

Quantitative and Molecular Behavior Genetics

Aim of the course

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The aim of the course is to familiarize students with the theoretical framework of behavior genetics and recent developments of the field with special regard to the psychological and psychiatric applications.

Learning outcome, competences

knowledge:

- Understanding the theoretical framework and logic of behavior genetic analysis
- Understanding the basic principles and methods of molecular genetic analysis
- Understanding the molecular genetic variability underlying various psychological differences among people

attitude:

- Understanding the consequences of gene-environment interplay in the development of cognitive abilities, personality and mental health. Students are supposed to discover the powerful influence of contemporary genetics on the psychological sciences and keep their mind open to this influence in their studies and eventually in their future work.

skills:

- none

Content of the course

Topics of the course

- Concepts and principles of quantitative genetic analysis.
- Methodology used in animal and human behavior genetic analyses.
- Heritability estimates in twin and adoptive studies.
- Gene-environment interactions and correlations.
- Constraints of the quantitative behavior genetic approach.
- Molecular behavior genetics. Molecular mechanisms of heredity. DNA structure and function; DNA replication. The genetic code.
- The human genome: structure and variations. Gene polymorphisms. Molecular insights into human evolution.
- Identifying genes underlying phenotypical variations: candidate genes, genome-wide analysis.
- Regulation of gene expression. Epigenetic effects.
- Intelligence, temperament, personality, psychiatric genetics: recent results.

Learning activities, learning methods

- Attending the course, studying the course material together with the uploaded readings

Evaluation of outcomes

Learning requirements, mode of evaluation, criteria of evaluation:

requirements

- demonstrating knowledge as outline

above mode of evaluation:

- written examination at the end of the course

criteria of evaluation:

- passing the examination requires understanding the basic concepts and the most important results in the field

Reading list

Compulsory reading

list

- Lakatos, K. (2011). A gének és a környezet szerepe az emberi viselkedésben. In I. Danis, M. Farkas, M. Herczog, & L. Szilvási (szerk.). Biztos Kezdet Kötetek I.: Génektől a társadalomig: a koragyermekkorai fejlődés szinterei. (126-165). Budapest: Nemzeti Család- és Szociálpolitikai Intézet. <http://mek.oszk.hu/14800/14803/14803.pdf>
- Gervai, J. (2009). Viselkedésgenetika a humán genom megfejtése előtt és után: kvantitatív és molekuláris genetikai alapok. *Pszichológia*, 29, 3-24.
- Lakatos, K. (2009). A csecsemő- és gyermekkorai temperamentum molekuláris genetikai háttere. *Pszichológia*, 29, 25-42.
- Nemoda, Z., Tárnok, Z. (2009). Monoamin rendszerek érintettsége gyermekkorai neuropszichiátriai zavarokban. *Pszichológia* 29, 43-62.
- Plomin R, DeFries JC, Knopik VS, Neiderhiser JM. (2013). Behavioral Genetics. Chapters 2- 4, Worth Publishers, New York, 6-49.
- Plomin R, DeFries JC, Knopik VS, Neiderhiser JM. (2013). Behavioral Genetics. Chapters 8 and 9, Worth Publishers, New York, 105-143.
- Keszler, G., Székely, A., Sasvári-Székely, M. (2012). A gének működése. In: Bereczkei, T., Hoffmann, Gy. (eds). Gének, gondolkodás, személyiség. Budapest, Akadémiai Kiadó, 75-100.
- Lakatos, K. (2012). Az öröklés és a környezet hatásai az emberi viselkedésre. In: Bereczkei, T., Hoffmann, Gy. (eds). Gének, gondolkodás, személyiség. Budapest, Akadémiai Kiadó, 187-216.
- Varga, G., Székely, A. (2012). A személyiség genetikai háttere. In: Bereczkei, T., Hoffmann, Gy. (eds). Gének, gondolkodás, személyiség. Budapest, Akadémiai Kiadó, 275-304.

Recommended reading list

- Plomin R, DeFries JC, Knopik VS, Neiderhiser JM. (2013). Behavioral Genetics. Worth Publishers, New York, USA, p. 503. ISBN-13: 978-1-4292-4215-8
- Rutter M. (2006) Genes and behavior: Nature-nurture interplay explained. Blackwell. ISBN-13: 978-1-4051-1061-7 (paperback).
- McEwen BS et al. (eds) (2011). Social Neuroscience: Gene, Environment, Brain, Body. Annals of the New York Academy of Sciences, Vol. 1231. ISBN-13: 978-1-57331-840-2
- <http://www.nature.com/scitable/ebooks/cntNm-3>
- <http://www.nature.com/scitable/topic/genetics-5>
- <http://www.nature.com/scitable/ebooks/cntNm-8>
- <http://www.nature.com/scitable/ebooks/cntNm-16553838>