POST-TRAUMATIC STRESS DISORDER

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BASIC SCIENCE AND CLINICAL PRACTICE

Edited by

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Preface

Post-traumatic stress disorder or PTSD is a psychiatric condition that can occur in anyone who has experienced a life-threatening or violent event. The trauma can be due to war, terrorism, torture, natural disasters, accidents, violence, or rape. PTSD was once associated exclusively with military service and characterized by the terms “shell shock” and “battle fatigue.” However, now it is recognized that PTSD can occur in any traumatic situation and can afflict children as well as adults. Studies across cultures, languages, and races suggest that PTSD is a universal response to exposure to traumatic events.

In the U.S. population, the prevalence rate of PTSD is approximately 8%, with the rate for women more than twice that for men (1). In the aftermath of Hurricane Katrina, the prevalence of PTSD in the New Orleans metro area (hardest hit by the hurricane) was 30.3% compared to 12.5% in the remainder of the hurricane area (2). Among U.S. military personnel, a study (3) found that during the 1991 Gulf War symptoms of PTSD were evident in 6.2% of the deployed troops versus 1.1% of the nondeployed peers. Importantly, 10 years later the rate of PTSD among deployed veterans (Operation Enduring Freedom-Operation Iraqi Freedom; OEF-OIF) was three times higher than in the nondeployed peers. In the Iraq War, a U.S. Army study found that 12.9% of the soldiers suffered from PTSD (4). Not all individuals exposed to a life-threatening event develop PTSD, indicating significant individual differences in coping with the stressful event. However, prior history of trauma may increase the risk for PTSD (5), suggesting an additive effect of stress.

The brain’s response to trauma and stress, also termed the “fight-or-flight” response, was first described by Walter Cannon in 1915 (6). Its purpose is to mobilize the body to action and protect us from danger. The cascade of chemicals unleashed during a fight-or-flight response acts on specific brain regions, in particular the hippocampus and amygdala, which are parts of the limbic system related to emotion, memory, and cognition. The amygdala is especially vulnerable because it is here that a fearful association of the event is processed and stored.

Individuals with PTSD have memories of the event that they relive again and again (i.e., flashbacks, nightmares, preoccupation with thoughts or images of the events of war); they avoid people and places associated with the trauma, becoming distressed at cues or reminders of the experience (e.g., the anniversary of the event); and they are hyperaroused (difficulty sleeping, trouble concentrating, hypervigilant).

In the past few years, there has been a tremendous growth in our understanding of PTSD. Relevant brain areas have been identified; there are animal models to study the disease; there are sound evaluation methods; and large-scale clinical trials are under way to examine the effectiveness of psychological and pharmacological treatments. In this text, we have invited experts to review the current state of knowledge regarding PTSD, including treatment strategies, both pharmacological and psychological. The collection of reviews in this book covers epidemiological findings, neurobiology and neurophysiology, brain imaging, and treatment strategies.

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About the Editors

P. J. Shiromani, Ph.D., is an associate professor of neurology at Harvard Medical School and senior research scientist at the VA Boston Healthcare System, where he is the director of the Molecular Sleep Laboratory. Dr. Shiromani's research identifies the neural circuitry underlying sleep and wakefulness and how the brain shifts between states of consciousness. He has pioneered the use of molecular tools to identify key neurons regulating sleep. His current research effort uses gene transfer to rescue the neurodegenerative sleep disorder narcolepsy. In recognition of his research, he has received the Young Investigator Award from the Sleep Research Society. He is the author of more than 100 research articles in leading scientific journals. His research has been supported by the National Institutes of Health (NIH) and by the Veterans Administration. He has served as chair of an NIH review group and as a regular member of several NIH review groups. He was the first editor of the *Sleep Research Society Bulletin*.

Terence M. Keane, Ph.D., is associate chief of staff for research and development, VA Boston Healthcare System; director, National Center for PTSD, Behavioral Sciences Division; professor and vice chair of research and psychiatry, Boston University School of Medicine. He is recognized internationally as a leading expert on trauma and PTSD, authoring numerous books and research articles in peer-reviewed journals.

Joseph E. LeDoux, M.D., is university professor and Henry and Lucy Moses Professor of Science, New York University; director, Center for the Neuroscience of Fear and Anxiety; and director, Emotional Brain Institute. He is the author of hundreds of research articles in scholarly journals and books (*The Emotional Brain*, Simon & Schuster; and *Synaptic Self*, Viking Press). LeDoux's work focuses on the study of the neural basis of emotions, especially fear and anxiety. Central to emotional processing is the amygdala, a brain area that LeDoux and his collaborators study extensively. Using an array of methods, including neuroanatomical, electrophysiological, neurochemical, molecular, and behavioral approaches, he has contributed to the understanding of emotional learning and memory. For more information, visit www.cns.nyu.edu/ledoux. Over the course of his career, LeDoux has received a number of awards, including the Fyssen Foundation International Prize, the Hoch Award, the Jean-Louis Signoret Prize, and consecutive MERIT Awards and Research Scientist Awards from the American National Institute of Mental Health. LeDoux sits on the editorial board of several journals and has given the Society for Neuroscience Presidential Lecture. He is a Fellow of the American Association for the Advancement

of Science, a Fellow of the New York Academy of Sciences, and a Fellow of the American Academy of Arts and Sciences. LeDoux is also a member of the Amygdaloids, a band of scientists who play original songs about mind and brain and mental disorders, the lyrics of which are often inspired by his research. Since the Amygdaloids formed in 2006, they have played at Madison Square Garden, the John F. Kennedy Center, the 92nd Street Y, and numerous rock clubs in New York City. Their first CD, *Heavy Mental*, was released in 2007, and they are working on a second CD tentatively titled *Brainstorm*. Information about the band is available at www.cns.nyu.edu/ledoux/amygdaloids and at www.myspace.com/amygdaloids.

Contents

Preface.....	v
About the Editors	vii
Contributors	xi
1 Post-Traumatic Stress Disorder: Definition, Prevalence, and Risk Factors	1
<i>Terence M. Keane, Brian P. Marx, and Denise M. Sloan</i>	
Amygdala and Fear	
2 The Amygdala and the Neural Pathways of Fear.....	23
<i>Jacek Dębiec and Joseph LeDoux</i>	
3 Physiology of the Amygdala: Implications for PTSD	39
<i>Donald G. Rainnie and Kerry J. Ressler</i>	
4 Counteracting Molecular Pathways Regulating the Reduction of Fear: Implications for the Treatment of Anxiety Diseases	79
<i>Andre Fischer and Li-Huei Tsai</i>	
5 Memory in PTSD: A Neurocognitive Approach	105
<i>Mieke Verfaellie and Jennifer J. Vasterling</i>	
Animal Models of Post-Traumatic Stress Disorder	
6 Toward Animal Models of Post-Traumatic Stress Disorder	133
<i>Hagit Cohen and Gal Richter-Levin</i>	
7 PTSD: From Neurons to Networks.....	151
<i>Rajnish P. Rao, Aparna Suvrathan, Melinda M. Miller, Bruce S. McEwen, and Sumantra Chattarji</i>	
Post-Traumatic Stress Disorder and Arousal	
8 Arousal Neurons in the Brain	187
<i>Priyattam J. Shiromani and Carlos Blanco-Centurion</i>	
9 Hyperarousal and Post-Traumatic Stress Disorder: A Role for the Hypocretin System	201
<i>Matt Carter and Luis de Lecea</i>	

10	The Locus Coeruleus-Noradrenergic System and Stress: Implications for Post-Traumatic Stress Disorder	213
	<i>Craig W. Berridge</i>	
11	Effect of Stress on Sleep and Its Relationship to Post-Traumatic Stress Disorder.....	231
	<i>L. D. Sanford and X. Tang</i>	
Stress Hormones in Post-Traumatic Stress Disorder		
12	Stress Hormones and PTSD	257
	<i>Rachel Yehuda</i>	
13	Low Basal Cortisol and Startle Responding as Possible Biomarkers of PTSD: The Influence of Internalizing and Externalizing Comorbidity	277
	<i>Mark W. Miller, Erika J. Wolf, Laura Fabricant, and Nathan Stein</i>	
Brain Imaging in Post-Traumatic Stress Disorder		
14	Functional Neuroimaging in Post-Traumatic Stress Disorder	297
	<i>Israel Liberzon and Sarah N. Garfinkel</i>	
15	The Amygdala in Post-Traumatic Stress Disorder	319
	<i>Lisa M. Shin</i>	
Treatment Strategies		
16	Pharmacologic Treatment of PTSD.....	337
	<i>Murray A. Raskind</i>	
17	Guided Imagery as a Therapeutic Tool in Post-Traumatic Stress Disorder	363
	<i>Jennifer L. Strauss, Patrick S. Calhoun, and Christine E. Marx</i>	
18	Virtual Reality Exposure Therapy for Combat-Related PTSD.....	375
	<i>Albert Rizzo, Greg Reger, Greg Gahm, JoAnn Difede, and Barbara O. Rothbaum</i>	
	Index	401

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