

Course Description

Health Psychophysiology and Psychoneuroimmunology

Leading Lecturer: Adrien Rigó

Aim of the course

Aim of the subject

To learn about bio-medical, psychophysiological and psychoneuroimmunological backgrounds, and about psychophysiological pathological features of psychosomatic and somatization disorders and diseases, within the frame of the bio-psycho-social theory.

Acquired competencies

Knowledge

The student:

- Knows regulation of the visceral organs, including structure and operation and of input and output and central regulation of the visceral organs, respectively.
- Should be familiar with the psychophysiological aspects of emotions and motivations and with the modern interpretation of the homeostasis.
- Has systems-based knowledge about the relationship of health and disease.
- Is familiar with psychophysiology and complex organization of pain, knows about main therapeutic methods treating pain.
- Knows structure and function of the immune system, and the possible relationships within the immune-neuroendocrine network.
- Becomes familiar with results of the psychoneuroimmunological research, especially regarding stress, life-style, and psychiatric dysfunctions.
- Gets an overview about the immunological consequences of different psycho-social interventions.

Attitude

The student's:

- Attitude is based on the systems theory.
- Preferences are organized around the bio-psycho-social theory
- Interest is wide and multifunctional, being open to analyzing and understanding psychosomatic and somato-psyche processes.

Abilities

The student becomes able:

- To orient in the relevant literature with proper criticism.
- To understand and handle psychophysiological and psychoneuroimmunological publications.

- To co-operate with the physicist staff in diagnosing and treating psychosomatic patients, and represents an interactive approach.

Content of the course

Major topics

I. Psychophysiology block

- Structure and operation of the visceral system.
- Visceral input, sensation and perception.
- Central nervous aspects and outputs of the visceral regulation.
- Mechanisms of drives, emotions and motivations.
- Homeostasis and variostasis.
- Psycho-social mechanisms in the background of visceral functions.
- Disorders and maladaptive accommodation of the visceral functions.

II. Aging and pain block

- Process and theories of aging.
- Psychophysiology of aging.
- Definitions, organization and models of pain.
- Nociception and pain types.
- Measuring and alleviating pain.
- Psychological management of pain.

III. Stress-plasticity block

- Psychophysiology of stress (repetition).
- Possibilities and consequences of long-term modification of the stress-axes (programming stress-axes) regarding mental and somatic health.
- Individual differences and the role of individual-environment interactions in stress reactivity.
- Advantages and disadvantages of plasticity; changes of central nervous mechanisms in the background of somatic and somatization disorders (time-dependent sensitization, olfactory-limbic model, sickness model, neurogenic inflammation model); epigenetic results.

IV. Psychoneuroimmunological block

- Structure, operation of the immune system and measurement methods.
- Relationships of the immune functions to the neuro-endocrine system.
- Effect of stress on the immune system.
- Relationship of life-style (nutrition sleep, drug-use, physical activity) to the immune functions.
- Immune features in psychiatric disorders.
- Effects on the immune functions of psycho-social interventions.

Learning activities, learning methods

Frontal lectures with an emphasis on proper demonstrations and on interactive thinking by presenting short tasks.

Evaluation of outcomes

Learning requirements, mode of evaluation, criteria of evaluation:

requirements

- Being familiar with the topics of the lectures.
- Knowing the compulsory literature.

mode of evaluation:

Type of the final mark: written and oral exam (marks 1 to 5)

Written exam of the Psychophysiology and Pain blocks (40%)

Written exam of the Stress-plasticity and Immune system blocks (30%)

Oral exam: Interpretation of a psychoneuroimmunological publication and its association to the material of the whole course. (30%)

Aspects of the evaluation:

Extent of the basic knowledge.

Ability to apply the knowledge in evaluating and interpreting scientific publications.

Reading list

Compulsory reading list

- Ádám, G. *Visceral Perception: Essay on the Doorstep of Cognition*. Plenum Press, New York, 1998.
- Bower, J.E., Irwin, M.R. Mind–body therapies and control of inflammatory biology: A descriptive review. *Brain Behav. Immun.* (2015), <http://dx.doi.org/10.1016/j.bbi.2015.06.012>
- Cervero, F. and Jänig, W. Visceral nociceptors: A new world order? *Trends in Neurosci.* 15: 374-378, 1992.
- Cox, M.J. and Paly, B. Families as systems. *Ann. Rev. Psychol.* 48: 243-267, 1997.
- Engel, G.L. The need for a new medical model: A challenge for biomedicine. *Science*, 196:129, 1977.
- Furtado, M., Katzman, M.A. (2015). Neuroinflammatory pathways in anxiety, posttraumatic stress, and obsessive compulsive disorders. *Psychiatry Research*, 229. 37-48.
- Gershon, H., Gershon, D. Paradigms in aging research: a critical review and assessment. *Mechanisms of Aging and Development*, 117: 21-28, 2000.
- Kanning, M., Schlicht, W. (2008). A bio-psycho-social model of successful aging as shown through the variable “physical activity”. *European Review of Aging and Physical Activity*. 5:35

- Lazarus, R.S. From psychological stress to the emotions: A history of changing outlooks. *Ann. Rev. Psychol.* 44: 1-21, 1993
- Leonard, B.E. (2014). Impact of inflammation on neurotransmitter changes in major depression: An insight into the action of antidepressants. *Progress in Neuro-Psychopharmacology and Biological Psychiatry.* 48. 261-267.
- Maniam, J., Antoniadis, Ch., Morris, M.J. (2014). Early-life stress, HPA axis adaptation, and mechanisms contributing to later health outcomes. *Frontiers in Endocrinology*, doi: 10.3389/fendo.2014.00073
- Markle, J.G., Fish, E.N. (2014). Sex matters in immunity. *Trends in immunology*, 35. 97-104.
- Oken, S.B., Chamine, I., Wakeland, W, (2015). A system approach to stress, stressors and resilience in humans. *Behavioural Brain Research*, 282. 144-154.
- Simpson, R.J., Bosch, J.A. (2014). Special issue on exercise immunology: Current perspectives on aging, health and extreme performance. *Brain, Behavior and Immunity*, 39. 1-7.
- Sin, N.L., et al. Daily positive events and inflammation: Findings from the National Study of Daily Experiences. *Brain Behav. Immun.* (2014), <http://dx.doi.org/10.1016/j.bbi.2014.07.015>
- Skinner, M. (2014). Environmental stress and epigenetic transgenerational inheritance. 12:153. <http://www.biomedcentral.com/1741-7015/12/153>
- Zachariae, R. (2009). Psychoneuroimmunology: A bio-psycho-social approach to health and disease. *Scandinavian Journal of Psychology*, 50, 645–651.

Recommended reading list

- Ádám, G. Interoception and Behavior. Akadémiai Kiadó, Budapest, 1957.
- Ader, R. Historical perspectives on psychoneuroimmunology. In: Friedman, H., Klein, T.W. and Friedman, A.L. Psychoneuroimmunology, Stress and Infection. pp. 1-24. CRC Press, Boca Raton, FL, 1996.
- Ader, R., Felten, D.C. and Cohen, N. Psychoneuroimmunology. pp. 611-646. Academic Press, San Diego, 1991.
- Almeida, T.F., Roizenblatt, S., Tufik, S. Afferent pain pathways: a neuroanatomical review. *Brain Res.* 12: 40-56, 2004.
- Bahnson, C.B. Psychosomatic issues in cancer. In: Gallon, R.L. (ed.): The Psychosomatic Approach to Illness. pp. 53-87. Elsevier Biomedical, New York, 1982.
- Birbaumer, N. and Öhman, A. The Structure of Emotion. Psychophysiological, Cognitive and Clinical Aspects. pp. 31-45. Hogrefe and Herber Publ., Seattle, 1993.
- Blackmore, S.J. Near-death experiences. *J. Royal Soc. Med.* 89: 73-76, 1996.
- Bowker, J. The Meanings of Death. Cambridge Univ. Press, Cambridge, UK, 1993.
- Bykov, K.M. The Cerebral Cortex and the Internal Organs. Chemical Publishing, New York, 1957
- Cacioppo, J.T. and Petty, R.E. (eds.) Social Psychophysiology. The Guilford Press, New York, 1983.
- Cervero, F and Morrison, J.F.B. (eds.) Progress in Brain Research: Visceral Sensation. vol 67. Elsevier, Amsterdam, 1986.
- Christodoulou, G.N. (ed.): Psychosomatic Medicine. Past and Future. pp. 265-268. Plenum Press, New York, 1987.
- Ciriello, J., Calaresu, F.R., Renaud, L.P. and Polosa C. (eds.) Organization of the Autonomic Nervous System. Central and Peripheral Mechanisms. Alan R. Liss, Inc., New York, 1987.
- Costa, P.T., Metter, E.J., McCrae, R.R. Personality stability and its contribution to successful aging. *J. Geriatr. Psychiatr.* 27: 41-59, 1994.

- Davies, I. Ageing. Edward Arnold Inc, London, 1983.
- DeVita, M.A. The death watch: certifying death using cardiac criteria. *Prog. Transplant*, 11: 58-66, 2001.
- Engel, B.T. Psychosomatic medicine, behavioral medicine, just plain medicine. *Psychosom. Med.* 48: 466-479, 1986
- Ford, C.V. Somatizing Disorders. Elsevier Biomedical, New York, 1983.
- Gallon, R.L. (ed.): *The Psychosomatic Approach to Illness*. pp. 1-15. Elsevier Biomedical, New York, 1982.
- Glaser, R. and Kiecolt-Glaser, J.K. (eds.): *Human Stress and Immunity*. Academic Press, San Diego, 1994
- Greaves, M.W., Wall, P.D. Patophysiology of itching. *Lancet*, 348: 938-940, 1996.
- Grings, W.W. and Dawson, M.E. *Emotions and Bodily Responses*. Academic Press, New York, 1978.
- Hinde, R.A. and Stevenson-Hinde, J. (eds.): *Relationships within Families: Mutual Influences*. Clarendon Press, Oxford, 1988.
- Hölzl, R. and Whitehead, W.E. (eds.) *Psychophysiology of the Gastrointestinal Tract*. pp. 351-360. Plenum Press, 1983
- Langley, L.L. (ed.). *Homeostatis. Origins of the Concept*. pp. 129-151. Dowden, Hutchinson and Ross, Inc. Stroudsburg, P.A., 1973.
- Loewy, A.D. and Spyer, K.M. (eds.) *Regulation of Autonomic Functions*. pp. 104-125, Oxford University Press, Oxford-New York, 1990.
- MacLean, P.D. *The Triune Brain in Evolution*. Plenum Press, New York, 1990.
- Rolls, E.T. *The Brain and Emotion*. Oxford University Press, Oxford, 1999.
- Samuel, G. *Mind, Body and Culture*. Cambridge Univ. Press, Cambridge, U.K., 1990.
- Scherer, K.R. and Eckman, P. (eds.): *Approaches to Emotion*. pp. 247-257. Lawrence Erlbaum Ass. Inc, Hillsdale, N.J. 1984.
- Shorter, E. *From Paralysis to Fatigue: A History of Psychosomatic Illness in the Modern Era*. The Free Press, New York, 1992.
- Wolman, B.B. *Psychosomatic Disorders*. Plenum Medical Book Co., New York, 1988.