

- Essential PsychopharmaStahlogy -

Symptoms and Circuits

Deconstructing psychiatric disorders to achieve remission

Stephen M. Stahl

Adjunct Professor of Psychiatry, UCSD
Editor-in-Chief

Meghan Grady

NEI Staff Writer

A new conceptualization of the biological basis of psychiatric disorders has been forming—namely, the idea of “symptoms and circuits.”¹⁻³ Rather than diagnose and treat a psychiatric syndrome, clinicians can deconstruct these disorders into symptoms and then match those individual symptoms to hypothetically malfunctioning neuronal circuits.

Our current understanding of the association between certain

psychiatric symptoms and brain regions is demonstrated in Tables 1 through 5. In addition, key neurotransmitter projections for brain regions associated with emotionality are shown in Figure 1, while key neurotransmitter projections for brain regions associated with somatic symptoms are shown in Figure 2, those associated with cognition are shown in Figure 3, and those associated with sleep are shown in Figure 4.

Figure 1. Projections to “Emotional” Brain Centers

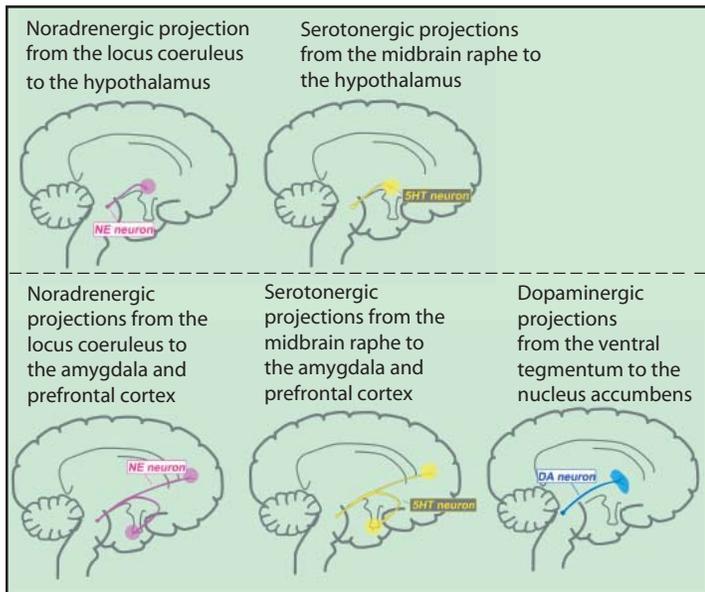


Figure 2. Projections to “Somatic” Brain/CNS Centers

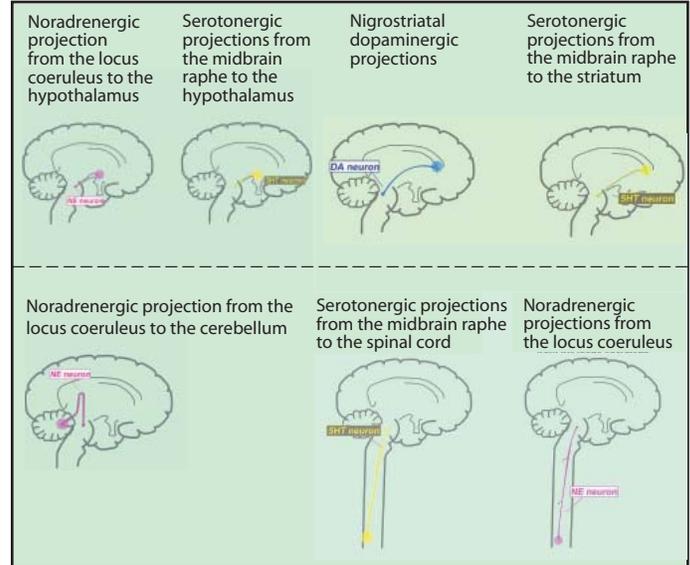


Figure 3: Projections to “Cognitive” Brain Centers

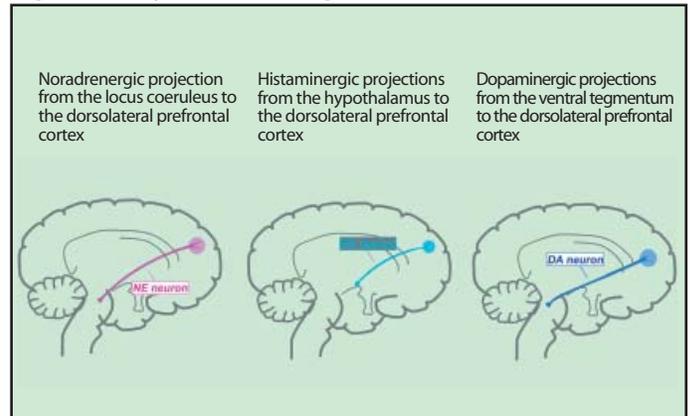


Figure 4: Projections to “Sleep” Brain Centers

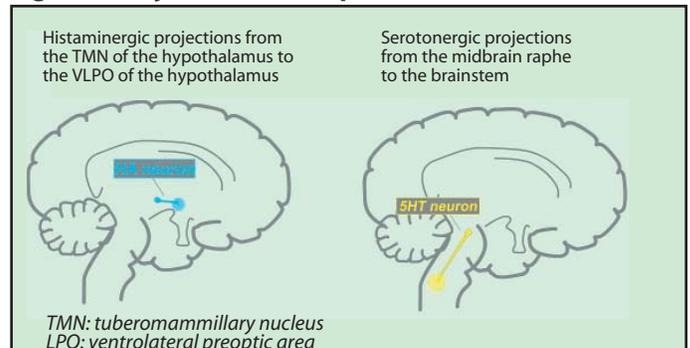


Table 1: “Emotional” Brain Centers¹

Brain Area	Associated Symptom(s)
Medial prefrontal cortex	Depressed mood, guilt, feeling worthless, suicidality
Anterior cingulate cortex	Depressed mood, guilt, feeling worthless, suicidality
Orbital prefrontal cortex	Depressed mood, guilt, feeling worthless, suicidality
Amygdala	Guilt, feeling worthless, suicidality
Nucleus accumbens	Loss of pleasure, feeling worthless, guilt, suicidality
Hypothalamus	Loss of pleasure

Table 2: "Anxious" Brain Centers ²	
Brain Area	Associated Symptom(s)
Medial and orbital prefrontal cortex	Panic, phobia, anxious misery, apprehension, obsessions
Amygdala	Panic, phobia, re-experiencing
Striatum	Anxious misery, apprehension, obsessions
Thalamus	Anxious misery, apprehension, obsessions
Hippocampus	Re-experiencing
Brainstem areas	Autonomic responses

Table 3: "Cognitive" Brain Centers ^{1,2,4,5}	
Brain Area	Associated Symptom(s)
Dorsolateral prefrontal cortex	Problems concentrating, mental fatigue, executive dysfunction
Hippocampus	Problems with declarative memory
Amygdala	Problems with procedural memory
Cerebellum	Problems with procedural memory
Motor cortex	Problems with procedural memory

Table 4: "Somatic" Brain/CNS Centers ¹⁻²	
Brain Area	Associated Symptom(s)
Hypothalamus	Weight change
Striatum	Physical fatigue, psychomotor agitation/retardation
Cerebellum	Physical fatigue, psychomotor agitation/retardation
Spinal cord	Physical fatigue, pain

Table 5: "Sleep" Brain Centers ¹⁻²	
Brain Area	Associated Symptom(s)
Hypothalamus	Sleep disturbance
Brainstem sleep centers	Sleep disturbance

The Bottom Line—The concept of symptoms and circuits may have implications beyond helping to explain the biological basis of symptoms in psychiatric disorders. It may also allow clinicians to base treatment on the specific symptom profile of each patient, rather than select the same treatment for every patient with a particular disorder, since symptoms are associated with divergent parts of the brain and different neurotransmitters project to each of those brain regions. Ultimately, this may optimize the chances of achieving remission of all symptoms and improve patient outcomes. ♣

References

1. Stahl SM. J Clin Psychiatry 2003;64(11):1282-3.
2. Stahl SM. J Clin Psychiatry 2003;64(12):1408-9.
3. Stahl SM. J Clin Psychiatry 2004;65(1):8-9.
4. Brewin et al. Behav Res Ther 2001;39(4): 373-393.

PsychEd Up Staff

Editor-in-Chief

Stephen M. Stahl

Managing Editor

Gerardeen Santiago

Publication Editor

Auriana Albert

NEI Staff Writers

Katherine J. Carpenter

Meghan Grady

Eleanor Roberts

Jennifer Stahl

Arbor Scientia Staff Writer

Darius Shayegan

Design Artists

Donny Carpio

Elizabeth Kim

Illustrators

Nancy Muntner

Contact Information

5857 Owens Avenue, Suite 102

Carlsbad, CA 92008

Tel: (760) 931-8857

Fax: (760) 931-8713

E-mail: psychedup@neiglobal.com

URL: www.neiglobal.com

Publication Information

PsychEd Up—ISSN:1553-8907 (print), 1553-8915 (online)—is published monthly by NEI Press. Copyright © 2005, NEI Press. All rights reserved. No part of this publication may be reproduced or transmitted, in any form, by any means, without the prior written permission of NEI Press.

The opinions expressed in this publication are those of contributing authors and do not necessarily reflect the views of NEI Press. NEI Press will not assume responsibility for damages, losses, or claims of any kind, including direct or consequential damages, arising from or related to the information contained in this publication, including any claims related to the products, drugs, or services mentioned herein. Doctors recommending and patients using drugs based on information in this publication are strongly advised to pay careful attention to and consult information provided by the manufacturer of any drugs they plan to recommend and/or use.

Additionally, every effort has been made in preparing this publication to provide accurate and up-to-date information in accord with accepted standards and practice at the time of publication. Nevertheless, the psychopharmacology field is evolving rapidly. The authors, editors, and NEI Press therefore (i) make no warranties that the information contained herein is totally free from error, not least of which because clinical standards are constantly changing through research and regulation, and (ii) disclaim any responsibility for the continued currency of this information.