Genetics and Pharmacogenetics: What should the clinician know?

Course Directors:

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Course Description:

This course will provide an overview of the recent progress in psychiatric genetics and pharmacogenetics, with a particular emphasis on areas that are of relevance to clinical practitioners. We will highlight the clinical utility of microarrays (for copy number variation [CNV] detection) and exome sequencing in neurodevelopmental disorders and discuss the emerging prospects for the use of polygenic risk scores in certain clinical contexts. The course will then shift to the discussion of the use of pharmacogenetics in psychiatric practice utilizing case-based descriptions of where (and where not) pharmacogenetics current may have clinical utility. The course will consist of brief lectures and interactive sessions.

Objectives:

- Comprehend the major types of genetic variation that are relevant for psychiatric disorders
- Identify the major types of genetic tests that are currently available
- Understand the potential utility of pharmacogenetic testing in clinical care

Course Schedule: Wednesday, 3 August 2022, 9am-12pm CEST

9:00 – 9:55:
Heritability, GWAS, Polygenic risk, Exome and Genome – what do they mean and why should we care?

10:00 -10:30:
Genetics in the Clinic: an example from adult autism with comorbid mood disorder

10:30 -11:00:
Pharmacogenetics: a brief introduction

11:05 – 11:45
Clinical case studies in Pharmacogenetics

11:45 – 12:00:
Ongoing controversies and ethical considerations

Course Readings:

(made available to registered participants)

1. McMahon FJ. Putting Genetics to Work in the Psychiatric Clinic. *AJP*. 2022;179(3):182-188. doi:10.1176/appi.ajp.2021.22010024

2. Genes To Mental Health (G2MH): A Framework to Map the Combined Effects of Rare and Common Variants on Dimensions of Cognition and Psychopathology. doi:10.1176/appi.ajp.2021.21040432

3. Wray NR, Lin T, Austin J, et al. From Basic Science to Clinical Application of Polygenic Risk Scores: A Primer. *JAMA Psychiatry*. 2021;78(1):101. doi:10.1001/jamapsychiatry.2020.3049

4. Murray GK, Lin T, Austin J, McGrath JJ, Hickie IB, Wray NR. Could Polygenic Risk Scores Be Useful in Psychiatry?: A Review. *JAMA Psychiatry*. 2021;78(2):210. doi:10.1001/jamapsychiatry.2020.3042

5. Kreiman BL, Boles RG. State of the Art of Genetic Testing for Patients With Autism: A Practical Guide for Clinicians. *Seminars in Pediatric Neurology*. 2020;34:100804. doi:10.1016/j.spen.2020.100804

6. Trubetskoy V, Pardiñas AF, Qi T, et al. Mapping genomic loci implicates genes and synaptic biology in schizophrenia. *Nature*. 2022;604(7906):502-508. doi:10.1038/s41586-022-04434-5

7. Singh T, Poterba T, Curtis D, et al. Rare coding variants in ten genes confer substantial risk for schizophrenia. *Nature*. 2022;604(7906):509-516. doi:10.1038/s41586-022-04556-w

8. Murphy LE, Fonseka TM, Bousman CA, Müller DJ. Gene-drug pairings for antidepressants and antipsychotics: level of evidence and clinical application. *Mol Psychiatry*. 2022;27(1):593-605. doi:10.1038/s41380-021-01340-6

9. Morris E, O'Donovan M, Virani A, Austin J. An ethical analysis of divergent clinical approaches to the application of genetic testing for autism and schizophrenia. *Hum Genet*. 2022;141(5):1069-1084. doi:10.1007/s00439-021-02349-1