The European Insomnia Network

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Major advances in the neuroscience of sleep function, as evident from this special issue, should inspire us to see to a good night’s sleep. However, for the 10% of us that struggle with chronic insomnia, this is not easily accomplished. Insomnia is the most frequent complaint in both psychological practice and the sleep clinic and a major risk factor for the development of a psychiatric disorder. Yet, our understanding of its brain mechanisms falls painfully behind with our accomplishments in understanding the neuroscience of normal sleep.

Therefore, this year, more than 100 researchers and clinicians from 23 countries committed themselves to cooperate in the European Insomnia Network with the aim to accelerate progress in our understanding of the neuroscience of this debilitating condition. How can we accomplish such acceleration?

A major problem that has obstructed progress in our understanding of chronic insomnia is that the diagnosis is based exclusively on subjective complaints. A routine polysomnographic evaluation seldom shows abnormalities. This general finding has led some to suggest that the major problem of insomnia is a misperception of their sleep state. However, there is a large gap between the routine polysomnographic evaluation and the presently available neuroimaging tools. Can we be sure that nothing is wrong if we base our conclusion on the somewhat archaic qualitative analysis of staging sleep on the basis of two EEG-channels? As a metaphor: would we send a patient with cardiovascular complaints home after taking his pulse only and concluding that nothing strange can be observed? We would not, since we know that a multichannel cardiogram might be applied to reveal subtle signs of severe heart failure.

Likewise, we might learn more about insomnia by applying state-of-the-art neuroimaging tools. For example, researchers on the neural correlates of consciousness (NCC) that developed and applied sophisticated analyses of EEG, MEG and fMRI, now have evidence that the complexity and recurrence of brain activity determine whether a stimulus induces a conscious experience. Application of these tools to insomnia may reveal the neural correlates of the subjective experience of lying awake during a poor night’s sleep better than qualitative analysis of a two-channel EEG does.

A second major problem has been to objectify the subjective complaints of daytime functioning. Standard neuropsychological tests have not unequivocally demonstrated performance deficits. Here again, application of advanced neuroscience methods seems necessary. Indeed, computerized psychomotor assessment and memory consolidation paradigms recently demonstrated abnormalities in insomnia. Also, fMRI studies demonstrated that compensatory brain activation masks performance deficits that were expected with the suboptimal activation of brain circuits dedicated to the cognitive processes probed by the task.

Thirdly, with a prevalence of about 10%, it is unlikely that a single diagnostic category suits the whole heterogeneous group of people wrestling with poor sleep. The situation may be compared to the diagnosis of dementia many years ago; by now we know that it is essential to differentiate between Alzheimer’s, vascular, fronto-temporal, etc. Finding homogeneous subgroups of insomnia phenotypes now seems possible. Widespread Internet access now allows for large-scale international studies applying questionnaires and computerized tasks to obtain a multivariate characterization of insomnia in subjective, behavioral, environmental, performance and even molecular genetic dimensions. Subsequent application of the above mentioned neuroscience tools to selected homogeneous subgroups will strongly increase the likelihood of finding robust abnormalities.

The European Insomnia Network will work on the normalization of minimal data sets to allow for exchange and a database; on promoting neuroscientists to learn about insomnia and sleep scientists to catch up on neuroscience; and on promoting the development of better models and pharmacological treatments for insomnia. These are essential steps to ameliorate the profound suffering of one out of ten of us.