard gas, GB (Sarin), and VX). These data include experiments conducted from 1917 until the 1980s under controlled conditions of concentration (C) and time (t), with thorough characterization of severity of the observed health endpoints.

Such data are amenable to analysis with categorical regression using severity of response as the category. Such analysis has provided specific information on the relationship between C and t for the individual agents and a robust basis for deriving acute human health effect criteria.

Results of analyzing these compounds as well as formaldehyde for acute effects thresholds will be presented publicly for the first time at Medichem in Paris. Results will be compared with other health effect criteria derived with laboratory animals using more standard assessment procedures.

**A request to members:** data involving controlled human exposures to substances with acute effects have proven understandably difficult to locate. Most data obtained so far have been recovered from the military archives of the US and indirectly Great Britain. Any members with knowledge of or access to such data are kindly requested to communicate with the author (kek@deltatoxicology.com) as I hope to have additional

compounds analyzed to present to Medichem in September. Confidential information will remain so and will only be used to confirm data that may be made publicly available.

K.E. Kelly (Crystal Bay, NV, USA)



## Welcome to New Members

Dr. **Ivelina Andonova**, Devnya Cement, Devnya (Bulgaria),

Dr. **Eric Benbrik**, Service Central de Médecine du Travail, Hotel Dieu, Paris (France),

Dr. **B. Rodrigo Cabanilla**, Monsanto Inc., St. Louis (U.S.A.),

**Ann Claridge**, PROSAR Inc., St. Paul (U.S.A.),

Prof. **Gaku Ichihara**, Nagoya University Graduate School of Medicine (Japan),

Dr. **Abdoul Aziz Kasse**, Cheikh Anta Diop University Cancer Center, Dakar Peytavin (Sénégal),

Dr. **Marc-Alain Levy**, Rambam Medical Center, Haifa (Israel),

Dr. **Thomas Martin**, Washington Poison Center, Seattle (U.S.A.),

Dr. **Mor Ndiaye**, Centre Hospitalier Universitaire, Dakar Fann (Sénégal),

**Olia Nikiforova**, National Centre of Hygiene, Sofia (Bulgaria),

Dr. **Etienne Noel**, Institut Provincial d'Hygiène et de Bactériologie du Hainaut, Mons (Belgium),

Vidka **Peneva-Nikolova**, National Centre of Hygiene, Sofia (Bulgaria),

Dr. **Robert Winker**, Dept. of Occupational Medicine, University of Vienna (Austria),

Dr. **Hristo Yordanov**, National Centre of Hygiene, Sofia (Bulgaria),

Dr. **Daniela Zheynova**, Lukoil Heftohim, Bourgas (Bulgaria)



## Forthcoming Events

### XXXII. Medichem 2004 - Paris

The XXXII. Medichem International Congress will take place on September 1-3, 2004 in Paris, France at the Sofitel Paris Forum Rive Gauche Hotel. The main theme for the Congress is "Toward Global Sustainable Best Practices for Chemical Safety & Health." Each day will be devoted primarily to a different aspect of this goal. Day 1 will cover Protecting Ourselves (worker health and safety), Day 2 will focus on Protecting Our Neighbours (Community preparedness, prevention and response) and Day 3 will highlight Protecting Our Future (children and the environment). Complete information on the Congress may be obtained at <http://www.medichem2004.org>

### Sixth International Symposium on Biological Monitoring in Occupational & Environmental Health

September 6-8, 2004 in Heidelberg.

Further information is available from

[holger\\_zimmer@med.uni-heidelberg.de](mailto:holger_zimmer@med.uni-heidelberg.de) and at

<http://www.med.uni-heidelberg.de/arbmed/c-hom.htm>

### XXXIII. Medichem 2005 - Goa

The XXXIII. Medichem International Congress will take place on September 21-23, 2005 in Goa, India. Further Information will be available soon.

