Introduction

In the past 100 years there has been a revolution in our understanding of the brain. So far, this has done little to disrupt mainstream psychiatric practice. That is set to change. New neuroscience-based treatments are emerging, while evidence from neuroscience and genetics is calling into question traditional diagnostic boundaries. Psychiatrists of the future will need to integrate their understanding of brain imaging, molecular diagnostics, psychological factors and social context to provide neuroscience-informed care plans.

In recognition of the changes to come, and the need to train the next generation of psychiatrists in modern neuroscience, the Gatsby Foundation, Wellcome and the UK Royal College of Psychiatrists brought together a board of experts under the brilliant direction of Professors Wendy Burn and Mike Travis. Their brief was to develop and implement a new neuroscience curriculum for psychiatrists in training preparing for the Membership of the Royal College of Psychiatrists (MRCPsych) professional examination. The Cambridge Textbook of Neuroscience for Psychiatrists accompanies that new curriculum and should serve as a 'one-stop shop' for what any psychiatrist needs to know about the brain.

Understanding the brain and mind requires a vast array of techniques and conceptual approaches. In this book, we have brought together basic neuroscientists, geneticists, psychologists, psychiatrists, neurologists, neurosurgeons and endocrinologists to bring you the cutting edge of translational neuroscience, focused on addressing the material most relevant to current or future psychiatric practice. Much of the material draws on the lectures prepared for undergraduate and clinical teaching by the faculty of Cambridge Neuroscience and their collaborators beyond the university. We thank them all for their generous contributions.

The book opens with chapters on the basic neuroscience of cells and synapses; the array of methods used in neuroscience; and the neuroanatomy most relevant to psychiatrists. We move on to consider the brain circuits and modulators which underlie functions relevant to psychiatry such as stress responses, motivation, sleep and empathy. We outline the basics of neural development and developmental models of psychiatric disorders. Finally, we consider the neuroscience of each of the major psychiatric diagnoses. We recommend moving back and forth between these sections as you build your knowledge, using the cross-references provided. For example, if you are interested in the neuroscience of obsessive–compulsive disorder (OCD), you might start with the section on OCD, go back to read the section on the neural circuitry of habits, recap the neuroanatomy of the striatum and frontal lobes, then move on to read the section on the neuroscience of brain stimulation.

Despite the vast neuroscientific literature, we are only beginning to understand the neuroscience of psychiatric symptoms, syndromes and treatments. We've tried to reflect this in the textbook, showcasing what is known, but also highlighting aspects of psychiatry that are less well understood, and key outstanding questions in each area.

Our chapters align with the neuroscience syllabus generated under the Gatsby–Wellcome–RCPsych Neuroscience Project described above, and link to the curriculum from the USA National Neuroscience Curriculum Initiative (NNCI). Throughout the book, QR codes link out to relevant online resources from the NNCI. We are grateful to David Ross and Mike Travis at NNCI for discussions during the production of this book and for providing the hard links allowing us to integrate with their fantastic resources. We are also hugely indebted to our brilliant team of peer reviewers, mainly psychiatry trainees, whose incisive feedback was instrumental to the development of these chapters, honing their accessibility and clinical relevance. We are grateful to Dr Gareth Cuttle at the Royal College of Psychiatrists for coordinating this process.

We are keen that this book and its future editions are as useful as possible to those practising clinically, or researching questions of clinical relevance. We would be grateful for your feedback and suggestions, which you can submit as issues on our GitHub repository at **https://github.com/maryellenlynall/neuroscience_for_psychiatrists**.

Introduction

If something comes up in clinical practise and you find yourself wondering, 'What's the neuroscience of that?', but find that it is not covered in this book, we'd like to know!

Editing this book has been a privilege and a pleasure, in large part because of the fantastic team at Cambridge University Press, including Jessica Papworth, Saskia Pronk, Olivia Boult, Anna Whiting and Catherine Barnes, as well as expert copy-editing by Zoë Lewin.

We hope that this book proves a helpful accompaniment to your study and practice, and that you find the material as insightful and thought-provoking as we do.

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