

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel and other significant contributors in the order listed on Form Page 2.  
Follow this format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME <b>Michael Ray Irwin</b>		POSITION TITLE <b>Professor of Psychiatry and Biobehavioral Sciences</b>	
eRA COMMONS USER NAME <b>IRWIN2</b>			
EDUCATION/TRAINING <i>(Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)</i>			
INSTITUTION AND LOCATION	DEGREE <i>(if applicable)</i>	YEAR(s)	FIELD OF STUDY
University of Pennsylvania	B.A.	1976	Biophysics
University of California, San Diego	M.D.	1981	Medicine
University of California, San Diego	Intern	1981-82	Medicine
University of California, Los Angeles	Resident	1982-85	Psychiatry

### A. Positions and Honors.

#### Professional Positions

1985-1991 Assistant Professor, Dept of Psychiatry, University of California, San Diego  
1991-1995 Associate Professor, Dept of Psychiatry, University of California, San Diego  
1985-1991 Associate Director, Clinical Center for Research on Alcoholism, San Diego VAMC, San Diego  
1991-2001 Director, Psychopharmacology Research Fellowship Training Program, UCSD  
1995-2001 Professor, Department of Psychiatry, University of California, San Diego  
2001-present Norman Cousins Professor, Semel Institute for Neuroscience & Human Behavior, UCLA

#### Grant Review Committees

1995-1998 NIMH Mental Health, AIDS, and Immunology II Review Panel  
1990-1992 NIH CRC Site Visit Review Committee  
1990-1991 VA Merit Review Ad Hoc Committee  
2001-2005 National Advisory Council Center for Complementary and Alternative Medicine (NCCAM)

#### Editorial Boards

1992-present Editorial Board, *Psychosomatic Medicine*; Associate Editor (1992-2002)  
1993-present Editorial Board, *Brain, Behavior and Immunity*, Associate Editor (2002-2006)  
2006-present Editorial Board, *Sleep*  
1993-1998 Consulting Editor, *Annals of Behavioral Medicine*

#### Awards and Other Professional Activities

1976 Honors, A.B. Magna cum laude, Univ. of Pennsylvania  
1987 Diplomate, American Board of Psychiatry  
1991 Early Career Award, American Psychosomatic Society  
1996-1999 Council Member, Psychoneuroimmunology Research Society  
1996-present Member, American College of Psychiatry  
1999-2001 President-Elect, President - Psychoneuroimmunology Research Society  
2000-2003 Council Member, American Psychosomatic Society  
2001-2003 Council Member, Academy Behavioral Medicine Research  
2001-present Member, National Advisory Council, Center for Complementary and Alternative Medicine  
2002-2004 President-Elect, President - Academy of Behavioral Medicine Research  
2004 Plenary Speaker, Nobel Conference "Inflammatory Reflex", Stockholm Sweden  
2005 Faculty Research Mentor Award, UCLA School of Medicine  
2007 Norman Cousins Research Award, Psychoneuroimmunology Research Society

### B. Selected Peer-Reviewed Publications (in chronological order, selected from over 200).

**Irwin M**, Caldwell C, Smith TL, Brown S, Schuckit MA, Gillin JC: Major depressive disorder, alcoholism, and reduced natural killer cell cytotoxicity: Role of severity of depressive symptoms and alcohol consumption. Archives of General Psychiatry, 47:713-719, 1990. Abstracted in: Digest of Neurology and Psychiatry 59:25, 1991; Abstracted in: Focus on Depression, 2:46, 1991.

**Irwin M**, Brown M, Patterson TL, Hauger R, Mascovich A, and Grant I: Elevated plasma levels of neuropeptide Y and reduced natural killer cell activity in depression and Alzheimer caregiver stress. FASEB Journal, 5:3100-3107, 1991.

**Irwin M**, Smith TL, and Gillin JC: Electroencephalographic sleep measures and natural killer activity in depressed patients and control subjects. Psychosom Med, 54:10-21, 1992.

- Murray DR, **Irwin M**, Rearden A, Ziegler M, Motulsky H, Maisel A. Sympathetic and immune interactions during dynamic exercise: mediation via a beta<sub>2</sub>-adrenergic dependent mechanism. Circulation, 86:203-213, 1992.
- Irwin M**: Central CRH and Interleukin 1-B suppress in vivo specific antibody responses. Endocrinol, 133:1352-1360, 1993.
- Irwin M**, Mascovich A, Gillin JC, Willoughby R, Pike J, Smith TL: Partial sleep deprivation reduces natural killer cell activity in humans. Psychosom Med, 56:493-498, 1994.
- Irwin M**, McClintick J, Costlow C, Fortner M, White J, Gillin JC: Partial night sleep deprivation reduces natural killer and cellular immune responses in humans. FASEB Journal, 10:643-653, 1996.
- Friedman EM, **Irwin MR**: Modulation of immune cell function by the autonomic nervous system. Pharmacol Ther, 74:27-38, 1997.
- Irwin M**, Thompson J, Miller C, Gillin JC, Ziegler J. Effects of sleep on catecholamine and cytokine levels in humans. J Clin Endocrinol Metab, 84:197-1985, 1999.
- Irwin M**, Artin KH, Oxman MN. Screening for depression in the older adult: criterion validity of the 10-item Center for Epidemiologic Studies (CES-D) Scale. Arch Intern Med, 159:15, 1701-1704, 1999.
- \* **Redwine L**, Hauger RL, Gillin JC, **Irwin M**: Effects of sleep and sleep deprivation on Interleukin-6, growth hormone, cortisol and melatonin levels in humans. J Clin Endocrinol Metab, 85:3597-3603, 2000.
- \* **Kuhlwein E**, **Irwin M**: Melatonin modulation of lymphocyte proliferation and Th1/Th2 cytokine expression. J Neuroimmunology, 117: 51-57, 2001.
- Irwin M**, Gillin JC, Dang J, Weissman J, Phillips E, Ehlers CL: Sleep deprivation as a probe of homeostatic sleep regulation in primary alcoholics. Biol Psychiatry, 51:632-641, 2002.
- \* **Redwine L.**, Snow S, Mills P, **Irwin M**. Acute psychological stress: Effects on chemotaxis and cellular adhesion molecule expression. Psychosomatic Med, 65:598-603, 2003.
- Irwin M**, Clark C, Kennedy B, Gillin JC, Ziegler M. Nocturnal catecholamines and immune function in insomniacs, depressed patients, and control subjects. Brain Behavior & Immunity, 17:365-372, 2003.
- \* **Irwin MR**, **Pike JL**, Cole JS & Oxman M. Effects of a behavioral intervention, Tai Chi Chih, on varicella zoster virus specific immunity & health functioning in older & at-risk adults. Psychosom Med, 65:824-30,2003.
- \* **Irwin M**, **Kuhlwein E** & Hauger R. Abnormal melatonin secretion and disordered sleep in abstinent alcoholics. Biological Psychiatry, 51:632-641, 2003.
- Lesperance F, Frasere-Smith N, Theroux P, **Irwin M**: Association between major depression, s-ICAM, interleukin-6, and CRP in patients with coronary artery disease. Am J Psychiatry, 161:271-277, 2004.
- \* **Redwine L**, Dang J, **Irwin M**: Cellular adhesion molecule expression, nocturnal sleep and partial night sleep deprivation. Brain Behavior & Immunity 18: 333-340, 2004.
- \* **Irwin M.**, **Rinetti G**, **Redwine L**, **Motivala S**, Dang J, Ehlers C: Nocturnal proinflammatory cytokine-associated sleep disturbances in abstinent African American alcoholics. Brain, Behav & Immun 18: 349-360, 2004.
- Irwin MR**, Ziegler M: Sleep deprivation potentiates activation of cardiovascular and catecholamines responses in abstinent alcoholics. Hypertension. 45(2):252-257.
- \* **Motivala S**, Sarfatti A, Olmos L, **Irwin MR**: Inflammatory markers and sleep disturbance in major depression. Psychosom Med. 76:107-194, 2005.
- Oxman MN, Levin MJ, ... **Irwin MR**, ... and the Shingles Prevention Study Group. Prevention of herpes zoster and postherpetic neuralgia in older adults with a live attenuated varicella-zoster virus vaccine: results of Veterans Administration Cooperative Study #403 - The Shingles Prevention Study NEJM 352:2271-2284, 2005.
- Vedhara K, **Irwin MR**: Human Psychoneuroimmunology. Oxford University Press, 2005.
- Irwin MR**, Cole JC, Nicassio PM: Comparative meta-analysis of behavioral interventions for insomnia and their efficacy in adults and in older adults 55 + years. Health Psychol 25, 3-14, 2006.
- \* **Collado-Hidalgo A**, Bower JE, Ganz PA, Cole SW, & **Irwin MR**. Inflammatory biomarkers for persistent unexplained fatigue in breast cancer survivors. Clinical Cancer Research 12:2769-2766, 2006.
- \* **Motivala SJ**, Levin MJ, Oxman MN, **Irwin MR**: Impairments in health functioning and sleep quality in older adults with a history of depression. J Am Ger Soc. 54:1184-1191, 2006.
- \* **Irwin MR**, Wang M, Campomayor CO, **Collado-Hidalgo A**, Cole SW: Sleep deprivation and activation of morning levels of cellular and genomic markers of inflammation. Arch Intern Med 166:1756-1762, 2006.
- \* **Motivala SJ**, Thayer J., **Irwin MR**: Tai Chi Chih acutely decreases sympathetic nervous system activity in older adults. J. Geron: Med Sci 61A:1177-1180,2006.
- \* **Irwin MR**, Olmos L., Wang M, Valladares EM, **Motivala SJ**, Fong T, Newton T, Butch A., Cole SW: Cocaine dependence and acute cocaine induce decreases in monocyte proinflammatory cytokine expression across the diurnal period: autonomic mechanisms. JPET 320(2):507-15, 2007.
- \* **Redwine LS**, Mills PJ, Hong S., Rutledge T., Reis V, Maisel A., **Irwin MR**: Symptoms of depression, TH1/Th2 cytokine ratios and cardiac morbidity and mortality in heart failure patients. Psychosom Med 69:23-9, 2007.
- Bower JE, Ganz PA, Azis N., Olmstead R, **Irwin MR**, Cole SW: Inflammatory responses to psychological stress in fatigued breast cancer survivors: relationship to glucocorticoids. Brain Behav Immun 21:251-258, 2007.

- Irwin MR**, Olmstead R, Oxman MN: Augmenting immune responses to varicella zoster virus in older adults: a randomized controlled trial. *J Am Ger Soc* 55:511-517, 2007.
- Irwin MR**, Miller AH: Depressive disorders and immunity: 20 years of progress and discovery. *Brain Behav Immun* 21:374-383, 2007.
- Frasure-Smith N, Lesperance F, **Irwin MR**, Sauve C, Lesperance J, Theroux P: Depression and inflammatory markers predict long-term major adverse cardiovascular events in patients with recent acute coronary syndromes *Biol Psychiatry* 62:302-308, 2007
- Zautra AJ, Parrish BP, VanPuymbroeck CM, Tennen H, Davis MC, Reich JW, **Irwin MR**: Depression history, stress, and pain in rheumatoid arthritis patients. *J Beh Med* 30:187-197, 2007
- \* **O'Connor M-F**, **Irwin MR**, Seldon J., Kwan L, Ganz PA: Proinflammatory cytokines and depression in a familial cancer registry. *Psycho-oncology*, 16:499-501, 2007.
- \* **O'Connor MF**, **Motivala SJ**, Valladares EM, Olmstead R, **Irwin MR**: Sex differences in monocyte expression of IL-6: role of autonomic mechanisms. *Am J Physiol: Integ Reg Mech* 293(1):R145-R151, 2007.
- \***Motivala SJ**, **Irwin MR**. Sleep and immunity: cytokine pathways linking sleep and health outcomes. *Current Directions in Psychol Sci*, in press.
- Dantzer R, Capuron L, **Irwin MR**, Miller AH, Ollat H, Perry VH, Rousey S: Identification and treatment of symptoms associated with inflammation in medically ill patients. *Psychoneuroendocrinology*. 33(1):18-29, 2008.
- Irwin MR**. Human psychoneuroimmunology: Twenty Years of Discovery. *Brain Behav Immun* 22(2):129-39, 2008.
- \* **Motivala SJ**, Khanna D, Fitzgerald J, **Irwin MR**: Stress activation of cellular markers of inflammation: protective effects of tumor necrosis  $\alpha$  antagonists. *Arthritis and Rheumatism* 58:376-383, 2008.
- \* Davis MC, Zautra AJ, Younger J, **Motivala SJ**, Attrep J, **Irwin MR**: Chronic stress and regulation of cellular markers of inflammation in rheumatoid arthritis: implications for fatigue. *Brain Behavior and Immunity* 22:24-32, 2008.
- Miller A, Ancoli-Israel S, Bower J, Capuron L, McDonald P, **Irwin MR**: Behavioral co-morbidities in patients with cancer: neuroendocrine-immune mechanisms of the "sixth vital sign". *Journal of Clinical Oncology* 26:971-982, 2008.
- Zautra AJ, Davis MC, Reich JW, Nicassio P, Tennen H, Finan P, Kratz A, Parish B, **Irwin MR**: Comparison of cognitive-behavioral and mindfulness meditation interventions on adaptation to rheumatoid arthritis for patients with and without history of recurrent depression. *J Consult Clin Psychol* 2008.

### **C. Research Support**

#### **Ongoing Research Support**

- |   |  |
|---|--|
| T32 MH19925 Irwin (PI)<br>NIH/NIMH<br>Post-Graduate Training Program in PNI & Mental Disorders<br>This training grant provides research training in Psychoneuroimmunology for 3 post-doctoral fellows per year.<br>Role: PI   | 07/01/03-06/30/13                          |
| R01 HL079955 (Irwin)<br>NIH/NHLBI<br>Sleep and Immune Mechanisms in Rheumatoid Arthritis<br>Aims to enhance our understanding of the role played by sleep in symptom severity and disability in rheumatoid arthritis and relationships between sleep and cytokines in mediating these impairments in health.                        | 05/20/06-04/30/10                          |
| R01 AG026364 (Irwin)<br>NIH/NIA<br>Aging: Cytokine Mechanisms and Treatment of Insomnia<br>Examines the efficacy of two mind-body interventions, Cognitive Behavior Therapy and Tai Chi Chih, in improving sleep outcomes in older adults.  | 09/01/05-08/31/10                          |
| R01 CA119159 (Irwin)<br>NIH-NCI<br>Tai Chi Effects on Chronic Insomnia in Breast Cancer Survivors: Immune mechanisms<br>Constitutes the first, randomized controlled clinical trial of the effects of Tai Chi on sleep outcomes in breast cancer survivors, and will advance psychobiology models of insomnia treatment mechanisms. | 09/01/06-08/30/11                          |
| R01 NR009228 (Doering)<br>NIH/NHLBI<br>Enhancing Recovery after Cardiac Surgery<br>Examines the role of the proinflammatory cytokine network in mediating depression in coronary artery bypass graft patients and tests the effects of cognitive behavioral therapy on cytokine and depression outcomes.                            | 07/22/05-05/31/09<br>Role: Co-Investigator |

R01 AG026006 (Zautra) NIH/NIA Resilience and Health within Persons and Across Communities This application is intended to identify the effects of resilience capacity on physical and emotional functioning.	09/01/05-08/31/09 Role: PI of Subcontract
P60 AG10415 (Reuben) NIH-NIA UCLA Older Americans Independence Center To expand scientific knowledge that will lead to better ways to maintain or restore independence in older adults. The IBC provides intellectual and technical support for the analysis of inflammatory dynamics in Center research programs.	09/01/06-08/31/11 Role: PI of Inflammatory Biology Core (IBC)
M01 RR00865 (Levey) NIH/NCRR UCLA General Clinical Research Center Provides infrastructure support for clinical research programs throughout the UCLA medical campus.	12/01/05-11/30/11 Role: Associate Program Director
R01 AR049840 (Nicassio) NIH/NIAMS Behavioral Treatments for Rheumatoid Arthritis Tests whether behavioral interventions reduce disease activity and decreases pro-inflammatory cytokine response in rheumatoid arthritis patients.	08/01/03-07/31/08 Role: Other Significant Contributor
U01 AT003682 (Bower) NIH/NCCAM Iyengar Yoga for Breast Cancer Survivors with Persistent Fatigue This randomized controlled trial will determine the feasibility and acceptability of an Iyengar yoga intervention for breast cancer survivors with persistent fatigue and evaluate its effects on fatigue and related physical, behavioral and immune outcomes.	09/30/06-08/31/09 Role: Other Significant Contributor
Young Investigator Award (Eisenberger) NARSAD An fMRI Study of Cytokine-Associated Depression and Social Pain Examines the neurobiological correlates of emotion regulation and social pain processes.	07/01/06-06/30/08 Role: Principal Mentor (Other Significant Contributor)
No number (Eisenberger) Dana Foundation An fMRI Study of Cytokine-Associated Depression and Social Pain Examines the neurobiological correlates of emotion regulation and social pain processes.	07/01/06-06/30/08 Role: Principal Mentor (Other Significant Contributor)
K23 AG027860 (Motivala) NIH-NIA Aging: Insomnia Treatment and Energy Balance Examines the role of behavioral interventions in altering energy balance in older adults with insomnia.	12/01/06-11/30/11 Role: Principal Mentor (Other Significant Contributor)
K01 AG028404 O'Connor (PI) NIH-NIA Complicated Grief in Older Adults: Physiological Substrates of Emotion Regulation This project examines the neurobiological underpinnings of traumatic grief in older adults.	07/01/07-06/30/12 Role: Principal Mentor (Other Significant Contributor)

**Completed Research Support (in the last 3 years)**

R01 MH55253 (Irwin) Depression and Trial of Varicella Vaccine in the Elderly To determine whether major depressive disorder is associated with declines in VZV specific immunity the elderly and evaluate whether major depressive disorder attenuates the magnitude or duration of vaccine-stimulated VZV specific immunity as compared to responses in controls.	NIH/NIMH	05/15/00-04/30/05
R01 AG18367 (Irwin) Behavioral Intervention for Herpes Zoster Risk in Aging This study examines whether a relaxation response based behavioral intervention, Tai Chi Chih (TCC) influences <i>in vivo</i> immune responses to varicella vaccine in older adults with implications for herpes zoster risk; and, 2) assess whether changes in psychological adaptation, health behaviors, and health functioning predict changes in varicella vaccine responses following TCC.	NIH/NIA	09/01/00-07/31/05

R01 AA 13239 (Irwin)	NIH/NIAAA	06/01/01-03/31/06
Alcoholism: Sleep and Cytokines in African Americans		
This study will advance our understanding of the reciprocal relationships between cytokines and sleep in alcohol dependence with implications for answering why sleep is disordered in alcoholic patients and for the development of novel treatments for sleep disturbance in alcoholism.		
R01 DA16541 (Irwin)	NIH/NIDA	09/30/02-05/31/06
Cocaine Dependence: EEG Sleep and Cytokines		
This study will determine the predictive validity of proteomic measures of nocturnal cytokines on sleep depth in cocaine dependent subjects during acute/protracted abstinence and following acute cocaine administration.		
R01 AR/AG41687 Zautra (PI) (Irwin Subcontract PI)	NIH/NIAMS	08/01/00-05/31/06
Stress and Adaptation in Rheumatoid Arthritis		
This study examines whether cognitive behavior therapies reduce disease activity and improve the mental health of older adults with rheumatoid arthritis. The subcontract supports stress reactivity studies and neuroendocrinologic and immunologic assessment		