LONDON SOUTH BANK UNIVERSITY

unit guide

Psychopharmacology

PSY_3_PHR

Faculty of Arts and Human Sciences
Department of Psychology

Academic Year 2008-09
Semester 1

become what you want to be

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1.0 UNIT DETAILS

Unit Title:	Psychopharmacology
Unit Level:	3
Unit Reference Number:	PSY_3_PHR
Credit Value:	1
Student Study Hours:	150
Contact Hours:	48
Private Study Hours:	102
Pre-requisite Learning (If applicable):	None
Co-requisite Units (If applicable):	None
Course(s):	BSc Psychology BSc Psychology (Clinical Psychology) BSc Psychology (Child Development) Graduate Diploma in Psychology
Year and Semester	Year 3 Semester 1
Unit Coordinator:	Dr Nicky Rycroft
UC Contact Details (Tel, Email, Room)	rycroftn@lsbu.ac.uk Tel 020 7815 8047 Room E337 Office Hours Thursdays 2-4pm
Teaching Team & Contact Details (If applicable):	See UC contact details
Subject Area:	Psychology
Summary of Assessment Method:	1 x Unseen Examination (60%) 1 x 2,500 word report (40%)

2.0 SHORT DESCRIPTION

This unit focuses on the scientific study of how drugs affect brain function and to use such research to further our understanding of the biological mechanisms underlying behaviour. Topics covered in this unit include recreational and abusive use of drugs, cognitive enhancing drugs, the cannabinoid system and the therapeutic potential of cannabis, the biological basis of addiction and in-depth coverage of the drugs used to treat schizophrenia, anxiety and mood disorders. In these last three lectures, we will look at the history of drug development in clinical psychopharmacology and discuss future avenues of research to develop more acceptable medications for mental health problems.

3.0 AIMS OF THE UNIT

The unit aims to:

- Provide students with advanced knowledge of pharmacological processes
- Provide students with an up-to-date curriculum in Psychopharmacology that is delivered to a high quality and informed by research and scholarship
- Enable students to develop advanced intellectual and analytical skills that provide a sound basis for progression into work and/or further study
- Develop students' skills in adapting writing style to suit a particular audience

4.0 LEARNING OUTCOMES

4.1 Knowledge and Understanding

- In depth knowledge of the mechanisms by which drugs alter brain functioning
- Understand how pharmacological manipulations affect behaviour
- Ability to critically evaluate psychopharmacological research
- Able to identify future avenues of research for drug treatments for mental illness

4.2 Intellectual Skills

- Critical evaluation of published research
- Adapting writing style for a specific audience
- Understanding highly technical pharmacological literature and terms

4.3 Practical Skills

- Independent background research into a set, specified topic
- Incorporate information from a variety of sources

4.4 Transferable Skills

- Make critical judgements and evaluations about relevant research;
- Ability to write in an appropriate style for a non-academic audience
- Communicate effectively using written and spoken language.
- Self-management of own study time

5.0 ASSESSMENT OF THE UNIT

Assessment for this unit is one piece of coursework (40%) and one exam (60%).

Coursework

2.500 word report. Details will be given out in class and posted on Blackboard

Once completed, students must print out two copies of the report and hand them in to the Faculty Office (see below). Students may be required to provide electronic copy of written work submitted. In such instances, the individual student will be written to requesting electronic submission. Failure to provide electronic copy within TWO WEEKS of a written request will result in the work being deemed an incomplete submission, and no mark will be given. The work will then have to be referred for a capped mark. When ECs have already been accepted for a unit, this will not negate the proper investigation of any component of that unit for any allegation of academic misconduct, nor the subsequent imposition of any appropriate penalty for proven misconduct

Exam

A 2-hour, unseen examination. The exam paper is in two sections, section A (short answer questions or SAQs) and section B (essay questions). In section A you will be asked to answer 3 out of 5 SAQs. In section B you will be asked to answer one out of 3 essay questions. We will practice writing answers to SAQs in the revision session

Notes about submitting coursework

Coursework deadlines are published in Course/Field Guides and on Psychology notice boards. It is your responsibility to ensure that you are aware of these dates. All coursework must be submitted to the AHS Faculty Office in Borough Road (B266).

1. When handing in coursework, you must:

    - complete the coursework submission form and attach it to the front of your coursework;
    - take the coursework to the Faculty Office. Your submission form will be date stamped and a receipt issued. Please keep all receipts;
    - hand in two copies of your coursework (both attached to the same submission form)
    - **keep a copy of your coursework**

You must not hand coursework to your unit co-ordinator or other lecturer.

2. Unless you have obtained a formal extension from your year tutor, coursework submitted:

    - up to two weeks after the deadline date will receive a maximum mark of the pass mark (40%);
    - more than two weeks after the deadline will not be marked.

3. Extensions are only granted for valid reasons (see Course guide). The Year Tutor will normally require concrete evidence (e.g. medical certificate). If you want an extension of the deadline date, you must:

    - get a copy of the form for late submission from the Faculty Office;
    - fill in Part A of the form, giving reasons why you cannot meet the existing deadline date;
    - supply the Year Tutor with relevant documentary evidence;
    - submit the form to the Year Tutor who will fill in Part B – the decision whether to agree the request rests with the Year Tutor;
    - attach the form to the front of your coursework when you submit it (keep a copy for your records);
    - each extension form is only valid for one piece of coursework;
    - the maximum extension is two weeks.

Students should note that extensions are only granted in exceptional circumstances. In order for an illness or other personal problem to be accepted as grounds for an extension, the Year Tutor will need to convince herself that the problem occurred at such a time, and was of such a duration, that a student's ability to complete the assignment to the best of their ability was significantly reduced.

6.0 INTRODUCTION TO STUDYING THE UNIT

6.1 Overview of the Main Content

Week	Session	Seminar
1	Introduction to the unit and some basic biology	
2	Neurotransmitters and drug effects	Group work: mechanisms of drug action
3	Research in Psychopharmacology. Methods, ethics and the use of animals	Understanding journal articles in Psychopharmacology
4	Recreational and abusive use of drugs	
5	The cannabinoid system and therapeutic uses of cannabis	Video: 'Cannabis from the Chemist'
6	Psychostimulants	Small group tutorials (optional)
7	Biological basis of addiction	Small group tutorials (optional)
8	Self-managed study time (no formal tuition – Nicky will be available in her office during teaching time for one-to-one help with understanding course material)	
9	Schizophrenia and antipsychotics	
10	Depression and antidepressants	
11	Anxiety disorders and anxiolytics	
12	Revision session	SAQ practice

6.2 Overview of Types of Classes

Small group teaching allows more flexibility in the teaching style used. The sessions outlined above will not usually be formal lectures followed by seminars. Instead, the sessions will be more interactive. The optional small group tutorials will cover topics chosen by the students, more information on these will be given out in class. **Sessions start promptly at 9.30am on Thursday morning and will normally finish by 12.30.**

6.3 Importance of Student Self-Managed Learning Time

Self-managed learning is particularly important for this as the lectures provide the basic information required for the assessments, and further reading is crucial to obtain good marks in the coursework and the exam. Two core texts are recommended for this course, see below.

6.4 Employability

The seminars for this unit promote small group discussion and peer learning. These will help to develop skills such as listening to others, being aware of others needs and abilities and help to develop confidence in evaluating new and sometimes complex material.

7.0 THE PROGRAMME OF TEACHING, LEARNING AND ASSESSMENT

Week One: Introduction to the Unit, basic neuroanatomy and routes of administration

Aims:

To review the structure of the nervous system, some basic biology and to describe the different ways drugs can be administered.

Learning outcomes:

At the end of this lecture students will be able to:

- Describe the structure of a neuron
- Understand the pharmacokinetics of different routes of administration
- Understand that drug effects can vary according to how they are taken

Synopsis

This lecture will introduce students to some basic principles of psychopharmacology. We will cover some basic biology, the structure of a neuron and the nervous system and how drugs 'move' around the body. The pharmacokinetics (meaning how quickly drugs are absorbed, distributed and metabolised) of a drug and route of administration, can influence the effect a drug has.

Core Reading

Meyer, J.S. and Quenzer, L.F. (2005) Psychopharmacology: Drugs, the brain and behaviour. Sunderland: Sinauer Associates. **Chapter 1.**

Julien, R.M. (2008) A Primer of Drug Action 11th or 10th Ed. New York: Worth Publishers: **Chapter 1 p 3-37**.
NOTE: If you are using the 9th edition you don't need to know the finer details of drug metabolism given on pages 25-32. The section on drug tolerance and dependence (end of the chapter in both editions) is useful, more so for later lectures.

Kalat JW (2007) Biological Psychology 9th Edition. Wadsworth: California. **Chapter 2 Module 2.1 p 30-38**. Provides a brief & basic overview of the cells of the nervous system. This section on its own, does not cover everything you need to know from this session.

Week Two: Neurotransmission and Drug Effects

Aims:

- To describe the structure and function of different types of receptor cell found in the synapse
- To identify the different ways drugs can interfere with synaptic transmission
- To identify the function and describe the synthesis of major neurotransmitters in the brain

Learning outcomes:

By the end of the lecture students will be able to:

- Describe the many different ways drugs can affect synaptic transmission
- Describe how neurotransmitters are synthesised in the brain
- Describe the function of different neurotransmitter systems.

Synopsis:

This lecture will start by taking an in depth look at the synapse and the different types of receptor cells found there. There are many different ways in which a drug can alter 'normal' synaptic transmission, we will identify and describe each of them in turn. We will also look at the different types of neurotransmitter found in the brain, how our brains synthesis (make, or produce) neurotransmitters and the function of the major neurotransmitters (i.e. acetylcholine, serotonin, dopamine, noradrenaline, glutamate and GABA).

Reading

Core Reading

Meyer, J.S. and Quenzer, L.F. (2005) Psychopharmacology: Drugs, the brain and behaviour. Sunderland: Sinauer Associates. **Chapter 3, page 63-85.**

Julien, R.M. (2008) A Primer of Drug Action 11th Ed. New York:Worth Publishers: **Chapter 3 p.63-92**. OR Chapter 3 of the 10th Ed., p. 60-88

Kalat, J.W. (2007) Biological Psychology 9th Edition. Wadsworth: California. Chapter 2 Module 2.2 'The Nerve Impulse' p 39-48, Module 3.1 'The Concept of the Synapse' p 52-57, Module 3.2 'Chemical Events at the Synapse p 58-68. This book gives a clear & easy to read summary of drug effects and synaptic transmission, but doesn't really go into enough detail for this unit.

Optional Reading (If you are still struggling with the material from this lecture, two other books in the library provide clear and fairly easy to read accounts of synaptic transmission)

McKim, W.A. (1997) Drugs and Behaviour 3rd Edition. New Jersey:Prentice Hall. Chapter 4 ' Neurophysiology, neurotransmitters and the nervous system. P 48-68

- Note that as this book is quite old some of the information is out of date, in particular things like the number of different receptor subtypes (more are being

discovered all the time). However, it does provide a clear, fairly easy to read description of action potentials and fast vs. slow transmission, see pages 48-56

Stahl, S.M. (2000) Essential Psychopharmacology. Neuroscientific Basis and Practical Applications, 2nd Edition. Cambridge: Cambridge University Press. Chapter 2 'Receptors and enzymes as the targets of drug actions' p35-76

- This is a very clearly written text that gives a lot of detail on reuptake (transport carriers) and second messenger systems (slow neurotransmission). However, it does go into more detail than you actually need for this course so stick to Meyer & Quenzer (2005) if you want to start with something a bit more basic. Also, concentrate on reading pages 39-56 and pages 65-71. You DO NOT need to know details of gene regulation (cFos and cJun).

Week Three: Research in Psychopharmacology. Methods, ethics and the use of animals

Aims:

- To recap and consolidate material covered in the first two lectures
- To describe the methods used when doing behavioural pharmacology research in animals
- To look at ethical issues surrounding drug research in humans
- To read and understand psychopharmacology journal articles

Learning outcomes:

By the end of the lecture students will:

- Have confidence in their ability to read and understand psychopharmacological literature
- Understand the ethical issues surrounding human drug research
- Understand and evaluate the value of drug research in animals

Synopsis:

The first part of this session will be spent describing the methods used in both human and animal psychopharmacological research. We will also discuss the ethical issues involved in giving drugs to both humans and animals. The second part of this session will be spent discussing psychopharmacology journal articles.

Reading

Core Reading

Meyer, J.S. and Quenzer, L.F. (2005) Psychopharmacology: Drugs, the brain and behaviour. Sunderland: Sinauer Associates. **Chapter 4, page 89-109.**

Trigo, J.M., Renoir, T., Lanfumey, L., Hamon, M., Lesch, K.P., Robledo, P. and Maldonado, R. (2007) 3,4-Methylenedioxymethamphetamine self-administration is abolished in serotonin transporter knockout mice. Biological Psychiatry 62:669-679

This journal article will be given out in week 2. Please read it BEFORE you come to the session in week 3.

Optional Reading

McKim, W.A. (1997) Drugs and Behaviour 3rd Edition. New Jersey:Prentice Hall. Chapter 2 ' Research Design and the Behavioral Analysis of Drug Effects'. P 25-39

Week Four: Recreational and Abusive use of drugs

Aims:

- Describe the mechanism of action of commonly used recreational drugs (e.g. alcohol, cannabis, cocaine, ecstasy, hallucinogens)
- Describe the history of drug use patterns
- Describe the effects these drugs have on human performance
- Consider reasons why some drugs are illegal.

Learning outcomes

By the end of the lecture students will be able to

- Understand the mechanism of action of some recreational drugs
- Describe the effects of these drugs
- Understand the relationship between the pharmacological and behavioural effect of drugs
- Understand the relationship between harm caused by drug use and the legal status of a drug

Synopsis

This lecture will describe the mechanism of action of commonly used recreational drugs. We will focus on both legal and illegal drugs and take a brief look at how alcohol, cannabis, cocaine, ecstasy and hallucinogens affect brain function and behaviour. We will also look at the harm these drugs can cause, both in terms of brain damage and effects on the life of the user. The session will end with a discussion on why some drugs are controlled (i.e. illegal) while others are freely available in Western society. What is the relationship between harm done to the brain & behaviour and the legal status of a drug?

Core Reading

Nutt, D. (2006) A tale of two Es. Journal of Psychopharmacology 20:315-317

Meyer, J.S. and Quenzer, L.F. (2005) Psychopharmacology: Drugs, the brain and behaviour. Sunderland: Sinauer Associates. **Chapters 14 'Hallucinogenic Drugs' p348-358 and chapter 9 'Alcohol', page 215-227.**

Julien, R.M. (2008) A Primer of Drug Action 11th Ed. New York: Worth Publishers. **Chapter 21 p683-704.** Or Chapter 21 p645-665 of the 10th Edition.

Dumont G.J.H., Wezenberg E., Valkenberg, M.M.G.J., de Jong A.J., Buitelaar J.K., van Gerven J.M.A. and Verkes R.J. (2008) Acute neuropsychological effects of MDMA and ethanol (co-)administration in healthy volunteers. Psychopharmacology 197:465-474

Optional Reading

Stahl, S.M. (2000) Essential Psychopharmacology. Neuroscientific Basis and Practical Applications, 2nd Edition. Cambridge: Cambridge University Press. Chapter 13 'Psychopharmacology of Reward and Drugs of Abuse' p499-528.

- Provides a brief but clear & easy to read account of the pharmacological actions of recreational drugs.

Daumann, J., Hensen, G., Thimm, B., Rezk, M., Till B., and Gouzoulis-Mayfrank E. (2004) Self-reported psychopathological symptoms in recreational ecstasy (MDMA) users are mainly associated with regular cannabis use: further evidence from a combined cross-sectional/longitudinal investigation. Psychopharmacology 173:398-404

Vollenweider, F.X. and Geyer, M.A. (2001) A systems model of altered consciousness: Integrating natural and drug-induced psychoses. Brain Research Bulletin 56:495-507

Cole, J.C. and Sumnall, H.R. (2003) Altered states: the clinical effects of ecstasy. Pharmacology and Therapeutics 98:35-58

Week Five: The cannabinoid system and therapeutic applications of cannabis

Aims:

- Describe pharmacological and behavioural effects of cannabis
- Look at the history of cannabis use by humans
- Identify why cannabis may have therapeutic potential

Learning Outcomes:

At the end of the lecture students will be able to:

- Describe the mechanism of action of cannabis
- Describe the behavioural effects of cannabis
- Understand why cannabis may be useful as medicine for specific disorders
- Appreciate the ethical issues involved in researching the effects of cannabis on disorders

Synopsis:

This lecture will start by watching a documentary called 'Cannabis from the chemist'. This programme was made in 2001 when research into medicinal cannabis was just beginning in the UK. The rest of the lecture will look at the behavioural effects of cannabis, the history of cannabis use by humans and whether or not cannabis is an addictive drug. Endocannabinoids is a term used to describe 'cannabis-like' substances that occur naturally in the brain and this lecture will look at recent discoveries of both endocannbinoids and newly developed drugs that block cannabis receptors. Recently, research has been conducted on the efficacy of cannabis for treating a variety of disorders including Multiple Sclerosis, glaucoma, and symptoms of tremors, pain and nausea associated with different diagnoses.

Reading:

Core reading

Gonzalez, R. (2007) Acute and non-acute effects of cannabis on brain functioning and neuropsychological performance. Neuropsychology Review 17:347-361

Amar, A.B. (2006) Cannabinoids in medicine: A review of their therapeutic potential. Journal of Ethnopharmacology. 105:1-25

Meyer, J.S. and Quenzer, L.F. (2005) Psychopharmacology: Drugs, the brain and behaviour. Sunderland: Sinauer Associates. **Chapter 13 p327-344**

Julien, R.M. (2005) A Primer of Drug Action 11th Ed. New York: Worth Publishers: **Chapter 17 p572-606.** Or Chapter 18 of the 10th Ed. p556-558

Optional Reading

Baker, D., Pryce, G., Giovannoni, G. and Thompson, A.J. (2003) The therapeutic potential of cannabis. The Lancet Neurology 2:291-298

Budney, A.J., Hughes, J.R., Moore, B.A. and Vandrey, R. (2004) Review of the validity and significance of cannabis withdrawal syndrome. American Journal of Psychiatry 161:1967-1977

Iversen, L. (2003) Cannabis and the brain. Brain 126:1252-1270

Ranganathan, M. and D'Souza, D.C. (2006) The acute effects of cannabinoids on memory in humans: a review. Psychopharmacology 188:425-444

Week Six: Psychostimulants

Aims:

- Describe the mechanism of action of nicotine, caffeine and amphetamines
- Describe the effects these drugs have on human performance
- To look at the difference between recreational use of amphetamines and how similar drugs are used to treat Attention Deficit Hyperactivity Disorder

Learning outcomes:

By the end of the lecture students will:

- Be able to describe the effects psychostimulant drugs have on the brain
- Know why these drugs are commonly used by humans
- Explain the different mechanisms of action of amphetamine (used recreationally) and methylphenidate (used in clinical treatment of ADHD)

Synopsis:

This lecture will describe the mechanisms of action of three psychostimulant drugs, namely nicotine, caffeine and the amphetamines. Each drug has a different effect on neurotransmission and these will be related to the behavioural effects of the drugs.

Amphetamine-like drugs are used in the treatment of ADHD in children and we will take a critical look at how methylphenidate differs from amphetamines used recreationally and the efficacy of using stimulant drugs to treat ADHD.

Reading

Core Reading

For nicotine, caffeine and amphetamines:

Meyer, J.S. and Quenzer, L.F. (2005) Psychopharmacology: Drugs, the brain and behaviour. Sunderland: Sinauer Associates. **Chapters 11 and 12, page 275-323.**

Julien, R.M. (2005) A Primer of Drug Action 11th Ed. New York: Worth Publishers: **Chapter 13 p461-478 (the section on amphetamines), Chapter 14 p479-512 (for nicotine and caffeine)** Or Chapter 7 p210-221 and Chapter 8 p225-253 of the 10th Edition

Roehrs, T. and Roth, T. (2008) Caffeine: Sleep and daytime sleepiness. Sleep Medicine Reviews 12:153:162

Rycroft, N., Hutton, S.B., Clowry, O., Groomsbridge, C., Sierakowski, A. and Rusted, J.M. (2007). Non-cholinergic modulation of antisaccade performance. A modafinil-nicotine comparison. Psychopharmacology 195:245-253

Silber, B.Y., Croft, R.J., Papafotiou, K., Stough, C. (2007) The acute effects of d-amphetamine and methamphetamine on attention and psychomotor performance. Psychopharmacology 187:154-169

Stoops, W.W., Lile, J.A., Fillmore, M.T., Glaser, P.E.A. and Rush, C.R. (2005) Reinforcing effects of methylphenidate: influence of dose and behavioural demands following drug administration. Psychopharmacology 177:349-355

Optional Reading

Nutt, D.J., Fone, K., Asherson, P., Bramble, D., Hill, P., Matthews, K., Morris, K.A., Santosh, P., Sonuga-Barke, E., Taylor, E., Weiss, M. and Young, S. (2006) Evidence-based guidelines for management of attention-deficit/hyperactivity disorder in adolescents in transition to adult services and in adults: recommendations from the British Association for Psychopharmacology. Single copy only for personal use downloadable from: http://bap.org.uk/consensus/adult_ADHD.html

Volkow, N.D. and Swanson, J.M. (2003) Variables that affect the clinical use and abuse of methylphenidate in the treatment of ADHD. American Journal of Psychiatry 160:1909-1978

Lorist, M.M. and Tops, M. (2003) Caffeine, fatigue and cognition. Brain and Cognition 53:82-94

Rycroft, N., Hutton, S.B. and Rusted, J.M. (2006) The antisaccade task as an index of working memory performance: modulation by nicotine. Psychopharmacology 188:521-529

Week Seven: Biological Basis of Addiction

Aims:

- To establish what is meant by 'addiction'
- To identify changes in the brain that result from repeated drug use
- Focus on two 'addictive' drugs, alcohol and heroin
- To identify the role of dopamine in addictive behaviours

Learning Outcomes:

At the end of the lecture students will:

- Be aware of the difficulties involved in defining addiction
- Be able to describe changes in the brain that result from repeated drug use
- Have detailed knowledge of the mechanisms of action of alcohol and heroin
- Be able to describe both psychological (i.e. attentional bias) and biological (i.e. changes in dopaminergic function) aspects of addiction.

Synopsis:

This session will start by defining addiction. We will then take an in depth look at how alcohol and heroin affect the brain and the changes that occur in the brain as a consequence of repeated use of these drugs. We will explore the role of the dopamine system in substance use and how this links into the common phenomenon of attentional bias in drug users.

Reading:

Core Reading:

Meyer, J.S. and Quenzer, L.F. (2005) Psychopharmacology: Drugs, the brain and behaviour. Sunderland: Sinauer Associates. **Chapter 8 p185-215**

Julien, R.M. (2005) A Primer of Drug Action 11th Ed. New York:Worth Publishers. **Chapter 4 p95-131 for alcohol and chapter 16 p529-572 for opioids.** Or Chapter 4 p91-126 for alcohol, Chapter 15 p461-501 for opioids in the 10th Edition

Franken, I.H.A. (2003) Drug craving and addiction: integrating psychological and neuropsychopharmacological approaches. Progress in Neuro-Psychopharmacology and Biological Psychiatry 27:563-579

Hyman, S.E. (2005) Addiction: a disease of learning and memory. American Journal of Psychiatry 162:1414-1422

Optional Reading

Edenberg, H.J. and Kranzler, H.R. (2005) The contribution of genetics to addiction therapy approaches. Pharmacology and Therapeutics 108:86-93

Kalivas, P.W. and Volkow, N.D. (2005) The neural basis of addiction: a pathology of motivation and choice. American Journal of Psychiatry 162:1403-1413

Lingford-Hughes, A.R., Welch, S. and Nutt, D.J. (2004) Evidence based guidelines for the pharmacological management of substance misuse, addiction and comorbidity: recommendations from the British Association for Psychopharmacology. Journal of Psychopharmacology 18 (3):293-335. Single copy only for personal use downloadable from: http://www.bap.org.uk/consensus/addiction.html

Tomkins, D.M. and Sellers, E.M. (2001) Addiction and the brain: the role of neurotransmitters in the cause and treatment of drug dependence. Canadian Medical Association Journal 164 (6):817-821

Week Nine: Schizophrenia and Antipsychotics

Aims:

- Summarise the biological basis of schizophrenia
- Identify the different mechanisms of action of 'typical' and 'atypical' antipsychotic drugs
- Describe the pharmacological mechanisms underlying the side effects of these drugs
- Outline future avenues of research for more acceptable medications for schizophrenia
- Review animal models of schizophrenia

Learning Outcomes:

At the end of the lecture students will:

- Be able to describe the biological basis of schizophrenia
- Understand the different pharmacological actions of typical and atypical drugs
- Understand why these drugs have side effects and be able to outline pharmacological strategies for reducing these side effects
- Evaluate animal models of schizophrenia used in drug development

Synopsis:

This lecture will start by outlining the biological basis of schizophrenia. There are a wide variety of drugs available to reduce the symptoms of schizophrenia and this lecture will outline the pharmacological actions of the main anti-psychotic drugs. Anti-psychotics have many side effects, most of which can be explained by the pharmacological mechanisms of the drugs. This lecture will also discuss the use of animals in drug development research and evaluate animal models of schizophrenia.

Reading:

Core Reading

Tandon, R., Belmaker, R.H., Gattaz, W.F., Lopez-Ibor Jr., J.J., Okasha, A., Singh, B., Stein, D.J., Olie, J.P., Fleischhacker, W.W. and Moeller, H.J. (2008) World Psychiatric

Association Pharmacopsychiatry Section statement on comparative effectiveness of antipsychotics in the treatment of schizophrenia. Schizophrenia Research 100: 20-38. *This is an extremely comprehensive review paper. Don't worry about fully understanding sections 2, 3, 4, 5 and 6. These sections give details of how the meta-analyses were conducted. Just concentrate on reading section 1 and sections 7-13.*

Meyer, J.S. and Quenzer, L.F. (2004) Psychopharmacology: Drugs, the Brain and Behaviour. Massachusetts: Sinauer Associates. Chapter 14 'Schizophrenia' pages 442-467

Julien, R.M. (2005) A Primer of Drug Action 11th Ed. New York:Worth Publishers. **Chapter 9 p294-340** Or Chapter 11 p337-381in the 10th Edition

Powell, C.M. and Miyakawa, T. (2006) Schizophrenia-relevant behavioural testing in rodent models: A uniquely human disorder? Biological Psychiatry 59:1198-1207

Optional Reading

Tandon, R., Keshavan, M.S. and Nasrallah, H.A. (2008) Schizophrenia, "Just the Facts": What we know in 2008 part 1: Overview. Schizophrenia Research 100: 4-19

Kapur, S. and Seeman, P. (2001) Does fast dissociation from the dopamine D2 receptor explain the action of atypical antipsychotics?: A new hypothesis. American Journal of Psychiatry 158 (3): 360-369

Martin, J.L.R., Perez, V., Sacristan, M., Rodriguez-Artalejo, F., Martinez, C. and Alverez, E. (2006) Meta-analysis of drop-out rates in randomised clinical trials, comparing typical and atypical antipsychotics in the treatment of schizophrenia. European Psychiatry 21:11-20

Moghaddam, B. (2003) Bringing order to the glutamate chaos in schizophrenia. Neuron 40:881-884. Note, you do not need to understand the role of different genes in protein synthesis (page 882)

Week Ten: Depression and antidepressants

Learning Outcomes:

At the end of the lecture students will be able to:

- Describe the biological basis of depression
- Understand the mechanism of action of various antidepressant drugs
- Understand and evaluate the potential role brain-derived neurotrophic factor (BDNF) plays in depression

Synopsis:

This lecture will start by describing the biological basis of depression and the mechanism of action of the main classes of antidepressant drug (e.g. tricyclic drugs, MAOI's, SSRI's and SNRI's). In recent years a new theory about the biological basis of depression, relating the disorder to neurotrophic factors, has gained support through

pharmacological research. This new theory could represent a breakthrough in our understanding and treatment of depression.

Reading

Core Reading

Meyer, J.S. and Quenzer, L.F. (2005) Psychopharmacology: Drugs, the Brain and Behaviour. Massachusetts: Sinauer Associates. Chapter 16 'Affective Disorders' pages 385-410

Julien, R.M. (2005) A Primer of Drug Action 11th Ed. **Chapter 7 p197-251** Or chapter 9 p255-306 in the 10th Edition.

Castren, E., Voikar, V. and Rantamaki, T. (2007) Role of neurotrophic factors in depression. Current Opinion in Pharmacology. 7:18-21

Yoshimura R., Mitoma, M., Sugita, A., Hori, H., Okamoto, T., Umene W., Ueda N. and Nakamura J. (2007) Effects of paroxetine or milnacipran on serum brain-derived neurotrophic factor in depressed patients. Progress in Neuro-Psychopharmacology & Biological Psychiatry 31:1034-1037

Optional Reading

Anderson, I.M., Nutt, D.J. and Deaking, J.F.W. (2000) Evidence based guidelines for treating depressive disorders with antidepressants: a revision of the 1993 British Association for Psychopharmacology guidelines. Journal of Psychopharmacology 14:3-20 Single copy only for personal use downloadable from: http://www.bap.org.uk/consensus/

Duman, R.S. and Monteggia, L.M. (2006) A neurotrophic model for stress-related mood disorders. Biological Psychiatry 59:1116-1127

Kalueff, A.F., Wheaton, M. and Murphy, D.L. (2007) What's wrong with my mouse model? Advances and strategies in animal modelling of anxiety and depression. Behavioural Brain Research 179: 1-18

Vaswani, M., Kadar, L.F. and Ramesh, S. (2003) Role of selective serotonin reuptake inhibitors in psychiatric disorders: a comprehensive review. Progress in Neuro-psychopharmacology and Biological Psychiatry. 27:85-102

Week 11: Anxiety disorders and anxiolytics

Aims:

- Summarize the biological basis of anxiety
- Describe the mechanism of action of barbiturate and benzodiazepine drugs
- Compare the effects of these GABAergic drugs to anxiolytics that interact with the serotonergic system

- Review current research into the development of receptor subtype specific GABAergic drugs

Learning outcomes:

At the end the lecture students will be able to:

- Describe the biological mechanisms that underly anxiety
- Describe the pharmacological actions of anxiolytic drugs
- Discuss the implications of why drugs with different mechanisms of action can reduce anxiety

Synopsis:

This lecture will start by describing the biological mechanisms that underlie anxiety. The mechanism of action of barbiturate and benzodiazepine drugs will be compared with the mechanism of action of new, 'second generation' anxiolytics. At present, research into new anxiolytics is focused on development of drugs that are selective for one subtype of the GABA receptor and this lecture will also look at the use of animal models in development of these new GABAergic compounds.

Reading:

Core Reading

Meyer, J.S. and Quenzer, L.F. (2004) Psychopharmacology: Drugs, the Brain and Behaviour. Massachusetts: Sinauer Associates. Chapter 17 'Anxiety' pages 411-440

Julien, R.M. (2005) A Primer of Drug Action 11th Ed. New York:Worth Publishers. **Chapter 6 p169-194**. Or Chapter 6 p164-188 in the 10th Edition.

De Haas S.L., de Visser, S.J., van der Post J.P., de Smet, M., Schomaker R.C., Rijnbeek, B., Cohen A.F., Vega, J.M., Agrawal, N.G.B., Goel, T.V., Simpson, R.C., Pearson, L.K., Hesney, M., Murphy, M.G. and van Gerven, J.M.A. (2007) Pharmacodynamic and pharmacokinetic effects of TP023, a $GABA_A$ $\alpha_{2,3}$ subtype selective agonist, compared to lorazepam and placebo in healthy volunteers. Journal of Psychopharmacology 21:374-383

Basile, A.S., Lippa, A.S. and Skolnick, P. (2004) Anxioselective anxiolytics: can less be more? European Journal of Psychopharmacology 500:441-451

- This is a very technical paper. Don't worry if you don't understand the finer details of the structure of the $GABA_A$ receptor or section 3 'Molecular genetic evidence of anxioselectivity'. The most important part is section 5, comparing preclinical and clinical effects of new medications.

Optional Reading

Baldwin DS et al (2005) Evidence-based guidelines for the pharmacological treatment of anxiety disorders: recommendations from the British Association for Psychopharmacology. Journal of Psychopharmacology 10:567-596 Single copy only for personal use downloadable from: http://www.bap.org.uk/consensus/

Bruce, S.E., Vasile, R.G., Goisman, R.M., Salzman, C., Spencer, M., Machan, J.T. and Keller, M. (2003) Are benzodiazepines still the mediation of choice for patients with panic disorder with or without agoraphobia? American Journal of Psychiatry 160:1432-138

Kalueff, A.F., Wheaton, M. and Murphy, D.L. (2007) What's wrong with my mouse model? Advances and strategies in animal modelling of anxiety and depression. Behavioural Brain Research 179: 1-18

Whalen, P.J., Johnstone, T., Somerville L.H., Nitschke, J.B., Polis, S., Alexander, A.L., Davidson, R.J. and Kalin, N.H. (2008) A functional magnetic resonance imaging predictor of treatment response to venlafaxine in generalised anxiety disorder. Biological Psychiatry 63:858-863

Whiting, P.J. (2006) GABA-A receptors: a viable target for novel anxiolytics? Current Opinion in Pharmacology 6:24-29

Week Twelve Revision Lecture

Aims:

- To recap information from earlier in the course
- To check students' understanding of basic pharmacological mechanisms
- To practice writing answers to SAQs for the exam

Synopsis

This will be a student-led session, covering any topics from across the course that require revision or clarification. We will also spend time putting together 'model' answers to the SAQs from previous exam papers.

8.0 LEARNING RESOURCES

8.1 Core Materials

There are two recommended textbooks for this course. They are:

- Meyer JS,Quenzer LF (2005) Psychopharmacology: Drugs, the brain and behaviour. Sunderland: Sinauer Associates.

- Julien RM (2008) A Primer of Drug Action 11th Ed. New York:Worth Publishers:

Either book is recommended for purchase. Students with an interest in recreational drug use may prefer Meyer and Quenzer (2005), Julien (2008) is more relevant to anyone interested in clinical drug use. When chapters from both books are set as 'core reading', you don't need to read both as they cover very similar material. The library has a few copies of both the 9th and 10th editions of Julien. The 10th edition is certainly worth buying and is now cheaper than the 11th.

8.2 Optional Materials

The library does have a lot of copies of other psychopharmacology textbooks. Occasionally chapters from these books are recommended as optional reading.

Stahl SM (2000) Essential Psychopharmacology. Neuroscientific Basis and Practical Applications, 2nd Edition. Cambridge: Cambridge University Press.

- This is a clearly written book but often goes into more detail on biological processes than is required for this unit. It is recommended as extra reading for anyone who is confident in their knowledge of biological processes or who wants to know more about other drugs used to treat clinical disorders

Leonard BE (2003) Fundamentals of Psychopharmacology. Cambridge:Wiley. Chapter 15 p375-416

- As with Stahl (2000) this book also gives more detail on biological processes than needed for this unit. It uses a lot of technical terms and some students may find it a bit confusing.

Journals

Reading journal articles is highly recommended for this unit. You will need to use journal articles for your coursework and LSBU subscribes to many titles that are useful for this unit. Recommend journals available through the library are:

Psychopharmacology
American Journal of Psychiatry
European Psychiatry
Drug and Alcohol Dependence
Pharmacology and Therapeutics
Current Opinion in Pharmacology
Progress in Neuro-psychopharmacology and Biological Psychiatry
Behavioural Brain Research
Journal of Psychopharmacology

The full text of all of the papers indicated as core or optional reading are available through LSBU. Please ask for help during class time if you are unable to access them.

Websites

For anything to do with the structure of the nervous system:

'Neuroscience for Kids' – just type this into Google and it will take you straight there.

For consensus statements (i.e. recommendations for treating disorders) see the British Association for Psychopharmacology website.

I would recommend using Web of Science (instead of, or as well as PsychInfo) to find journal articles. You can access Web of Science through the library. From the library homepage click on 'e-resources' to open an A-Z list. Web of Science is listed under 'I' as its full title is 'ISI Web of Knowledge'.

DO NOT use wikipedia for this unit, even if you reference it correctly. Wikipedia can be useful to help improve your understanding but it should not be referenced in your work as anyone can change the text in Wikipedia at any time. Please stick to textbooks and journal articles.