

Current Topics in Neurotoxicity 8

Norbert Müller
Aye-Mu Myint
Markus J. Schwarz *Editors*

Immunology and Psychiatry

From Basic Research to Therapeutic
Interventions



WORLD PSYCHIATRIC ASSOCIATION



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Preface

Although Emil Kraepelin, the founder of modern psychiatric classification, described the influence of infections on psychiatric disorders as early as 1890 in his manuscript “Ueber Psychosen nach Influenza” (“On psychoses after influenza”), he was by far not the first one to perform research in the field of psychoneuroimmunology. In 1887, the later Nobel Laureate Julius Ritter Wagner von Jauregg published a sort of ancient meta-analysis on the therapeutic influence of typhus infections on patients with psychiatric disorders. He merged data from observations in Austrian, German and Swiss asylums during typhus epidemics, showing that psychiatric symptoms improved in about half of the patients and that about one-third of them were cured after the infection had subsided. These observations served as the basis for Wagner von Jauregg’s fever therapy, which was adopted in some European countries during the 1920s and 1930s. One extremely intriguing example of the effect of “immunological” research is the identification of *Treponema pallidum* as the causative agent of neurosyphilis and the discovery of Salvarsan, the first chemotherapeutic drug against *Treponema*. These findings resulted in the causative treatment of about one-third (!) of all psychiatric patients at that time. He won the Nobel Prize in 1927 for his treatment of paralysis using malaria inoculation.

After World War II and the triumphal procession of the neuroleptics in the 1950s and 1960s, research in biological psychiatry focused on neurotransmitter disturbances and their influence on psychiatric disorders. Without doubt, those neurotransmitter disturbances play a key role in disorders such as schizophrenia, major depression, autism and anxiety, but—despite huge amounts of research—the causes of the neurotransmitter changes are widely unknown. Unfortunately, the spectacular progress in psychopharmacotherapy had a negative impact on immunological research in psychiatry. In the 1980s, investigations of autoantibody titres in patients with schizophrenia were a kind of revival of immunological research in psychiatry. Only in recent years was it proven, for example, that autoantibodies directed against the NMDA receptor can cause schizophrenia (or rather a schizophrenia-like syndrome). This example highlights the extremely difficult path from a hypothesis to a proven finding in the field of immunological research in psychiatry.

The growing, fascinating and future-oriented field of psychoneuroimmunology claims to close the gap between the neurotransmitter disturbances and the underlying processes such as infections or other body/environmental processes. The immune system, consisting of an innate and adaptive part, shows an extremely high multiplicity and variability of cellular and humoral components and in addition underlies multiple influences that hinder especially clinical research with patients.

Thanks to encouraging scientific results, interest in the field of psychoneuroimmunology has grown over the last few years with regard to basic and clinical research, including therapeutic studies. The growing number of scientific groups in the field reflects this growing interest.

Therefore, the editors decided to prepare a more or less representative overview of the current activities in the field by asking internationally established scientists and junior researchers from experienced groups to contribute a chapter reflecting their current research. Practically, all scientists we addressed agreed to write a chapter.

One of the scientific platforms of psychoneuroimmunological research in the field of psychiatry is the section “Immunology in Psychiatry” of the World Psychiatric Association (WPA), which was founded in the early 1990s by Manfred Ackenheil from Germany, Oakley Rey from the USA and Costas Stefanis from Greece. Many of the contributors to this book are active members in the section, which regularly organizes workshops, symposia and lectures at WPA congresses and co-organizes many additional meetings and research activities. The editors of this book, Aye-Mu Myint (secretary of the section), Markus J. Schwarz (past secretary) and Norbert Müller (chair), therefore dedicate their contributions to the WPA section “Immunology in Psychiatry.”

The editors cordially thank all authors of this book for the tremendous work they have invested and the publisher Springer for their help and support. Furthermore, we thank Richard Kostrzewa, the editor of the series, for the inspiration for this book and Karin Koelbert for her help with handling the manuscripts. We think we have succeeded in assembling a representative overview of the current state of psychoneuroimmunological research in the field of psychiatry and related topics.

Munich, Germany

Norbert Müller
Aye-Mu Myint
Markus J. Schwarz

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About the Editors

Norbert Müller After studies of psychology and medicine, Dr. Müller was trained in psychiatry, psychotherapy and neurology at the University Hospital of the Ludwig-Maximilians-University in Munich. He did research in the field of psychoneuroimmunology since 1983, primarily in schizophrenia, affective disorders and Tourette's syndrome. The research focused on pathophysiological aspects and on therapy with anti-inflammatory compounds. Since 2000, he is Professor of Psychiatry, at the department of Psychiatry and Psychotherapy, LMU Munich. He was president of the German Society of Biological Psychiatry and member of the executive committee and treasurer World Federation of Societies of Biological Psychiatry (WFSBP), since 2006 he was chair of the section "Immunology in Psychiatry" of the World Psychiatric Association (WPA). He won several honours and scientific awards including the Emil-Kraepelin Research Award.

Dr. Aye-Mu Myint is a Medical Doctor and obtained her Ph.D. in Neuroscience from the University of Maastricht, The Netherlands and has done Habilitation in Experimental Psychiatry at Magdeburg University, Germany. She is working as visiting scientist at Ludwig-Maximilian University Munich, Germany since 2007 as well as senior research scientist at Advanced Practical Diagnostics bvba (apDia), Belgium since 2006. She is also an honorary assistant professor at the School for Mental Health and Neuroscience from Maastricht University. In 2003, she proposed the "neurodegeneration" hypothesis explaining the neurotoxic changes induced through the involvement of immune system imbalance and imbalance of the kynurenine metabolites beyond the activity of tryptophan pathway. She is one of the leading scientists in the field of neuroscience and psychiatry, and is working on major psychiatric disorders, depression-dementia link, psychoneuroimmunology, kynurenine pathway, and related neuroendocrinology in clinical settings as well as animal and in vitro models of depression, schizophrenia, and neurodegenerative disease. She is also involved in antibodies and immunoassay developments through EU consortia. Outside the EU consortium, she has collaborations with several universities including the University of New South Wales, Australia, and the Universities of Chicago, Illinois, and John Hopkins of the United States.