

Preface

As one in the series of *Current Topics in Behavioral Neuroscience*, this book draws together the latest developments in both preclinical and clinical research of attention-deficit hyperactivity disorder (ADHD). We have tried to highlight the science that is common to both, as well as the chasms that separate them. This appraisal is timely in view of the forthcoming publication of DSM-5 in 2013, which aims to update the diagnostic criteria for ADHD, based on its current neuroscientific understanding.

ADHD has a worldwide incidence of about 5% in children but it is not a benign disorder found only in the young, as was once believed. As the opening chapter of this book makes clear, ADHD persists into adulthood in more than half of the cases. These patients often experience serious comorbidity, such as substance misuse (especially alcohol), anxiety and emotional lability; bipolar disorder and criminality. Any one of these problems can ruin social function, employability, and quality of life, and they all illustrate why it is so important that we find ways of understanding the neurobiology of this disorder and develop effective treatment approaches.

There is an obvious and justifiable emphasis on the latest research that points to ADHD as a neurodevelopmental disorder involving alterations in prefrontal brain regions, but the role of other brain regions, such as those coupled to the periphery, is covered too. At last, there is real progress in understanding the consequences of disrupting these complex feed-back and feed-forward loops and their functional connections with forebrain neuronal circuits.

After that, the theme of the chapters switches to comorbid problems, especially drug misuse and obesity. It is not at all obvious why these debilitating conditions are so prominent with ADHD, compared with other psychiatric disorders, but that anomaly must give clues to their underlying neurobiology. More clues are emerging from genetic studies, which are gradually identifying candidates that are more certain, or more common, than others. However, as is now evident, all these factors can be confounded by the impact of early life experience on gene expression and factors that govern brain development, including those that determine gender.

As in other fields, the development of an animal model of ADHD is seen as an essential step in translational research. Validating these animal models, even as mere drug screens, is a constant and challenging process. Several mouse contenders are reviewed here but whether a strain of mouse will ever be developed that replicates the benchmark rodent model of ADHD, the Spontaneously Hypertensive Rat (SHR), remains to be seen.

Apart from the SHR, which has been studied in exceptional detail, there is a striking dearth of preclinical research of ADHD compared with other CNS disorders. That could well explain why, despite the prevalence of ADHD, only five drugs are licensed to treat ADHD in the USA – and only three of these are available in the UK. Yet, given that even the first-line treatments for ADHD (psychostimulants) are ineffective in about 20–25% of cases, there is a pressing need for new approaches to pharmacotherapy of ADHD, particularly in adults, based on a strong scientific rationale.

The last chapter offers a novel framework in which to view the various accounts and explanations of ADHD presented herein and in the broader ADHD literature. It presents an updated version of the theoretical framework initially presented by Peter Killeen at the international multidisciplinary research group led by Terje Sagvolden at the Centre for Advanced Studies at the Norwegian Academy for Science and Letters (2004–2005). This “think-tank” on ADHD acted as a catalyst in generating new ideas and new lines of international collaborative research between basic and clinical scientists and the establishment of the journal *Behavioral and Brain Functions*, of which Terje was Editor-in-Chief.

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