Editorial

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The term “interventional psychiatry” was created some years ago in order to describe the use of neurotechnologies as treatment options in psychiatry. These so called “interventional” methods encompass techniques which modulate brain circuitry through neurostimulation. A fast growing evidence coming from neuroscience research has stimulated intensive clinical research activities leading to more refined technical applications for novel therapeutic targets. Thus, different brain stimulation procedures have been developed, some of them were recognized as treatment strategies for psychiatric indications.

This special issue of *Neuropsychobiology* has the aim to give an overview on the preclinical knowledge underlying the different brain stimulation methods, and to summarize different clinical applications used to treat specific psychiatric disorders. In general, noninvasive neuromodulation is a tool to study brain functions and to gain insights into basic mechanisms which may contribute to the development of psychiatric disorders. In this context, aspects like neural activity and connectivity, neurochemistry, as well as neuroinflammatory processes are discussed. As outlined in the articles, the combination of, for example, transcranial magnetic stimulation (TMS) with brain imaging has improved the knowledge of the anatomical and functional cross-talk between different brain regions

[1]. These findings, in turn, have contributed important knowledge about functional connectivity aberrations and changes in pathological states such as depression. Moreover, transferring these results into the clinic has allowed to broaden the spectrum of therapies in psychiatric disorders in general. The use of repetitive TMS is an example of how this translational view has opened a successful treatment option, for example, for patients with psychotic disorders [2]. On the other side, methods known since decades, like electroconvulsive therapy (ECT), were refined and can be directed more specifically to different disease states of depression, having much less side effects than years ago [3]. Finally, a more recent development is the introduction of transcranial direct current stimulation (tDCS). It alters the cortical excitability using weak polarizing current. Pharmacological experiments suggest that glutamatergic mechanisms like N-methyl-D-aspartate receptors are involved in plasticity-related processes induced by tDCS. Other studies point to a tDCS-mediated effect on serotonergic and dopaminergic systems [4]. Clinical studies conducted so far are very promising in having an additional tool to treat psychiatric disorders in the near future. To date, first evidence exists for the application in depression, schizophrenia, substance use disorders, and anxiety disorders. Among them, depression has been the most extensively studied psychi-

atric condition showing that tDCS may efficiently reduce the clinical symptoms.

In conclusion, the different neuromodulation techniques are exciting new approaches in psychiatry improving our armamentarium of the therapy of illness states which are difficult to treat by use of our traditional options according to the bio-psycho-social model. However,

so far we have only limited knowledge of the underlying mechanisms. Therefore, we clearly need more research in order to define protocols for the specific use of these new techniques, and to create the evidence of its application in different psychiatric disorders.

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