

## BIOGRAPHICAL SKETCH

Provide the following information for the key personnel in the order listed for Form Page 2.  
Follow the sample format for each person. **DO NOT EXCEED FOUR PAGES.**

NAME		POSITION TITLE	
Clemens Kirschbaum		Professor of Psychology	
EDUCATION/TRAINING (Begin with baccalaureate or other initial professional education, such as nursing, and include postdoctoral training.)			
INSTITUTION AND LOCATION	DEGREE (if applicable)	YEAR(s)	FIELD OF STUDY
University of Muenster, Germany	Diploma	1985	Psychology
University of Trier, Germany	Ph.D.	1991	Psychology
University of Rochester, N.Y., U.S.A.		1992-1993	Psychoimmunology

**NOTE: The Biographical Sketch may not exceed four pages. Items A and B (together) may not exceed two of the four-page limit. Follow the formats and instructions on the attached sample.**

**A. Positions and Honors.** List in chronological order previous positions, concluding with your present position. List any honors. Include present membership on any Federal Government public advisory committee.

### Positions and Employment

1985-1986 Teaching assistant, University of Muenster  
1986-1991 Teaching assistant, University of Trier  
1992-1993 Postdoctoral Fellow, University of Rochester  
1993-1999 Assistant Professor of Psychology, University of Trier  
1999-2003 Full Professor of Psychology, University of Duesseldorf  
2003-current Full Professor of Psychology, Technical University of Dresden

### Honors

1991 Dissertation Award, University of Trier  
1992 Young Investigator Award, Society for the Immunocompromised Host  
1995 Neil Miller Award, Academy of Behavioral Medicine Research  
1996 Heisenberg scholarship, German Research Foundation  
1997 Innovation Award, Foundation for the Advancement of the Center for Psychobiology and Psychosomatic Research

**B. Selected peer-reviewed publications (in chronological order).** Do not include publications submitted or in preparation.

(selected from 155 peer-reviewed journal publications)

1. Kirschbaum, C. & Hellhammer, D. H. (1989). Salivary cortisol in psychobiological research: an overview. *Neuropsychobiology*, 22, 150-169.
2. Buske-Kirschbaum, A., Kirschbaum, C., Stierle, H., Lehnert, H. & Hellhammer, D.H. (1992). Classical conditioning of natural killer cell activity (NKCA) in humans. *Psychosomatic Medicine*, 54, 123-132.
3. Dressendörfer, R. A., Kirschbaum, C., Rohde, W., Stahl, F. & Strasburger, C. J. (1992). Synthesis of a cortisol-biotin conjugate and evaluation as tracer in an immunoassay for salivary cortisol measurement. *Journal of Steroid Biochemistry and Molecular Biology*, 43, 683-692.
4. Kirschbaum, C., Wüst, S., Faig, H.\_G. & Hellhammer, D.H. (1992). Heritability of cortisol responses to h\_CRH, ergometry, and psychological stress in humans. *Journal of Clinical Endocrinology and Metabolism*, 75, 1526-1530.
5. Kirschbaum, C., Pirke, K.M. & Hellhammer, D. H. (1993). The 'Trier Social Stress Test' - a tool for investigating psychobiology stress responses in a laboratory setting. *Neuropsychobiology*, 28, 76-81.
6. Kirschbaum, C., Klauer, T., Filipp, S.-H. & Hellhammer, D. H. (1995). Sex specific effects of social support on cortisol and subjective responses to acute psychological stress. *Psychosomatic Medicine*, 57, 23-31.

7. Kirschbaum, C., Prüßner, J.C., Stone, A.A., Federenko, I., Gaab, J., Lintz, D., Schommer, N. & Hellhammer, D.H. (1995). Persistent high cortisol responses to repeated psychological stress in a subpopulation of healthy men. *Psychosomatic Medicine*, 57, 468-474.
8. Kirschbaum, C., Schommer, N., Federenko, I., Gaab, J., Neumann, O., Oellers, M., Rohleder, N., Untiedt, A., Hanker, J., Pirke, K.M. & Hellhammer, D.H. (1996). Short-term estradiol treatment enhances pituitary-adrenal axis and sympathetic responses to psychosocial stress in healthy young men. *Journal of Clinical Endocrinology and Metabolism*, 81, 3639-3643.
9. Kirschbaum, C., Gonzalez Bono, E., Rohleder, N., Gessner, C., Pirke, K.M. & Hellhammer, D.H. (1997). Effects of fasting and glucose load on free cortisol responses to stress and nicotine. *Journal of Clinical Endocrinology and Metabolism*, 82, 1101-1105.
10. Wolf, O.T., Kirschbaum, C., Hellhammer, D.H., Born, J. & Fehm, H.L. (1997). A single administration of dehydroepiandrosterone (DHEA) does not enhance memory performance in young healthy adults, but immediately reduces cortisol levels. *Biological Psychiatry*, 42, 845-848.
11. Wolf, O.T., Neumann, O., Geiben, A.C., Strasburger, C.J., Dressendörfer, R.A., Pirke, K.M., Hellhammer, D.H. & Kirschbaum, C. (1997). Effects of a two-week dehydroepiandrosterone (DHEA) substitution on cognitive performance and well being in healthy elderly women and men. *Journal of Clinical Endocrinology and Metabolism*, 82, 2363-2367.
12. Kirschbaum, C., Kudielka, B.M., Gaab, J., Schommer, N., Untiedt, A. & Hellhammer, D.H. (1999). The impact of gender, menstrual cycle phase and oral contraceptives on the activity of the hypothalamus-pituitary-adrenal axis. *Psychosomatic Medicine*, 61, 154-162.
13. Kudielka, B.M., Schmidt-Reinwald, A.K., Hellhammer, D.H. & Kirschbaum, C. (1999). Psychological and endocrine responses to psychosocial stress and dexamethasone/corticotropin-releasing hormone in healthy postmenopausal women and young controls: the impact of age and a two-week estradiol treatment. *Neuroendocrinology*, 70, 422-430.
14. Ebrecht, M., Buske-Kirschbaum, A., Hellhammer, D.H., Kern, S., Rohleder, N., Walker, B.R. & Kirschbaum, C. (2000). Tissue specificity of glucocorticoid sensitivity in healthy adults. *Journal of Clinical Endocrinology and Metabolism*, 85, 3733-3739.
15. Wolf, O.T., Preut, R., Hellhammer, D.H., Kudielka, B.M., Schürmeyer & Kirschbaum, C. (2000). Testosterone and cognition in elderly men: A single testosterone injection blocks the practice effect in verbal fluency, but has no effect on spatial or verbal memory. *Biological Psychiatry*, 47, 650-654.
16. Heinrichs, M., Meinschmidt, G., Neumann, I., Wagner, S., Kirschbaum, C., Hellhammer, D.H. & Ehlert, U. (2001). Effects of suckling on hypothalamus-pituitary-adrenal axis responses to psychosocial stress in postpartum lactating women. *Journal of Clinical Endocrinology and Metabolism*, 86, 4798-4804.
17. Rohleder, N., Schommer, N., Hellhammer, D.H. & Kirschbaum, C. (2001). Sex differences in glucocorticoid sensitivity of pro-inflammatory cytokine production after psychosocial stress. *Psychosomatic Medicine*, 63, 966-972.
18. Coe, C., Kramer, M., Kirschbaum, C., Netter, P. & Fuchs, E. (2002). Prenatal stress diminishes cytokine production after an endotoxin challenge and induces glucocorticoid resistance in juvenile rhesus monkeys. *Journal of Clinical Endocrinology and Metabolism*, 87, 675-681.
19. Bierhaus, A., Wolf, J., Andrassy, M., Rohleder, N., Humpert, P.M., Petrov, D., Ferstl, R., Wendt, T., Rudofsky, G., Joswig, M., Morcos, M., Schaninger, M., McEwen, B., Kirschbaum, C. & Nawroth, P. (2003). A mechanism converting psychosocial stress into mononuclear cell activation. *Proceedings of the National Academy of Sciences U.S.A.*, 100, 1920-1925.
20. Coe, C.L., Kramer, M., Czéh, B., Gould, E., Reeves, A.J., Kirschbaum, C. & Fuchs, E. (2003). Prenatal stress diminishes neurogenesis in the dentate gyrus of juvenile rhesus monkeys. *Biological Psychiatry*, 54, 1025-1034.
21. Heinrichs, M., Baumgartner, T., Kirschbaum, C. & Ehlert, U. (2003). Social support and oxytocin interact to suppress cortisol and subjective responses to psychosocial stress. *Biological Psychiatry*, 54, 1389-1398.
22. Kudielka, B.M., Broderick, J.E. & Kirschbaum, C. (2003). Compliance with saliva sampling protocols: Electronic monitoring reveals invalid cortisol daytime profiles in noncompliant subjects. *Psychosomatic Medicine*, 65, 313-319.
23. al'Absi, M., Wittmers, M., Ellestad, D., Nordehn, G., Kim, S.W., Kirschbaum, C. & Grant, J.E. (2004). Sex differences in pain and hypothalamic-pituitary-adrenocortical responses to opioid blockade. *Psychosomatic Medicine*, 66, 198-206.
24. Rohleder N, Joksimovic L, Wolf JM & Kirschbaum C. (2004) Hypocortisolism and increased glucocorticoid sensitivity of pro-inflammatory cytokine production in Bosnian war refugees with posttraumatic stress disorder. *Biological Psychiatry*, 55:745-51
25. Voderholzer, U., Hohagen, F., Klein, T., Jungnickel, J., Kirschbaum, C., Berger, M. & Riemann, D. (2004). Impact of sleep deprivation and subsequent recovery sleep on cortisol in unmedicated depressed patients. *American Journal of Psychiatry*, 161, 1404-1410.
26. Geiss, A., Rohleder, N., Kirschbaum, C., Steinbach, K., Bauer, H.W., Anton, F. (2005) Predicting the failure of disc surgery by a hypofunctional HPA axis: evidence from a prospective study on patients undergoing disc surgery. *Pain*, 114, 104-117.
27. Kudielka, B.M. & Kirschbaum, C. (2005). Sex differences in HPA responses to stress: a review. *Biological Psychology*, 69, 113-132.

28. Wolf, O.T., Heinrich, A.B., Hanstein, B. & Kirschbaum, C. (2005). Estradiol or estradiol/progesterone treatment in older women: no strong effects on cognition. *Neurobiology of Aging*, 26, 1029-1033.
29. Kuhlmann, S., Kirschbaum, C. & Wolf, O.T. (2005). Effects of oral cortisol treatment in healthy young women on memory retrieval of negative and neutral words. *Neurobiology of Learning and Memory*, 83, 158-162.
30. Polk, D.E., Cohen, S., Doyle, W.J., Skoner, D.P. & Kirschbaum, C. (2005). State and trait affect as predictors of salivary cortisol in healthy adults. *Psychoneuroendocrinology*, 30, 261-272.
31. Cohen, S., Schwartz, J.E., Epel, E., Kirschbaum, C., Sidney, S. & Seeman, T. (2006). Socioeconomic status, race and diurnal cortisol decline in the Coronary Artery Risk Development in Young Adults (CARDIA) study. *Psychosomatic Medicine*, 68, 41-50.
32. Federenko, I.S., Schlotz, W., Kirschbaum, C., Bartels, M., Hellhammer, D.H. & Wüst, S. (2006). The heritability of perceived stress. *Psychological Medicine*, 36, 375-386.
33. Rohleder, N. & Kirschbaum, C. (2006). The hypothalamic-pituitary-adrenal (HPA) axis in habitual smokers. *International Journal of Psychophysiology*, 59, 236-243.
34. Rohleder, N., Otto, B., Wolf, J.M., Klose, J., Kirschbaum, C., Enck, P. & Klosterhalfen, S. (2006). Sex-specific adaptation of endocrine and inflammatory responses to repeated nauseogenic body rotation. *Psychoneuroendocrinology* 31: 226-236
35. Rohleder, N., Wolf, J.M., Herpfer, I., Fiebich, B.L., Kirschbaum, C. & Lieb, K. (2006). No response of plasma substance P, but delayed increase of interleukin-1 receptor antagonist to acute psychosocial stress. *Life Sciences*, 78, 3082-3089.
36. Wessa, M., Rohleder, N., Kirschbaum, C. & Flor, H. (2006). Altered cortisol awakening response to awakening in posttraumatic stress disorder. *Psychoneuroendocrinology*, 31, 209-215.
37. Badrick E., Kirschbaum C. & Kumari M. (2007). The relationship between smoking status and cortisol secretion. *Journal of Clinical Endocrinology and Metabolism* 92:819-824.
38. Dettenborn, L., Rosenloecher, F., Kirschbaum, C. (2007). No effects of repeated forced wakings during three consecutive nights on morning cortisol awakening responses (CAR): A preliminary study. *Psychoneuroendocrinology*, 32, 915-921.
39. Badrick, E., Bobak, M., Britton, A., Kirschbaum, C., Marmot, M. & Kumari, M. The relationship between alcohol consumption and cortisol secretion in an ageing cohort. *Journal of Clinical Endocrinology and Metabolism*, 93, 750-757.
40. Kern S, Oakes TR, Stone CK, McAuliff EM, Kirschbaum C, Davidson RJ. (2008). Glucose metabolic changes in the prefrontal cortex are associated with HPA axis response to a psychosocial stressor. *Psychoneuroendocrinology* 33, 517-529.
41. Kirschbaum, C., Tietze, A. & Dettenborn, L. Hair as a Retrospective Calendar of Cortisol Production - Increased Cortisol Incorporation into Hair in the Third Trimester of Pregnancy. *Psychoneuroendocrinology*, 34, 32-37.
42. Perkonig, A., Ohashi, T., Stein, M.B., Kirschbaum, C. & Wittchen, U. Posttraumatic stress disorder and obesity: Evidence for a risk association from a prospective-longitudinal community study. *American Journal of Preventive Medicine*, 36, 1-8.

**C. Research Support.** List selected ongoing or completed (during the last three years) research projects (federal and non-federal support). Begin with the projects that are most relevant to the research proposed in this application. Briefly indicate the overall goals of the projects and your role (e.g. PI, Co-Investigator, Consultant) in the research project. Do not list award amounts or percent effort in projects.

**Completed Research Support**

He 1013 6-1 DFG - German Research Foundation- (Kirschbaum, PI)

Classical conditioning of natural killer cell activity in humans; April 1, 1989 – March 31, 1991

Role: Co-investigator. This project investigated the possibilities to enhance certain functions of the human immune system by a classical conditioning procedure. Epinephrine was used as an unconditioned stimulus in a five-day learning trial. We were the first to clearly show that also the human immune system can be altered by learning.

Ki 537-6-1 DFG (Kirschbaum PI)

Endocrine and subjective stress responses mediated by menstrual cycle phase and oral contraceptive use; January 1, 1995 –December 31, 1997

Role: PI; Using the Trier Social Stress Test we showed that the HPA axis response to stress changes as a function of sex steroid levels. Clear-cut gender differences were observed in the endocrine stress response, while no significant differences emerged with regard to subjective stress responses in women and men.

He 1013-10-1 DFG (Kirschbaum PI)

Habituation to repeated psychosocial stress and health; April 1, 1997 – March 31, 1999

Role: PI; Repeated psychosocial stress in the laboratory was used to monitor the plasticity of endocrine stress responses in healthy younger adults.

He 1013-10-1 DFG (Kirschbaum PI)

Protective effects of sex steroids in elderly men and women under psychological stress; January 1, 1997 – December 31, 1999

Role: PI; Psychological and pharmacological challenge tests were used in these studies to investigate age- and sex-steroid related changes in subjective and endocrine responses. Lowered pituitary feedback sensitivity was observed in elderly subjects with little or no decrement in endocrine responsiveness to psychosocial stress as a function of ageing.

Ki 537-9-1 DFG (Kirschbaum, PI)

Stress reactivity and glucocorticoid sensitivity in atopic patients and healthy subjects; January 1, 2000 – December 31, 2001

Role: PI; The modulation of GC sensitivity in peripheral leukocytes are studied in several groups of healthy adults and patients suffering from neurodermatitis or allergic asthma. With a tissue culture model, the feedback sensitivity of the immune system is studied using the production of cytokines as a read-out signal.

Ki 537-9-3 DFG (Kirschbaum, PI)

NF-kappa B binding activity under acute psychosocial stress; December 1, 2000 - November 30, 2002

Role: PI; A potential pathway linking psychosocial stress to chronic inflammatory disease is studied in this research project. The activation of the intracellular transcription factor NFkB is measured in response to psychosocial stress.

Ki 537-14 DFG (Kirschbaum, PI)

Stress in Morbus Addison patients; October 1, 2002 – September 30, 2004

Role: PI; The role of the HPA axis response to acute psychosocial stress is investigated in this project. It is testing the so-called Munch hypothesis of the teleological meaning of this highly conserved biological response to threat.

Ki 537-18 DFG (Kirschbaum, PI)

CNS correlates of psychosocial stress; April 1, 2004 – March 31, 2005

Role: PI. This project investigates the specific activation patterns in the central nervous systems that follow exposure to acute psychosocial stress. A PET and an fMRI experiment will be conducted, the latter includes repeated stress sessions for the investigation of habituation processes.

### **Ongoing Research Support**

Ki 537-20 DFG (Kirschbaum, PI)

Serotonin transporter polymorphisms: Impact on stress responses, startle-response and emotional memory in humans. August 1, 2005 to present

Role: PI. The development of gene X environment interactions is studied across the life span in four cross-sectional age cohorts (newborn, 8-10 yrs, 20-30 yrs, and 65-80 yrs). The special emphasis of this study is the hypothesized development of hyperresponsive amygdala neurons in individuals carrying one or two copies of the short allele of the 5-HTTLPR

Ki 537/21 DFG (Kirschbaum, PI)

Chronic stress by “repeated hits” and maladaptation? A biopsychological investigation of the allostatic load model in amateur sports. July 1, 2006 to present

Role: PI. In a group of amateur ballroom dancers, the chronic stress model of McEwen is tested with regard to endocrine regulation, immune competence and measures of glucose tolerance.