Welcome and Introduction.

Small, workshop style meetings, focused narrowly on a topic are one of the most productive sources of inspiration. This Sleep and Breathing meeting has a rich heritage of similar meetings that have enhanced many research careers. These meetings are particularly important for new and early career researchers and are always a source of new ideas. This year’s meeting is particularly poignant, as it coincides with the loss of a giant leader in sleep, Christian Guilleminault. Those of us in Australia had been looking forward to his presence at the upcoming IPSA meeting (International Pediatric Sleep Association), an organization and meeting pioneered by him, and to be held next year in Brisbane. He will be greatly missed.

The first such meeting dedicated to sleep and breathing was organized by Elio Lugaresi and his small team and held at a resort in Rimini, Italy in 1972. The proceedings were published in the journal Bulletin Pathophysiologie Respiratoire, with the foresight of Pierre Sadoul (1, 2), who was the founder and editor of the Journal, (a forerunner of “Respiration Physiology”, and the now “Respiratory Physiology and Neurobiology”). The Rimini symposium, and its publication, was a great source of stimulus to many of us junior researchers. Around this time, a young Eliot Phillipson, working in Toronto Canada returned to visit his mentor, Julius Comroe at the Cardiovascular Research Institute (CVRI) in San Francisco, and presented his work on breathing in exercising dogs. When he showed Comroe how breathing changed when the dog went to sleep on the treadmill during a break from the exercise experiments, Comroe told him to forget the exercise physiology and study how breathing changed in sleep: On Comroe’s desk was a copy of the proceedings of the Rimini meeting. The symposium and its publication changed the course of his research. The arrival by surface mail of that publication in Australia in 1974, many months after the meeting in Italy – had a similar impact on several young researchers working in Sydney with their mentor, David Read and indeed changed the course of our projects.

The second such meeting, was held in July 1977 at a ranch in Santa Clara California, sponsored by the Kroc Foundation, and run by Christian Guilleminault and Bill Dement, with the proceedings published in a Monograph entitled “The Sleep Apnea Syndromes” (3). This meeting captured the work of a small but burgeoning research endeavor on sleep apnea. When I returned to Sydney in 1979 after working with Eliot in Toronto, and while struggling to establish a clinical service and suitable human facilities, I decided, with David Read, and David Henderson-Smart, to hold a similar meeting in Sydney. With the enthusiastic support of Tom Roth (who
gained the generous support of the Upjohn Company), and Christian Guilleminault who arranged for its publication, we managed to bring together many of the few researchers in this area in March 1980. The proceedings were published as a special edition in the new journal Sleep (4), (photo and caption), with the individual manuscripts as well as the individual discussions. The papers and some of those discussions are accessible on-line.

I was also fortunate to attend a similar workshop-style meeting on sleep apnea which was organized by Markku Partinen and held at a resort in Siuntio, Finland in 1988. My meeting with fellow attendee Hermann Peter from the productive Marburg group enabled us to begin our first Australian epidemiology study of sleep apnea in Busselton, Western Australia. He sent Hartmut Schneider with many on-loan Mesam portable devices to study many subjects enrolled in this population survey, a project that has led to several ongoing publications (6,7). This meeting also initiated several other major collaborations, including Heinrich Becker from the Marburg team, and Olli Polo, and then Turkka Kirjavainen, all of whom spent several productive years with us in Sydney.

The next meeting dedicated to breathing in sleep, was held in Banff Canada in April 1989, and similarly published as a monograph (5). These several early monographs were particularly important as at that time sleep apnea had little presence in the mainstream medical literature and was largely dismissed as an interesting curiosity of minor relevance in medicine. While the meeting was subsequently held every second year, we also managed to hold two more in Australia (Cairns, 1992) and at Manly in Sydney (2000).

My approach with such meetings was to ensure that all the early researchers could attend and be actively involved in the discussions. I continue to encourage Fellows to go back to the early references and specifically try to imagine how those earlier researchers where thinking. To ask this question, without the glare of current understanding – to put yourself in their shoes! How would you investigate this problem? Old questions frequently bring new ideas to fruition; those “old questions” were usually beyond the capacity of the technology to answer – and now you can answer them with the new tools at your disposal. For example, here we are, almost 50 years after, and we can begin to answer the many questions many of us asked back then about sleep apnea: What is happening to the brain in sleep apnea? Now, miraculous advances in brain imaging are giving us new answers and with those answers, a whole new vista of new questions. Another old question: How do mitochondria respond to this amazing pattern of hypoxic challenge in sleep apnea, or to the remarkable pattern of sleep fragmentation? New answers are now emerging with the similarly “miraculous” developments in the methods and technology used in cell biology.

Then, as now, such questions are typically often too big to answer. However, the “art” of science is in taking a large question and selecting small targets that you can answer. In an era of large clinical trials, and the promise of “big data” – which is in some way more akin to astronomy than physiology – it is still important to identify small targets and generate hypotheses (i.e. to have ideas!), and design experiments – the classical way of revealing new understanding.
The special nature of the type of workshop you are attending here in Finland is that it is the foodstuff of ideas. It will be during one of your many interactions with the other participants, the side discussions – the apparently random comment or observation, the unplanned and unexpected light-bulb moment – the result of putting your creative brains together – freed from all the other distractions for a few days and nights – that the new ideas will emerge. One, of many memorable examples, was how a presentation on the cellular mechanisms of atherosclerosis at our 1992 meeting – by Professor Roger Dean, an expert in atherosclerosis who was at that time, essentially unaware of sleep apnea, but invited by us as a guest to bring in another area of expertise – stimulated another participant, Peretz Lavie, to suggest to his Scientist wife, Lena Lavie, to explore the role of repetitive hypoxia – with the subsequent many new discoveries from her group.

While a newcomer to the area of sleep and breathing may be overwhelmed by the sheer quantity and quality of research in the area, and may be tempted to gravitate to the mainstream themes, or even “fashions” of current research – or surrender to the long and tedious work of yet another randomized controlled trial – or to focus on the radar “blips” on the horizon of emerging “big data”, truly new and revolutionary ideas will still more often emerge from good ideas and small targets. One such small target was the idea that applying gentle pressure through the nose might answer the question about the mechanism of sleep induced upper airway obstruction: was the mechanism passive closure (i.e. loss of muscle tone, and or suction induced closure) or was there still the possibility that it was active muscle spasm sphincter-like closure? No one imagined the future of this simple experiment some 40 years ago.

In your few, precious days of focus, use your knowledge of the many rich and varied functions of sleep, and let yourself “sleep-on” the many discussions and enable your own creative brain to do the work in coming up with new perspectives, new ideas, and generate hypotheses that will advance our understanding. Remember how Otto Loewi proved that nerve endings release chemical effectors and remember that his dream was of a method to answer an ongoing debate about the way in which nerves interacted. The dual frog heart water bath experiment.

Remember also, sage advice from some of our predecessors, with Pasteur’s adage that;

“For fortune favors the prepared mind”.

While I in no way disparage the great value of large clinical trials or underrate the great advances that will be enabled by the big data revolution, these methods are not an alternative to experimental research. Finally, for those of you who choose to continue to follow the experimental pathway of research, my own guiding principle came from the father of Nuclear Physics, Lord Rutherford:

“If you need statistics, re-design the experiment”.

Welcome to Finland. I know your hosts - my dear colleagues and friends - will look after you and will create a great environment for your meeting and that will stimulate ideas with your melatonin supercharged, creative sleep, in the warmth and bright light of the Finnish summer.

I am sorry to be absent in person, but I am certainly there in spirit.
Colin Sullivan
Sydney, Australia. July 2019

4) Sullivan CE, Henderson Smart, Read. Sleep and Breathing. Sleep. 1980 Sep 1;3(3-4)

PARTICIPANTS AT THE SYDNEY SLEEP AND BREATHING MEETING, MARCH 1980


Third Row (seated): Michael Hensley, Nick Saunders, John Remmers, Unsure, Unsure (both from Orem’s lab),