

TAKE-HOME NOTES:

Genetics for psychiatrists

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In this module we have explored the basics and some of the complexities of the research methods used in psychiatric genetics. We have tried to highlight why this field of work is clinically relevant and have discussed a number of recent advances including, for example, the discovery of candidate genes for psychosis and developments in our understanding of gene-environment interactions.

Perhaps more than any other field of psychiatric research, molecular genetics has the potential to significantly impact on the way that we diagnose, classify and treat all of the major mental illnesses.

- Over the next generation, genetic epidemiology will inform changes to the diagnosis and treatment of serious mental disorders.
- Molecular genetic investigations of psychiatric disorders are already identifying key proteins involved in the pathogenesis of mental illnesses.
- The nature-nuture debate is over: understanding gene-environment interplay is the next step forward.
- Genetic studies have produced strong evidence for genes involved in schizophrenia, bipolar disorder and Alzheimer's disease.
- For the major psychiatric disorders we can expect that a large number of relatively common gene variants of small effect will influence pathogenesis.
- Molecular genetics will produce new avenues for the development of novel treatments.
- Pharmacogenomics holds promise for tailoring treatments to individuals.
- Genetic research in psychiatry, as part of the overall drive to understand what causes mental illnesses, will ultimately reduce stigma.

Reflection

(1.3) In your view, which do you think has a stronger impact on mental illness: genetic make-up or environmental influence? Do you think that one is more important than the other?

(4.8) Can you think of any scenarios where the discovery of risk genes for mental disorder might lead to an ethically unacceptable situation?

Tables and figures

[Figure 1: Lifetime risk of schizophrenia by relationship to an affected proband](#)

[Figure 2: Gene-environment interactions](#)

[Figure 3: Lifetime risk of schizophrenia – MZ versus DZ twins](#)

[Figure 4: Cross-over of genetic material during gametogenesis](#)

[Figure 5: Linkage regions for schizophrenia](#)

[Figure 6: Association of a balanced autosomal translocation t \(1;11\) with major mental illness](#)

[Figure 7: A metaphase spread from a member of the family who carries the translocation](#)

[Figure 8: Disrupted genes at the 1:11 chromosomal breakpoint region](#)

[Figure 9: Models of the possible genetic relationships between schizophrenia and bipolar disorder](#)

References

Caspi A, Sugden K, Moffitt TE et al (2003) Influence of life stress on depression: moderation by a polymorphism in the 5-HTT gene. *Science*, **301**(5631): 386–9. [\[abstract\]](#)

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Craddock N & Owen MJ (2005) The beginning of the end for the Kraepelinian dichotomy. *British Journal of Psychiatry*, **186**: 364–6. [\[full text\]](#)

Craddock N, O'Donovan MC & Owen MJ (2006) Genes for schizophrenia and bipolar disorder? Implications for psychiatric nosology. *Schizophrenia Bulletin*, **32**(1): 9–16. [\[full text\]](#)

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Fonagy P (2004) Psychotherapy meets neuroscience: A more focused future for psychotherapy research. *Psychiatric Bulletin*, **28**: 357–359. [\[full text\]](#)

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Zammit S & Owen MJ (2006) Stressful life events, 5-HTT genotype and risk of depression. *British Journal of Psychiatry*, **188**: 199–201. [\[full text\]](#)

Further reading

McGuffin P, Owen MJ & Gottesman II (2004) *Psychiatric Genetics and Genomics*, Oxford University Press.

Nuffield Council on Bioethics: Genetics and Human Behaviour: the Ethical Context. [\[website\]](#)

Nuffield Council on Bioethics: Mental Disorders and Genetics: the Ethical Context. [\[website\]](#)

Useful web links

Department of Psychological Medicine, Cardiff University [\[website\]](#)

DNA from the Beginning: an animated primer on the basics of DNA, genes and heredity [\[website\]](#)

Human Genome Project [\[website\]](#)

International HapMap project [\[website\]](#)

International Society of Psychiatric Genetics [\[website\]](#)

Information on the discovery of DISC1 [\[website\]](#)