

Re: *Psychiatry, Psychoanalysis, and the New Biology of Mind* by Eric R. Kandel
Washington, DC: American Psychiatric Publishing, 2005. X1 + 414 pp.

Eric Kandel is the first American psychiatrist to win the Nobel prize in physiology or medicine. His book consists of eight chapters. Each chapter includes a previously published article by Kandel with a commentary on the article by one of eight commentators, only one of whom is a psychoanalyst. The theme of the book is the research done by Kandel and how his research can improve the training and practice of psychoanalysis. His research focuses on the molecular basis of synaptic plasticity in the central nervous system and on the relationship of this plasticity to cognitive function. He opened up the study of long-term synaptic plasticity and its relationship to learning and memory storage.

In Chapter 1, *Psychotherapy and the Single Synapse: The Impact of Psychiatric Thought on Neurobiologic Research*, Kandel explains that the long-term efficacy of synaptic connections is played on by environmental effects such as learning. What learning accomplishes in the instances studied is to alter the effectiveness of preexisting pathways, thereby leading to the expression of new patterns of behavior. He believes the ability to learn from experience is certainly the most remarkable aspect of human behavior.

Judith Rappaport writes of the first chapter *Psychotherapy and the Single Synapse* “this article presents a lucid, remarkably timely review of advances in understanding the impact of experience on biological structure and function.” (p. 1)

In Chapter 2, *A New Intellectual Framework for Psychiatry*, Kandel writes that by 1960 psychoanalytically oriented psychotherapy had become the prevailing model for understanding all mental and some physical illnesses. He believes there was a drift away from biology due to the slow maturation of the brain sciences.

According to Kandel, the initial separation of psychoanalysis from neural science advocated by Freud was stimulated by the realization that a merger was premature. In the 1960's, rather than being seen as premature, the merger of psychoanalysis and biology was seen as unnecessary because neural science was increasingly considered irrelevant. As a group psychoanalysts devalued experimental inquiry.

The unease of social scientists with biology derives in part from two misapprehensions (not unique to social scientists): first, that biologists think that biological processes are strictly determined by genes, and second, that the sole function of genes is the inexorable transmission of hereditary information from one generation to another. These profoundly wrong ideas led to the notion that invariant, unregulated genes, not modifiable by external events, exert an inevitable influence on the behavior of individuals and their progeny. In this view, social forces as such have little influence on human behavior. They are powerless in the face of the predetermined, relentless actions of the genes.

Kandel points out that in studying the specific changes that underlie persistent mental states, normal as well as disturbed, we should also look for altered gene expression. Development, stress, and social experience are all factors that can alter gene expression by modifying the binding of transcriptional regulators to each other and to the regulatory regions of genes.

Kandel believes that psychoanalysis has lacked any semblance of a scientific foundation. It has lacked a scientific tradition, a questioning tradition based not only on imaginative insights but on creative and critical experiments designed to explore, support, or, as is often the case, falsify those insights.

About this chapter, Thomas Insel comments that Kandel “notes the need to enhance psychiatric training with neuroscientific expertise and describes the importance of biology for a comprehensive understanding of mental processes.” (p. 27)

In Chapter 3, *Biology and the Future of Psychoanalysis*, Kandel writes that Freud wrote in “On Narcissism” (1914) “that we must recollect that all of our provisional ideas in psychology will presumably one day be based on an organic substructure.” (p. 78) Kandel goes on to critique psychoanalysis by stating that psychoanalysis has not evolved objective methods for testing the exciting ideas it had formulated earlier. He claims that this is regrettable, since psychoanalysis represents the most coherent and intellectually satisfying view of the mind. Kandel writes that psychoanalysis may reenergize itself by a closer relationship with cognitive neuroscience.

However, in support of psychoanalysis Kandel writes that in the early years, psychoanalysts could and did make many useful and original contributions to our understanding of the mind simply by listening to patients, or by testing ideas from the analytic situation in observational studies.

Kandel goes on to state that many ideas within psychoanalytic thought and its core methodology, free association, derive from the concept of psychic determinism (Kris 1982). He draws on the ideas of Brenner (1978) to say that the purpose of free association is to have the patient report to the psychoanalyst all thoughts that come to mind and to

refrain from exercising over them any degree of censorship or direction. According to Brenner, nothing happens by chance. Each psychic event is determined by the ones which precede it.

Kandel believes that we have in biology a good beginning of an understanding of how associations develop in procedural memory. (p. 74). He tells how during the first 2-3 years of life, when an infant's interaction with its mother is particularly important, the infant relies primarily on its procedural memory systems. He supports this theory drawing on Clyman (1991) who believes that infantile amnesia presumably occurs because of slow development of the declarative memory system.

Other examples of Kandel's research that come from neuroscience is that of Bruce McEwen and Robert Sapolsky (1995) who discovered that the increases in glucocorticoids which follow prolonged separation have adverse effects on the hippocampus. Kandel goes on to say psychoanalysts are beginning to learn about neural science and psychopharmacology, an exciting step forward, a step that should lead in the long run to a new curriculum for the analytic clinician. On the other hand, Kandel states that psychoanalysis is no longer thriving. This is due, he says, to the proliferation of different forms of short-term therapy (almost all of which derive from psychoanalysis), the emergence of pharmacotherapy, and the economic impact of managed care. He believes cognitive therapy has compelling objective evidence that now exists yet there is no compelling evidence outside subjective impressions that psychoanalysis works better than nonanalytically oriented therapy or placebo. "The failure of psychoanalysis to provide objective evidence that it is effective as a therapy can no longer be accepted" (p. 97) states Kandel.

Kandel goes on to critique psychoanalytic training. The psychoanalytic institutes must change from being vocational schools – guilds as it were – to being centers of research and scholarship. What drew so many of us to psychoanalysis in the late 1950s was its bold curiosity – its investigative zeal, he says..

In his commentary on Chapter 3 Arnold M. Cooper writes that “Kandel has provided a brief course in neurobiology for psychoanalysts in this remarkable paper filled with suggestions for future combined research. There is no question that another century of neuroscience will produce advances that seem unimaginable today, including a richer, more nuanced understanding of such human qualities as emotional responsiveness, unconscious mental processing, chronic resentment, self-damaging behavior, self-pity, persistent avoidance of loving and gratifying relationships and resistance to change.”

(p. 60)

In Chapter 4, *From Metapsychology to Molecular Biology: Explorations into the Nature of Anxiety*, Kandel notes that despite the importance of anxiety, little is known of its underlying cellular and molecular mechanisms.

Donald F. Klein writes in his commentary on this chapter that this important 1983 article by Kandel served as an icebreaker for more dedicated neuroscientific psychiatric study by addressing how animal models can yield insights, extending from behavioral to molecular levels, relevant to both experimental animals and humans. At the same time, Joseph LeDoux states that Kandel’s 1983 paper is important not because it solved the problems of pathological fear and anxiety, but because it suggested a strategy about how we might go about using what we know about the neural basis of learning and memory to gain insights into acquired fear and anxiety.

In Chapter 5, *Neurobiology and Molecular Biology: The Second Encounter*, Kandel states that “we are confronting in the nervous system some of the most difficult and profound problems in biology.” (p. 196) The nervous system is one of the last frontiers of biology and insight into its cellular and molecular mechanisms is likely to be particularly penetrating and unifying. As a commentary, Eric J. Nestler writes how in this article Kandel researched precisely how neural circuits produce complex behavior.

In Chapter 6, *Neural Science: A Century of Progress and the Mysteries that Remain*, Kandel says that Albright, Jessell, Kandel and Posner (2000) write that “neural science seeks to understand how the neural circuits that are assembled during development permit individuals to perceive the world around them; how they recall that perception from memory, and, once recalled, how they can act on the memory of that perception. Neural science also seeks to understand the biological underpinnings of our emotional life, how emotions color our thinking, and how the regulation of emotion, thought, and action goes awry in diseases such as depression, mania, schizophrenia, and Alzheimer’s disease.” (p. 203)

Kandel gives an explanation that the individual neurons that make up the brain work together in specialized groups, or systems, each of which serves a distinct function. Systems neuroscience is the study of these neural systems, which include those involved in vision, memory, and language.

He believes that perhaps the greatest unresolved problem in visual perception, in memory, and in all of biology resides in the analysis of consciousness and that two major issues lie at the heart of the study of consciousness 1) awareness of the sensory world and 2) volition, the voluntary control of thoughts and feelings.

In his commentary on *Neural Science* Steven E. Hyman says that “the work of Eric Kandel stands as an inspiration to psychiatry because it connects the experiential and biological levels of analysis with each other (Kandel 1998). This work suggests a forward path for an eventual understanding of the mechanisms by which psychiatric treatment - especially psychotherapy - might act.” (p. 199)

In Chapter 7, *The Molecular Biology of Memory Storage*, Kandel asks that we seek answers to important questions such as: How do different regions of the hippocampus and the medial temporal lobe interact in the storage of explicit memory? He says we know very little about the nature of recall of explicit memory, a recall that requires conscious effort.

In his commentary on this chapter Charles F. Zorumski writes that “the ability of an organism to modify its behavior based on experience is arguably the most important and fascinating property of the nervous system.” (p. 337)

In Chapter 8, *Genes, Brains, and Self-Understanding: Biology's Aspirations for a New Humanism*, Kandel relates that the revolution in genomics and in brain science will radically change the way we practice medicine. He believes that medicine will be transformed from a population-based to an individual-based medical science; it will become more focused on the individual and his or her predisposition to health and disease. Second, he believes that we will, for the first time, have a meaningful and nuanced biology of human mental processes and human mental disorders. He says “If we are successful in advancing this new humanistic agenda, the genomic revolution and the new insights into the biological nature of mind will not only enhance medical care but will also change fundamentally the way we view ourselves and one another.” (p. 376)

Commenting on this chapter John M. Oldham writes that “the potential for the new knowledge of the human genome to move us from a focus on populations at risk to the specific genetic vulnerabilities of an individual is exciting and increasingly real, paving the way for renewed and individualized emphasis on protective mechanisms and prevention.” (p. 373)

In his conclusion, Kandel writes that ideally people at risk will know of their risk before the appearance of symptoms, so that their disease might at least be partially prevented through medical intervention. He says that it is very likely that during our lifetime brain imaging will succeed in resolving these unique differences of our brain, and we will then have a biological foundation for the individuality of our mental life. He says then we will have a powerful new way of diagnosing behavioral disorders and evaluating the outcome of treatment including the outcome of psychotherapy.

He also believes that in view of our progress in the biological understanding of mental disorders, we can ask, is the attempt to evaluate psychotherapy in biological terms still a profitable endeavor? He asks this because our experience has made it clear that drugs alone are often not sufficient treatment. Some patients do better when psychotherapy is combined with drugs, while other patients do reasonably well with psychotherapy alone. Because of this, Kandel says we may now be able to describe with some rigor the metabolic changes in the brain that result from drug therapy and those that result from psychotherapy.

Kandel believes that the goal for the next decade is twofold: first, we need to determine how specific combinations of genes give rise to altered brain anatomy that results in mental illness by increasing vulnerability to specific social and environmental

experiences. Second, we need to see how drugs and psychotherapy can complement one another in the treatment of mental disorders. With this agenda, Kandel writes, the new biology of mind will assume its ascribed role as the natural bridge between the humanities, which is concerned with the nature of human existence, and the natural sciences, which are concerned with the nature of the physical world. Further, he believes that in the next half century great universities will be judged by how successfully they make that bridge and how much they contribute to our understanding of the human mind. He expresses the hope that psychiatry and psychoanalysis will be central contributors to this historic effort to understand the mind.

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