

Preface

Deep brain stimulation (DBS) was introduced in the 1980s for the treatment of therapy-resistant neurological disorders, and has been applied since 2000 on an experimental basis for the treatment of therapy-resistant psychiatric disorders. Since its introduction, DBS has evolved into a well-accepted therapy to treat patients with movement disorders, but the use of electrical stimulation to intentionally alter emotion, motivation, and cognition of psychiatric patients often causes amazement and even disbelief. Neurosurgery for the treatment of psychiatric disorders has always been and still is surrounded by controversy.

The relation between DBS and psychiatry is fascinating because it is both appealing and threatening. First, DBS for the treatment of psychiatric disorders is attractive because it offers an ultimate treatment option for a group of seriously ill, untreatable psychiatric patients. Second, the risk of the operation is relatively small and the technique renders the possibility of continual adjustment, which is an important issue for psychiatric patients. Finally, DBS has the potential to increase our understanding of the brain pathophysiology of psychiatric disorders; it offers a view into the pathological brain. DBS is also threatening because psychiatric disorders are less discrete and objectifiable conditions than movement disorders. Second, psychiatric symptoms are more intimately connected with a person's identity and integrity than motor symptoms, therefore raising more challenging ethical issues. Finally, the boundary between treatment and enhancement in psychiatry is vague. Altering cognition, emotion, and motivation is an intended goal in psychiatry and not a side effect, and may result in changes beyond the natural self.

In the past decade, DBS has been applied in obsessive-compulsive disorder, major depressive disorder, Tourette syndrome, and addiction. The results have consistently shown a promising success rate. However, the number of patients treated world-wide is still only limited and most reports deal with small-scale studies or case reports. Moreover, little is still known about how DBS acts in psychiatry, emphasizing the need for translational animal studies.

The purpose of this book is to conduct the first comprehensive overview of DBS in psychiatric disorders, with a particular emphasis on the relation between pre-clinical animal studies and clinical patient studies. The book starts with the basic

principles of stimulation ([Chap. 1](#)), neuroanatomical circuits ([Chap. 2](#)), and hypotheses of the mechanism of action ([Chap. 3](#)). Separate chapters subsequently review DBS in different psychiatric disorders and animal models: obsessive–compulsive disorder ([Chaps. 4–7](#)), major depressive disorder ([Chaps. 8–11](#)), Tourette syndrome ([Chap. 12](#)), addiction ([Chaps. 13, 14](#)), and psychiatric symptoms in Parkinson’s disease ([Chaps. 15, 16](#)). We have also included a discussion on the role of intracranial recordings ([Chap. 17](#)), neurotransmitter changes ([Chaps. 18](#)), glial cells ([Chap. 19](#)), the significance of animal studies ([Chap. 20](#)), neuroimaging ([Chap. 21](#)), and optogenetics ([Chap. 22](#)). The future of next-generation electrodes ([Chap. 23](#)) and nanotechniques ([Chap. 24](#)) is reviewed, and we end with a discussion of ethical issues of DBS in psychiatric disorders ([Chap. 25](#)) and a critical review of the history of DBS ([Chap. 26](#)).

We thank the authors, all experts in their field, for their excellent contributions to this compendium of DBS in psychiatric disorders. We greatly appreciate the editorial work of Renske van Dijk in the creation of this book. We sincerely hope that this compilation of present-day knowledge will contribute to increased understanding across the boundaries of separate specialties and research areas, and that it may be of help in guiding future steps for all those involved to advance the knowledge and application of DBS in psychiatric disorders.

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Deep Brain Stimulation

A New Frontier in Psychiatry

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2012, XII, 300 p., Hardcover

ISBN: 978-3-642-30990-8