Chapter 4
Biological explanations and treatment

LEARNING OBJECTIVES

After reading and studying this chapter and participating in lecture and discussion, students should be able to:

1. Understand basic neuroanatomy as it relates to mental health disorders.
2. Describe the neurotransmitter systems and the key neurotransmitters that influence mood and behaviour.
3. Understand key drug treatments that are used to alter neurotransmitter levels and, hence, mood and behaviour.
4. Critically consider three physical interventions used to treat mental health problems and the controversies associated with each: electroconvulsive therapy (ECT), transcranial magnetic stimulation (TMS), and psychosurgery.

CHAPTER OUTLINE

4.1 The behavioural anatomy of the brain

- Hindbrain, midbrain and forebrain
- Cerebrum
  - Frontal lobes
  - Temporal lobes
  - Occipital and parietal lobes

The synapse
The neurotransmitters
- Serotonin
- Norepinephrine
- Dopamine
- GABA

4.2 The autonomic nervous system
- Autonomic processes
- Endocrine responses

4.3 Drug therapies
- Treating depression
  - Drugs that increase norepinephrine: MAOIs
  - Drugs that increase serotonin: tricyclics, SSRIs and SNRIs
    - The problem with Prozac
- Treating anxiety
  - Drugs that enhance the action of GABA: the benzodiazepines
  - Drugs that increase serotonin (and norepinephrine)
- Treating schizophrenia
  - Drugs that reduce dopamine levels
  - Drugs that reduce NMDA levels
- Adherence to drug treatments

4.4 Electroconvulsive therapy (ECT)
- The ECT controversy
  - Effect on memory
- Alternatives to ECT

4.4 Psychosurgery
- Post-operative effects
- Availability of psychosurgery

QUESTIONS FOR DISCUSSION

These may be useful to include at the beginning of the teaching session to get a sense of students' pre-existing knowledge of the lecture content; to spark some interest in them; and as a link to refer to as the lecture progresses.

Which of the following are NOT in the listed side-effects associated with the antidepressant group of drugs, SSRIs (as noted in NHS advice)?

i. feeling agitated, shaky, or anxious
ii. feeling or being sick
iii. indigestion
iv. diarrhoea or constipation

v. loss of appetite and weight loss
vi. dizziness
vii. blurred vision
viii. dry mouth
ix. excessive sweating
x. sleeping problems (insomnia) or drowsiness
xi. headaches
xii. low sex drive
xiii. difficulty achieving orgasm during sex or masturbation
xiv. in men, difficulty obtaining or maintaining an erection (erectile dysfunction)
xv. all of the above ARE side-effects

Which are the most effective antidepressants?

i. Tricyclics
ii. SSRIs
iii. SNRIs
iv. They are all equally effective

Note there is no simple answer here actually; the effectiveness of the drugs is relatively similar. Even SNRIs, which should be optimal, are marginally if at all better than SSRIs. The key may be the differences in side-effects, where SSRIs are the winner.

Which of the following drug types are used in the treatment of schizophrenia?

i. Anticholinergics
ii. Antipsychotics
iii. Anticoagulants
iv. Antidipsotropics
v. All of the above

LECTURE SUGGESTIONS

This chapter is a basic primer for later reviews of treatment for specific conditions. It is really intended to provide a basic preparation for them. As such, it is more descriptive than critical of theory and empirical findings. There is consequently no real theme,

message, or specific points of debate within it that have not been considered before, except perhaps the challenge of some of the more physical treatments such as ECT and psychosurgery.

CLASSROOM ACTIVITIES

Potential discussion topics:

- **Opposing small groups** argue the case for and against ECT as a treatment for depression. The pros may want to consider its effectiveness, its acceptability as a second-line treatment, the nature of safeguards to ensure its safe use, and its relatively quick effects. The antis may consider the benefits of alternative physical treatments such as medication, and the costs of ECT in terms of its negative cognitive impact. Try to come to a resolution: would you recommend ECT for the treatment of a family member with long-term depression?

- **Small group discussion**: We know that medication adherence is relatively poor in the treatment of most medical conditions, and the treatment of mental health problems is no different. So, why is this the case? What general (e.g. forgetting, an anti-medication attitude) or specific (e.g. unacceptable side-effects) factors may contribute to the problem, and how may these be resolved? As an addendum, two other issues may be considered:

  Increasingly, medical treatments are seen as a process of concordance rather than adherence. Concordance is a process through which the treating physician and the individual being treated come to an agreement about their treatment plan, including medication and so on. Adherence is a process through which the treating physician prescribes medication based on their medical expertise and the patient is expected to conform to this. So, what are the pros and cons of this approach, and can non-adherence be reframed as a failure to achieve concordance and a legitimate expression of patient choice rather than a ‘failure’ to adhere?