What's in a Name? Psychosomatic Medicine and Biobehavioral Medicine

This issue marks the 70th anniversary of the founding of *Psychosomatic Medicine.* It is also the inaugural issue for adding, *Journal of Biobehavioral Medicine* as our new subtitle. Why, after 70 years of successful publication, does our journal now have a subtitle? Why was this particular subtitle chosen? And what does this change mean for the future of the journal?

In their introductory editorial in January 1939 (1), Helen Flanders Dunbar and her associate editors[1] noted that "psychosomatic medicine" was a new term that was not yet well known in the medical community. They expressed concern that it could lead to misconceptions and misunderstandings unless it was clearly defined. They defined it as the study of the ". . . interrelation [of] the psychological and physiological aspects of all normal and abnormal bodily functions . . .." They rejected mind-body dualism in psychosomatic medicine, asserting that ". . . the complex neurophysiology of mood, instinct, and intellect differs from other physiology in degree of complexity, but not in quality," and that ". . . psychic and somatic phenomena take place in the same biological system and are probably two aspects of the same process . . .."

The contents of the first issue of *Psychosomatic Medicine* reflected this perspective, and today's readers would find that some of the articles in that issue concerned surprisingly contemporary topics.[2] For example, it included an article on the role of hostility in essential hypertension (2) and a review of experimental research on the structure and functions of the hypothalamus (3). Thus, from its very beginning, *Psychosomatic Medicine* has been publishing articles on the roles of the central and peripheral nervous systems, and of psychological, behavioral, and social variables, in the development and progression of cardiovascular disease, diabetes, obesity, cancer, and other serious medical conditions.

While rejecting mind-body dualism, the original editors embraced two other kinds of dualism. One of them pertained to the types of medical conditions and outcomes that were considered to be within the field's and the journal's domain. In addition to papers on relatively "hard" medical outcomes, such as cardiovascular disease, early volumes also included articles on "soft" outcomes, such as conversion hysteria and functional gastrointestinal complaints (4). In the ensuing years, many other papers also focused on similar problems, such as chronic pain, somatoform disorders, and unexplained somatic symptoms, such as chronic fatigue (5).

The other kind of dualism concerned the psychiatric and psychological factors that were thought to be plausible explanations for the outcomes of interest. Some were observable phenomena, or at least were measurable via self-report questionnaires, psychophysiological instruments, human or animal experiments, or other objective techniques; were reasonably familiar to nonpsychiatric physicians and laypeople; and could be readily described in common sense terms. Examples included factors, such as hostility (2), frustration (6), tension (7), depression (7), and various types of overt behavior (8). Others were unobservable psychoanalytic constructs that were more obscure for nonpsychiatrists, such as intrapsychic conflict (9), oral dependence (10), and hypertrophied conscience (11).

Over the years since our founding, the relatively soft and obscure strands of psychosomatic medicine have, unfortunately, helped to foster some of the misconceptions and misunderstandings that our founders hoped to prevent. The term "psychosomatic" has acquired a variety of meanings, and some of them are quite negative. For example, a 1994 survey of newspapers in the United States and the United Kingdom found that, out of 215 articles in which the word "psychosomatic" was mentioned, 34% used it in a stigmatizing, pejorative manner; it often connoted a symptom or condition that was considered to be imaginary, unimportant, malingered, or due to a character flaw (12). "Psychosomatic" also carries negative connotations for many laypeople (13) as well as for many physicians and nurses (14,15), especially in some countries and cultures. In addition, psychosomatic complaints figure prominently in a substantial proportion of the clinical encounters with which many physicians would rather not have to contend, i.e., those with "difficult patients," "frequent attenders," and "excessive utilizers" (15–23). Some patients who are dismissed as presenting baseless psychosomatic complaints, actually have unrecognized medical conditions, such as hypothyroidism (24), but this fact does little to burnish the image of psychosomatic disorders among physicians.

Regardless of the negative reactions that these phenomena may elicit from some quarters, they continue to have a substantial impact on patients' quality of life and on their patterns of healthcare utilization (25,26). We still publish some of the best articles on somatoform disorders, chronic fatigue syndrome, chronic pain, etc. (24,27,28), and will continue to do so. In recent years, however, interest in these disorders has been eclipsed by "hotter" topics, in terms of the manuscripts we receive, the ones we publish, and the ones that have the highest impact. For example, we have published numerous articles on the genetic substrates of psychological phenotypes,

[1]Franz Alexander (Associate Editor for Psychoanalysis), Dana W. Atchley (Internal Medicine), Stanley Cobb (Neurology), Hallowell Davis (Physiology), Clark L. Hull (Psychology), Howard S. Liddell (Comparative Physiology), Grover F. Powers (Pediatrics), and Theodore P. Wolfe (Reviews). In addition to serving as the first Editor-in-Chief of *Psychosomatic Medicine*, Dr. Dunbar was one of the founders of the American Psychosomatic Society, the journal's owner.

[2]The full text of every issue of *Psychosomatic Medicine,* dating back to January 1939, is available online at www.psychosomaticmedicine.org.

DOI: 10.1097/PSY.0b013e3181954848

0033-3174/09/7101-0001

such as anger, stress, and depression and their relationships with cardiovascular disease (29–34); on psychoneuroimmunological factors in medical illness (35–49); and on neuroimaging studies of depression and other health-related manifestations of affective dysregulation (50–52). Some of the most frequently cited articles that have been published in this journal in recent years concern depression, hostility, or hopelessness as predictors of medical morbidity and mortality in heart disease, diabetes, or cancer (53–59).

During the tenure of our current Editor-in-Chief, one of our goals has been to increase the journal's impact and readership among nonpsychiatric physicians and scientists. Unfortunately, the negative attitudes about most psychosomatic phenomena that pervade the medical community have been a significant impediment to achieving this goal. We have had, for example, informal discussions with a number of nonpsychiatric physicians who have never read this journal or who have never even heard of it. When asked to guess what sorts of articles we publish, most of the answers have focused on somatoform disorders, difficult patients, excessive healthcare utilization, etc.

Consequently, we decided to conduct a more systematic survey of faculty physicians at two university medical centers in the United States. The survey provided the respondents with a list of some of the most highly cited articles from recent volumes of the journal, most of which had little or nothing to do with somatoform disorders, difficult patients, or excessive utilization of health services. We then provided a list of three possible titles for a journal that publishes such articles and asked, "In your opinion, which of the following titles would best fit a journal that publishes this type of research? Please rank each title 1, 2, or 3 in order of your preference." The titles, in the order they were most frequently ranked, were *Biobehavioral Medicine, Biopsychosocial Medicine*,[3] and *Psychosomatic Medicine.*

Around the same time, specialists in consultation-liaison psychiatry decided to change the name of their field to psychosomatic medicine, and psychosomatic medicine was designated by the American Board of Neurology and Psychiatry as an official psychiatric subspecialty.[4] Psychiatrists are one of our core constituencies, but *Psychosomatic Medicine* is a multidisciplinary journal rather than one that identifies primarily with the psychiatric subspecialty of psychosomatic medicine (in contrast to *Psychosomatics*, the official journal of the Academy of Psychosomatic Medicine). Furthermore, there is considerable overlap between the interests of subspecialists in psychosomatic medicine and the contents of *Psychosomatic Medicine*, but they are not completely identical.

The results of our survey, and the elevation of psychosomatic medicine to the status of an official subspecialty, prompted us to consider changing the title of the journal, or, alternatively, keeping the title but adding a new subtitle. It is not easy to change the title of a scientific journal, especially one that has been in existence for decades. Even if a new title might be more fitting than the old one, changing it can have adverse consequences. If implemented too abruptly, such a change could, for example, offend some of the journal's most loyal subscribers and contributors, and it could cause a temporary decrease in the journal's impact factor. With that in mind, the editors recently proposed to give *Psychosomatic Medicine* a subtitle, *Journal of Biobehavioral Medicine*, rather than replacing the former with the latter, at least for now.

"Biobehavioral" is defined in Merriam-Webster's Medical Dictionary as: "of, relating to, or involving the interaction of behavior and biological processes," and in the American Heritage Medical Dictionary as: "of or relating to the interrelationships among psychosocial, behavioral, and biological processes, as in the progression or treatment of a disease." It is not a new term; it appeared in the medical literature in the early 1970s (60,61), and possibly even before then. Since then, it has been used in numerous scientific articles pertaining to the roles of stress, emotion and mood, social isolation, behavioral patterns, personality traits, neurobehavioral structures and functions, genetic factors, and other psychosocial and behavioral characteristics in conditions such cardiovascular disease (62–72), cancer (73–75), smoking (76), aging (77–79), and HIV/AIDS (48,80). It tends to connote a focus on observable or measurable independent variables, on surrogate (e.g., transient arrhythmia) or hard (e.g., myocardial infarction) medical outcomes, and on behavioral (e.g., nonadherence) or biological (e.g., inflammatory) mediators. In short, it is the best available adjective for some of the best research we have been publishing, and for the kind of articles we want to attract.

After giving our proposal due consideration, the Council of the American Psychosomatic Society approved the new subtitle at their fall 2008 meeting. In doing so, they helped the Society's journal reach out to the broader medical community, better positioned us vis-à-vis the new subspecialty of psychosomatic medicine, and took an initial step toward reconciling the journal's identity with its 21st century content.

Some day in the not-too-distant future, this journal may no longer be called *Psychosomatic Medicine*. It may eventually become *Biobehavioral Medicine,* or perhaps *The Journal of Biobehavioral Medicine*. That is for a future Council to decide. But regardless of what this journal calls itself, it is, and it has been for the past 70 years, the world's premiere journal of biobehavioral medicine.

Note to Readers

We are interested in your reaction to our new subtitle, and in your thoughts on whether the journal's main title should remain the same or eventually be changed. Please e-mail your comments to PsychosomaticMedicine@gmail.com.

[3]After completing the survey, we learned that the Japanese Society of Psychosomatic Medicine had recently launched a journal named *Biopsychosocial Medicine.*

[4]Psychiatrists who subspecialize in psychosomatic medicine have expertise in the diagnosis and treatment of psychiatric disorders in "complex medically ill patients." This definition of medical illness includes conditions such as stroke, heart disease, and diabetes; somatoform disorders; and psychiatric syndromes that are due to the direct, physiological effects of a medical illness.

EDITORIAL

KENNETH E. FREEDLAND, PHD
Department of Psychiatry, Washington University School of Medicine, St. Louis, Missouri

ECO J. C. DE GEUS, PHD
Department of Biological Psychology, Vrije Universiteit, Amsterdam, Netherlands

ROBERT N. GOLDEN, MD
School of Medicine and Public Health, University of Wisconsin-Madison, Madison, Wisconsin

WILLEM J. KOP, PHD
Division of Cardiology, Department of Medicine, University of Maryland Medical Center, Baltimore, Maryland

GREGORY E. MILLER, PHD
Department of Psychology, University of British Columbia, Vancouver, British Columbia, Canada

VIOLA VACCARINO, MD, PHD
Division of Cardiology, Departments of Medicine and Epidemiology, Rollins School of Public Health, Emory University, Atlanta, Georgia

BABETTE BRUMBACK, PHD
Departments of Epidemiology and Biostatistics, University of Florida, Gainesville, Florida

MARIA M. LLABRE, PHD
Department of Psychology, University of Miami, Coral Gables, Florida

VICTORIA J. WHITE, MA
Division of Cardiology, Department of Medicine, Emory University, Atlanta, Georgia

DAVID S. SHEPS, MD, MSPH
Atlanta VA Medical Center, Division of Cardiology, Department of Medicine, Emory University, Atlanta, Georgia

REFERENCES

1. The Editors. Introductory statement. Psychosom Med 1939;1:3–5.
2. Saul LJ. Hostility in cases of essential hypertension. Psychosom Med 1939;1: 153–61.
3. Ingram WR. The hypothalamus: a review of the experimental data. Psychosom Med 1939;1:49–91.
4. Alexander F. Psychological aspects of medicine. Psychosom Med 1939;1:7–18.
5. Bartley SH. Conflict, frustration, and fatigue. Psychosom Med 1939;5:160–3.
6. Rosenzweig S. Frustration as an experimental problem. Psychosom Med 1939;1:199–200.
7. Rennie TAC, Howard JE. Hypoglycemia and tension-depression. Psychosom Med 1942;4:273–82.
8. Hamilton JA. Psychophysiology of blood pressure: I. Personality and behavior ratings. Psychosom Med 1942;4:125–33.
9. Weiss E. Cardiospasm: a psychosomatic disorder. Psychosom Med 1944; 6:58–70.
10. Alexander F. Note on psychoanalytic terms used in the following portion of this symposium. Psychosom Med 1939;1:138.
11. Katz LN, Leiter L. The present conception of "essential" hypertension: a physiological and clinical correlation. Psychosom Med 1939;1:101–17.
12. Stone J, Colyer M, Feltbower S, Carson A, Sharpe M. "Psychosomatic": a systematic review of its meaning in newspaper articles. Psychosomatics 2004;45:287–90.
13. Courts NF, Bartol GM. Psychosomatic: connotations for people who are neither nurses nor physicians. Clin Nurs Res 1996;5:283–93.
14. Elks ML. "I'm OK; you're not": medical socialization and psychosomatic illness. Med Hypotheses 1997;48:33–6.
15. Tylee A, Gandhi P. The importance of somatic symptoms in depression in primary care. Prim Care Companion J Clin Psychiatry 2005;7:167–76.
16. Reid S, Wessely S, Crayford T, Hotopf M. Medically unexplained symptoms in frequent attenders of secondary health care: retrospective cohort study. BMJ 2001;322:767.
17. Bellon JA, Fernandez-Asensio ME. Emotional profile of physicians who interview frequent attenders. Patient Educ Couns 2002;48:33–41.
18. Hahn SR, Thompson KS, Wills TA, Stern V, Budner NS. The difficult doctor-patient relationship: somatization, personality and psychopathology. J Clin Epidemiol 1994;47:647–57.
19. Jackson JL, Kroenke K. Difficult patient encounters in the ambulatory clinic: clinical predictors and outcomes. Arch Intern Med 1999;159:1069–75.
20. Simon JR, Dwyer J, Goldfrank LR. The difficult patient. Emerg Med Clin North Am 1999;17:353–70.
21. Ojascastro A. Upholding standards of care for difficult patients. Bioethics Forum 2000;16:17–21.
22. Elder N, Ricer R, Tobias B. How respected family physicians manage difficult patient encounters. J Am Board Fam Med 2006;19:533–41.
23. Ferrari S, Galeazzi GM, Mackinnon A, Rigatelli M. Frequent attenders in primary care: impact of medical, psychiatric and psychosomatic diagnoses. Psychother Psychosom 2008;77:306–14.
24. Dimsdale JE, Dantzer R. A biological substrate for somatoform disorders: importance of pathophysiology. Psychosom Med 2007;69:850–4.
25. Egan KJ, Katon WJ. Responses to illness and health in chronic pain patients and healthy adults. Psychosom Med 1987;49:470–81.
26. Kalaydjian A, Merikangas K. Physical and mental comorbidity of headache in a nationally representative sample of US adults. Psychosom Med 2008;70:773–80.
27. Bair MJ, Wu J, Damush TM, Sutherland JM, Kroenke K. Association of depression and anxiety alone and in combination with chronic musculoskeletal pain in primary care patients. Psychosom Med 2008;70:890–7.
28. Majer M, Welberg LA, Capuron L, Miller AH, Pagnoni G, Reeves WC. Neuropsychological performance in persons with chronic fatigue syndrome: results from a population-based study. Psychosom Med 2008; 70:829–36.
29. Scherrer JF, Xian H, Bucholz KK, Eisen SA, Lyons MJ, Goldberg J, Tsuang M, True WR. A twin study of depression symptoms, hypertension, and heart disease in middle-aged men. Psychosom Med 2003;65:548–57.
30. Wang X, Trivedi R, Treiber F, Snieder H. Genetic and environmental influences on anger expression, John Henryism, and stressful life events: the Georgia cardiovascular twin study. Psychosom Med 2005;67:16–23.
31. McCaffery JM, Frasure-Smith N, Dube MP, Theroux P, Rouleau GA, Duan Q, Lesperance F. Common genetic vulnerability to depressive symptoms and coronary artery disease: a review and development of candidate genes related to inflammation and serotonin. Psychosom Med 2006;68:187–200.
32. McCaffery JM, Snieder H, Dong Y, de Geus E. Genetics in psychosomatic medicine: research designs and statistical approaches. Psychosom Med 2007;69:206–16.
33. Elovainio M, Jokela M, Kivimaki M, Pulkki-Raback L, Lehtimaki T, Airla N, Keltikangas-Jarvinen L. Genetic variants in the DRD2 gene moderate the relationship between stressful life events and depressive symptoms in adults: cardiovascular risk in young Finns study. Psychosom Med 2007;69:391–5.
34. Vaccarino V, Lampert R, Bremner JD, Lee F, Su S, Maisano C, Murrah NV, Jones L, Jawed F, Afzal N, Ashraf A, Goldberg J. Depressive symptoms and heart rate variability: evidence for a shared genetic substrate in a study of twins. Psychosom Med 2008;70:628–36.
35. Benschop RJ, Geenen R, Mills PJ, Naliboff BD, Kiecolt-Glaser JK, Herbert TB, van der Pompe G, Miller GE, Matthews KA, Godaert GL, Gilmore SL, Glaser R, Heijnen CJ, Dopp JM, Bijlsma JW, Solomon GF, Cacioppo JT. Cardiovascular and immune responses to acute psychological stress in young and old women: a meta-analysis. Psychosom Med 1998;60:290–6.

36. Bower JE, Ganz PA, Aziz N, Fahey JL. Fatigue and proinflammatory cytokine activity in breast cancer survivors. Psychosom Med 2002;64:604–11.
37. Pasic J, Levy WC, Sullivan MD. Cytokines in depression and heart failure. Psychosom Med 2003;65:181–93.
38. Chen E, Fisher EB, Bacharier LB, Strunk RC. Socioeconomic status, stress, and immune markers in adolescents with asthma. Psychosom Med 2003;65:984–92.
39. Miller GE, Cohen S, Pressman S, Barkin A, Rabin BS, Treanor JJ. Psychological stress and antibody response to influenza vaccination: when is the critical period for stress, and how does it get inside the body? Psychosom Med 2004;66:215–23.
40. Cohen S, Doyle WJ, Turner RB, Alper CM, Skoner DP. Childhood socioeconomic status and host resistance to infectious illness in adulthood. Psychosom Med 2004;66:553–8.
41. Motivala SJ, Sarfatti A, Olmos L, Irwin MR. Inflammatory markers and sleep disturbance in major depression. Psychosom Med 2005;67:187–94.
42. Kop WJ, Gottdiener JS. The role of immune system parameters in the relationship between depression and coronary artery disease. Psychosom Med 2005;67(Suppl 1):S37–S41.
43. Miller GE, Rohleder N, Stetler C, Kirschbaum C. Clinical depression and regulation of the inflammatory response during acute stress. Psychosom Med 2005;67:679–87.
44. Redwine LS, Mills PJ, Hong S, Rutledge T, Reis V, Maisel A, Irwin MR. Cardiac-related hospitalization and/or death associated with immune dysregulation and symptoms of depression in heart failure patients. Psychosom Med 2007;69:23–9.
45. Kwaijtaal M, van der Ven A, van Diest R, Bruggeman CA, Bar FW, Calandra T, Appels A, Sweep FC. Exhaustion is associated with low macrophage migration inhibitory factor expression in patients with coronary artery disease. Psychosom Med 2007;69:68–73.
46. Glei DA, Goldman N, Chuang YL, Weinstein M. Do chronic stressors lead to physiological dysregulation? Testing the theory of allostatic load. Psychosom Med 2007;69:769–76.
47. Marsland AL, Gianaros PJ, Prather AA, Jennings JR, Neumann SA, Manuck SB. Stimulated production of proinflammatory cytokines covaries inversely with heart rate variability. Psychosom Med 2007;69:709–16.
48. Cole SW. Psychosocial influences on HIV-1 disease progression: neural, endocrine, and virologic mechanisms. Psychosom Med 2008;70:562–8.
49. Carrico AW, Antoni MH. Effects of psychological interventions on neuroendocrine hormone regulation and immune status in HIV-positive persons: a review of randomized controlled trials. Psychosom Med 2008;70:575–84.
50. Lane RD. Neural substrates of implicit and explicit emotional processes: a unifying framework for psychosomatic medicine. Psychosom Med 2008;70:214–31.
51. Frewen P, Lane RD, Neufeld RW, Densmore M, Stevens T, Lanius R. Neural correlates of levels of emotional awareness during trauma script-imagery in posttraumatic stress disorder. Psychosom Med 2008;70:27–31.
52. Critchley HD, Lewis PA, Orth M, Josephs O, Deichmann R, Trimble MR, Dolan RJ. Vagus nerve stimulation for treatment-resistant depression: behavioral and neural effects on encoding negative material. Psychosom Med 2007;69:17–22.
53. van Melle JP, de Jonge P, Spijkerman TA, Tijssen JG, Ormel J, van Veldhuisen DJ, van den Brink RH, van den Berg MP. Prognostic association of depression following myocardial infarction with mortality and cardiovascular events: a meta-analysis. Psychosom Med 2004;66:814–22.
54. de Groot M, Anderson R, Freedland KE, Clouse RE, Lustman PJ. Association of depression and diabetes complications: a meta-analysis. Psychosom Med 2001;63:619–30.
55. Frasure-Smith N, Lesperance F, Juneau M, Talajic M, Bourassa MG. Gender, depression, and one-year prognosis after myocardial infarction. Psychosom Med 1999;61:26–37.
56. Everson SA, Goldberg DE, Kaplan GA, Cohen RD, Pukkala E, Tuomilehto J, Salonen JT. Hopelessness and risk of mortality and incidence of myocardial infarction and cancer. Psychosom Med 1996;58:113–21.
57. Lesperance F, Frasure-Smith N, Talajic M. Major depression before and after myocardial infarction: its nature and consequences. Psychosom Med 1996;58:99–110.
58. Carney RM, Rich MW, Freedland KE, Saini J, teVelde A, Simeone C, Clark K. Major depressive disorder predicts cardiac events in patients with coronary artery disease. Psychosom Med 1988;50:627–33.
59. Barefoot JC, Dahlstrom WG, Williams RB Jr. Hostility, CHD incidence, and total mortality: a 25-year follow-up study of 255 physicians. Psychosom Med 1983;45:59–63.
60. Beck H. Minimal requirements for a biobehavioral paradigm. Behav Sci 1971;16:442–55.
61. Bell IR. A kinin model of mediation for food and chemical sensitivities: biobehavioral implications. Ann Allergy 1975;35:206–15.
62. Lown B. Sudden cardiac death: biobehavioral perspective. Circulation 1987;76:I186–I196.
63. Schneiderman N, Chesney MA, Krantz DS. Biobehavioral aspects of cardiovascular disease: progress and prospects. Health Psychol 1989;8:649–76.
64. Ahern DK, Gorkin L, Anderson JL, Tierney C, Hallstrom A, Ewart C, Capone RJ, Schron E, Kornfeld D, Herd JA. Biobehavioral variables and mortality or cardiac arrest in the cardiac arrhythmia pilot study (CAPS). Am J Cardiol 1990;66:59–62.
65. Kamarck T, Jennings JR. Biobehavioral factors in sudden cardiac death. Psychol Bull 1991;109:42–75.
66. Sloan RP, Bigger JT Jr. Biobehavioral factors in Cardiac Arrhythmia Pilot Study (CAPS). Review and examination. Circulation 1991;83(4 Suppl):II52–II57.
67. Williams RB Jr, Suarez EC, Kuhn CM, Zimmerman EA, Schanberg SM. Biobehavioral basis of coronary-prone behavior in middle-aged men. Part I: Evidence for chronic SNS activation in type As. Psychosom Med 1991;53:517–27.
68. von Kanel R, Mills PJ, Fainman C, Dimsdale JE. Effects of psychological stress and psychiatric disorders on blood coagulation and fibrinolysis: a biobehavioral pathway to coronary artery disease? Psychosom Med 2001;63:531–44.
69. Blumenthal JA, Sherwood A, Gullette EC, Georgiades A, Tweedy D. Biobehavioral approaches to the treatment of essential hypertension. J Consult Clin Psychol 2002;70:569–89.
70. Herd JA, Hoogwerf BJ, Barton F, Terrin ML, Czajkowski SM, Lindquist R, Dupuis G. Heart rate and blood pressure responses to mental stress and clinical cardiovascular events in men and women after coronary artery bypass grafting: the post coronary artery bypass graft (post-CABG) biobehavioral study. Am Heart J 2003;146:273–9.
71. Lindquist R, Dupuis G, Terrin ML, Hoogwerf B, Czajkowski S, Herd JA, Barton FB, Tracy MF, Hunninghake DB, Treat-Jacobson D, Shumaker S, Zyzanski S, Goldenberg I, Knatterud GL. Comparison of health-related quality-of-life outcomes of men and women after coronary artery bypass surgery through 1 year: findings from the POST CABG biobehavioral study. Am Heart J 2003;146:1038–44.
72. Williams RB. Psychosocial and biobehavioral factors and their interplay in coronary heart disease. Annu Rev Clin Psychol 2008;4:349–65.
73. Andersen BL, Kiecolt-Glaser JK, Glaser R. A biobehavioral model of cancer stress and disease course. Am Psychol 1994;49:389–404.
74. Andersen BL. Biobehavioral outcomes following psychological interventions for cancer patients. J Consult Clin Psychol 2002;70:590–610.
75. Lutgendorf SK, Lamkin DM, Jennings NB, Arevalo JM, Penedo F, Degeest K, Langley RR, Lucci JA III, Cole SW, Lubaroff DM, Sood AK. Biobehavioral influences on matrix metalloproteinase expression in ovarian carcinoma. Clin Cancer Res 2008;14:6839–46.
76. Pomerleau OF. Nicotine and the central nervous system: biobehavioral effects of cigarette smoking. Am J Med 1992;93:2S–7S.
77. Swan GE, LaRue A, Carmelli D, Reed TE, Fabsitz RR. Decline in cognitive performance in aging twins. Heritability and biobehavioral predictors from the National Heart, Lung, and Blood Institute twin study. Arch Neurol 1992;49:476–81.
78. Matthews KA, Kuller LH, Wing RR, Meilahn EN. Biobehavioral aspects of menopause: lessons from the healthy women study. Exp Gerontol 1994;29:337–42.
79. Steptoe A, Marmot M. Burden of psychosocial adversity and vulnerability in middle age: associations with biobehavioral risk factors and quality of life. Psychosom Med 2003;65:1029–37.
80. Schneiderman N. Behavioral medicine and the management of HIV/AIDS. Int J Behav Med 1999;6:3–12.