

Abstracts from the ESRS meeting are published in the *Journal of Sleep Research*, and were made available at the meeting in a CD-ROM.

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# Scientific highlights from the European Sleep Research Society Congress, 2008



## Summary

You simply cannot go to Glasgow in Scotland and be a shrinking violet. Or at least this is what we were told when we attended the European Sleep Research Society (ESRS) Congress in Glasgow in 2008. This report aims to illustrate how collaboration and communication between specialists can help to facilitate breakthroughs in clinical practice. We leave it up to the reader to decide whether those who attended also made breakthroughs in learning local customs.

The ESRS was founded in 1971. The purpose of the society is to promote research on sleep and related areas, to improve care for patients with sleep disorders and to facilitate the dissemination of information regarding sleep research and sleep medicine. The ESRS meetings are held biannually and are well known for their high standard of scientific presentations. Indeed, the 19th Congress, hosted by the British Sleep Society in Glasgow was no exception: 1,400 people from 54 countries attended the meeting and presented almost 800 abstracts between them. Although these numbers are much smaller than the European Respiratory Society's Congress, they

show the growth of interest in the speciality of sleep. The high delegate:presentation ratio also illustrates that European sleep researchers are very active.

The programme comprised of invited lecturers, symposia and poster sessions, as well as interactive sessions taking the form of discussion meetings, video-based case presentations and debates. There was also a "Datablitz" session, in which presenters had one min and one slide to present some central aspect of their research. This was both entertaining and informative. Topics covered throughout the conference spanned the full range, from the basic science of sleep to sleep

medicine practice. The cream of the crop, according to four international delegates, included keynote lectures by Professors Allan Pack (Director, Center for Sleep and Respiratory Neurobiology, University of Pennsylvania Medical Center, Philadelphia, PA, USA) and Professor Virend Somers (Mayo Clinic College of Medicine, Rochester, MN, USA), as well as upcoming research in sleep and driving, and childhood sleep. Brief reviews of these areas of interest are given below.

## Sleeping worms

Z. Shaikh

As sleep disorders increase in prevalence, the importance of understanding the function and regulation of sleep is paramount. It is hard to believe that fruit flies and worms could hold the key to help unlock the mystery behind this fundamental biological process. In his fascinating keynote lecture, Prof. Allan Pack demonstrated that by using behavioural characteristics alone, sleep-like states can be identified in many non-mammalian species such as the fruit fly *Drosophila melanogaster* [1, 2]. Using *D. melanogaster* as a model system, Prof. Pack has been able to identify important molecular pathways regulating sleep and wakefulness. Interestingly, these are conserved between model systems and mammals, lending strength to the argument that sleep is a basic biological process which is evolutionarily ancient.

Another model used by Prof. Pack is the roundworm *Caenorhabditis elegans* [3]. *C. elegans* exhibit periods of quiescence at four distinct times during larval development. These are called "lethargus" periods, sleep-like states characterised by a cessation of movement and feeding. They exhibit rhythmicity, are reversible and accompanied by an increase in arousal threshold. Studies in *C. elegans* have played key roles in the discovery of genes regulating sleep. For instance, the *egl-4* gene, which encodes a cyclic GMP-dependent protein kinase, is thought to play an important role as a regulator and promoter of sleep-like behaviour. The video highlight of the talk was a film of *C. elegans* arousing from a period of lethargus [3]. It is remarkable to think that such



Adult *Caenorhabditis elegans*, © Zeynep F. Altun



*Learning from Dr Melissa Hack, President of this British Sleep Society, learns local customs from one of Glasgow's sleep experts, Professor Colin Espie.*

simple observations under different experimental conditions have enabled the discovery of regulatory genes and pathways.

We learned that the paradigm of using non-mammalian species as models to study sleep creates unparalleled opportunities to enhance our understanding of regulatory molecular pathways. In time, this important work will help explain the aetiology of sleep disorders and enable the development of potential therapeutic targets.

## Hypnotic hangovers and driving risk

M. Jackson

Population surveys indicate that 0.7-7% of adults use sleep-enhancing medication [4]. Drivers who take hypnotic medications, such as benzodiazepines, are over-represented in road accidents, and have a higher odds ratio of crash risk [5, 6]. Furthermore, this increased crash risk is associated with therapeutic doses, rather than abuse. The presentation by Assistant Prof. Joris Verster (Dept of Psychopharmacology, University of Utrecht, Utrecht, The Netherlands) reviewed the literature pertaining to the subjective, cognitive and driving-related effects of sleeping medications.

Both epidemiological road data and in-laboratory simulated driving studies have examined the relative risk of road accidents after doses of a range of sleeping medications. Experimental studies have shown that, even the day after administration, these drugs induce an impairment to real or simulated driving. There appear to be differences between the effects of different drug classes on performance, depending on the



*Professor Allan Pack, Director of the centre for Sleep Respiratory Neurobiology, University of Pennsylvania Medical Centre, USA, returns home to give one of the ESRS keynote lectures.*

half-life and dosage of the drug, and time after administration. Studies have demonstrated that one in four drivers perform worse after a dose of Temazepam, a commonly prescribed hypnotic sleeping medication, than at a blood alcohol concentration of 0.05%.

Classes of nonhypnotic drugs have been designed to attempt to remedy the side-effects of benzodiazepines and differential effects on driving performance have been observed. For instance, Zaleplon had little or no effect on driving performance 4 h postadministration, whereas Zopiclone significantly impaired simulated driving steering performance 4 h after middle-of-the-night administration [7]. A case-control study reported that Zopiclone produced a fourfold increase in accident risk [8], which is similar to that of illegal doses of alcohol.

These studies have generally used young, healthy volunteers; however, given the ageing of the population, future studies should aim to examine the impact of sleeping medication in elderly subjects. Other factors, such as sex differences, long-term use of sleeping medications and the interaction of sleeping medications with circadian variations in performance, have not been examined. This presentation highlighted the impact of sleeping medication on driving-related performance: an issue practitioners and doctors should be aware of, and make known to their patients, when prescribing these medications.

## Risky rhythms

A. Atalla

The ESRS Congress was peppered with highlights, both in- and outside the lecture theatres; however, one stands out as having particular clinical significance for all. In his keynote lecture, Prof. Virend Somers talked about the pathophysiological and epidemiological links between sleep-disordered breathing and cardiovascular disease - a much debated subject. Within this, he talked about the data linking obstructive sleep apnoea (OSA), atrial fibrillation (AF) [9] and sudden cardiac death.

That AF should be epidemiologically associated with OSA is pathophysiologically plausible given the recurrent hypoxaemia, adrenergic surges, negative intrathoracic pressure swings and endothelial dysfunction accepted as being part of this prevalent disease. Previous work has shown that OSA patients are at risk of nocturnal AF (and other arrhythmias, including nonsustained ventricular tachycardia) [10, 11] as well

as treatment-refractory or persistent and permanent AF [12], or AF that recurs some time after initially successful electrical cardioversion [13]. Obesity (an important risk factor for AF) as well as the magnitude of OSA-related nocturnal desaturations, is independently associated with incident AF [14].

OSA is known to be thrombogenic by a variety of mechanisms, including increased platelet aggregation and activation, which nocturnal continuous positive airways pressure (CPAP) ventilation has been shown to reverse [15]. This prothrombotic state, when coupled with the cerebrovascular risk of AF, adds to the already compelling clinical and health-economic argument in favour of CPAP therapy.

The discussion of sudden cardiac death further demonstrated the importance of ongoing compliance, as patients not compliant with CPAP therapy have been shown to have an increased risk for sudden cardiac death compared with those who are compliant [16]. Sudden cardiac death in this group is in contrast to that in the general population in that it more often occurs overnight; additionally, the risk of nocturnal sudden cardiac death has been correlated with the severity of OSA as measured by the apnoea/hypopnoea index [17].

This thought-provoking lecture emphasised not just the importance of making the diagnosis of OSA and compliance with treatment, but also the importance of being able to consider alternative/underlying aetiologies in patients such as those with lone or treatment-refractory AF.

## Sleep in children

C. Hill

Whilst the adult sleep specialists engaged in heated debate as to whether short sleep is a cause of major ill health, in childhood, the focus remained firmly in promoting the duration and integrity of sleep. Childhood sleep quality during critical periods of development has the potential to influence learning - as well as life long physiology and function. The array of paediatric specific topics aired at the ESRS, too many to mention individually, are a testament to the activity of scientific endeavour in this field and one notable paper reflected this theme.

Dr Eus Van Someren, PhD, head of the Sleep and Cognition group at the Netherlands Institute for Neuroscience (Amsterdam, The Netherlands) reported results from the "Great Sleep Experiment". This imaginative research exploited



school children as co-researchers rather than merely as research subjects. The children were active agents in both understanding the research question and developing the study design. Fifty classes of 11–12-year-olds learnt about scientific method and the science of sleep and learning, and applied these skills and understanding to write a "grant application". Applications were judged by an international scientific committee. The two winning classes participated in the Great Sleep Experiment, hosted in the Science Museum Nemo in Amsterdam, which was temporarily converted into a cognitive and sleep laboratory with capacity for 35 children. Sleep labs from all over the Netherlands supported the event with staff and equipment. Children underwent one night of polysomnography and undertook cognitive tasks addressing visual, motor and visuomotor skill learning as well as executive learning. Sleep-dependent improvements in motor task performance accuracy were demonstrated. Unlike in adults, enhanced speed performance was also demonstrated over a period of wakefulness. Thalamo-cortical oscillations in sleep related to general motor skill ability and may provide an indication of neuronal maturation. The study demonstrated that the creativity and cooperation of children can be harnessed to produce relevant science and set a new standard for participant involvement.

These research data are a reminder that physicians need to promote healthy sleep in childhood particularly where common conditions such as sleep-disordered breathing may impact adversely on sleep quality.

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## Summary

One of the striking things about this pot pourri of research reports is the diversity of research methodology and what can be learned from applying different approaches to research questions. This may be one of the valuable outcomes from such meetings. Prof. Colin Espie, director of the University of Glasgow Sleep Centre, who chaired the organising committee for ESRS 2008, summed this up when he stated that: "It is great to see so many advances in our field, and the opportunity to meet with so many colleagues from across the world was stimulating and encouraging." And so, as the last chords of Auld Lang Syne fade away, we look forward to a bright future for sleep research across Europe.